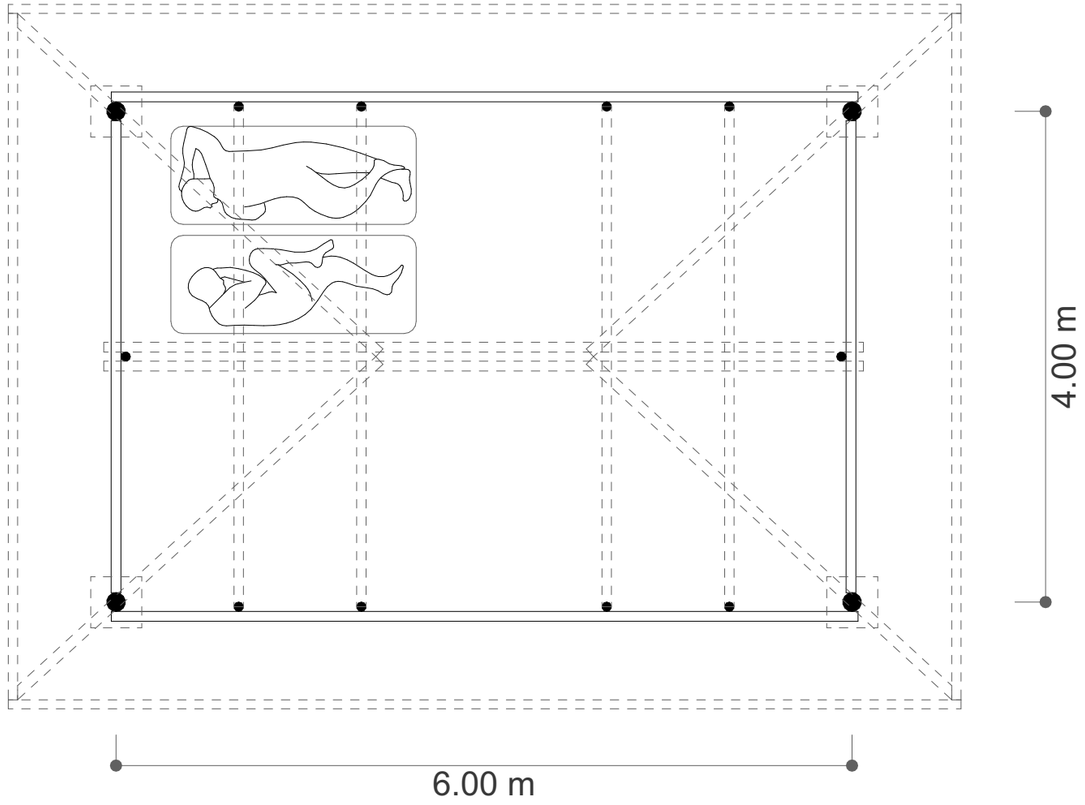
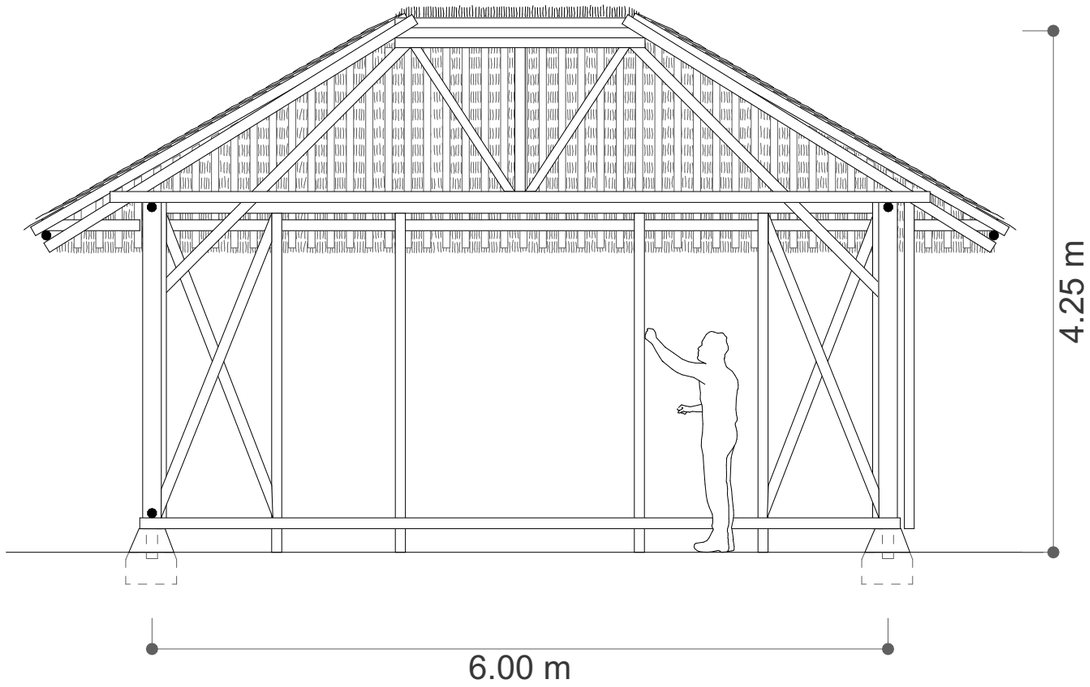
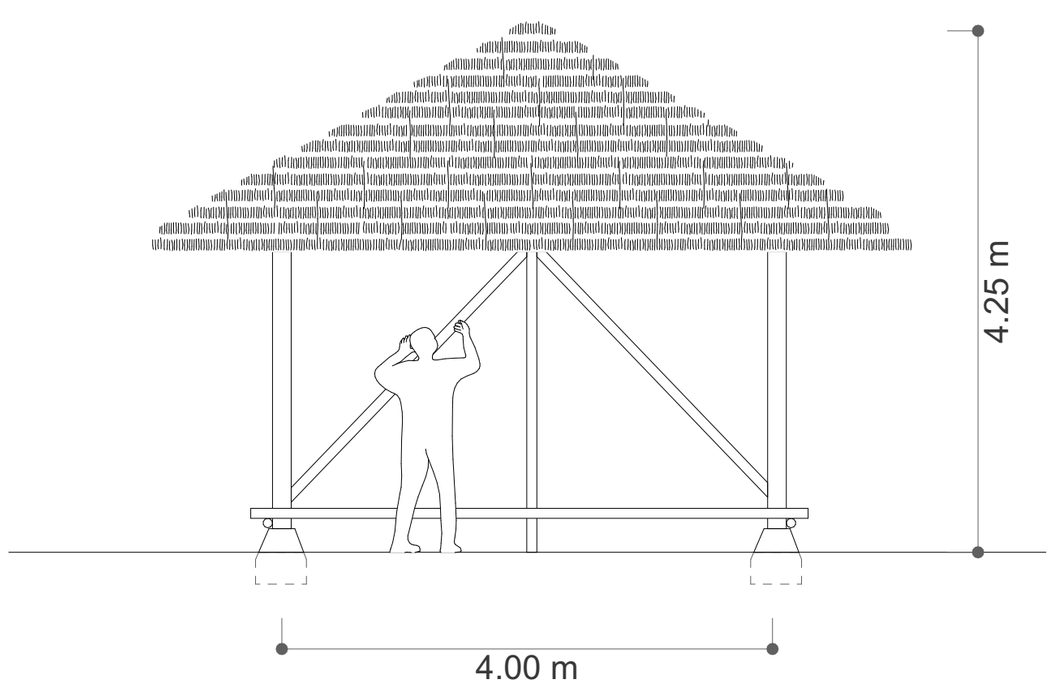


Bamboo Shelter
by
International Federation of Red Cross and Red Crescent Societies





Foundation

Prepare the site, remove obstacles such as stones and flatten the ground.

Mark the position of the foundations. It is a rectangle if the diagonales have the same length.

Dig the holes for the foundation about 40 cm deep.

Insert the four main foundations and cover them well with the surrounding gravel.

Primary Columns

Leave the secondary foundation holes. Cut indentations for the roof into the four main columns.

Mark the indentation at the upper end of the columns using a pen.

Cut the indentation using a saw. This will form the support for the diagonal roof beams.

Erect the first column.

The column is fitted on top of the steel plug in the foundation.

Erect the next column as well.

Beams

Use a rope to knot the horizontal beams to the vertical columns.

Make sure to leave enough space for a second beam below the first.

Tighten all knots firmly to ensure a stable connection between all elements.

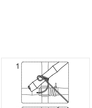
Repeat this for the upper beam.

Repeat the steps for all elements. Knot together the upper beams where they meet.

Use an extra piece of rope to ensure a solid connection between the two beams.

Secondary Columns

Attach the secondary columns to the beams using the same knot as shown before.



Wrap a plastic bag around the foot of the columns to protect against humidity and pests.

Make sure water runs off when covering it with gravel.

Repeat this step for all elements.

The final shelter will have openings for windows and doors.

Bracing 1

Add the first diagonal bracing.

Apply the steps to both ends consecutively. First mark and cut the slant in the bamboo.

Carve the notch for the rope and a slit so that the elements fit into one another.

Attach the bracing at the lower end using a piece of rope.

Use a second rope to secure and tighten the first knot.

Repeat the same for the upper end. The final joints look like this.

Bracing 2

Add the second diagonal bracing.

First cut the upper ends of both bracing elements as shown before.

Then connect the bracings with each other using a piece of rope.

Use two more ropes to tighten the first knot and connect to the beam.

Knot together the lower ends with the main columns as shown before.

The final joints will look like this.

Bracing 3

Add the third diagonal bracing.

First knot the bracing to the column. The rope should go around at least three times.

Use the rest of the rope to connect the bracing with the beam.

Repeat the same for the upper joint, the final joints look like this.

Repeat the steps for all elements.

Repeat all of the steps for the wall on the back side of the shelter.

The finished structure with all bracings will look like this.

Roof beams

Lay the roof beams for onto the frame and attach it firmly.

First knot the roof beams to each other to prevent lateral slipping.

Then secure the knot to the horizontal beam with an additional rope.

Roof main frame

Prepare the main roof frame on the ground.

Use ropes to make the connections as shown before.

Prepare the main roof frame on the ground.

Use ropes to make the connections as shown before.

Lift the main roof frame up and between the supporting beams. Attach it at the intersections.

Attach the main roof frame to the structure with the same knots as shown before.

Build a platform from wooden planks for easier access to the roof. Avoid planks laying on the ground.

Make sure the planks are sufficiently cantilevered for safety.

Roof secondary frame

Attach the first diagonal roof beam.

Make sure to attach the beam firmly so that it doesn't slip from the corner column.

Add the second diagonal beam and cross it over the first one at the ridge purlin.

Attach the diagonals to each other as well as to the ridge purlin.

Repeat the step for the other side. Add the two short eaves purlins on top of the diagonals.

Knot the short purlin tightly to the diagonal to prevent it from slipping.

Then add the long eaves purlins on top of the short purlins.

Knot them tightly to both the purlin and diagonal roof beam.

Rafters

Use the crossed ends of the diagonals as support for a new ridge purlin.

Make a tight knot to ensure a stable connection.

Attach the rafters using nails.

Nail each roof lath to the purlin and diagonal with two nails. Be careful to avoid splitting of the bamboo.

Finish attaching all of the rafters until the whole roof is covered.

Roof Panels

Create the roof panels. Start by splitting the bamboo into smaller laths.

After splitting, use the knife to clear the laths from sharp edges and irregularities.

Wrap the palm leaves around the lath one after another and attach using the string and needle.

Wrap half of the leaf under and the other half over the lath.

Alternate through each leaf from bottom to top. Make a tight knot in the end to ensure stability.

Store the finished panels in a dry place. Prevent pests and humidity from destroying them.

Start adding the panels to the roof, starting from the bottom upwards.

Use a small piece of string to attach the laths to each of the rafters.

Repeat this for all panels until the whole roof is covered.

Facade

Create the facade. First add the horizontal bars as a primary support structure.

Attach the bars to the structure using the same knot as before.

Next add the vertical spacer studs. Create them by splitting the bamboo as shown before.

Carve a small hole in the beams to insert the studs. The studs should be about 70 cm apart.

Repeat adding spacer studs until the whole facade is covered. Leave window and door openings free.

Finally insert the bamboo planks to create the facade.

Interweave the planks between the spacer studs so that they sit firmly.

Leave the openings for windows and door uncovered.

The finished shelter is now ready for use.