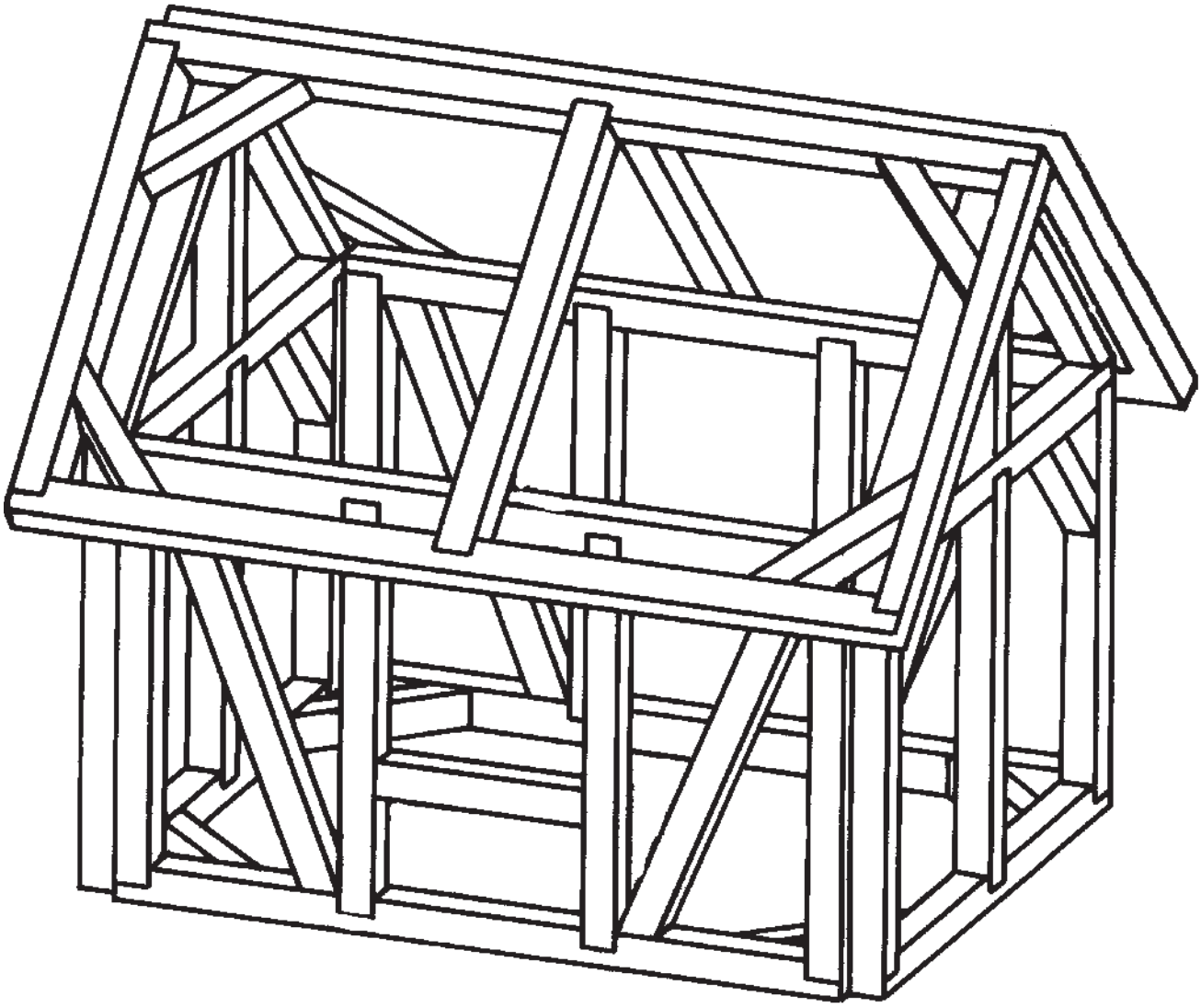
OPITEC

Hobbyfix

108.205

Miniature Greenhouse



Contents:

10	Pine strips	10 x 10 x 300 mm
20	Pine strips	10 x 10 x 250 mm
4	Plastic foil	210 x 300 mm
2	Hinges	12 x 16 mm
90	Brass pins	10 mm

Please Note

The OPITEC range of projects is not intended as play toys for young children.They are teaching aids for young people learning the skills of Craft, Design and Technolo- gy.These projects should only be undertaken and tested with the guidance of a fully qualified adult. The finished projects are not suitable to give to children under 3 years old. Some parts can be swallowed. Dan- ger of suffocation!

MININTURE GREENHOUSE

1.1 Description

The miniature greenhouse is timber framed. The base frame is made of pine strips 10 x 10 mm and consists of 2 side planes, 2 gable planes and 2 roof planes. The surfaces are covered with plastic foil which is nailed on the inside. The 2 roof planes are connected together with 2 hinges and rest on the rafters. The open spaces in the bottom part can be filled in with Styrofoam and painted.

1.2 Didactic Reflections

The task of constructing this miniature greenhouse covers construction and wood working. Groups of 12 year olds should assemble this model. The task offers many different possibilities from both the technical and the educational point of view. Students can plan and build big timber framed models or they can assemble these smaller ones. Talented students are challenged with the more difficult wood connections while less talented ones are happy about the successful completion of easier ones. Besides, this task is very similar to reality.

Before the students start the actual construction of this model they should practice elementary wood connections like the ones shown on diagram No. 1 and 2. Please give your students pine strips 20 x 20 mm for this introductory work. You can use them later for grading.

1.3 Steps

Base frame - side panels

Have the students make a sketch at a scale of 1:1, from which they can tell the length, height and the construction of the sides (see diagram 3).

Note:
At this introductory phase of the assembly the students should not „overload“ the sketch with a number of „unnecessary“ beams. Point out to the students that the finished panels must be identical with the sketch.

Marking and cutting the support and cross beams

Note:
Firstly mark out and cut the longer members to length.
All of the beams of the same type have to be the same length. This can be achieved by marking them simultaneously. (For example: the two side panels have four support beams. The students lay four pine strips down, side by side, and then mark them all at the same time. That way they all have the same length.)

All of the cutting is done with a scroll saw (with size 4-5 blades). If there are any inaccuracies, the students will have to file the ends with a fine file. Experience in Arts & Crafts classes has shown that students quickly develop into „real professionals“.

Marking and completing wood connections

Note:
Again, simultaneous marking of all wood connections ensures more accurate joints and saves time. Here, too, the students should rely on their sketches.

You should mark the joints before you cut them. The support beams and cross beams will fit better if the student files them with a file small enough to fit into the grooves. The sawing as well as the filing should be done on the inside of the groove (see diagram 2).

Gluing the side panels

Note:
The students are not to glue the sides together until they make sure that all joints for support and cross beams fit properly.

Holding the joints together until the glue is dry can be accomplished with rubber bands. Ensure that the parts are held at a right angle immediately after placing the rubber bands around the joints. If the student does not do this, he will experience problems when he has to glue the side panels and the gable planes together. If the students use Ponal express glue they will be able to continue working with the glued parts.

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Making, fitting and gluing the braces

Note:
The best way to mark the angles on the braces is to place a pine strip underneath the brace in the position it will later have in the frame. It is a good idea to mark it with a pointed pencil on the inside of the beam (upper and lower cross beams).

Filing and sanding the side panels

Note:
Make sure the students do not round off the corners when filing and sanding.

Base frame - gable planes and roof planes

Note:
Both the two roof planes and the two gable planes are only repetitions of the basic pattern described above (diagrams 3-5).

For the gable planes the students simply glue two extra strips onto the frame. They represent the two rafters. The two rafters are simply glued bluntly onto the frame. It is not necessary to hold these joints together. The students simply press the pieces together by hand. In order to keep the pieces from sticking to the work surface use a surface to which glue does not stick. Do not put in the posts until the glue has dried.

Base frame - gluing of the four walls

Note:
The gable planes and side planes should be glued together in a way that leaves a small groove (for placement of the clear panels!). The side planes extend somewhat beyond the gable planes. Hold the corners together with clothes-pins until the glue has dried. Make sure to check the right angle. Additional stabilization can be achieved by gluing small braces on the inside of every corner.

Base frame - connecting the two roof panels

Note:
The two roof panels are placed side-by-side and the two hinges are nailed onto them. Using the hinges lets the roof panels adjust to any angle of the rafters.

Clear panels

Note:
Before cutting the transparent sheet make a paper pattern in order not to have any unnecessary waste of material.
When fixing the transparent sheet in place make a small hole for the panel pins with a scriber or bradawl so that they do not slip.
The panel pins may need to be shortened with end cutters by about 1 mm if they come through the framework.

Corner joint

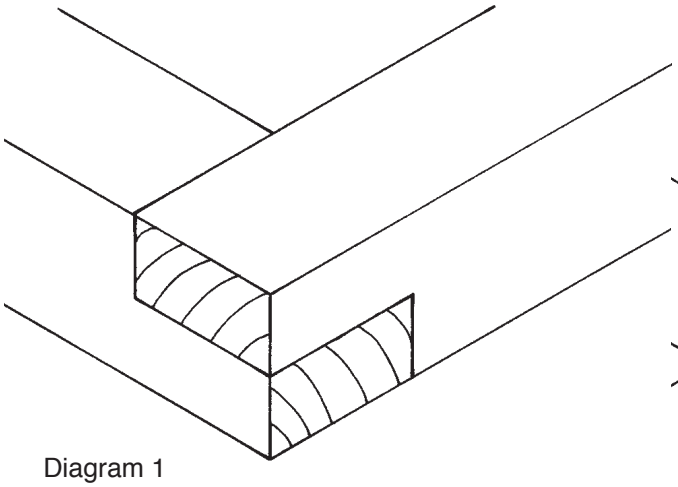

Diagram 1

Cross joint

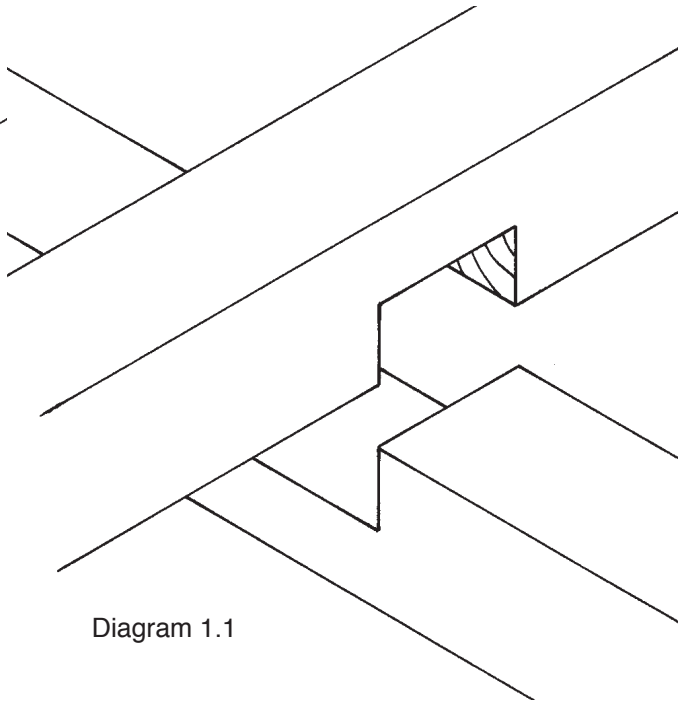

Diagram 1.1

Center-mounted post

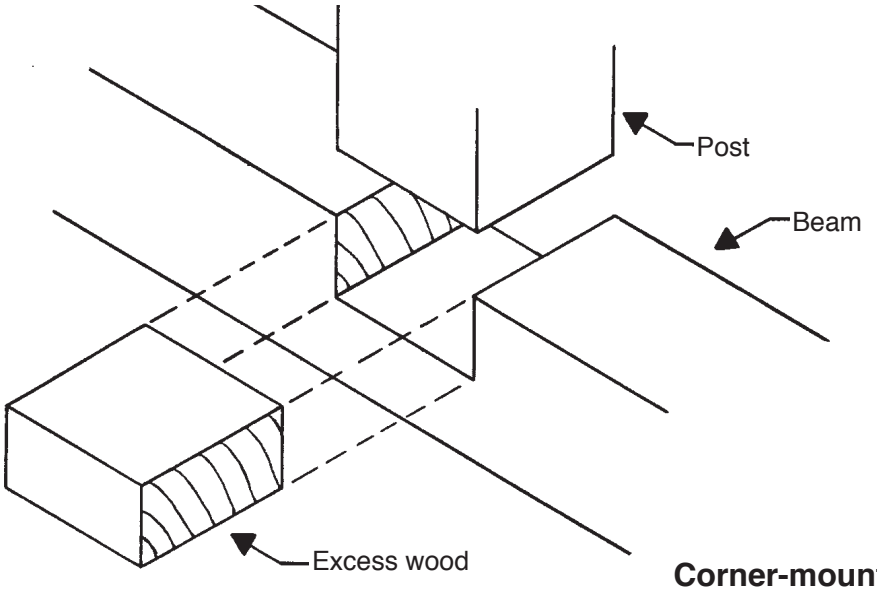

Diagram 2

Corner-mounted post

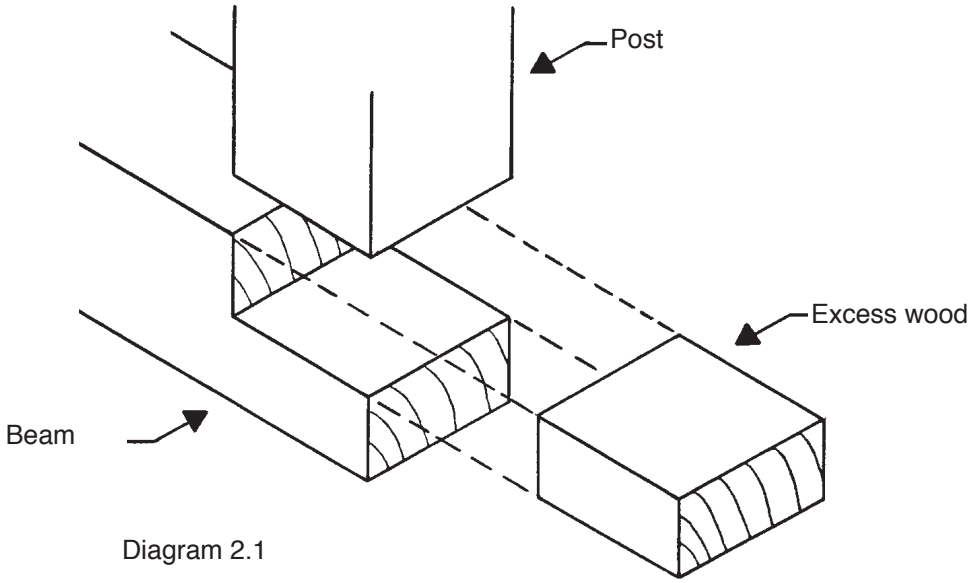

Diagram 2.1

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Side panel

Scale 1 : 1

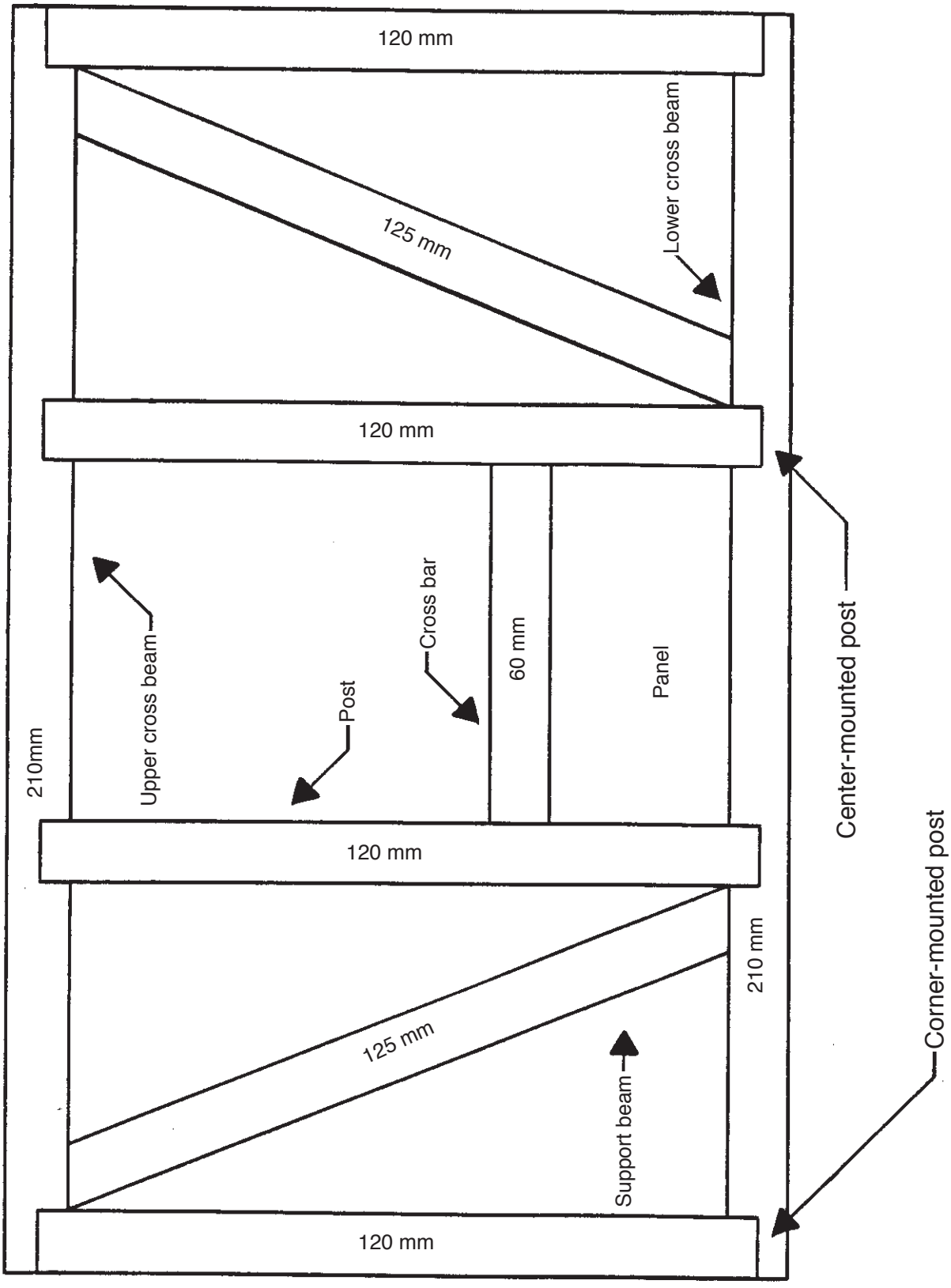

Diagram 3

Gable Panel

Scale 1 : 1

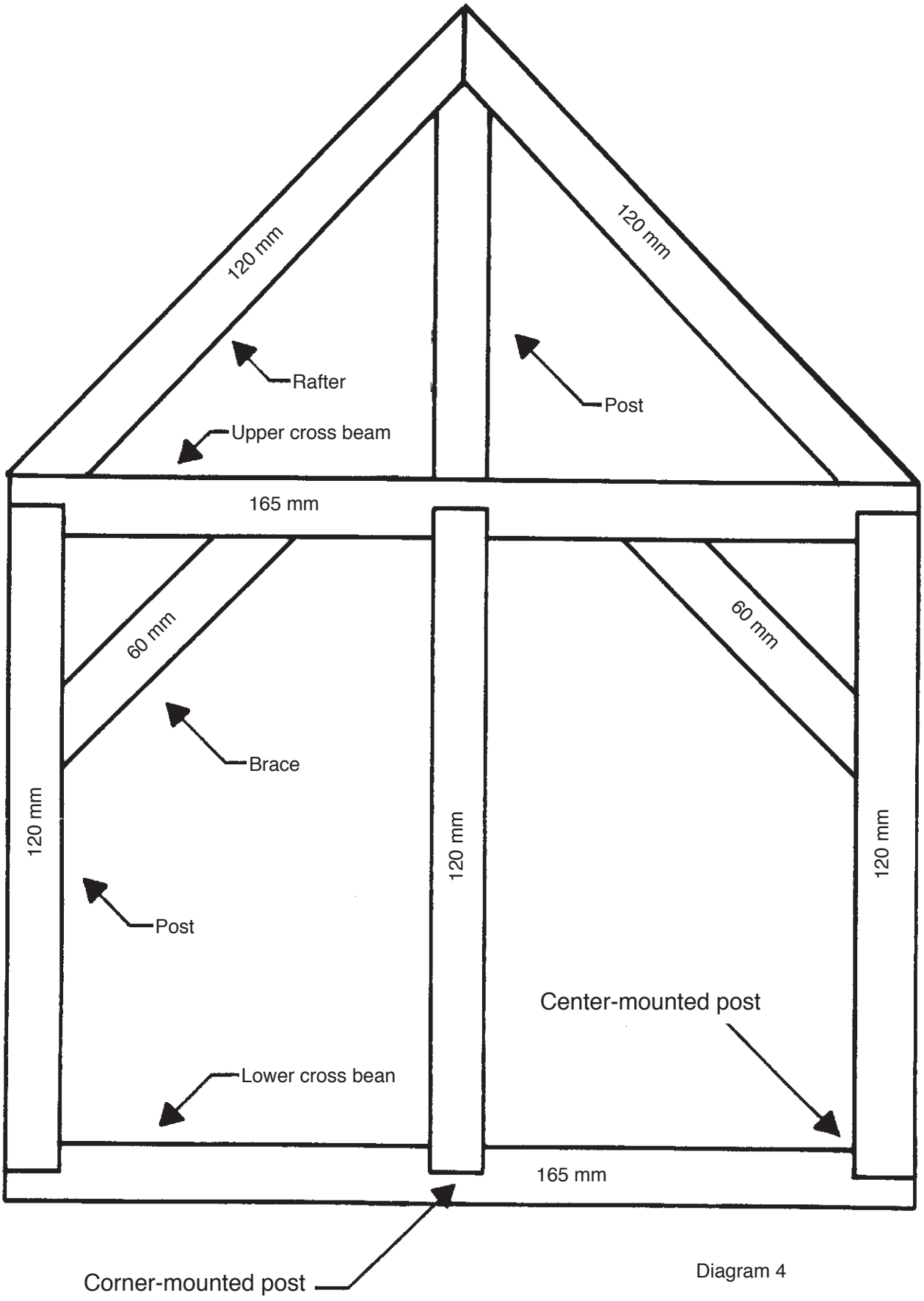

Diagram 4

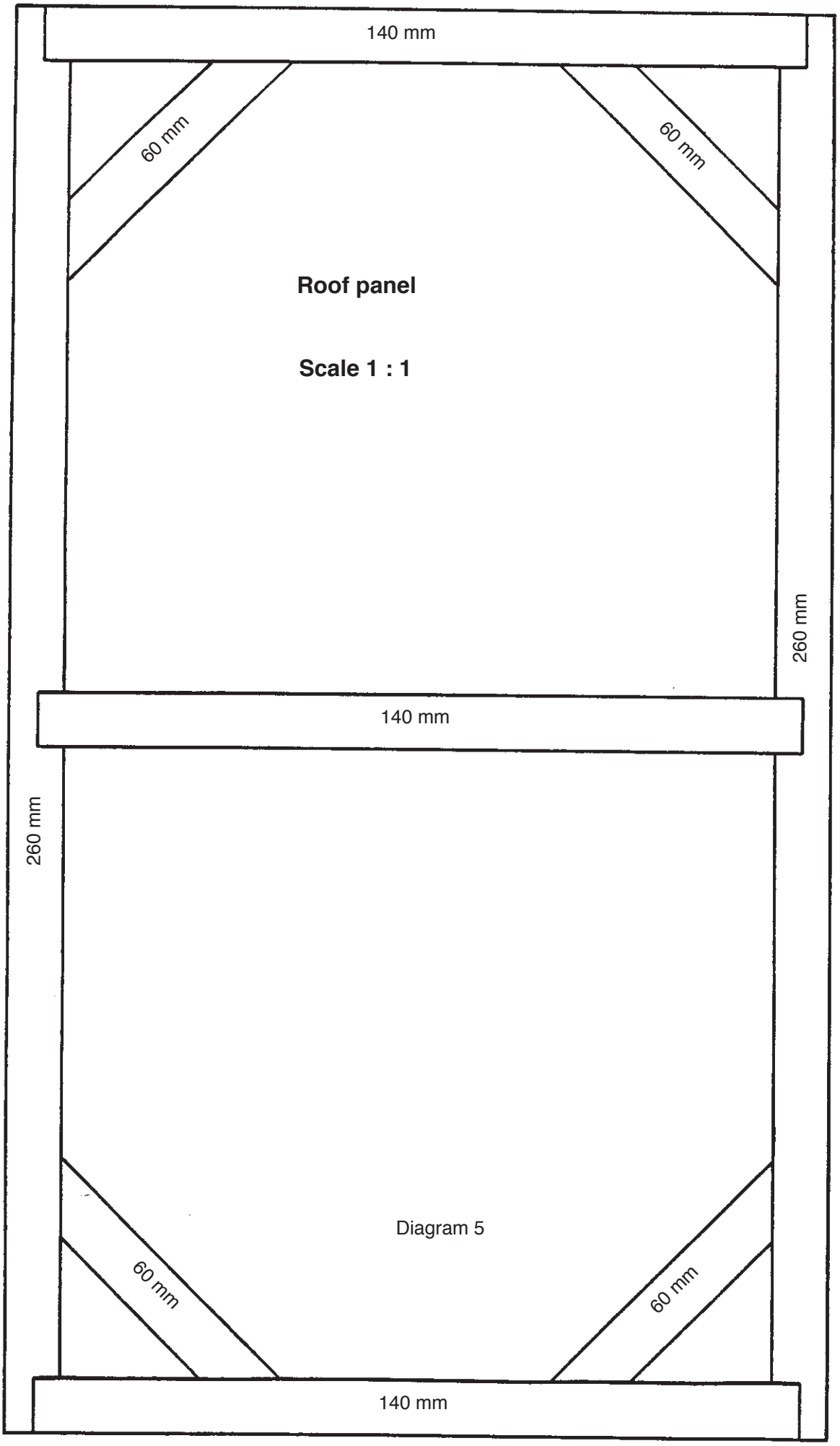
140 mm
60 mm
60 mm
Roof panel
Scale 1 : 1
260 mm
140 mm
260 mm
60 mm
60 mm
140 mm

Diagram 5