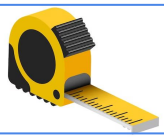
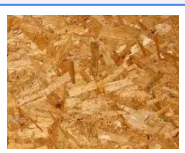
Emergency Shelter Kit

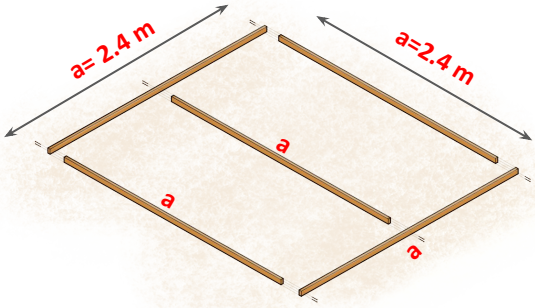
PALESTINE SHELTER CLUSTER
Coordinating Humanitarian Shelter and Settlements

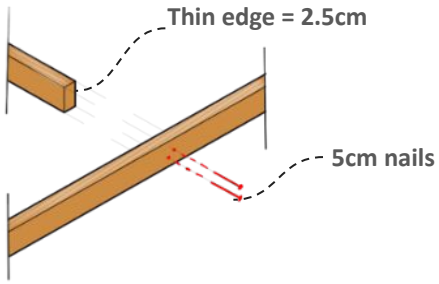
This IEC indicates techniques to assemble a shelter and does not prescribe a specific shelter design. **Partners are encouraged to modify the quantities below based on the materials, resources, and space available to them.**
For a video demonstration, refer to the ESK: Shelter Kit Construction Video | Shelter Cluster

Essential Components			
Component	**Unit**	**Quantity**	**Indicative Picture**
Timber, untreated, essential for frame construction, required to be at least 2.4 meters in length. This IEC is for cross-sections of **5cm x 2.5cm**	Pcs	114	
Tarpaulins, woven plastic, available in sizes of 6x4 meters, 5x4 meters, or as a roll of 4 meters width. They can be used for roofing, walls and flooring.	Pcs	3	
Nails, 5 cm nails for timber connections. Used for structural joints and fixing cover-battens.	Kg	1.6	
Rope, Minimum 30 meters length, in roll, 6mm thickness.	Lm	30	
Hand saw, total length 60 cm, for wood, good quality, tempered, hardened and set teeth. Unbreakable handle.	Pcs	2-3	
Measuring tape, 3 meters, graduated in centimeters.	Pcs	1	
Hammer, metal or fiberglass handle.	Pcs	1	

Optional Components			
Timber sheet (Plywood or OSB), Approx. 1 cm thick, used for creating beams, trusses, doors, bracing, raised floors, and internal cladding.	Pcs	3	
Plastic sheet, 0.3mm thick, roll is up to 50 sqm per shelter. Minimum width 4 m.	Sqm	50	

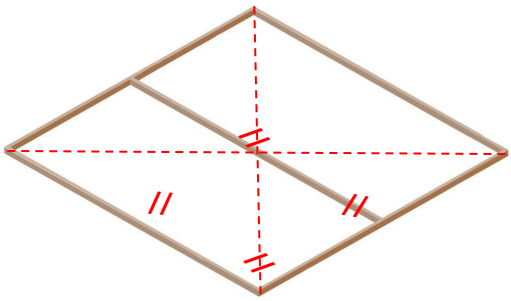
How to Build Wall Panels

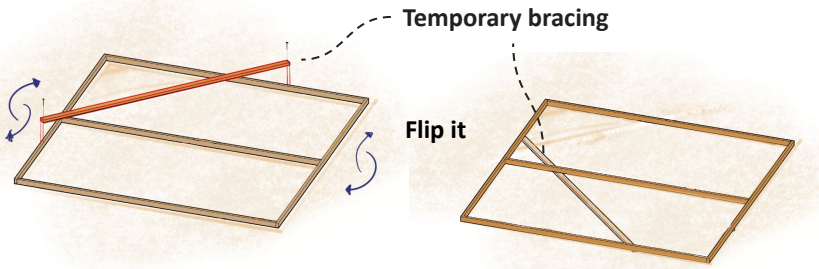




1. Lay out the pieces of timber, standing them up on the thin edge.

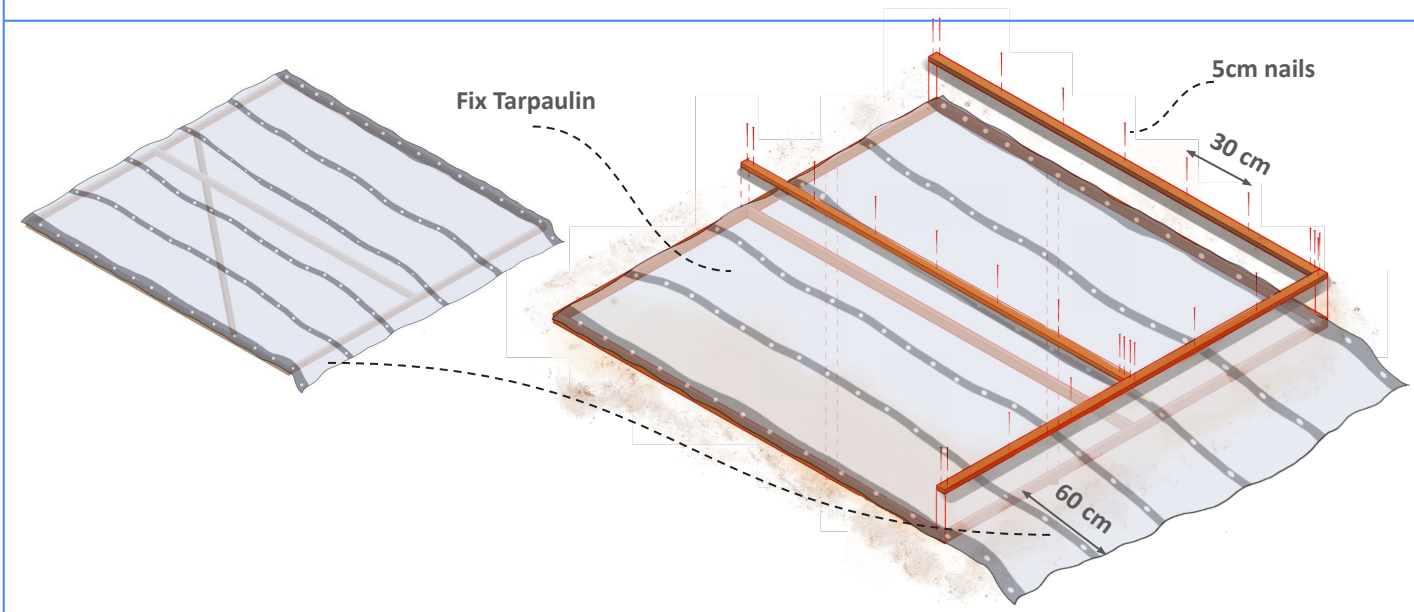
2. Nail the timber together using 5cm nails.





To check if the panel is square: measure the two diagonal measurements, should be equal.

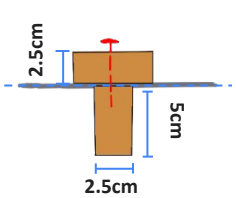
3. Add temporary bracing, of any size, to hold it square then flip it to fix the tarpaulin on the frame.

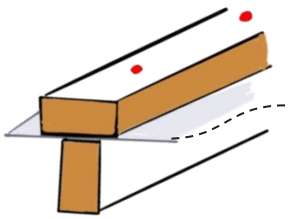


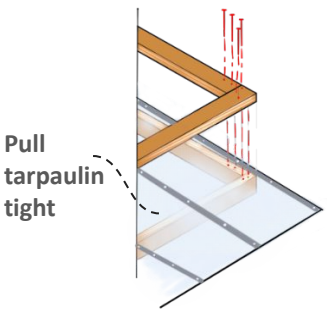
4. Lay the tarpaulin over the frame. Leaving a 60cm outside the bottom edge of the frame, to avoid filtration and to favor the anchorage.

5. Fix on the 5 x 2.5cm cover battens with 5 cm nails every 30cm.

The frame is constructed as a T-section which makes it strong



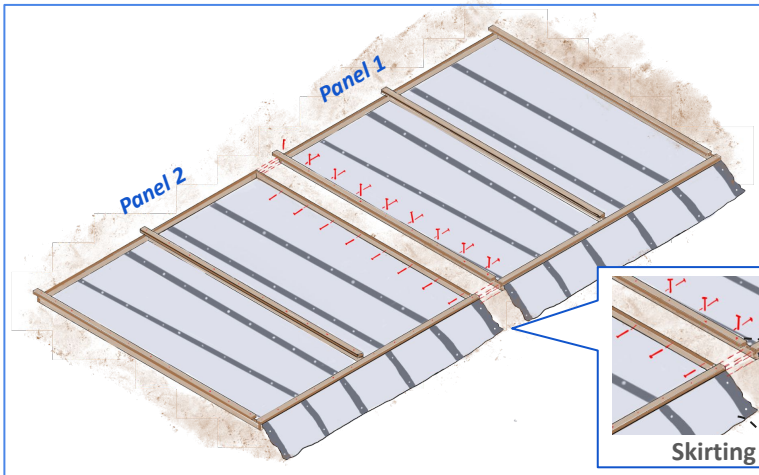


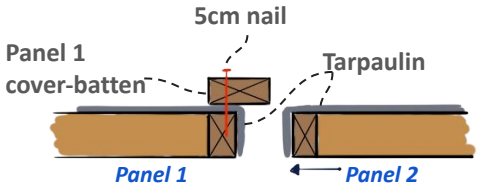


The tarpaulin holds the frame square and so should be pulled tight, but not so tight that it bends the timber.

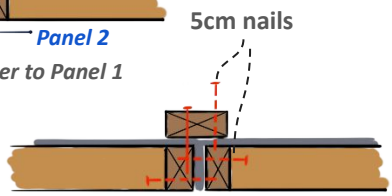
Tarpaulin fixed
= Panel held square
= Remove temporary bracing

How to Connect Wall Panels





A. Move Panel 2 closer to Panel 1

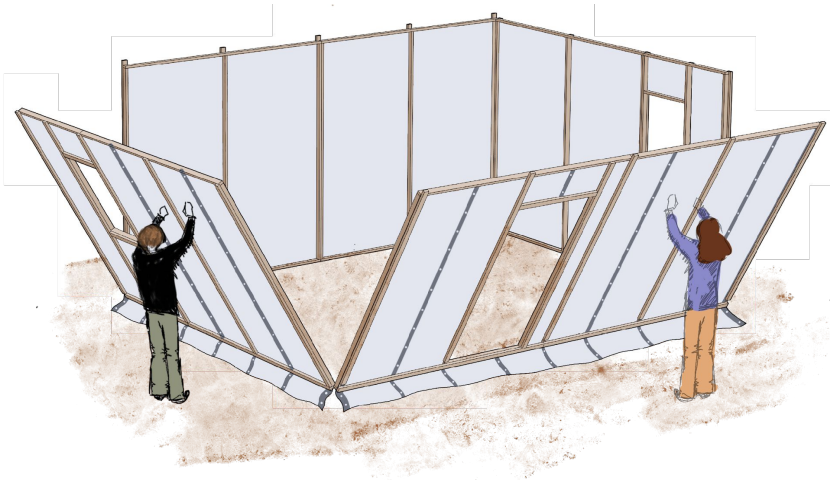


B. Connect the panels together by nailing the cover-batten

C. Nail the vertical studs timbers once the panels are lifted

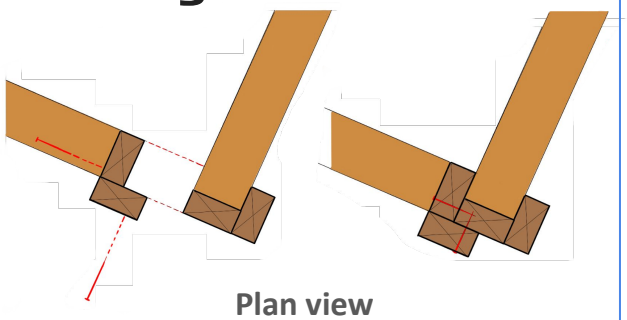
The panels are connected together while still flat on the ground. The cover-batten is used to make a strong connection. Once the wall panel has been lifted into position, then the two vertical studs must also be nailed together.

Lift the panels together



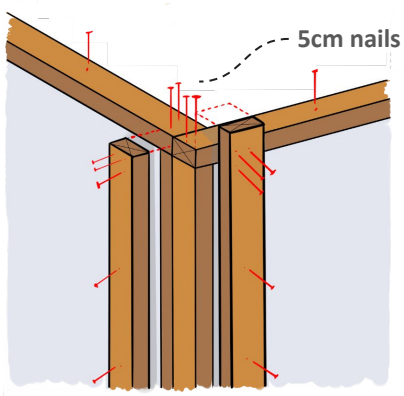
Is the shelter square? Measure the diagonals, should be the same.

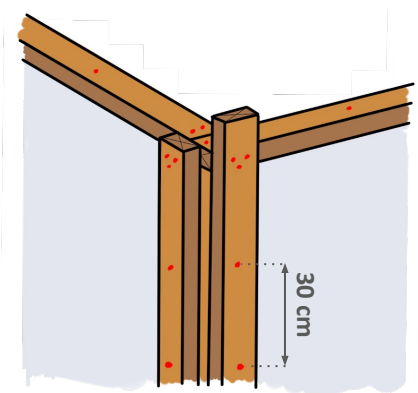
How the corner is joined together?



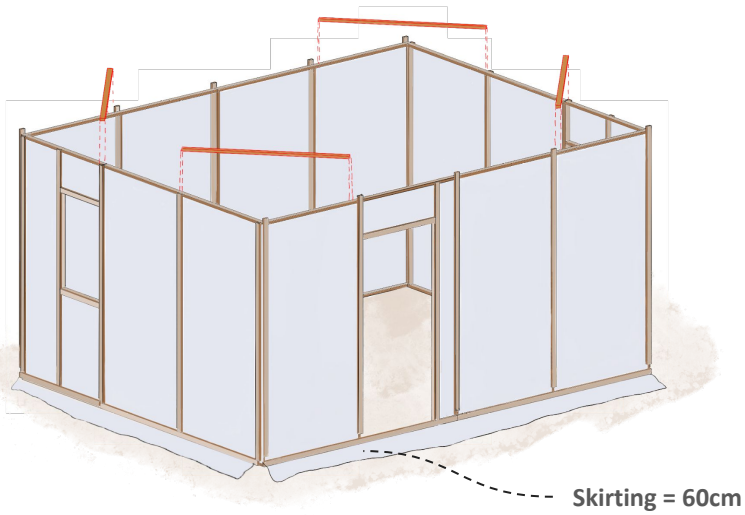
Plan view

Connect the corners securely using:

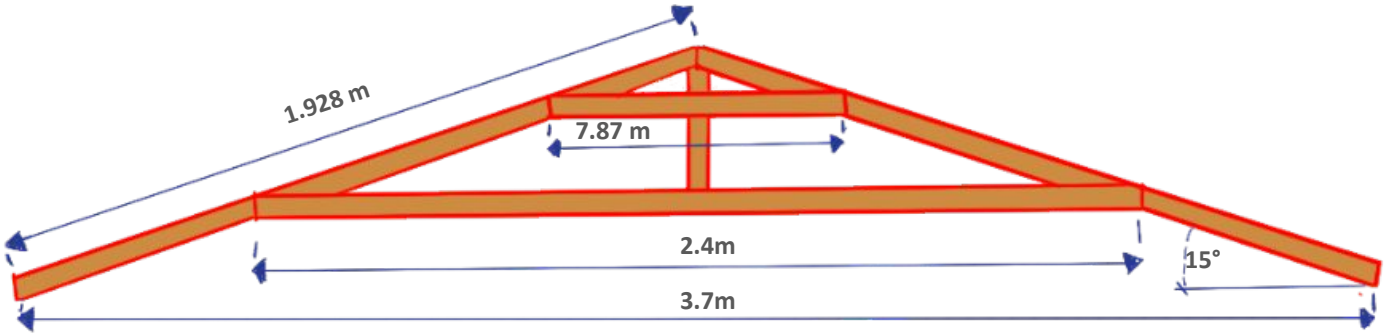




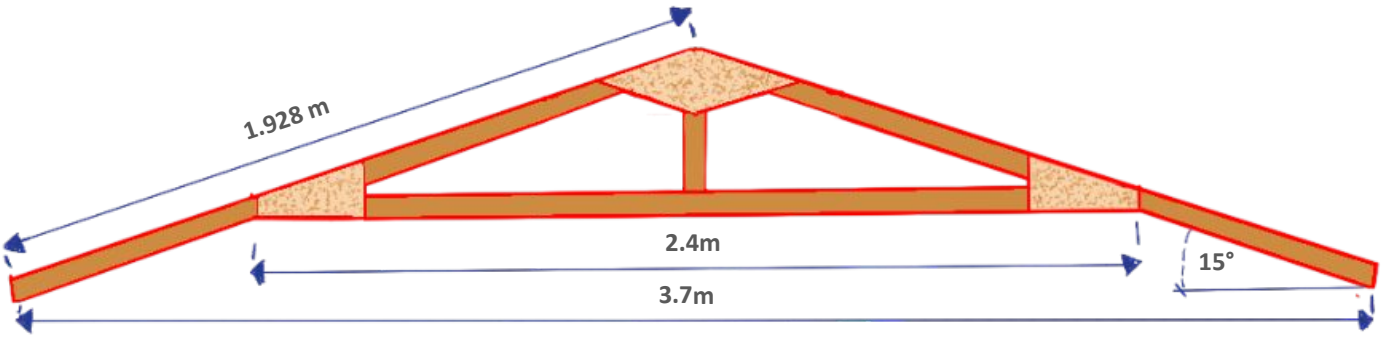
Add corner bracing



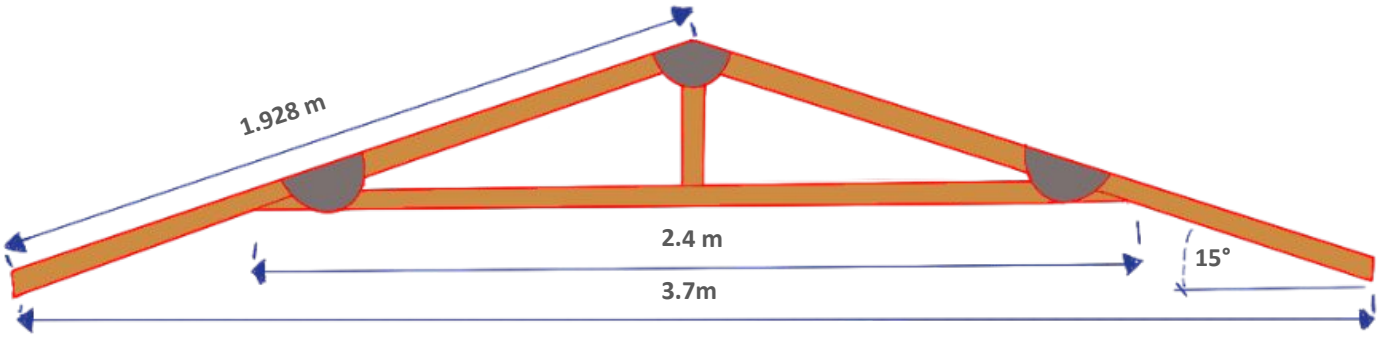
Roofing: Pitched Roof



The horizontal pieces of timber are doubled, one on either side.



If OSB or plywood is available, then this truss with 'gusset plates' is a good option with strong connections.



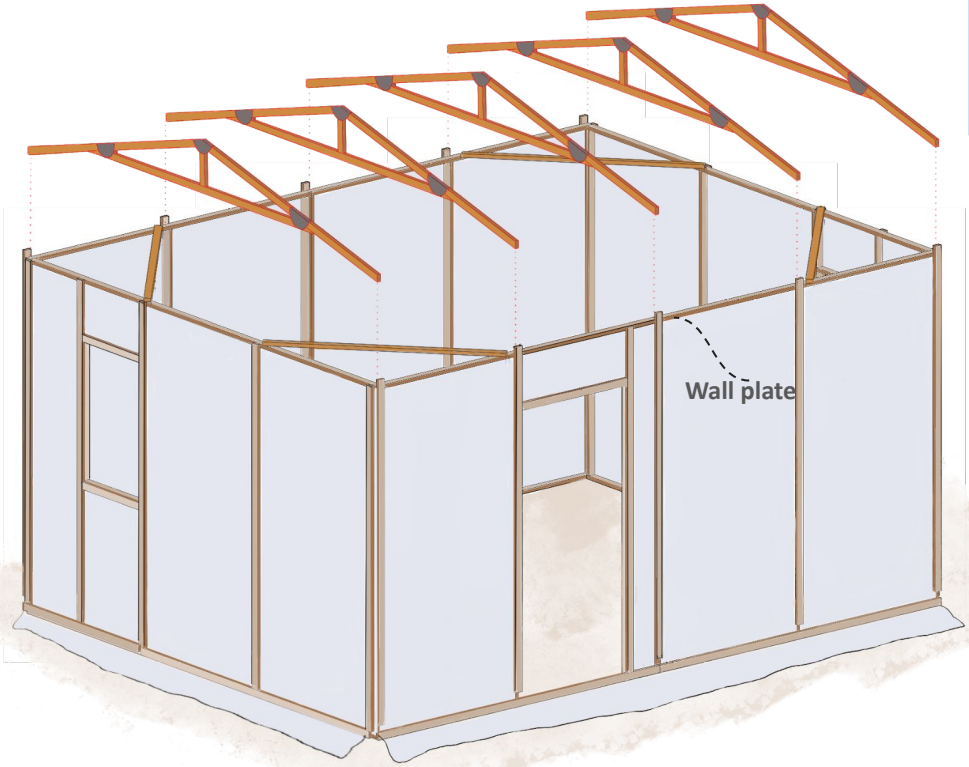
If short of timber, this is a good option. Strong connections are made with pieces of used tin cans.

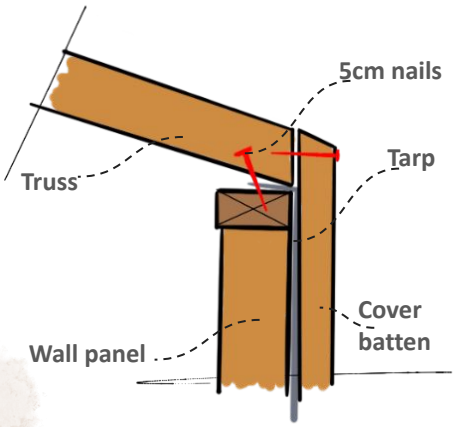
HELPFUL TIP

To ensure uniformity and save time, construct all trusses simultaneously by stacking them one on top of the other or using one as a template.
This approach guarantees that each truss is identical and reduces the risk of errors during the assembly process.

How to Build Roof Trusses

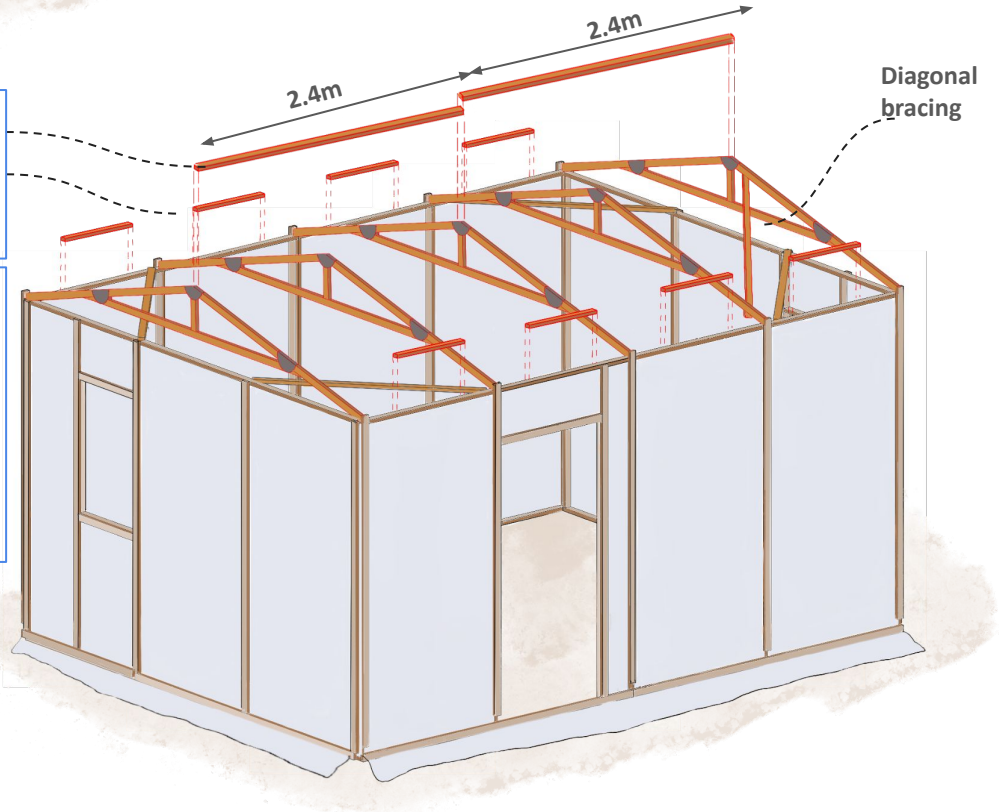
The trusses are placed one by one and fixed to the wall plate

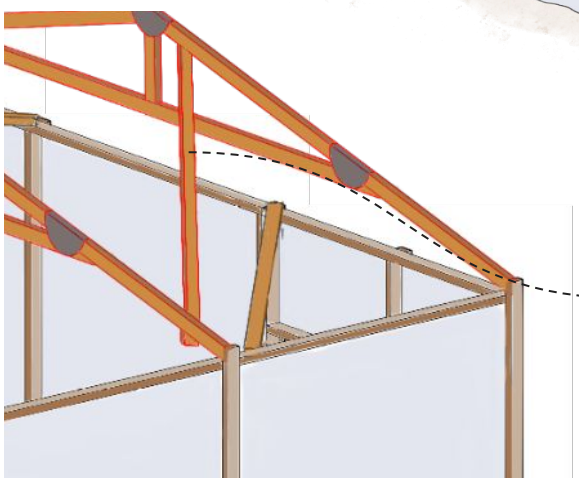




The short off-cuts and cover battens are there to secure the top of the tarpaulin.

The long horizontal piece at the ridge of the roof should be 2 x 2.4m lengths. They join the trusses together and also provide a support for the tarpaulin.

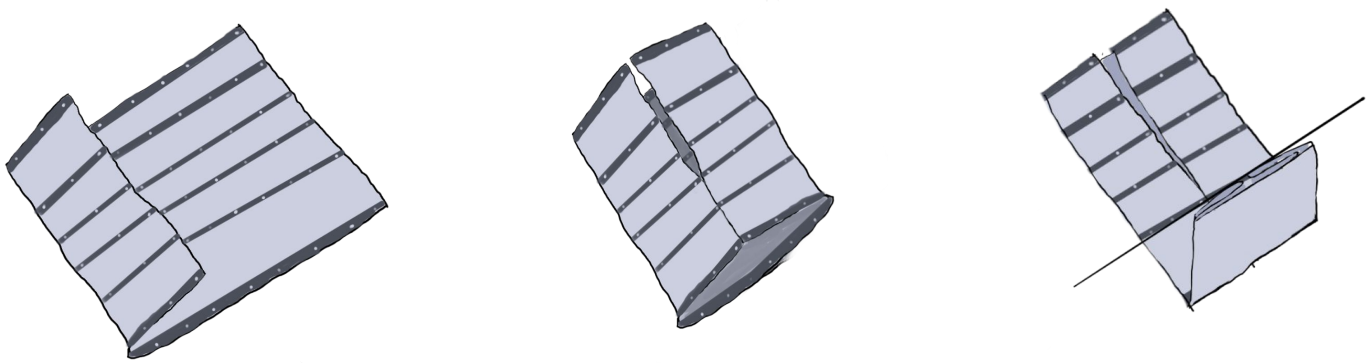




Diagonal braces need to be fixed, one at either end. These are fixed to the underside of the first and second truss and the final two trusses.

How to Cover the Roof

1. Fold the Tarpaulin to facilitate its raising to the roof



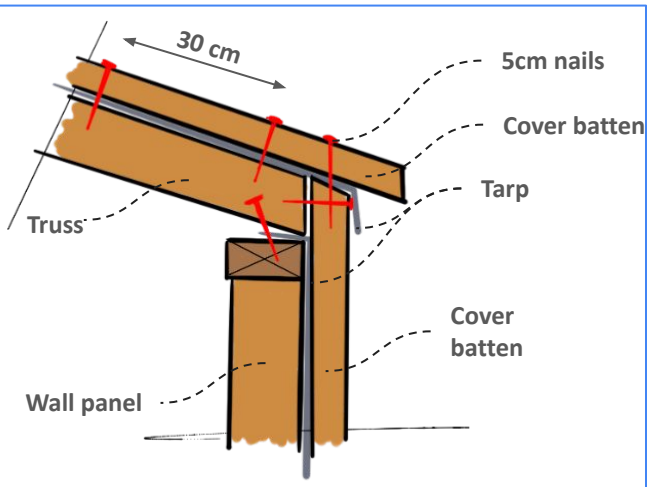
First fold: Fold the left-hand edge towards the centre line

Second fold: Fold again to the centre. Repeat for the right-hand edge

Finally: Fold to the centre as shown.

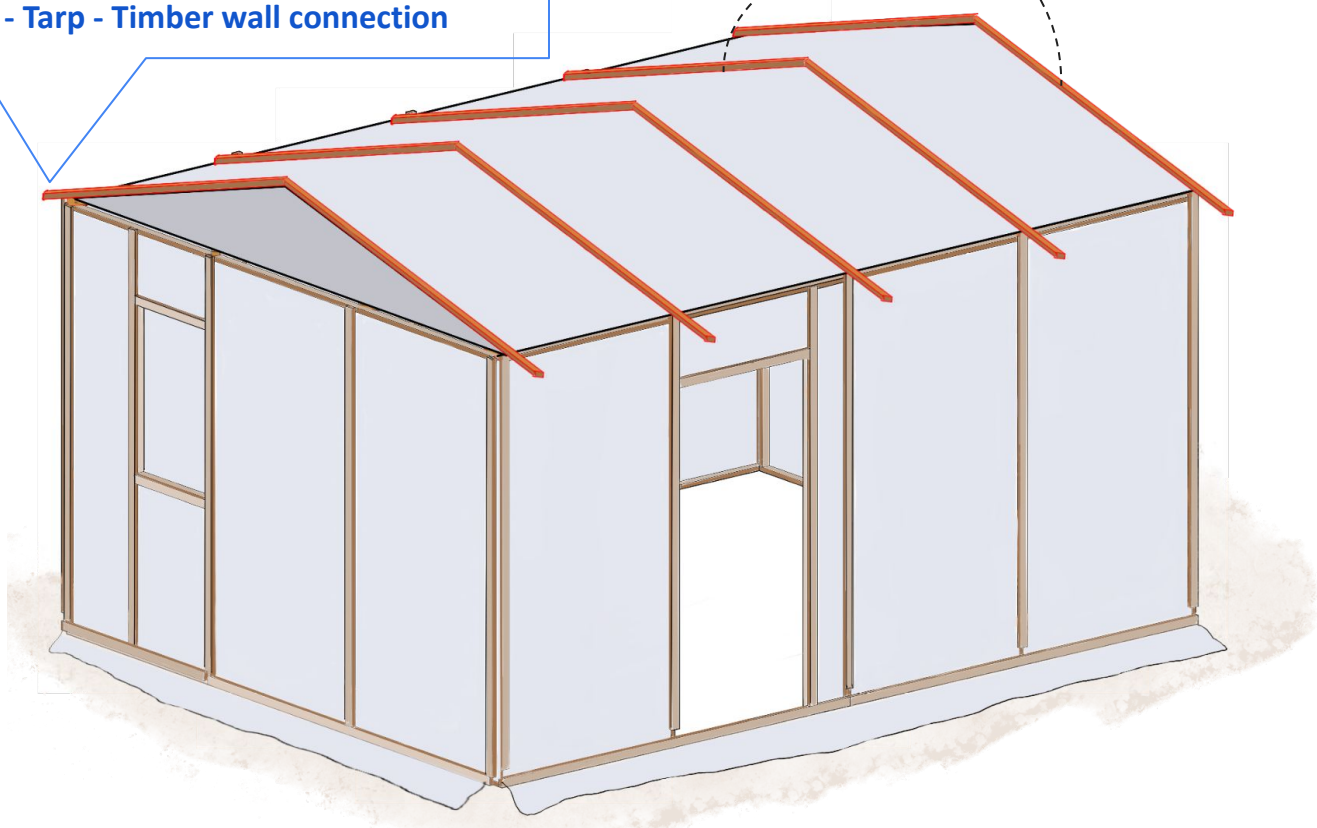
2. Progressively unroll the tarpaulin over the roof structure - start from middle

3. Add timber cover battens and short off-cuts to pin roof tarp



Truss - Tarp - Timber wall connection

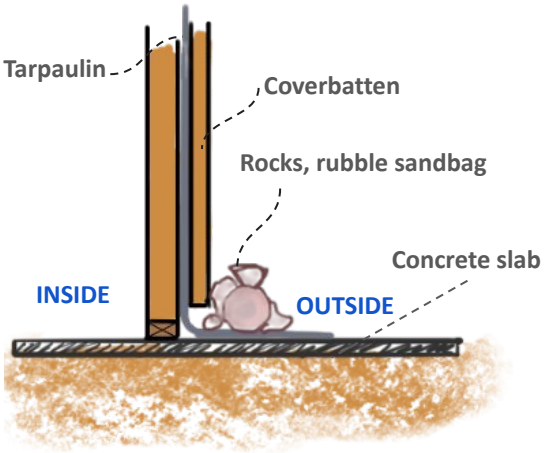
The cover battens are there to secure the top of the tarpaulin.



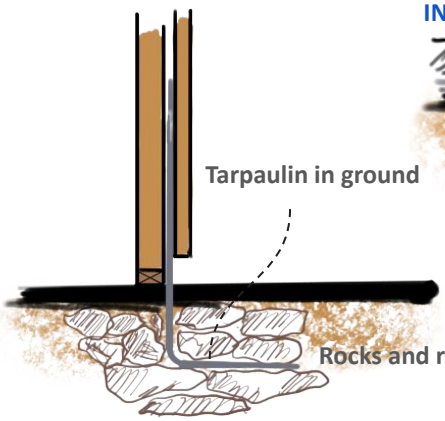
How to Fix Shelter on Ground

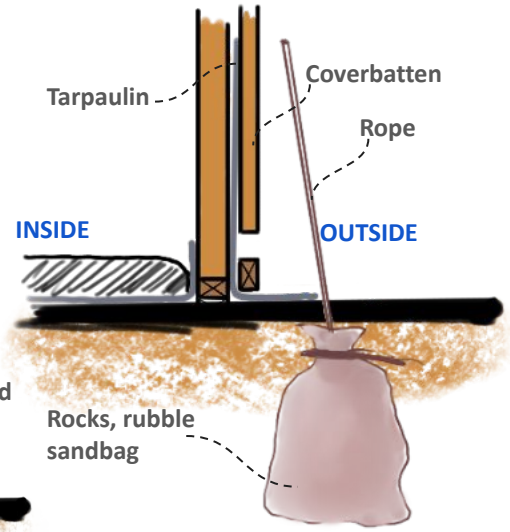
The type of anchoring, or foundation, will depend on the ground conditions.

A- SOFT/SANDY GROUND AND HARD SURFACE:



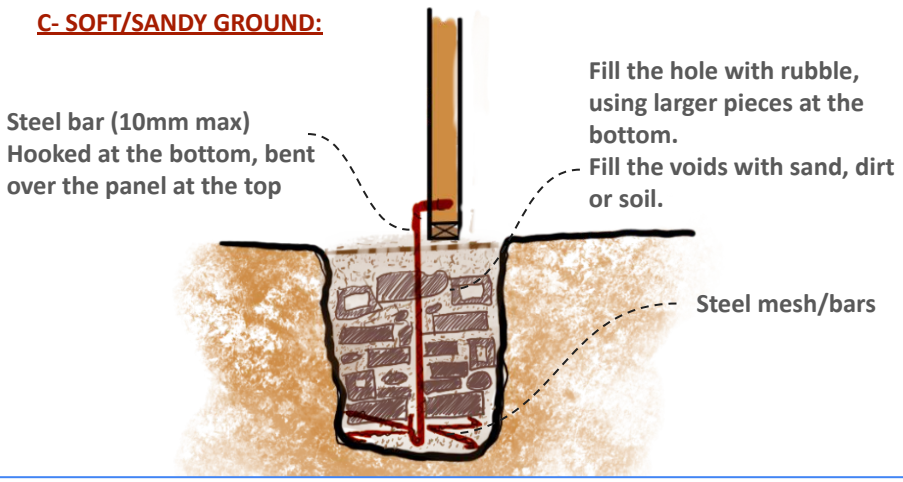
B- SOFT/SANDY GROUND:



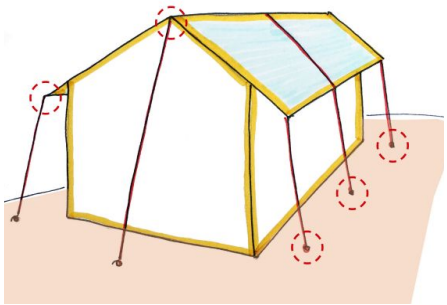


Weighing down the tarpaulin "skirt" is the simplest method and suitable for soft or sandy ground, and a concrete slab. Buried sandbags at each corner, or close to each corner, is another option for sandy ground

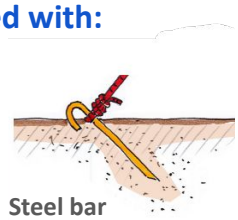
C- SOFT/SANDY GROUND:

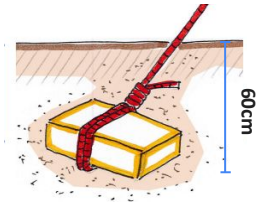


With rubble and old rebar available, this is an appropriate anchoring or foundation detail.



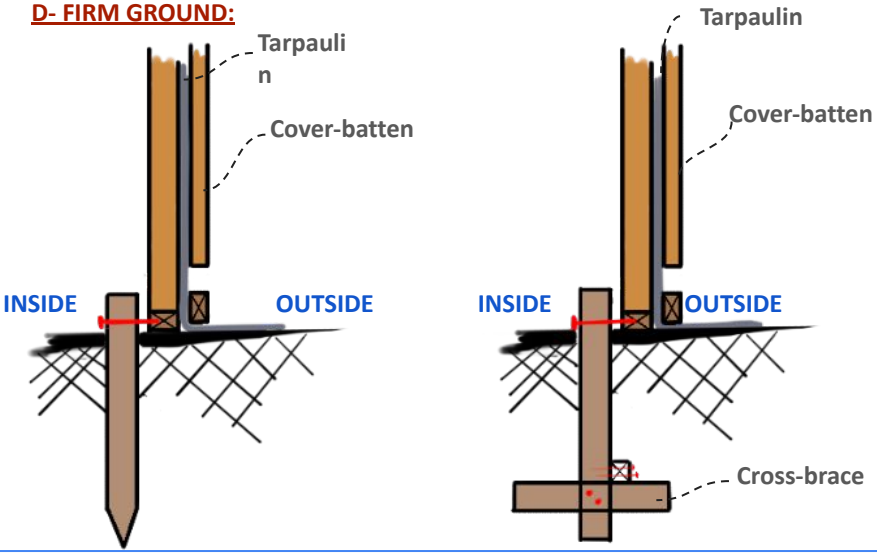
Anchoring with sandbags can be replaced with:





Brick/ hollow blocks/ or concrete

D- FIRM GROUND:



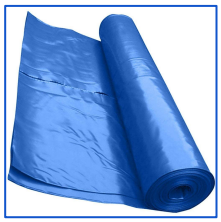
Driving, or burying, wooden stakes into the ground is only suitable for firm ground.

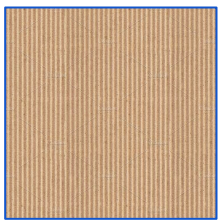
In exposed areas, the use of guy-ropes is recommended

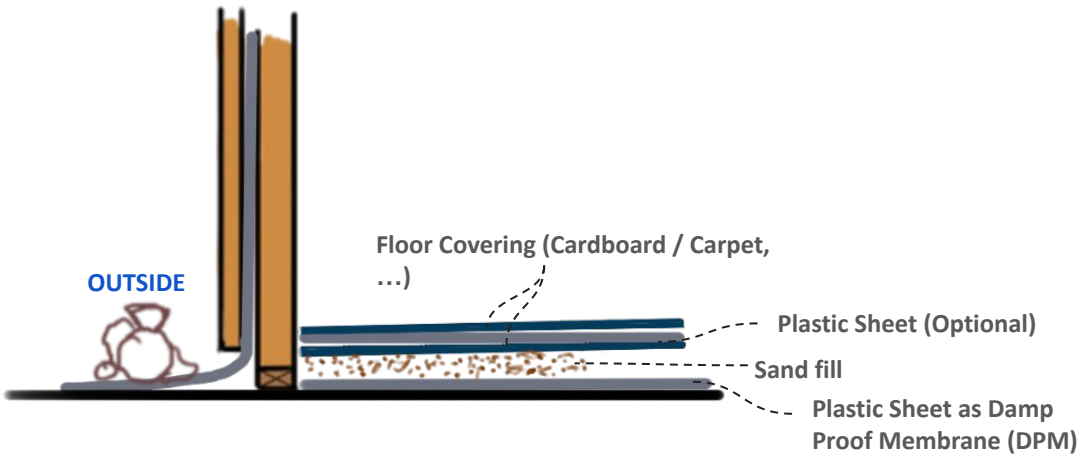
How to Cover the Shelter Floor

It is a good idea to have a raised floor inside the shelter that is kept dry and contained by a plastic sheet (a damp-proof membrane - DPM).

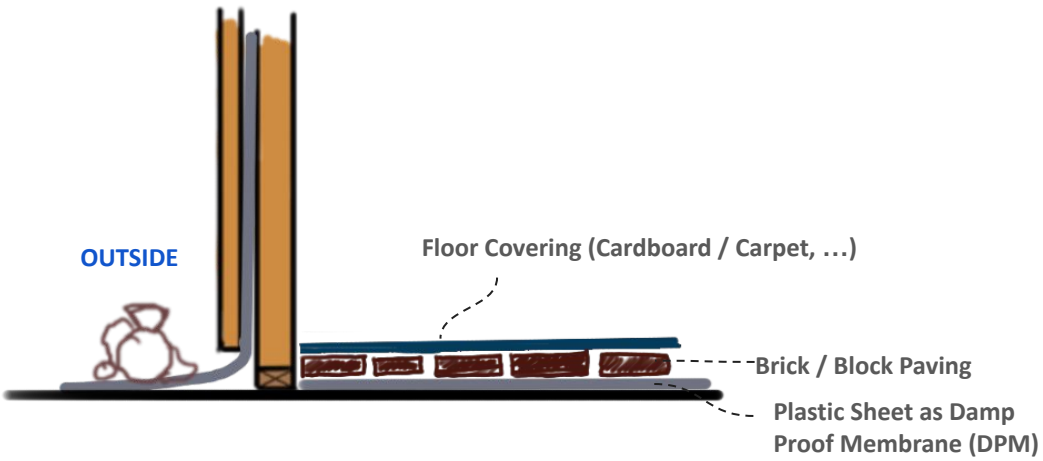
This can be achieved in a number of ways:



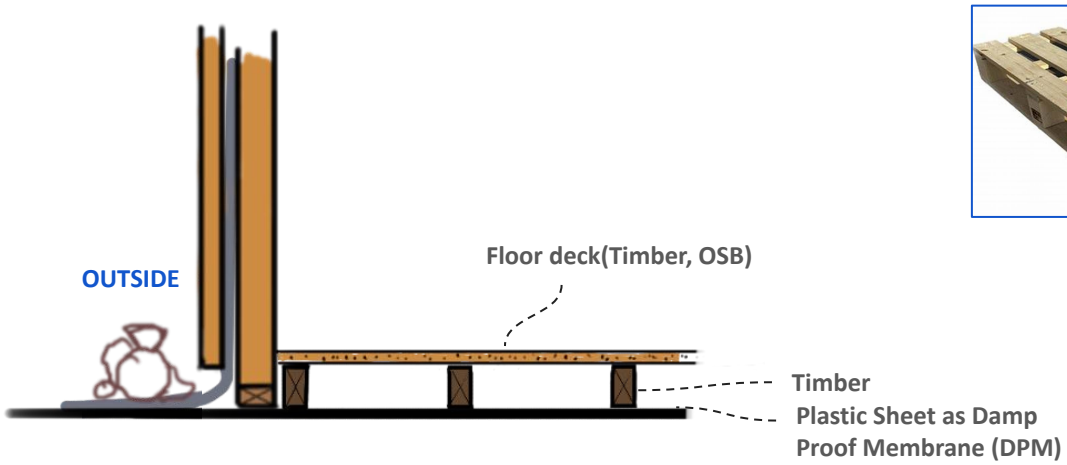




1. Simply covering the inside with plastic sheet, carpet or even cardboard.



2. Raising the ground level with rubble, bricks, broken blocks; filling the gaps with sand; and covering with a suitable flooring. A plastic sheet DPM is advised if available.



3. A good solution would be to use wooden pallets to construct a level raised floor.