



CC-4 Horizontal Formwork

Light, safe and fast recoverable formwork with excellent finishes

Construcción



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 document, and the data on stress and loads should be respected. ULMA Construcción'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 elements made by our company only. Combining such equipment with other systems is not only dangerous but 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.

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Index

CC-4 Horizontal Formwork

4	Product description
10	Solutions
28	System features
39	Assembly, use and disassembly
50	Conditions of handling and maintenance
51	Components and accessories
56	ULMA Construcción addresses
60	Our products



Safety note



Control note



Warning note



Information note

► Product description

Light and versatile system with excellent exposed concrete finishes

CC-4 is a recoverable horizontal formwork system for both solid and lightened slabs with a very good finish, focused on residential and non-residential construction.

It is characterised by its fast assembly and disassembly, as well as worker's safety during the handling process. Most of its components are made in aluminium.



▲ Formwork detail

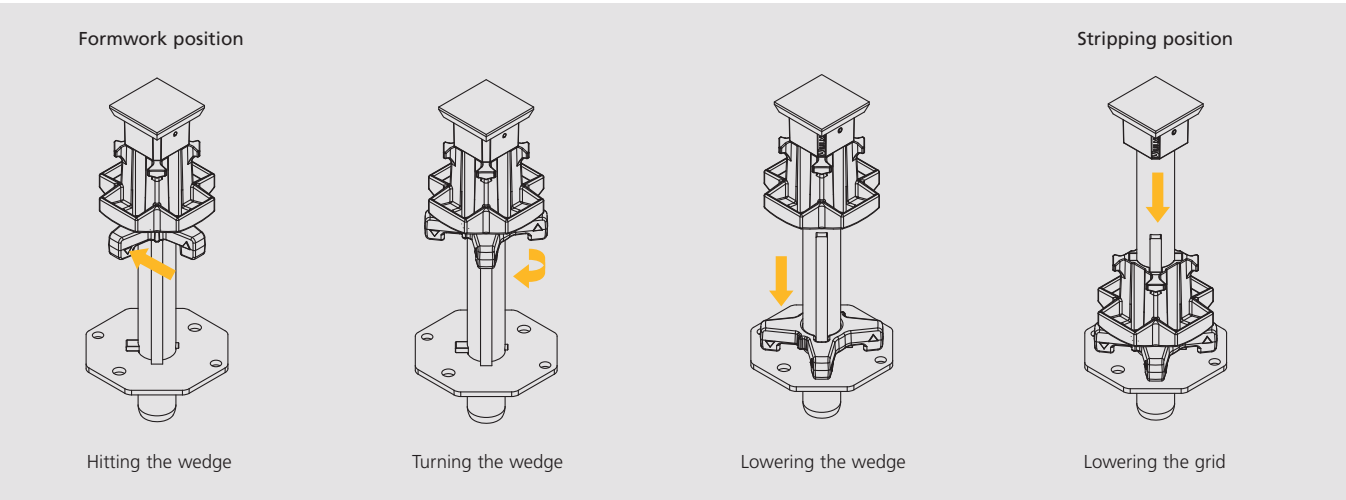
■ Main features of the CC-4

- Most of the components are manufactured in **aluminium**, providing **lightness** to the system.
- It allows the **grid's previous assembly** and the later placement of the panels or plywood.
- **Direction of the beams can be changed** in any position using the **90° assembly**, making the system really flexible.
- The **formwork surface of panels or boards**, depending on the selected system, provides excellent concrete finishes.
- **Only one** remaining element (Drophead) **together with the prop.**
- The striking system allows **material to be recovered** without falling to the floor, contributing to worker's safety.



▲ CC-4 Panel System

The **Drophead CC** allows the materials safe recovery by a simple operation.



CC-4 Horizontal Formwork

The CC-4 System is designed to allow different types of assembly:

► CC-4 Panel System:

Optimal efficiency for large areas

System for solid slabs, primarily focused to **non-residential construction** of large areas, where the **geometry and the span between columns are regular** and the **finish** requirements are highly demanding.

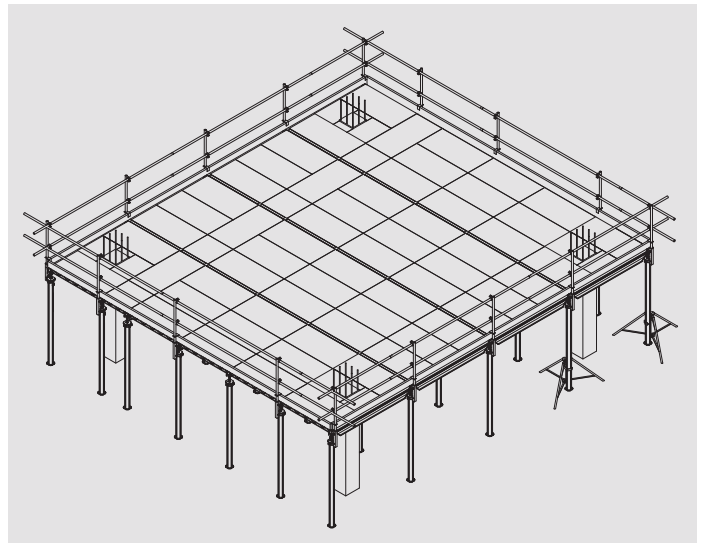
The CC-4 Panel System is composed of Dropheads, Beams, Transversal CC TE and Panels. The shuttering face is composed by Panels, Transversals and Dropheads.

The Drophead enables the recovery of all the parts that belong to the system, except the prop and the Head itself, without any parts falling to the ground.

Repercussion of 0.29 props/m², with the basic dimensions:

- Panel de 1.5 x 0.75 m.
- Reticula de 2.32 x 1.5 m.

The system has elements for infilling on columns and walls, perimeter protection and safety.



✔ CC-4 Ply System:

Excellent finish for any type of geometry

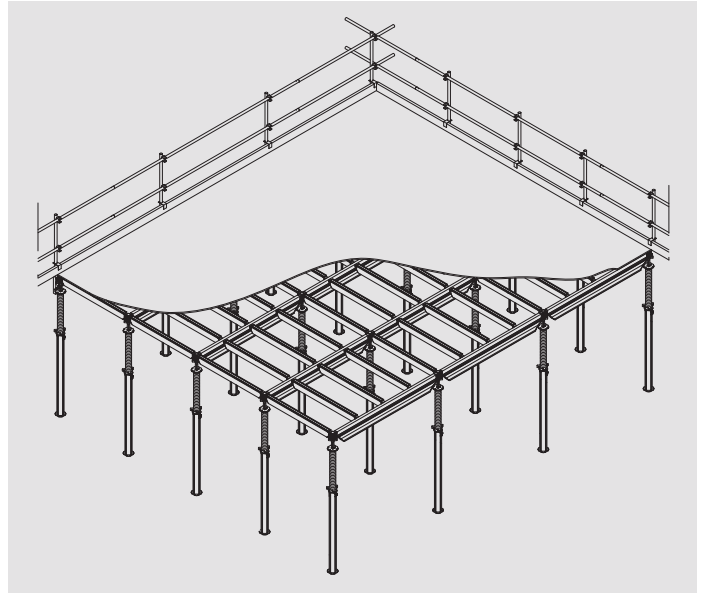
System for slabs primarily focused to **residential** and **non-residential construction**, with **complex geometries** and **very demanding finish** requirements.

System with Dropheads, Beams and Transversals CC TR, forming a grid to place the shuttering boards.

Allows to recover the Beams, Transversals and Boards not trapped by the drophead.

The system has accessories for infilling on columns and walls, perimeter protection and safety.

This system is characterized by its high **versatility**.



■ CC-4 Panel System

▣ Basic components

The basic components of this system are:

■ Drophead CC

It has a dropping system which facilitates dismantling, enabling Panels, Beams and Transversals to descend. This head and the prop are the only remaining elements.



■ Beam CC

It defines the length of the grid, which can be 2.32 or 1.57 m long.



■ Transversal CC TE

It establishes the width of the grid, which can be 1.5 or 0.75 m between axes. It is always in contact with the concrete. It is designed for the joint with the panel to be watertight.



■ Panel CC

The shuttering face is a phenolic plywood fixed into the frame. It includes some hollows on the sides, as handles, to facilitate its manipulation.



■ CC-4 Ply System

▣ Basic components



■ Drophead CCT

Includes a drop system that facilitates dismantling, allowing the Beams and Transversals to descend for their recovery.



■ Beam CC

Determines the length of the grid (2.32 m or 1.57 m).



■ Transversal CC TR

Determines the width of the grid (2.075 m, 1.5 m or 0.75 m) and its plastic block allows the board to be nailed.



■ Board

Shuttering surface in contact with concrete. It may be of any size.



► Solutions

A world of geometrical possibilities

■ grafsystem

Application software

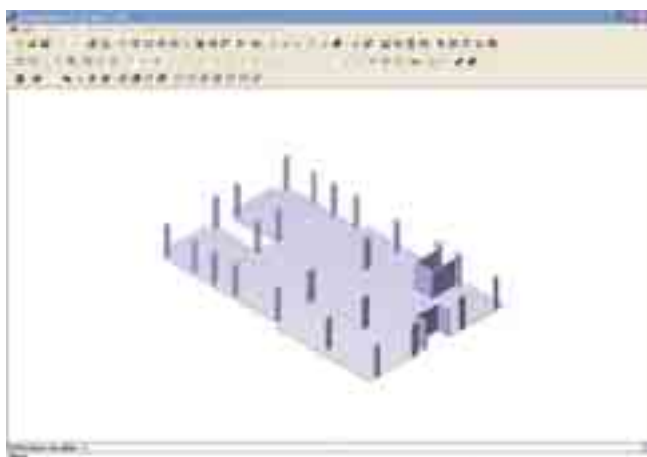
This software, developed by ULMA Construcción, offers the solution for any construction project applying all the products in ULMA's portfolio.

grafsystem obtains, quickly and easily, the assembly drawings and a detailed material's budget for each project.



With the project drawings, ULMA Construcción Technical Department can solve every construction job, when building vertical or horizontal structures.

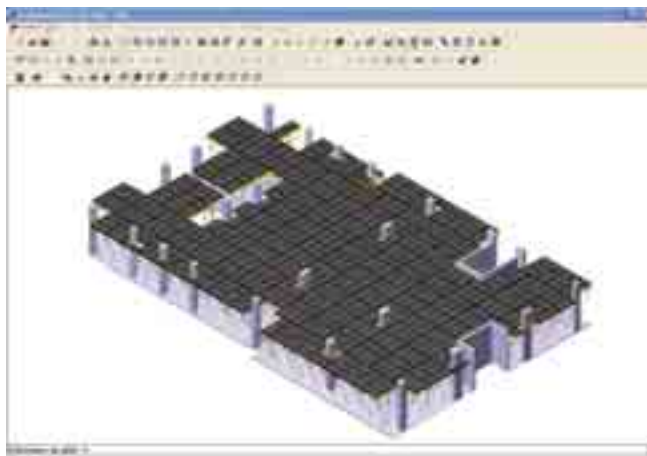
In short, by simply entering the desired structure geometry, this software provides the best solution for any case.



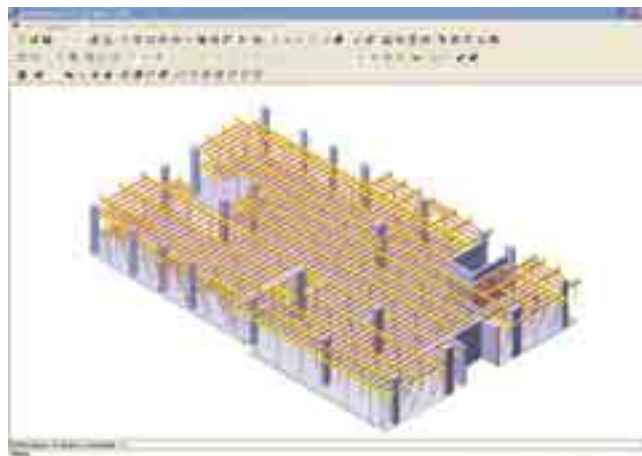
▲ Jobsite geometry



▲ List of materials – budget



▲ Solution – CC-4 Panel System



▲ Solution – CC-4 Ply System

90° assembly

The direction of the formwork can be changed according to need, providing versatility and makes infilling simpler. Beams CC, Transversals CC TE, Transversals CC TR and Panels CC can be placed on the lateral profile of the Beams CC, Beams CC W and Perimeter Beam CC.

The 90° assembly, enables an optimal distribution of the formwork, to improve infilling on columns or hollows, as well as to minimize the infilling on straight or irregular walls.

In every 90° assembly, an additional prop has to be installed to support the beam projected 90°. Using:

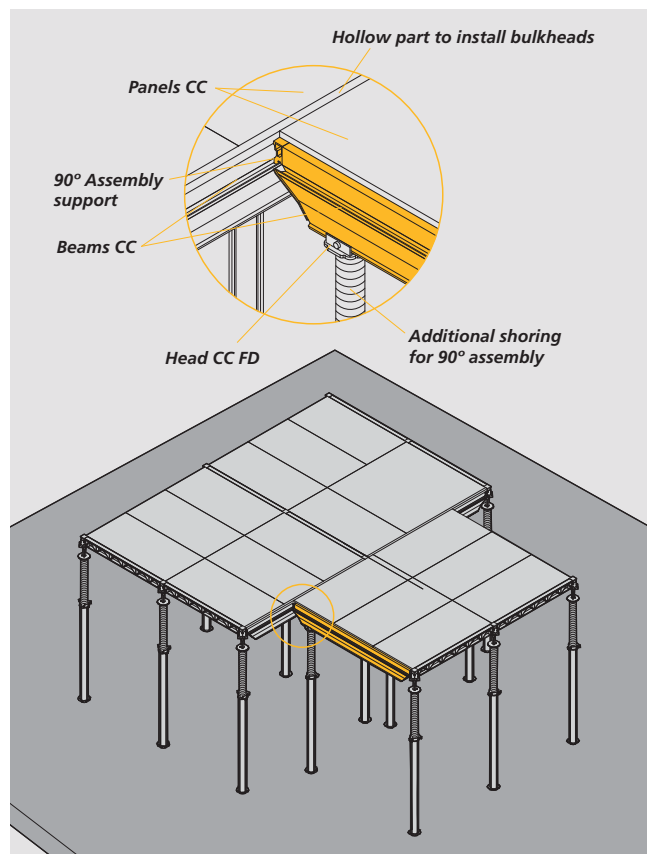
- Head CC FD for 90° assemblies on the basic grid.
- Clamp CC or Tie piece CC LD for 90° assemblies in the perimeter solution, which also prevents the Beam from overturning.



For further information refer to *Perimeter formwork* section.

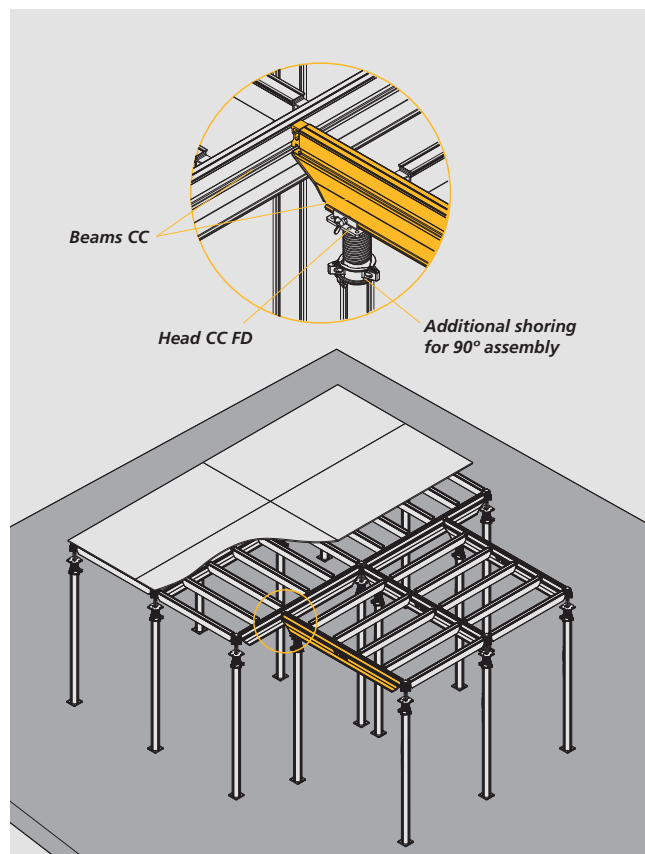


CC-4 Panel System



▲ Basic grid 90° assembly

CC-4 Ply System



▲ Basic grid 90° assembly

■ Infillings

▣ Infilling on column

The optimal situation for infilling on columns is when the layout of the formwork allows to have the columns inside the Beam CC and Transversal CC TE or CC TR grid.

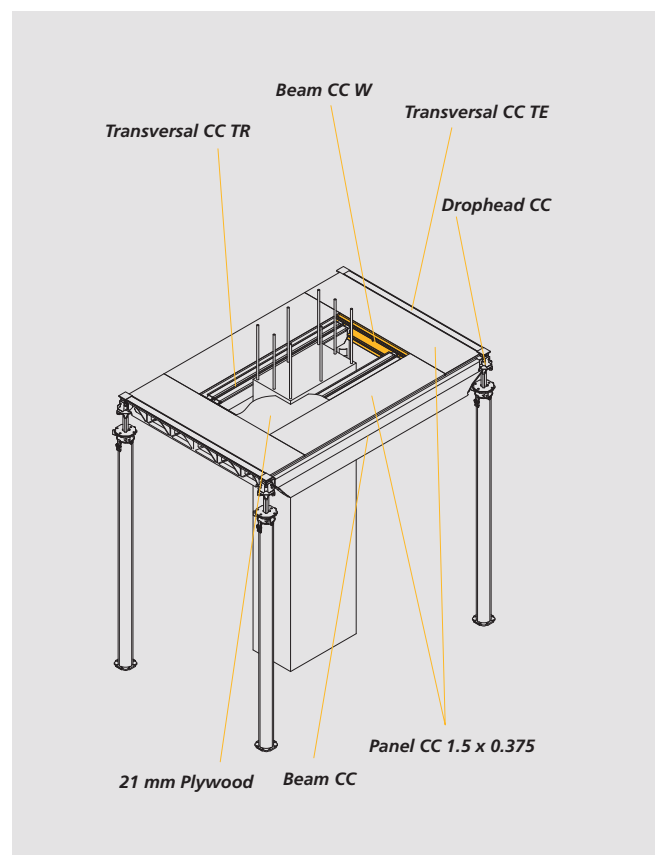
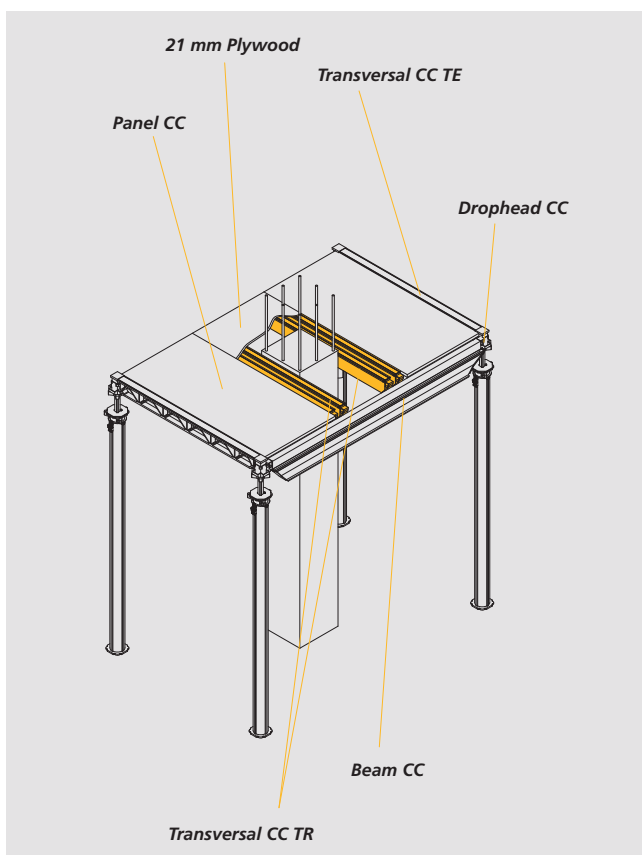
Transversals CC TR are used as a support to nail 21 mm thickness plywood on top.

■ CC-4 Panel System

Column inside the grid

Infilling is done with Transversals CC TR and 21mm thickness plywood when columns dimensions allow it.

If the column's geometry allows it, a collar can be installed using the Beam CC W to support the Transversals CC TR. To minimise the use of infilling plywood, Panel CC 1.5 x 0.375 is available.



If the structure elements coincide with the column, there are two options:

- Carry out a local formwork offset.
- Assemble a narrower local grid.

Column in a panel

Use Transversals CC TR 1.5 on both sides of the column to nail the infilling plywood properly (21 mm-thick plywood).



Column in two Panels

Use Panels CC 1.5 x 0.375 (narrow panel) to reduce the infilling surface until it is equivalent to one single panel.



Column that coincides with the Beam CC

Use the Beam CC W 1.5 for the local column off-set.



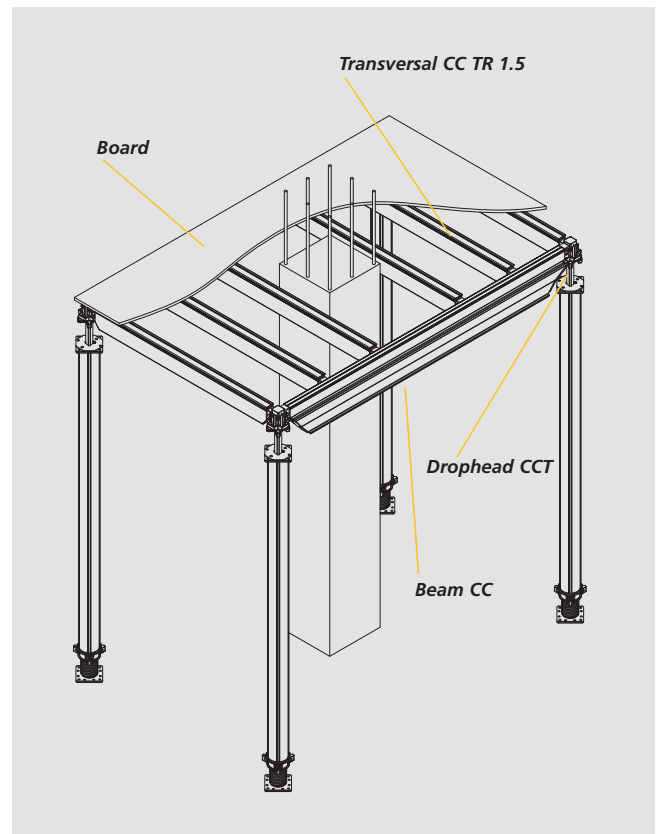
▲ Assembly begins in the area of capitals

■ CC-4 Ply System

The infilling on column is done in a simple manner, since the Transversals CC TR can be placed at any point of the beam.

Depending on the dimension of the column, Beams CC W can be used to place additional Transversals CC TR.

The flexibility and versatility of the CC-4 Ply Horizontal Formwork allows completing the column infillings quickly and easily.



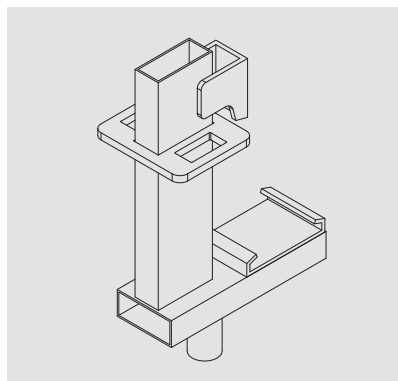
Infilling on walls

CC-4 Panel System

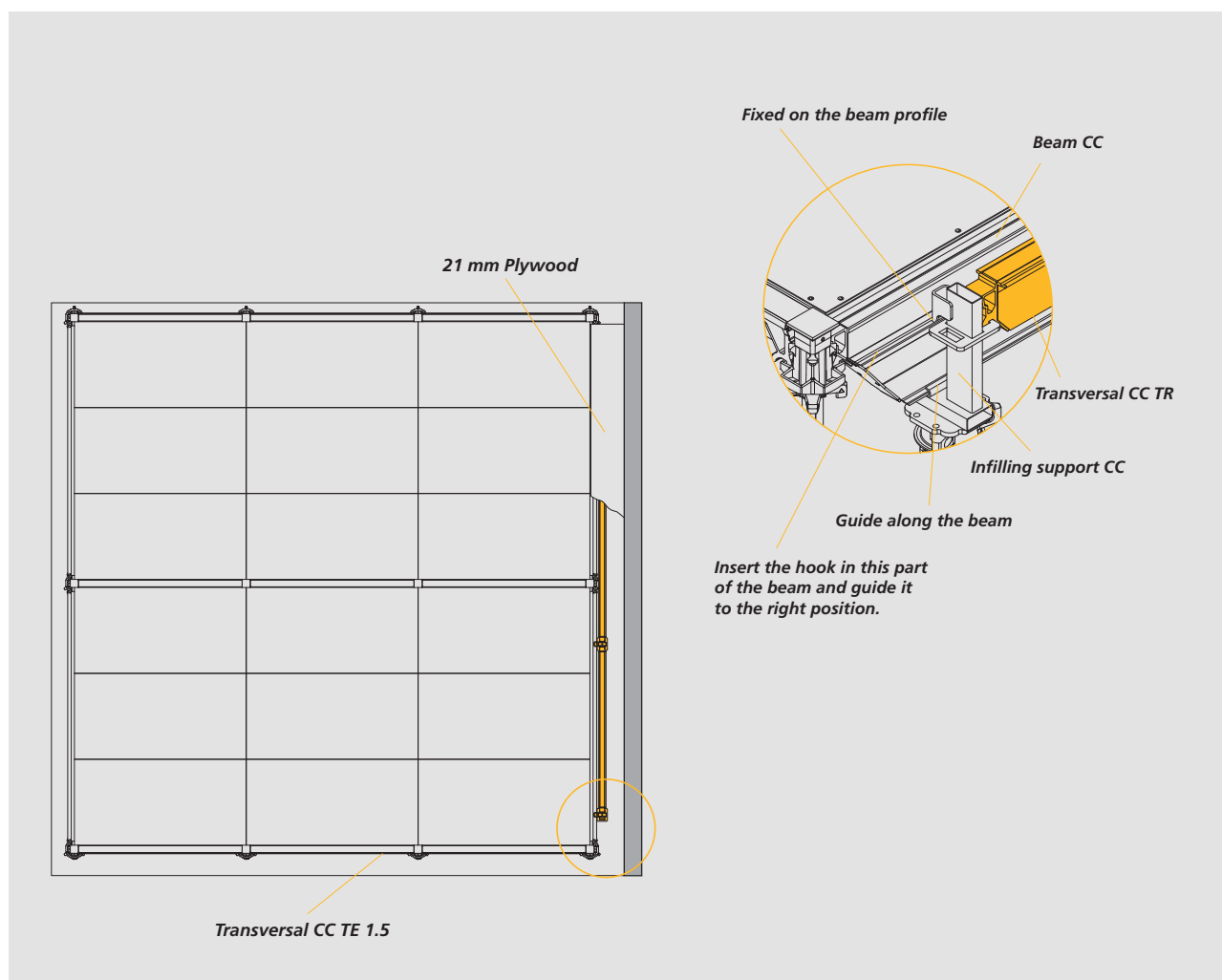
Infilling on walls in the direction of the Beams CC

The formwork should be as close as possible to the wall. Changing the direction of the beams (90° assembly) may improve the infillings on walls.

The CC Infilling support installed on the Beam CC provides support to install Transversals CC TR parallel to the Beam and, facilitate the infilling on walls, providing support for the 21 mm Infilling plywood.



◀ CC Infilling supports



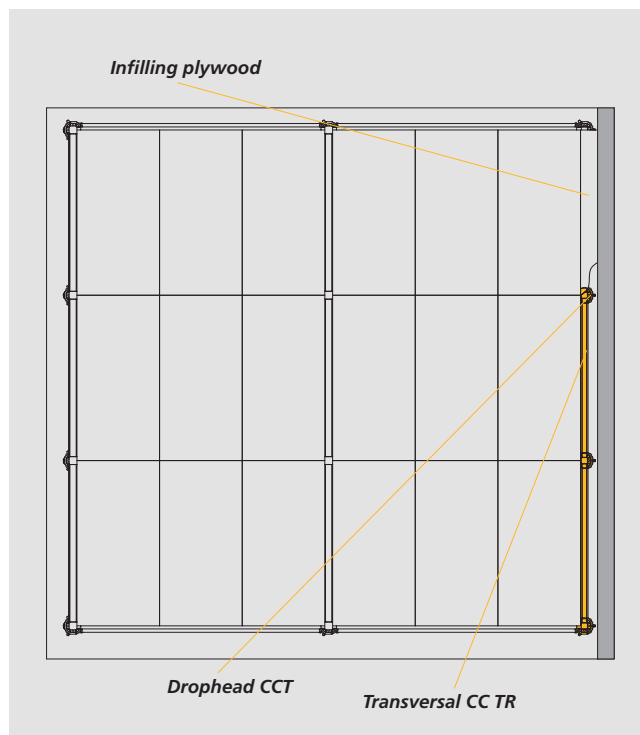
Infilling on walls in the perpendicular direction of the Beams CC

The Dropheads should also be installed as close as possible to the wall, combining different lengths of the Beam CC.

In the last grid, close to the wall, replace the Dropheads CC with Dropheads CCT, and the Transversals CC TE with the Transversals CC TR to support the 21mm Infilling plywood.



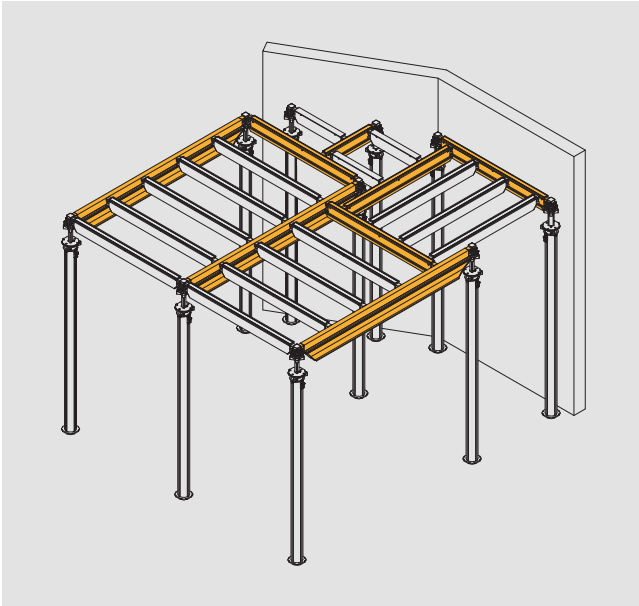
This solution is preferable because the infilling is easier.



Use the Drophead CCT and Transversal CC TR to nail the 21 mm plywood for infilling on walls.

The Timber beams VM 20 can be used in both the CC-4 Panel and the CC-4 Ply Systems to support the Infilling board.





■ CC-4 Ply System

Regardless of whether the union between walls is a straight angle or not, the infilling is facilitated since the beams can be rested on top of each other.



■ Perimeter formwork

The perimeter formwork allows the placement of the stopend and provides a perimeter working surface.

CC-4 offers two options for the perimeter assembly:

- Solution with a Perimeter beam
- Solution with a Perimeter clamp

■ Solution with Perimeter beam

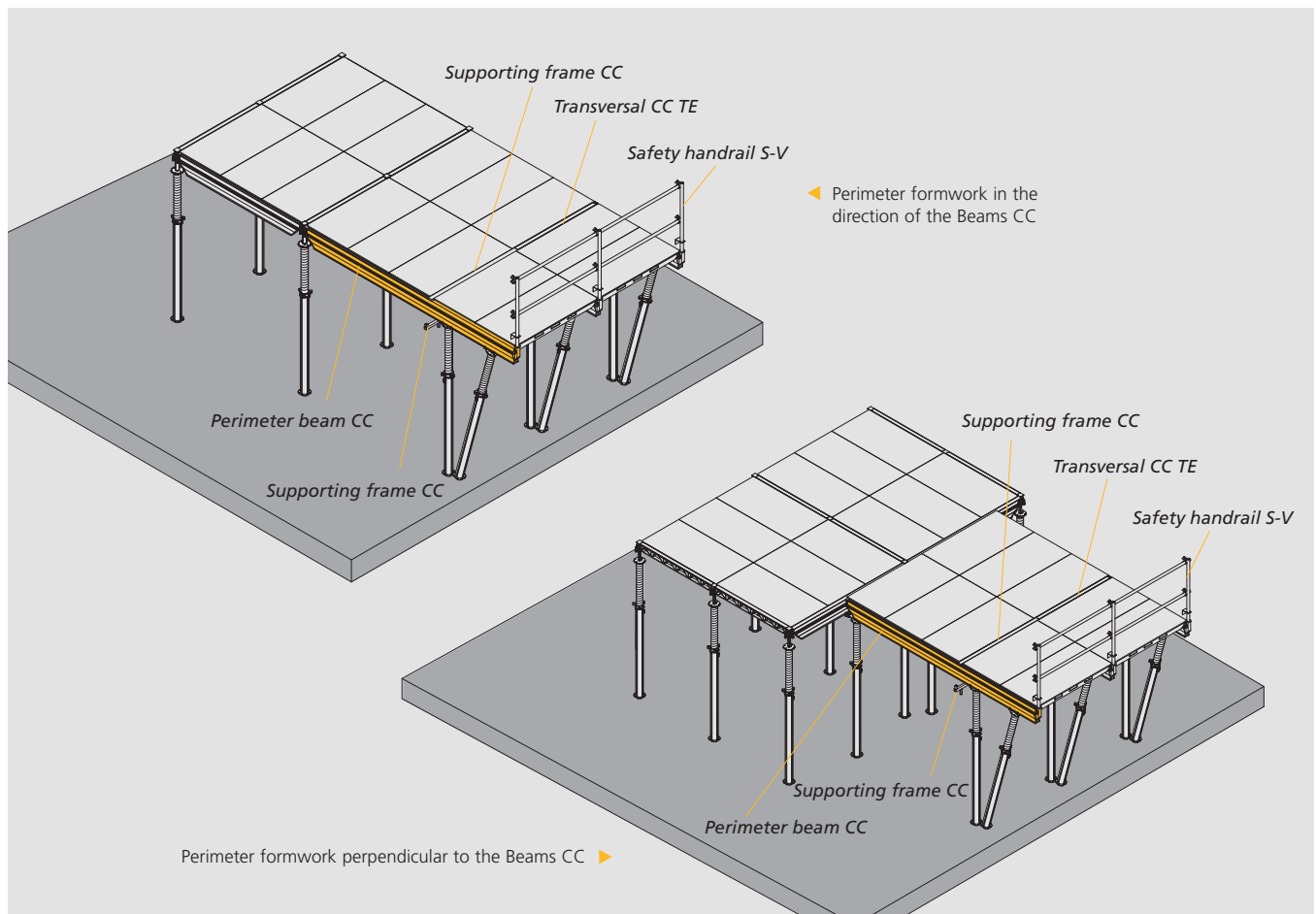
The assembly of the Perimeter beams CC can be done starting from the CC Dropheads (in the direction of the Beams CC), or from the Beams CC (perpendicular to the Beams CC).

The difference between both assemblies is the safety accessories they use. This way it is possible to cover all the area to be shuttered.



In order to prevent the Perimeter beam CC from tipping over, use the Fixing hook CC in the direction of the Beams CC and the Clamp CC perpendicular to the Beams CC.

■ CC-4 Panel System





- ▲ Use of the Perimeter beam CC with the Clamp CC and the Supporting frame CC to solve the perimeter area



The perimeter formwork with Perimeter beams CC will always project less than a panel and a half, i.e., no more than 1.1 m.

■ CC-4 Ply System



- ▲ Perimeter formwork solution with Perimeter beam CC in the CC-4 Ply System

CC-4 Horizontal Formwork

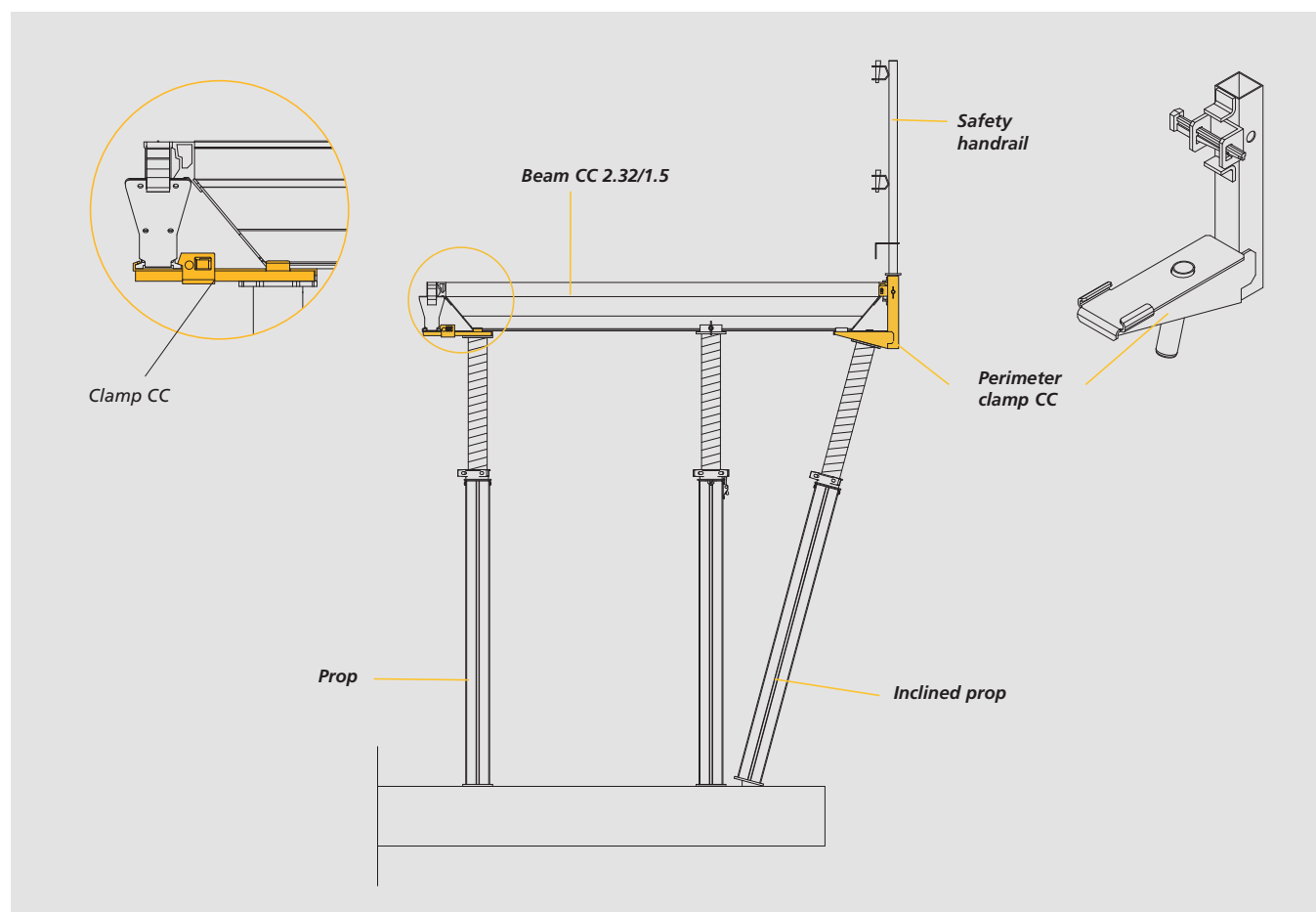
► Solution with Perimeter clamp

The Perimeter clamp CC on the Beam CC is used as an alternative to the Perimeter beam CC.

As with Perimeter beams CC, the assembly can be carried out starting from a Drophead CC (in the direction of the Beams CC), or from the 90° assembly from a Beam CC (perpendicular to the Beams CC). The Perimeter clamp CC is always assembled on a Beam CC.

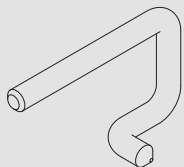


The maximum distances at the end of the slab are 0.75 m (when using a 2.32 m Beam CC) and 0.5 m (when using a 1.57 m Beam CC).



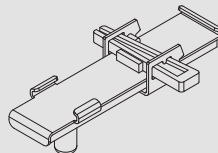
■ Safety elements

Fixing hook CC



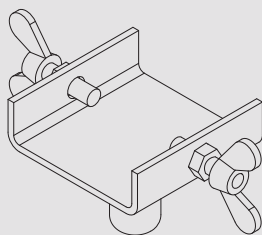
This part has the same purpose as the Clamp CC when it is installed on the drophead, to prevent the beams situated on the perimeter from overturning.

Clamp CC



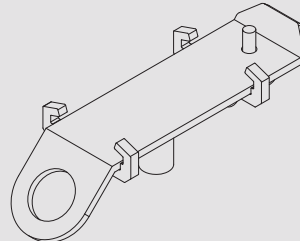
It is an element to fasten beams assembled at 90° to prevent the beams placed on the perimeter from overturning. It has a socket for a reinforcement prop.

Head CC FD



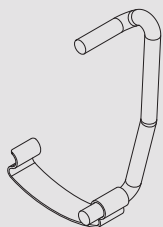
The Head CC FD is an auxiliary head to install additional props, either under beams or between panels if necessary. The most common use is to reinforce a beam in a 90° assembly.

Tie piece CC LD



It is an element that is inserted and fixed on the lower part of the perimeter beam to anchor the beam to the slab with a cable or chain. It is a useful element for the perimeter solution.

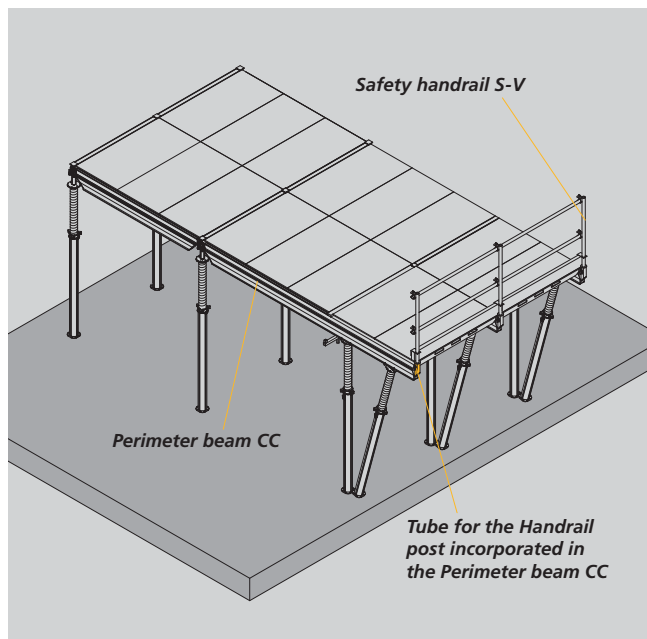
Wind clip



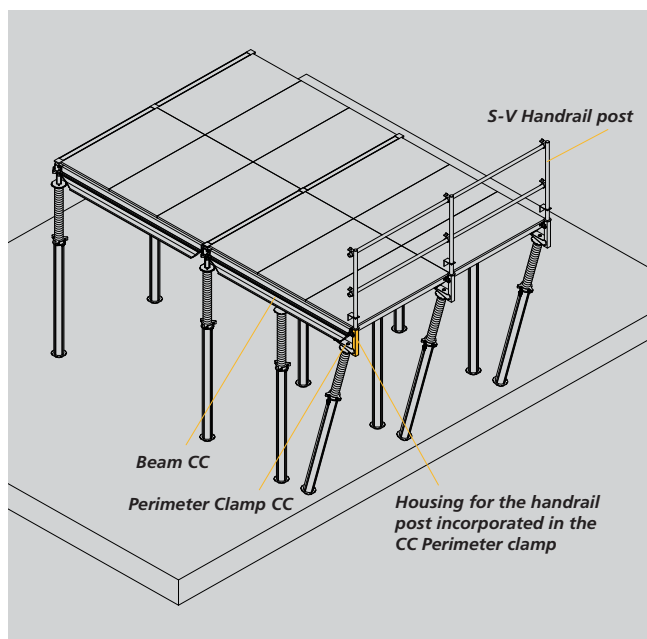
A part used to fasten the Panel CC to the Beam CC, in the event of high wind stress on the perimeter grids and in formworks of great height subject to wind.

■ Perimeter formwork

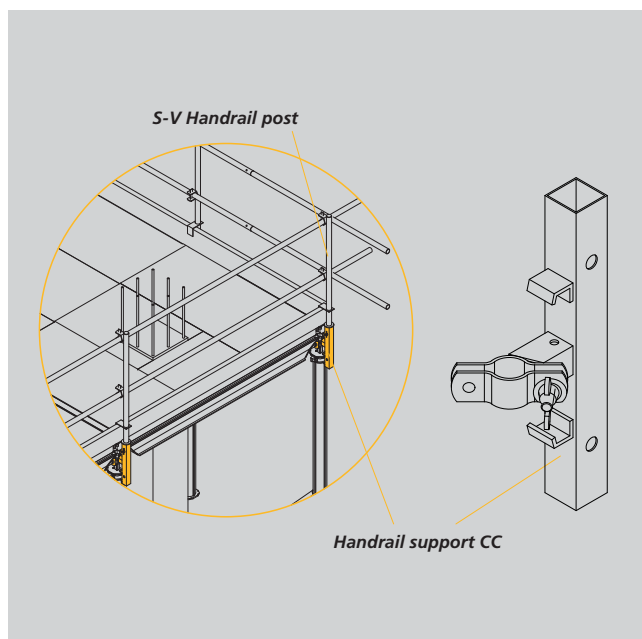
The perimeter protection will be carried out by installing the Handrail posts and the corresponding tubes or wood planks and toeboards around the formwork's perimeter.



▲ Perimeter beam CC, which incorporates a tube for the Safety handrail on its end ▲



▲ Perimeter clamp CC, which incorporates a tube for the Safety handrail on its end



▲ Handrail support CC, which enables the installation of the Safety handrail when placed on the Drophead CC



▲ Perimeter railing to provide safety during the execution process ▲

■ Lightened slabs

Lightened slabs can be made using the CC-4 Panel System. To avoid punching the lightening blocks, the Drophead CCT and Supporting transversals are used, instead of the Drophead CC and Transversal CC TE. The Drophead CCT allows the beams and the panels to be

recovered keeping them from falling when the concrete has reached the minimum required resistance. Once the head is stripped, the Supporting transversal and the prop remain as supporting elements until the concrete has reached the required strength.

Supporting frame CC



Jobsite references



▲ Las Arenas Commercial Center, Barcelona (Spain) ▲



▲ Fira Towers, Barcelona (Spain) ►





▲ S and V Tower, Madrid (Spain)



▲ S and V Tower, Madrid (Spain) ▲



▲ Castelnuovo del Garda Commercial Center, Verona (Italy)



▲ Woodstock Hospital (Canada)



▲ Torch Tower, Dubai (UAE)



▲ Torreldones Commercial Center, Madrid (Spain)



▲ Forum Coimbra (Portugal)



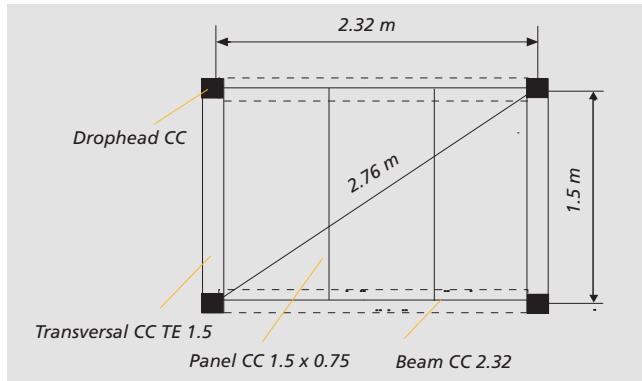
▲ Renoma Commercial Center, Wroclaw (Poland) ▲

System features

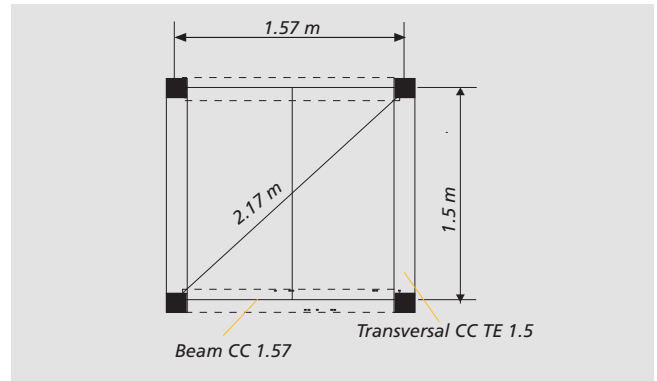
CC-4 Panel System

Grids

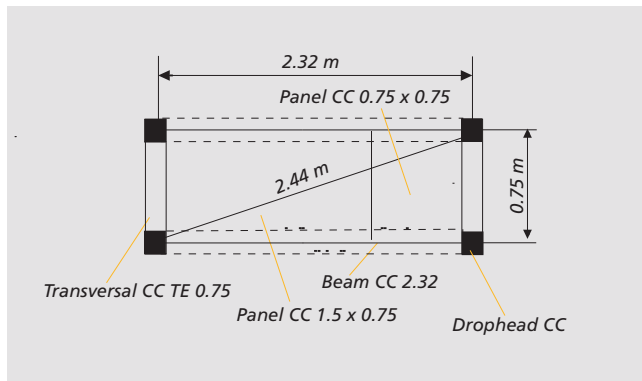
Depending on the needs, the following grids can be assembled with the CC-4 Panel System.



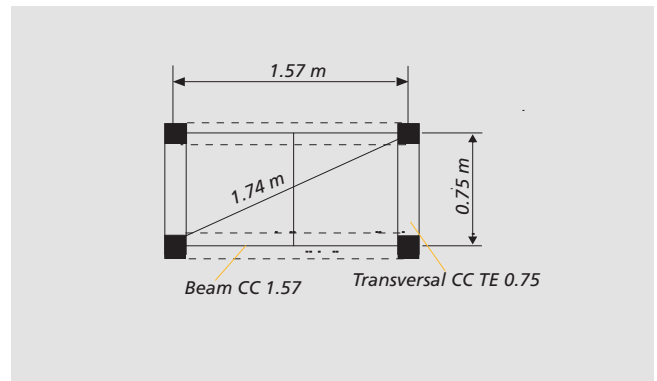
▲ 2.32 x 1.5 Grid



▲ 1.57 x 1.5 Grid

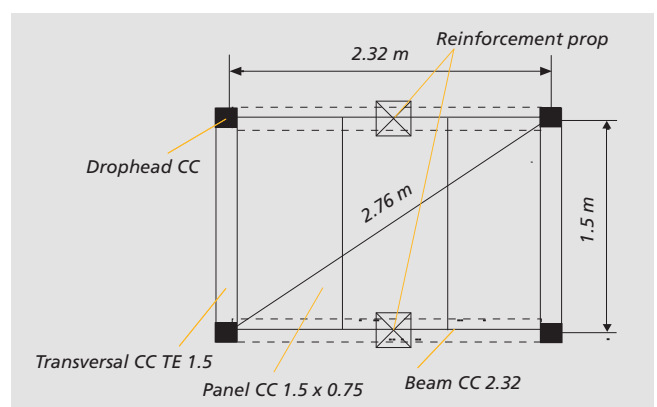


▲ 2.32 x 0.75 Grid



▲ 1.57 x 0.75 Grid

The maximum slab thickness reached by the different grids depends on the size of the grid and the finish quality required. To achieve this, the beam and panel deflections should be added and verified that they are smaller than the maximum deflection for the required finish quality. Nevertheless, it has to be verified that the loads applied to each element are not higher than their working load. Finally, check the shoring, which depends on the type of props that are used and the clear height.



▲ 2.32 x 1.5 Grid with reinforced beam



The formwork system can be used up to 90 cm slab thickness.

■ Maximum slab thicknesses

The following maximum slab thicknesses are established for the different grids:

GRID (m)	MAXIMUM SLAB THICKNESS (cm)
2.32 x 1.5	40
1.57 x 1.5	60
2.32 x 1.5 Reinforced beam	60
2.32 x 0.75	90
1.57 x 0.75	90

▲ CC-4 Panel System's maximum slabs



▲ CC-4 Panel System in dismantling phase



■ Loads transferred to the prop

The following table lists the loads transferred to the prop, depending on the slab's thickness and the grid:

Slab thickness (cm)	GRIDS				
	BEAM 2.32			BEAM 1.57	
	1.50 m GRID		0.75 m GRID	1.50 m GRID	0.75 m GRID
	PROP LOAD (kN)	PROP LOAD (kN) (Reinforced beam *)	PROP LOAD (kN)	PROP LOAD (kN)	PROP LOAD (kN)
5	9.60		4.80	6.50	3.20
10	13.90		7.00	9.40	4.70
15	18.30		9.10	12.40	6.20
20	22.60		11.30	15.30	7.70
25	27.00		13.50	18.30	9.10
30	31.30		15.70	21.20	10.60
35	36.10		18.10	24.40	12.20
40	40.90	25.56	20.40	27.70	13.80
45		28.55	22.80	30.90	15.50
50		31.54	25.20	34.10	17.10
55		34.53	27.60	37.40	18.70
60		37.52	30.00	40.60	20.30
65			32.40		21.90
70			34.80		23.60
75			37.00		25.00
80			39.20		26.50
85			41.30		28.00
90			43.50		29.40



Attention should be paid to the load that the remaining support prop should bear upon the removal of the extra prop. It is necessary to verify this load.



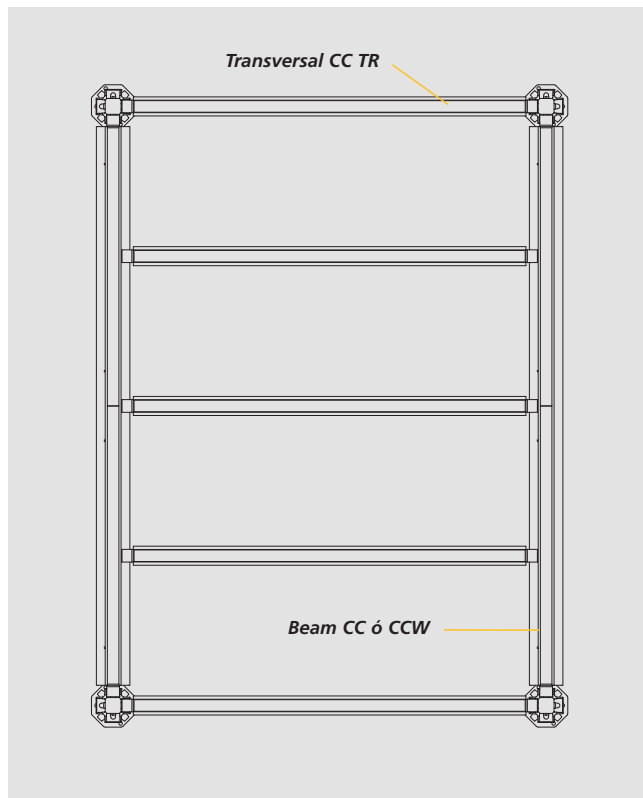
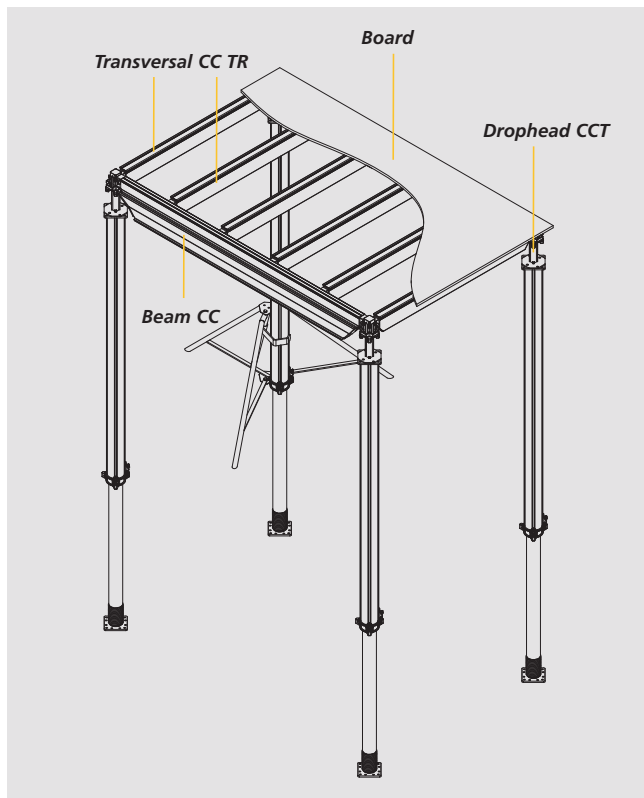
Props shall be used correctly, respecting load limits, plumbed and with a stable support.



CC-4 Ply System

Grids

Depending on the selection of the Beam CC or the Beam CC W, and the size of the Transversal CC TR and the distance between them, different grids are obtained.



SOLUTION WITH BEAM CC		GRID
Beam CC 2.32	Transversal CC TR 2.075	2.32 x 2.075
	Transversal CC TR 1.5	2.32 x 1.5
	Transversal CC TR 0.75	2.32 x 0.75
Beam CC 1.57	Transversal CC TR 2.075	1.57 x 2.075
	Transversal CC TR 1.5	1.57 x 1.5
	Transversal CC TR 0.75	1.57 x 0.75
SOLUTION WITH BEAM CC W		GRID
Beam CCW 2.075	Transversal CC TR 2.075	2.075 x 2.075
	Transversal CC TR 1.5	2.075 x 1.5
	Transversal CC TR 0.75	2.075 x 0.75
Beam CCW 1.5	Transversal CC TR 2.075	1.5 x 2.075
	Transversal CC TR 1.5	1.5 x 1.5
	Transversal CC TR 0.75	1.5 x 0.75



▲ CC-4 Ply System Grid

CC-4 Horizontal Formwork

The maximum slab thickness feasible with each grid depends on the grid dimensions, the board used and the desired finish quality.



Maximum slab thicknesses

Below is a list of the maximum slab thicknesses with the Beam CC 2.32 and Transversals CC TR, with various distances between them and different boards:

Distance between Transversals (mm)	Grid	Maximum slab thickness (cm)		
	Type of board	BIRCH 15 mm	BETO 18 mm	BETO 21 mm
580	Beam CC 2.32 x Transversal CC TR 2.075	28	31	31
	Beam CC 2.32 x Transversal CC TR 1.5	37	44	44
	Beam CC 2.32 x Transversal CC TR 0.75	51	52	75
464	Beam CC 2.32 x Transversal CC TR 2.075	31	31	31
	Beam CC 2.32 x Transversal CC TR 1.5	44	44	44
	Beam CC 2.32 x Transversal CC TR 0.75	80	80	90



■ Working load tables for CC-4 Ply System

As an example, the following table includes the finish quality for each slab thickness with the Beam CC 2.32 and different Transversals CC TR with a separation of 580 mm between them, according to **DIN 18202**, using different types of boards.

Colour	Finish in accordance with DIN 18202
7	Group 7
6	Group 6
5	Group 5
Restricted	Load restrictions

Distance between 580 mm Transversals CC TR	BEAM CC 2.32											
	Transversal CC TR 2.075				Transversal CC TR 1.5				Transversal CC TR 0.75			
	BIRCH 15 mm	BETO 18 mm	BETO 21 mm	Prop Load (kN)	BIRCH 15 mm	BETO 18 mm	BETO 21 mm	Prop Load (kN)	BIRCH 15 mm	BETO 18 mm	BETO 21 mm	Prop Load (kN)
Slab thickness (cm)	TOTAL deflection	TOTAL deflection	TOTAL deflection		TOTAL deflection	TOTAL deflection	TOTAL deflection		TOTAL deflection	TOTAL deflection	TOTAL deflection	
5	7	7	7	13.24	7	7	7	9.57	7	7	7	4.79
10				19.26				13.92				6.96
11				20.46				14.79				7.40
12	6	7	7	21.66	7	7	7	15.66	7	7	7	7.83
13				22.87				16.53				8.27
14				24.07				17.40				8.70
15	6	6	7	25.27	6	7	7	18.27	7	7	7	9.14
16				26.48				19.14				9.57
17				27.68				20.01				10.01
18	5	6	6	28.88	5	6	6	20.88	6	7	7	10.44
19				30.09				21.75				10.88
20				31.29				22.62				11.31
21	5	5	5	32.49	5	6	6	23.49	6	7	7	11.75
22				33.70				24.36				12.18
23				34.90				25.23				12.62
24	5	5	5	36.11	5	6	6	26.10	6	7	7	13.05
25				37.31				26.97				13.49
26				38.51				27.84				13.92
27	5	5	5	39.72	5	6	6	28.71	6	7	7	14.36
28				40.92				29.58				14.79
29				42.12				30.45				15.23
30	5	5	5	43.33	5	6	6	31.32	5	6	6	15.66
31				44.65				32.28				16.14
32				45.97				33.23				16.62
33	Restricted	Restricted	Restricted	47.30	Restricted	5	5	34.19	5	6	6	17.10
34				48.62				35.15				17.57
35				49.95				36.11				18.05
36	Restricted	Restricted	Restricted	51.27	Restricted	5	5	37.06	5	5	6	18.53
37				52.59				38.02				19.01
38				53.92				38.98				19.49
39	Restricted	Restricted	Restricted	55.24	Restricted	Restricted	Restricted	39.93	Restricted	Restricted	5	19.97
40				56.56				40.89				20.45
41				57.89				41.85				20.92
42	Restricted	Restricted	Restricted	59.21	Restricted	Restricted	Restricted	42.80	Restricted	Restricted	5	21.40
43				60.54				43.76				21.88
44				61.86				44.72				22.36
45	Restricted	Restricted	Restricted	63.18	Restricted	Restricted	Restricted	45.68	Restricted	Restricted	5	22.84
46				64.51				46.63				23.32
47				65.83				47.59				23.79
48	Restricted	Restricted	Restricted	67.16	Restricted	Restricted	Restricted	48.55	Restricted	Restricted	5	24.27
49				68.48				49.50				24.75
50				69.80				50.46				25.23
51	Restricted	Restricted	Restricted	71.13	Restricted	Restricted	Restricted	51.42	Restricted	Restricted	5	25.71
52				72.45				52.37				26.19
53				73.77				53.33				26.67
54	Restricted	Restricted	Restricted	75.10	Restricted	Restricted	Restricted	54.29	Restricted	Restricted	5	27.14
55				76.42				55.25				27.62
60				83.04				60.03				30.02
61	Restricted	Restricted	Restricted	84.37	Restricted	Restricted	Restricted	60.99	Restricted	Restricted	5	30.49
62				85.69				61.94				30.97
63				87.01				62.90				31.45
64	Restricted	Restricted	Restricted	88.34	Restricted	Restricted	Restricted	63.86	Restricted	Restricted	5	31.93
65				89.66				64.82				32.41
70				96.28				69.60				34.80
75	Restricted	Restricted	Restricted	102.30	Restricted	Restricted	Restricted	73.95	Restricted	Restricted	5	36.98

CC-4 Horizontal Formwork



- ▲ To check the slab thicknesses for other layouts and the prop loads, refer to the CC-4 Ply User's Manual



- ▲ Grid assembly for CC-4 Ply System



- ▲ Boards assembly for CC-4 Ply System

■ Prop working loads

■ Working loads for EP Props with CC-4

The following table shows the working loads obtained by calculation according to **EN 1065**, when EP Props are used with CC-4 Formwork.

Prop	C25		C+D30		C+D35		C+D40	
Inner Tube	Above	Below	Above	Below	Above	Below	Above	Below
h (m)	1.48 - 2.50 m		1.72 - 3.00 m		1.98 - 3.50 m		2.22 - 4.00 m	
5.00								
4.90								
4.80								
4.70								
4.60								
4.50								
4.40								
4.30								
4.20								
4.10								
4.00							23.20	27.10
3.90							24.90	29.30
3.80							26.70	31.70
3.70							28.50	34.30
3.60							30.50	37.20
3.50					29.80	34.70	32.60	40.50
3.40					32.30	38.10	35.00	43.05
3.30					34.90	41.90	37.60	43.05
3.20					37.70	43.05	40.50	43.05
3.10					40.80	43.05	42.30	43.05
3.00			23.30	28.20	43.05	43.05	43.05	43.05
2.90			25.30	31.30	43.05	43.05	43.05	43.05
2.80			27.50	34.80	43.05	43.05	43.05	43.05
2.70			29.90	38.90	43.05	43.05	43.05	43.05
2.60			32.50	43.05	43.05	43.05	43.05	43.05
2.50	32.30	36.30	34.20	43.05	43.05	43.05	43.05	43.05
2.40	35.80	41.10	35.50	43.05	43.05	43.05	43.05	43.05
2.30	37.80	43.05	37.10	43.05	43.05	43.05	43.05	43.05
2.20	39.10	43.05	39.20	43.05	43.05	43.05		
2.10	40.20	43.05	42.20	43.05	43.05	43.05		
2.00	41.70	43.05	43.05	43.05	43.05	43.05		
1.90	43.05	43.05	43.05	43.05				
1.80	43.05	43.05	43.05	43.05				
1.70	43.05	43.05						
1.60	43.05	43.05						
1.50	43.05	43.05						



Inner tube below **ALWAYS** with screwed head.

CC-4 Horizontal Formwork

Prop	C+D45		C+D50		C+E30		C+E40	
Inner Tube	Above	Below	Above	Below	Above	Below	Above	Below
h (m)	2.48 - 4.50 m		2.73 - 5.00 m		1.71 - 3.00 m		2.22 - 4.00 m	
5.00			23.70	26.40				
4.90			25.10	28.40				
4.80			26.60	30.30				
4.70			28.10	32.20				
4.60			29.70	34.30				
4.50	28.90	32.60	31.40	36.60				
4.40	30.80	35.00	33.20	39.10				
4.30	32.80	37.60	35.20	41.90				
4.20	35.00	40.30	37.40	43.05				
4.10	37.20	43.40	39.80	43.05				
4.00	39.70	43.05	42.40	43.05			36.00	40.50
3.90	42.40	43.05	43.05	43.05			38.80	43.05
3.80	43.05	43.05	43.05	43.05			41.80	43.05
3.70	43.05	43.05	43.05	43.05			43.05	43.05
3.60	43.05	43.05	43.05	43.05			43.05	43.05
3.50	43.05	43.05	43.05	43.05			43.05	43.05
3.40	43.05	43.05	43.05	43.05			43.05	43.05
3.30	43.05	43.05	43.05	43.05			43.05	43.05
3.20	43.05	43.05	43.05	43.05			43.05	43.05
3.10	43.05	43.05	43.05	43.05			43.05	43.05
3.00	43.05	43.05	43.05	43.05	39.70	43.05	43.05	43.05
2.90	43.05	43.05	43.05	43.05	43.05	43.05	43.05	43.05
2.80	43.05	43.05	43.05	43.05	43.05	43.05	43.05	43.05
2.70	43.05	43.05			43.05	43.05	43.05	43.05
2.60	43.05	43.05			43.05	43.05	43.05	43.05
2.50	43.05	43.05			43.05	43.05	43.05	43.05
2.40					43.05	43.05	43.05	43.05
2.30					43.05	43.05	43.05	43.05
2.20					43.05	43.05		
2.10					43.05	43.05		
2.00					43.05	43.05		
1.90					43.05	43.05		
1.80					43.05	43.05		
1.70								
1.60								
1.50								



Inner tube below ALWAYS with screwed head.

■ Working loads for ALUPROP Prop

The following table lists the **working loads (KN)** of the ALUPROP Prop for each height. The most appropriate one should be selected for each case depending on the load to carry and the height to cover.

Inner Tube	Above	Below	Above	Below	Above	Below	Above	Below
h (m)	1.65 - 2.80 m		2.20 - 3.70 m		3.30 - 4.80 m		4.50 - 6.00 m	
1.65	151.20	106.90						
1.70	148.60	106.90						
1.80	143.40	106.90						
1.90	138.20	106.60						
1.95	135.50	106.20						
2.00	132.80	105.70						
2.10	127.30	104.40						
2.20	121.70	102.70	132.40	115.50				
2.30	116.10	100.50	126.70	110.80				
2.40	110.30	97.90	121.00	106.30				
2.50	104.40	94.80	115.50	101.90				
2.60	98.50	91.40	110.10	97.70				
2.70	92.40	87.40	104.70	93.60				
2.80	86.30	83.10	99.40	89.70				
2.90			94.20	86.00				
3.00			89.10	82.40				
3.10			84.10	79.00				
3.20			79.10	75.70				
3.30			74.30	72.60	89.60	75.70		
3.40			69.50	69.70	85.20	73.40		
3.50			64.80	66.90	80.90	71.20		
3.60			60.20	64.30	76.80	68.90		
3.70			55.70	61.80	72.80	66.70		
3.80					69.00	64.40		
3.90					65.30	62.20		
4.00					61.80	59.90		
4.10					58.40	57.60		
4.20					55.20	55.30		
4.30					52.10	53.00		
4.40					49.20	50.70		



This data is for new Props. Props should be used plumbed and with centred vertical load.



The Props can be used with the Inner tube above or below, as long as it is taken into consideration that the load capacity is different for each case.

CC-4 Horizontal Formwork

Inner Tube	Above	Below	Above	Below	Above	Below	Above	Below
h (m)	1.65 - 2.80 m		2.20 - 3.70 m		3.30 - 4.80 m		4.50 - 6.00 m	
4.50					46.40	48.40	51.90	47.10
4.60					43.80	46.10	50.10	45.70
4.70					41.30	43.70	48.40	44.20
4.80					38.90	41.40	46.60	42.80
4.90							44.80	41.40
5.00							42.90	40.00
5.10							41.10	38.60
5.20							39.20	37.20
5.30							37.40	35.80
5.40							35.50	34.40
5.50							33.60	33.00
5.60							31.70	31.60
5.70							29.80	30.20
5.80							27.80	28.80
5.83							27.30	28.40
5.90							25.90	27.50
6.00							23.90	26.10



This data is for new Props. Props should be used plumbed and with centred vertical load.



The Props can be used with the Inner tube above or below, as long as it is taken into consideration that the load capacity is different for each case.



▲ For further information refer to CC-4 Panel and CC-4 Ply Horizontal Formwork User's Manual

▶ Assembly, use and disassembly

Lightness, safety and speed

■ Assembly instructions

▶ CC-4 Panel System

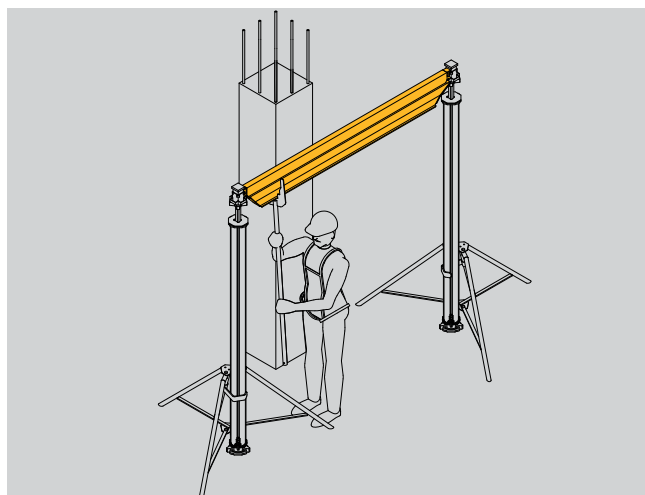
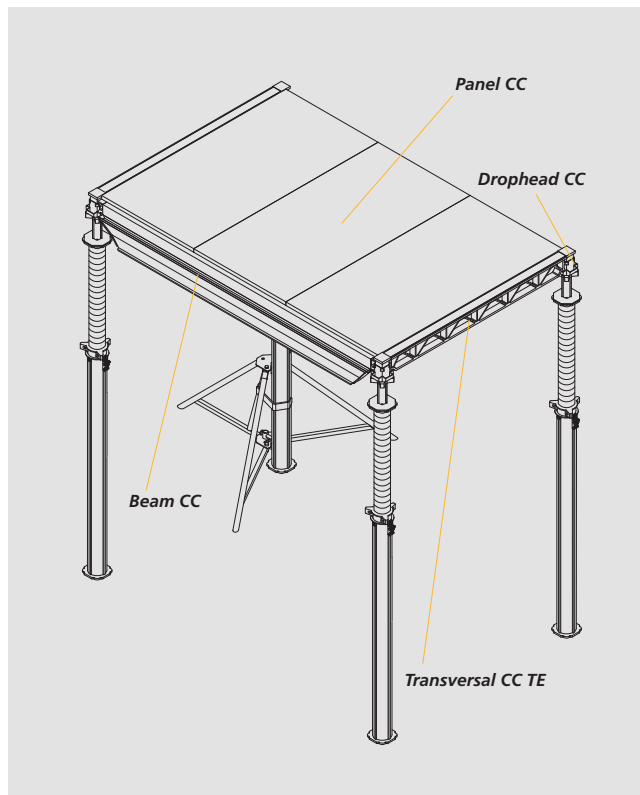
The basic grid is formed by Beams CC and Transversals CC TE, supported by Dropheads CC. Panels CC are supported by the beams.

The parts in contact with the concrete are: Panels CC, Transversals CC TE and Dropheads CC.

The only remaining element is the Drophead CC, with its corresponding prop.



▶ For further information refer to CC-4 Panel Horizontal Formwork User's Manual



- ▲ • Assemble the Dropheads CC on the props.
- Following the layout, stabilise the prop with tripods round a column and hang a Beam CC from the dropheads.

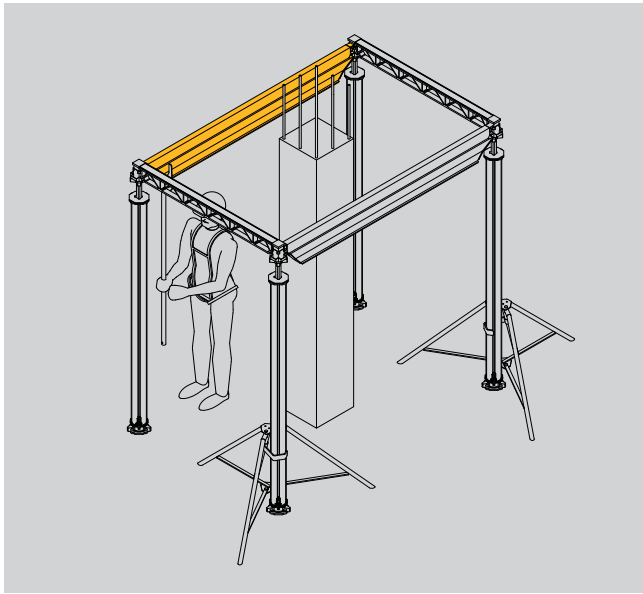


▲ Layout before assembling the grid

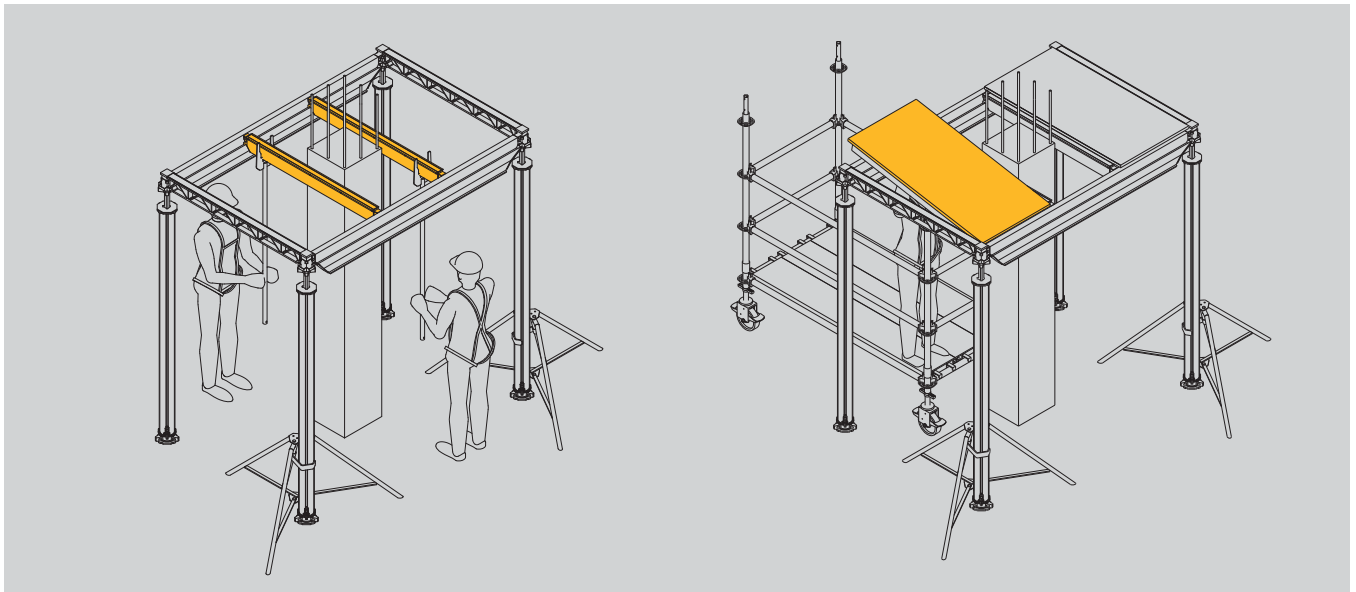


Verify the correct fitting of the Head.

CC-4 Horizontal Formwork



- 2 • Install two props with Dropheads CC and assemble the Transversals CC TE.
• Close the grid with a Beam CC and place it around the column following the layout.



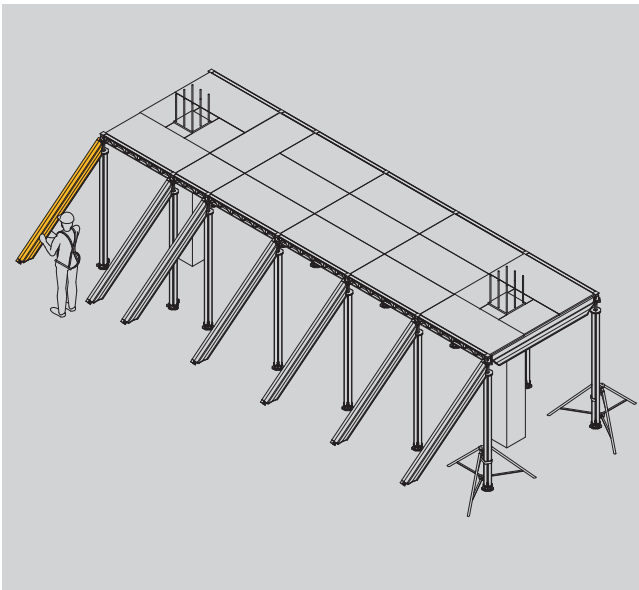
- 3 • Install the Panels CC and Transversals CC TR to proceed with the infilling on the column.
• Infill the column with 21 mm plywood.



- 4 • Assemble the grid in the direction of the Transversal and level it.



▲ Assemble the grid

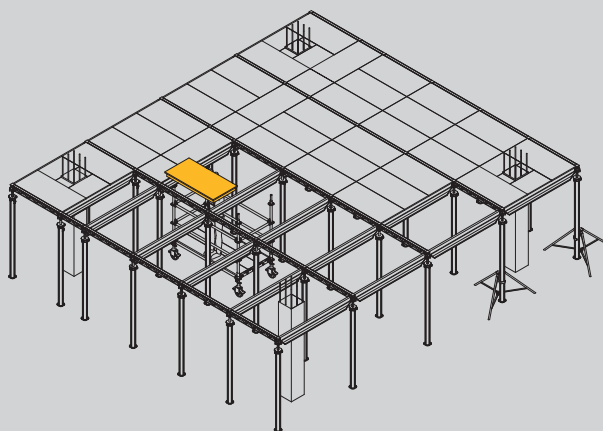


- 5 • Install the Panels CC and carry out the infilling on columns.
• Hang Beams CC to continue the assembly in the direction of the main beam. Level the grid.



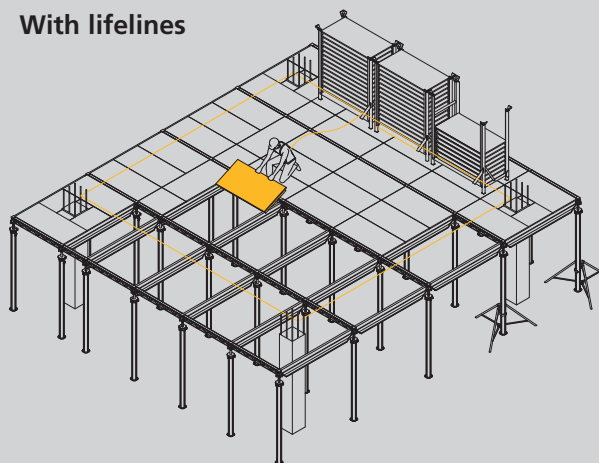
▲ Beams CC assembly

From mobile towers



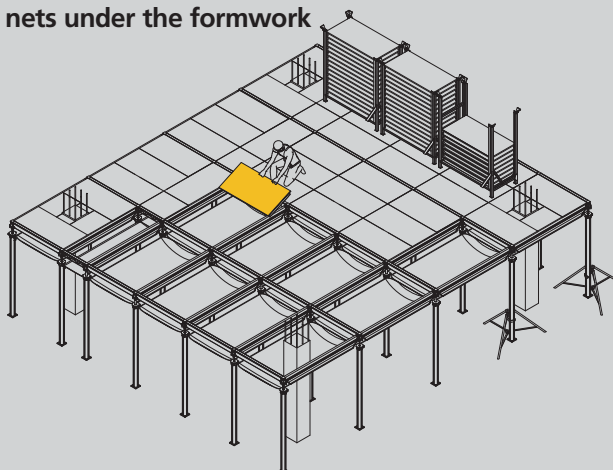
- ▶ The beams and panels are designed so as all the panels in the same grid can be placed without moving the mobile tower.

With lifelines



- ▶ It enables the installation of several panels from a fixed point of the working platform, because panels slide along the beams until they stop against the transversals.

With nets under the formwork



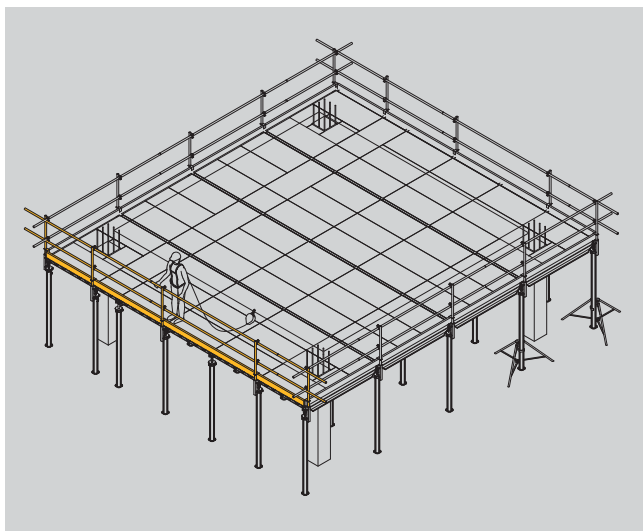
Simple net hook

- ▶ Detail of attaching the net to the Drophead CC

6 • Assemble the grid and the Panels CC



Mounting the Panels CC from ▶
lifting platforms



- ▲ Finish assembling the Panels CC and the infilling on columns.
- Install the Safety handrails and Toe boards, always while wearing a harness that is attached to a lifeline.



▲ Detail of Handrail post assembly



DISMANTLING: In normal setting conditions, recoverable material can be removed after three days.

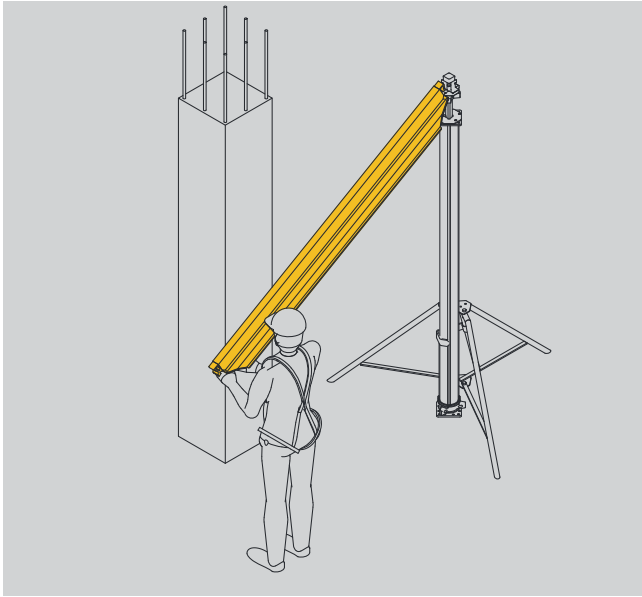
CC-4 Ply System

The basic grid is formed by Beams CC and Transversals CC TR, which rest on the Dropheads CCT. The Transversals and the heads are the elements supporting the board.

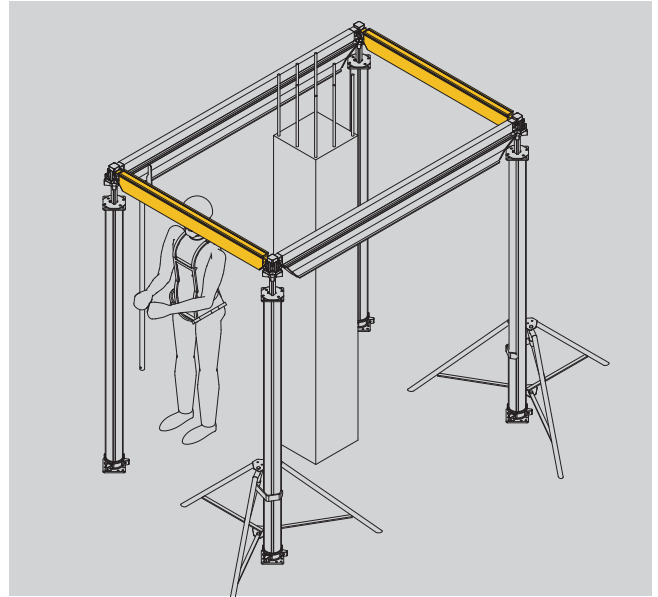


- ▲ For further information refer to CC-4 Ply Horizontal Formwork User's Manual

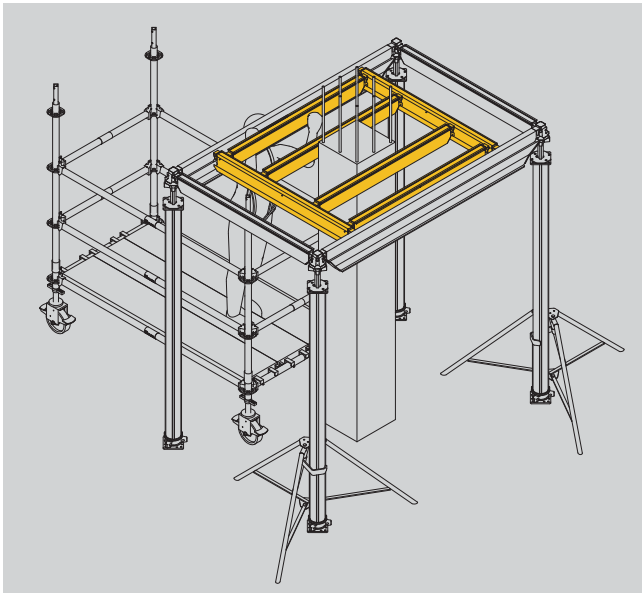




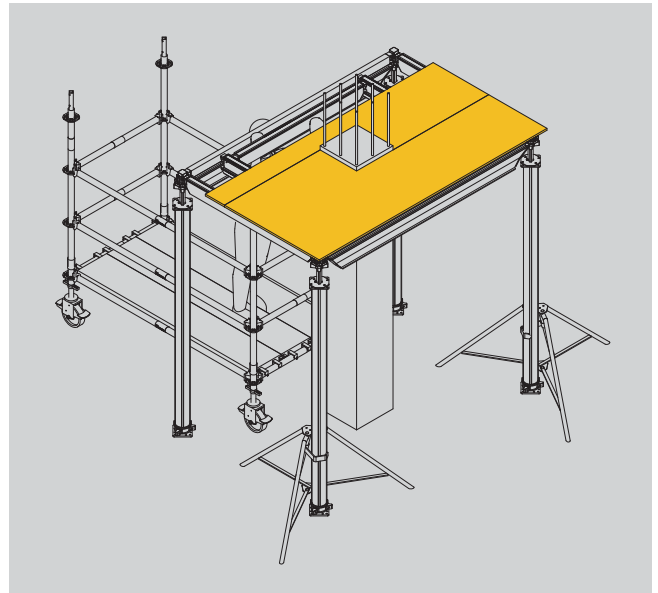
- 1
- Assemble the Dropheads CCT on the props.
 - Verify the correct fitting of the head.
 - Following the layout, stabilise the prop with tripods round a column and hang a Beam CC from the head.
 - Place the Drophead CCT on the prop, stabilise it with a tripod and mount the Beam CC or the Beam CC W.



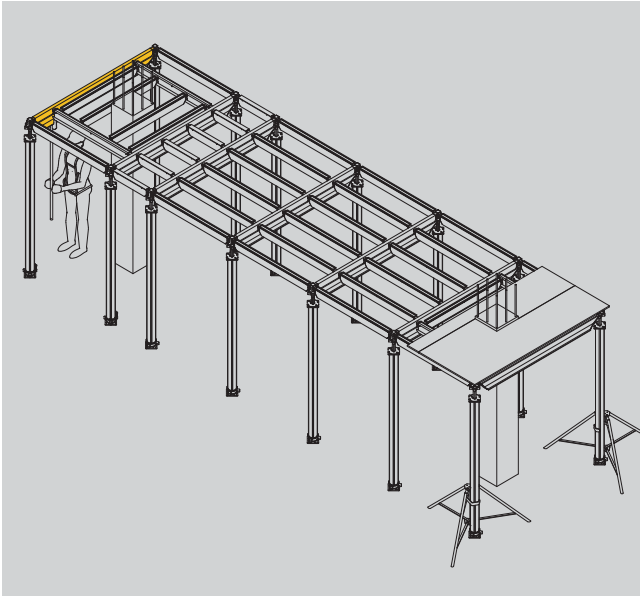
- 2
- Hang two Transversals CC TR from the Dropheads CCT.
 - Install two props with Dropheads CCT and assemble the Transversals CC TR.
 - Close the grid with a Beam CC or Beam CC W and place it around the column following the layout.



- 3
- Install the Beams CC W and Transversals CC TR to carry out the infilling on the column.



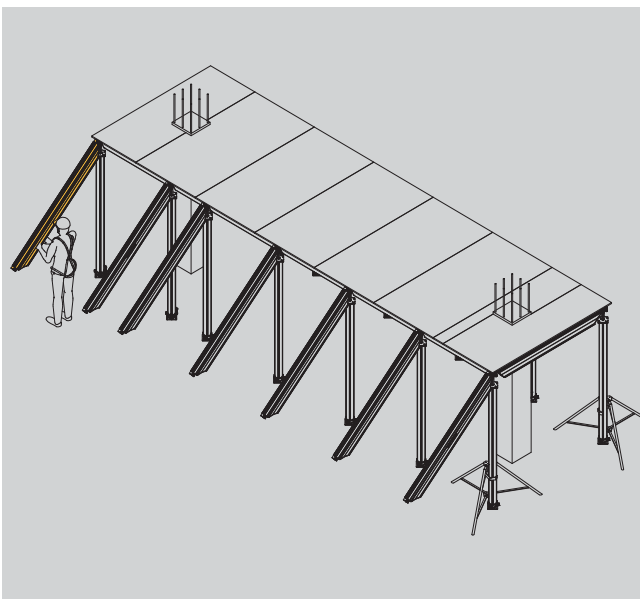
- 4
- Infill the column with plywood.



- 5 • Assemble the grid in the direction of the Transversal and level it.



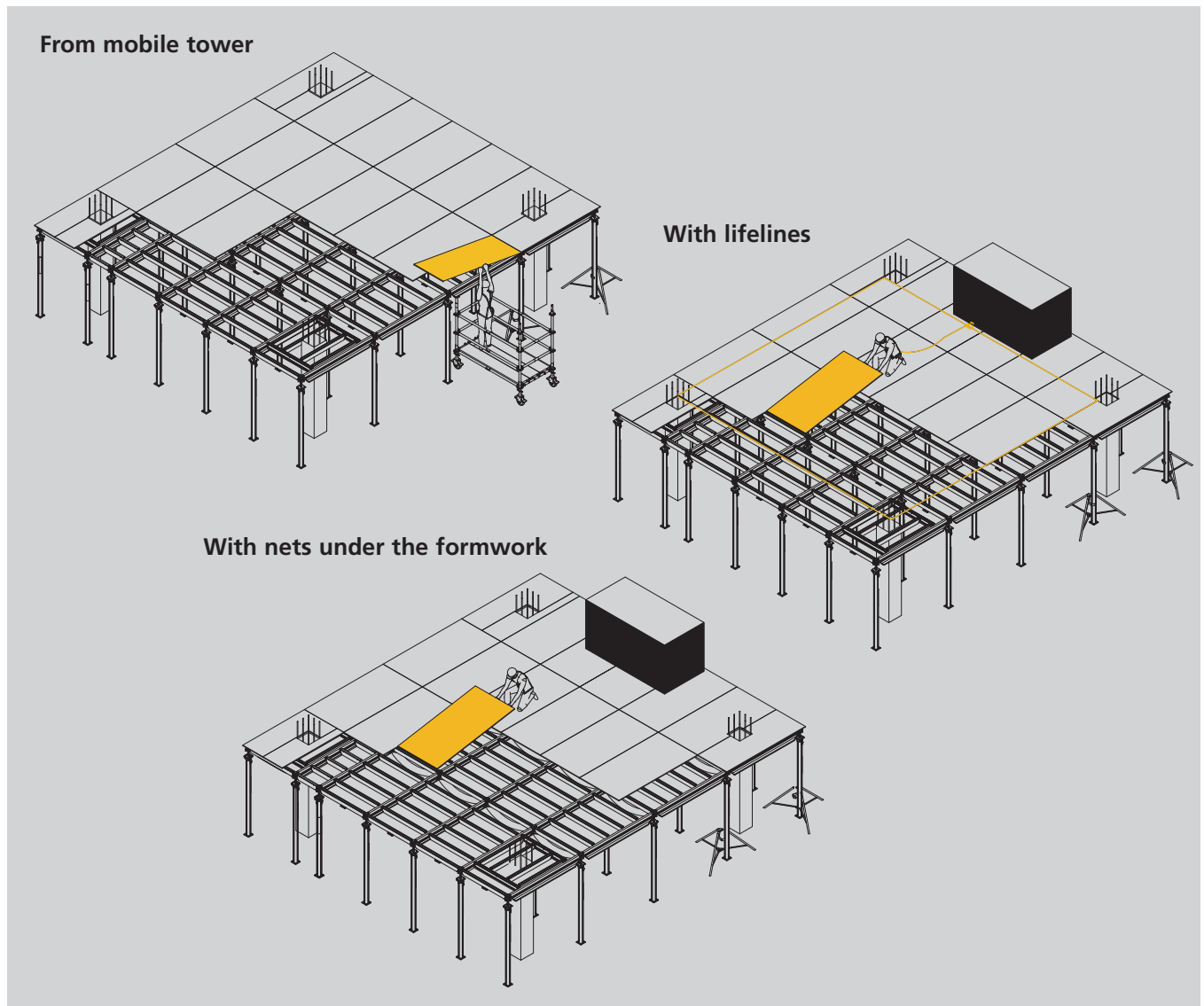
▲ Grid assembly for CC-4 Ply System



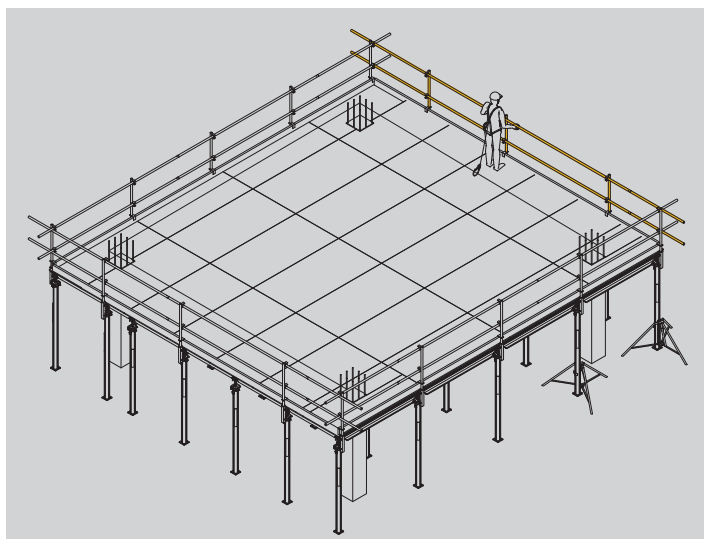
- 6 • Carry out the infilling on columns.
- Place Beams CC or Beams CC W to continue the assembly in the longitudinal direction. Level the grid.



▲ Perimeter beam CC assembly



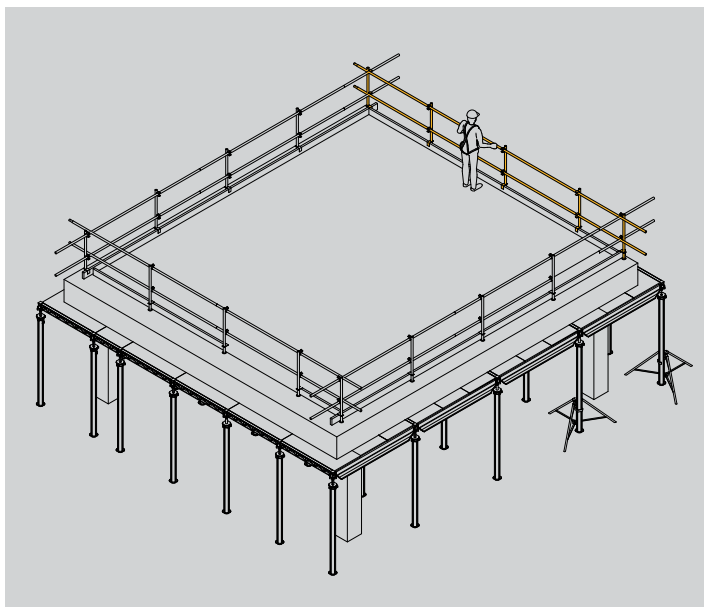
- 7 • Assemble the boards.



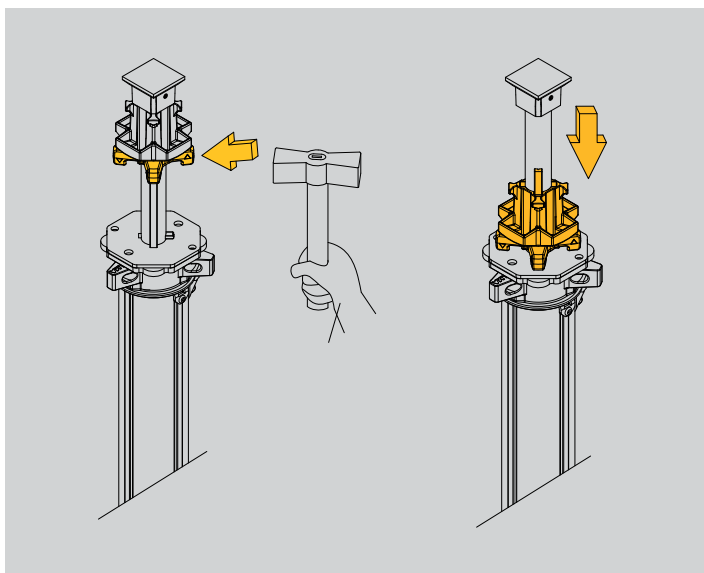
- 8 • Finish assembling the boards and carry out the infilling on columns.
- Install the Safety handrails and Toe boards, always wearing a harness attached to a lifeline.

Disassembly instructions

CC-4 Panel System

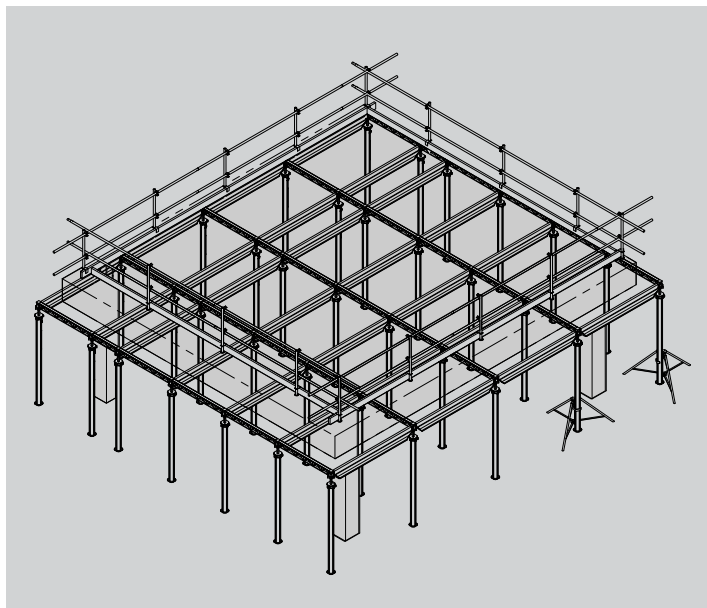


- 1 • Move the Safety handrail (Handrail, Handrail support and Toe boards) to the plastic handrail support or replace it with another type of perimeter protection.
- Remove the additional props for infilling or 90° assembly.

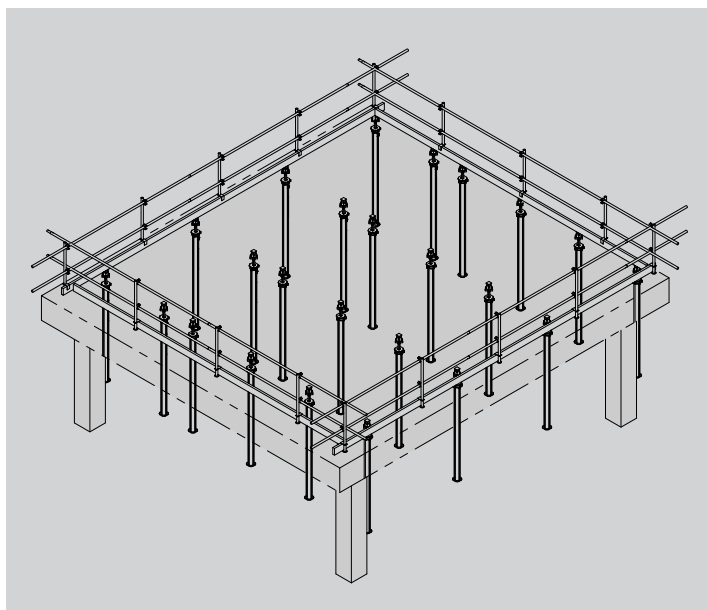


- 2 • Strike the wedges on the Dropheads CC, except the ones on the Perimeter beams.
- The wedge drops 150 mm and then the Beams, Transversals and Panels drop too.





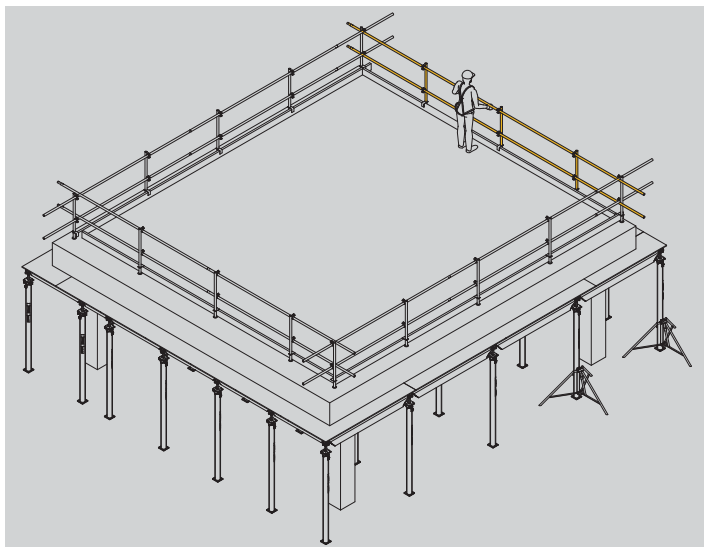
- 3 • Remove the Panels.



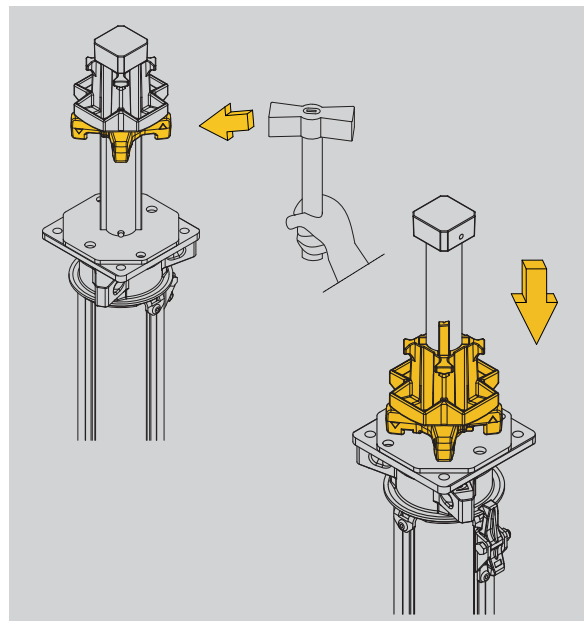
- 4 • Remove the Transversals CC TE and Beams CC.



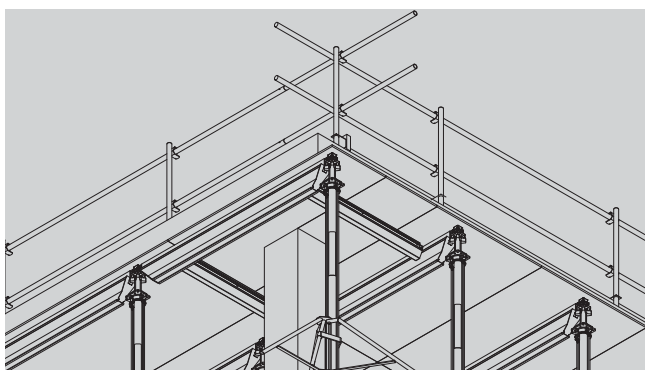
CC-4 Ply System



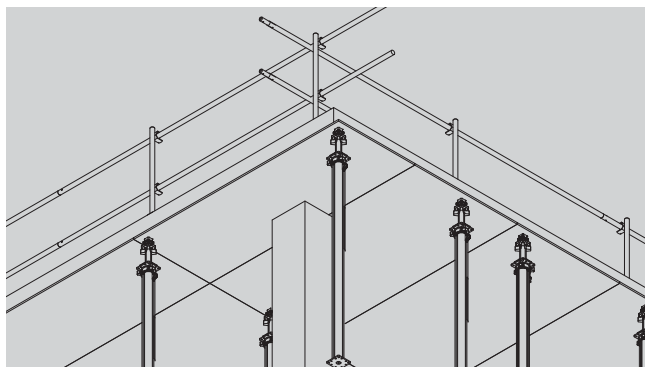
- 1 • Move the Safety handrail (Handrail, Handrail support and Toe boards) to the plastic handrail support or replace it with another type of perimeter protection.
- Remove the additional props for infilling or 90° assembly.



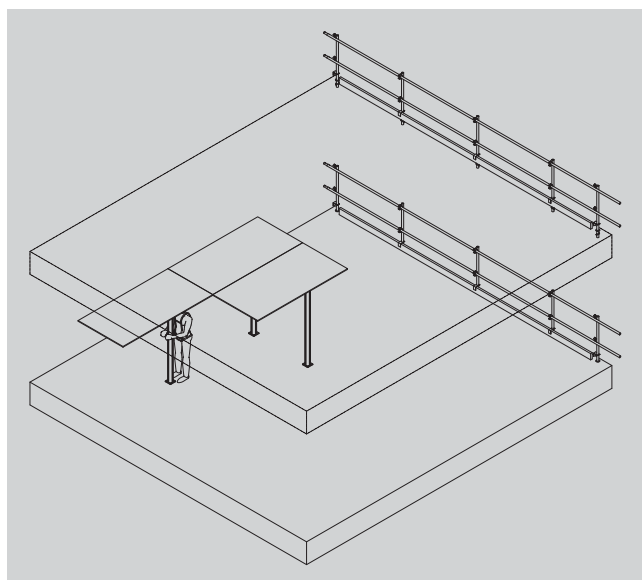
- 2 • Strike the wedges on the Dropheads CCT. The wedge drops 150 mm and then the Beams and Transversals.



- 3 • Remove the Transversals CC TR.



- 4 • Remove the beams.



- 5 • Remove the remaining material (Props, Dropheads CCT and Boards) when the concrete reaches the required strength.

► Conditions of handling and maintenance

■ CC Panels Pallet

Panels CC should be piled up on Panels Pallets CC. Each pallet can transport:

- 14 Panels CC 1.5 x 0.75
- 28 Panels CC 0.75 x 0.75
- 28 Panels CC 1.5 x 0.375

They can be transported with a crane or a forklift truck. Up to two pallets can be stacked up. They facilitate transport, assembly and disassembly of the panels and moving them on the jobsite.



The panels should always be stacked with the shuttering face upwards, to prevent water or dirt from accumulating on the frame.

■ Beams Pallet CC

As with the panels, Beams CC should be transported on a special pallet to minimize damage and prevent elements from falling due to slide of beams.

They can be transported with a crane or a forklift truck. Up to three pallets can be stacked up. They facilitate transport, assembly and disassembly of the panels and moving them on the jobsite.

There are two different pallets to transport both Beams CC sizes.

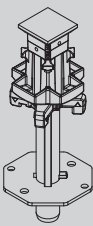
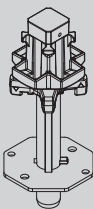
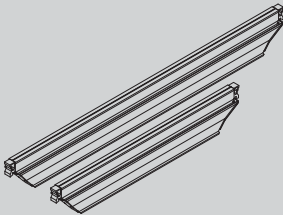
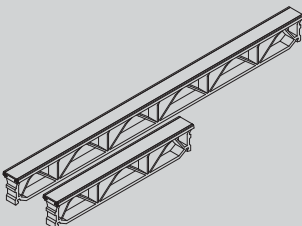
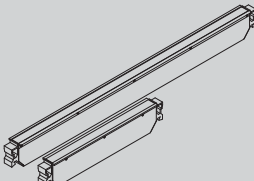
Both pallets have a hinged door at each side that prevents the beams from falling off the sides of the pallet and facilitate the loading and unloading of the pallets.

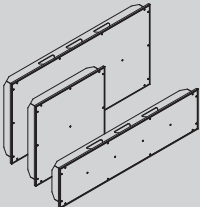
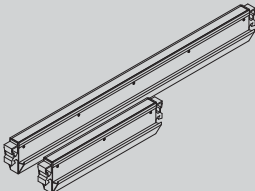
Both pallets hold 27 Beams CC. Special attention must be paid to the distribution of the beams.



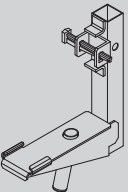
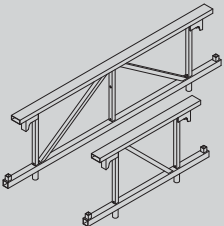
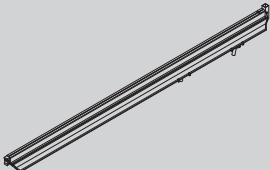
► Components and accessories

Basic elements

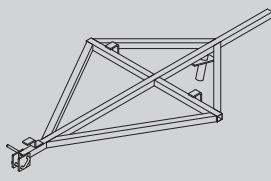
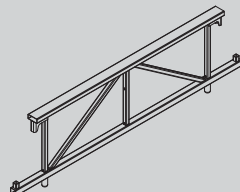
	WEIGHT (kg)	CODE
Drophead CC	4.6	1870060
		
Drophead CCT	4.5	1870155
		
Beam CC		
Beam CC 2.32	16	1870029
Beam CC 1.57	10.6	1870031
		
Transversal CC TE		
Transversal CC TE 1.5	3.5	1870035
Transversal CC TE 0.75	1.7	1870040
		
Transversal CC TR		
Transversal CC TR 2.075	8.7	1870225
Transversal CC TR 1.5	6.8	1870045
Transversal CC TR 0.75	3.4	1870050
		

	WEIGHT (kg)	CODE
Panel CC		
Panel CC 1.5 x 0.75	15.4	1870090
Panel CC 0.75 x 0.75	8.3	1870096
Panel CC 1.5 x 0.375	9.1	1870165
		
Beam CC W		
Beam CC W 2.075	12.5	1870230
Beam CC W 1.5	9.5	1870105
Beam CC W 0.75	4.6	1870150
		

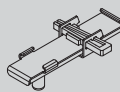
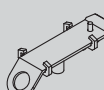
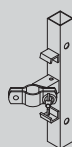
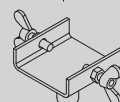
Perimeter formwork

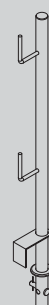
	WEIGHT (kg)	CODE
Perimeter clamp CC	5.6	1870200
		
Beam support CC		
Beam support CC 1.5	12.4	1870160
Beam support CC 0.75	7.3	1870115
		
Perimeter beam CC	31.8	1870100
		

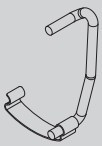
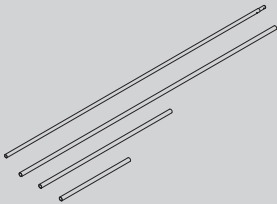
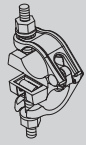
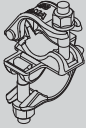
CC-4 Horizontal Formwork

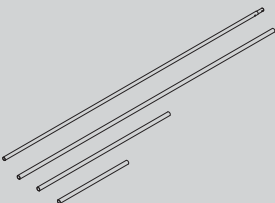
	WEIGHT (kg)	CODE
Striking tool CC	7.6	1870190
		
Ply Supporting beam CC		
Ply Supporting beam CC 2.075	15.1	1870220
Ply Supporting beam CC 1.5	11.6	1870215
		

Safety elements

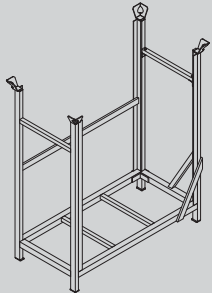
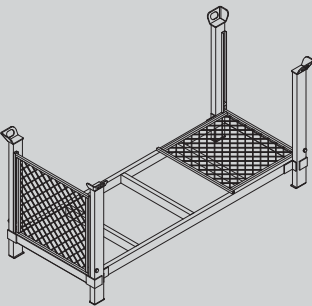
	WEIGHT (kg)	CODE
Clamp CC	3	1870140
		
Tie piece CC LD	2.2	1870101
		
Fixing hook CC	0.2	1870099
		
Handrail support CC	3.8	1870120
 		
Head CC FD	1	1870080
		

	WEIGHT (kg)	CODE
Safety handrail 1.5	9.6	2211156
 		
Clamp handrail	14.4	2211200
 		
Safety handrail S-V	3.9	1860516
		
Safety handrail post	3.4	1902210
		

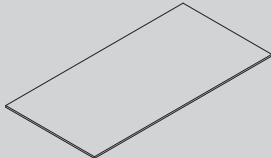
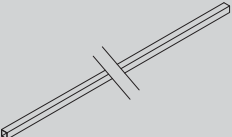
	WEIGHT (kg)	CODE
MEGAFORM Handrail post	3.4	1904311
		
Wind clip	0.31	1870255
		
Tube Tube 42/4070 with socket Tube 42/1.55 Tube 42/2.10 Tube 42/3.1	8.4 3 4.1 6.4	2023800 2033700 2033800 2034000
		
Right angle coupler 42/42	1.2	2012600
		
Right angle coupler 48/48	1.2	2125148
		
Swivel coupler 42/42	1.3	2012400
		

	WEIGHT (kg)	CODE
Swivel coupler 48/48	1.3	2125147
		
Tube Tube 48/4100 with socket Tube 48/1.6 Tube 48/2.1 Tube 48/2.6 Tube 48/3.1 Tube 48/3.6 Tube 48/4.1 Tube 48/5	13.1 5.5 7 8.7 11.4 12.1 14.6 18	2125649 2125290 2125291 2125647 2125249 2125648 2125250 2125251
		

Storage

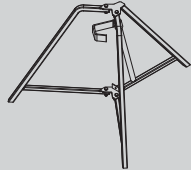
	WEIGHT (kg)	CODE
Panel Pallet CC	97	1870085
Capacity: • 14 Panels CC 1.5 x 0.75 • 28 Panels CC 0.75 x 0.75 • 28 Panels CC 1.5 x 0.375		
Beam Pallet CC Beam Pallet CC 1.57 Beam Pallet CC 2.32	87 87	1870144 1870145
Capacity: • 27 Beams CC		

Supplies and replacements

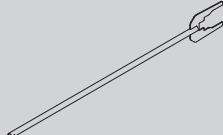
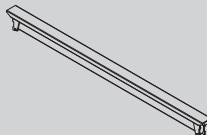
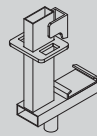
	WEIGHT (kg)	CODE
Board		
Plywood 1.25 x 2.5 x 0.021 Beto	40.7	1940166
Plywood 1.25 x 2.5 x 0.018 Beto	34.9	1940198
		
90/6 CC Filler	2.1	1870112
		
Filler 70 x 35 x 21	0.031	1870260
		
Plastic plug 42	0.007	1904100
		
Plastic handrail support	0.1	1860533
		

Shoring elements

	WEIGHT (kg)	CODE
EP Prop		
EP Prop C 25	14.6	2200048
EP Prop C + D 30	16.5	2200000
EP Prop C + D 35	21.2	2200068
EP Prop C + D 40	23.7	2200012
EP Prop C + D 45	29.1	2000084
EP Prop C + D 50	31.7	2200057
EP Prop C + E 30	18.9	2200023
EP Prop C + E 40	26.4	2200033
		

	WEIGHT (kg)	CODE
ALUPROP Prop		
ALUPROP Prop 1.65-2.8	17.6	2220010
ALUPROP Prop 2.2-3.7	21.6	2220020
ALUPROP Prop 3.3-4.8	25.4	2220030
ALUPROP Prop 4.5-6.0	29.6	2220040
		
Universal tripod	11.2	2220090
		

Other components

	WEIGHT (kg)	CODE
Lifting fork CC	3.1	1870185
		
Supporting frame		
Supporting transversal CC 1.5	9.8	1870999
Supporting transversal CC 0,75	5.5	1870990
		
Infilling support CC	2.5	1870205
		

Using the Components in the CC-4 Panel and CC-4 Ply Systems

Denomination	CC-4 PANEL	CC-4 PLY
BASIC ELEMENTS		
Drophead CC	●	
Drophead CCT	●	●
Beam CC 2.32	●	●
Beam CC 1.57	●	●
Transversal CC TE 1.5	●	●
Transversal CC TE 0.75	●	●
Transversal CC TR 2.075		●
Transversal CC TR 1.5	●	●
Transversal CC TR 0.75	●	●
Panel CC 1.5 x 0.75	●	
Panel CC 0.75 x 0.75	●	
Panel CC 1.5 x 0.375	●	
Beam CC W 2.075	●	●
Beam CC W 1.5	●	●
Beam CC W 0.75	●	●
PERIMETER FORMWORK		
Perimeter clamp CC	●	●
Beam support CC 1.5	●	
Beam support CC 0.75	●	
Perimeter beam CC	●	●
Striking tool CC	●	
Ply Supporting beam CC 2.075		●
Ply Supporting beam CC 1.5		●
SAFETY ELEMENTS		
Clamp CC	●	●
Tie piece CC LD	●	●
Fixing hook CC	●	●
Soporte barandilla CC	●	●
Cabezal CC FD	●	●
Safety handrail 1.5	●	●
Clamp handrail	●	●
Safety handrail S-V	●	●
Safety handrail post	●	●
MEGAFORM Handrail post	●	●
Wind clip	●	
Tube 42/4070 with socket	●	●
Tube 42/1.55	●	●
Tube 42/2.10	●	●
Tube 42/3.1	●	●
Right angle coupler 42/42	●	●
Right angle coupler 48/48	●	●
Swivel coupler 42/42	●	●
Swivel coupler 48/48	●	●
Tube 48/4100 with socket	●	●
Tube 48/1.6	●	●
Tube 48/2.1	●	●
Tube 48/2.6	●	●
Tube 48/3.1	●	●
Tube 48/3.6	●	●
Tube 48/4.1	●	●
Tube 48/5	●	●

Denomination	CC-4 PANEL	CC-4 PLY
STORAGE		
Panel Pallet CC	●	
Beam Pallet CC 1.57	●	●
Beam Pallet CC 2.32	●	●
SUPPLIES AND REPLACEMENTS		
Plywood 1.25 x 2.5 x 0.021 Beto	●	●
Plywood 1.25 x 2.5 x 0.018 Beto		●
90/6 CC Filler	●	
Filler 70 x 35 x 21	●	
Plastic plug 42	●	●
Plastic handrail support	●	●
SHORING ELEMENTS		
EP Prop C 25	●	●
EP Prop C + D 30	●	●
EP Prop C + D 35	●	●
EP Prop C + D 40	●	●
EP Prop C + D 45	●	●
EP Prop C + D 50	●	●
EP Prop C + E 30	●	●
EP Prop C + E 40	●	●
ALUPROP Prop 1.65 - 2.8	●	●
ALUPROP Prop 2.2 - 3.7	●	●
ALUPROP Prop 3.3 - 4.8	●	●
ALUPROP Prop 4.5 - 6.0	●	●
Universal tripod	●	●
OTHER COMPONENTS		
Lifting fork CC	●	●
Supporting transversal CC 1.5	●	
Supporting transversal CC 0.75	●	
Infilling support CC	●	



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