MILLS
Scaffolding - Falsework - Formwork

TOURÉCHAF

Falsework tower with integral safety...

MILLS FALSEWORK TOURÉCHAF
THERE'S NOTHING LIKE THE ORIGINAL MILLS
2009
MADE IN FRANCE

INTERMAT INNOVATION AWARDS 2012 GOLD

CRAMIF
CRAMIF TROPHY
Safety at Work and Occupational Health
Awarded to
MILLS
2011

> Patented system.
Made in France

Mills provides you with solutions

Touréchaf: falsework tower with integral safety system...

TABLE OF CONTENTS

The latest revised versions of technical information are available on www.mills.fr.

In 2009, Mills has developed a new falsework tower for construction work to meet the recommendations in the France Health Insurance Agency Technical Note n° 24. This tower is a major improvement over the many falsework towers already on the market which are heavier and more difficult to erect safely.

This new-generation tower is easy to use, safe and uses lightweight components. It has become the reference tower.

It is used in the building and public works sector.

It is compatible only with Mills scaffolding system, making it easy to make connections, brace towers together and decking between the towers.

Associated with the MP3 secondary beams and with the GCC formwork guardrail, Touréchaf for the first time allows for assembly and disassembly with collective safety of conventional formwork on a shoring tower.

Since 2013, we have developed solid expertise in BIM (Building Information Modelling) on major worksites and make our Mills Noemi BIM software program available to our customers. This installation and calculation software optimises design and implementation on the worksite. The support and development of it are provided by our team of developers.

Touréchaf and its accessories are made of galvanised steel. They have a long service life and can be recycled. Their robustness and the proximity of our factories effectively respond to the requirements of sustainable development.

Manufacturing in our factories in France also guarantees a high level of quality.

Touréchaf falsework tower for the construction of the Armandie grandstands in Agen.

Simplicity, rapidity and integral safety...

This flashcode gives you direct access to the presentation and assembly video from your telephone.

> Assembling and disassembling with collective protection.

> 4 identical frames per level:

Each frame has:
- Safety features: rail, midrail and access ladder.
- The automatic locking system without pins.
- A lifting ring.

> A single deck:

- Access deck covering half the area of a level.

> Unit weight of standard parts less than 15 kg to reduce MSK conditions.

> Compatible with our scaffolding system:

- Wind bracing and connection between towers without using "tube and coupler" systems.
- Decking between towers for formwork and removing formwork.
- Decking at the top of the towers for keying girders.

> Dedicated packing.

> CRAMIF NT24 compliant.

> Compliant with the highest security requirements of the standard NF P93-551:

- Classes A1, RL1, G1.

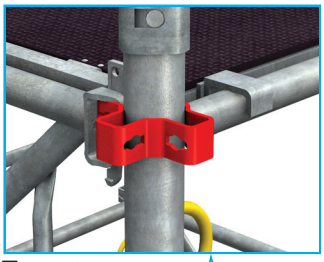
> 6 tonnes per foot:

- With the **screw jacks set to the maximum of their stroke** which is 49 cm at the foot and 60 cm at the top.
- ∅ 60 mm standard.

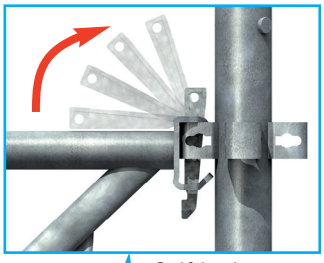
"**Frame**": construction for integral safety...

The Touréchaf design uses a triangular frame, which incorporates all the safety elements: rail, midrail, access ladder automatic locking system and a lifting ring so that the tower can be moved safely by crane.

The Touréchaf frame weighs 12.4 kg.



Two stirrups at each corner to anchor scaffolding components

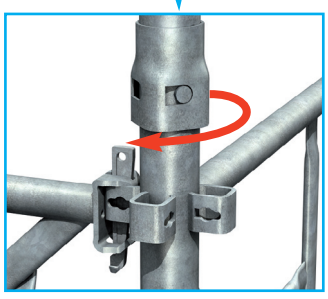


Self-locking wedge key

Built-in lifting ring

Built-in access ladder

Built-in guardrail with rail + midrail



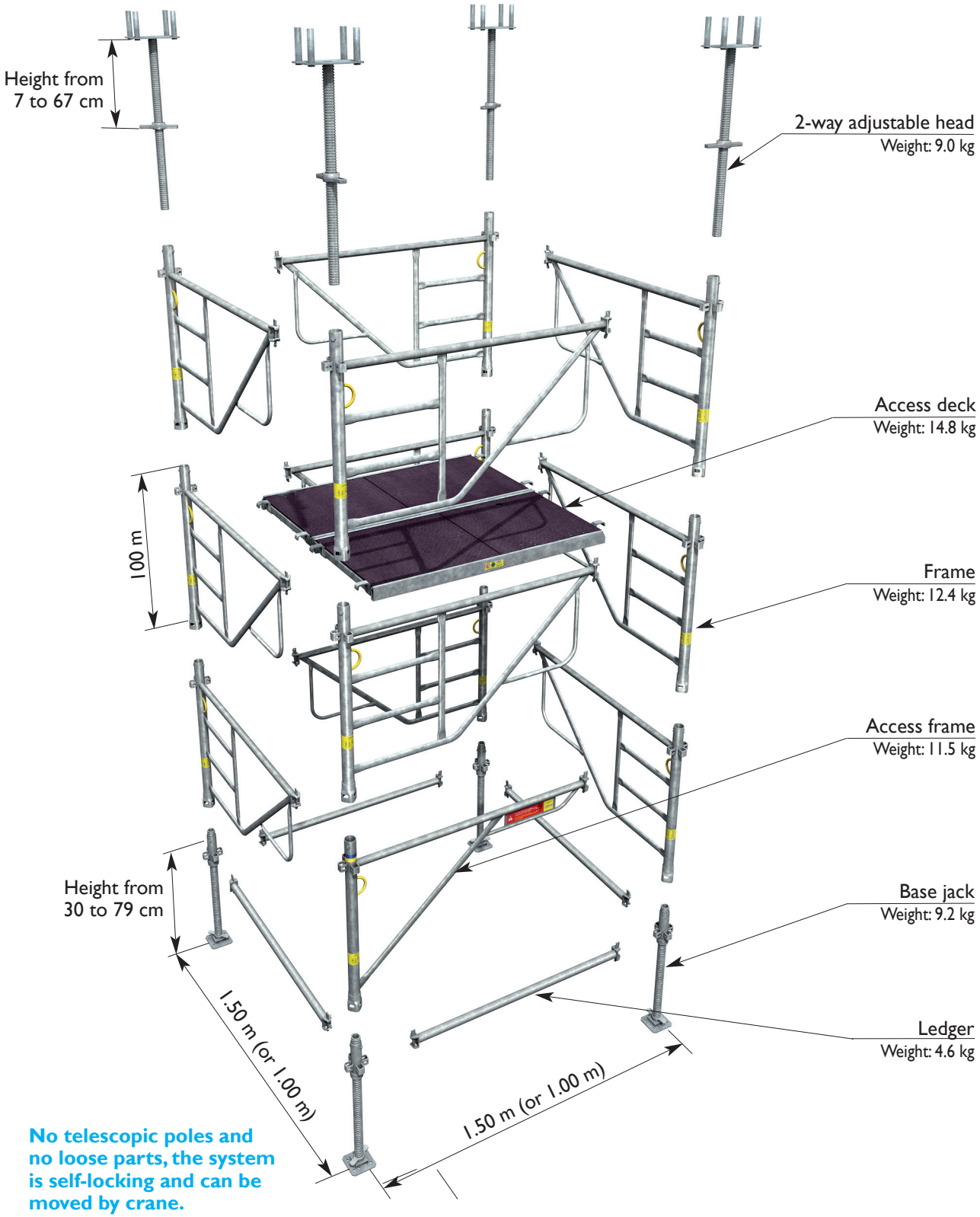
Automatic locking system by rotation:
- between frames,
- between frame and base jack.

The tower can be moved safely by crane.

With the Touréchaf safety comes as standard...

The Touréchaf complies with France Health Insurance Agency Technical Note no. 24 recommendations.

"Tower": provides a high level of collective protection



No telescopic poles and no loose parts, the system is self-locking and can be moved by crane.

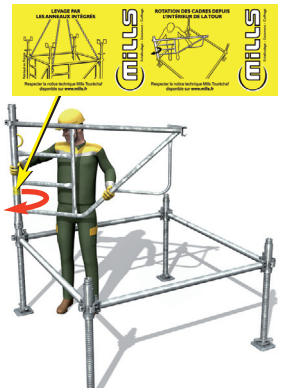
Dismantle in the reverse order of assembly...

Assembling and dismantling a 1.50 x 1.50 m tower...

REQUIREMENTS:

> Ensure that the load is evenly distributed on the ground.
> Ensure that the base is levelled.
> Fit the first level frames from inside the tower.
> Fit the trapdoor next to the ladder.
> Ensure that the towers are stable.
> Centre the load in the fork heads.
> Check that the screw jacks are vertical.
> Engage the deck securing pins.

> **1** - Erect the base and level it. Verify the square by pushing a deck into the angle.



> **2** - From the inside of the tower, fit the 1st frame diagonally and swivel to lock it.

> **3** - Fit the access frame for easy access.

> **4** - Fit 2 access decks and assemble the 2nd level.

Fit a temporary deck level

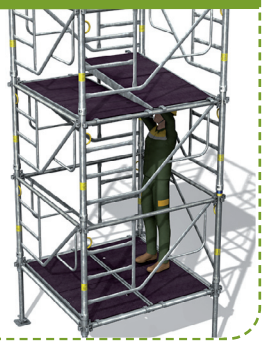
> **5** - Fit a 1st access deck.

> **6** - Move up to the next level and fit the 2nd access deck.

> **7** - Assemble the 3rd level.

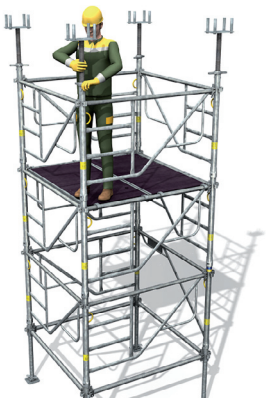
Raise the access decks to their final position so that there is a height of 2.00 m between decks.

> **8** - Move the 1st access deck.

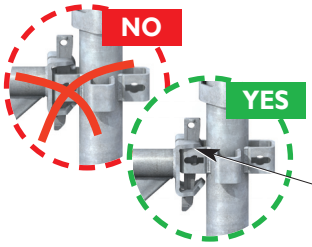


> **9** - Raise the 2nd access deck from below.

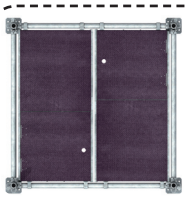
> **10** - The first-level deck can be removed. The upper level can be accessed using the built-in ladder.



> **11** - Fit and adjust the adjustable heads. Dismantle in the reverse order.



Place the clamp in contact with the stirrup of the standard.



Two 1.50 m access decks

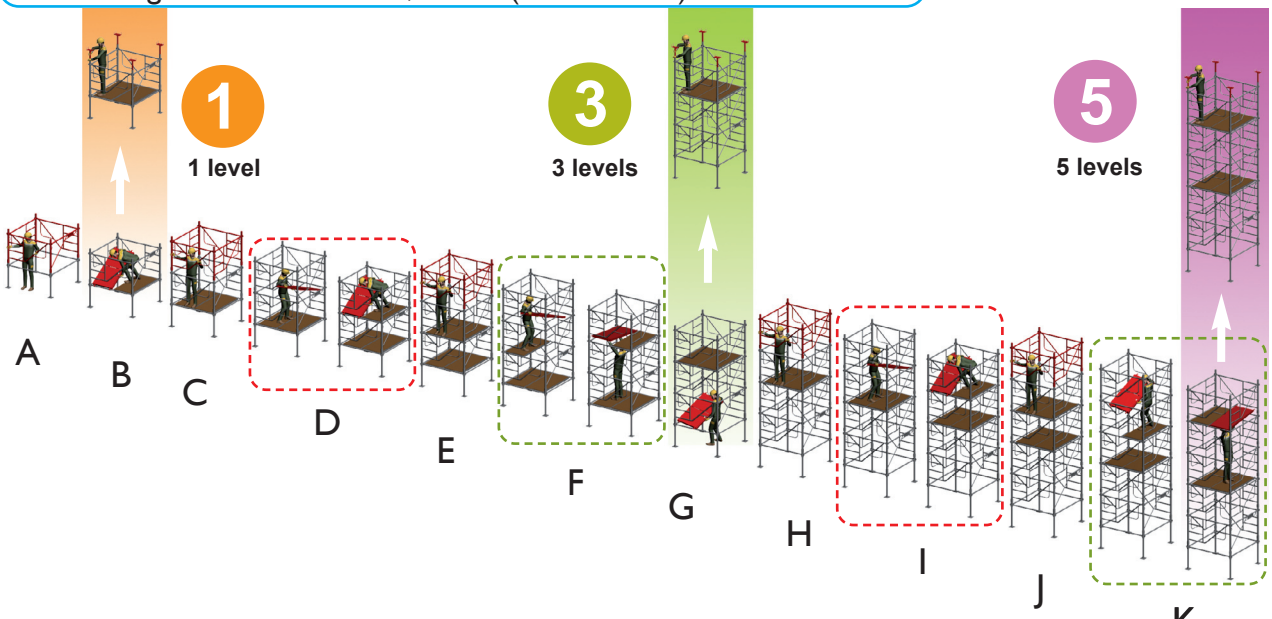
Components required for 1.50 x 1.50 m frame

Type of tower	1	2	3	4	5
Number of frame levels	**1**	**2**	**3**	**4**	**5**
Minimum height[1]	1.82 m[2]	2.37 m	3.37 m	4.37 m	5.37 m
Maximum height	2.46 m	3.46 m	4.46 m	5.46 m	6.46 m
Base jack	4	4	4	4	4
1.50 m ledger	4	4	4	4	4
1.50 m access frame	1	1	1	1	1
1.50 m frame	3	7	11	15	19
2-way adjustable head	4	4	4	4	4
1.50 m access deck	0 / 2	2	2[3]	4	4
Weight (kg)	140 / 170	220	270	350	400

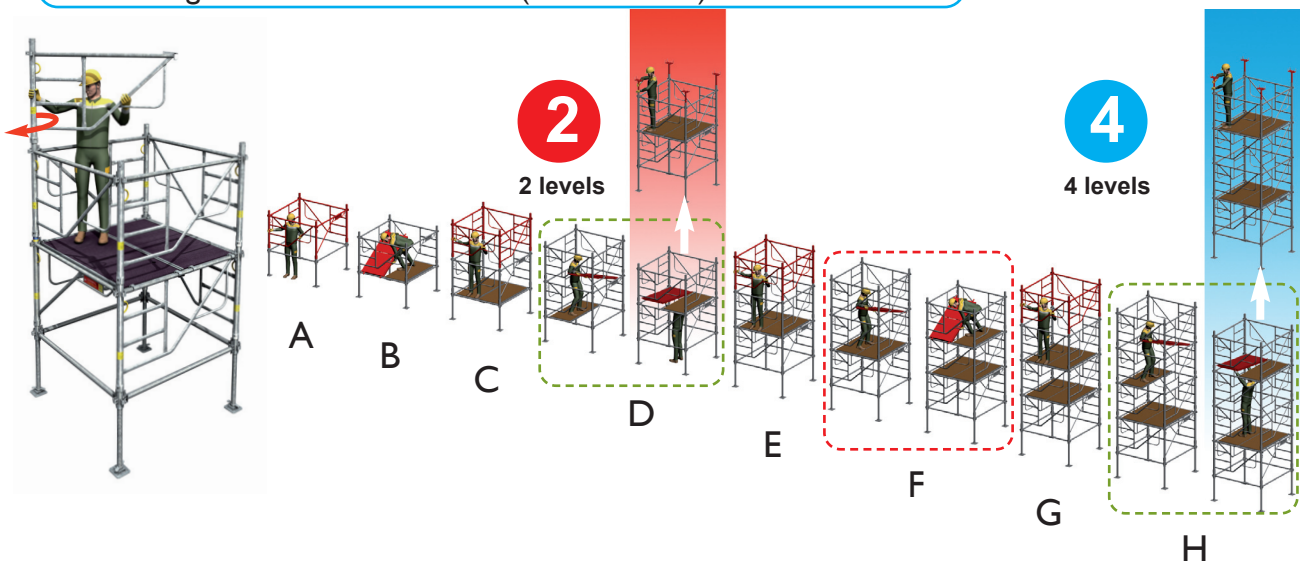
[1] - **N.B.: add a few cm for falsework striking.**
[2] - Min. height determined by the length of the 2 screw jacks.
[3] - Add 2 additional access decks for assembly.

Tip for calculating
= number of levels + 0.37 m
= number of levels + 1.46 m
= 4
= 4
= 1
= (number of levels x 4) - 1
= 4

Assembling a Touréchaf with 1, 3 or 5 (odd number) frame levels



Assembling a Touréchaf with 2 or 4 (even number) frame levels



Dismantle in the reverse order of assembly...

Assembling and dismantling a 1.50 x 1.00 m tower...

REQUIREMENTS:

> Ensure that the load is evenly distributed on the ground.

> Ensure that the base is levelled.

> Fit the first level frames from inside the tower.

> Fit the trapdoor next to the ladder.

> Ensure that the towers are stable.

> Centre the load in the fork heads.

> Check that the screw jacks are vertical.

> Engage the decks securing pins.

> **1** - Erect the base and level it. Verify the square by pushing a deck into the angle.

> **2** - From the inside of the tower, fit the 1st frame diagonally and swivel to lock it.

> **3** - Fit the 1.50 m access frame for easy access.

> **4** - Fit two "1 m access decks" and assemble the 2nd level.

Fit a temporary deck level

> **5** - Fit a 1st 1 m access deck.

> **6** - Access the upper level and fit the 2nd 1 m access deck.

> **7** - Assemble the 3rd level.

Raise the access decks to their final position so that there is a height of 2.00 m between decks.

> **8** - Move the 1st access deck.

> **9** - Raise the 2nd access deck from below.

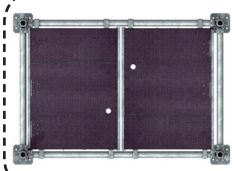
> **10** - The first-level deck can be removed. The upper level can be accessed using the built-in ladder.

> **11** - Fit and adjust the adjustable heads. Dismantle in the reverse order.

Components required for 1.50 x 1.00 m frame

Type of tower	1	2	3	4	5
Number of frame levels	**1**	**2**	**3**	**4**	**5**
Minimum height[1]	1.82 m[2]	2.37 m	3.37 m	4.37 m	5.37 m
Maximum height	2.46 m	3.46 m	4.46 m	5.46 m	6.46 m
Base jack	4	4	4	4	4
1.50 m ledger	2	2	2	2	2
1.00 m ledger	2	2	2	2	2
1.50 m access frame	1	1	1	1	1
1.50 m frame	1	3	5	7	9
1.00 m frame	2	4	6	8	10
2-way adjustable head	4	4	4	4	4
1.00 m access deck	0/2	2	2[3]	4	4
Weight (kg)	130/150	200	250	310	360

[1] - **N.B.: Add a few cm for falsework striking.**
[2] - Min. height. determined by the length of the 2 screw jacks.
[3] - Add 2 additional access decks for assembly.



Two 1.00 m access decks

Assembling and dismantling a 1.00 x 1.00 m tower...

> **1** - Erect the base and level it. Verify the square by pushing a deck into the angle.

> **2** - From the inside of the tower, fit the 1st level frames with an access frame.

> **3** - Fit three 0.30 m decks and then fit the 2nd level frames.

REQUIREMENTS:

> Ensure that the load is evenly distributed on the ground.

> Ensure that the base is levelled.

> Fit the first level frames from inside the tower.

> Fit the trapdoor next to the ladder.

> Ensure that the towers are stable.

> Centre the load in the fork heads.

> Check that the screw jacks are vertical.

> Engage the decks securing pins.

Fit a temporary deck level

> **4** - Fit a 0.30 m deck and climb up to the next level using the built-in ladder. Fit 2 more 0.30-m decks.

> **5** - Fit the 3rd level frames.

Raise the deck to its final position so that there is 2.00 m between decks.

> **6** - Remove two 0.30 m decks. Go down to the lower level and remove the 3rd panel.

> **7** - Fit an access deck then a 0.20 m panacier (steel board).

> **8** - The first-level deck can be removed. Access the upper level and fit and adjust the adjustable heads. Dismantle in the reverse order.

Components required for 1.00 x 1.00 m tower

Type of tower	1	2	3	4	5
Number of frame levels	**1**	**2**	**3**	**4**	**5**
Minimum height[1]	1.82 m[2]	2.37 m	3.37 m	4.37 m	5.37 m
Maximum height	2.46 m	3.46 m	4.46 m	5.46 m	6.46 m
Base jack	4	4	4	4	4
1.00 m ledger	4	4	4	4	4
1.00 m access frame	1	1	1	1	1
1.00 m frame	3	7	11	15	19
2-way adjustable head	4	4	4	4	4
1.00 m access deck	0	1	1	2	2
0.20 x 1.00 m Panacier (steel board)	0	1	1	2	2
0.30 x 1.00 m deck	0/3	0	0[3]	0[3]	0[3]
Weight (kg)	130/140	190	230	290	330

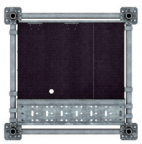
[1] - **N.B.: add a few cm for falsework striking.**
[2] - Min. height determined by the length of the 2 screw jacks.
[3] - Add 3 additional 0.30 x 1.00 m decks for assembling towers with more than 3 levels.

Dismantle in the reverse order of assembly...

Temporary deck level.

Three 0.30 x 1.00 m steel decks

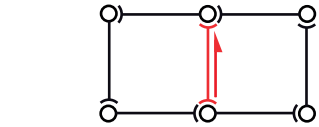
Final deck level.



1 access deck and 1 0.2 x 1.00 m Panacier

Assembling and dismantling a tower with 6 legs...

Assembling towers with 6 legs:

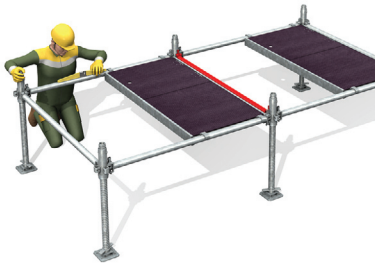


Frame

Ledger

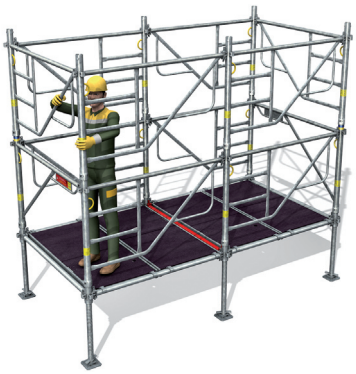
Diagonal brace

WARNING:
The middle standards must be braced using ledgers and diagonal braces at all levels.



> **1**- Erect the base and level it. Verify the square by pushing a deck into the angle.

> **2**- From the inside of the tower, fit the 1st access frame diagonally and swivel to lock it.



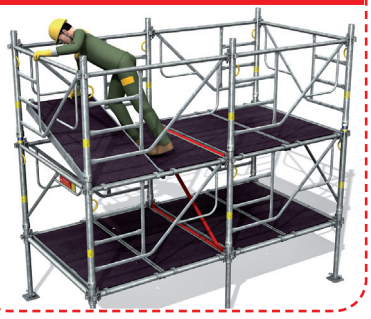
> **3**- Assemble the 2nd level.

Fit a temporary deck level

> **4**- Fit a 2nd deck level.

> **5**- The scaffolding must be braced using ledgers and diagonal braces.

Fit a temporary deck level



> **6**- Move up to the next level and fit the fourth access deck.

> **7**- Assemble the frames for the third level.

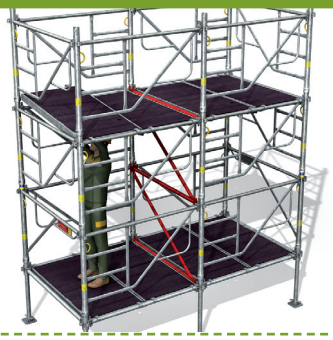
Raise the access decks to their final position so that there is a height of 2.00 m between decks.

> **8**- Move the first two access decks.

REQUIREMENTS:
> Ensure that the load is evenly distributed on the ground.
> Ensure that the base is levelled.
> Fit the first level frames from inside the tower.
> Fit the trapdoor opposite the ladder.
> Ensure that the towers are stable.
> Centre the load in the fork heads.
> Check that the screw jacks are vertical.
> Engage the decks securing pins.

Dismantle in the reverse order of assembly...

Raise the access decks to their final position so that there is a height of 2.00 m between decks.

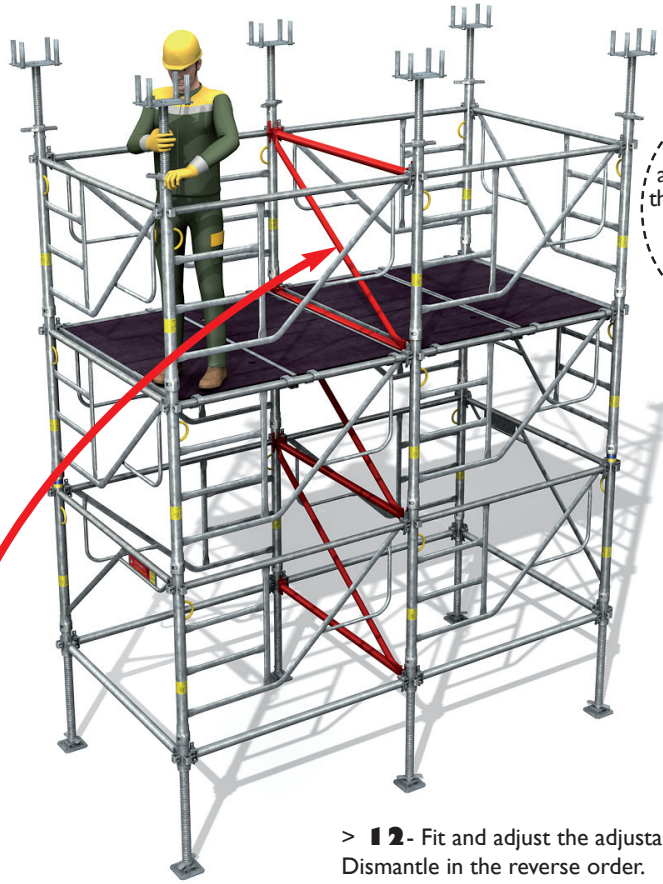


> **8**- The scaffolding must be braced using ledgers and diagonal braces.

> **9**- Raise the 4th access deck from below.

> **10**- The first-level deck can be removed.
The upper level can be accessed using the built-in ladder.

> **11**- The scaffolding must be braced using a ledger and a diagonal brace.



WARNING:
The middle standards must be braced using ledgers and diagonal braces at all levels.

> **12**- Fit and adjust the adjustable heads.
Dismantle in the reverse order.

Dismantle in the reverse order of assembly...

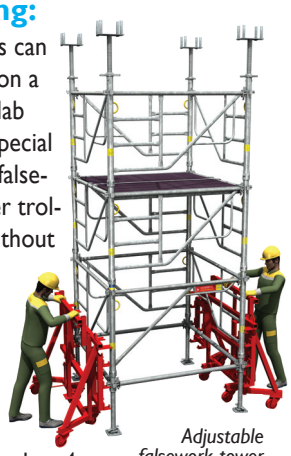
The unit weight of standard parts is less than 15 kg to reduce MSK conditions...

Ergonomic **design**...

The Touréchaf has been specially designed to reduce MSK conditions. Standard parts weigh less than 15 kg and are easy to handle. The design makes it easy to lift the tower by crane to reduce the number of times it has to be dismantled and reassembled.

> Moving:

The towers can be moved on a concrete slab using the special adjustable falsework tower trolleys and without disturbing the screw jacks.
Do not move an isolated tower taller than 4 frames with the adjustable falsework tower trolley.

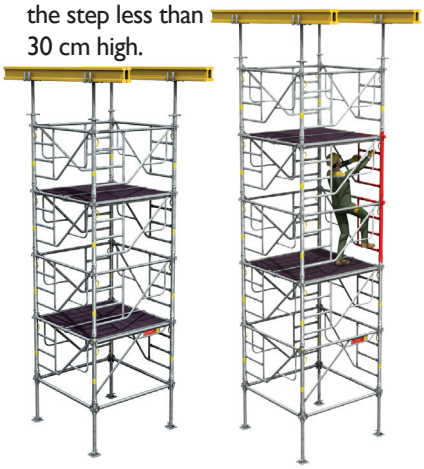


Adjustable falsework tower trolley (600 kg. adm. per trolley)

For more information please refer to the use sheet.

>Access:

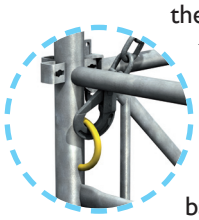
The 2 access decks form a full decking with every 2.00 m as "scaffold" landings. The ladder compliant with the standard (NF P93-551/A1) is built into the tower and the distance of its bars makes the step less than 30 cm high.



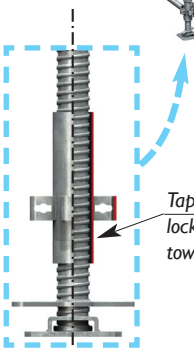
4 levels *5 levels*

> Lifting:

The tower has built-in lifting rings so that it can be moved by crane. This operation is easy and safe as the frames forming the tower are secured by the automatic locking system, including the base jack.



WLL of the ring:
1,250 kg for an angle of 30° max.



Tapped base jack ring to lock the screw jack to the tower.

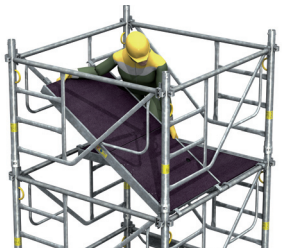
> Storage:

The frames are stored vertically, and right side up so there is no need to bend down to pick them up or turn them over.

> Handling:

The Touréchaf frame is fitted to a single attachment point from inside the tower.

Fitting the decking:



To make it easier to fit the deck, hold the end in position with the right hand and forearm. First install the 2 hooks under the ladder.

Lower the deck while leaning on the frame.

Raise the deck:

There are two handles under the deck so that it can be raised easily.

A Touréchaf being lifted by helicopter using the lifting rings to the top of a 100 m high tower.

Specifications and load capacity...

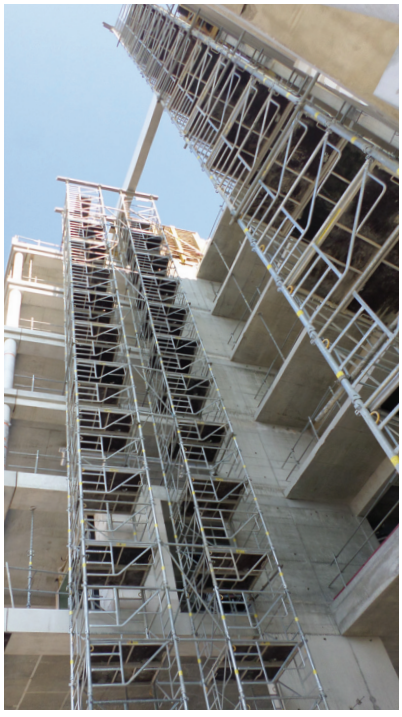
> Bearing capacity:

The maximum load is **6 tonnes (60 kN SLS)** per standard for towers less than **6 m** high with the screw jacks set to the maximum of their travel. Beyond that, take the ground load of the structure's own weight into account above 6 m.

WARNING: The towers must systematically be provided with screw jacks or bases connected with ledgers.

> Characteristics of the main components:

Description	Geometry	fy
Frame:		
- Standard	Ø 60.3 tube - th. 2.7	320 MPa
- Board bearer	Ø 40 tube - th. 2	235 MPa
Ledger	Ø 48.3 tube - th. 2.7	320 MPa
Base jack	Ø 48 tube - th. 5.6 threaded	436 MPa
Adjustable head	Ø 48 tube - th. 5.6 threaded	436 MPa
Diagonal brace	Ø 38 tube - th. 2.7	320 Mpa



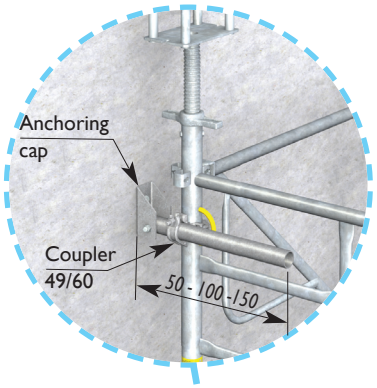
High-height Touréchaf falsework for the erection of the head office of Caisse d'Epargne in Bordeaux.

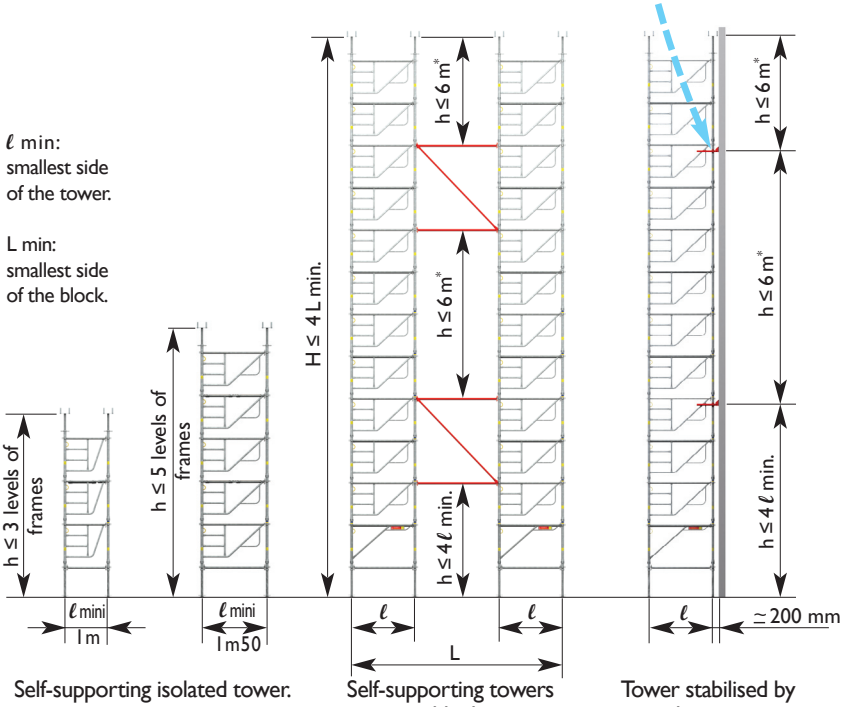
> Stability of the towers during assembly and dismantling:

The action of the wind requires compliance with stability rules, in particular during assembly and dismantling phases.

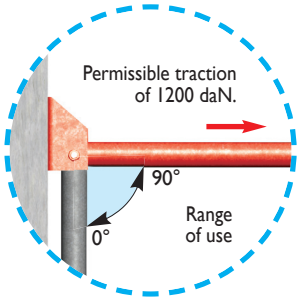
These rules are based on a wind of 65 km/h (20 daN/m²).

In more severe conditions of use, the towers must no longer be isolated but wind braced between them or anchored to what exists, in order to stabilise them in all directions.





**Max. free distance between anchoring / wind bracing / formwork to retain the bearing capacity of the tower.*



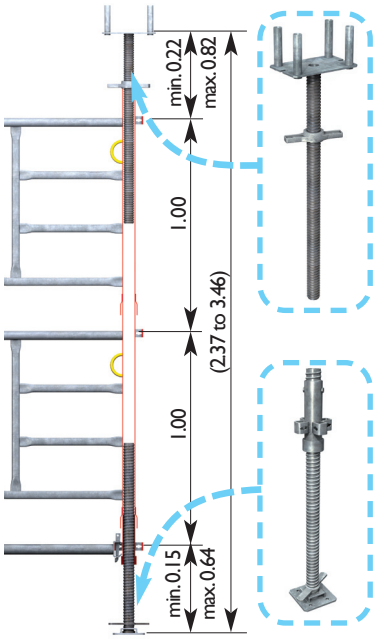
Slip resistance of the straight coupler 49/60: 1500 daN ULS and 900 daN SLS.

WARNING: See general recommendations.

Functional dimensions and **mini tour**...

> Functional dimensions:

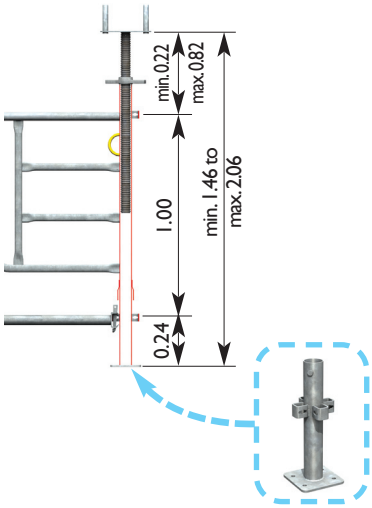
Standard Touréchaf with 2-way adjustable heads and screw jacks:



With a single frame level:
Variable height: ***1.82 m to 2.46 m.***
The min. height is determined by the length of the 2 screw jacks.

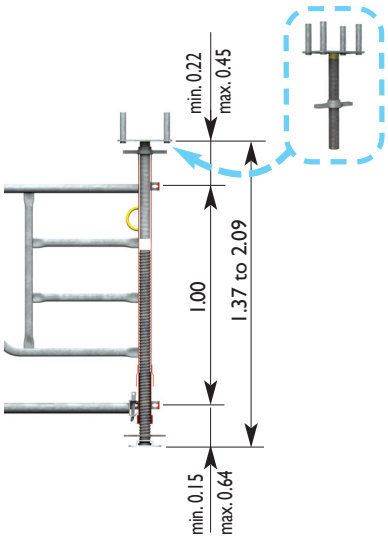
> Low-height Touréchaf:

Standard Touréchaf with 2-way adjustable heads and bases without stud bolt:
Height varies from: ***1.46 m to 2.06 m.***



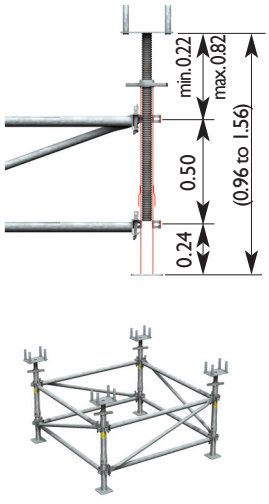
Standard Touréchaf with short adjustable heads and screw jacks:

Height varies from:
- ***1.37 m to 2.09 m***
  with short screw jack (011101-3).



Touréchaf with 2-way adjustable heads and base without stud bolt:
Tower made with single 0.50 m single standards and diagonal braces.

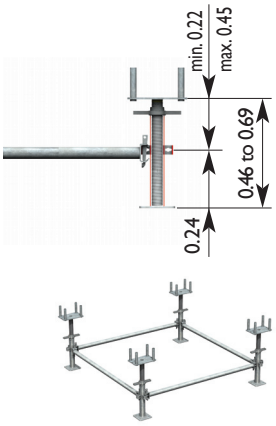
Height varies from:
0.96 m to 1.56 m



WARNING:
Each standard section must be braced and anchored at both ends in both directions.

Touréchaf with 2-way adjustable heads and bases without stud bolt:

Height varies from:
- ***0.46 m to 0.69 m***
  with short screw jack (011101-3).



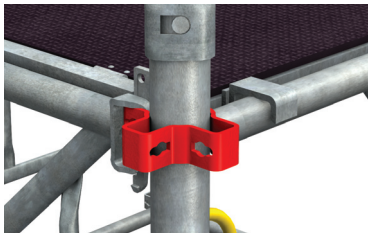
Installation of a low-height Touréchaf for the dividing structure of Aulnay-sous-Bois.

Compatibility with scaffolding...

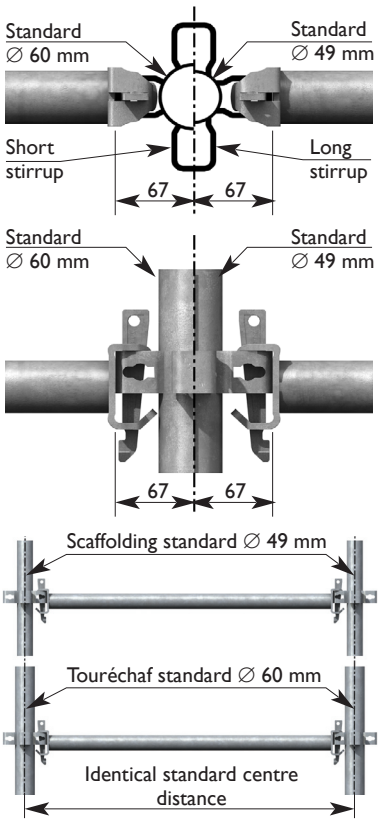
The use of a falsework tower does not stop with the assembly of its adjustable heads. By definition, it supports a load, most often prefabricated concrete or cast in place which requires creating a working platform at the top part in order to lay the formwork in collective protection.

The "**TOURECHAF**" was designed to respond to this dual function: "Falsework **TOWER**" for the load take-up and "**SCAF**folding" to allow for the formwork operations and the installation of prefabricated components in collective safety.

The CRAB connection fixed at the head of the standards of the Touréchaf frames is unique.



It alone allows a ledger to have a single centre distance, irrespective of standard diameter: 49 mm for scaffolding or 60 mm for the Touréchaf. This technical advantage without equal allows us to use our scaffolding equipment on the Touréchaf and thus simply transform the top of our falsework into a secure working platform.



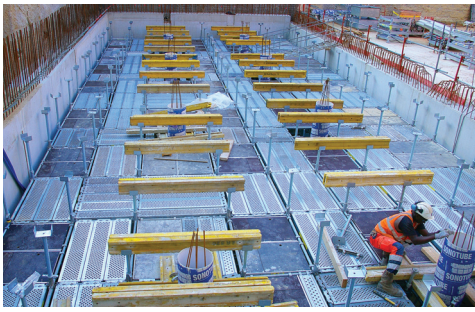
The length of the stirrups welded on the Touréchaf standards with a diameter of 60mm are shorter than those welded on the scaffolding standards with a diameter of 49mm in order to offset the difference in section. **The centre distance is retained**.

The ledgers, diagonal braces and decks of our scaffolding equipment are thus compatible with Touréchaf.

It becomes simple to make the connections, the "Z" wind bracings and the decking between towers.

Mainly two decking heights between towers are distinguished:
In the lower part of the top frame for the fitting and removal of the conventional formwork:

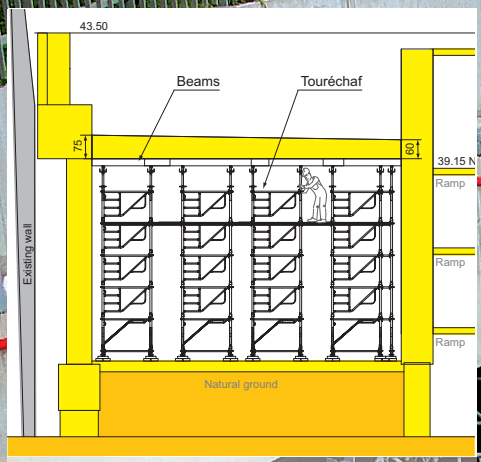
In the highest part of the top frame for the fitting of prefabricated parts.



There is no stirrup at mid-height of the standards of the frames. Indeed, they could generate horizontal forces brought by a diagonal brace for example, which would increase the risks of buckling.

This chapter "Scaffolding compatibility" presents:
- Towers with more than 4 feet.
- Wind bracing.
- Towers with extension.
- Runs and blocks.
- The decking between towers.
- Cantilevering.
- Different heights and mobile towers.

It becomes simple to make the connections, the "Z" wind bracings and the decking between towers...



Decking at the top of towers for assembling and removing formwork for a concrete slab in Paris 12th arrondissement.

Compatibility with scaffolding...

The Touréchaf makes it possible, without using tube and coupler systems, to assemble interconnected towers to form blocks and runs. Each 1.00 m high standard must be braced and anchored at both ends in both directions.

With respect to the ledger, the diagonal brace is assembled on the side where the deck is parallel to the latter so as to avoid interferences between the hooks of the deck and the diagonal brace.

Legend:

- *Frame*
- ce — *Access frame*
- *Ledger*
- *Diagonal brace*
- *Ledger for wind bracing*
- *Diagonal brace for wind bracing*
- *Panacier: width 0.20 m*
- *Access deck*
- *Single standard*

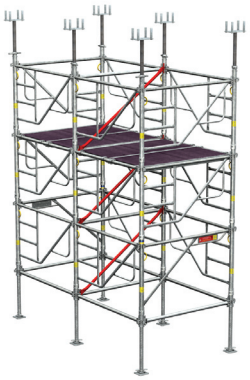
WARNING:
The middle standards must be braced using ledgers and diagonal braces at all levels.

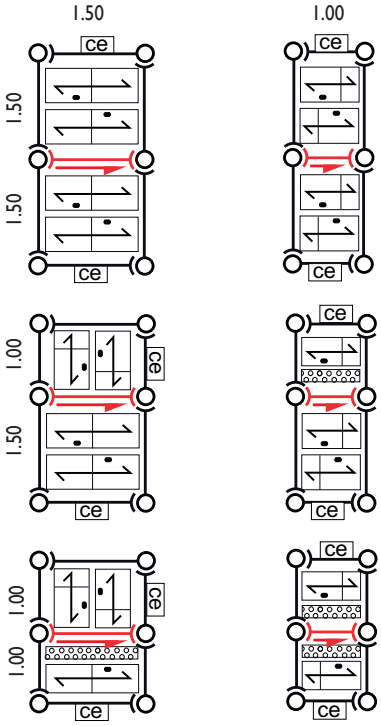
REQUIREMENTS:

> Engage the decks securing pins.

> Respect the platform unit distribution and the recommendations in their technical information.

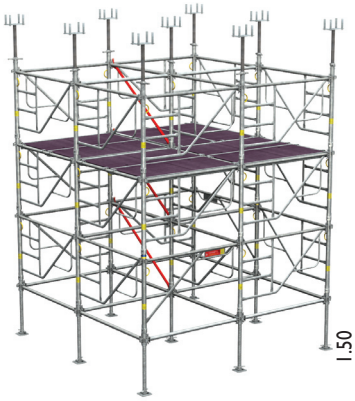
> Towers with 6 legs:





Rules for laying out the components of towers with 6 legs:
- At the periphery:
6 frames (of which 2 access frames on the 1st level, preferably the 1.50 m mesh).
- Inside and on all levels: 1 diagonal brace and 1 ledger.

> Towers with 9 legs:



Rules for laying out the components of towers with 9 legs:
- At the periphery:
8 frames (of which 2 access frames on the 1st level, preferably the 1.50 m mesh).
- Inside and on all levels:
1 fixed-height frame, 1 diagonal braces and 3 ledgers.

TIP Install the access frame parallel to an access deck.

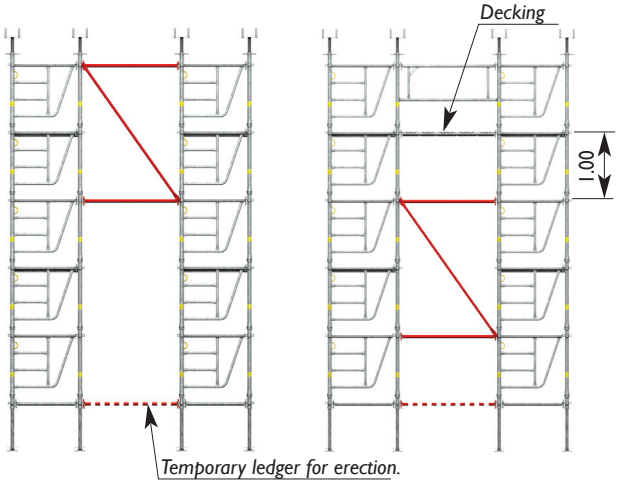
Touréchaf falsework for the construction of the primary settling unit of the Acheres water treatment plant.

Compatibility with scaffolding...

> Wind bracing:

Wind bracing and connecting the towers together is very simple using our ledgers and diagonal braces avoiding "tube and coupler" systems.

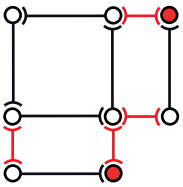
When the interconnected towers in block are equipped with decking at the top, the wind bracing has to be placed at least 1.00 m under the deck in order to avoid possible interference between the diagonal braces and the decks.



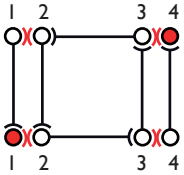
The wind bracing has to be checked in all vertical planes that comprise a tower.

> Towers with extension:

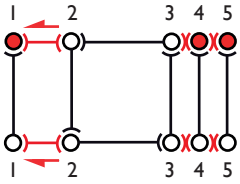
An extension can be added using frames and single standards, for example:

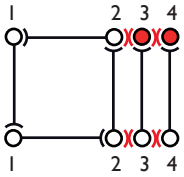


On its level and in its plane a single frame can brace up to 4 standards.
Beyond 4 standards, a frame or a diagonal brace has to be added.



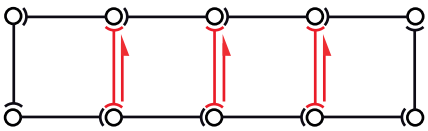
Example:





> Run:

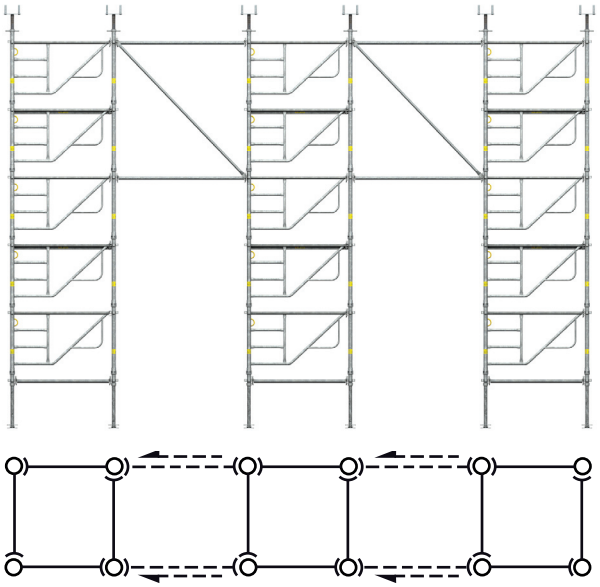
- Continuous run:



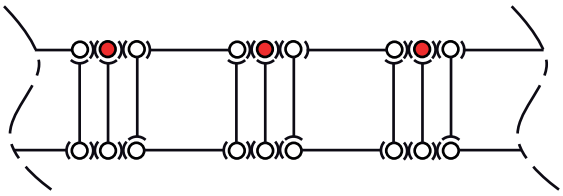
Brace the middle standards.

Same principle as a tower with 6 legs.

- Run with wind bracing between towers:

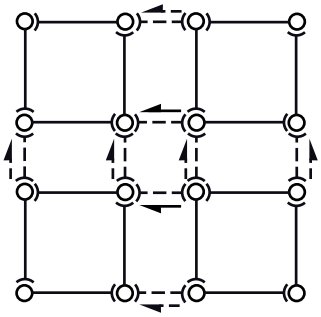


- Run with extensions:

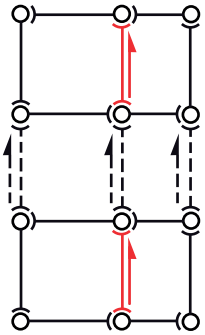


> Blocks:

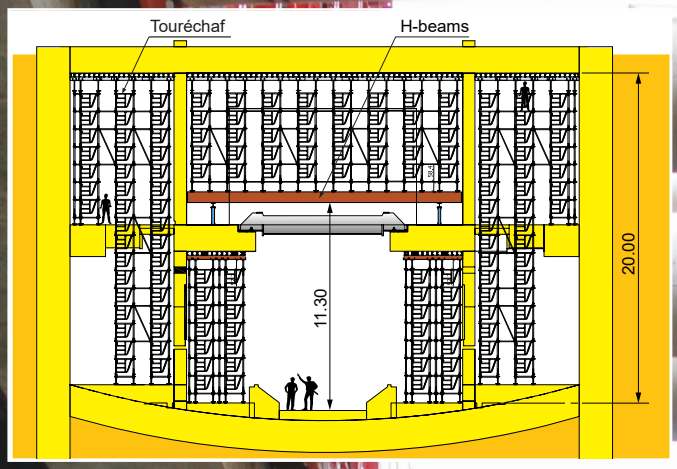
Interconnected towers



ou



Brace the middle standards.



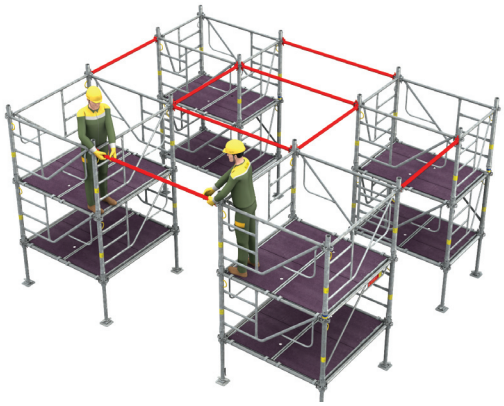
Touréchaf falsework for the new Ardoines station in Vitry-sur-Seine on line 15 of the Grand Paris.

Compatibility with scaffolding...

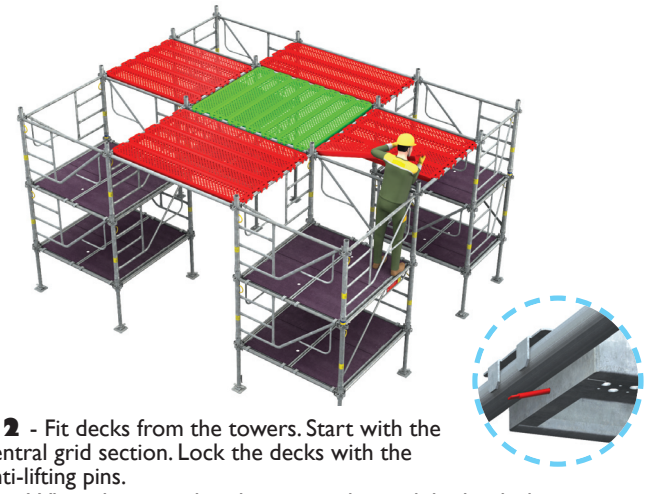
> Decking between towers:

For heights over 3.00 m, the decking between the towers facilitates the falsework and formwork removal operations. It is installed simply using ledgers and decks. An access frame can be added at the top of the towers to access the decking.

Assembly instructions for decking between towers:

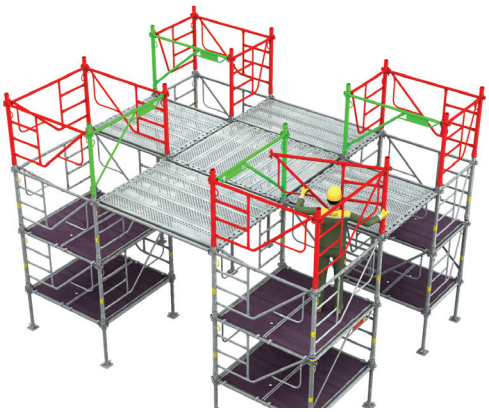


> **1** - Fit ledgers from inside the tower.

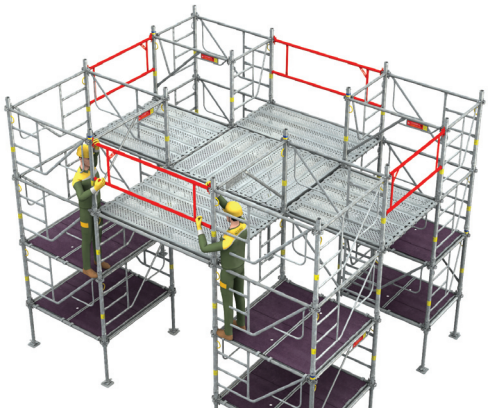


> **2** - Fit decks from the towers. Start with the central grid section. Lock the decks with the anti-lifting pins.

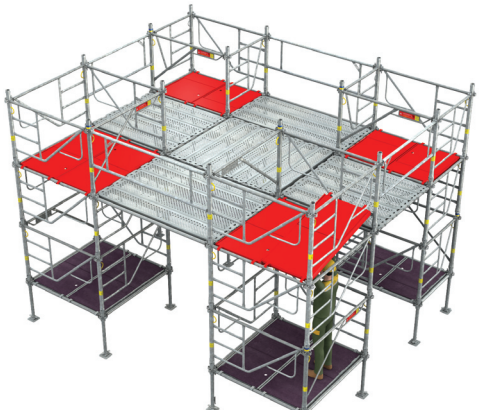
TIP When the central grid section is large, slide the decks on the ledgers with the pins engaged.



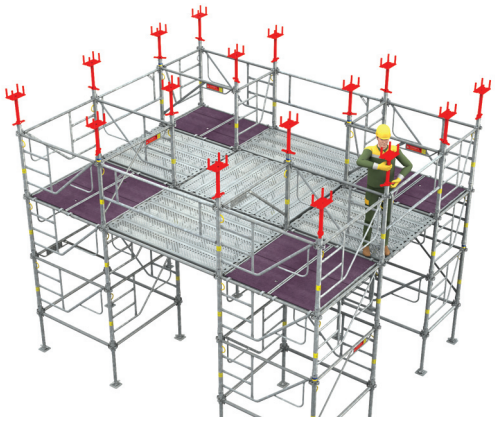
> **3** - Fit the frames including 1 access frame for access to the decking.



> **4** - Fit the inter-tower guardrails. They make it possible to secure the periphery of the decking if necessary.



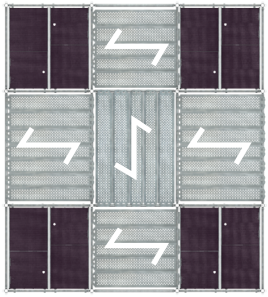
> **5** - Move the access decks. The decking is secure.



> **6** - Access the decking and fit the adjustable heads. Dismantle in the reverse order.

> CHOOSING THE LOAD-BEARING LEDGER for a distributed load of 200 kg/m² on the deck.

For decks laid in a checkerboard pattern

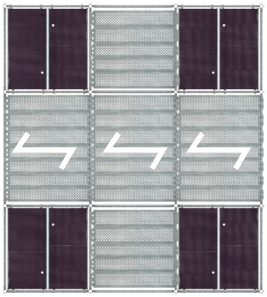


Load-bearing ledger (m)	Length of the deck (m)				
	1.00	1.50	2.00	2.50	3.00
0.70	L	L	L	L	L
1.00	L	L	L	L	L
1.50	L	L	L	L	L
2.00	L	L	RL	RL	RL
2.50	RL	RL	RL	RL	RL
3.00	RL	RL	RL	RL	X

L: Ledger or Touréchaf frame.

RL : Reinforced ledger.

For decks laid continuously



Load-bearing ledger (m)	Length of the deck (m)				
	1.00	1.50	2.00	2.50	3.00
0.70	L	L	L	L	L
1.00	L	L	L	L	L
1.50	L	L	L	RL	RL
2.00	RL	RL	RL	RL	RL
2.50	RL	RL	RL	X	X
3.00	RL	X	X	X	X

> DISTRIBUTION OF THE DECKS

Mills Acram and Multicrab decks are two models compatible with the Touréchaf.
The 2 models cannot be mixed.

Mills Acram decks	Grid spacing (m)						Bracket (m)	
	.70	1.0	1.5	2.0	2.5	3.0	.38	1.0
250mm	-	-	2	4	-	2	-	-
300mm	2	3	3	3	8	8	1	3

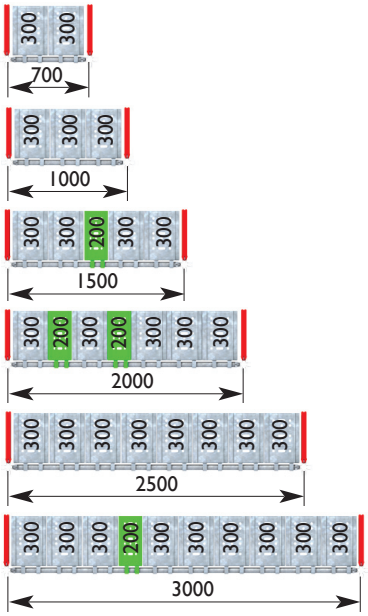
Refer to the technical and user information of the Mills Acram notice.

Multicrab decks	Grid spacing (m)						Bracket (m)	
	.70	1.0	1.5	2.0	2.5	3.0	.38	1.0
200mm	-	-	1	2	-	1	-	-
300mm	2	3	4	5	8	9	1	3

Refer to the technical and user information of the Crab range notice.

Diagrams for Multicrab decks distribution :

Ledgers along the decks are required.

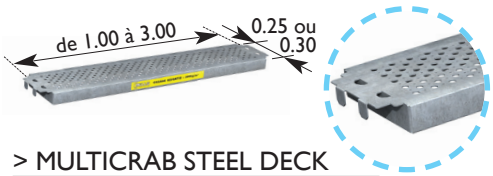


> TOURÉCHAF INTER-TOWER GUARDRAIL

Dimension	Code	Weight
0.70 m	011207-8	4.4
1.00 m	011210-2	4.7
1.50 m	011215-1	7.9
2.00 m	011220-1	10.1
2.50 m	011225-0	12.9
3.00 m	011230-0	14.0

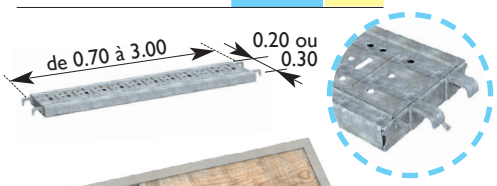
> MILLS ACRAM STEEL DECK

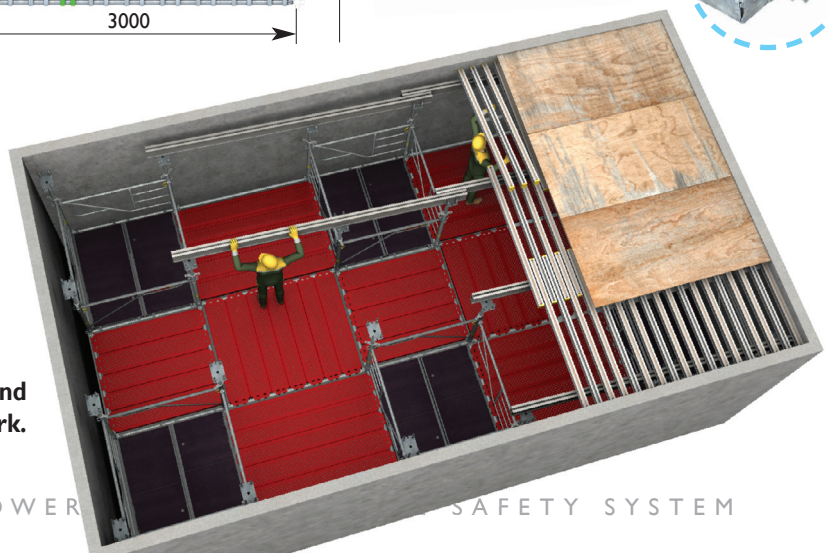
Dimension	Code	Weight
1.00 x 0.25 m	025602-4	4.7
1.50 x 0.25 m	023621-6	7.2
2.00 x 0.25 m	023624-0	9.2
2.50 x 0.25 m	023625-7	14.8
3.00 x 0.25 m	023626-5	17.0
1.00 x 0.30 m	023684-4	5.0
1.50 x 0.30 m	023680-2	8.0
2.00 x 0.30 m	023681-0	10.5
2.50 x 0.30 m	023682-8	16.7
3.00 x 0.30 m	023683-6	19.5



> MULTICRAB STEEL DECK

Dimensions	Code	Weight
0.70 x 0.20 m	107021-8	6.4
1.00 x 0.20 m	110021-3	7.9
1.50 x 0.20 m	115021-8	9.2
2.00 x 0.20 m	120021-1	11.6
2.50 x 0.20 m	125021-6	14.2
3.00 x 0.20 m	130021-9	16.7
0.70 x 0.30 m	107031-7	6.6
1.00 x 0.30 m	110031-2	9.7
1.50 x 0.30 m	115031-7	10.2
2.00 x 0.30 m	120031-0	13.6
2.50 x 0.30 m	125031-5	18.7
3.00 x 0.30 m	130031-8	21.6





Deck used for assembling and removing formwork.

Compatibility with scaffolding...

> Resistance of scaffolding components:

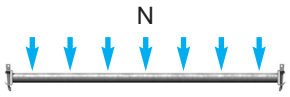
The values given hereinbelow are the maximum permissible loads by the scaffolding components.
The load capacities are given at the SLS (Serviceability Limit State)
To calculate values for the ULS (Ultimate Limit State): x1.5

> Ledgers:

Ø 48.3x2.7 - f_y =320 MPa

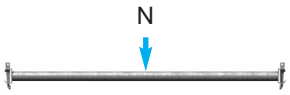
Bending with a uniformly distributed load (daN/m):

Length (m)	L	RL
0.70	1900	-
1.00	950	1510
1.50	465	1370
2.00	179	817
2.50	98	545
3.00	65	305



Bending with load concentrated in the middle of the span (daN):

Length (m)	L	RL
0.70	595	-
1.00	438	1180
1.50	325	1090
2.00	212	728
2.50	144	417
3.00	111	260



Compressive load (daN):

Length (m)	L	RL
0.70	1950	-
1.00	1950	1950
1.50	1950	1950
2.00	1950	1950
2.50	1898	1950
3.00	1366	1950

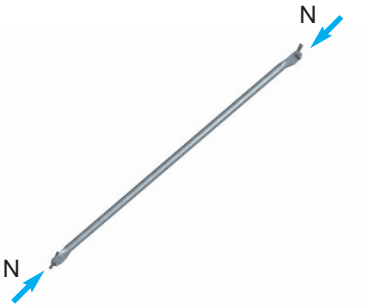
Traction load: 2040 daN

> Diagonal brace:

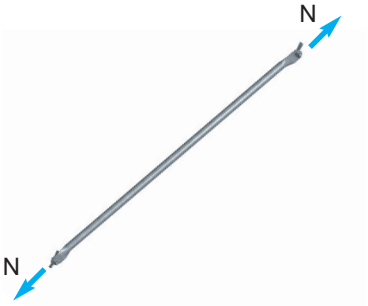
Ø 38x2.7 - f_y =320 MPa

Compressive load (daN):

Mesh (m) Ht x Lg (m)	Centre distance (m)	Load (daN)
0.50x0.35	0.56	1200
0.50x1.00	1.04	1200
0.50x1.50	1.49	1200
1.00x0.35	1.03	1200
1.00x0.70	1.17	1200
1.00x1.00	1.35	1200
1.00x1.50	1.72	1200
1.00x2.00	2.15	1120
1.00x2.50	2.60	799
1.00x3.00	3.00	587
2.00x0.70	2.09	1176
2.00x1.00	2.19	1084
2.00x1.50	2.45	889
2.00x2.00	2.76	717
2.00x2.50	3.13	569
2.00x3.00	3.53	456



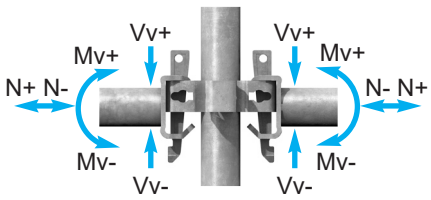
Traction load: 1200 daN

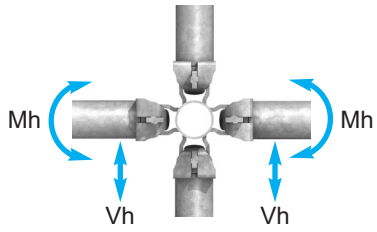


> Crab Node:

Permissible loads of the stirrup stressed by ledgers:

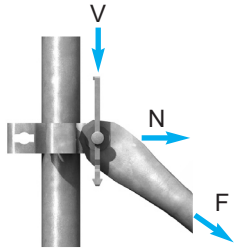
Description	Symbol	Load
Vertical force	Vv- Vv+	300 daN 1135 daN
Vertical moment	Mv- Mv+	40 daN.m 32 daN.m
Vertical rigidity	Rv	39 daN.m/°
Compression	N-	1950 daN
Traction	N+	2040 daN
Horizontal moment	Mh	21 daN.m
Horizontal rigidity	Rh	7 daN.m/°
Horizontal force	Vh	770 daN

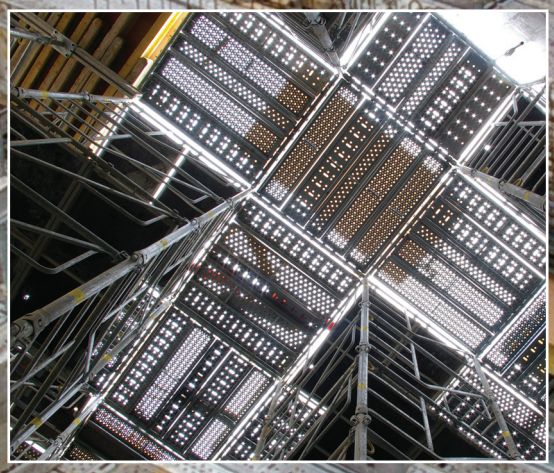


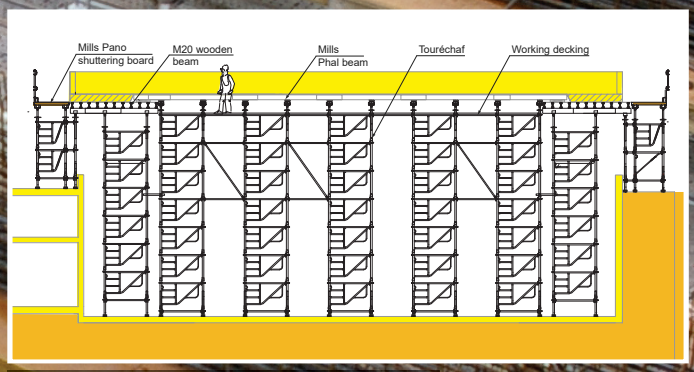


Permissible loads of the stirrup stressed by a diagonal brace in tensioning:

Description	Symbol	Load
Vertical force	V	2250 daN
Traction	N	2210 daN
Axial force	F	1200 daN







Touréchaf falsework with decking between towers for girder formwork, Delessert passage in Paris.

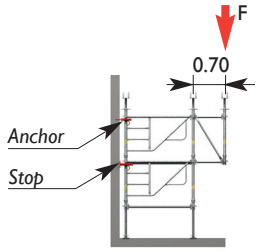
Compatibility with scaffolding...

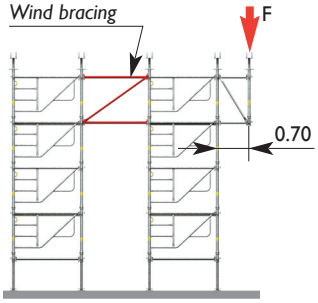
> Cantilever:

Cantilevers able to take up the load are made simply of scaffolding ledgers and diagonal braces.
The permissible load per fork head F is limited to 500 daN up to 1m50 cantilevered.
Beyond this, a study is needed to check the forces in each component.
The load exerted on the cantilever is taken by the load-bearing standard.

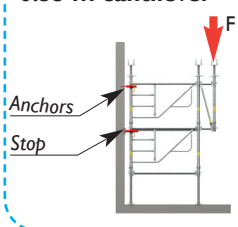
REQUIREMENTS:
> Before installing the cantilever, the tower has to be stabilised using an anchoring system or wind bracing with other towers.

0.70 m cantilever





0.35 m cantilever

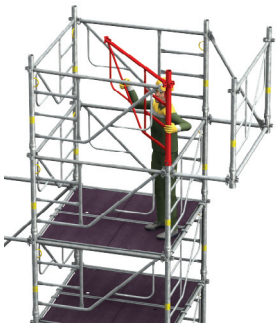


Assembly instructions for the cantilever of max. 0.70 m. in collective protection:

> **1** At the last level, fit the frames except the one in front of the cantilever.
Assemble the base of the cantilever (ledger + base).
Fit a diagonal brace.

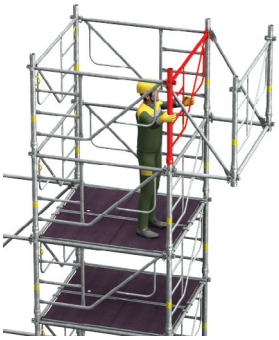
> **2** - Fit the ledger.

> **3** - Fit a single standard and a frame at the end of the cantilever.



> **4** - Install the last frame of the tower without completely locking it.

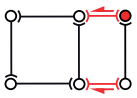
> **5** - For the 2nd diagonal brace, lock the low end and maintain the other end on the frame.



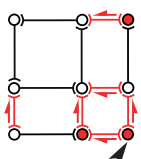
> **6** - Lock the last frame.

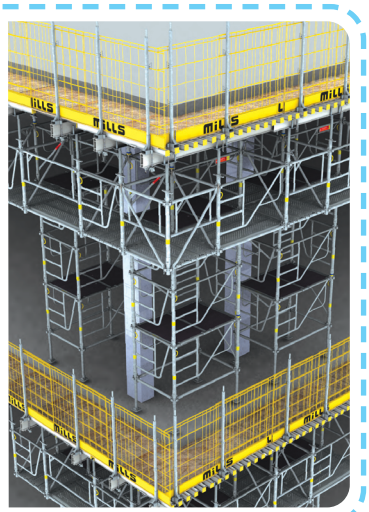
> **7** - Move the access decks one level up.
Fasten the other end of the diagonal brace.
Fit side ledgers.
Fit the adjustable heads.
Dismantle in the reverse order.

Simple cantilever.



Corner cantilever.



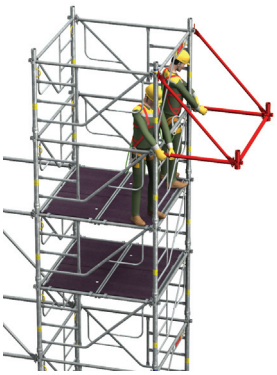


> Assembly instructions for the cantilever, 1.00 m and more with PPE (individual fall arrest system):

WARNING: See the general recommendations, chapter on assembly and disassembly in PPE.

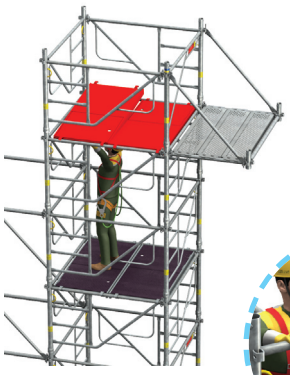
> **1** At the last level, fit 3 frames and an access frame. Fasten the high ends of the 2 diagonal braces of the cantilever.

> **2** - Fasten the base of the cantilever (ledger + base) to the diagonal braces.



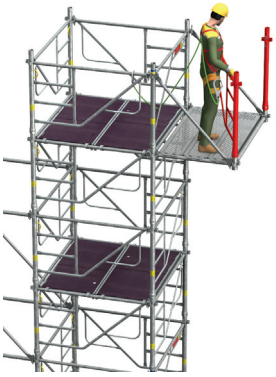
> **3** - Fit the cantilever and lock the ledgers.

> **4** - Install the decks. Lock them and push them to the end of the cantilever.

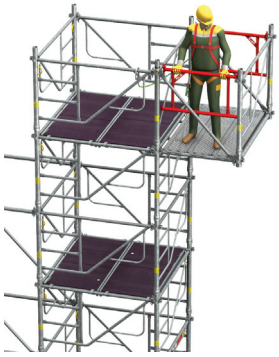


> **5** - Move the access decks one level up.

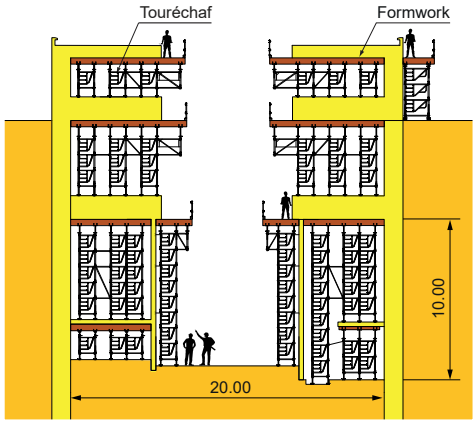
> **6** - Secure the harness on the upper bar of the frame for phases 7 and 8.



> **7** - Fit a frame and a single standard. The frame can be replaced with a standard, a diagonal brace and an inter-tower guardrail.

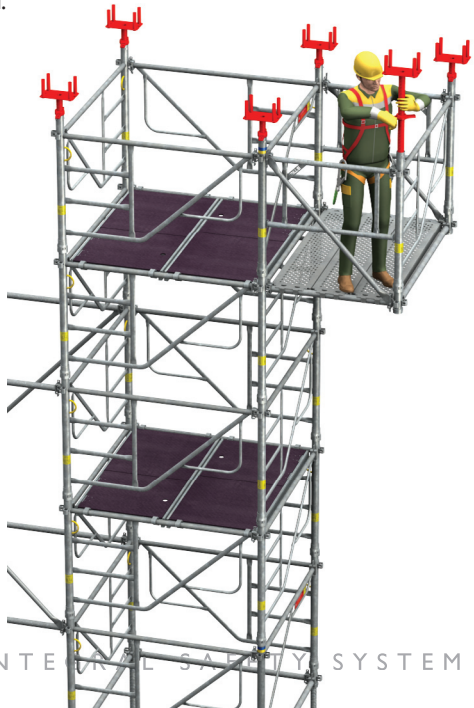


> **8** - Fit the inter-tower guardrails on the sides. The deck is secure.



Shaft falsework.

> **9** - Fit the adjustable heads. Disassemble in the reverse order.



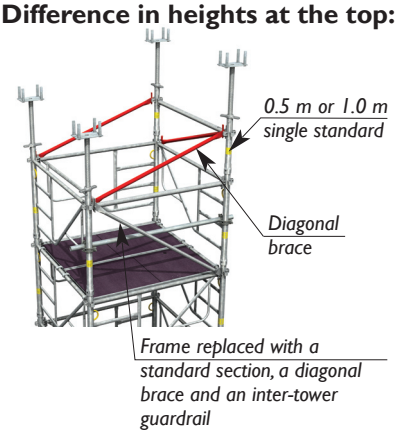
Compatibility with scaffolding...

Touréchaf adapts to every terrain...

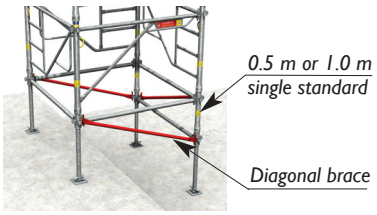
> Using single standards to accommodate different heights:

Falsework can be erected with different heights at the top or bottom using 0.50 m or 1.00 m standards with diagonal braces.

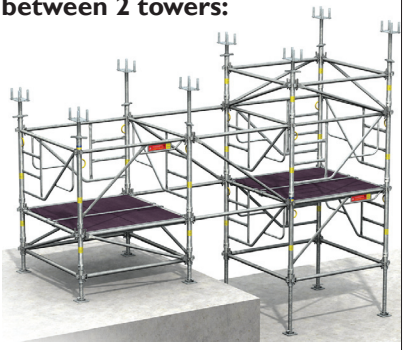
Difference in heights at the top:



Difference in heights at the bottom:



Difference in height between 2 towers:



WARNING: Each single standard must be braced properly in both directions.

> Mobile Touréchaf scaffolding:

Touréchaf castors convert falsework towers into mobile scaffolding with a particularly stable square base.

Advantages:

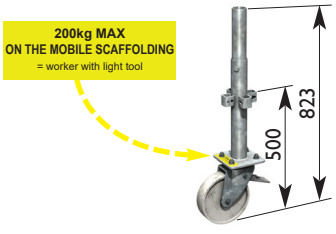
The Touréchaf mobile scaffolding has all the advantages of Touréchaf falsework towers

- Automatic locking system.
- Built-in lifting ring.
- Built-in access ladder.
- Limited number of components.
- Easy to assemble.
- Lifting by crane.

WARNING: Max. load of 200 kg for the mobile scaffolding = workers with light tools.

> TOURÉCHAF CASTOR

Description	Code	Weight
Castor (with connector)	011190-6	8.5

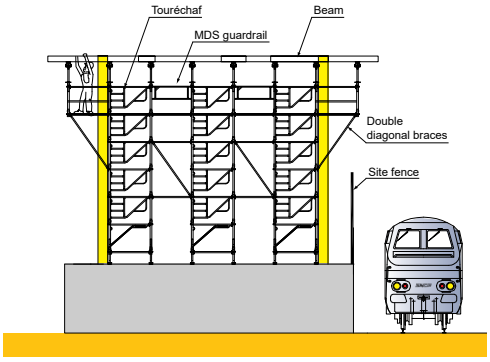


Touréchaf falsework for carrying out girders at 50 m in height on domes of the 3 tanks of the methane terminal (LNG) on the seafront in Dunkerque.

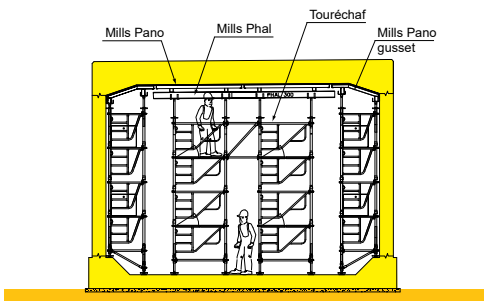
Compatibility with scaffolding...

Examples of special cases:

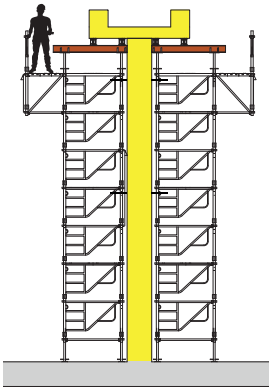
> Reinforced 1.50m cantilevers by double diagonal braces and decking for the installation of the formwork:



> Falsework of an access viaduct with Mills Pano:



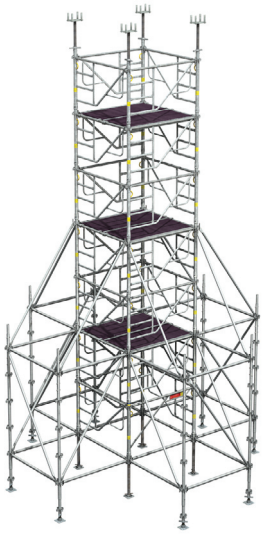
> Cantilevers in a basin and decking at the top of the towers:



The Touréchaf falsework has a traffic decking on the 1m00 cantilever so that workers install the girder in collective protection.
The guardrail is made of Touréchaf frames.

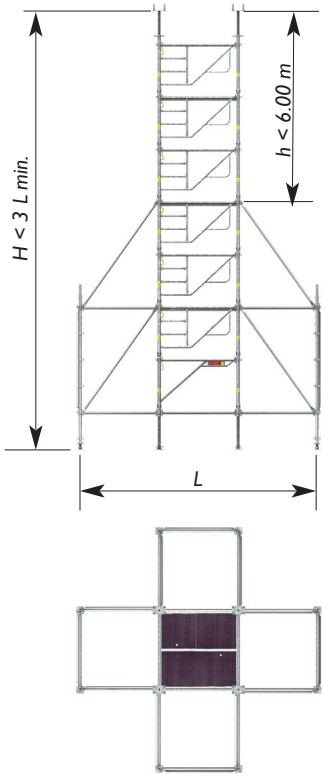
The compatibility with the scaffolding offers many working platform combinations in safety...

> Single falsework tower equipped with stabilisers:

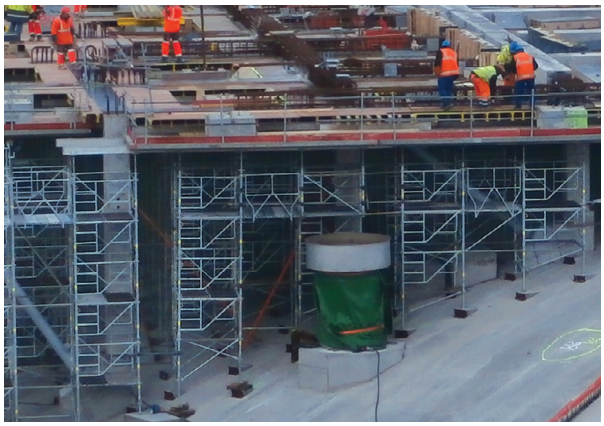


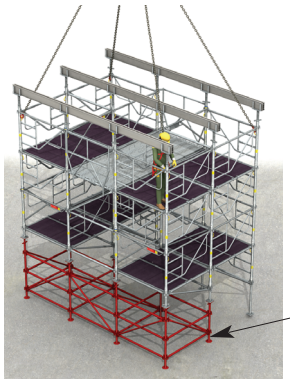
The stabilizers comprise scaffolding standards, ledgers and diagonal braces.

Stability rule for the assembly and dismantling phases of the tower:



> Falsework blocks installed on the dome of a reservoir:

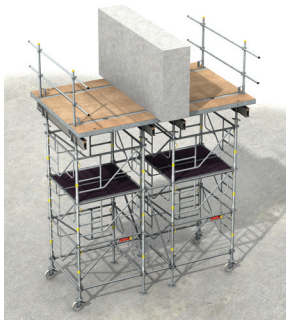




Prefabrication of falsework block on the ground on a temporary scaffolding structure, before the cranage thereof 50 m high.

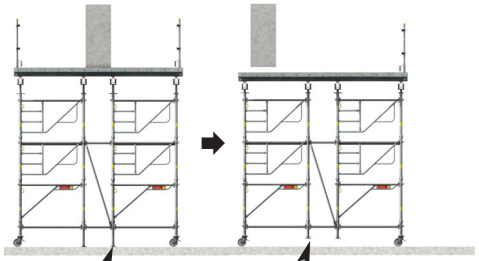
The scaffolding is set to reproduce the shape of dome.

> Rolling tool for the girder formwork:



Several tools are placed side by side under the girder.

In the falsework position: *In the moving position:*



Our **BIM** approach...

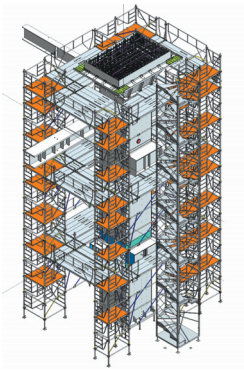
Mills, as a first-rate falsework, scaffolding and temporary access manufacturer in Europe, participates in the digitalisation of the building sector via the BIM (Building Information Modelling).

The BIM is a working method that makes it possible to pool data with all the stakeholders in the project. This data is synthesised with a 3D model, which provides each stakeholder with a more precise understanding and a more global view.

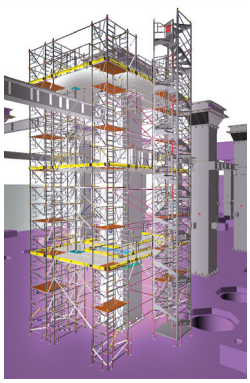
We have always been convinced that BIM is an effective method for working together, reducing the risk of errors, improving safety on the site, optimising the scheduling and controlling the cost of the works.

In 2005, our internal team of developers created the Scaff' CAD software for designing in 3D, generating equip-ment lists, detecting interferences and having a better understanding of the project.

In 2012, Mills designed its first falsework in BIM with its customers on major projects: Louis Vuitton Foundation, Philharmonie of Paris.
Scaff'CAD was transcribed in BIM and became NOEMI BIM. It was recently used on the underground stations of Grand Paris, the Achères water treatment plant, the new head office of Vinci Archipel…



1 - Modelling with Mills Noemi BIM.



2- Synthesis and modus operandi.

3 - Installation on site using a 3D model.

Since 2018, Mills is the main supplier and designer of falsework and modular access for the worksite of the Hinkley Point C EPR nuclear power plant in England. For this titanic project, we are working with a level 2 BIM approach. We work with the various stakeholders in the worksite with openBIM, in an environment where the data is pooled.

These projects reward the continuous improvement in our NOEMI BIM software program and the increase in skills of our design offices.

We are continuing the development of our NOEMI BIM software to an even higher level of automation for modelling and controlling plans.

Our other objective is to allow for the use of information coming from BIM for the other operational entities, in particular the site engineers that implement the equipment on the worksites.

This approach is shared with our customers who use TOURECHAF who we train on NOEMI BIM and who help us to advance via their feedback

Mills has been involved with BIM for many years now...

BIM
A REFERENCE RECOGNISED BY CERTIVEA

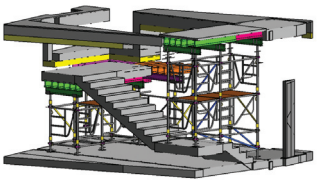
Our NOEMI BIM software...

NOEMI BIM is a software program designed for working in a BIM environment. Its features automate the designing and modelling of Mills Touréchaf falsework, scaffolding and access equipment.

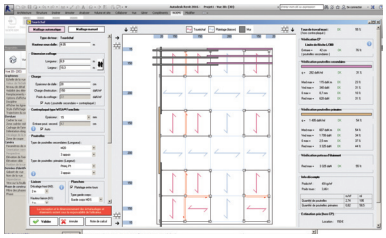
For all users:
It has a simplified mode that makes it easy to quickly learn the main functions (automatic and instantaneous generation of equipment lists, automatic design).

Incorporated into Revit and Navisswork, it offers a complete set of tools to execute the most demanding projects.

Modelling:
It instantly generates structures with collective safety and the necessary accessories.
Modifications are made directly in the 3D view with intelligent tethering and automatic length detection.

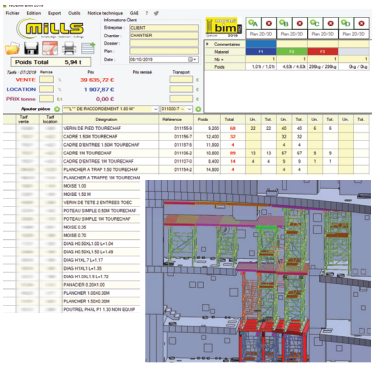


Calculation:
NOEMI BIM automatically designs the single falsework and generates a calculation note.



Control for structures:
NOEMI BIM checks the modelling of the falsework even for non-rectangular configurations.

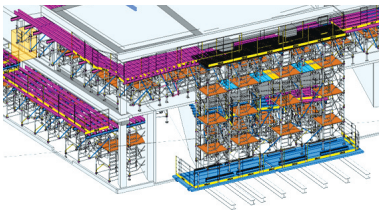
List of equipment and packing:
NOEMI BIM counts the equipment per phase, optimises deliveries and deduces the packing and the flatbed linear for transport.



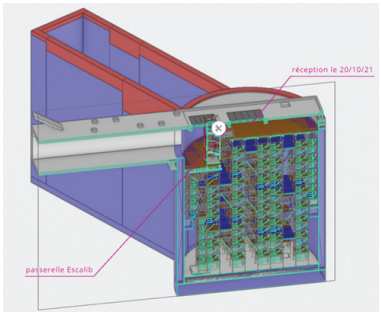
Collaboration and deployment of BIM:

Our software is compatible with the Open-BIM format. Pre-configuring the template facilitates exporting to the .ifc format.

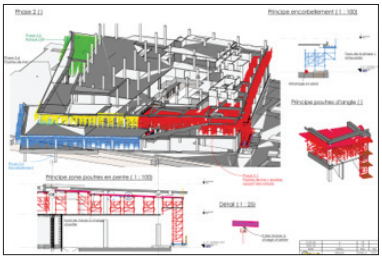
Thanks to several levels of detail, colours and the nested 2D, the component library adapts to any support for reading (paper, touch tablet, PC…).



An operational software that evolves:
Team of developers at Mills works on optimising the software and developing new features.



Sharing experience:
Mills offers training on the use of NOEMI BIM and designing falsework.
In addition, 80 tutorials are available in the software.



How to obtain Mills NOEMI BIM:
Download the software at www.mills.fr/noemi-bim
or contact
noemi@mills.fr

MILLS noemi bim

A BIM approach was applied for studying and assembling the Touréchaf falsework equipped with Mills Escalib access for the GTA table of the future Hinkley Point EPR power plant in England.

©Bylor JV - Hinkley Point C.

Mills GCC: Guardrail for formwork with Safe Assembly & Dismantling system

Combined with the Touréchaf falsework towers and the MP3 formwork beams, the GCC Mills allows for the first time, to assemble and dismantle in collective protection a traditional formwork supported by towers.

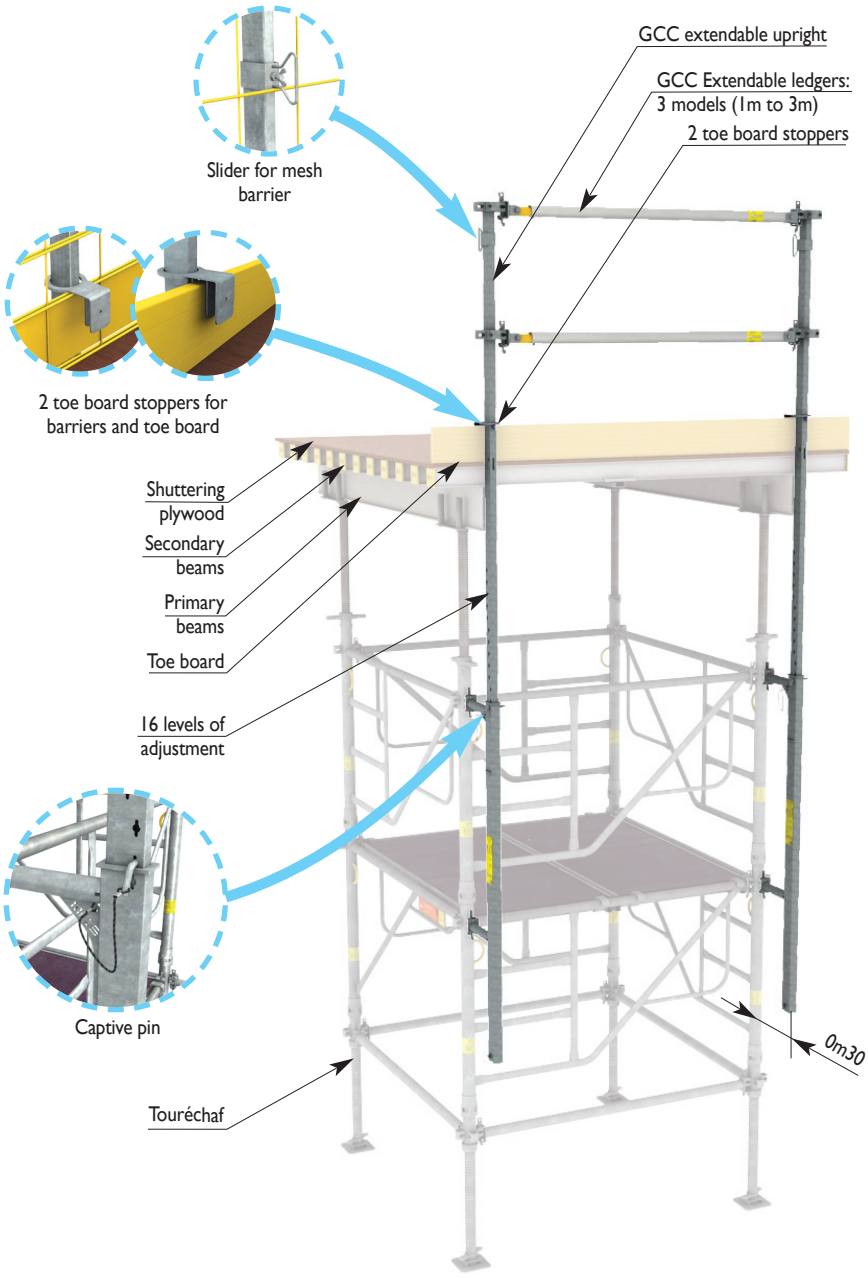
The edge guardrail of the future formwork is set from the towers before the beam laying.

The operator then installs the primary and secondary beams from the towers. He can then lay the plywood in collective protection (individual fall arrest system unneeded) with the guardrail already in place.

Levelling the GCC is simple to set up because it depends on the formwork level, not on the output of the tower jacks.

Advantages:

> Simple and quick implementation without individual fall arrest system.
> Adjustable to the jack output of the falsework and formwork thickness according to the formwork altimetry.
> Visual indicator for fast adjustment.
> Accepts non-metric spacing between uprights.
> Light parts <15 kg.
> Requires only a hammer.
> Extendable rails and upright with anti-release device (no loose parts).
> Upright with hand guard and anti-finger trap system.
> Lockable upright slide for transport.
> Meets the requirements of the EN 13374-A standard relating to temporary peripheral guardrails.
> Compatible with mesh barriers.
> Possibility of creating open or closed angles (balcony formwork).

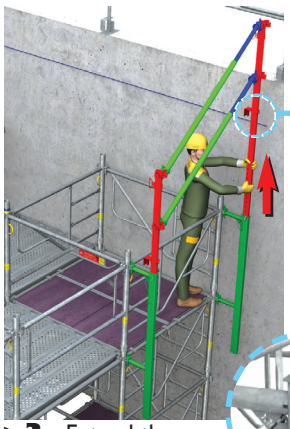


> Patented system.

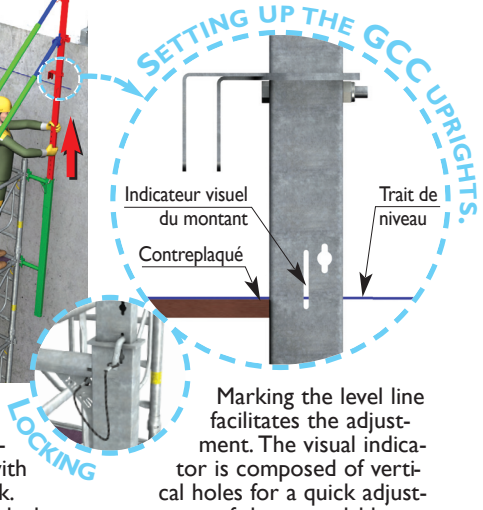
Assemble and dismantle a traditional formwork on falsework towers in collective protection and without individual fall arrest system

> **1** - Install two GCC uprights from the falsework decking.

> **2** - Install two GCC ledgers on the uprights.

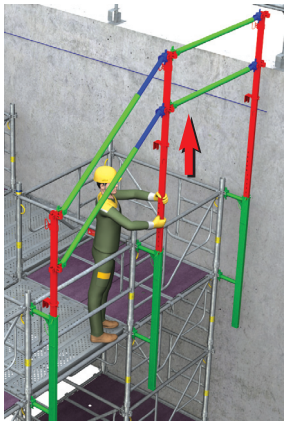


> **3** - Extend the first GCC upright so that the visual indicator is levelled with the future formwork. Lock the upright with the captive pin.



Marking the level line facilitates the adjustment. The visual indicator is composed of vertical holes for a quick adjustment of the extendable upright with the level of the future formwork.

> **4** - Continue the assembly in the next mesh by installing an upright and two ledgers.

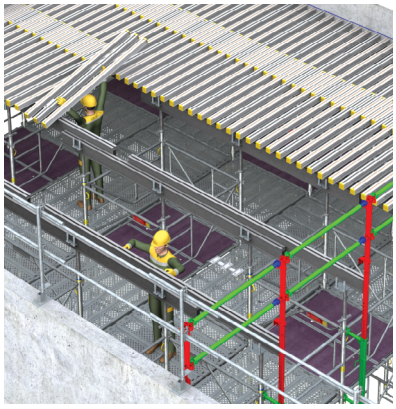


> **5** - Level the second upright.

> **6** - Repeat the steps 4 and 5 mesh by mesh.

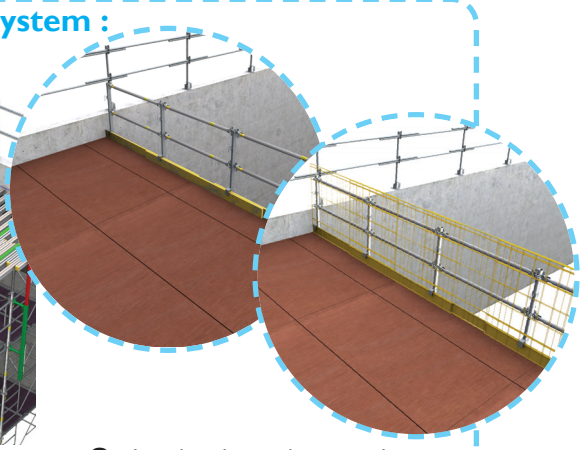
Dismantle in the reverse order, once the formwork is removed.

Formwork installation without individual fall arrest system :



> **7** - Install the beams.

> **8** - Lay the plywood. The MP3 beams as secondary beams make the operator's displacement safe.



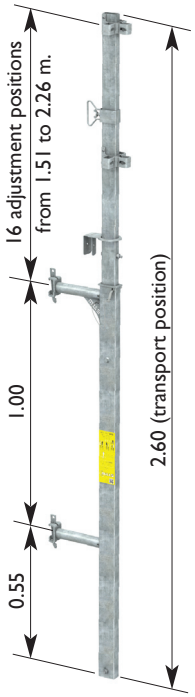
> **9** - Lay the plywood against the GCC uprights then install the toe boards or mesh barriers

Mills GCC: Guardrail for formwork with Safe Assembly & Dismantling System

> MILLS GCC parts description:

> GCC EXTENDIBLE STANDARD

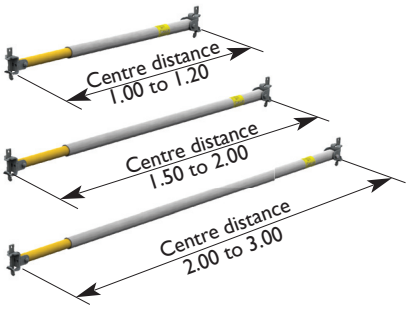
Description	Code	Weight
Extendable GCC upright	011300-1	13.8



> EXTENDABLE GCC LEDGER

Dimension	Code	Weight
1.00 m to 1.20 m(1)	011301-9	2.9
1.50 m to 2.00 m(2)	011302-7	3.9
2.00 m to 3.00 m(3)	011303-5	5.0

Standard ranges of use :



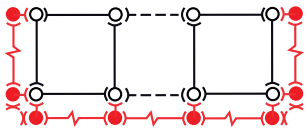
Net length L_n min. / max.
(1) 0.84 m / 1.38 m.
(2) 1.32 m / 2.34 m.
(3) 1.83 m / 3.28 m.

All dimensions in mm or m.
Weight in kg.

> Other configurations:

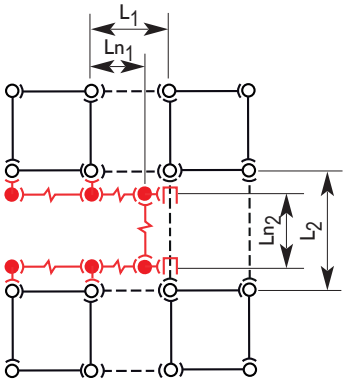
The GCC guardrails can be adapted to different formwork configurations such as the creation of balconies or shaft protection.

GCC guardrail with exterior angles in case of a balcony.



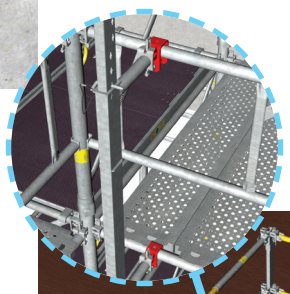
Legend:
- *Touréchaf frame*
- *Ledger*
- *GCC upright*
- *GCC ledger*
- *U 1 stirrup*
- *350mm ledger*

GCC guardrail with interior angles in case of a shaft.

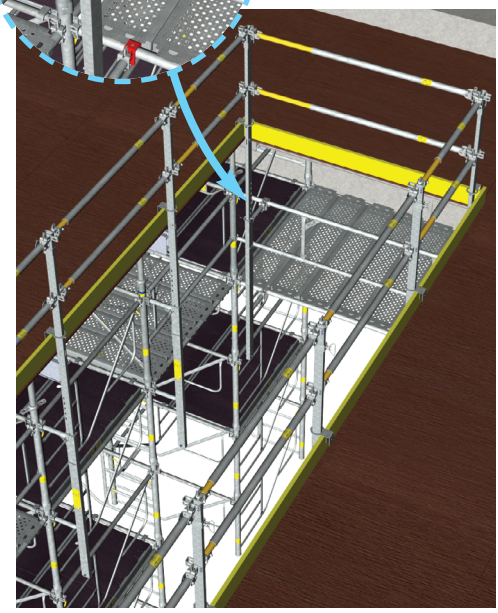


Centre distance L_1	Extendable ledger model
3.00 m	2.00 m à 3.00 m
2.50 m	2.00 m à 3.00 m
2.00 m	1.50 m à 2.00 m
1.50 m	1.00 m à 1.20 m
Other lengths	Ln = L_1 - 0.45 m

Centre distance L_2	Extendable ledger model
3.00 m	2.00 m à 3.00 m
2.50 m	1.50 m à 2.00 m
Other lengths	Ln = L_2 - 0.76 m



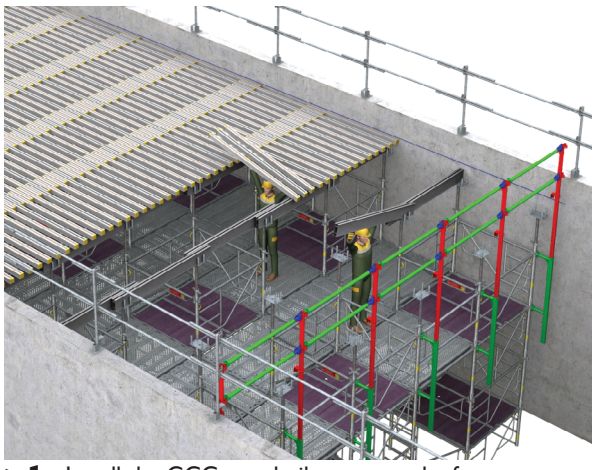
The use of 2 "U 1 stirrups" allows the installation of the GCC upright on the falsework ledgers.



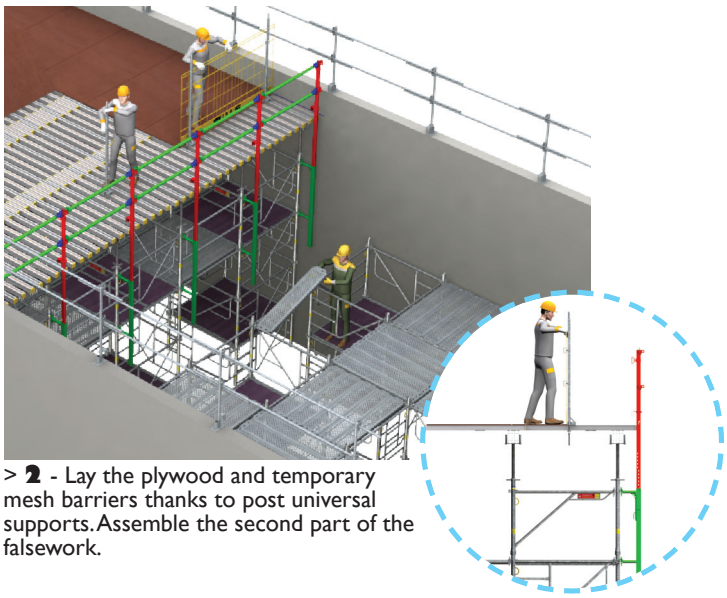
> U 1 STIRRUP

Description	Code	Weight
U 1 stirrup	251001-4	0.75

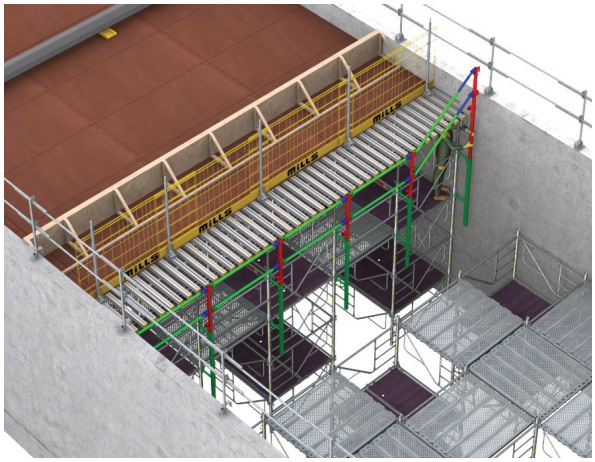
Install a temporary guardrail for a partial acceptance of the falsework:



> **1** - Install the GCC guardrail to secure the future formwork then the formwork beams.

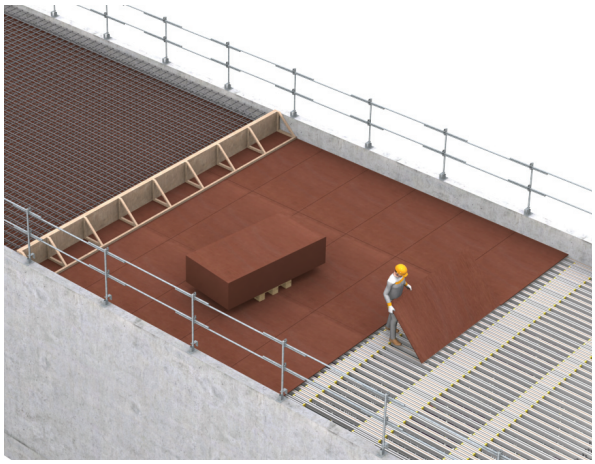


> **2** - Lay the plywood and temporary mesh barriers thanks to post universal supports. Assemble the second part of the falsework.



> **3** - Acceptance of the first part of the falsework. Remove the GCC guardrail.

> **4** - Install the decking between the first and second part of the falsework.

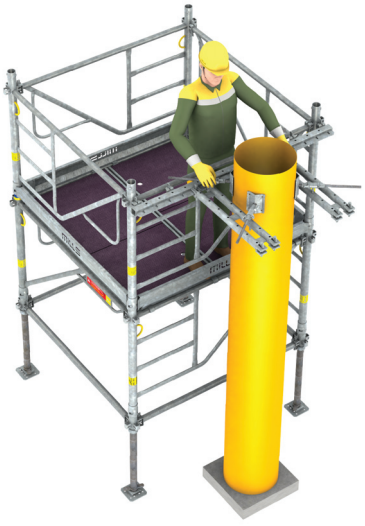


> **5** - If required, install the GCC guardrail at the edge of the second part. Install the formwork beams. Remove the temporary mesh barriers. Install the plywood.

Collective protection is also gains in productivity...

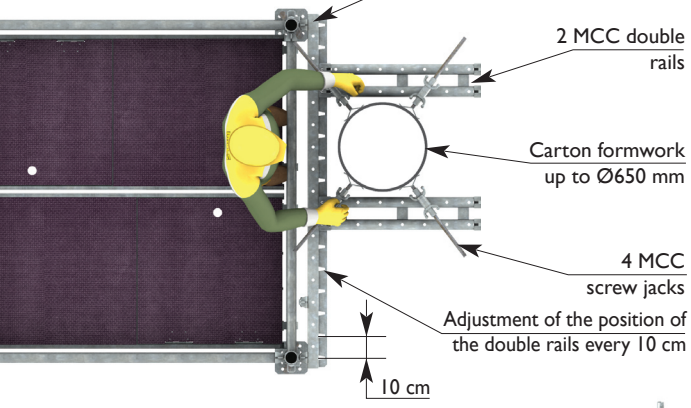
MCC Mills: Carton Formwork Bridle...

The MCC Mills makes it possible to maintain the formwork of the standards and to carry out concreting with collective safety.
It is assembled from the deck of the Touréchaf and the adjustment of the line is done easily using the wedge key rail system and 4 screw jacks.
In standard use, it makes it possible to maintain formwork from Ø 150 to 650 mm.

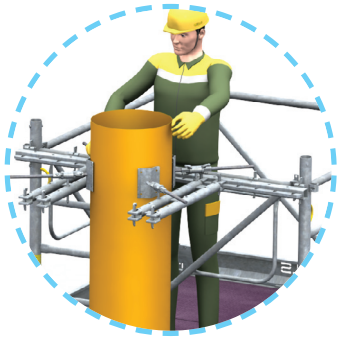


> Composition of a complete MCC Mills for carton formwork from Ø150 to 650 mm:

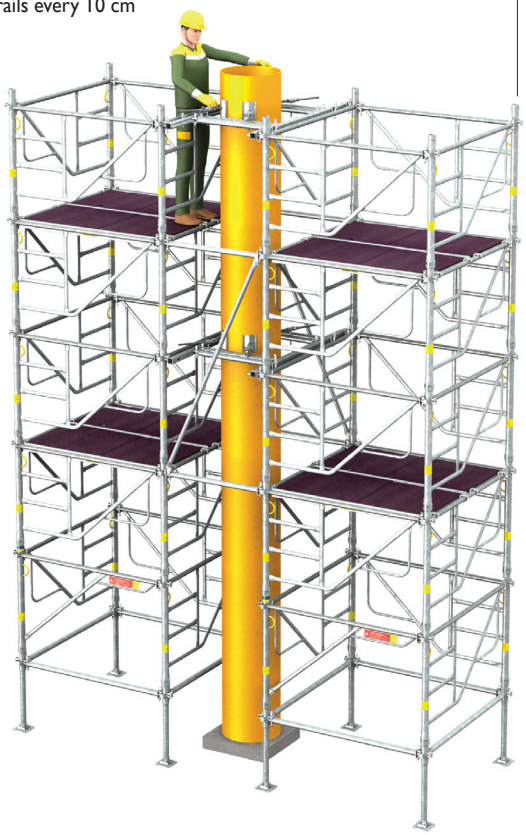
- 4 MCC screw jacks.
- 1 MCC rails bearer.
- 2 MCC double rails.



The heel-piece can play the role of maintaining the formwork at the foot



For greater stability, it is possible to position 2 facing towers connected by MCC double rails and braced by ledgers and diagonal braces for a spacing between towers of 1m00.

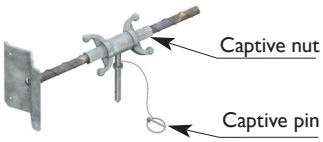


> Main components:

> MCC SCREW JACK

Description	Code	Weight
MCC screw jack	011253-2	2.4

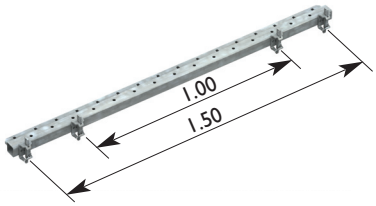
Used in kits of 4.



> MCC RAILS BEARER

Description	Code	Weight
MCC rails bearer	011250-8	12.7

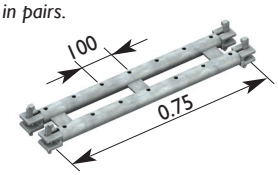
Compatible with Touréchaf 1m and 1m50.



> MCC DOUBLE RAIL

Description	Code	Weight
MCC double rail	011252-4	7.0

Used in pairs.



WARNING: Check the stability of the assembly.

Refer to the data of the carton formwork manufacturer for the number of maintainers.

All dimensions are in mm and in m.
Weights are in kg.

MCC for the creation of the C3C station (Chevilly Trois-Communes) on the extension of the underground line 14 south.

Touréchaf falsework for the construction of the Bordeaux Sports Cathedral.

5T & 2.5T **Wall Brackets...**

The 5T wall bracket and the 2.5T wall bracket are wall brackets that make it possible to withstand heavy duty loads, when it is not possible to install a falsework tower.

> Compatible with the MILLS system:

They are compatible with all the adjustable heads of the Touréchaf.

> Easy to implement and remove:

Light, with the respective weights of 15 and 6 kg, they reduce the risk of MSK conditions.

The anchoring wall plugs remain accessible, even with the screw jack in place, which facilitates bracket removal.

Installing a beam parallel to the wall gives tolerance in their installation.

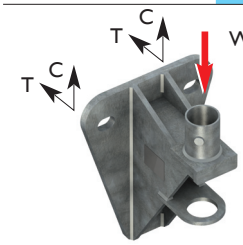
The geometry of the 2.5T Bracket allows for easy handling.

When the fork head is low, the fastener remains accessible with a classic drill bit extension of 200mm min. The fork can also be freed first by using it as lever to turn the wall bracket.

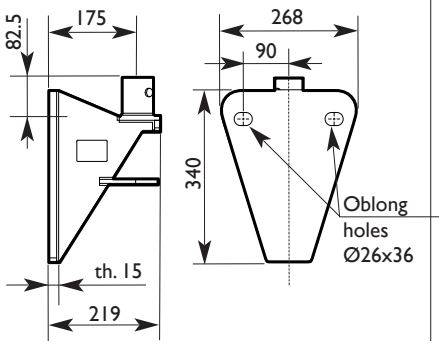
5T wall bracket:

> 5T WALL BRACKET

Description	Code	Weight
5T wall bracket	080460-9	15



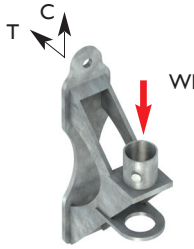
Max. resulting reactions not weighted per pin:
- Shearing: 2,765 daN
- Traction: 2,260 daN



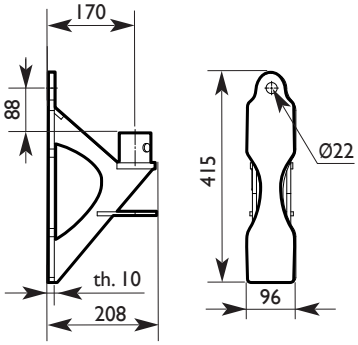
2.5T wall bracket:

> 2.5T WALL BRACKET

Description	Code	Weight
2.5T wall bracket	080462-5	6.4



Max. resulting reactions not weighted per pin:
- Shearing: 2,500 daN
- Traction: 1,500 daN



> Examples of fasteners:

Loaded at full capacity:

- If the 5T Bracket is loaded at **50 kN max. SLS.**
- If the 2.5T Bracket is loaded at **25 kN max. SLS.**

Hilti HSL4-G M16 d24x230 stud bolt built for heavy loads:

REQUIREMENTS: Add a washer to the fastener. Example for anchors on a C20/25 class non-cracked concrete with a thickness of 30 cm. Without edging effects. Installation depth 15 cm.

Alternative for a reduced load:

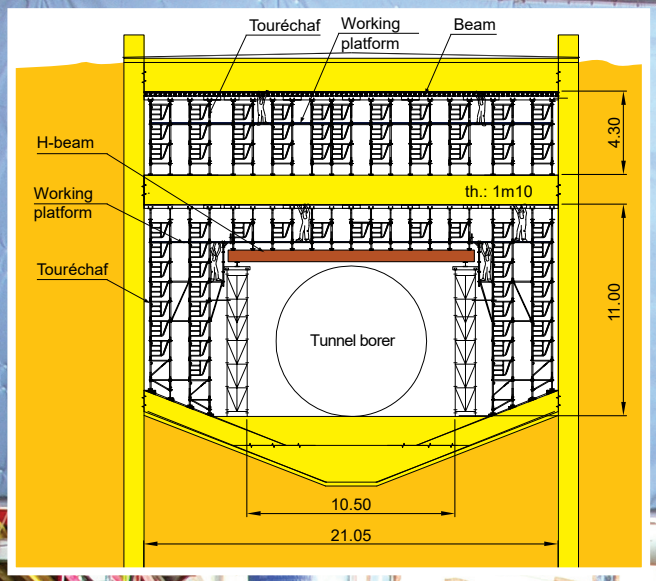
- If the 5T Bracket is loaded at **32 kN max. SLS***.
- If the 2.5T Bracket is loaded at **19 kN max. SLS***.

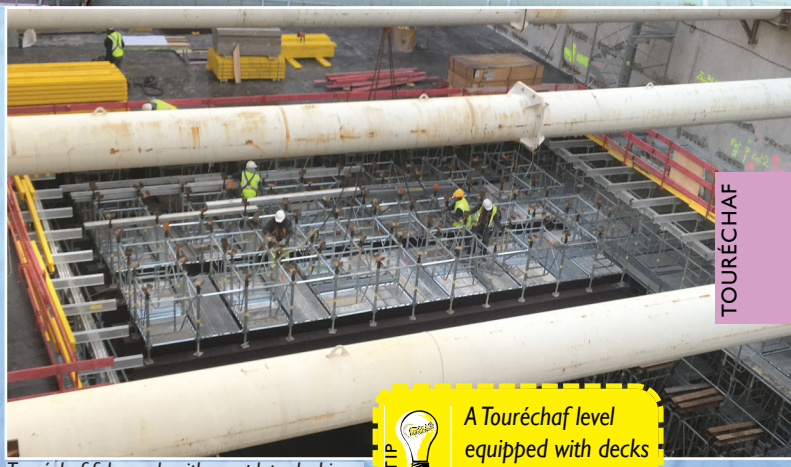
Hilti HUS4 H M14 x130 concrete screw:

REQUIREMENTS: Add a washer to the fastener. Example for anchors on a C20/25 class non-cracked concrete with a thickness of 20 cm. Without edge effects. Installation depth 11.5 cm

*Load limited by the concrete class

WARNING: In any case, it is imperative to refer to the latest recommendations from the supplier of the fasteners.





Touréchaf falsework with complete decking at the top of the towers for the construction of the "Cardinet" underground station, on line 14 of Grand Paris.

TIP

A Touréchaf level equipped with decks was prefabricated then craned on the H-beams in order to secure the implementation of the formwork.

Keying girders...

A decking must be installed at the top of towers for keying girders.

> Using keying guardrails:

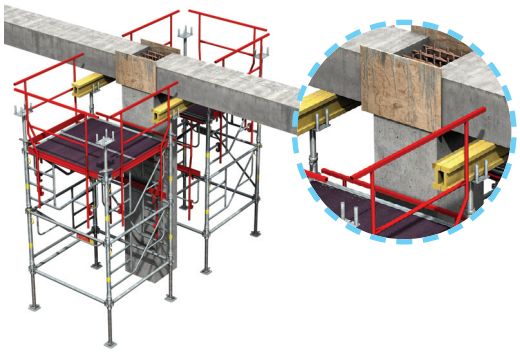
1 m and 1.50 m keying guardrails protect workers while they are keying girders.

Advantages:

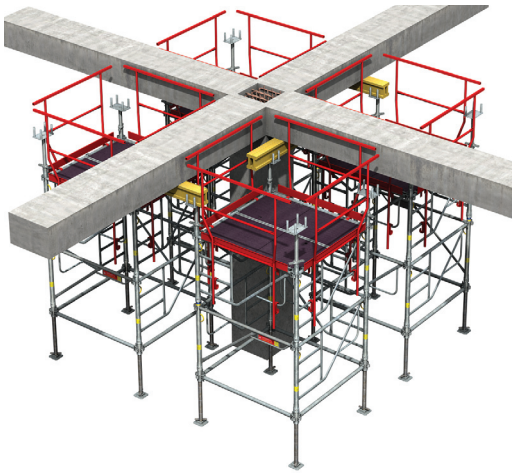
> Easy and fast.
> The guardrail is offset to allow room for the beams.
> Enables the towers to be moved.
> Specific cradle.

> Principle for use:

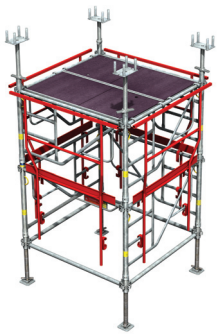
>Adjust the screw jacks then install the girders with the guardrails in high position.



>To facilitate the formwork of the node, it is possible to lower the keying guardrail on the girder side.



> Keying principle for four girders.

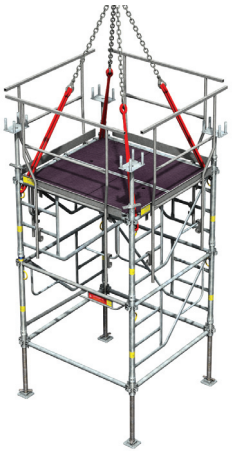


> 4 keying guardrails in low position to pass under the girders without removing the screw jacks and the decks.

Moving:

> Lifting by crane.

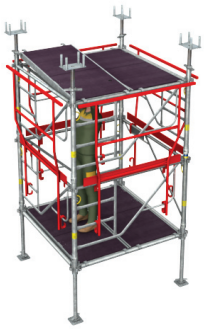
To facilitate attaching the tower from the deck, install 4 slings of the same length on the lifting rings.



> Moving using trolleys.

Example:
1.00 x1.50 m tower.

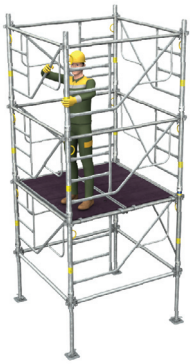
> Assembly instructions for towers with 2 levels of frames max.:



> 1 - Raise the decks at the top of the tower.

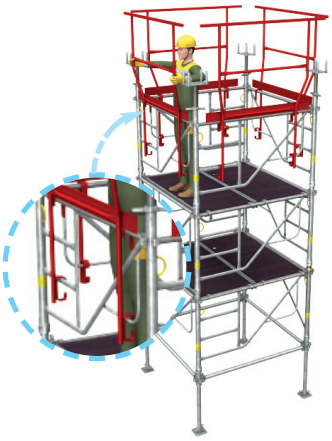
> 2 - Install the four keying guardrails from the outside of the tower.

> Assembly instructions for towers from 3 levels of frames:

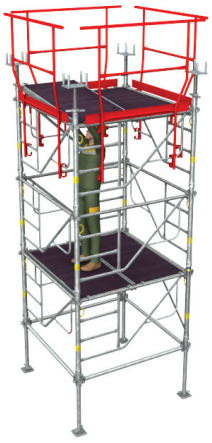


> 1 - Fit the last level of frames.

> 2 - Fit an access deck level.



> 3 - Fit keying guardrails and adjustable heads.

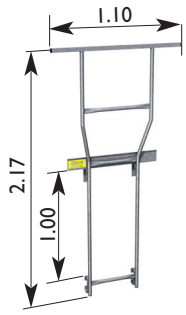


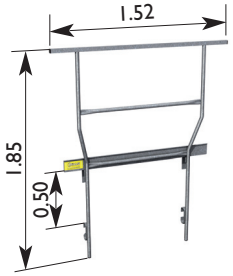
> 4 - Move the decks at the top of the tower.

> 5 - The work deck is secure. Dismantle in the reverse order.

> KEYING GUARDRAIL

Dimension	Code	Weight
1.00 m	011110-4	12.0
1.50 m	011115-3	13.9

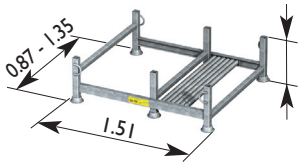




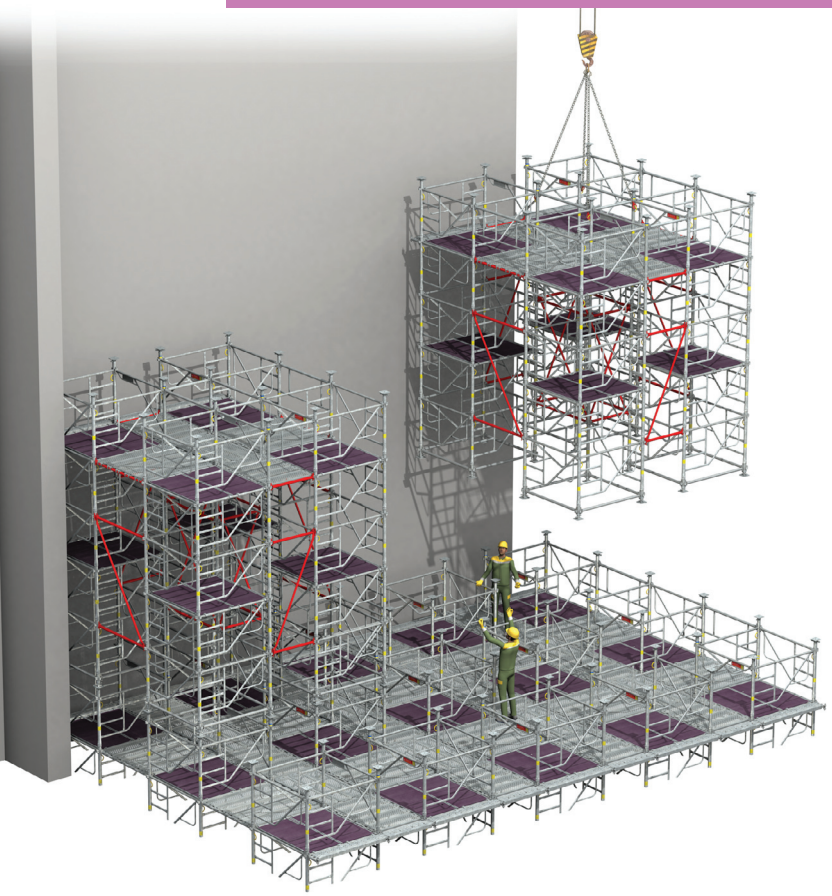
> CRADLE FOR 20 KEYING GUARDRAILS

Dimension	Code	Weight
1.00 m	011162-5	84.2
1.50 m	011163-3	83.4

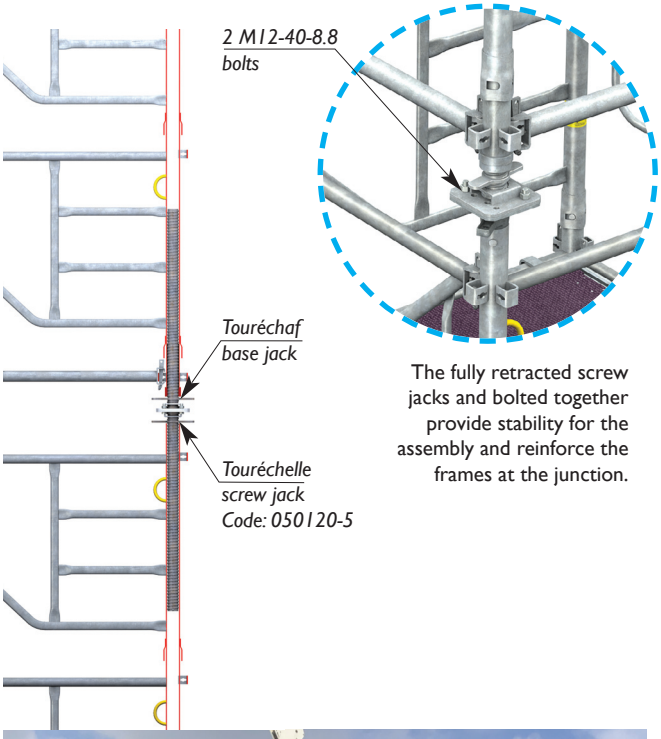
Dropsides:
- Folded: 0.45
- Deployed: 1.25



Stacking of Touréchaf with a crane...



In the case of high-height falsework, it is possible to superimpose isolated towers or blocks assembled beforehand. The junction between towers is done via bolting plates.



The fully retracted screw jacks and bolted together provide stability for the assembly and reinforce the frames at the junction.

Stacking Touréchaf assembled beforehand allows for gains in productivity...

Stacking Touréchaf for the future operation centre of lines 16 and 17 of the Grand Paris Express in Aulnay-sous-Bois.

Touréchaf falsework for the new Harbour Master of the port of Calais. It was constructed by stacking several tower blocks.

Block 5

Block 4

Block 3

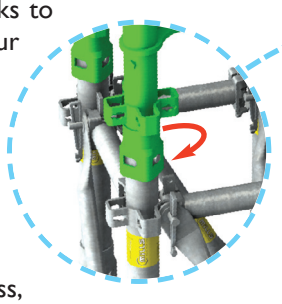
Block 2

Block 1

Touréchaf **Pylon**...

The Touréchaf Pylon is designed for heavy loads. It has a load-bearing capacity of **26 tons (260 kN) at a height of 6m**. Its design is compliant with standard EN 12812.

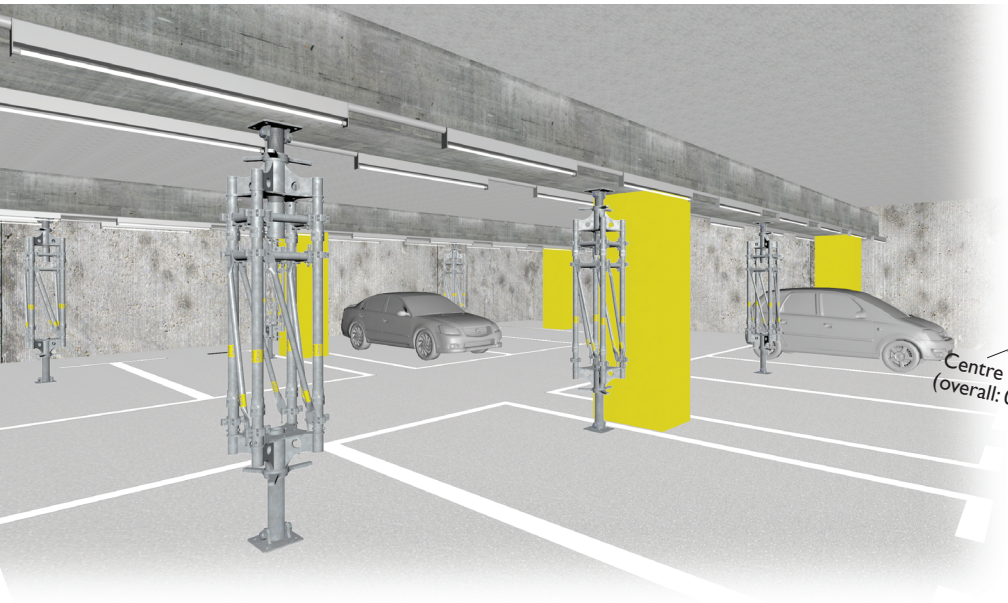
Comprised of Touréchaf components, it enjoys great modularity thanks to its compatibility with our scaffolding equipment.



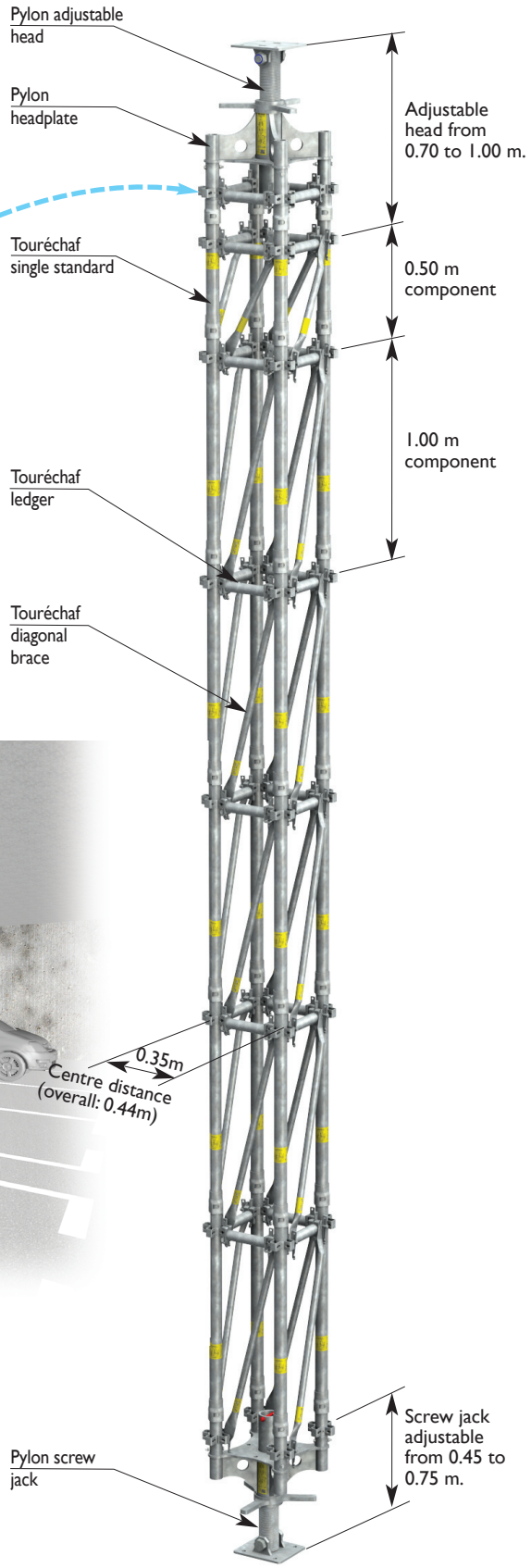
Quick to assemble: The standards are locked without pins by a 1/8 rotation and the ledgers and diagonal braces via simple keying.

Operational: easily add access, circulation or bracing with Touréchaf equipment.

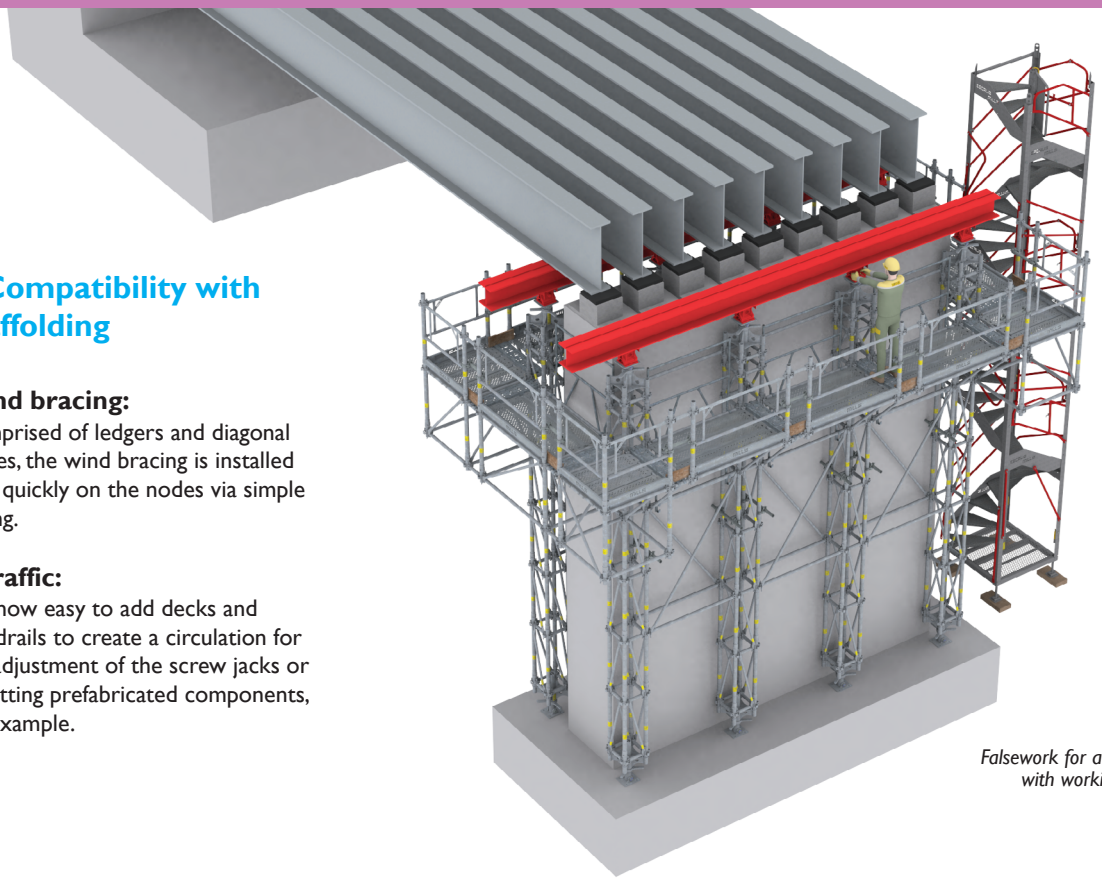
Ergonomic: it can be mounted horizontally and has a lifting point at its ends.



Example of falsework as underlying work.



Applications...



Falsework for a bridge deck with working platform.

> Compatibility with scaffolding

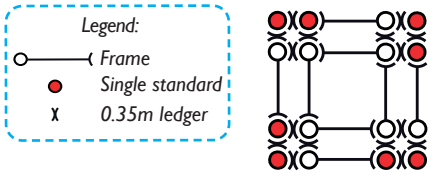
Wind bracing:
Comprised of ledgers and diagonal braces, the wind bracing is installed very quickly on the nodes via simple keying.

> Traffic:
It is now easy to add decks and guardrails to create a circulation for the adjustment of the screw jacks or for fitting prefabricated components, for example.

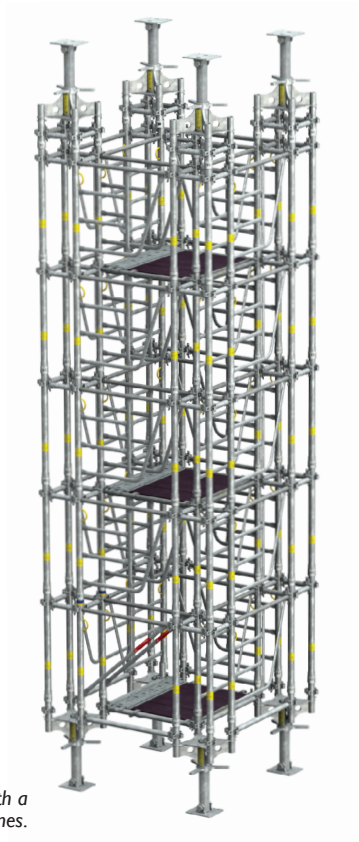
> Tower for heavy load:

Based on a 16-standard Touréchaf with 0.35m extensions, it is possible to use the pylon screw jacks to form a tower with 4 legs that can support:
- 96 tonnes. (24 t/screw jack) without the 0.35 m diagonal braces.
- 110 tonnes (27.5 t/screw jack) with diagonal braces on all the meshes of 0.35 m.

The assembly and access are equivalent to a conventional Touréchaf.



WARNING: Comply with the stability rules during assembly of the chapter Specifications and load capacity.



Example of a tower with a capacity of 96 tonnes.

The access footbridge to the platforms of the SNCF railway station in Amiens is back propped.

Specifications and load capacity...

> Single Touréchaf pylon:

Composition & permissible load SLS.

By precaution, to define the permissible load, we always consider the screw jacks extended to the maximum.

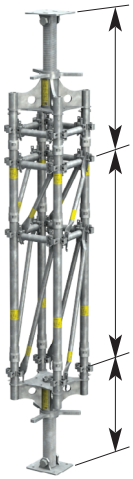
				COMPOSITION OF THE SINGLE STANDARD PYLON										
					Pylon head plate	Pylon screw jack	Pylon footplate	Single standard 50	Single standard 100	Diagonal brace 35x50ht	Diagonal brace 35x100 ht	35 ledger	
Height Min. (m)	Max. (m)	**Height H of the body of the Pylon (m)**	Permiss. load Single pylon (Tonnes)	**Type S**	011102-1	011105-4	011103-9	011170-8	011171-6	250503-0	251003-0	250203-7	Weight (kg)
1.35	1.75	0	27.5	0+0	1	2	1	-	-	-	-	4	134
1.65	2.25	0.5	27.5	0+1	1	2	1	4		4		8	158
2.15	2.75	1	27.5	1+0	1	2	1		4		4	8	174
2.65	3.25	1.5	26.5	1+1	1	2	1	4	4	4	4	12	198
3.15	3.75	2	26.5	2+0	1	2	1		8		8	12	214
3.65	4.25	2.5	26.5	2+1	1	2	1	4	8	4	8	16	238
4.15	4.75	3	26.5	3+0	1	2	1		12		12	16	254
4.65	5.25	3.5	26.5	3+1	1	2	1	4	12	4	12	20	278
5.15	5.75	4	26.5	4+0	1	2	1		16		16	20	294
5.65	6.25	4.5	26.0	4+1	1	2	1	4	16	4	16	24	318
6.15	6.75	5	25.5	5+0	1	2	1		20		20	24	334
6.65	7.25	5.5	25.0	5+1	1	2	1	4	20	4	20	28	358
7.15	7.75	6	24.5	6+0	1	2	1		24		24	28	374
7.65	8.25	6.5	24.0	6+1	1	2	1	4	24	4	24	32	398
8.15	8.75	7	23.5	7+0	1	2	1		28		28	32	414
8.65	9.25	7.5	22.5	7+1	1	2	1	4	28	4	28	36	438
9.15	9.75	8	21.5	8+0	1	2	1		32		32	36	454
9.65	10.25	8.5	20.5	8+1	1	2	1	4	32	4	32	40	478
10.15	10.75	9	19.5	9+0	1	2	1		36		36	40	494
10.65	11.25	9.5	18.5	9+1	1	2	1	4	36	4	36	44	518
11.15	11.75	10	17.5	10+0	1	2	1		40		40	44	534

Type "S" for standard: screw jacks at the foot and the head.

Type S 0+0

Standard pylon

Type S 1+1



Standard pylon

REQUIREMENTS:

> The load applied must be centred on the screw jack, aligned with the axis of the Pylon.
> The composition of the Pylon must absolutely be complied with.
> Provide for the use of a wedge jack for loads greater than 15 tonnes.
> For any non-vertical use of the Pylon, a specific study must be conducted.

TIP

The height of a type S Pylon = the height H of the body of the Pylon + 1.15 m to 1.75 m.

COMPOSITION OF THE SINGLE PYLON WITH BASES WITHOUT STUD BOLT

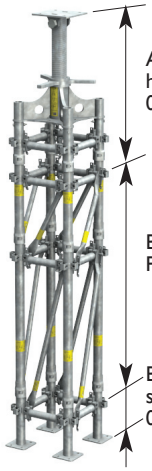
Height Min. (m)	Max. (m)	**Height H of the body of the Pylon (m)**	Permiss. load Single pylon (Tonnes)	**Type S**	Pylon head plate 011102-1	Pylon screw jack 011105-4	Base without stud bolt 011192-2	Single standard 50 011170-8	Single standard 100 011171-6	Diagonal brace 35x50ht 250503-0	Diagonal brace 35x100 ht 251003-0	35 ledger 250203-7	Weight (kg)
0.94	1.24	0	27.5	0+0	1	1	4	-	-	-	-	8	89
1.44	1.74	0.5	27.5	0+1	1	1	4	4		4		12	114
1.94	2.24	1	27.5	1+0	1	1	4		4		4	12	129
2.44	2.74	1.5	26.5	1+1	1	1	4	4	4	4	4	16	154
2.94	3.24	2	26.5	2+0	1	1	4		8		8	16	169
3.44	3.74	2.5	26.5	2+1	1	1	4	4	8	4	8	20	194
3.94	4.24	3	26.5	3+0	1	1	4		12		12	20	209
4.44	4.74	3.5	26.5	3+1	1	1	4	4	12	4	12	24	234
4.94	5.24	4	26.5	4+0	1	1	4		16		16	24	249
5.44	5.74	4.5	26.0	4+1	1	1	4	4	16	4	16	28	274
5.94	6.24	5	25.5	5+0	1	1	4		20		20	28	289
6.44	6.74	5.5	25.0	5+1	1	1	4	4	20	4	20	32	314
6.94	7.24	6	24.5	6+0	1	1	4		24		24	32	329
7.44	7.74	6.5	24.0	6+1	1	1	4	4	24	4	24	36	354
7.94	8.24	7	23.5	7+0	1	1	4		28		28	36	369
8.44	8.74	7.5	22.5	7+1	1	1	4	4	28	4	28	40	394
8.94	9.24	8	21.5	8+0	1	1	4		32		32	40	409
9.44	9.74	8.5	20.5	8+1	1	1	4	4	32	4	32	44	434
9.94	10.24	9	19.5	9+0	1	1	4		36		36	44	449
10.44	10.74	9.5	18.5	9+1	1	1	4	4	36	4	36	48	474
10.94	11.24	10	17.5	10+0	1	1	4		40		40	48	489

Type "B" for base: bases at the foot and adjustable head.

Type B
0+0

Pylon with bases

Type B
1+1



Pylon with bases

TIP

The height of a type B Pylon = the height H of the body of the Pylon + 0.94 m to 1.24 m.

The Touréchaf Pylon is designed for heavy loads.

Specifications and load capacity...

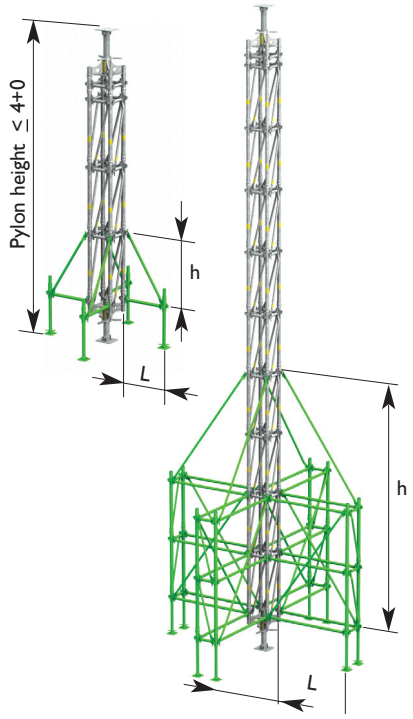
> Stabilisation during assembly and dismantling:

Stabilisation assumptions:
- Winds 65 km/h.
- 1% slope.
- 15 kg horizontal force at the head.

Single Touréchaf pylon:

A single Pylon can be anchored to a Wall or maintained with stabilisers.

Type of Pylon	Min. width of the stabiliser L (m)	Min. height of the stabiliser h (m)
0+0 0+1	0.35	-
1+0 1+1 2+0 2+1 3+0 3+1 4+0	0.70	1.00
4+1 5+0 5+1 6+0 6+1 7+0 7+1	1.00	2.00
8+0 8+1 9+0 9+1 10+0	1.50	4.00

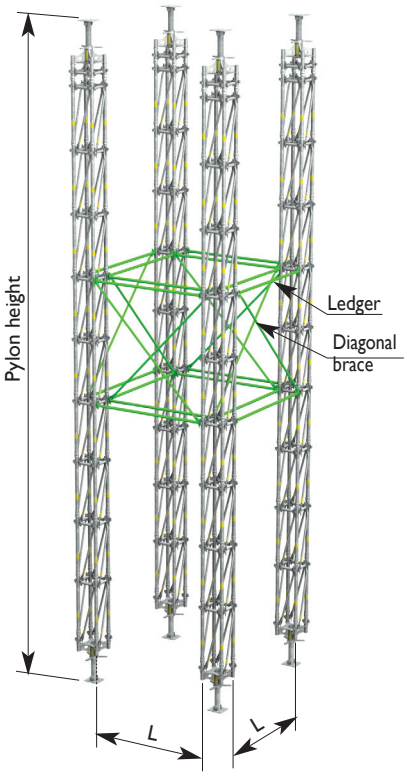


Block of Touréchaf Pylons:

The Touréchaf Pylon can be stabilised using wind bracing with the neighbouring pylons.

Type of Pylon	Min. width of the wind bracing L (m)
0+0 0+1 1+0	0.35
1+1 2+0 2+1 3+0	0.70
3+1 4+0 4+1	1.00
5+0 5+1 6+0 6+1 7+0 7+1	1.50
8+0 8+1 9+0 9+1 10+0	2.00

Beyond 11m75 high, contact our design offices.



When beginning assembly, temporarily stabilise each isolated pylon with wind bracing in the lower portion.

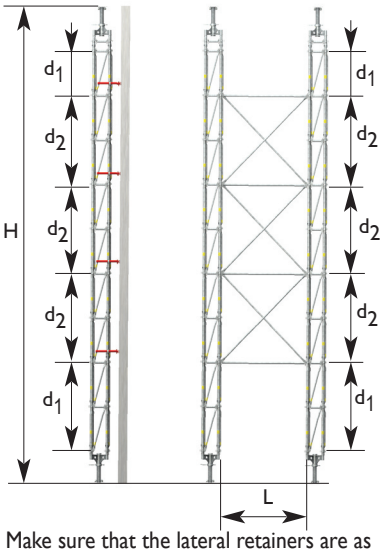
> Reinforcement of the load-bearing capacity of the Pylons:

The reinforcing is done by multiplying the lateral retainers (fixed support, anchoring or wind bracing) over the height in both horizontal directions.

d_1 : free distance at the head and at the foot.
d_2 : distance between 2 retainers.

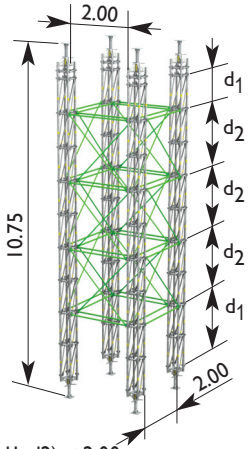
The permissible load of the Pylon is then equivalent to that of an isolated pylon of which the height of the body H is equal to the largest distance "d_1" and "d_2".

Take into account the structure's self-weight above 10 m.



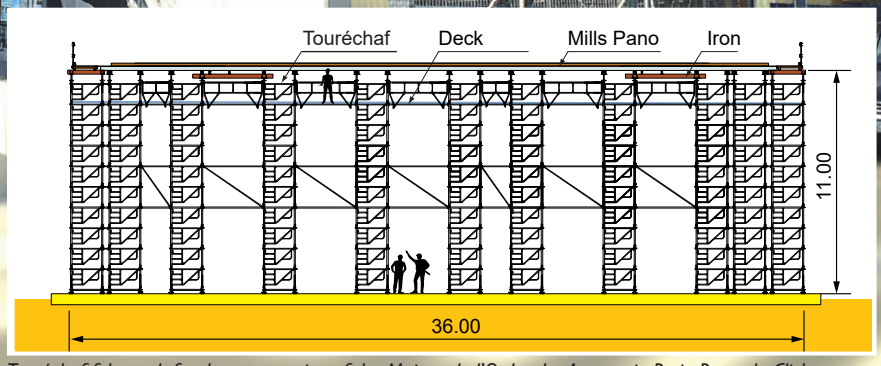
Make sure that the lateral retainers are as close as possible to the nodes.

Example : This block of 4 Pylons in 9+0 forms a tower 10m75 high.
The width L of the wind bracing is 2m00, the stability condition is complied with.



Max. (d1, d2) ≤ 2.00m :
So the permissible load retained is that of a pylon with a body 2m00 high, or 26.5 tonnes.

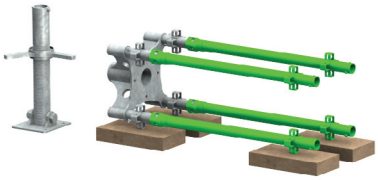
Decking at the top of towers for fitting and removing formwork in safety.



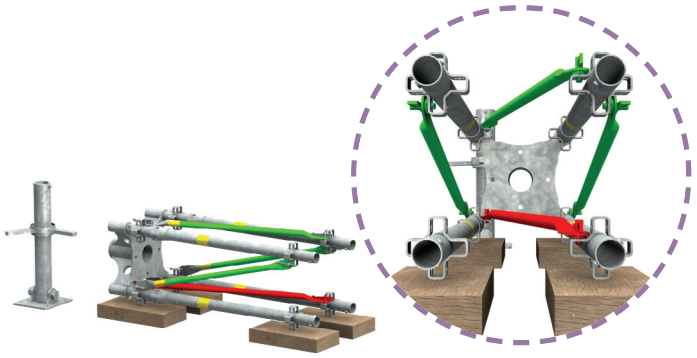
Touréchaf falsework for the construction of the Maison de l'Ordre des Avocats in Paris, Porte de Clichy.

Assembling and dismantling...

Horizontal assembly:



> **1** - Install wedges to facilitate the locking of the standards. Assemble the standards on the footplate.

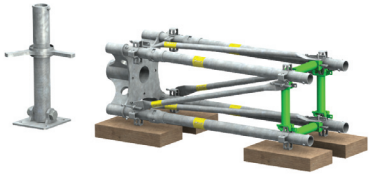


> **2** - Fit diagonal braces, starting with the side against the ground.

TIP The diagonal brace at the bottom is assembled inside the Pylon for easier assembly and in order to be able to stack the Pylons.

REQUIREMENTS:

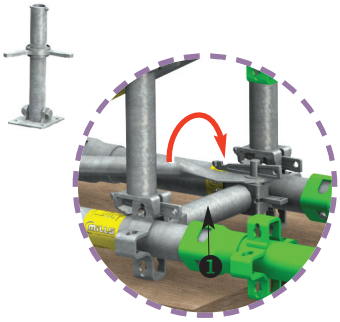
> It is important to position the diagonal braces as assembly takes place in order to ensure that the assembly is square.

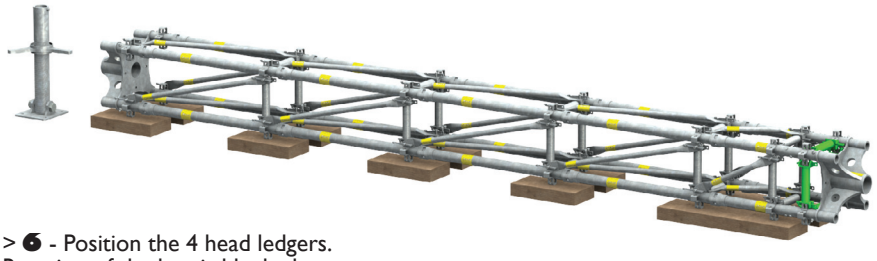


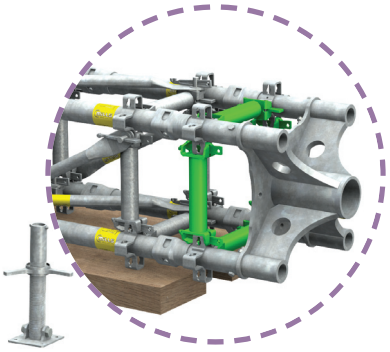
> **3** - Assemble the ledgers then lock the assembly.

> **4** - Repeat the operation until the desired height is reached.

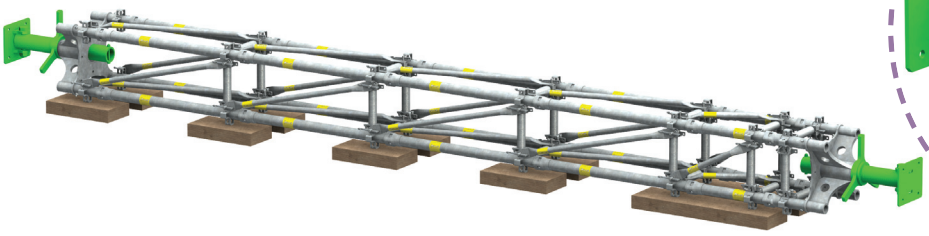
> **5** - Fit the headplate in the standards and lock the 4 legs via rotation ❶.

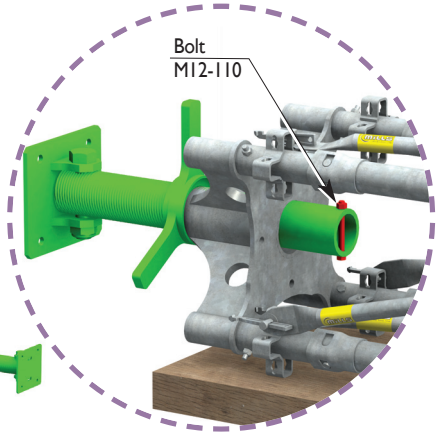




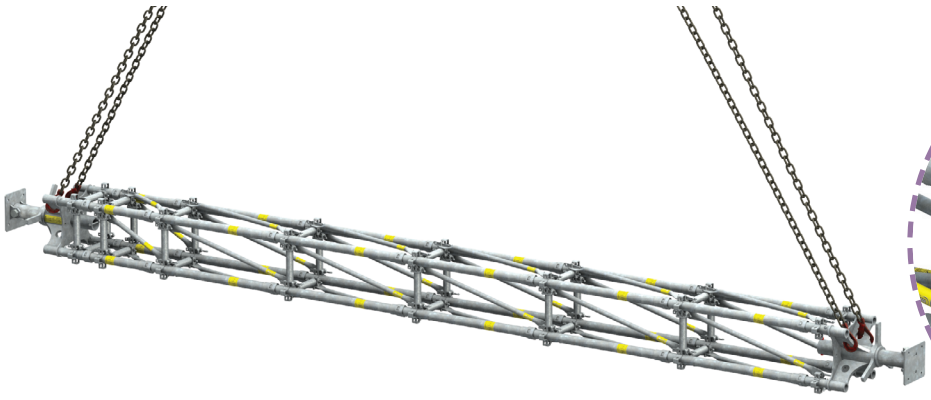


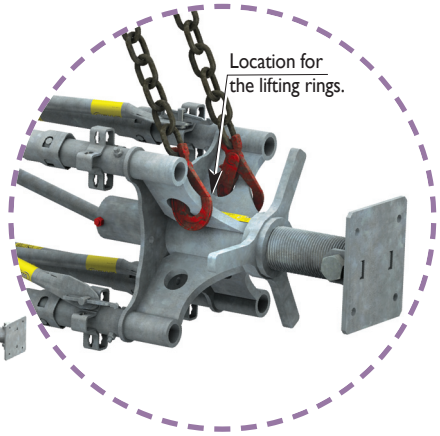
> **6** - Position the 4 head ledgers.
Rotation of the legs is blocked.





> **7** - Assemble the screw jacks on the head and footplates.
Fit the bolts on the screw jacks for the lifting (anti-dislocation).





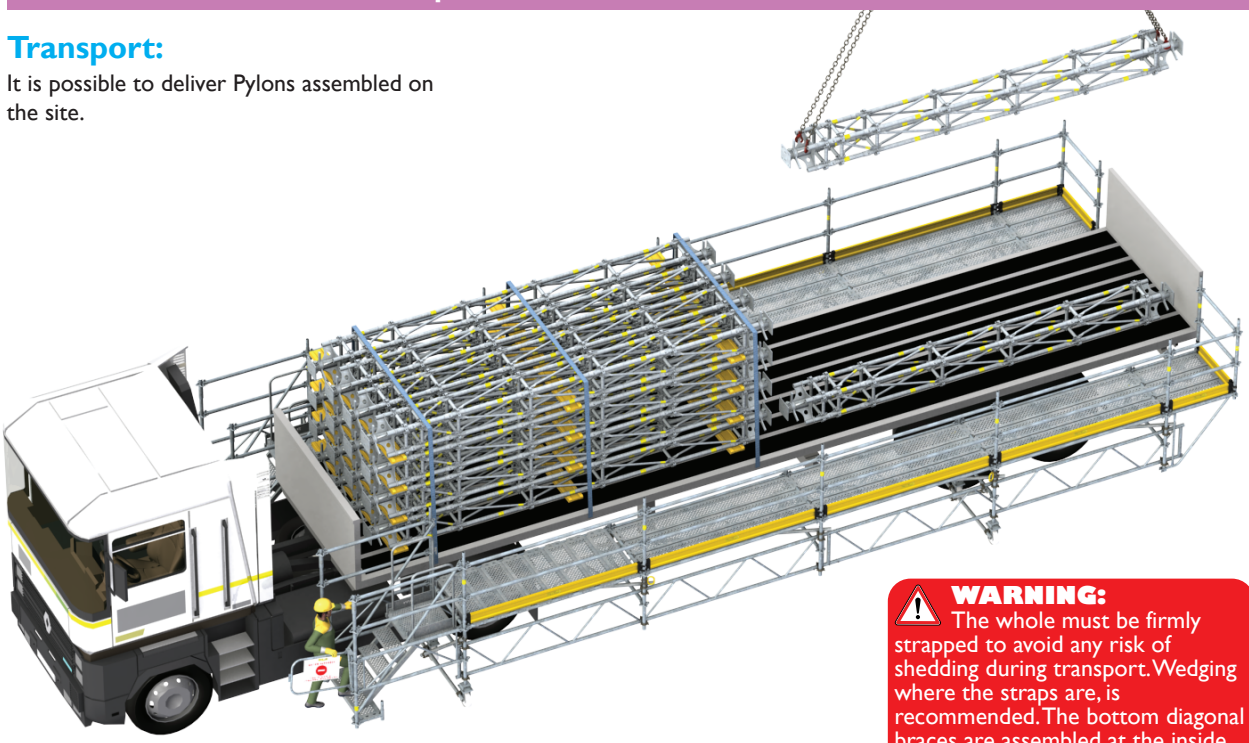
> **8** - Lift the Pylon via the rings provided for this purpose.

WARNING:
General lifting rules must be followed.

Lifting and transport...

Transport:

It is possible to deliver Pylons assembled on the site.



WARNING:
The whole must be firmly strapped to avoid any risk of shedding during transport. Wedging where the straps are, is recommended. The bottom diagonal braces are assembled at the inside to avoid damages.

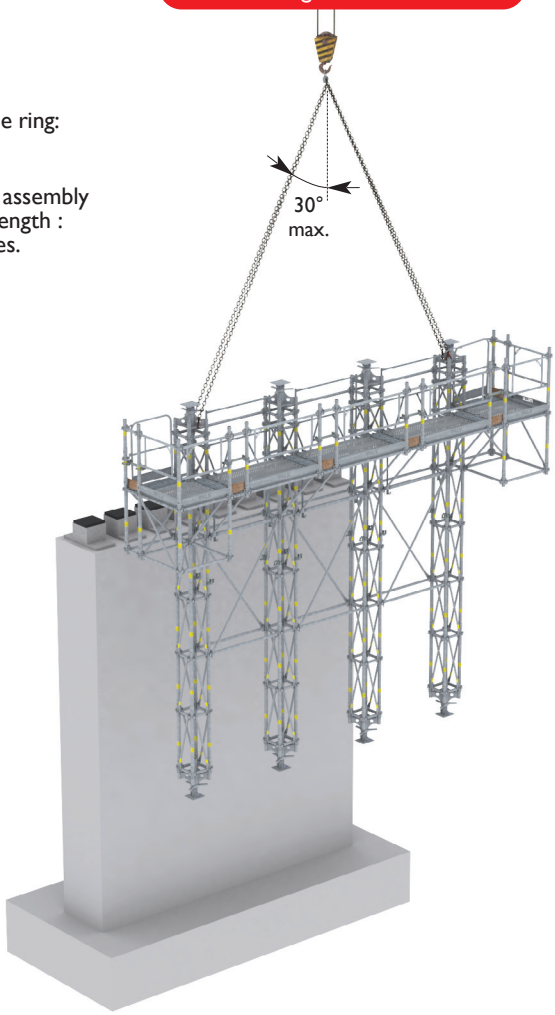
Lifting:

Use the rings of the plates to lift the Pylons.

WARNING:
Before lifting, ensure that the screw jack retaining device is in place. Lifting must be performed with 4 slings of equal length and which form a max. angle. of 30° with respect to the vertical.

WLL of the ring:
4 tonnes.

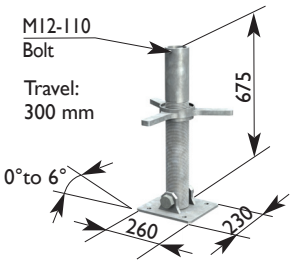
Standards assembly tensile strength :
1,25 tonnes.



Description of the **parts**...

> TOURÉCHAF PYLON SCREW JACK

Description	Code	Weight
TOEC Pylon Screw Jack	011105-4	25.7



> TOURÉCHAF PYLON HEADPLATE

Description	Code	Weight
TOEC Pylon headplate	011102-1	38.4

Net overall dimensions.
L.: 484 x ℓ.: 484 x Ht.: 485 mm.

> TOURÉCHAF PYLON FOOTPLATE

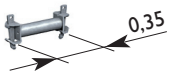
Description	Code	Weight
TOEC Pylon footplate	011103-9	38.2

L.: 484 x ℓ.: 484 x Ht.: 470 mm.

Touréchaf Pylon for a structure in Vitry-sur-Seine.

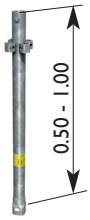
> LEDGER

Dimension	Code	Poids
0.35 m	250203-7	1.5



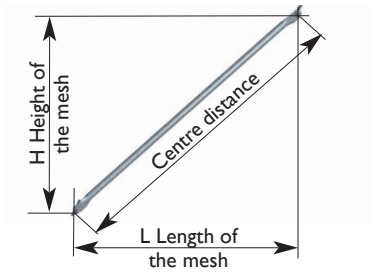
> SINGLE STANDARD

Dimension	Code	Weight
0.50 m	011170-8	2.8
1.00 m	011171-6	5.1



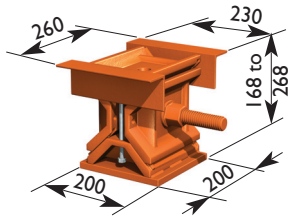
> DIAGONAL BRACE

Dimension	Centre distance	Code	Weight	RAL code
H 0.50 x L 0.35	0.56 m	250503-0	1.6	1016
H 1.00 x L 0.35	1.03 m	251003-0	3.4	



> WEDGE JACK

Description	Code	Weight
42 tonne wedge jack	080455-9	29.5



The Pylon is compatible with Touréchaf...

All dimensions are in mm and in m.
Weights are in kg.

Accessories for **formwork**...

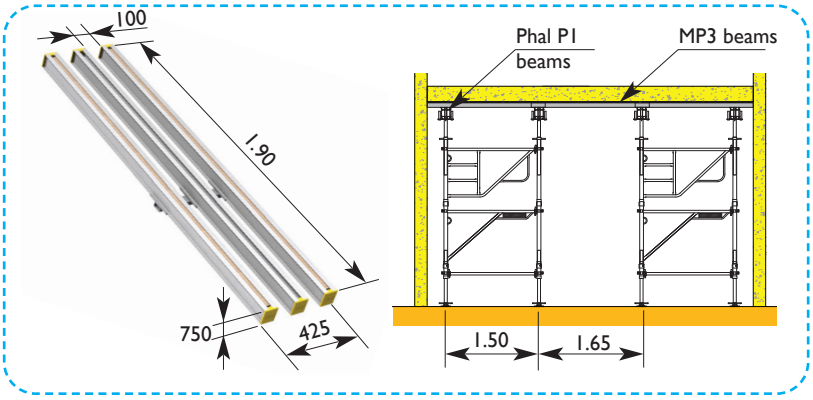
MP3 beams, for secure installation of plywood:

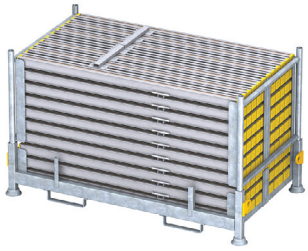
The MP3 formwork system is a set of 3 beams connected together by a handle that secures the installation of the plywood during the formwork of the concrete slabs.

The small spacing between the beams (10 cm) prevents a foot from passing and protects from the risks of falling. Also, the crossing zones of the MP3 make moving about easier.

MP1 unit beams are used for the keys. The complex shapes are carried out using standard stringers that have the same height as the MP3 and MP1.

The MP3 beams are delivered with specific cradles that do not require metal straps. Their low weight of 14.8 kg makes fitting easier.



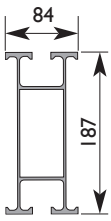


Special storage cradle.

Touréchaf falsework equipped with MP3 formwork aluminium beams for the construction of the Vista Palace - La Cigale Hotel at Roquebrune-Cap-Martin near Monaco.

Phal P1 aluminium beam

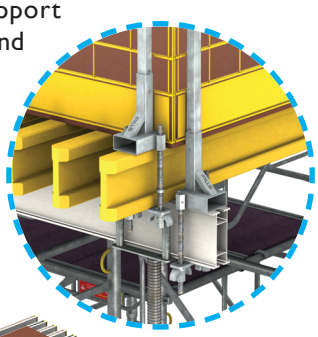
The Phal P1 aluminium beam is mainly used as a primary beam (installed in the fork heads). Particularly suited for Touréchaf, its robustness allows it to take up 6 tonnes, when stressing the tower to its maximum capacity.



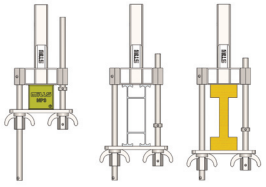
For more information, refer to the Mills formwork catalogue.

> Guardrail:

The protection system is comprised of universal post supports, post equipped with sliders and barriers.
The universal post support adapts to all primary and secondary beams.
The system meets the standards of EN 13374 class A.

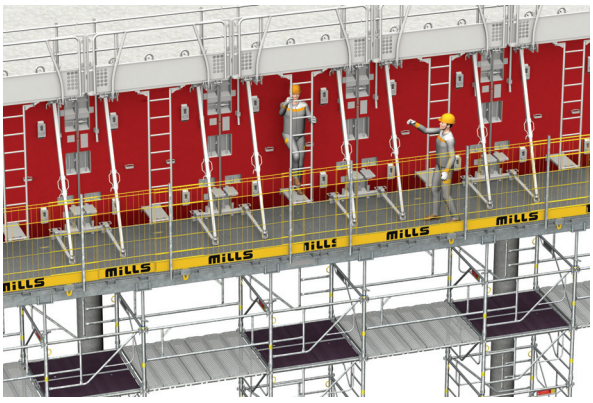


> Universal post support

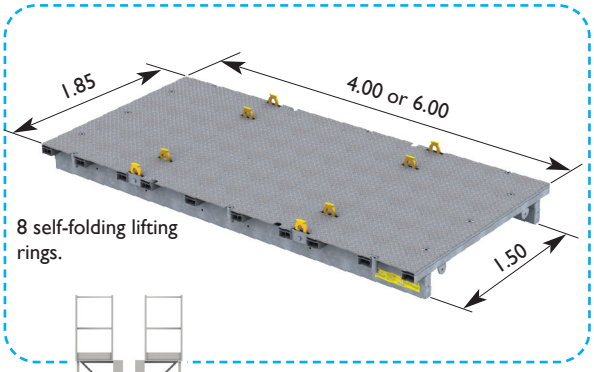


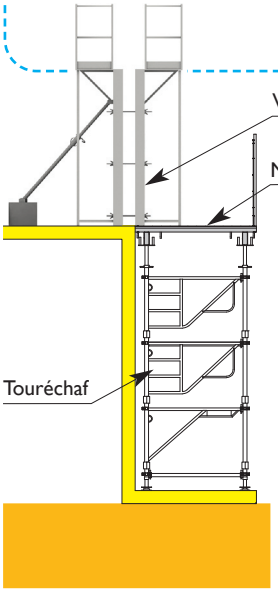
MP1/MP3 beam | P1 beam | M20 beam

> MWP: Mills Work Platform:

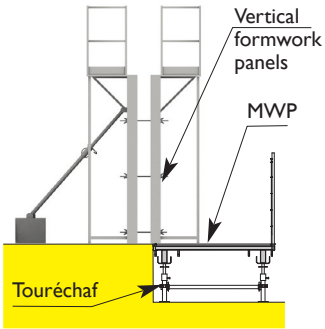


MWP is a deck that is compatible with our Touréchaf falsework. The 2 string beams spaced 1.50 m are installed directly in the fork heads. It is used as simple decking or as a replacement for cantilever working platforms when it cannot be installed.
It is proposed with a plywood or steel teardrop sheet cladding.





MWP on Touréchaf falsework as vertical formwork panels support.



MWP on low-height Touréchaf falsework.

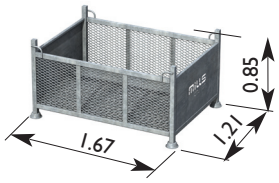
Storage...

The **maximum stacking height on a worksite** is considered to be limited by the height that a man standing on the ground can reach to lift:
- two cradles for 20 frames,
- two cradles for 13 decks,
- two cradles for 20 keying guardrails.
- two storage containers.

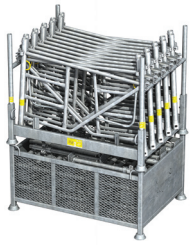
The storage containers and cradles all have lifting rings.

Storage container:

WLL: 1.500 daN



Stacking container and cradle for 20 x 1.50 m frames



> STORAGE CONTAINER

Description	Code	Weight
Touréchaf storage container	011165-8	110.0

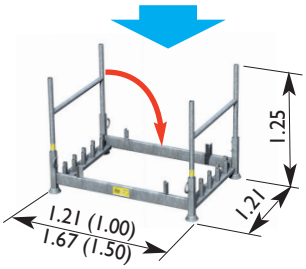
Load-bearing capacity:
- 200 x 1.00 m ledgers.
- 120 x 1.50 m ledgers.
- 50 x 2-way screw-jack heads.
- 100 screw jacks.

Cradle for 20 frames:

Stores 20 standard or access frames (1.00 m or 1.50 m).
WLL: 260 daN

When the cradle has less than 20 frames, use a metal strap.

Folding for storage.



Stacking for storage.

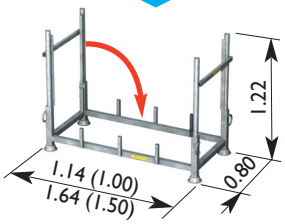
> CRADLE FOR 20 FRAMES

Dimension	Code	Weight
1.00 m	011159-1	77.4
1.50 m	011160-9	84.0

Cradle for 13 access decks:

Stores 13 access decks (1.00 m or 1.50 m).
WLL: 200 daN

Folding for storage.



Empilement pour stockage.

> CRADLE FOR 13 DECKS

Dimension	Code	Weight
1.00 m	011158-3	56.0
1.50 m	011161-7	60.0

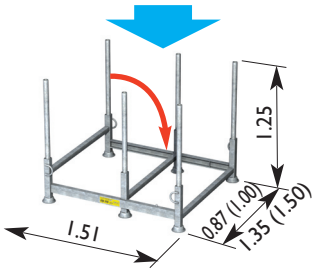
WARNING:
Mills containers and cradles must be used only for transporting or storing the equipment for which they were designed. Equipment has to be uniformly distributed in the package. The maximum number of containers and cradles that can be stacked must take into account the stability of the whole stack. The weight of the stack must not exceed 4.4 tonnes for containers and 4.1 tonnes for cradles.

All dimensions are in mm and in m.
Weights are in kg.

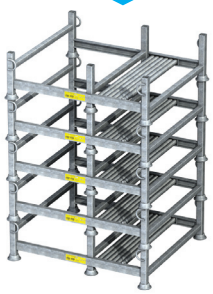
Cradle for 20 keying guardrails:

Takes 20 keying guardrails (1.00 m or 1.50 m).
WLL: 350 daN

Folding for storage.



Stacking for storage.



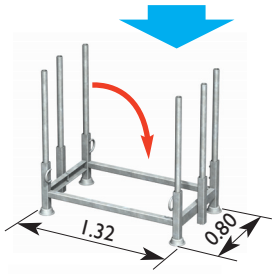
> CRADLE FOR 20 KEYING GUARDRAILS

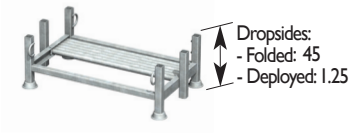
Dimension	Code	Weight
1.00 m	011162-5	84.2
1.50 m	011163-3	83.4

Cradle for 35 inter-tower guardrails:

Takes 35 inter-tower guardrails
WLL: 500 daN

Folding for storage.





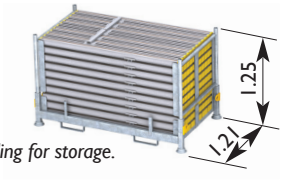
Stacking for storage.

> CRADLE FOR 35 INTER-TOWER GUARDRAILS

Description	Code	Weight
Cradle for 35 Inter-tower guardrails	011200-3	65.6

> Cradle for 40 MP3s:

WLL: 700 daN



Folding for storage.

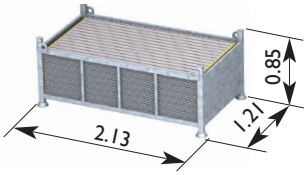
> CRADLE FOR 40 MP3s

Description	Code	Weight
Cradle for 40 MP3s	079924-7	107

> Large-size storage container:

Example of storage: 98 MP1

WLL: 1500 daN



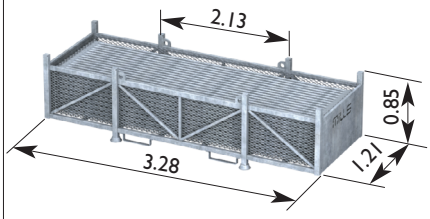
> LARGE-SIZE STORAGE CONTAINER

Description	Code	Weight
Large-size storage container	011166-6	180

> XL Storage container :

Example of storage: 144 [2.00 x 2.50 m diagonal braces].

WLL: 1800 daN



> XL STORAGE CONTAINER:

Description	Code	Weight
XL storage container	011168-2	288

Lifting...

> Maximum number of stacked containers and cradles when lifting:

Storage container:

2 loaded storage containers.
Max. weight for lifting: 3,300 kg

3 empty storage containers.

1 loaded frames cradle on
1 loaded storage container

Max. weight for lifting: 2000 kg

WARNING:
Lifting must be performed with 4 slings of equal length and which form a max. angle of 30° with respect to the vertical.

Cradle for 20 frames:

2 loaded cradles.
Max. weight for lifting: 700 kg

6 empty cradles.

Cradle for 13 decks:

2 loaded cradles.
Max. weight for lifting: 510 kg

6 empty cradles.

Cradle for 20 keying guardrails:

2 loaded cradles.
Max. weight for lifting: 800 kg

6 empty cradles.

Cradle for 35 inter-tower guardrails:

2 loaded cradles.
Max. weight for lifting: 1200 kg

6 empty cradles.

Cradle for 40 MP3s:

2 loaded cradles.
Max. weight for lifting: 1400 kg

6 empty cradles.

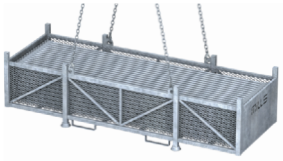
Large-size container:

2 loaded large-size storage containers.
Max. weight for lifting: 3400 kg

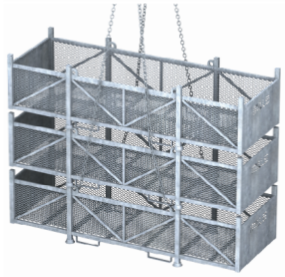
3 empty large-size storage containers.

XL container:

1 loaded XL storage container.
Max. weight for lifting: 2100 kg

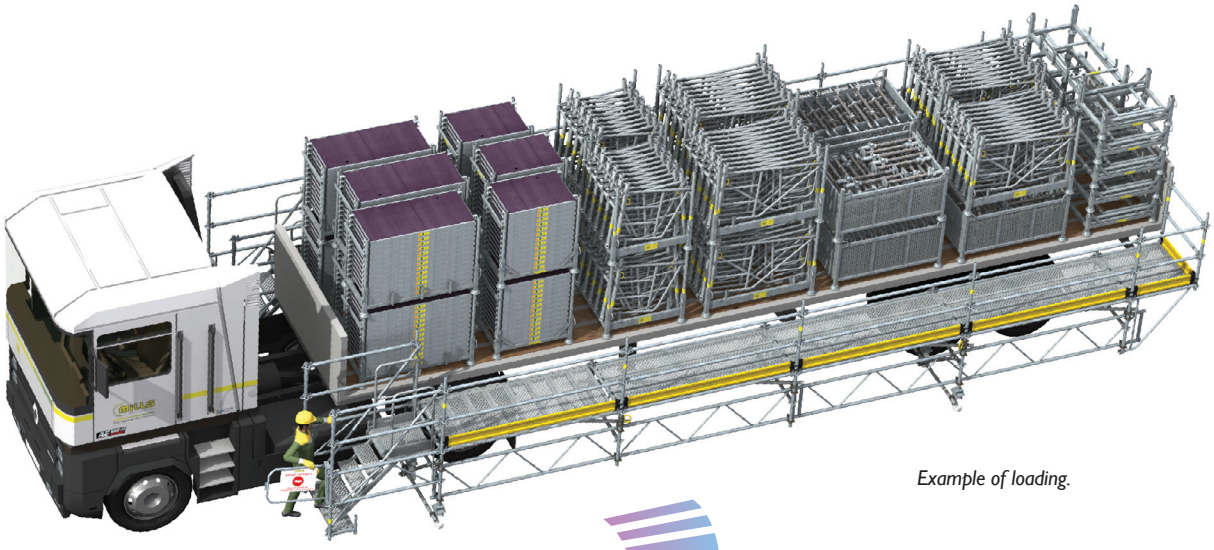


3 empty XL containers.

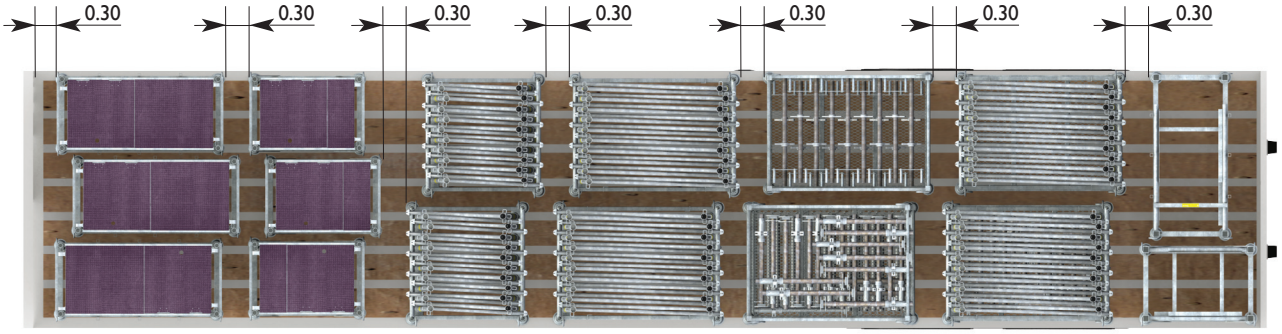


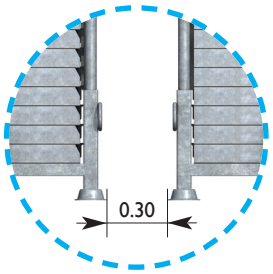
To facilitate handling, secure the lifting zone...

Transport...



Example of loading.





TIP We recommend a min. spacing of 0.30 m between containers and cradles to facilitate access to the lifting rings during crane handling operations.

nb. The NOEMI BIM software makes it possible to estimate the flatbed linear required for transport.

WARNING: The assembly must be firmly strapped to avoid any risk of shedding during transport.

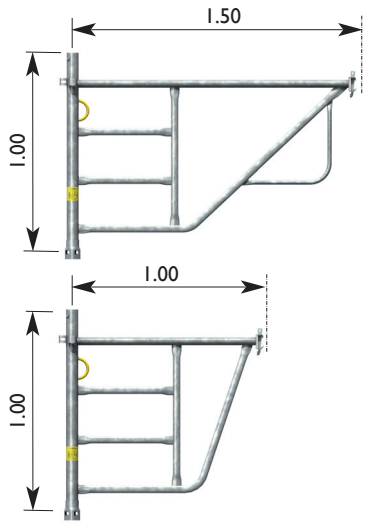
WARNING: Standard handling rules must be followed.

Description of the main **components**...

All dimensions are in mm and in m.
Weights are in kg.

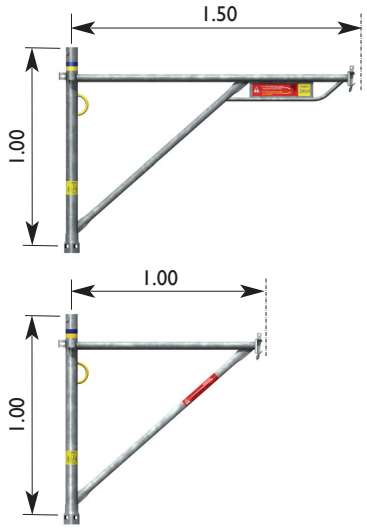
> FRAME

Dimension	Code	Weight
1.50 m	011156-7	12.4
1.00 m	011106-2	10.8



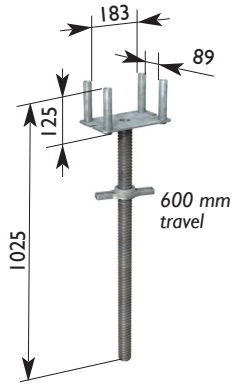
> ACCESS FRAME

Dimension	Code	Weight
1.50 m	011157-5	11.5
1.00 m	011107-0	8.4



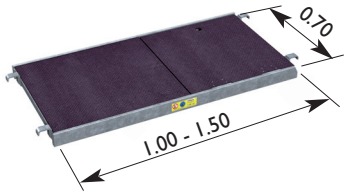
> 2-WAY ADJUSTABLE HEAD

Description	Code	Weight
2-way adjustable head	011100-5	9.0



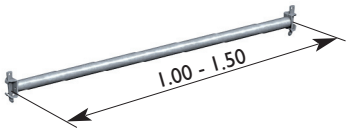
> ACCESS DECK

Dimension	Code	Weight
1.00 m	011104-7	11.3
1.50 m	011154-2	14.8



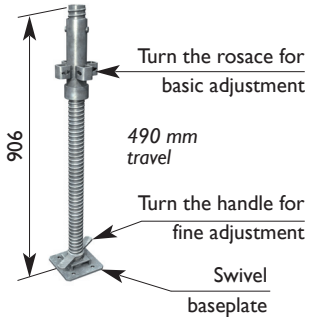
> LEDGER

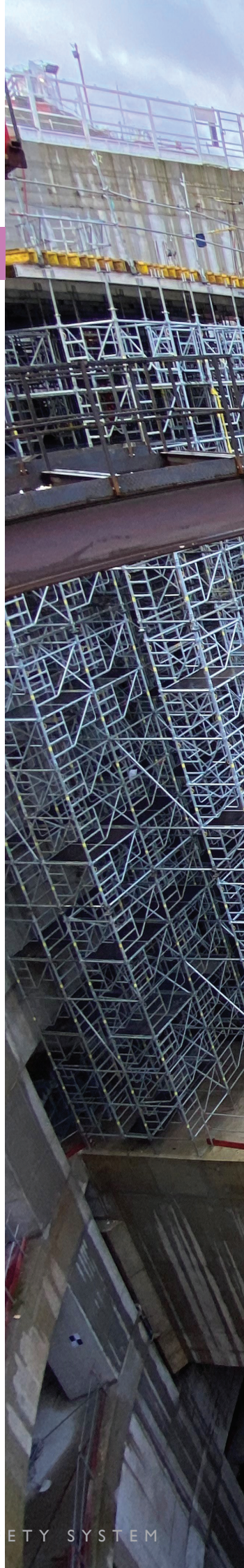
Dimension	Code	Weight
1.00 m	250210-2	3.3
1.50 m	250215-1	4.6

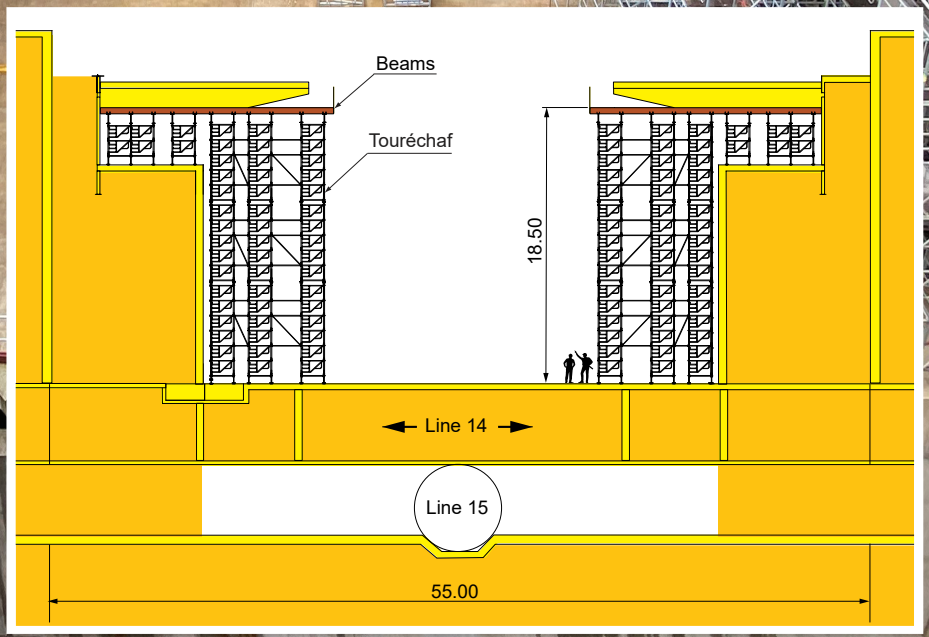


> BASE JACK

Description	Code	Weight
Base jack	011155-9	9.2







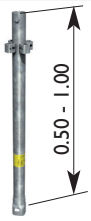
Touréchaf falsework and formwork of the bracket slabs of the future Institut Gustave-Roussy (IGR) underground station of Villejuif on line 14 south of the Grand Paris Express.

Description of the additional **components**...

All dimensions are in mm and in m.
Weights are in kg.

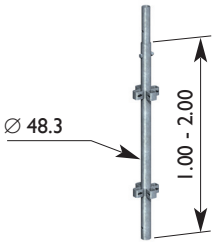
> SINGLE STANDARD

Dimension	Code	Weight
0.50 m	011170-8	2.8
1.00 m	011171-6	5.1



> SCAFFOLDING STANDARD

Dimension	Code	Weight
1.00 m	250101-3	5.3
2.00 m	250102-1	9.6



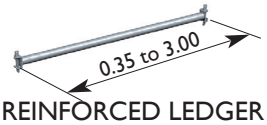
> CONNECTING PIN
(FOR STANDARD)

Description	Code	Weight
Connecting pin	021009-6	0.25

> LEDGER

Dimension	Code	Weight
0.35 m[(1)]	250203-7	1.5
0.50 m[(1)(2)]	250205-2	1.9
0.70 m	250207-8	2.5
2.00 m	250220-1	6.0
2.50 m	250225-0	7.5
3.00 m	250230-0	9.6

[(1)]*These ledgers are not suitable for decking grids.*
[(2)]*Little stock for rent.*

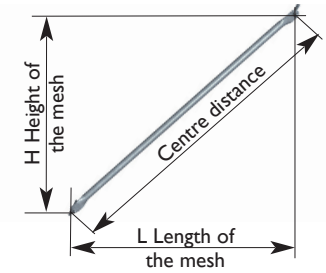


> REINFORCED LEDGER

Dimension	Code	Weight
1.50 m	252215-9	8.9
2.00 m	252200-1	12.1
2.50 m	252225-8	15.0
3.00 m	252230-8	17.7

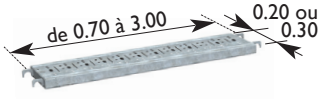
> DIAGONAL BRACE

Dimension	Centre distance	Code	Weight	RAL code
H 0.50 x L 0.35	0.56 m	250503-0	1.6	1016
H 0.50 x L 1.00	1.04 m	295010-3	2.9	-
H 0.50 x L 1.50	1.49 m	295015-2	3.7	-
H 1.00 x L 0.35	1.03 m	251003-0	3.4	1016
H 1.00 x L 0.70	1.17 m	251007-1	3.1	3015
H 1.00 x L 1.00	1.35 m	251010-5	3.8	1007
H 1.00 x L 1.50	1.72 m	251015-4	4.3	6019
H 1.00 x L 2.00	2.15 m	251020-4	5.7	9005
H 1.00 x L 2.50	2.60 m	251025-3	6.5	4004
H 2.00 x L 0.70	2.09 m	252007-0	5.5	9001
H 2.00 x L 1.00	2.19 m	252010-4	5.6	-
H 2.00 x L 1.50	2.45 m	252015-3	6.3	5024
H 2.00 x L 2.00	2.76 m	252020-3	7.2	3020
H 2.00 x L 2.50	3.13 m	252025-2	7.3	2004
H 2.00 x L 3.00	3.53 m	252030-2	9.2	4005



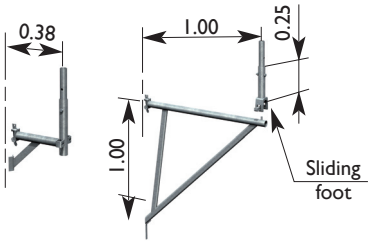
> MULTICRAB STEEL DECK

Dimensions	Code	Weight
0.70 x 0.20 m	107021-8	6.4
1.00 x 0.20 m	110021-3	7.9
1.50 x 0.20 m	115021-8	9.2
2.00 x 0.20 m	120021-1	11.6
2.50 x 0.20 m	125021-6	14.2
3.00 x 0.20 m	130021-9	16.7
0.70 x 0.30 m	107031-7	6.6
1.00 x 0.30 m	110031-2	9.7
1.50 x 0.30 m	115031-7	10.2
2.00 x 0.30 m	120031-0	13.6
2.50 x 0.30 m	125031-5	18.7
3.00 x 0.30 m	130031-8	21.6



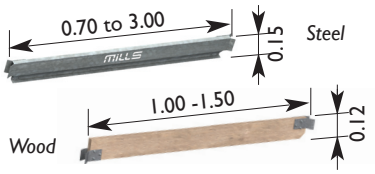
> CIRCULATION BRACKET

Description	Code	Weight
0.38 m bracket	011152-6	4.4
1.00 m bracket	250710-1	8.0
Sliding foot	250000-7	2.2



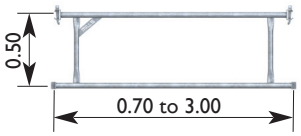
> TOURECHAF TOEBOARD
(FOR FRAME AND SINGLE STANDARD)

Dimension	Code	Weight
0.70 m steel	011311-8	2.3
1.00 m steel	011309-2	3.1
1.50 m steel	011316-7	4.5
2.00 m steel	011312-6	5.9
2.50 m steel	011313-4	7.2
3.00 m steel	011314-2	8.6
1.00 m wood	011310-0	2.4
1.50 m wood	011315-9	2.8



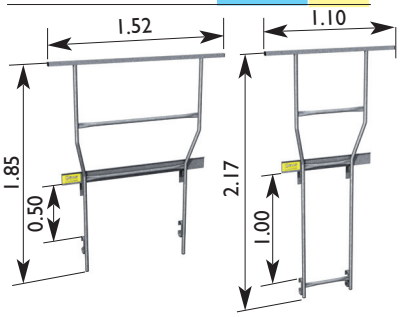
> TOURÉCHAF INTER-TOWER GUARDRAIL

Dimension	Code	Weight
0.70 m	011207-8	4.4
1.00 m	011210-2	4.7
1.50 m	011215-1	7.9
2.00 m	011220-1	10.1
2.50 m	011225-0	12.9
3.00 m	011230-0	14.0



> KEYING GUARDRAIL

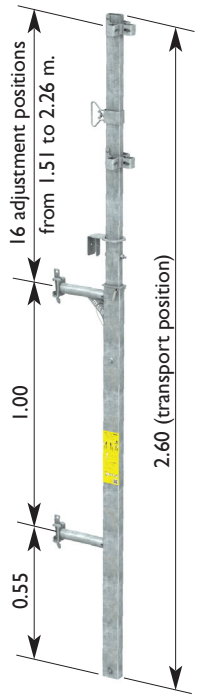
Dimension	Code	Weight
1.00 m	011110-4	12.0
1.50 m	011115-3	13.9



Compliant parts and accessories guaranteed...

> EXTENDABLE GCC UPRIGHT

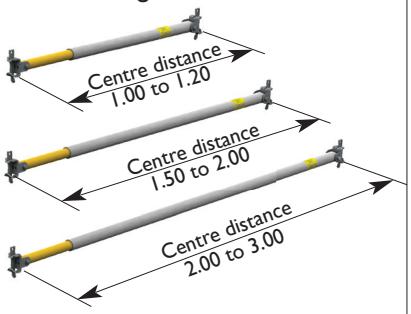
Description	Code	Weight
Extendable GCC upright	011300-1	14.9



> EXTENDABLE GCC LEDGER

Dimension	Code	Weight
1.00 m to 1.20 m(1)	011301-9	2.9
1.50 m to 2.00 m(2)	011302-7	3.9
2.00 m to 3.00 m(3)	011303-5	5.0

Standard ranges of use :



Net length L_n min. / max.
(1) 0.84 m / 1.38 m.
(2) 1.32 m / 2.34 m.
(3) 1.83 m / 3.28 m.

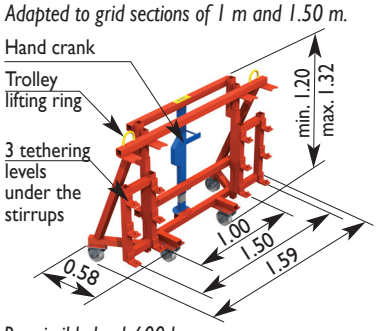
> U 1 STIRRUP

Description	Code	Weight
U 1 stirrup	251001-4	0.75

> ADJUSTABLE FALSEWORK TOWER TROLLEY

Description	Code	Weight
Adjustable falsework tower trolley	011167-4	106.0

Adapted to grid sections of 1 m and 1.50 m.



Permissible load: 600 kg

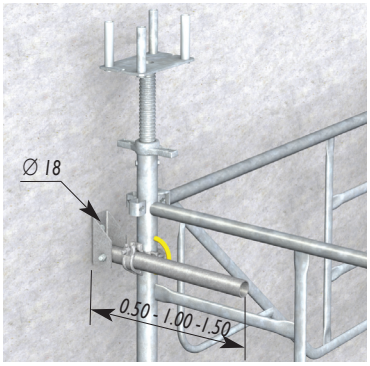
> TOURÉCHAF CASTOR

Description	Code	Weight
Castor (with connector)	011190-6	8.5

> ANCHORING CAP

Description	Code	Weight
Anchoring cap 0.50m	023050-8	2.7
Anchoring cap 1.00m	023051-6	4.7
Anchoring cap 1.50m*	023052-4	6.5

(Wall plug not supplied).
** Upon request.*



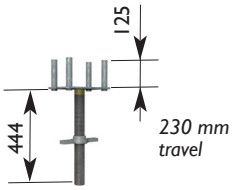
> RIGHT MIXED COUPLER

Description	Code	Weight
Right coupler 49x60 galva	019510-7	1.4

Slip resistance (class A):
1,500 daN ULS and 900 daN SLS.

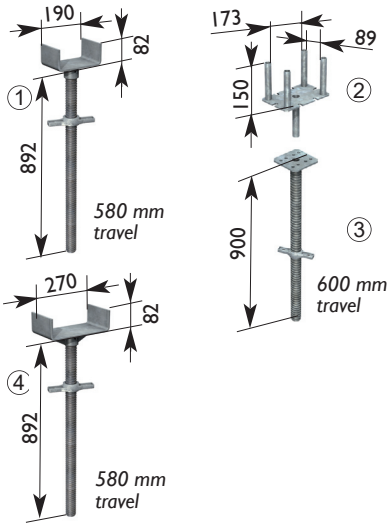
> SHORT SCREW JACK

Description	Code	Weight
Short screw jack	011101-3	6.5



> OTHER ADJUSTABLE HEADS

Description	Code	Weight
① Adjustable fork head	011153-4	9.1
② 4-way fork head	050100-7	3.5
③ Touréchelle Screw Jack	050120-5	8.5
④ Wide adjustable fork head	192460-4	11.2

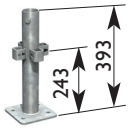


> TOURÉCHAF BASE

Description	Code	Weight
Base	011169-0	1.8

> BASE WITHOUT TOURECHAF STUD BOLT

Description	Code	Weight
Base without stud bolt	011192-2	3.3



Description of the additional **components**...

All dimensions are in mm and in m.
Weights are in kg.

> 5T WALL BRACKET

Description	Code	Weight
5T wall bracket	080460-9	15

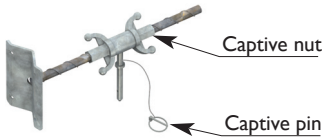
> 2.5T WALL BRACKET

Description	Code	Weight
2.5T wall bracket	080462-5	6.4

> MCC SCREW JACK

Description	Code	Weight
MCC screw jack	011253-2	2.4

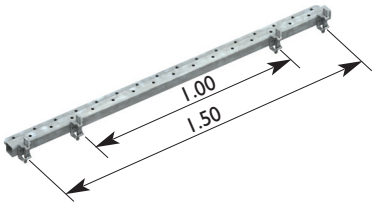
Used in kits of 4.



> MCC RAILS BEARER

Description	Code	Weight
MCC rails bearer	011250-8	12.7

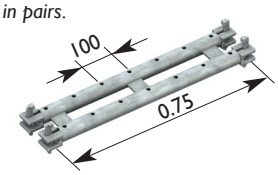
Compatible with Touréchaf 1m and 1m50.



> MCC DOUBLE RAIL

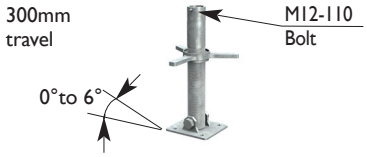
Description	Code	Weight
MCC double rail	011252-4	7.0

Used in pairs.



> TOEC PYLON JACK

Description	Code	Weight
TOEC Pylon Jack	011105-4	23.5



> TOEC PYLON HEADPLATE

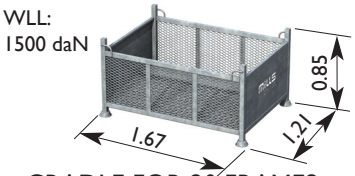
Description	Code	Weight
Headplate	011102-1	38.4

> TOEC PYLON FOOTPLATE

Description	Code	Weight
Footplate	011103-9	38.2

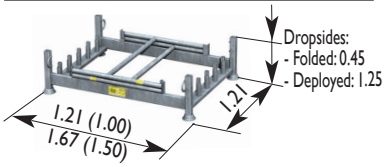
> STORAGE CONTAINER

Description	Code	Weight
Touréchaf storage container	011165-8	110.0



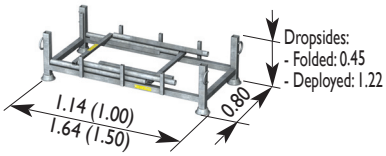
> CRADLE FOR 20 FRAMES

Dimension	Code	Weight
1.00 m	011159-1	77.4
1.50 m	011160-9	84.0



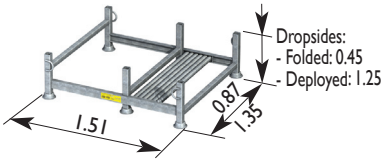
> CRADLE FOR 13 ACCESS DECKS

Dimension	Code	Weight
1.00 m	011158-3	56.0
1.50 m	011161-7	60.0



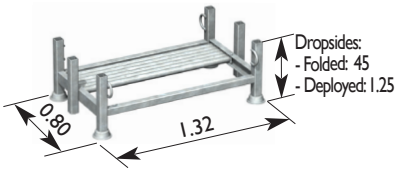
> CRADLE FOR 20 KEYING GUARDRAILS

Dimension	Code	Weight
1.00 m	011162-5	84.2
1.50 m	011163-3	83.4



> CRADLE FOR 35 INTER-TOWER GUARDRAILS

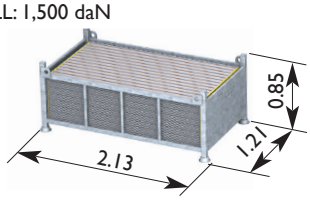
Description	Code	Weight
Cradle for 35 inter-tower guardrails	011200-3	65.6



> LARGE-SIZE STORAGE CONTAINER

Dimension	Code	Weight
Large-size storage container	011166-6	180

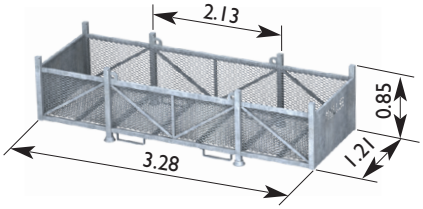
WLL: 1,500 daN



> XL STORAGE CONTAINER

Dimension	Code	Weight
XL storage container	011168-2	288

WLL: 1,800 daN



TOURECHAF : FALSEWORK TOWER WITH INTEGRAL SAFETY SYSTEM

Falsework **regulations** and standards...

The transposition of European directives via the decree of 1 September 2004 did not result in an abrogation of Article 218 relating to falsework towers of the decree of 8 January 1965.

For the time being, therefore, there are no explicit requirements for training, justification by calculation notes and inspecting falsework as set out in the decree of 1 September 2004 and the order of December 2004 for scaffolding. The decree of 8 January 1965 still applies for falsework.

Decree of 8 January 1965

The design of falsework over 6 metres in height must be justified by a design brief and the falsework must be constructed in accordance with an assembly drawing, except in emergencies or if it is not possible to comply with the drawing.

The design brief and assembly drawing must be kept on the worksite (article 218).

Falsework tower standard NFP 93-551:

European standard NF EN 12813 replaced standard NF P93-550 of December 1987 but does not provide for an assessment of falsework towers. That is why a new French standard NF P93-551 was made official in May 2016 and is mentioned by the amendment A1 in March 2021.

It unites in the same document:

- A method for calculating and testing that makes it possible to define the permissible load per foot. It includes the load criteria in a simplified manner of the European standard.
- The functional requirements in order to ensure safety of the erectors and of the users by breaking down CRAMIF Technical Notice 24.

The load criteria:

The text specifies the bearing capacity of a steel or aluminium tower with a height from 0 to 6.00 m, with the screw jacks extended to the maximum, held at the top and with a wind pressure of 20 kg/m^2.

The safety criteria:

The assembly operations must be able to be performed in collective protection. The triple classification specifies the level of safety of the tower by analysing the effectiveness of the access at the top of the tower, guardrails and lifting devices.

The best classes are:

- Access class A1: complete deck every 2.00 m with trapdoor and built-in access ladder. The spacing between bars must be comprised between 22.5 and 30cm. It is measured between the upper edges of the bars of the ladder.
- Side protection class RL1: The frames oppose one another in the passage of a 47 cm sphere diameter.
- Handling class with crane G1: lifting rings and built-in locking components.

Touréchaf is compliant with the highest classes: A1 - RL1 - G1.

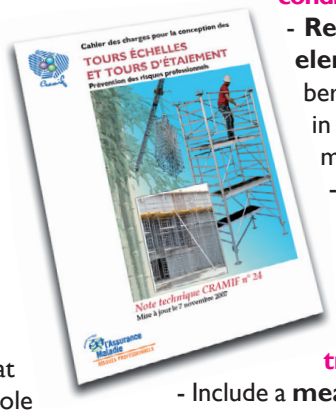
CRAMIF TECHNICAL NOTE 24 OF 2007

This note applies to falsework towers and is intended to improve the safety of users

Extracts from the note:

> Prevention of risks of falling from heights.

- The towers must be designed so that they can be **assembled**, **dismantled and be used safely**.
- It must be possible to adjust the screw jacks and fit beams while standing on the top deck which should be constructed in such a way that there are no gaps in the deck and that the deck covers the whole area of the tower. **Access should be through a trapdoor.**



Note: Evaluating the risks makes it possible to check that the installation of the toeboards is not justified during the assembly, dismantling, access and adjustment, when the decks are non-slip.

- When the towers are assembled in runs provide **gangways with guardrails, if required, to pass from one tower to another**.

> Prevention of MSK conditions

- **Reduce** the **weight of elements** and the number of constituent parts in the towers to the minimum.
- Design the tower so that it can **be moved easily by crane**.

> Prevention of tripping risks.

- Include a **means of accessing** the interior of the tower which can be used **at each working level**.
- Improve the ease of access to the inside at the bottom of the tower.

> Prevention of manual handling injuries.

- Provide **built-in** mechanisms to **lock** the base jacks at the bottom of the tower.
- Attach locking pins and wedges to the components so that they **cannot be lost**.

Touréchaf meets all the criteria of NT24.

CE marking

The falsework and its packing do not bear the CE marking. This is because they are not products subject to European directives known as"new approach" directives that impose such marking (full list on www.afnor.org).

Mills manufactures its equipment in France at its factory in Corrèze...

Recommendations...

> Inspection of the equipment:

Before starting assembling:
- Check that the components are in good condition.
- Do not use any components that are suspect (parts that are bent, squashed, loose, etc.).
- For the towers, refuse any parts not sourced from Mills falsework. Mixing parts from different sources is prohibited.

> Favour final collective protection:

When designing the assembly and dismantling of formwork and falsework, collective protection must be prioritized.
The assembly and dismantling procedures described in these technical instructions must be complied with. When in certain circumstances, they cannot be fully or partially implemented, it is then imperative to design a new and appropriate assembly and dismantling procedure. Individual protection of workers provided using a fall arrest system should be considered as a last resort. Procedures that require the use of a fall arrest system must in particular take into account suitable attachment points, the air draught and the stability of the structure in order to retain the fall.

> Recommendations:

When the falsework has been assembled, a formal acceptance report should be issued.

> Falsework striking:

The support for the building structure should be removed by lowering the adjustable heads to avoid destabilising the towers. All the screw jacks should be unscrewed together to prevent the load being taken by jacks that have not yet been unscrewed.

> Formwork:

The formwork calculation must take into account the effects of continuity. The continuity of a beam on three supports for instance distributes the loads on the supports differently from standard geometric distribution.

> Stability during the assembly phases:

The stability of the falsework must be checked while it is being assembled and dismantled, or in between, when the towers are exposed to the wind pressure and there is no concrete to act as a ballast.
Our stability rules also make it possible to prevent the risk of overall buckling of the falsework structure.

> Horizontal forces:

The propped components must not transmit horizontal forces over the falsework. Constructive measures will have to be implemented in order to take up these forces.

> Load distribution on ground or foundation:

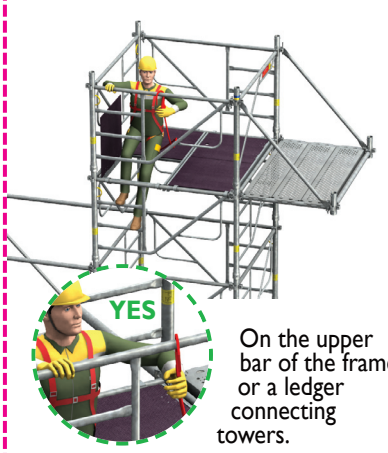
Bearing on concrete slab:
Generally, a tower does not require any particular preparation when it bears on a concrete slab. If the surface is uneven, wooden planks should be used between the base and the concrete.
It may be necessary to provide falsework under the lower floors if they are unable to take the ground loads.

Bearing on natural ground:
On natural ground, the load must be distributed appropriately, depending on the nature of the ground and the load.

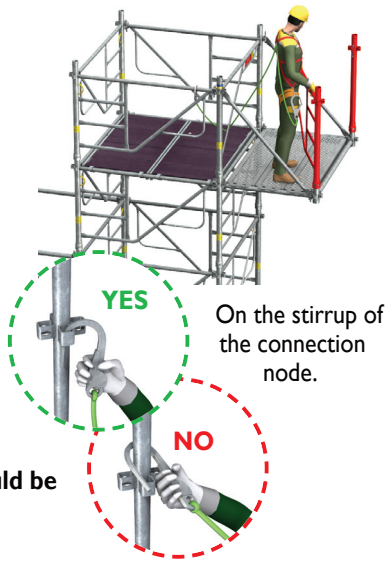
ASSEMBLY AND DISMANTLING IN PPE:

The attachment point must be located 1 m above the deck. Do not attach yourself to a frame or an isolated post. Ensure that all the frames are locked.

Attachment point adapted to the fall arrest system:



On the upper bar of the frame or a ledger connecting towers.

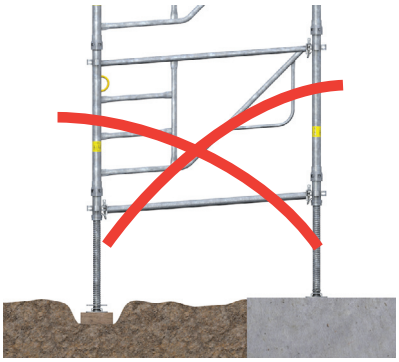


On the stirrup of the connection node.

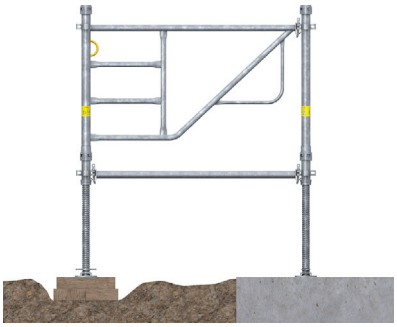
Only these attachment points should be used on the Touréchaf.

The connection nodes have been tested and approved by CEBTP in conditions stated by technical specifications issued by the SFECE and approved by specifiers (INRS, CRAMIF OPPBTP).

Differential settlement:
The four feet of the tower must bear on the same type of surface so that the settlement under each foot is identical.



If this is not possible, for example, if two base plates bear on a concrete slab and two bear on natural ground, the load on the base plates on the natural ground must be spread to minimise settlement.



Verification:
It is important to check that the pressure exerted by the post is not exceeding the load bearing capacity of the ground, which is:

F/S ≤ p where:

F = downward force on standard.
p = ground bearing capacity
S = bearing surface area.

If this is not the case, the bearing area should be increased by using an additional support.

Excessive stacking of wedges | Bearing over a gutter | Bearing on hollow block

WARNING: Absolutely prevent bearing on ground with unknown bearing capacity.

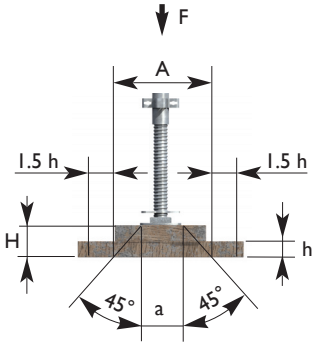
In practice, distribution devices are often made of wood (beams or baulks) when the support is a natural ground.

The calculations should assume that the load is spread in a compression cone with an aperture angle of 90°.

Often, the baulk exceeds that of the compression cone. If the ground is soft, it is possible to consider an additional distribution width, up to 3xh, where h is the wedge height.

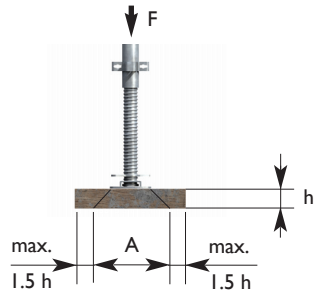
If the ground bearing pressure is not acceptable, it is possible to use a thicker baulk (called "trestle").

Baulk as trestle



a: width of the base plate
H : total height of the baulk
A : the with of the compression cone where A = 2 H + a
$S = (A + 3\ h)^2$

Single baulk



a : width of the base plate
h : total height of the baulk
A : the with of the compression cone where A = 2 h + a
$S = (A + 3\ h)^2$

MILLS PROVIDES YOU WITH SOLUTIONS

MILLS PROVIDES YOU WITH SOLUTIONS

MILLS
Scaffolding - Falsework - Formwork

Provides you with solutions

Made in France

EMS / EMI: 165 BOULEVARD VALMY - 92707 COLOMBES CEDEX - T. 01 57 60 94 05
HEAD OFFICE: 82, RUE EDOUARD VAILLANT - BP 119 - 93351 LE BOURGET CEDEX

www.mills.fr

www.mills.fr

MILLS COMMUNICATION - 17/11/2023 - PV