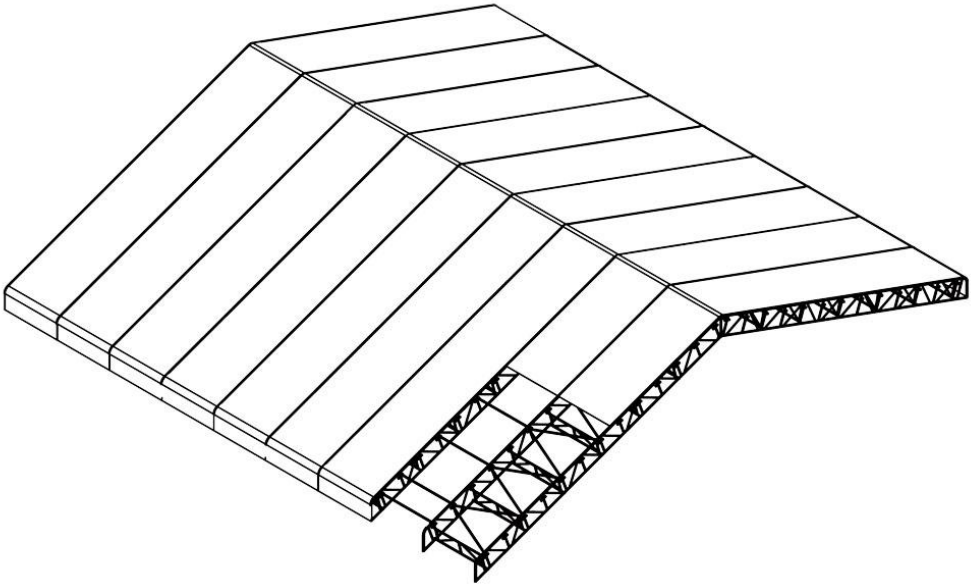
APAC

Pioneer of work zone safety Solutions

Temporary Roofing System



USER INSTRUCTION

General

APAC is a modular all-aluminium temporary roofing and weather-proofing system using the slide sheet or “keder” principle whichallows the roof covering to be installed in complete safety from underneath. APAC can be built safer and faster than manyexisting roofing systems. Using an exclusiveand revolutionary button system to retain the sheet tracking,APAC uses custom-designed APAC aluminium beams to maximise performance.

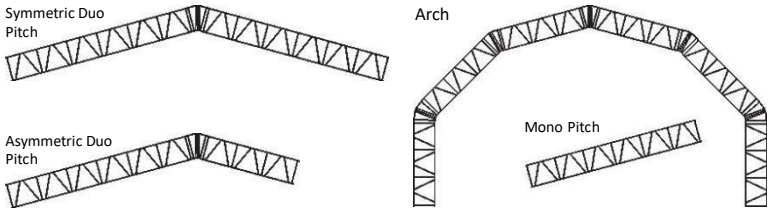
Choosing the SpanType

APAC is suitable for symmetric or asymmetric duo pitch spans, arch and mono Pitch spans using either the 78 cm or 45 cm deep beams.The following table provides a typical range of suitability for the various span types excluding any special measures:

Beam Size	Duo Pitch		Mono Pitch(2)	Arch(3)
	Symmetric	Asymmetric(1)		
45 cm	21 m	18 m	14 m	27 m
78 cm	36 m	32 m	19 m	44 m

1 Asymmetric roof assumes one side slope 50% longer than other side slope.
2 Mono pitchspan assumes a minimum angle of 15 degrees.
3 Uses 3 or 5 no ridge beams.

Widerspans are possible subject to individual engineering approval.



Erection Methods

APAC can be erected bya varietyof methods whichshould be chosen considering the size of the roof trusses and all relevantsite conditions:

- In situ erection on a scaffold supported with a perimeter platform. (It is considered that this method is suitable for spans up to 15 m only).

If the assembled trusses are too heavyto handle, alternate methods should be utilised:

- Erection bycrane• Erection from central tower• Roll-out method.

Compliances

There are no current International Standards for modular temporary roofing systems.The NASC has issued a Technical Guidance NoteTG9 for Temporary Roofing Design & Construction and this should be consulted for guidance .

The notes which follow have been prepared for the guidance of those concerned with the erection of the system and therefore do not form a part of anycontract.TheAPAC Roofing System is designed on the basis of a series of simply supported beams. It is the contractor'sresponsibility to provide a suitable support structure. It is also the contractors responsibility to meet the requirements of the Health & Safety atWorkAct, statutory regulations and relevantcodes of practice. wish to maintain the most effective methods at all times and therefore reserve the right to amend the following pages without prior notice.

Deliveryand Storage

It is the responsibility of the contractor to unload the components and check for anydamage. Before assembly,ensure all items are undamaged and fit for purpose.Anydamaged items should be segregated and replacements requested.

Components maybe stored in the open, but the area should be secure and care taken to keep them clean.

Safety Considerations

Adopt a safe system of workat all times. Plan the safe system prior to commencement of the job, ensuring that it is specific to the particular application and method of assembly.Ensure that all erecting personnel are adequately trained in the assembly of APAC, erection training and/or erection supervision is availablefrom if required.

Adopt suitable protectivemeasures to ensure against falls from height.

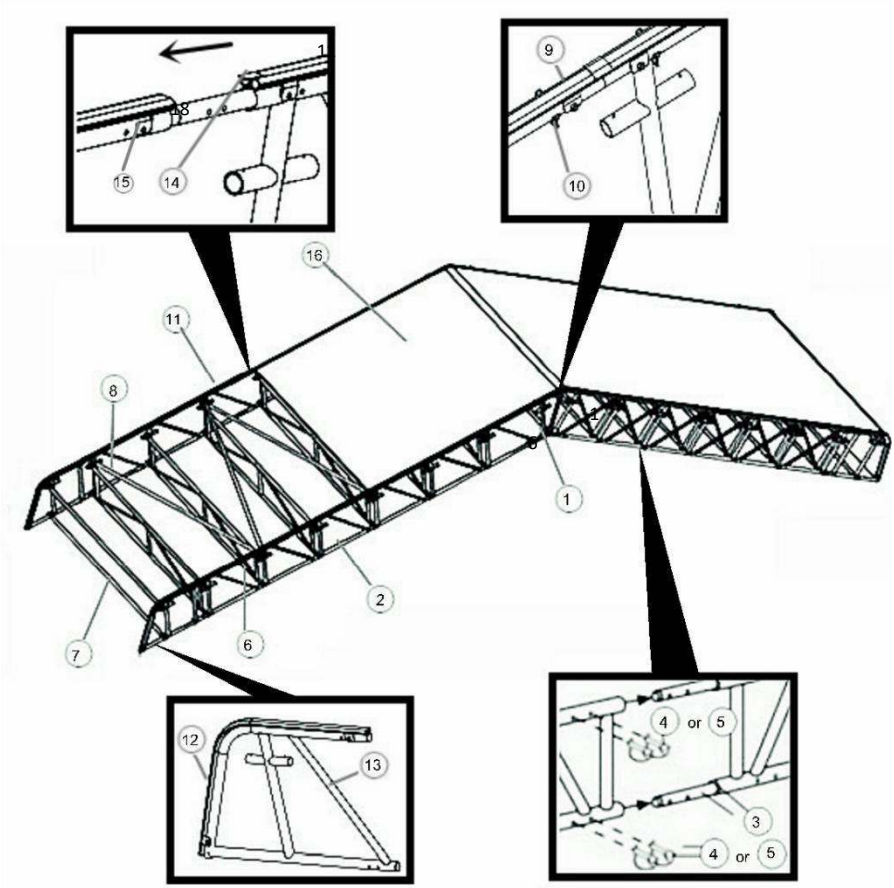
Preparation

Werecommend that at least four persons will be required to erect the APAC System.All roofing projects should be designed bya competent engineer and the drawingmust be present on site for guidance.

It is recommended that the supervisor should checkthat the following are satisfactory before commencing roof erection:

- Visualcheckof scaffold.
- Ledger or beam and inside standard support detail.
- RunWay™trackand supports (whererelevantfor rolling roofs) are installed correctly.
- Safe means of access to levelof workswhereroof is to be installed.
- Sufficient means of protection and safe system of workat levelwhereroof is to be installed. (i.e. fully boarded and guardrailed to inside and outside face or some other means of fall arrest system in place).
- If a craneis to be used, checksite is suitable for setting up and there are no overheadpowerlines or obstructions.
- Thegeneral alignment of the supporting scaffolds and anyleveldifferences. (Note that if the scaffold splaysor the front and backsupporting scaffold is not parallel, the levels will differ and adjustments will need to be made to the supporting scaffold structure to ensure the roof sits level).

Componentrecognition



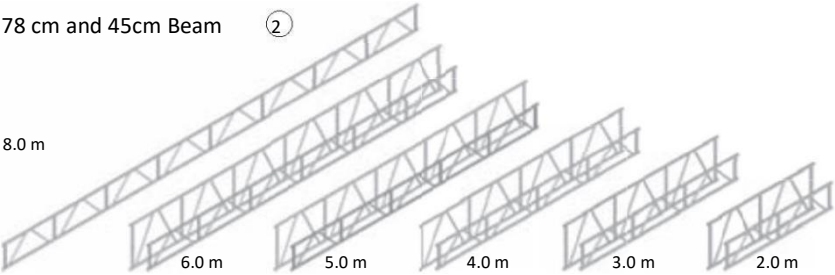
1 Ridge Beam
2 78 cm/45 cm Beams
3 Beam Spigot
4 Quick Release Pin M12x60
5 M12 x 60 Special Nut and Bolt
6 "K"Frame
7 Horizontal Brace
8 Diagonal Brace
9 Ridge Track
10 RidgeTrack Securing Pin M12x70
11 Beam Track
12 Eave Track
13 Eave Beam
14 Water Protection Stop
15 Track connector
16 Roof Sheet

Components

Ridge Beam (1)
18º x 78 cm and 18º x 45 cm is formed at 18 degrees to provide the roof pitch. 36° ridge beams also available(image not shown)

EavesBeam
36° x 75 cm and 36° x 45 cm Eaves Beams.

78 cm and 45cm Beam (2)



1.0 m beams are availablebyspecial order.

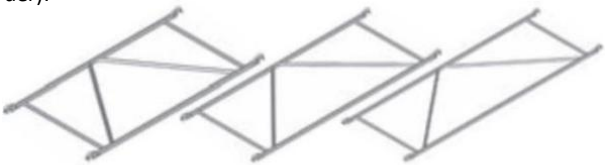
Beam Spigot (3)
Steel tube with 4 no. through bolt holes to connect the top and bottom chordsof beams.

Quick Release Pin (4)
Used to secure Beam Spigots and Track Connectors (16)

M12 x 60 (5)
Special Bolt and LockNut alternative To (4.)

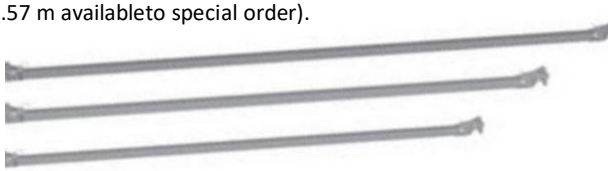
"K"Frame (6)

BraceframewhicAPAConnects the top members of pairs of trusses.Theends havea special clawcasting for simple fixing.Thecasting includes a top button whichsecures the tracksections. (2.07 m, 2.57 m, 3.07 m. & 1.57 m available to special order).



Horizontal Brace (7)

Provides horizontal restraint between top or bottom members of adjacent trusses. Ends include the clawcasting and trackbutton. (2.07 m, 2.57 m, 3.07 m. & 1.57 m availableto special order).



Diagonal Brace (8)

Provides diagonal bracing between top and bottom members of adjacent beam trusses. It is similar to, but longer than, the horizontal brace.Thereis no button on the end casting. (2.07 m, 2.57 m, 3.07 m x 78 cm 45 cm. & 1.57 m available to special order).

Ridge Track (9)

Provides the guide trackand support for the roof sheeting at the ridge position.
Requires 2 x (10) to secure.

RidgeTrackSecuring Pin (10)
Quickrelease pin secures trackto ridge beam.

BeamTrack (11)
Provides the guide trackand support for the sheeting.
(2, 3 & 4 m lengths).

EavesTrack (12)
Secures and tensions the roof sheeting to the structure at the eaves

Eave Beams (13)
Positioned at the eave tracks to connect the roof beams at the end.

Water Protection Stops (14)
Prevent rain and water entering the tracks

Track Connector (15)
Locks and secure the track to the beams
With 2 x (5) or 2 x (10)

Roof Sheet (16)

Manufactured from high grade, flame retardent PVC coated, polyester fabric.
Semi-translucent sheets are located in the trackingand pulled into position
across the roof. (2.07 m,2.13m 2.57 m, 3.05m,3.07 m & 1.57 wide to special order).

Assembly

Erection Procedure

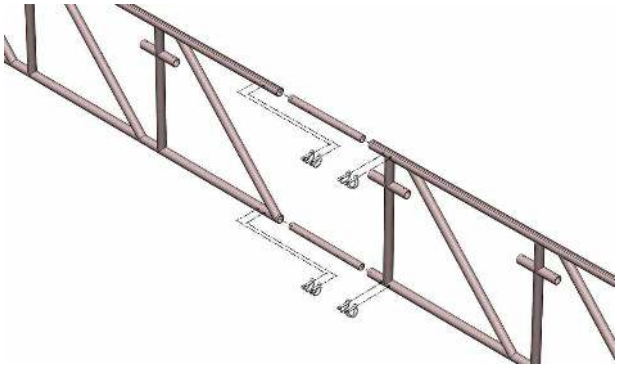
NOTE

The APAC roofcomponents for assembly should be selected in accordance with the engineer'sdesign that will havebeen produced for the project.Thisuser guide coversthe principal components, but the details of anyknee bracing,tension wires, spine beams or anysimilar special requirements should be sought fromthe engineer'sdesign drawing.

Assembling Trusses

Assemble the beams together at ground level, this way you will decrease work that is done on high level.

The lattice beams and the keder cover rails are mounted to each other by nuts and bolts. The spigots are connected with either locking pins or nuts + bolts. Connecting two lattice beams together requires 2 spigots and 8 pcs of quick release pins or nuts + bolts



Completed Connection

NOTE

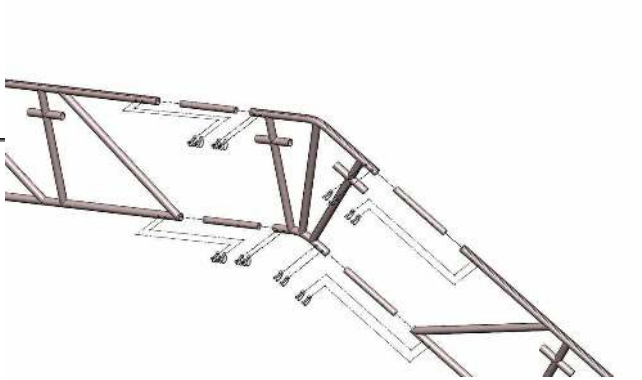
Orientation of end diagonals in each beam.

Assembling Ridges

Add ridge beam to end of beam in the centre bysliding onto spigots.

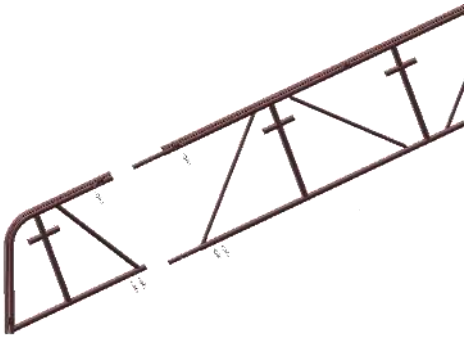
The ridge beam is connected in the same way as the lattice beams.

It is secured with quick release pins.9



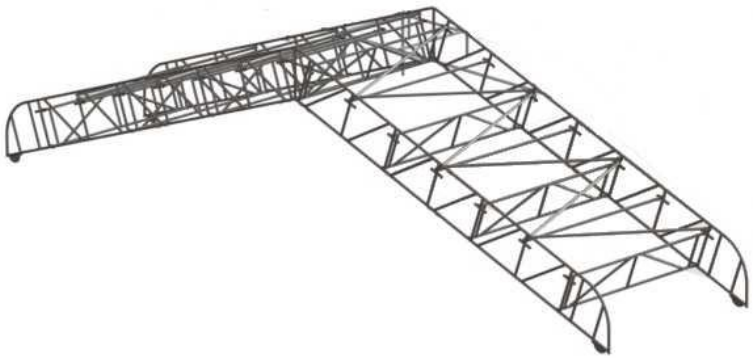
Eave Beam

Insert eave beams into the beam and secure with quick release pi ns.



Mounting a section

After the ridge beam and lattice beams have been connected they will be locked to each othe by ledgers and diagonals. By following this procedure one section will be created.

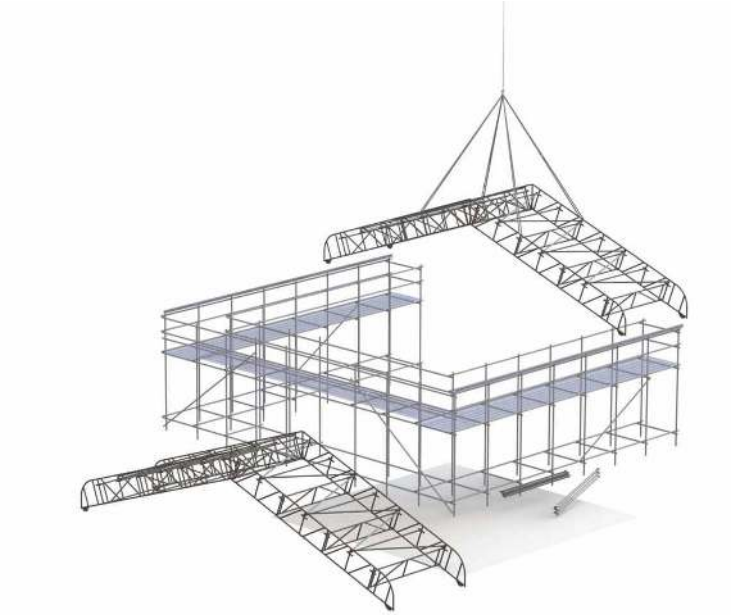


Mount a double ledger at every other vertical mounting point (2m distance from each other) and a normal ledger at every other vertical mounting point. Diagonals will be mounted at every mounting point. This section is called a supported section.

A section can be mounted entirely on top of a scaffold or by lifting it upwards at the same time when it is mounted from below.

Installation of sections

The sections are normally installed with a crane. The sections are mounted at ground level and lifted into position one by one. The system can also be mounted directly on the scaffold but this will increase the work at high levels and is much more dangerous. Mounting the sections requires a space on ground which is slightly larger than one section.

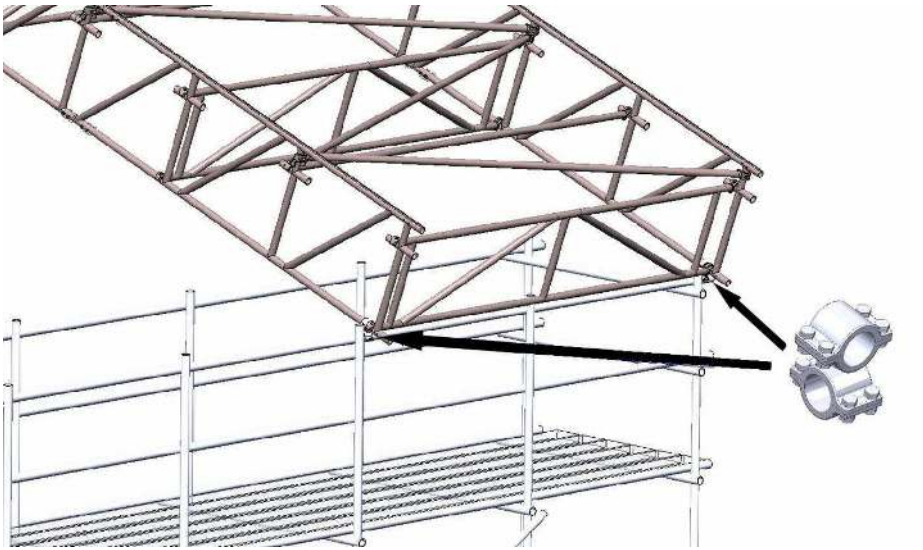


It is important that the sections that are lifted with a crane are supported sections. The intermediate sections (a section between 2 supported sections) only needs ledgers at 2 meter
distance (no diagonals or double ledgers are required).
To minimize work at high levels all material used for the intermediate section can be lifted up at the same time as the supported section is lifted in place. Material can be connected with the claw to the supported section. After the supported section is fastened into position the intermediate section ledgers can be mounted into position.

Pulling ropes for mounting the cover sheet can also be installed on the supported section before lifting so that you don't later have to climb over the section to fit the rope.

Locking the section in place

Sections are locked into place by using scaffold couplers.
Fit the opposite side double couplers directly onto the ledger or beam and only secure the gate to the ledger/beam. Allow the truss to locate into the gate and slide through until it finds its position



It is important that the locking position on each section is the same so that no Crosstensions will appear in the system. This will make it difficult to install the cover sheets.

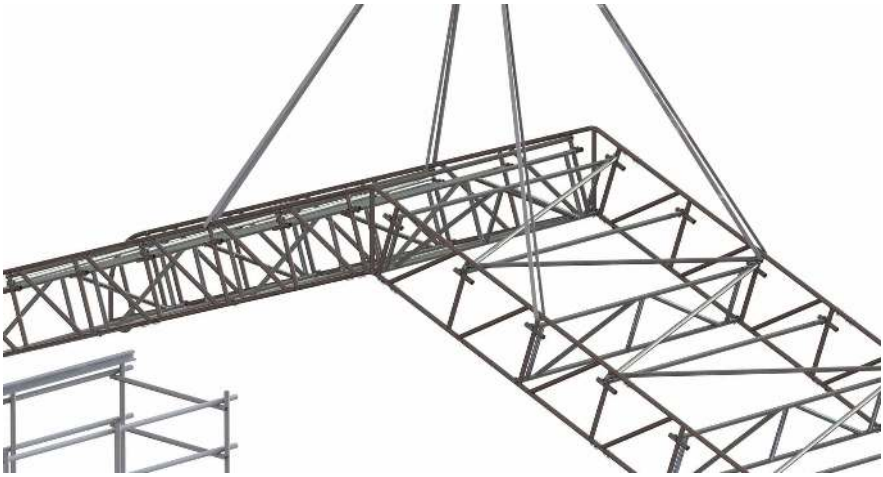
The supported sections and the whole system in general is flexible. The flexibility has to be removed by making sure that the whole section weight is sitting on the scaffold before tightening the couplers.

Fasten one end of the section while the crane is still holding the weight of the section. Then lower the section so that the whole section weight is sitting on the scaffold before tightening the couplers.

Installation of the roof continues by alternately installing a supported section and an intermediate section.

Lifting sections

Note that a section has to be attached at 4 points when lifting.

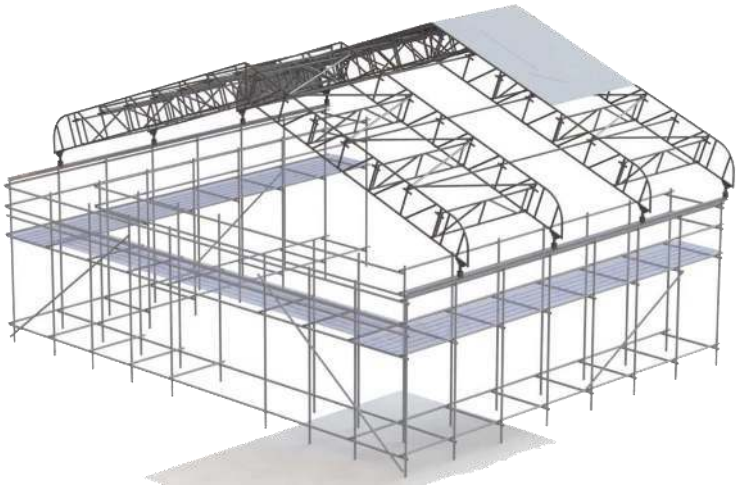


The attachment points have to be at a beam connection point and as close as possible to a double ledger. Take care not to damage the cover rails. It is only allowed to use lifting lines when lifting sections, chains or cables will damage the aluminium.

Lifting can only be done when wind speed is less than 10 ms (3ms if the cover sheet is still

Mounting the cover sheet

The cover sheet is very sensitive to wind and thus can only be mounted when the wind conditions are good. It is good to reserve 4 people for cover sheet installation (especially at larger roofs). 2 persons to pull the cover sheet and 2 persons to feed the cover sheet from the other end.



Check that the cover sheet is clean and suitable for the target site.

Feed the cover sheet keder rods into the cover rails. Install the pulling bar. The pulling bar is mounted into the cover sheet pockets so that the pulling bar is visible from both ends and will rest on top of the cover rails. Tie the pulling ropes to the pulling bar.

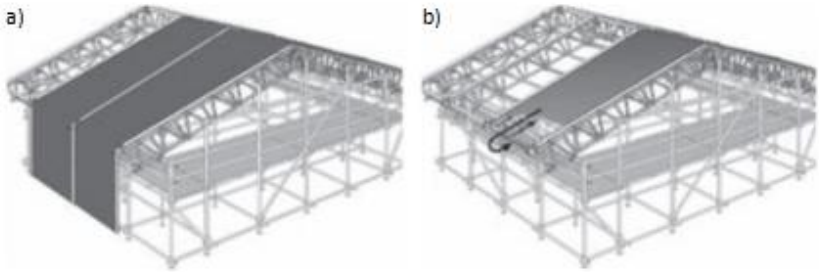
Start pulling the the cover sheet into position. You have to pull slowly and evenly from both sides.

When the cover sheet is in place it is locked into position with ratchet straps or similar.
.
The gable end is installed with the same principle.

Excess Sheeting

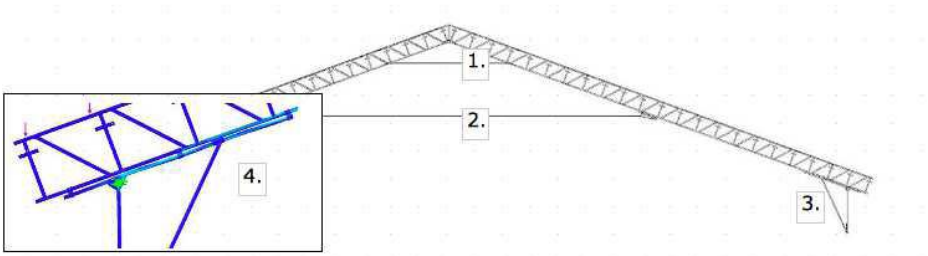
There are two recommended methods of dealing with excess sheeting:

a) Pull excess sheeting down the outside face of the scaffold.
b) Return the sheeting around the eave beam and over the brace tube.



Bracing and anchoring
Each section have to be braced in all directions – up,down, side and lengthwise.
Normally bracing is done in the following way:
– side bracing; by anchoring the section to the scaffold (the scaffold is anchored to the wall)
– lengthwise; sections are braced between eachother and the system is braced with ~~ratche~~t straps (the whole roof can be considered as one big supported section)
– up/down; each beam of the roof will be anchored to the wall with a ratchet strap
Wedge anchors and concrete screws can be used when anchoring to walls. The anchors have to be fastened to the plinth, vaults or concrete (tiles or bricks are not strong enough). The anchoring need is 40 Kg / m2 (of roof). 2000 kg/4000 kg ratches straps must be used.

Supports, loads and spans
A temporary roof must stand wind- and snowloads. Windload is 40kg/m2 and snowload 25 kg/m2. The system has to be anchored so that it can stand stormy winds (21 m/s). The force applied to gables and the roof is 40 kg/m2.



1. 6m tension bar
2. 20m tension wire
3. Tension support diagonals

Span	Height of section	Weight of section	Max load / m2
15 m	3.6 m	488 kg	Yli 100 kg / m2
20 m	4.3 m	520 kg	100 kg / m2
25 m	5.3 m	625 kg	70 kg / m2
30 m	6.4 m	878 kg	65 kg / m2 (1)
35 m	7.0 m	909 kg	65 kg / m2 (2) (4)
40 m	8.0 m	1042 kg	65 kg / m2 (3) (4)

1) Needs a 6m tension bar
2) Needs a 6m and a 20m tension wire
3) Needs a 6m, 20m tension wire and tension support diagonals
4) Needs end supports