

## User's Guide

# ALUPROP

03FAM87



**IMPORTANT:**

Any safety provisions as directed by the appropriate governing agencies must be observed when using our products.

The pictures in this document are snapshots of situations at different stages of assembly, and therefore are not complete images. For the purpose of safety, they should not be deemed as definitive.

All of the indications regarding safety and operations contained in this documents, and the data on stress and loads should be respected. ULMA's Technical Department must be consulted anytime that field changes alter our equipment installation drawings.

The loads featured in this document, related to the basic elements of the product, are approximate.

Our equipment is designed to work with accessories and items produced by our company only. Combining such equipment with other brands is not only dangerous without having made all corresponding verifications, it also voids any or all our warranties.

The company reserves the right to introduce any modifications deemed necessary for the technical development of the product.



**Safety note**



**Control note**



**Warning note**



**Information note**

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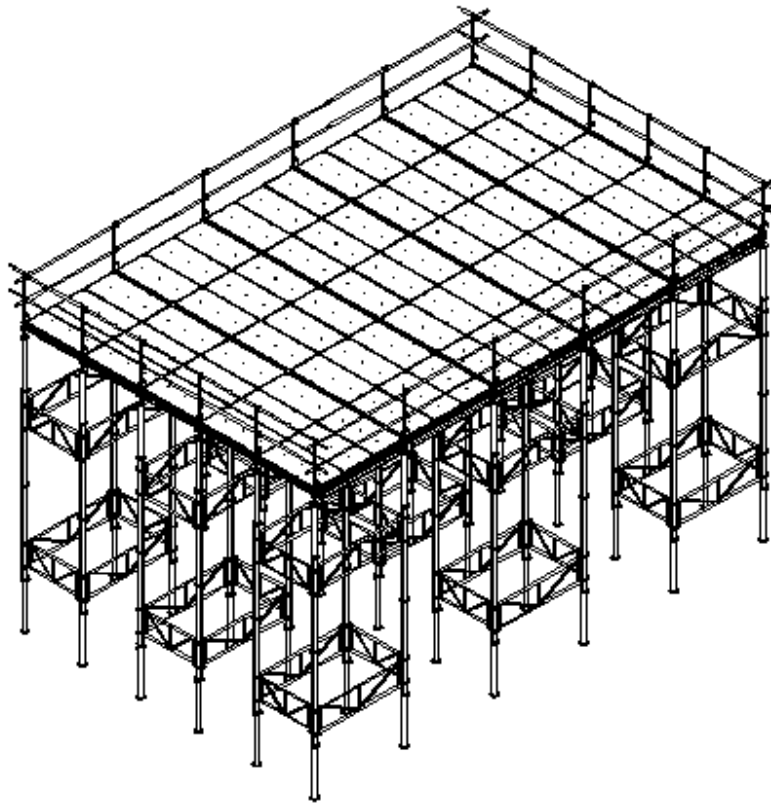
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## 1. PRODUCT DESCRIPTION

The ALUPROP System is composed of a range of aluminium props and bracing frames and is designed as a SHORING SYSTEM for ULMA horizontal formworks. It has to be used always respecting the loading limits and the assembly recommendations. The maximum height admissible of the ALUPROP towers is 12 m.

The ALUPROP may be used as single props or as shoring towers braced between them with bracing frames.



The bracing frame connects two props fixing the four hooks of the frame to the outer tube of the prop.

If the application surpasses the prop's maximum height or load, it will be necessary to build towers, always following the load limits and the assembly instructions.

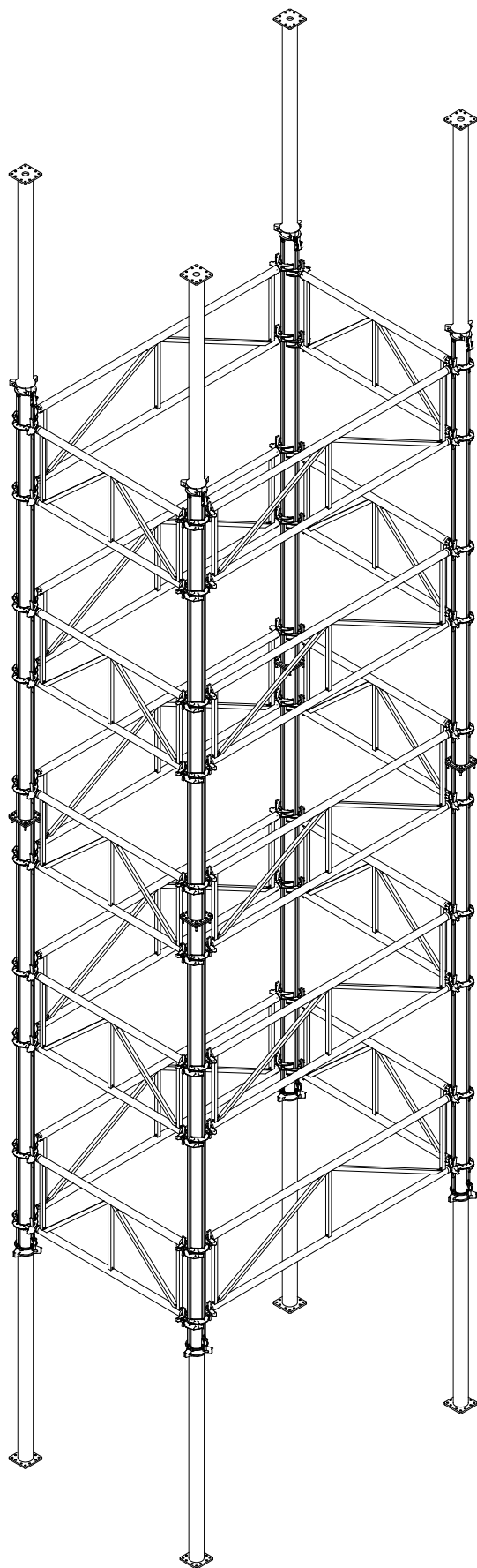
The ALUPROP System has also several components that optimize and facilitate the assembly of props and towers and the complete system is certified by the German Institute SIGMA KARLSRUHE GMBH.

SIGMA KARLSRUHE











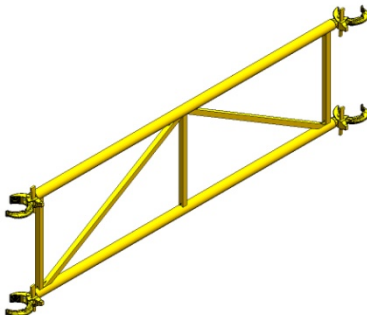

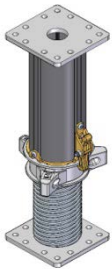
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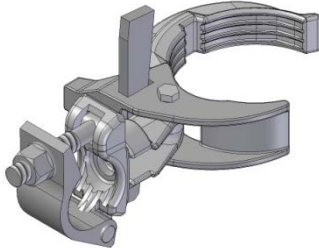


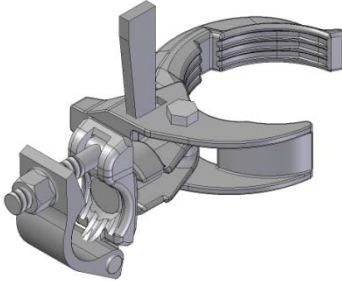
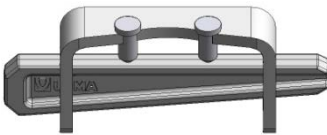






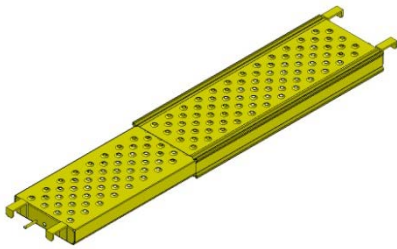
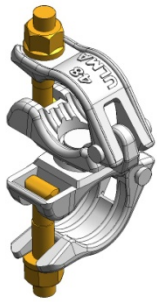

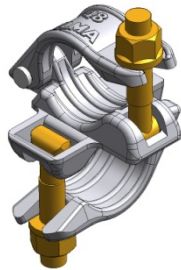
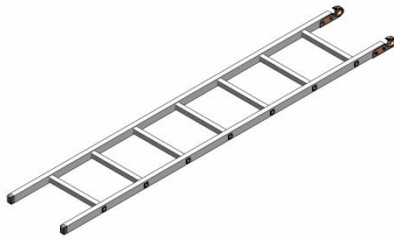
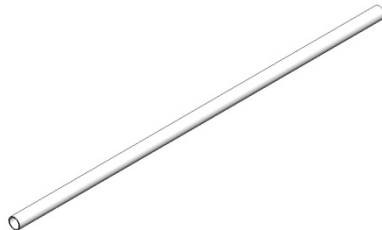
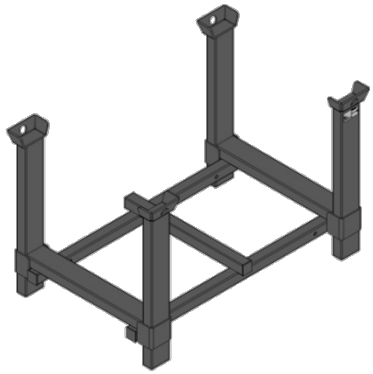


## 2. COMPONENTS AND ACCESSORIES


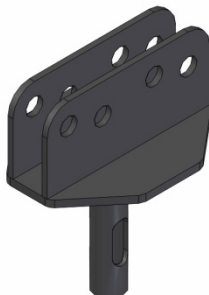
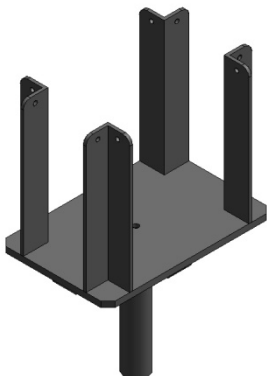
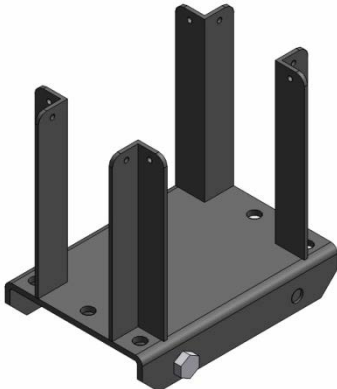
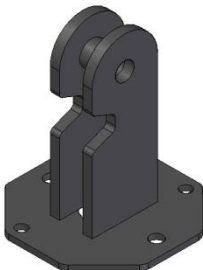
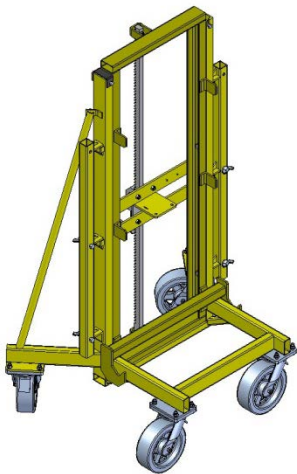
### 2.1. GRAPHIC DESCRIPTION

Item No.	Weight kg.	Name	Item No.	Weight kg.	Name
		PROPS			BRACING FRAMES
2220010	17	ALUPROP 1.65-2.8	2220120	18.7	BRACING FRAME 2.32 m
2220020	21	ALUPROP 2.2-3.7			
2220030	24.8	ALUPROP 3.3-4.8			Galvanized steel SIGMA KARLSRUHE 
2220040	29.2	ALUPROP 4.5-6			
			2220125	14.2	BRACING FRAME 1.5 m
		Aluminium SIGMA KARLSRUHE 			
2220055	4.5	SUPLEMENT 1m			Galvanized steel SIGMA KARLSRUHE 
			2220145	18	BRACING FRAME 2.075
		Aluminium SIGMA KARLSRUHE 			
2220200	5.8	ALUPROP SPINDLE			Yellow painted steel SIGMA KARLSRUHE 
					
		Aluminium			

Item No.	Weight kg.	Name	Item No.	Weight kg.	Name
2220130	14.7	BRACING FRAME 1.57  Black painted steel SIGMA KARLSRUHE 	2220075	1.8	FIX BRACING HOOK  Galvanized steel
2220140	9.5	BRACING FRAME 0.75 m  Galvanized steel SIGMA KARLSRUHE 	2220100	2.2	SWIVEL BRACING HOOK  Bichromate treated
2220080	1.1	ALUPROP CLAMP  Galvanized steel SIGMA KARLSRUHE 	9521592 0241000 9000001	0.044 0.01 0.001	SCREW NUT WASHER  Zinc coated steel
2220090	11.2	UNIVERSAL TRIPOD  Galvanized steel	2127716	12.4	PLATFORM 1.5  Galvanized steel

Item No.	Weight kg.	Name	Item No.	Weight kg.	Name
2067035	12.5	EXTENDING PLATFORM 1-1.5	2125147	1.3	SWIVEL COUPLER 48/48
2067048	17.3	EXTENDING PLATFORM 1.5-2.35			
2067043	20.5	EXTENDING PLATFORM 2-2.7			
					
		Yellow painted steel			Galvanized steel
2128152	17.5	TRAPDOOR PLATFORM 1.5	2125148	1.2	RIGHT ANGLE COUPLER 48/48
					
		Aluminium and wood			Galvanized steel
2125649	13.1	TUBE 48/ 4100 WITH SOCKET	2135352	2.2	ALUMINIUM LADDER FOR TRAPDOOR PLATFORM
2125290	5.5	TUBE 48/ 1.6			
2125291	7	TUBE 48/ 2.1			
2125647	6.7	TUBE 48/ 2.6			
2125249	11.4	TUBE 48/ 3.1			Aluminium
2125648	12.1	TUBE 48/ 3.6			
2125250	14.6	TUBE 48/ 4.1			
2125251	18	TUBE 48/ 5	1800000	53.0	PALLET E1
					
		Galvanized steel			Black painted steel



Item No.	Weight kg.	Name	Item No.	Weight kg.	Name
2211000	0.87	HEADS SIMPLE HEAD VR  Black painted steel	2211300	3.1	SIMPLE HEAD WALER  Black painted steel
2211003	4.7	DOUBLE HEAD VR  Black painted steel	2211095	4.5	ALUPROP HEAD  Black painted steel
1960370	2.53	HEAD JOINT PROP WALER  Black painted steel	2211625	250	LATERAL TROLLEY VR  Yellow painted steel Permissible load : 10 KN CE

## 2.2. ELEMENTS DESCRIPTION

### 2.2.1. ALUPROP Prop

The ALUPROP prop supports very high load capacities, is manufactured in aluminium and is designed to shore horizontal formwork and to meet other shoring requirements, taking into consideration the load limits and the assembly recommendations.

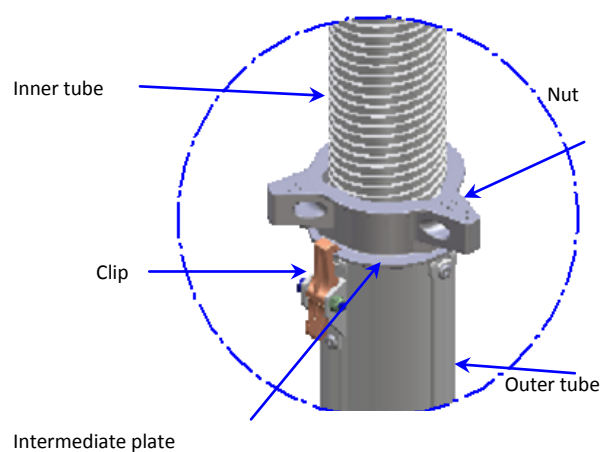
The main characteristics of the aluminium ALUPROP prop are:

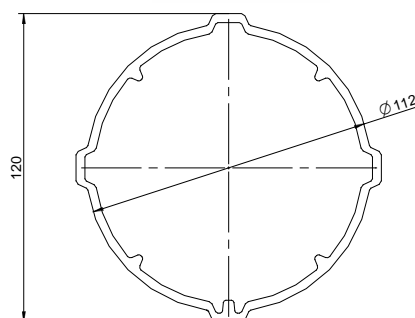
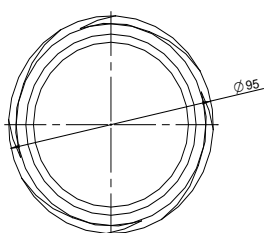
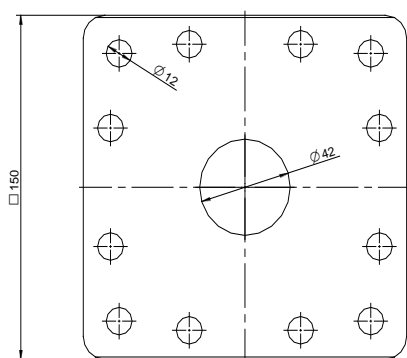
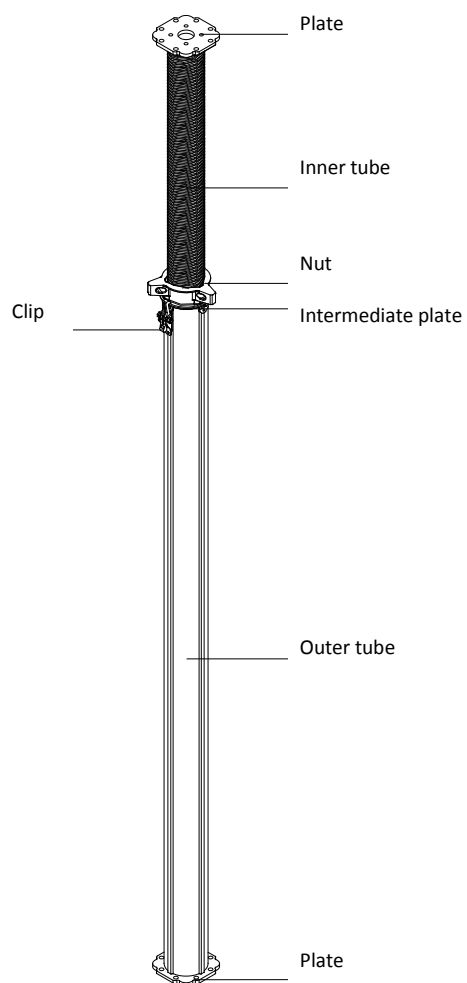
- Light weight because it is manufactured in aluminium.
- It is simple for the operators to handle the props and the shoring system.
- Inner tube is threaded over its whole length with multiple-start thread.
- Inner tube is protected against unintentional disengagement to assure it cannot slide out of the outer tube.
- Once the desired prop extension is set, the inner tube and outer tube cannot move axially.
- Self-cleaning thread: the thread design facilitates cleaning off the concrete adhered to the thread.
- Because of the appropriately designed outer tube profile, it is simple to brace the outer tube of these props using the bracing frames or bracing clamps and tubes.
- It is possible to build towers with the BRACING FRAMES.
- ALUPROP props are designed to be used one on top of another as long as the proper components are used for joining and bracing the props.
- Wing nut with holes to facilitate dismantling the prop.
- The prop has a clip or hook, which avoids any accidental movement of the inner tube.

PROP NAME	Minimum Length (mm)	Maximum Length (mm)
ALUPROP 1.65-2.8	1650	2800
ALUPROP 2.2-3.7	2200	3700
ALUPROP 3.3-4.8	3300	4800
ALUPROP 4.5-6.0	4500	6000

The ALUPROP prop is comprised of:

- Outer tuber.
- Inner tube.
- Nut.
- Top and bottom plates.
- Intermediate plate.
- Clip.





### 2.2.2. BRACING FRAME

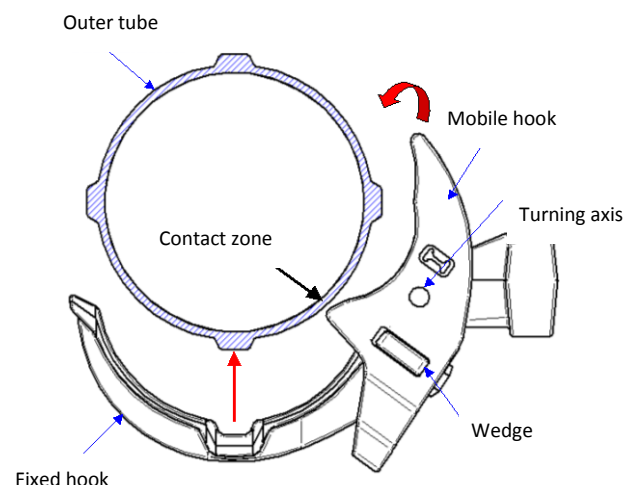
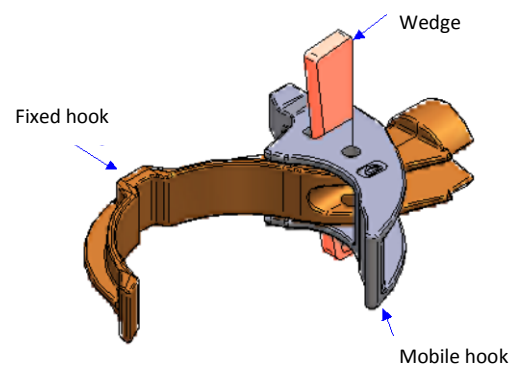
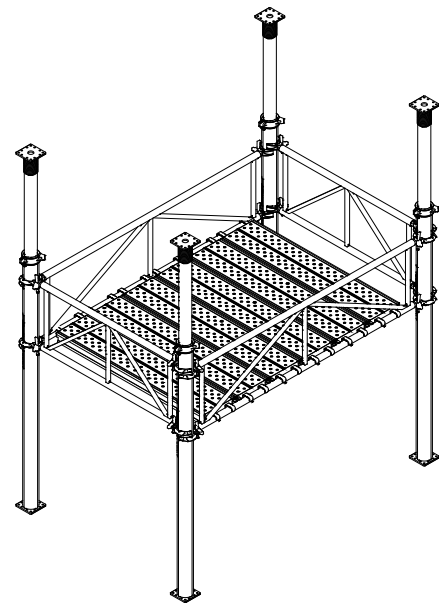
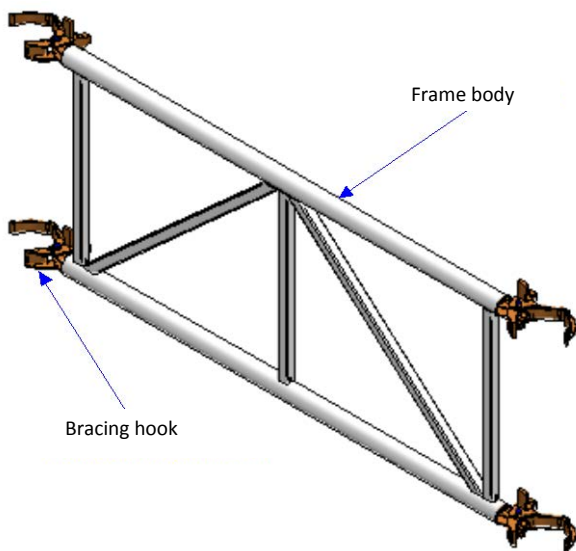
The Bracing Frame is a tubular steel frame which includes four bracing hooks that brace the outer tube with a wedge. There are five different bracing frame sizes: 2.32 m, 2.075 m, 1.57 m, 1.5 m and 0.75 m. The most common ones are the 2.32m and 1.5m.

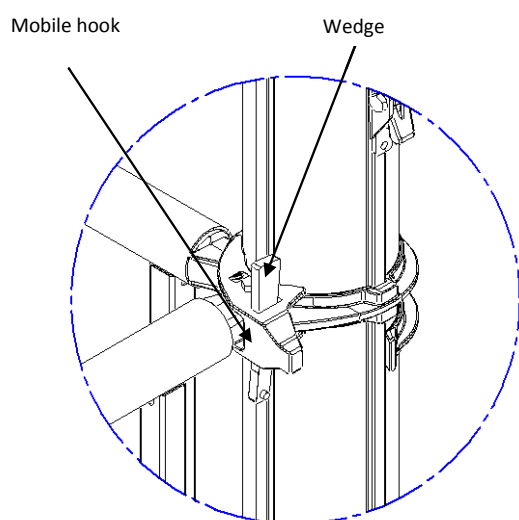
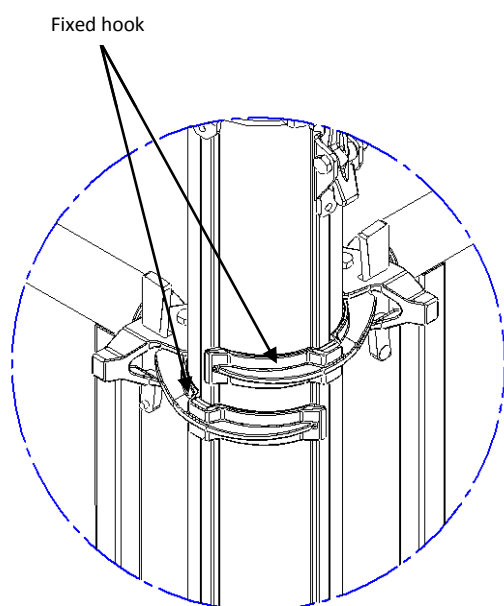
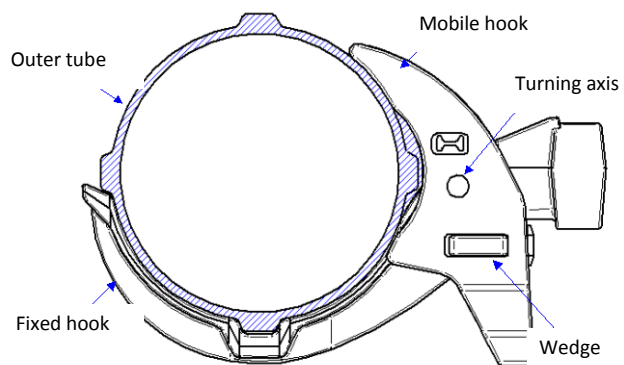
Bracing frames can be used to join props so as to form grids, which can then be assembled vertically to form shoring towers.

The tubular frame body is made of steel and is formed by two  $\varnothing 48\text{mm}$  diameter horizontal tubes. These horizontal tubes (the axis are separated 530 mm) allow bracing towers with tubes and 48mm couplers, and they make it possible to use 1.5m BRIO Scaffolding platforms as work platforms.

The bracing hook is comprised of three parts, the fixed hook, the mobile hook and the wedge.

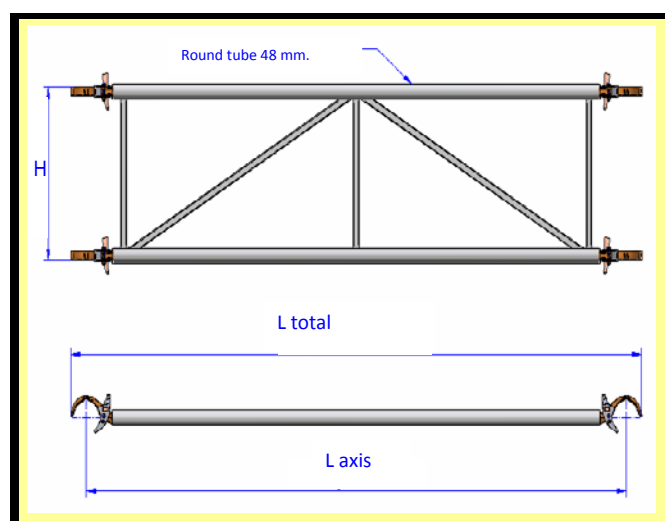
The shape of the fixed hook is the same as that of the outer tube while the mobile hook braces the outer tube from the other side, being pushed by the wedge.





TECHNICAL SHEET

	Code	Weight (Kg.)	Laxis (mm)	Ltotal (mm)	H (mm)
BRACING FRAME 2.32 m	2220120	17.7	2320	2451	558
BRACING FRAME 2.075 m	2220145	18.1	2075	2212	558
BRACING FRAME 1.5 m	2220125	13.6	1500	1631	558
BRACING FRAME 1.57 m	2220130	13.8	1570	1701	558
BRACING FRAME 0.75 m	2220140	8.7	750	881	558

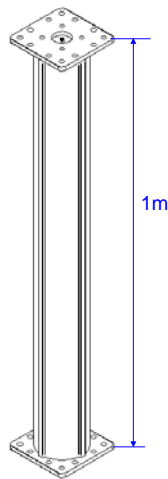


### 2.2.3. SUPPLEMENT 1 m

The Supplement 1 m has been designed to increase the range of extension of each ALUPROP prop.

The Supplement 1 m is fixed to the outer tube of ALUPROP prop with four screws, nuts and corresponding washers.

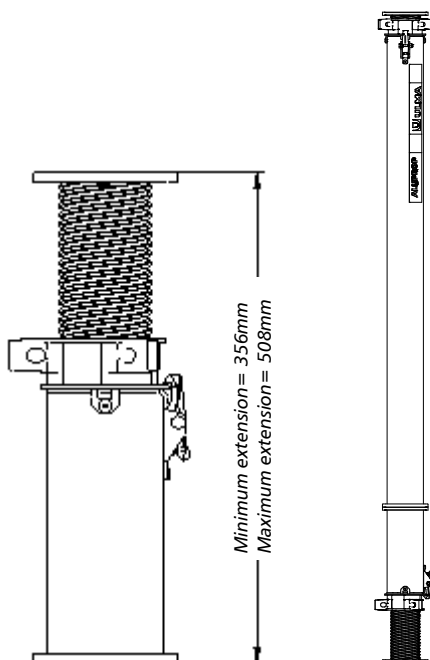
The Supplement 1 m can also be fixed to the outer tube of ALUPROP prop with two ALUPROP Clamps.



#### 2.2.4. ALUPROP SPINDLE

The Aluprop Spindle is designed for double height adjustment ALUPROP configurations. In addition, this configuration facilitates the stripping system by placing the spindle in the bottom of the assembly.

For its use, the outer tube of the spindle is fixed to the outer tube of the ALUPROP prop with four screws, nuts and corresponding washers. The spindle can also be fixed to the outer tube of ALUPROP prop with two ALUPROP Clamps.

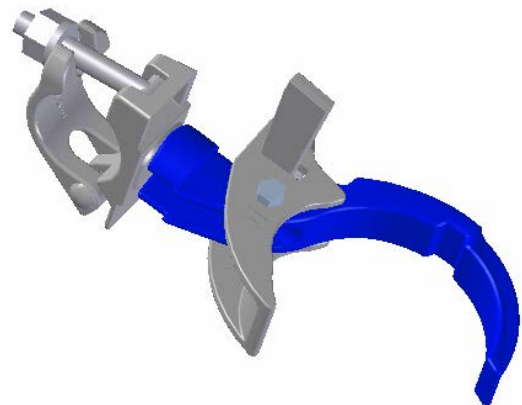


#### 2.2.5. FIX BRACING HOOK

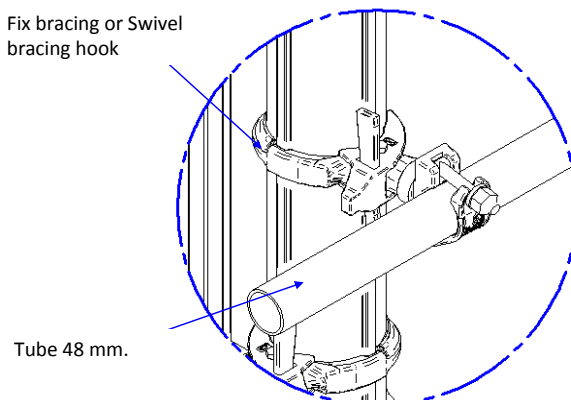
This element is used to connect the outer tube of the ALUPROP to a  $\varnothing 48$  mm tube, using the hook and the  $\varnothing 48$  coupler.

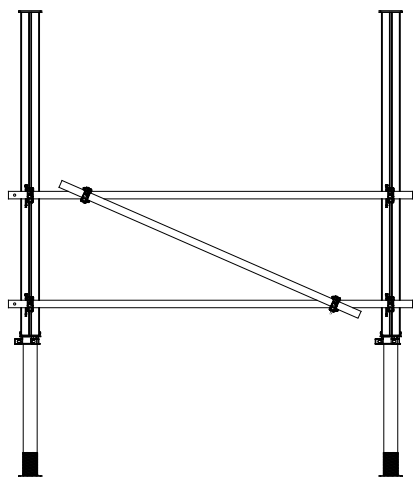
This element joins two props from different towers increasing their resistance and stability. It is used when it is not possible to brace the props with the standard bracing frames (2.32/ 2.075/ 1.57 / 1.5 / 0.75 ). The prop of one tower is connected to the prop of another tower using the fixed hook, which is connected to the outer tube of the prop and the coupler that ties to a  $\varnothing 48$  mm tube. For example, in infillings and in other types of formwork (RAPID, RECUB, Tables VR).

It is used also to set the safety handrails in these towers.



Fix bracing or Swivel bracing hook

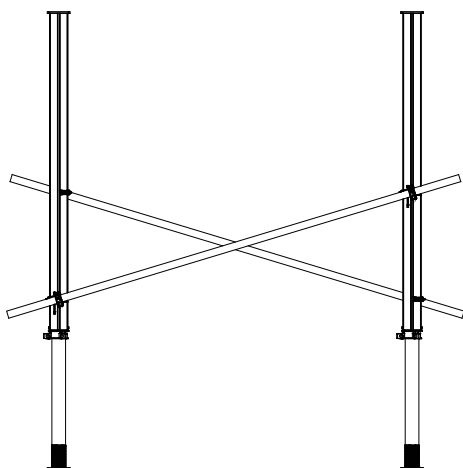
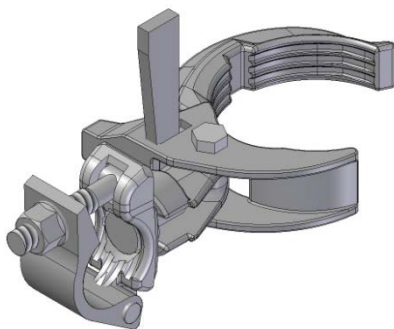




### 2.2.6. SWIVEL BRACING HOOK

The swivel bracing hook is used to connect the outer tube of the ALUPROP to a  $\varnothing 48$  mm tube, forming any angle between the hook and the swivel coupler of  $\varnothing 48$  mm using the hook and the  $\varnothing 48$  swivel coupler.

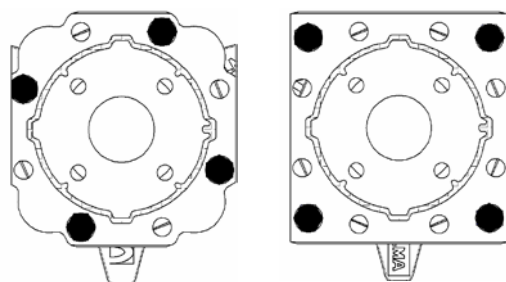
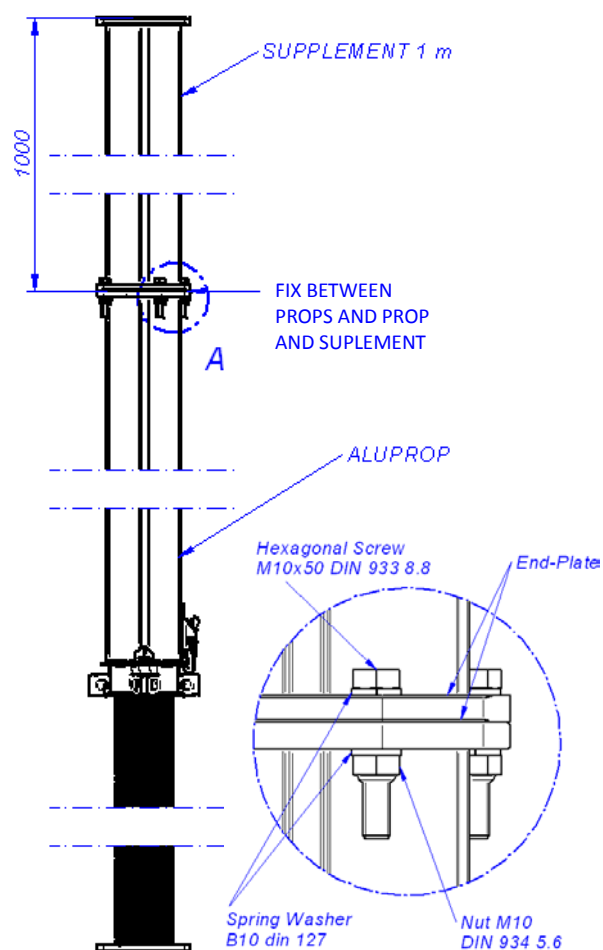
It is used to brace (vertical or horizontal) the ALUPROP towers and to set the safety handrails in these towers.



### 2.2.7. SCREWS AND NUTS

These are the tying elements between the ALUPROP props and also between the ALUPROP props and the Supplements 1 m or ALUPROP Spindle:

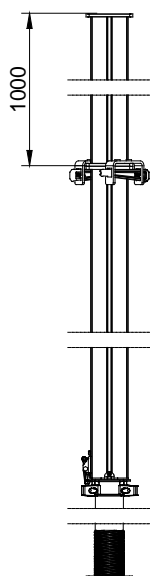
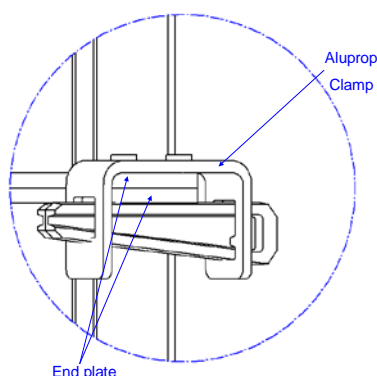
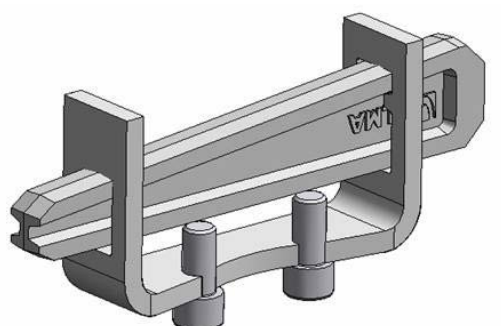
- Hexagonal Screw M10X50 DIN 933 8.8.
- Nut M10 DIN 934 5.6.
- Spring Washer B10 DIN 127.



### 2.2.8. ALUPROP CLAMP

The ALUPROP Clamp is designed to add the Supplement 1 m or the ALUPROP Spindle to the outer tube of ALUPROP prop or for fixing the outer tubes of ALUPROP props. It will be fixed with two ALUPROP Clamps in each joint.

The ALUPROP Clamp has two screws to guide in the ALUPROP endplate and a wedge to fix the props in a stiff way.



### 2.2.9. UNIVERSAL TRIPOD

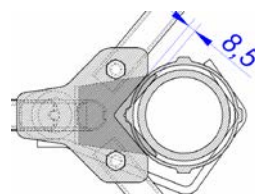
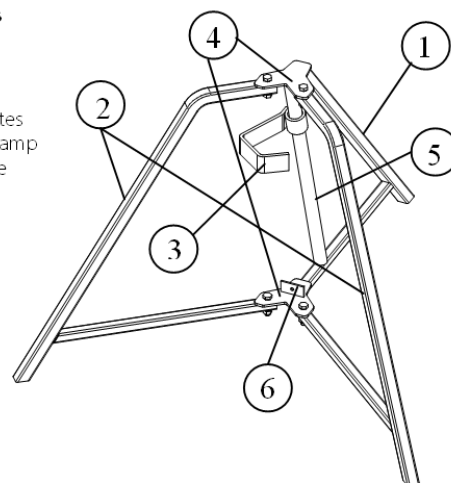
The Universal Tripod is designed to facilitate the correct assembly of all ULMA props and give stability to the different assemblies. This tripod can be used with all props that are made with 40-112 mm tubes.

The Universal Tripod has two mobile feet which permit the proper positioning of the tripod, one fixed foot that includes plates to support the prop and a clamp that slides on an inclined tube and permits bracing the ULMA props.

The lower plate has a nailing plate for cases where the tripod is bracing the inner tube (smaller diameter) and the outer tube and so a piece of wood is needed to absorb the difference of both diameters.

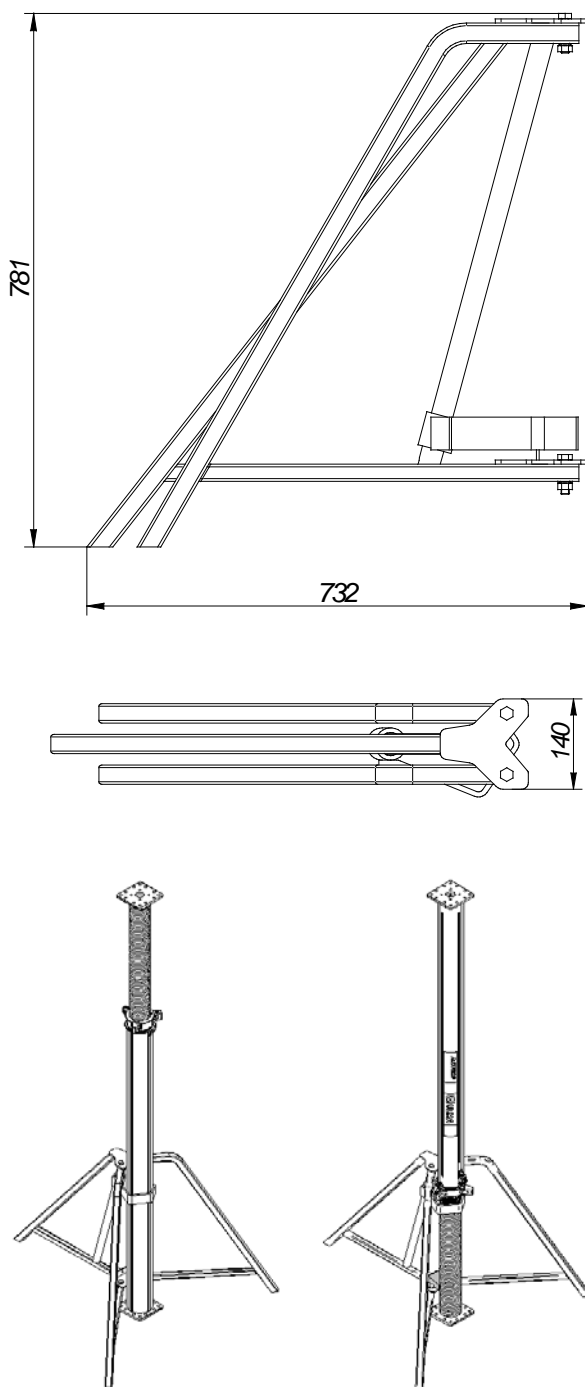
#### Components

- 1 – Fix foot
- 2 – Mobile feet
- 3 – Clamp
- 4 – Support plates
- 5 – Guide for clamp
- 6 – Nailing plate





Tripod dimensions with all feet together:



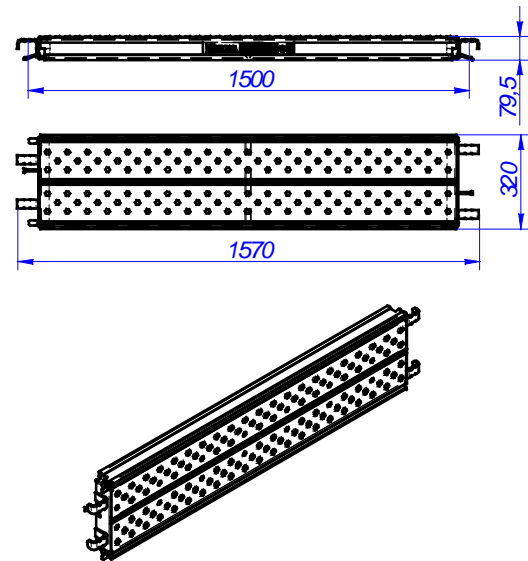
### 2.2.10. PLATFORM 1.5

This steel element is used to make the working platform where the workers stand or where the material is stacked. It supports punctual loads and distributed loads, and it transfers these loads to the horizontal

tubes of the bracing frames through the hooks only in the length of 1.5 m (Width of the tower).

It is made of non-slip, punched metal sheet, and is equipped with a safety pin to assure that it cannot be accidentally lifted. Part dimensions are:

width=320 mm and length=1.5 m.



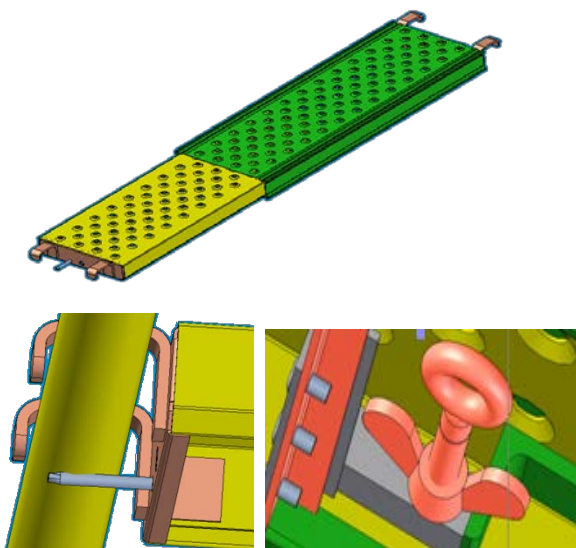
The Platform 1.5 is Class 6 (600 daN/m<sup>2</sup>) according to EN 12811-1.

### 2.2.11. EXTENDING PLATFORM

The Extending Platform is designed to make the working platform, and working loads of more than 2 kN must not be exerted on it. It is made of steel.

There are three ranges that can be regulated as follow:

- Extending platform 1-1.5 m.
- Extending platform 1.5-2.35 m.
- Extending platform 2-2.7 m.



Name	Minimum range	Maximum range	Weight	Maximum load
Extending platform 1-1,5m. (2067035)	1m.	1,5m.	12,5 kg	200kg.
Extending platform 1,5-2,35m. (2067048)	1,5m.	2,35	17,3 kg	
Extending platform 2-2,5m. (2067043)	2m.	2,5m.	20,5 kg	
300 mm. Width for all platforms				

Using 1.5-2.32m platform almost all types of towers can be solved.

### 2.2.12. TRAPDOOR PLATFORM 1.5

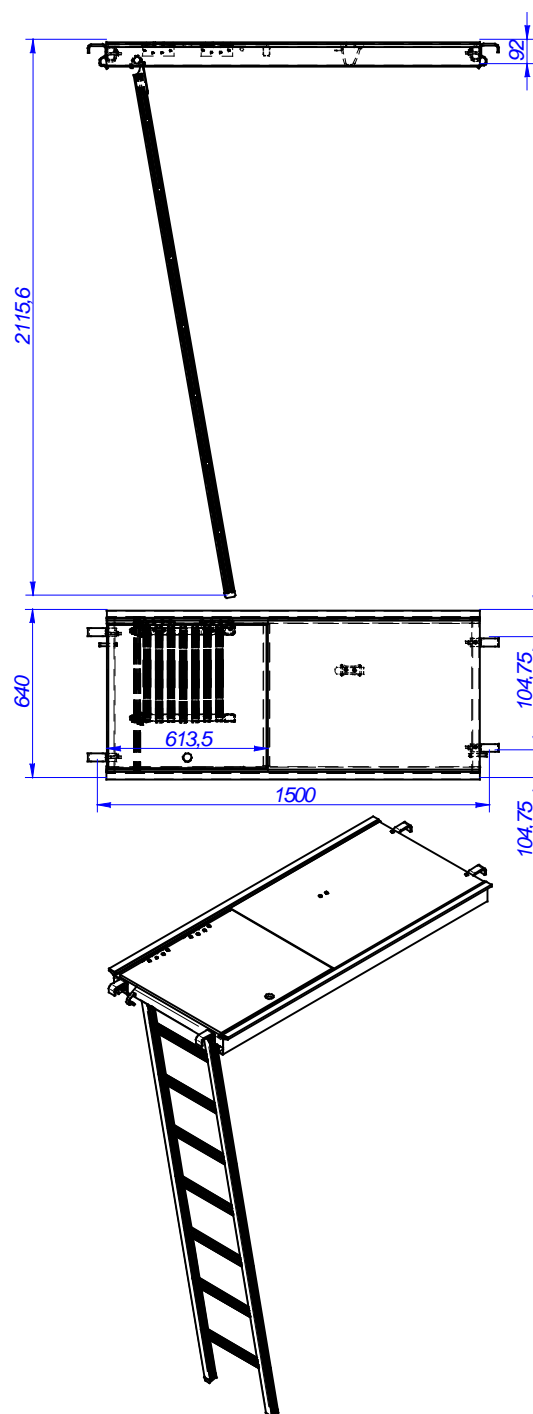
This is an aluminium-wooden platform with a ladder built into it. Besides functioning as the working platform from which the workers do their jobs, its trapdoor also converts it into a vertical passageway within the structure.

Both the structure and the ladder are manufactured from aluminium and the floors are made from 640 mm wide non-slip riveted plywood and length of 1.5 m.

Wood used is class 3 fire resistant.

The Trapdoor Platform 1.5 is Class 6 (600 daN/m<sup>2</sup>) according to EN 12811-1.

The ladder is usually sent dismantled of the platform body (next point).

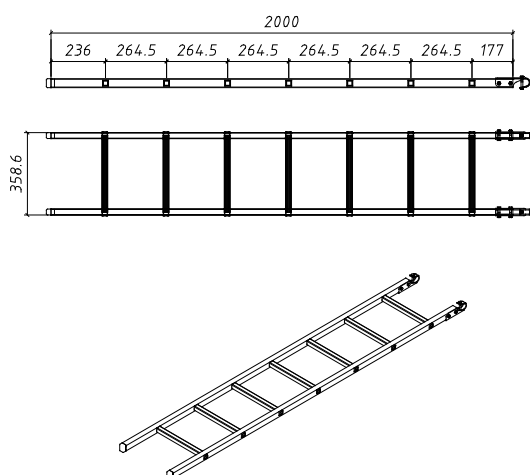


### 2.2.13. ALUMINIUM LADDER FOR TRAPDOOR PLATFORM

This is an aluminium ladder incorporated in the trapdoor platform, which permits the workers to climb from one level to the next.

The ladder is comprised of two 39x26 stringers and 7, 25 mm square tube rungs that are positioned every 260 mm along the height of ladder. The ladder is 2000 mm long, and it has a U-shaped hook. When the height between platforms is approximately 2000 mm the ladder takes the proper inclination.

It has a free width of 300 mm.



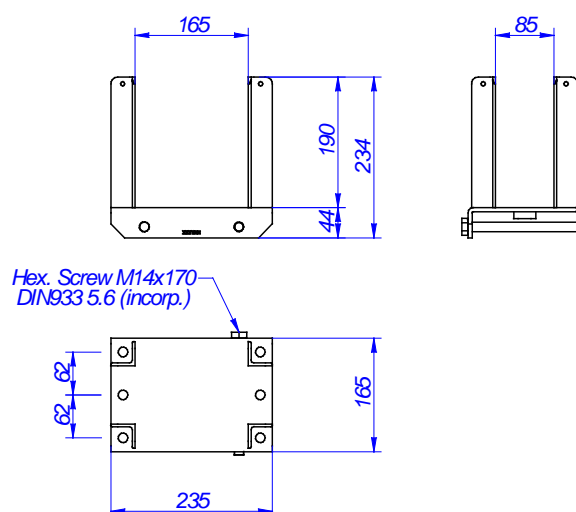
For other types of ladders see BRIO's manual.

### 2.2.14. HEADS

In the next chapter have been enclosed the different heads (common uses) available to use with ALUPROP prop.

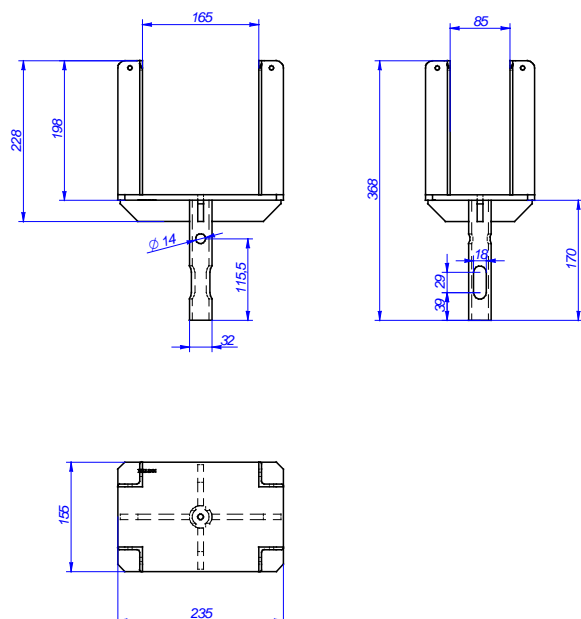
#### FOR TIMBER BEAMS VM20

##### ALUPROP HEAD



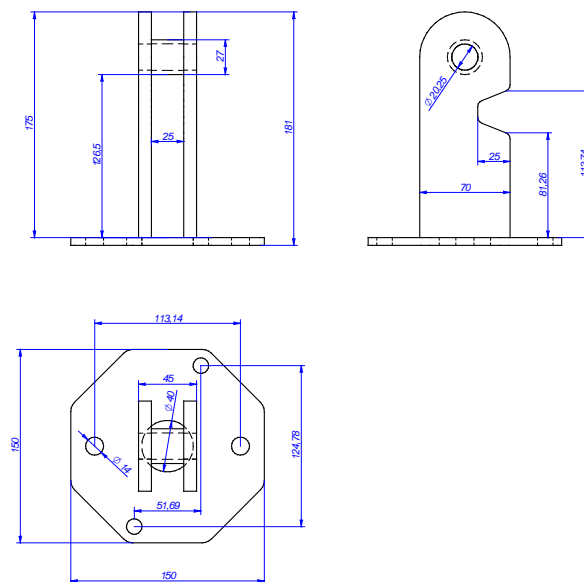
## FOR TIMBER BEAMS VM20

## DOUBLE HEAD VR

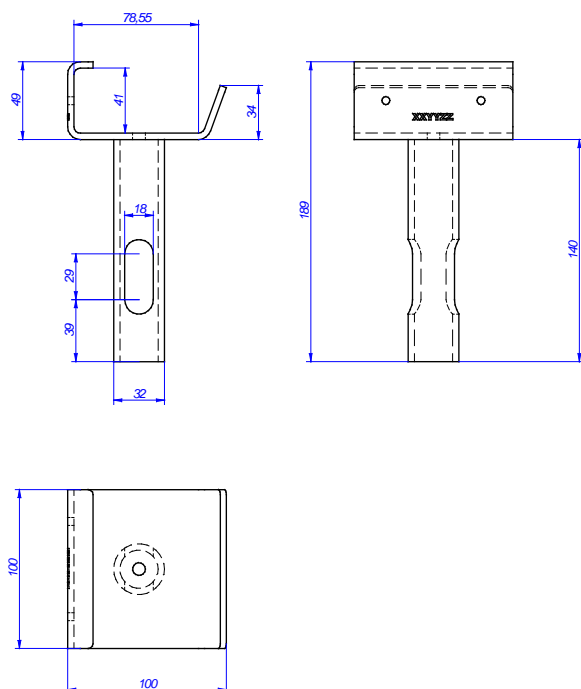


## FOR WALERS

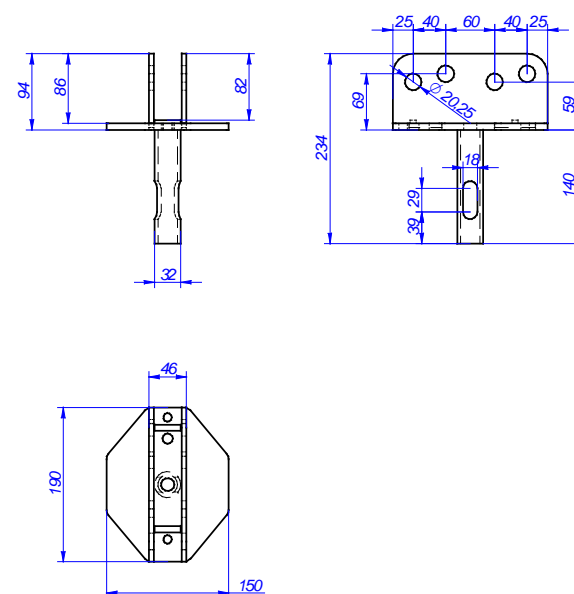
## HEAD JOINT PROP WALER



## SIMPLE HEAD VR

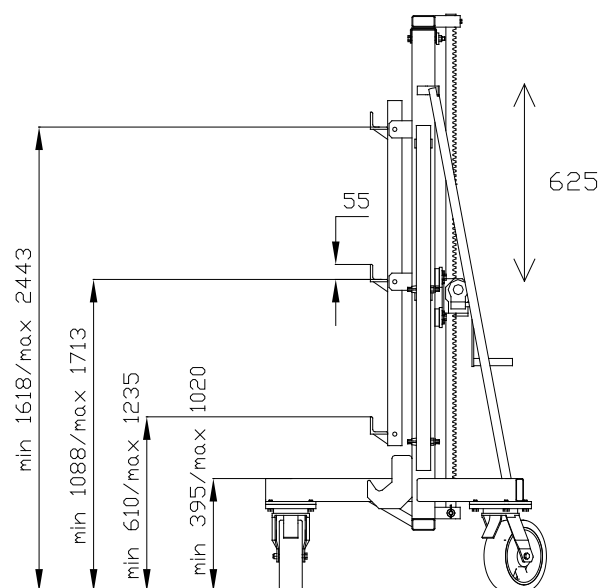
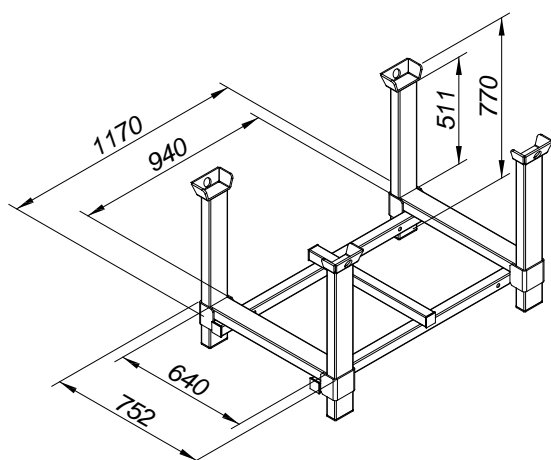


## SIMPLE HEAD WALER



Many other heads can be used depending on the formwork. Check each formwork's manual.

### 2.2.15. PALLET E1



Capacity: 20 ALUPROP Props.



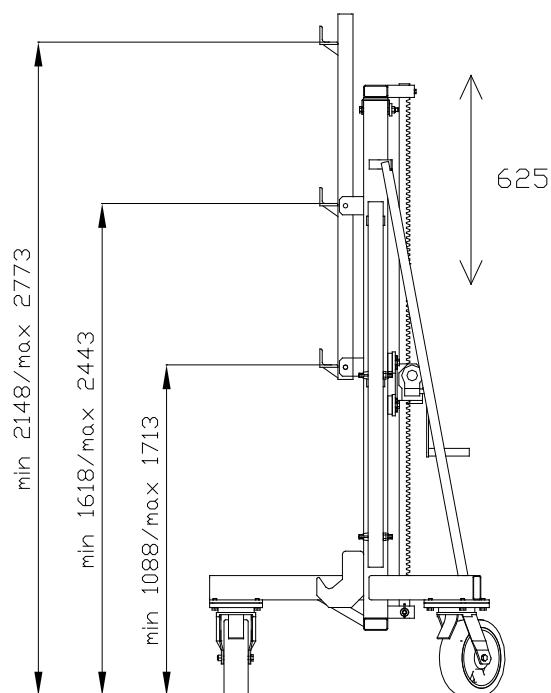
Check the User's Manual.

### 2.2.16. LATERAL TROLLEY VR

Element for horizontally transferring towers when they are supported with bracing frames. In these cases, two Lateral Trolley VR are used, which are fixed to the bracing frames.

The Lateral Trolley's regulation is 625 mm.

The permissible load of the Lateral Trolley is 10 kN.



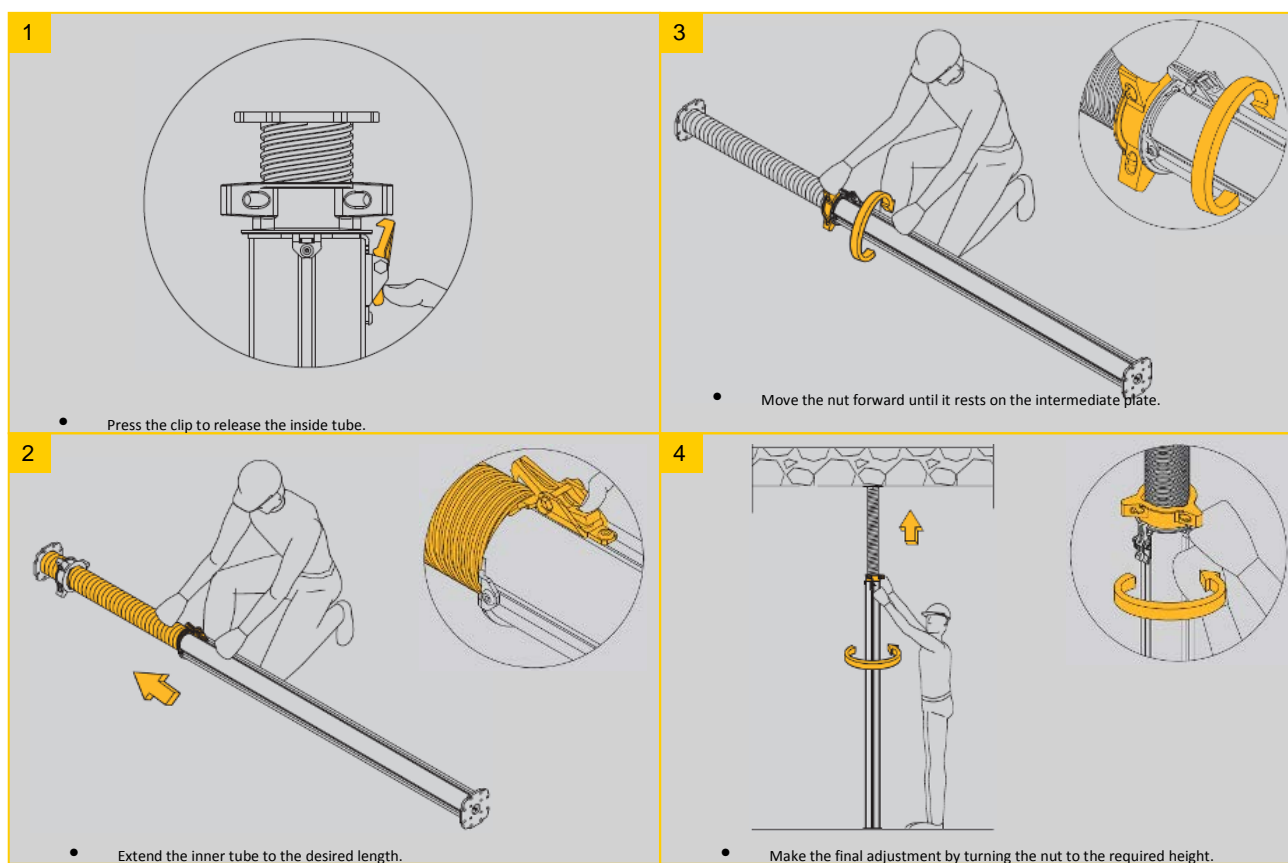
For further details, see Lateral Trolley's manual.

CE

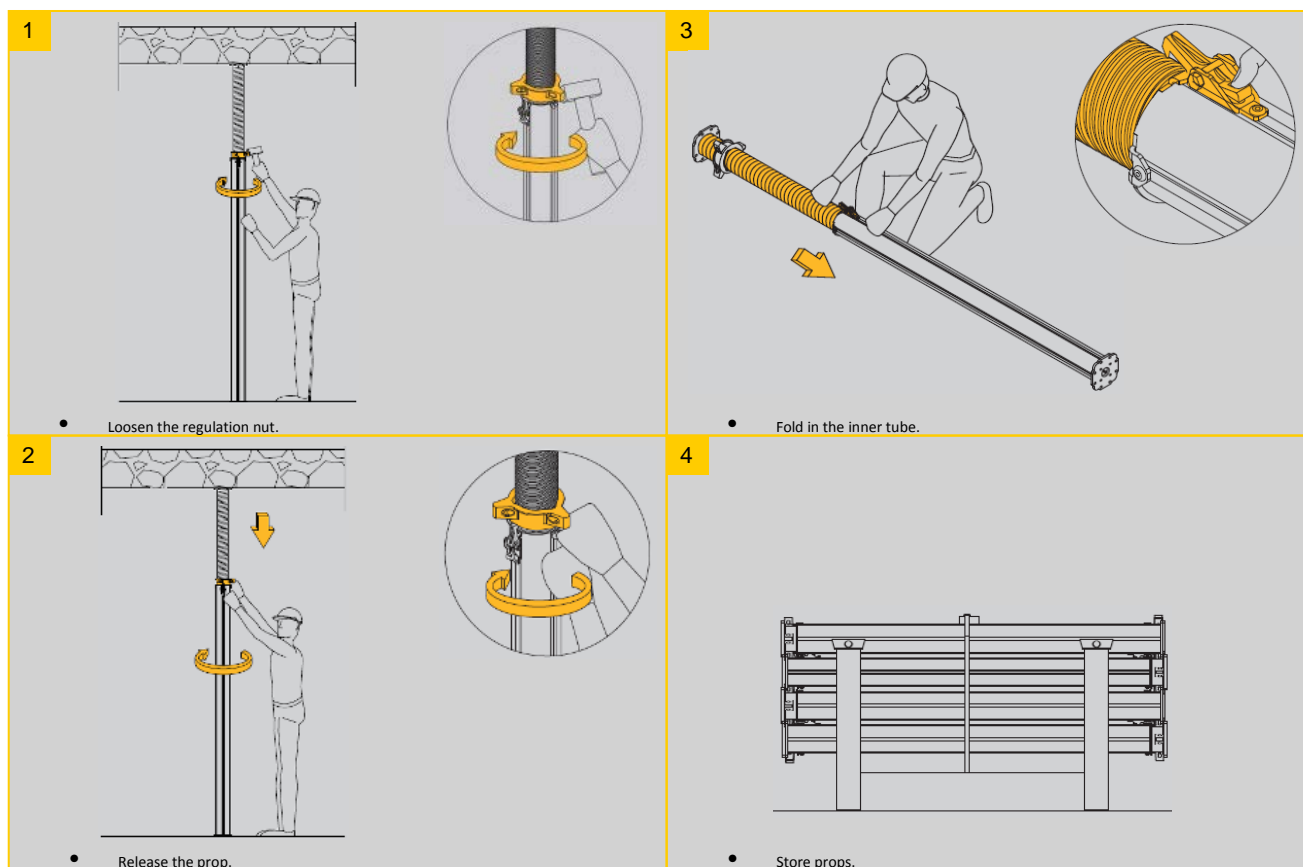
### 3. Assembly, Use and Disassembly

Check the conditions of support areas and anchorage of the structure (ground, walls, etc.) before erection: stability of the support (sills, wood boards, avoid manhole covers...), load-bearing capacity of the ground (shoring of basements), tie strength, etc.

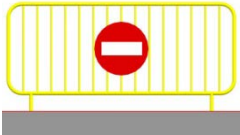
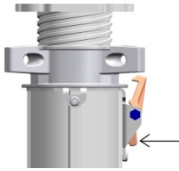


#### 3.1. PROP: BASIC ASSEMBLY INSTRUCTIONS

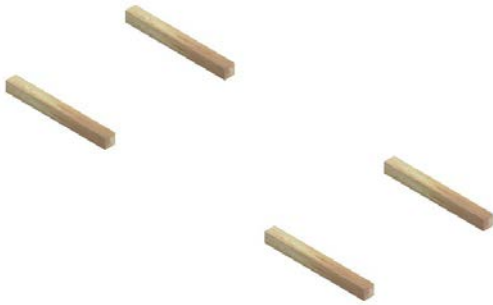
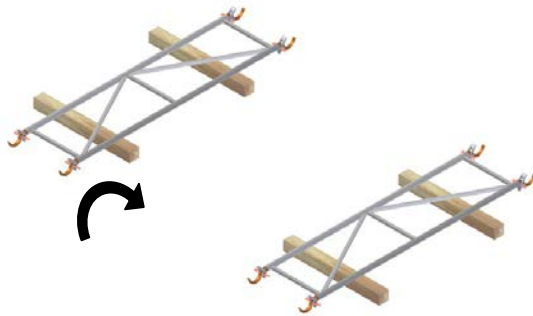



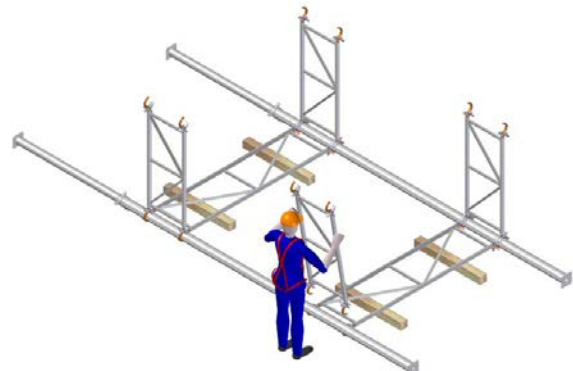
### 3.2. PROP: BASIC DISASSEMBLY INSTRUCTIONS



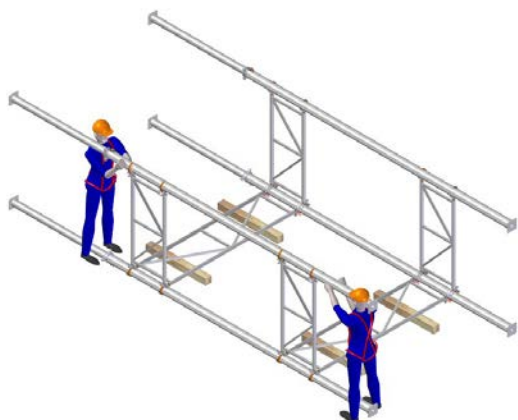
### 3.3. TOWERS: ASSEMBLY PROCESS UP TO 6m

			
1- The working area and the area for third-party movement should be delimited with tapes.	2- Regulation of the prop in height: ❖ Push the click to release the inside tube and extract until the desired extension.	❖ Slide the nut until laying it on the intermediate plate.	❖ Turn the nut until the appropriate height and adjust it.

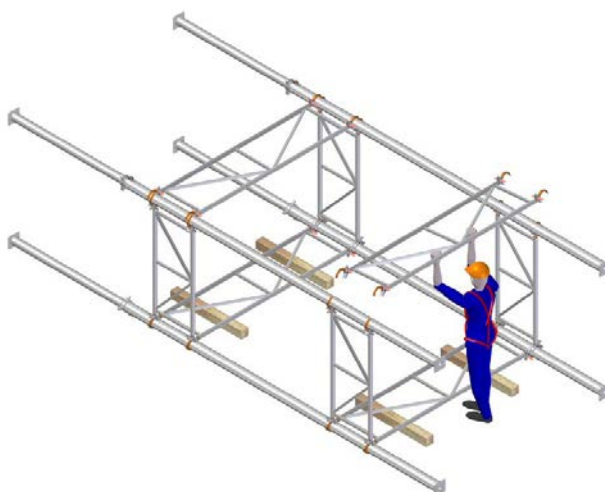
	
3- Place the planks of at least 10cm height on the ground, as a support for the Bracing Frames.	4- Lay the Bracing frames on the planks with the hooks opened upwards, aligned and with the appropriate distance according to layout.

	
5- Place the Props in the Hooks and wedged them.	6- Place both lateral Bracing frames.

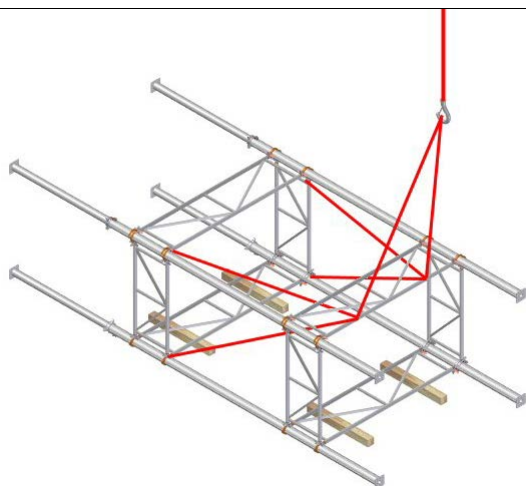




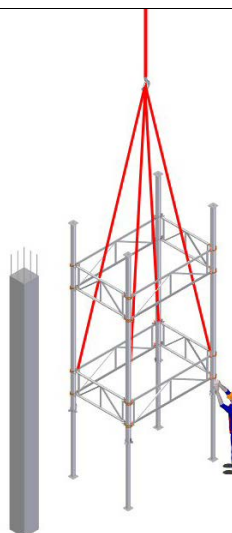
7- Place two Props on the lateral Bracing frames at the same distance as the previous ones.



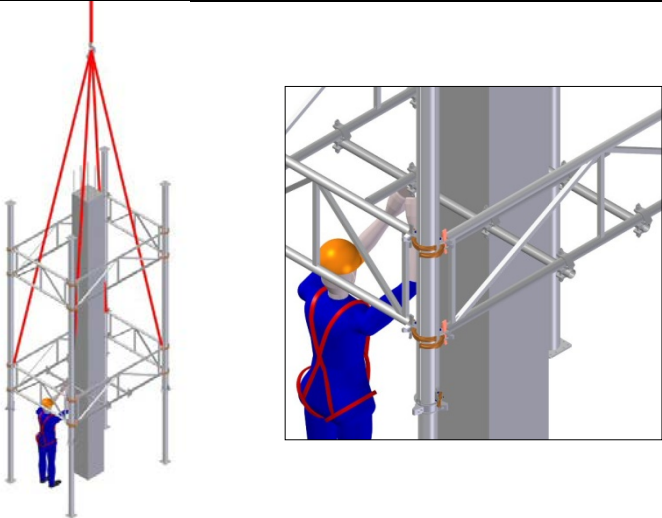
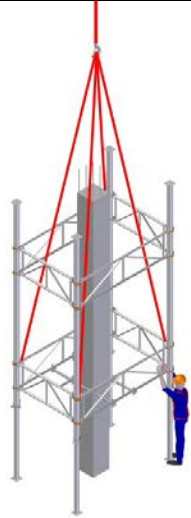
8- Place the last Bracing frames to complete the tower.


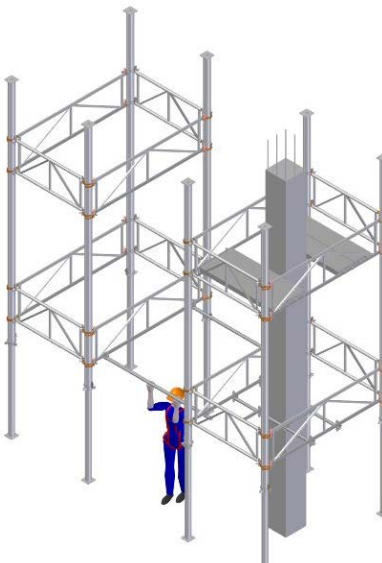
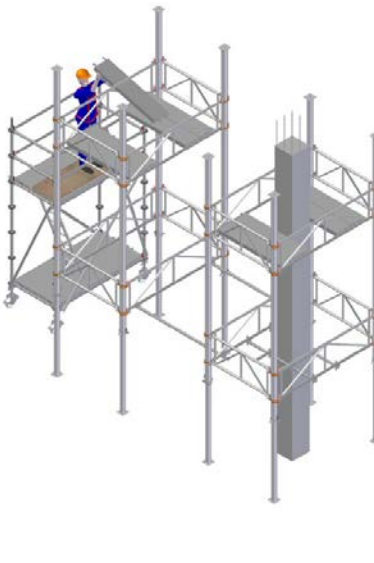


9- Fix the tower lying on the ground from the first bracing frames with four straps, so that after the lifting the slings can be removed from the floor or with an auxiliary medium.

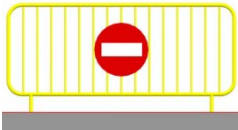
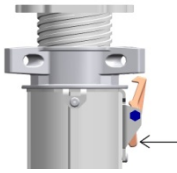




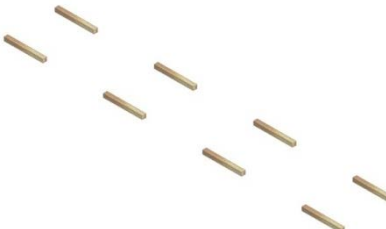
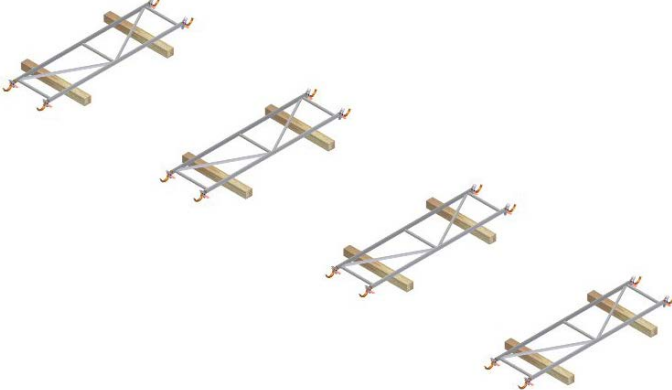
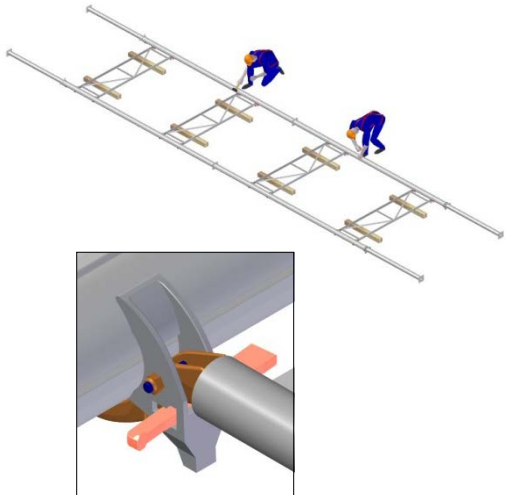


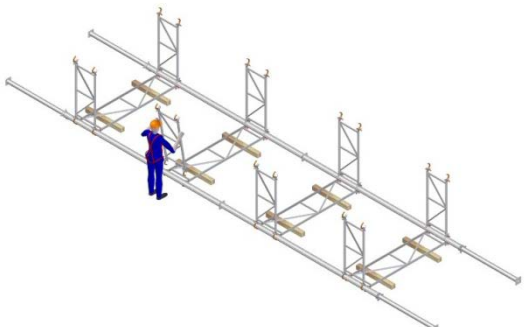
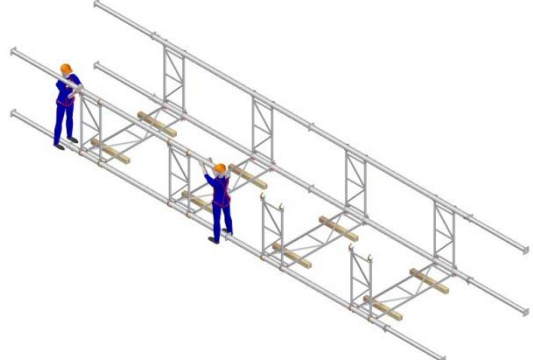
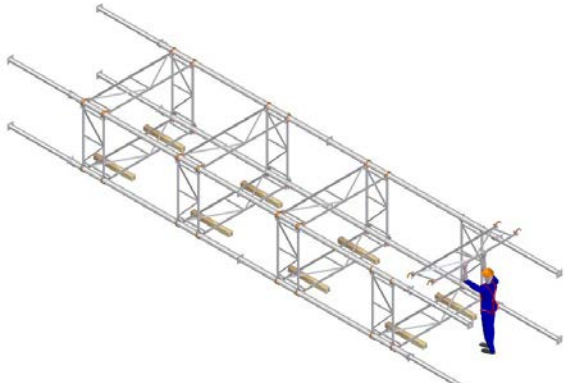
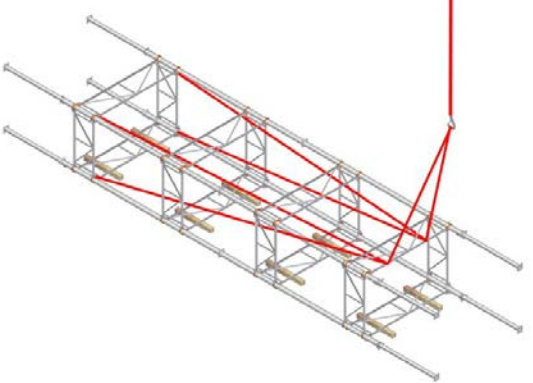
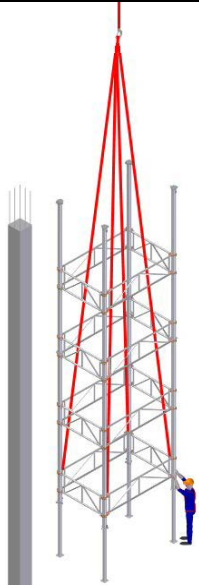
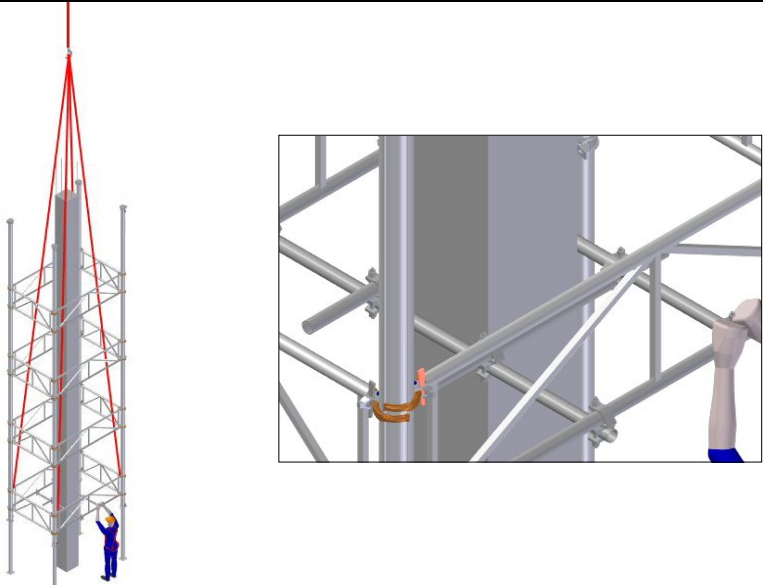
10- Lift the tower and move it to the final assembly area.

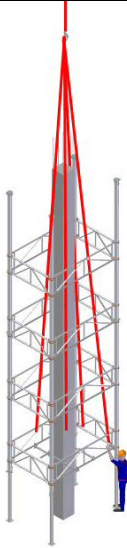
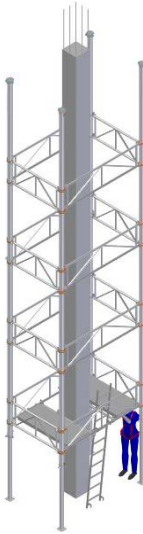
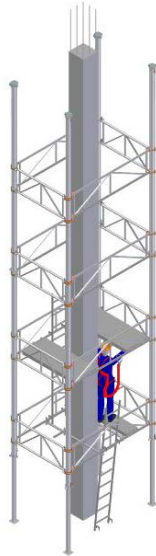
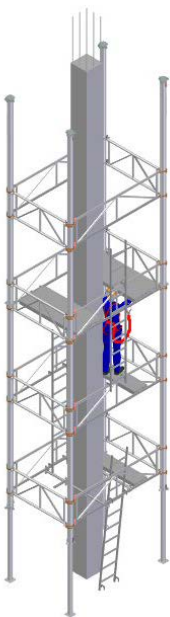
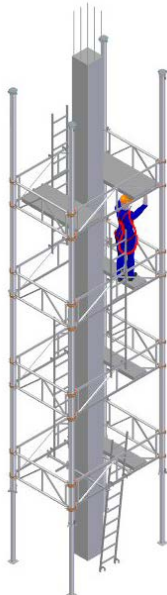
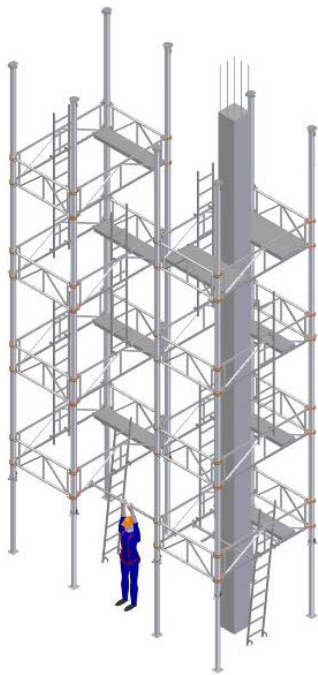
	
<p>11- Once the tower is placed in the position marked with topographic levels, make the perfect adjust maintaining the weight of the tower with the crane. Afterwards, make the perfect levelling with all the weight on the legs of the tower, but with the tower ensured by the crane. Fix the tower around the column.</p>	<p>12- Recover the slings from the ground or from an auxiliary medium.</p>

		
<p>13- Mount the platforms or boards in the last level (as a passageway) from an auxiliary medium.</p>	<p>14- Afterwards, place the contiguous towers according to the layout, taking into account the distance between the towers and place the bracing elements between towers (tubes and couplers or bracing frames)</p>	<p>15- Mount the platforms or boards in the second tower (last level) creating passageways from an auxiliary medium. Then complete the towers ALUPROP and mount the formwork system.</p>

### 3.4. TOWERS: ASSEMBLY PROCESS OVER 6m

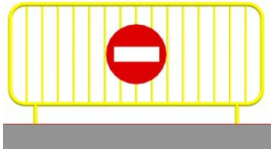

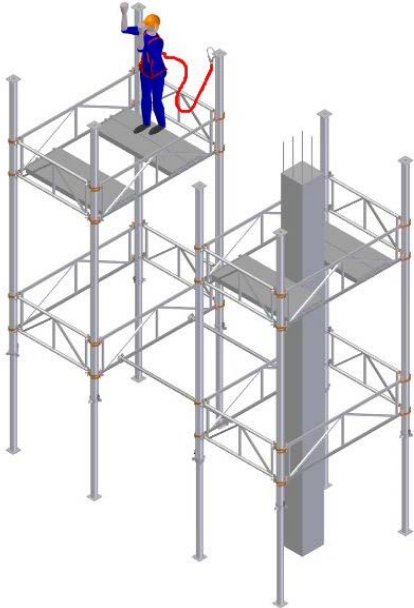

			
1- The working area and the area for third-party movement should be delimited with tapes.	2- Regulation of the prop in height: ❖ Push the click to release the inside tube and extract it until the desired extension. ❖ Slide the nut until laying it on the intermediate plate. ❖ Turn the nut until the appropriate height and adjust it.		
			
3-Join the ALUPROP prop with another ALUPROP prop (outside tubes or inside tube-outside tube) by screws M10x55 and washers DIN 127 until reaching the appropriate height.			4- Place the planks of at least 10cm height on the ground as a support for the bracing frames.
			
5- Lay the Bracing frames on the planks with the hooks opened upwards, aligned and to the appropriate distance according to layout.		6- Place the Props in the Hooks and wedged them.	

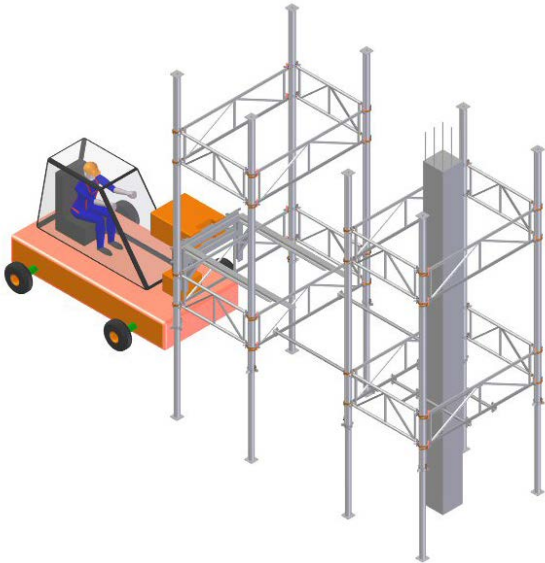


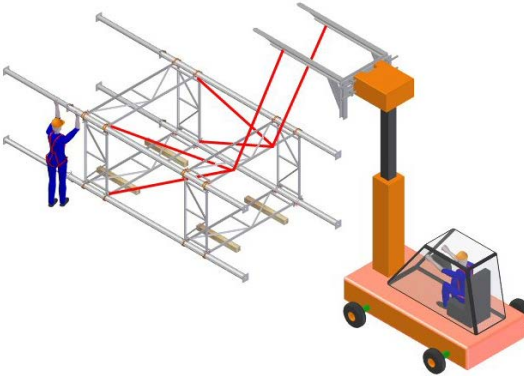
	
<p>7- Place both lateral Bracing frames.</p>	<p>8- Place two Props on the lateral Bracing frames at the same distance as the previous ones.</p>
	
<p>9- Place the last Bracing frames to complete the tower.</p>	<p>10- Fix the tower lying on the ground from the first bracing frames with four slings, so that after the lifting it can be removed from the floor with an auxiliary medium.</p>
	
<p>11- Lift the tower and move it to the final assembly area.</p>	<p>12- Once the tower is placed in the position marked with topographic levels, make the perfect adjust maintaining the weight of the tower with the crane. Afterwards, make the perfect levelling with all the weight on the legs of the tower, but with the tower ensured by the crane. Fix the tower around the column.</p>

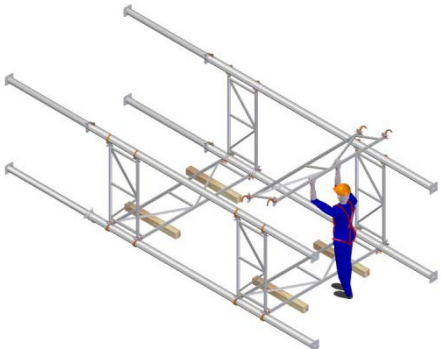
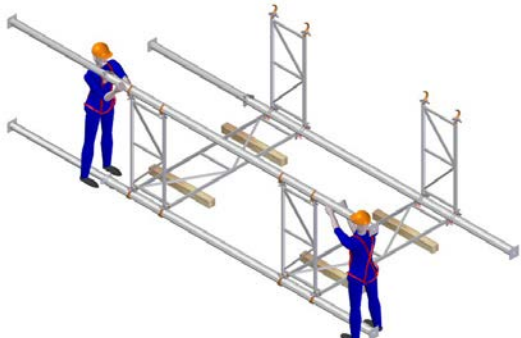
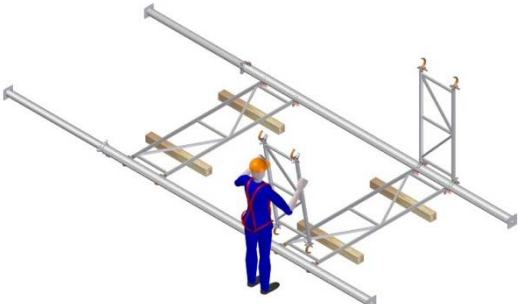

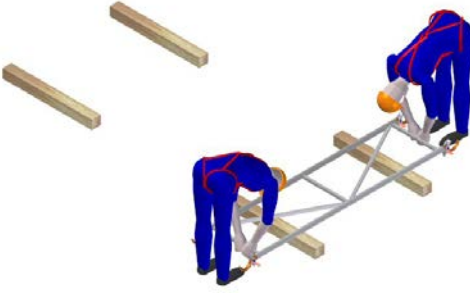

		
<p>13- Recover the slings from the ground or from an auxiliary medium.</p>	<p>14- Mount the platforms or boards of the first level. Then, locate the BRIO ladder and go up to the platforms.</p>	<p>15-Being tied all the time with the securing shackle of the harness to a tube of the bracing frame place the second ladder. Recover all the platforms or boards except one from the first level and locate the recovered ones in the second level. Complete the second level adding a new platform or board.</p>
		
<p>16- Being tied all the time with the securing shackle of the harness to the tube of the bracing frame, place next ladder and recover all the platforms or boards except one. Complete the level adding a new platform or board.</p>	<p>17- Being tied at all time with the securing shackle of the harness to the tube of the bracing frame, place next ladder and recover all the platforms or boards except one. Complete the level adding a new platform or board. Afterwards, go up in the ladder until the last level and place the structure of the formwork or the formwork of tables being tied all the time with the securing shackle of the harness to the hole of the end-plate of the prop.</p>	<p>18- Mount the towers in the same way and once they are completed, lift them one by one and place them on the correct place. Tied the towers with tubes and couplings or bracing frame according to the layout.</p>



### 3.5. TOWERS: DISASSEMBLY PROCESS UP TO 6m

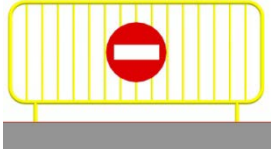


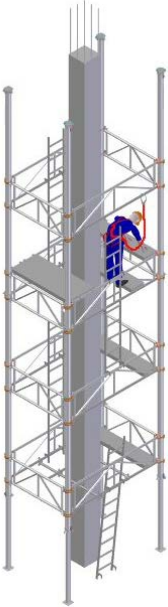
	
<p>1- The working area and the area for third-party movement should be delimited with tapes.</p>	<p>2- Locate the platforms in the upper frames.</p>
	
<p>3- Descend the tower a little bit in order to make easier the striking. Go up to the upper platform from an auxiliary medium and dismantle the formwork.</p>	<p>4- Remove the platforms from the ALUPROP tower.</p>


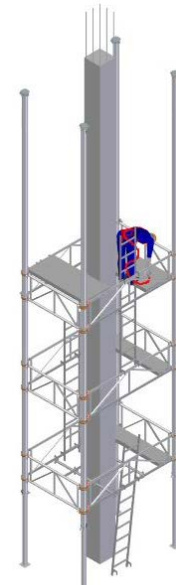
	
<p>5- Remove the tubes and couplings or bracing frames and diagonals between the towers if there are. Introduce the fork of the lifting platform between the tubes of the bracing frame.</p>	<p>6- Lift the tower with the lifting platform and move it to the disassembling area.</p>
	
<p>7- Place the slings in the tower with an auxiliary medium to lie it down and to make its disassembly easier.</p>	<p>8- Lie down the tower helping from one corner.</p>


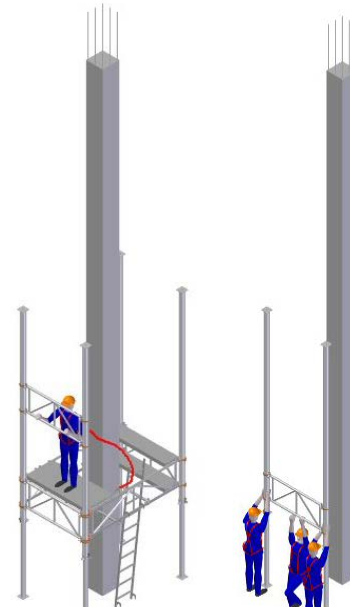
	
<p>9- Remove the frames that complete the tower.</p>	<p>10- Remove the props.</p>
	
<p>11- Remove the lateral bracing frames.</p>	<p>12- Strike the wedge of the bracing frames and remove the props.</p>
	
<p>13- Retire the bracing frames.</p>	<p>14- Fold the props introducing the inside tubes of the props.</p>



### 3.6. TOWERS: DISASSEMBLY PROCESS FOR TOWER OVER 6m

	
<p>1- The working area and the area for third-party movement should be delimited with tapes.</p>	<p>2- If there are no platforms, locate them on the different levels according to the AP03-01.</p>
	
<p>3- Descend the tower a little bit in order to make easier the striking Go up to the upper platform from an auxiliary medium and dismantle the formwork.</p>	<p>4- Descend to the lower level, remove the platforms and descend them to +0.53m from the level where we are.</p>

	
<p>5- Remove the top bracing frames as well as the ladder that lean on this level of the bracing frames.</p>	<p>6- Descend the platforms to -0.53m.</p>

	
<p>7- Follow the steps from 4 to 6. Release the screws from the props and descend them.</p>	<p>8- Proceed to dismantle the tower following the steps from 4 to 7 until completing it.</p>

### 3.7. OTHERS

For further uses and different ways to assembly and disassembly contact ULMA's Technical Department or ULMA 's Sales Representative.

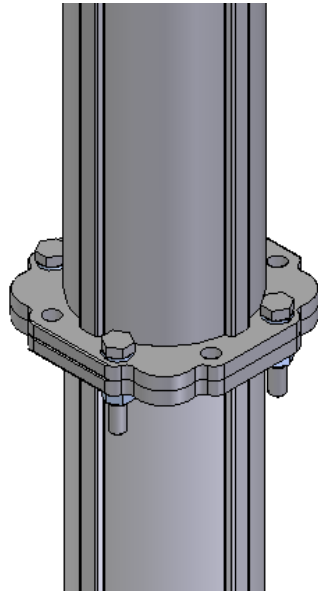
Examples of Standard Assembly and Disassembly Technical Instructions:

- Template for assembling ALUPROP Towers.
- Horizontal Formwork assembly on ALUPROP using collective protection: safety nets.
- Horizontal Formwork assembly on ALUPROP using Personal Protective Equipment.

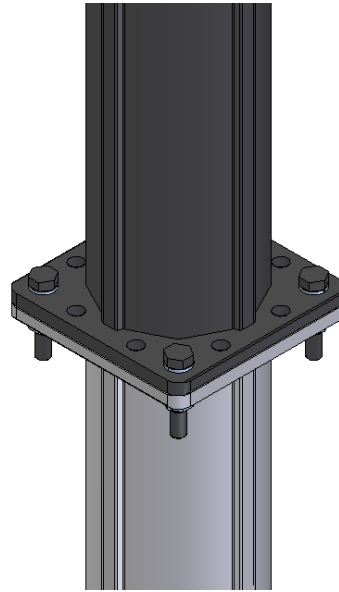
## 4. Solutions

### 4.1. PROP CONNECTIONS IN HEIGHT (SCREWS)

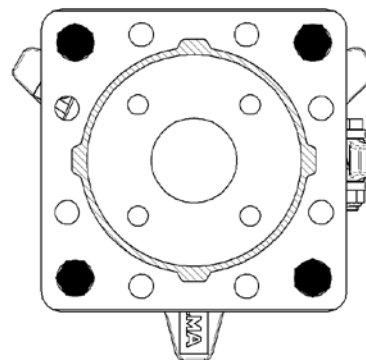
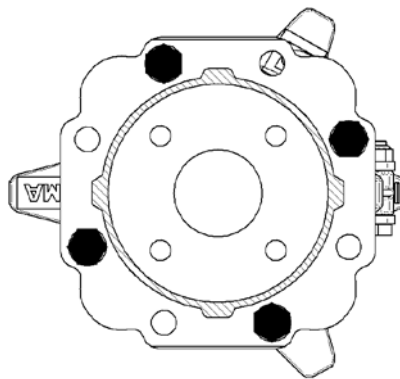
In case the height is over than 6m it is necessary to connect two props in height and brace the props with bracing frames. For the props connection it would connect the end plates of the outer tube of the prop with four M10x50 DIN 933 8.8 hexagonal screws (cod. 9521803) and their corresponding M10 DIN 934 5.6 nuts (cod. 0241000) and B10 DIN 127 spring washers (cod. 9000001) in both sides of the end plates. Never connect two final plates of the inner tube.



Fix between end-plate  
type1

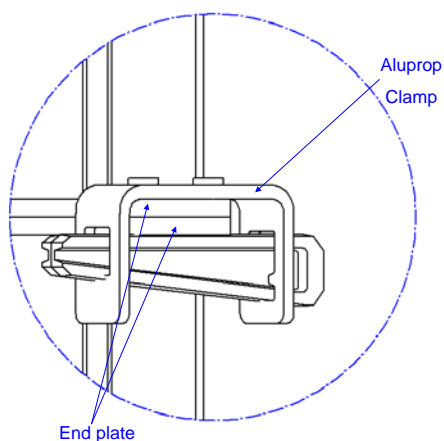


Fix between end-plate  
type2

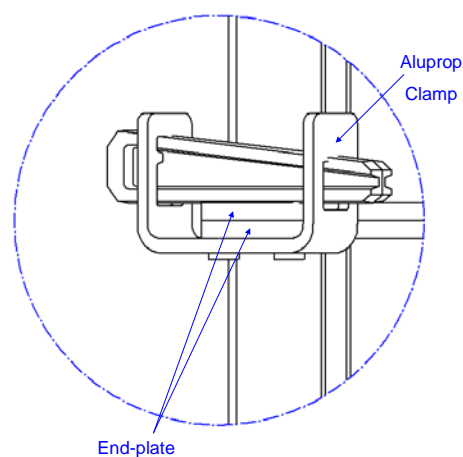


## 4.2. PROP CONNECTIONS IN HEIGHT (ALUPROP CLAMP)

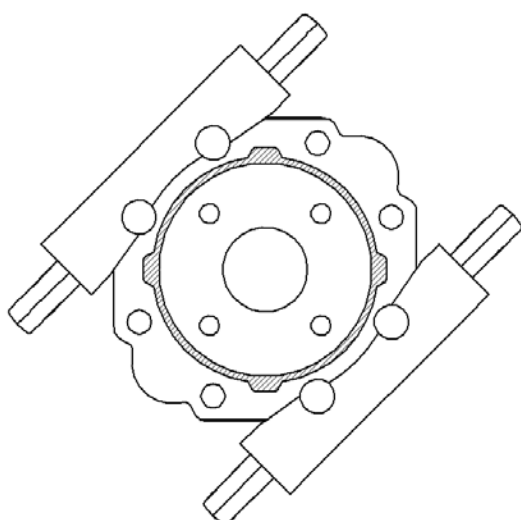
For the props connection also it would connect the end plates of the outer tube of the prop with two ALUPROP Clamps. Never connect two final plates of the inner tube.



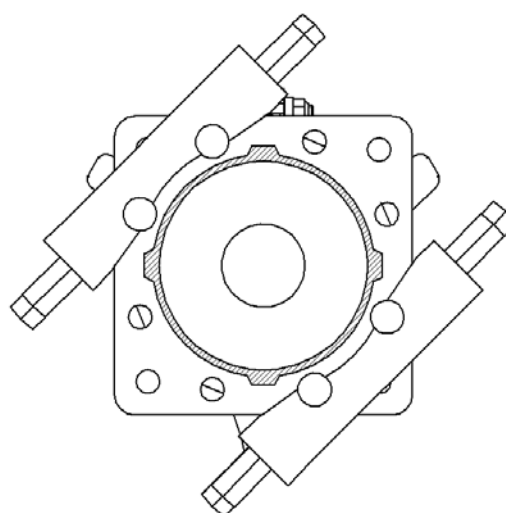
Fix: clamp in bottom position



Fix: clamp in upper position



Fix between end-plate type 1



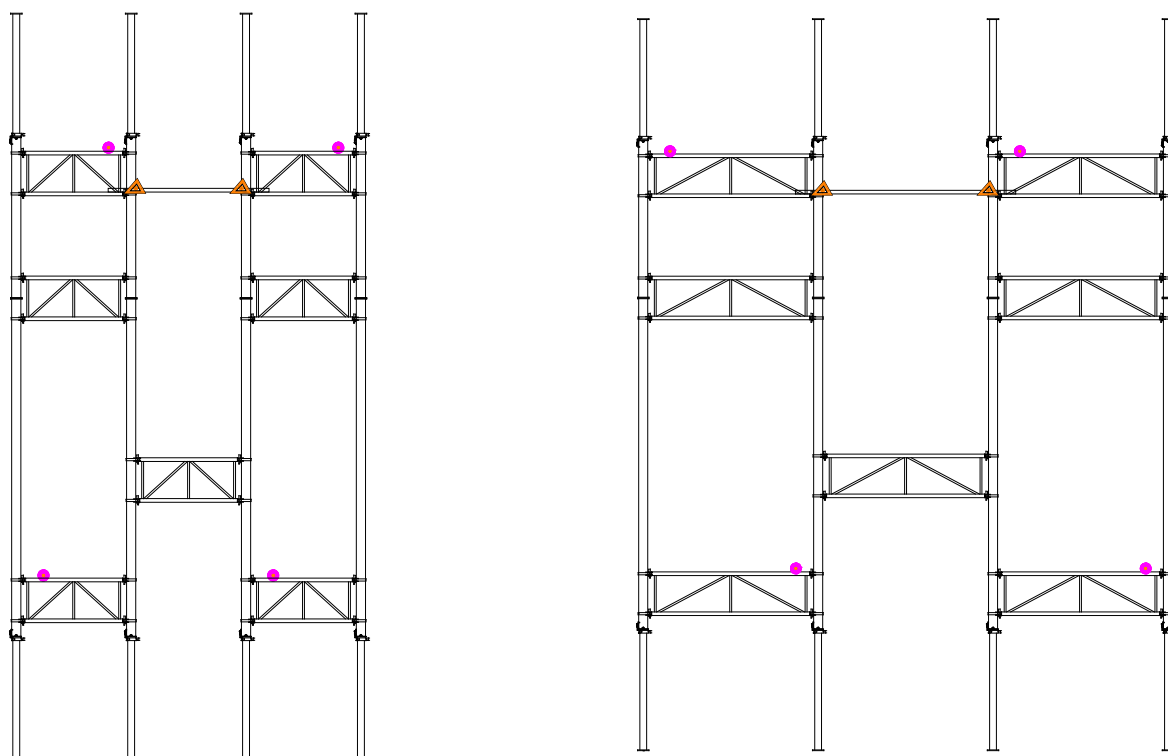
Fix between end-plate type 2

### 4.3. BRACING BETWEEN TOWERS

The towers that are over than 6m would be braced vertically between them every 5m:

- With bracing frames between towers.
- Bracing the towers with tubes and fix-couplers horizontally and diagonalizing with tube and swivel-couplers.

See Abstract 2 for correct assembly.



## 5. Features

The next working loads have been obtained from several tests and calculations of each component according to the corresponding standard and the configurations shown in the following pages.

The working load tables refer to European and American specifications, which correspond to the following standards:

- AMERICAN STANDARD:
  - Working loads obtained according to the conditions described in the ANSI/ASSE A10.9 standard.
  
- EUROPEAN STANDARD:
  - Working loads obtained according to the conditions described in the European standard EN 16031: ADJUSTABLE TELESCOPIC ALUMINIUM PROPS-Product specifications, design and assessment by calculation and test.

**The American criteria working loads will be the tables by default. In case of existing a more stringent standard such as the European one, European criteria's tables must be used.**

## 5.1. ALUPROP PROP

### 5.1.1. AMERICAN CRITERIA

WORKING LOADS (kN - kips) - SINGLE PROP ANSI/ASSE A10.9 (AMERICAN CRITERIA)									
Total height		ALUPROP 1.65-2.8		ALUPROP 2.2-3.7		ALUPROP 3.3-4.8		ALUPROP 4.5-6.0	
m	ft	kN	kips	kN	kips	kN	kips	kN	kips
1.65	5.4	104.8	23.6						
1.70	5.6	104.4	23.5						
1.80	5.9	103.6	23.3						
1.90	6.2	102.8	23.1						
2.00	6.6	102.0	22.9						
2.10	6.9	99.6	22.4						
2.20	7.2	97.3	21.9	101.4	22.8				
2.30	7.5	94.9	21.3	99.9	22.5				
2.40	7.9	92.5	20.8	98.4	22.1				
2.50	8.2	90.2	20.3	96.8	21.8				
2.60	8.5	87.9	19.8	95.3	21.4				
2.70	8.9	85.6	19.2	93.8	21.1				
2.80	9.2	83.3	18.7	91.5	20.6				
2.90	9.5			89.1	20.0				
3.00	9.8			86.8	19.5				
3.10	10.2			84.4	19.0				
3.20	10.5			82.1	18.5				
3.30	10.8			79.4	17.8	78.8	17.7		
3.40	11.2			76.7	17.2	78.2	17.6		
3.50	11.5			73.9	16.6	77.5	17.4		
3.60	11.8			71.2	16.0	76.9	17.3		
3.70	12.1			68.5	15.4	76.2	17.1		
3.80	12.5					75.6	17.0		
3.90	12.8					72.8	16.4		
4.00	13.1					70.0	15.7		
4.10	13.5					67.1	15.1		
4.20	13.8					64.3	14.5		
4.30	14.1					61.5	13.8		
4.40	14.4					59.5	13.4		
4.50	14.8					57.5	12.9	61.4	13.8
4.60	15.1					55.4	12.5	59.8	13.4
4.70	15.4					53.4	12.0	58.2	13.1
4.80	15.7					51.4	11.6	56.7	12.7
4.90	16.1							55.1	12.4
5.00	16.4							53.5	12.0
5.10	16.7			52.0	11.7				
5.20	17.1			50.5	11.4				
5.30	17.4	49.0	11.0						
5.40	17.7	47.5	10.7						
5.50	18.0	46.0	10.3						
5.60	18.4	44.6	10.0						
5.70	18.7	43.2	9.7						
5.80	19.0	41.9	9.4						
5.90	19.4	40.5	9.1						
6.00	19.7	39.1	8.8						
<b>Note:</b> - A safety factor 3:1 is regarded. Head and base are fixed, props are aligned vertically not out of plumb more than 1/8" in three feet and the slab formwork is secured at deck level in all directions. - For different conditions, working loads should be reduced by 20%.									



## 5.1.2. EUROPEAN CRITERIA

WORKING LOADS (kN) - SINGLE PROP EN 16031 (EUROPEAN CRITERIA)								
Total height (m)	ALUPROP 1.65-2.8		ALUPROP 2.2-3.7		ALUPROP 3.3-4.8		ALUPROP 4.5-6.0	
	IT above	IT below	IT above	IT below	IT above	IT below	IT above	IT below
1.65	151.2	106.9						
1.70	148.6	106.9						
1.80	143.4	106.9						
1.90	138.2	106.6						
2.00	132.8	105.7						
2.10	127.3	104.4						
2.20	121.7	102.7	132.4	115.5				
2.30	116.1	100.5	126.7	110.8				
2.40	110.3	97.9	121.0	106.3				
2.50	104.4	94.8	115.5	101.9				
2.60	98.5	91.4	110.1	97.7				
2.70	92.4	87.4	104.7	93.6				
2.80	86.3	83.1	99.4	89.7				
2.90			94.2	86.0				
3.00			89.1	82.4				
3.10			84.1	79.0				
3.20			79.1	75.7				
3.30			74.3	72.6	89.6	75.7		
3.40			69.5	69.7	85.2	73.4		
3.50			64.8	66.9	80.9	71.2		
3.60			60.2	64.3	76.8	68.9		
3.70			55.7	61.8	72.8	66.7		
3.80					69.0	64.4		
3.90					65.3	62.2		
4.00					61.8	59.9		
4.10					58.4	57.6		
4.20					55.2	55.3		
4.30					52.1	53.0		
4.40					49.2	50.7		
4.50					46.4	48.4	51.9	47.1
4.60					43.8	46.1	50.1	45.7
4.70					41.3	43.7	48.4	44.2
4.80					38.9	41.4	46.6	42.8
4.90							44.8	41.4
5.00							42.9	40.0
5.10							41.1	38.6
5.20							39.2	37.2
5.30							37.4	35.8
5.40							35.5	34.4
5.50							33.6	33.0
5.60							31.7	31.6
5.70							29.8	30.2
5.80							27.8	28.8
5.90							25.9	27.5
6.00							23.9	26.1

IT: Inner Tube

## 5.2. ALUPROP PROPS WITH SUPPLEMENT 1m

The next working loads have been obtained from calculations of all range of ALUPROP props with Supplement 1 m joint with screws, nuts and washers and also with ALUPROP Clamps.

### 5.2.1. AMERICAN CRITERIA

WORKING LOADS (kN - kips) - ALUPROP PROP WITH SUPPLEMENT 1m- ANSI/ASSE A10.9 (AMERICAN CRITERIA)																				
Total height		ALUPROP 1.65-2.8 + SUPPLEMENT 1m				Total height (m)	ALUPROP 2.2-3.7 + SUPPLEMENT 1m				Total height (m)	ALUPROP 3.3-4.8 + SUPPLEMENT 1m				Total height (m)	ALUPROP 4.5-6.0 + SUPPLEMENT 1m			
		W/ SCREWS		W/ CLAMP			W/ SCREWS		W/ CLAMP			W/ SCREWS		W/ CLAMP			W/ SCREWS		W/ CLAMP	
m	ft	kN	kips	kN	kips		kN	kips	kN	kips		kN	kips	kN	kips		kN	kips	kN	kips
1.65	5.4																			
1.70	5.6																			
1.80	5.9																			
1.90	6.2																			
1.95	6.4																			
2.00	6.6																			
2.10	6.9																			
2.20	7.2																			
2.30	7.5																			
2.40	7.9																			
2.50	8.2																			
2.60	8.5	77.6	17.4	72.3	16.3	2.60														
2.70	8.9	75.6	17.0	70.3	15.8	2.70														
2.80	9.2	73.5	16.5	68.2	15.3	2.80														
2.90	9.5	71.5	16.1	66.2	14.9	2.90														
3.00	9.8	69.4	15.6	64.1	14.4	3.00														
3.10	10.2	67.4	15.1	62.1	14.0	3.10														
3.20	10.5	65.3	14.7	60.0	13.5	3.20	72.7	16.3	68.6	15.4	3.20									
3.30	10.8	63.3	14.2	58.0	13.0	3.30	70.6	15.9	66.5	14.9	3.30									
3.40	11.2	61.2	13.8	55.9	12.6	3.40	68.5	15.4	64.4	14.5	3.40									
3.50	11.5	59.2	13.3	53.9	12.1	3.50	66.4	14.9	62.3	14.0	3.50									
3.60	11.8	57.1	12.8	51.8	11.6	3.60	64.3	14.5	60.2	13.5	3.60									
3.70	12.1	55.1	12.4	49.8	11.2	3.70	62.2	14.0	58.1	13.1	3.70									
3.80	12.5	53.0	11.9	47.7	10.7	3.80	60.1	13.5	56.0	12.6	3.80									
3.90	12.8					3.90	58.0	13.0	53.9	12.1	3.90									
4.00	13.1					4.00	55.9	12.6	51.8	11.6	4.00									
4.10	13.5					4.10	53.8	12.1	49.7	11.2	4.10									
4.20	13.8					4.20	51.7	11.6	47.6	10.7	4.20									
4.30	14.1					4.30	49.6	11.2	45.5	10.2	4.30	47.7	10.7	44.4	10.0	4.30				
4.40	14.4					4.40	47.5	10.7	43.4	9.8	4.40	46.5	10.5	43.2	9.7	4.40				
4.50	14.8					4.50	45.4	10.2	41.3	9.3	4.50	45.3	10.2	42.0	9.4	4.50				
4.60	15.1					4.60	43.3	9.7	39.2	8.8	4.60	44.1	9.9	40.8	9.2	4.60				
4.70	15.4					4.70	41.2	9.3	37.1	8.3	4.70	42.8	9.6	39.6	8.9	4.70				
4.80	15.7										4.80	41.5	9.3	38.4	8.6	4.80				
4.90	16.1										4.90	40.2	9.0	37.2	8.4	4.90				
5.00	16.4										5.00	38.9	8.8	36.0	8.1	5.00				
5.10	16.7										5.10	37.7	8.5	34.8	7.8	5.10				
5.20	17.1										5.20	36.5	8.2	33.5	7.5	5.20				
5.30	17.4										5.30	35.3	7.9	32.3	7.3	5.30				
5.40	17.7										5.40	34.1	7.7	31.1	7.0	5.40				
5.50	18.0										5.50	32.9	7.4	29.9	6.7	5.50	34.8	7.8	32.3	7.3
5.60	18.4										5.60	31.6	7.1	28.7	6.4	5.60	33.6	7.5	31.1	7.0
5.70	18.7										5.70	30.4	6.8	27.5	6.2	5.70	32.4	7.3	29.9	6.7
5.80	19.0										5.80	29.2	6.6	26.3	5.9	5.80	31.2	7.0	28.7	6.5
5.90	19.4															5.90	30.0	6.7	27.5	6.2
6.00	19.7															6.00	28.8	6.5	26.4	5.9
6.10	20.0															6.10	27.6	6.2	25.2	5.7
6.20	20.3															6.20	26.4	5.9	24.0	5.4
6.30	20.7															6.30	25.2	5.7	22.8	5.1
6.40	21.0															6.40	24.0	5.4	21.6	4.9
6.50	21.3															6.50	22.8	5.1	20.4	4.6
6.60	21.7															6.60	21.5	4.8	19.2	4.3
6.70	22.0															6.70	20.4	4.6	18.0	4.0
6.80	22.3															6.80	19.2	4.3	16.8	3.8
6.90	22.6															6.90	18.0	4.1	15.6	3.5
7.00	23.0															7.00	16.8	3.8	14.4	3.2

**Note:**

- A safety factor 3:1 is regarded. Props are aligned vertically not out of plumb more than 1/8" in three feet.

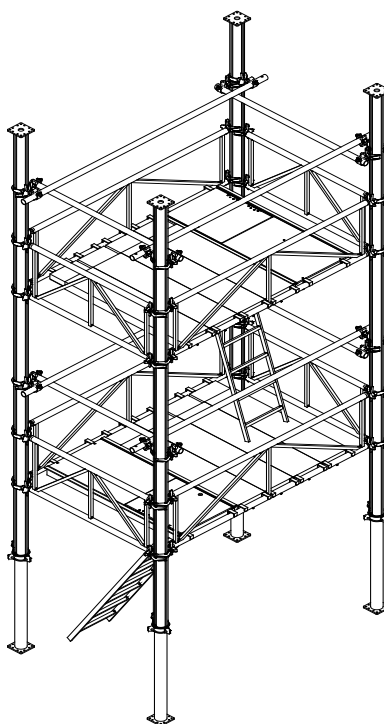
## 5.2.2. EUROPEAN CRITERIA

WORKING LOADS (kN) - ALUPROP PROP WITH SUPPLEMENT 1m- EN 16031 (EUROPEAN CRITERIA)															
Total height (m)	ALUPROP 1.65-2.8 + SUPPLEMENT 1m		Total height (m)	ALUPROP 2.2-3.7 + SUPPLEMENT 1m		Total height (m)	ALUPROP 3.3-4.8 + SUPPLEMENT 1m		Total height (m)	ALUPROP 4.5-6.0 + SUPPLEMENT 1m					
	W/SCREWS	W/CLAMP		W/SCREWS	W/CLAMP		W/SCREWS	W/CLAMP		W/SCREWS	W/CLAMP				
	kN			kN			kN			kN					
1.65															
1.70															
1.80															
1.90															
1.95															
2.00															
2.10															
2.20															
2.30															
2.40															
2.50															
2.60	72.4	65.1	2.60												
2.70	70.0	63.0	2.70												
2.80	65.7	59.1	2.80												
2.90	61.7	55.6	2.90												
3.00	58.3	52.5	3.00												
3.10	55.3	49.7	3.10												
3.20	52.7	47.4	3.20							60.2	53.5	3.20			
3.30	50.6	45.5	3.30							58.2	52.3	3.30			
3.40	48.9	44.0	3.40							56.1	50.5	3.40			
3.50	47.7	42.9	3.50							54.0	48.6	3.50			
3.60	46.9	42.2	3.60							51.9	46.7	3.60			
3.70	46.5	41.9	3.70	49.7	44.8	3.70									
3.80	46.1	41.2	3.80	47.6	42.8	3.80									
3.90			3.90	45.5	40.9	3.90									
4.00			4.00	43.3	39.0	4.00									
4.10			4.10	41.2	37.0	4.10									
4.20			4.20	39.0	35.1	4.20									
4.30			4.30	36.8	33.1	4.30					38.7	34.8	4.30		
4.40			4.40	34.6	31.2	4.40					37.5	33.7	4.40		
4.50			4.50	32.4	29.2	4.50					36.3	32.6	4.50		
4.60			4.60	30.2	27.2	4.60					35.1	31.6	4.60		
4.70			4.70	28.0	25.2	4.70					34.0	30.6	4.70		
4.80					4.80							4.80	33.0	29.7	4.80
4.90					4.90							32.0	28.8	4.90	
5.00	5.00	31.0			27.9		5.00								
5.10	5.10	30.1			26.8		5.10								
5.20	5.20	29.3			25.6		5.20								
5.30	5.30	28.5			24.5		5.30								
5.40	5.40	27.8			23.6		5.40								
5.50	5.50	27.1			23.0		5.50	29.0	21.6						
5.60	5.60	26.4			22.5		5.60	27.9	20.9						
5.70	5.70	25.8			22.2		5.70	26.9	20.2						
5.80	5.80	25.3			22.2		5.80	25.8	20.1						
5.90									5.90	24.8	19.6				
6.00									6.00	23.8	19.1				
6.10									6.10	22.9	18.5				
6.20									6.20	21.9	18.1				
6.30									6.30	20.9	17.6				
6.40									6.40	20.0	17.3				
6.50									6.50	19.1	16.9				
6.60									6.60	18.1	16.3				
6.70									6.70	17.2	15.5				
6.80									6.80	16.3	14.7				
6.90									6.90	15.5	13.9				
7.00	7.00	14.6	13.1												

### 5.3. ALUPROP TOWERS WITHOUT WIND (EUROPEAN CRITERIA)

The ALUPROP props can get braced with bracing frames or with tubes and bracing hooks. With this bracing, greater stability, shoring heights and load-bearing capacity is achieved. Moreover, for heights of more than 6m, towers can be assembled joining two ALUPROP props or one prop with the supplement or the spindle. For that, the followings should be considered:

- When two ALUPROP are joined, they must be braced.
- When joining two ALUPROP props in height to form the ALUPROP Tower, either screws or ALUPROP clamps can be used.
- It is recommended assembling the tower horizontally, then lifting and locating it in the proper position. Otherwise, it is recommended using the lift platform.
- For the assembly of the tower, and especially the formwork, platforms and stairs of access should be used. It may use the Bracing Hook as a safety handrail.



- The recommended distance between Bracing frames to assembly the tower with platforms is 2m.
- It is recommended to assemble the tower with Bracing frames with 2m distance between them to facilitate safety access.
- For obtaining the working loads of ALUPROP Tower configurations (American or European criteria), contact ULMA's technical department.

## 6. Terms and conditions of use

### 6.1. SAFE OPERATING GUIDELINES

#### 6.1.1. General guidelines

- It is recommended to strictly follow the instructions of the project plan, the health and safety plan, as well as any further technical and/or safety rules which might apply to the project.
- Works are carried out by qualified personnel only, and under the supervision of a competent person.
- Instructions of use for the employed equipment must be followed. Consult operating manuals of the manufacturer or distributor.
- Only statutory auxiliary means and the corresponding protection equipment, preferably collective protection equipment are employed.
- Personal protective equipment (PPE) should comprise at least safety helmet, safety footwear, protective gloves and tool holder belt. Whenever necessary use further PPE, such as reflective jackets, anti-fall harness with lifeline, goggles, breathing masks, earmuffs, etc.
- Avoid heavy impacts on working platform or plywood. It is strictly forbidden to jump on platforms or plywood, to abruptly unload material or letting it fall from height onto the platforms.
- If the building site is located nearby high voltage power lines, it is recommended to work without power supply. If this is not possible, the appropriate measures according to the respective reference standard should be taken.
- Under adverse weather conditions, works on the building site should stop.
- Under heavy wind conditions, remove materials and other objects from the platforms, and check the stability of all ties, meshes, platform anchorages, etc. before and afterwards.
- Before starting the stripping/dismantling procedure, check that all structural components (e.g. ties) are in place. If not, revise the assembly before proceeding with stripping/dismantling.
- Furthermore, check that no loose material remains on the structure, e.g. on working platforms, in danger of falling from it, and striking persons below.
- The following measures must be taken to restrict access to the structure during erection and dismantling or whenever the structure is not in correct working conditions (e.g. missing collective protection): signposting, fencing, closing or demarcation with straps, barriers or meshes of the working area and third-party passageways.
- Employees and any third party accessing a structure without collective protection yet in place, must wear all indicated PPE to prevent falls from height or to be protected from falling objects.
- The purchaser or lessee of the structure shall instruct its employees on all necessary guidelines for the safe operating of the structure.
- Any alterations of the structure must be executed under the supervision of a competent person and must comply with instructions in the operating manuals of the manufacturer or distributor.
- The purchaser or lessee shall conduct periodic checks of the assembly to verify the correct installation of critical structural elements and to identify the potential withdrawal of parts or the alteration of the structure as such by employees or a third party.

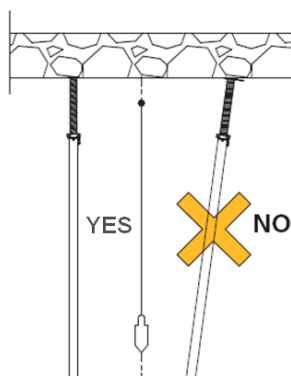
### 6.1.2. General guidelines

- Tower pieces and safety elements should be checked before every job. Check:
  - That no knocks or blows have damaged their section.
  - That they are not bent.
  - That their attachments are correct and effective.
  - Replace the pieces and safety elements when it is necessary.
- In mobile scaffolding towers, work with the brake on and do not move them when there is staff on top of them.
- The ALUPROP towers formwork must be put up and removed by competent persons assigned by the project manager to avoid any wrong operations.
- Conduct a general revision of the set after the assembly is completed.
- Check the state of the tower elements before undertaking any disassembly work.
- Providing the ALUPROP props a proper support is essential to assure the stability of the same. Suitable support is understood to be that which is capable of supporting loads that are transferred through the standards.
- It is recommended to use the wooden blocks to distribute loads or to protect the surfaces on which the scaffolding is supported.
- Place the safety pin in all the platforms before work in them.

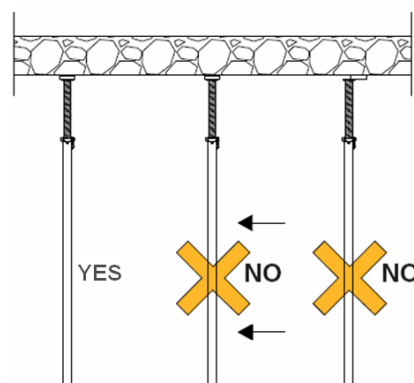
The most important recommendations for avoiding the main causes of accidents are the following:



The prop should be **plumbed**.



The **load** should be applied **vertically** on the prop and **centered**.



## 6.2. TRANSPORT, HANDLING AND STORAGE

### 6.2.1. General guidelines

- Get informed about hazards on the building site and preventive measures to avoid those.
- Obey the instructions of the person-in-charge at the workplace.
- Ensure adequate communication between the employees working together.
- Use work equipment only when authorised, trained and provided with all required information to conduct it.
- Maintain minimum distances to mobile work equipment (forklifts, lorries, cranes, other construction machinery) and to areas with the risk of falling objects.
- Do not stand, walk, or work under suspended loads, nor under the trajectory or in the vicinity of these loads.
- Avoid the parts suffering blows and crushing during transport, handling and storage.
- The material is packed for transport in appropriate containers such as wood or steel pallets, boxes, or strapped in bundles with stable base.
- Strap the bundles sufficiently stable to prevent them from moving and getting damaged. If necessary, protect the items with some sort of buffer.
- Cut the metal strap, standing on the side, using gloves and goggles to prevent getting cut by the bouncing strap or caught in the strap.

### 6.2.2. Transport

- Ensure the stable loading of the material, complying with the instructions of the driver (equilibrated distribution on the lorry bed, fastening of auxiliary items, etc.).

- Keep your distance when opening the containers after transport to prevent injuries from falling objects.

### 6.2.3. Handling

#### 6.2.3.1. Manual handling of loads

- Some ergonomic principles to be followed are listed below:
  - Do not make any sudden jerky movements.
  - Before lifting the load, examine it to detect any sharp corners, dirt, etc. and decide according to its shape, weight and volume for the best way to get a secure grip of the load.
  - Lift, separating the feet at shoulder distance, duck, bending the knees, never the back.
  - Do not attempt to lift alone, any load that is too heavy, too large, or awkward. Use a mechanical lifting device or get a helping hand from co-workers.

#### 6.2.3.2. Mechanical handling of loads

- Only statutory mechanical lifting devices, appropriate for the operation are allowed for use.
- Check the condition of the lifting gear such as slings or cables before each use and report any defects.
- Place lifting accessories and step back to a secure distance from the load and other materials which could get affected.
- Comply with all instructions given by the team chef who is specifically trained for this.
- Cause no sudden acceleration or deceleration of the moving load.
- When conducting difficult or dangerous lifting operations, or in the case that the crane operator

has no obstruction free visual control of the entire trajectory of the load, the crane operations are directed by a banksman who is in constant communication with the crane operator by means of a previously agreed sign code.

- If necessary, use tag lines to control the load from distance. Keep hands clear of suspended load if hands could get caught between the load and another object. Swinging and/or unforeseen movements with the load can cause serious accidents.

#### **6.2.4. Storage**

- Proper storage of the parts is fundamental to keep them in good working condition.
- Wherever possible, store the material in a place protected from atmospheric impact to avoid wear.
- It is recommended to place parts of the same type and dimensions in its respective container (boxes, steel pallets, etc.).
- Ensure the stability of any piles, bearing in mind the following aspects:
  - Load-bearing capacity of the ground
  - Varying ground levels
  - Levelling of the packages
  - Package or container support
  - Package stability
  - State of the strap
  - State and capacity of the containers used
  - Do not stack full containers on top of empty or half-empty containers
  - External conditions (wind, risk of another object hitting the pile, etc.)

## **6.3. INSPECTION AND MAINTENANCE**

### **6.3.1. General guidelines**

- ULMA is responsible for the delivery of the products, for sale or rent, in good working condition.
- From the moment of delivery, the responsibility for correct use, inspection and product maintenance passes on to the purchaser or lessee. All damaged and broken parts, parts with missing components, i.e. all parts in no proper working condition must be removed from service.
- For use, inspection and maintenance of the product, special attention should be paid to the following points:
  - Items aimed to ensure people's safety
  - Items made of aluminium, as they are more vulnerable to damages of the welded joints and deformation

### **6.3.2. Inspection instructions of appliances with CE marking of ULMA Construcción**

Before each use, the condition of these appliances must be checked, and if they do not fulfill all requirements defined in the User's Manual, it must be removed from service.

For more information, consult ULMA Construcción.

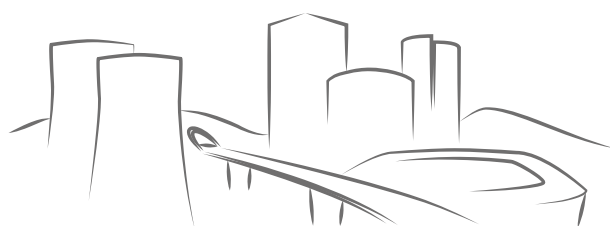
### **6.3.3. Inspection instructions with CE marking of equipment marketed by ULMA Construcción**

Equipment with CE marking marketed by ULMA Construcción is checked following the instructions stipulated in the User's Guide of the respective product.



## 7. Legal references

- **Council Directive 89/391/EEC** of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work.
- **Council Directive 89/654/EEC** of 30 November 1989 concerning the minimum safety and health requirements for the workplace.
- **Council Directive 89/656/EEC** of 30 November 1989 on the minimum health and safety requirements for the use by workers of personal protective equipment at the workplace.
- **Council Directive 90/269/EEC** of 29 May 1990 on the minimum health and safety requirements for the manual handling of loads where there is a risk particularly of back injury to workers.
- **Council Directive 92/57/EEC** of 24 June 1992 on the implementation of minimum safety and health requirements at temporary or mobile construction sites.
- **Council Directive 92/58/EEC** of 24 June 1992 on the minimum requirements for the provision of safety and/or health signs at work.
- **Council Directive 89/655/EEC - Council Directive 95/63/EEC - Directive 2001/45/EC** of the European Parliament and of the Council of 27 June 2001 amending Council Directive 89/655/EEC concerning the minimum safety and health requirements for the use of work equipment by workers at work.
- **Directive 2002/44/EC** of the European Parliament and of the Council of 25 June 2002 on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (vibration).
- **Directive 2003/10/EC** of the European Parliament and of the Council of 6 February 2003 on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (noise).
- **Directive 2006/42/EC** of the European Parliament and of the Council of 17 May 2006 on machinery, and amending Directive 95/16/EC (recast).



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