

A Living Roof for the Container

1. Outline Design

The design is based on the accompanying document “Build your own Little Green Roof” from RedRoseForest, which is the best of the non-commercial guides I was able to find on the Internet. It is designed for use on a garden shed with pitched roof, but I have been unable to find anything comparable for a flat roof and in any case our roof should have a pitch to assist with drainage. We could not use the container roof anyway as part of the construction as it is not flat, so the proposed design will differ from the one described in the following ways:

- We will create a false roof first, constructed from sheets of suitable plywood, which will be pitched – this in turn will be covered by the EPDM waterproofing (pond liner) as is done for the shed roof in the guide document
- It is probably easiest to make this false roof with a single pitch running from the farther side of the container down towards the front edge (road side) – with a 6inch support at one side this will give a sufficient slope for drainage and is effectively one half of the roof described in the guide document
- The living roof described in the guide document is not actually attached to the shed roof, but we will bolt ours to the 4 lifting hooks on the container to avoid it being lifted by wind

2. Detailed Design and Construction

The annotated photograph will give some idea of the appearance of the roof. The false roof is hidden behind a facing panel at either end to provide additional stability and prevent the structure being lifted by the wind. The main components are described below.



False Roof

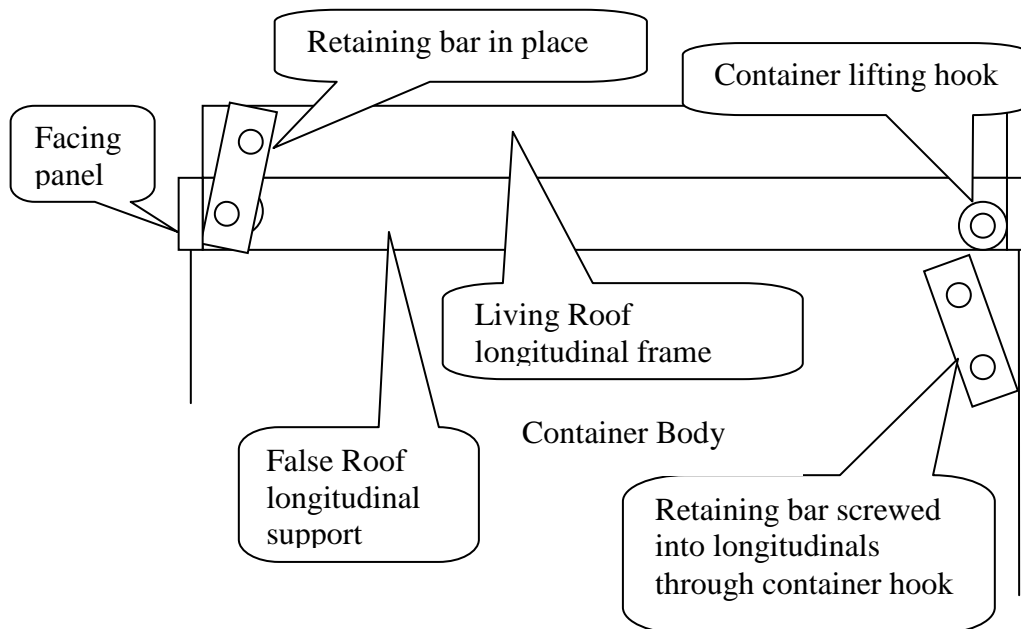
An accompanying scale drawing shows the elements of the construction of the false roof. We will use sheets of suitable plywood for the base, supported at 3 points by 3 longitudinals, a 6inch x 2inch length of wood for the back support with intermediate 4inch x 2inch and 2inch x 2inch lengths. This design was arrived at taking into account the

issues of availability and preparation of materials and the ribbed roof of the container. The actual roof will be shorter than the length of the container in order to accommodate the 2 facing panels made of 6inch x 2inch lengths.

We should assemble the false roof on the ground and then hoist this into position on the roof of the container. This will allow for the secure screwing of the plywood sections onto the wooden frame, painting the assembly with weatherproof paint followed by covering with the pond liner as discussed for the garden shed roof in the guide document. The facing panels are fitted after the living roof frame is in place.

Living Roof

The living roof frame is based on the materials described in the guide document, i.e. 6inch x 2inch wood lengths for the external frame and 4inch x 2inch lengths for the internal frame. Given the dimensions of the container we should probably aim for 3 longitudinal dividers and create a mix of 3 and 4 internal compartments similar to the roof illustrated in the guide document. The frame for the living roof can potentially also be part-assembled on the ground and then laid in place on top of the false roof. Note that, as discussed in the guide document, the frame is not directly attached to the false roof (to maintain the integrity of the waterproof liner). In our case the whole assembly is held securely on the container by means of the lifting hooks as follows:



The diagram shows the view of the back of the container (away from the road). The hooks at the road side are used to secure the front longitudinal of the living roof frame only. The retaining wooden bars are shown angled to avoid the side panels of the living roof frame because the container lifting hooks are close to the edge. The facing panels for the false roof are added last of all, being screwed to the longitudinal supports of the false roof and to the living roof frame where they overlap (at the front, road-side of the container). Once secured, the frame can be finished in situ and the compartments filled with growing material as discussed in the guide document.

3. Scale Drawing

This should give a good idea of the components of the false roof. The most critical measurement is the inside distance between the lifting hooks across the width of the container, between which the whole assembly must fit. This has been measured as 241.5cm as shown on the sketch but should be verified before construction is commenced. The length of the container is not as critical as some overhang can be tolerated and is probably necessary because of the position of the lifting hooks in order to insert bolts. It

has been measured at 314cm, and taking into account the width of the facing panels the actual width of the roof is shown at 304cm but this should be verified before assembly. The plywood will comprise several sheets as discussed below, and it may be advisable to support the joins with intermediate strapping as shown in the diagram, e.g. using 2" x 1" wooden sections.

4. Materials List

The following is an approximate list of materials:

Component	Description	Notes
False Roof	3 x sections of 18mm ply, 2 of 122cm x 242cm, 1 of 60cm x 242cm	See note below. Sizes need to be checked as discussed above.
False Roof	1 each 304cm length of 6" x 2", 4" x 2" and 2" x 2"	Using imperial sizes or metric equivalents depending on availability of wood.
False Roof	EPDM waterproof liner to fit approx 260cm x 310cm	Allowance for overlapping (could probably live with 2.5m width but length is more critical)
False Roof	Optional 6 x 75cm lengths of 2" x 1" strapping	Measurements approximate (cut to fit)
Facing Panels	2 x 241.5cm lengths of 6" x 2"	
Living Roof	2 x 242cm + 2 x 294cm lengths of 6" x 2"	Outer frame. Again, sizes need to be checked.
Living Roof	3 x 294cm + 10 x 72.3cm lengths of 4" x 2"	Inner frame, sizes approximate (cut to fit)
Living Roof	Compost and perlite mix (approx 800litres)	At 2:1 this is 270 litres of perlite (3 x 100litre bags), compost is from our supply
Fastenings	6 x 15cm bolts	Fit to container lifting hooks
Fastenings	2 x 30cm + 2 x 15cm lengths of 4" x 2"	Retaining bars as shown in diagram
Fastenings	4 x 90° angle brackets + assorted 5" and 2" screws	As discussed in guide document
Fastenings	Further 5" and 2" screws	Fix plywood sheets to longitudinals for false roof and attach facing panels

Notes:

- 1) B&Q sell spruce plywood (18mm thick) in sheets of 244cm x 122cm suitable for external use (at £30 a sheet online). This has been used as the basis of the above. The list of materials includes provision for supporting the joins between the sections with other softwood sections.
- 2) Again using B&Q as an example, the metric sizes of 50mm, 100mm and 150mm with thickness 47mm are available in a variety of lengths including 2.4m and 3m. Care will be needed to match the sizes needed to availability of supplies.