



The house that worked out

Is this home Australia's first council-approved cordwood residence?

We came across cordwood building accidentally. We were in the dreaming-about-it stage of house building and trawling the internet for inspiration when we stumbled across a photo of a darling little house fit for hobbits. It was a cordwood house. A few more clicks and we came to Rob Roy's website; he has published a number of books on the technique and runs workshops at his Earthwood Building School in the USA.

We are not builders; we have no prior experience with building. We are city-

BY PETER ROBEY

folk, born and bred. Yet over the next five years, we completely changed our lives and are now living in the country in a house we built with our own hands. Again and again throughout the whole building process, we were gobsmacked when a process actually *worked*. For this reason, we call our house 'The House That Worked Out,' and to the best of our

knowledge, it is the first council-approved cordwood house in Australia.

The House That Worked Out is based on Rob and Jaki Roy's own home 'Earthwood,' with changes to suit our climate, personal style, and the Building Code of Australia. It was completed to a livable state in two years and received final council approval within three years. In this time, we only used three contractors: Billy '5mm Bill' the concreter to ensure we had a level footing to start with; a plumber, because the Building





Code of Australia requires this; and an electrician. Other than this, we built the house entirely by ourselves (with the sometimes questionable help from our then young sons), everything from raising the frame to fitting the kitchen.

Approval process

After hearing other people's nightmare stories when it comes to having an unusual owner build approved, we were surprised at how simple the approval process can be. We were required to have an engineer stamp the plans to approve the structure – a simple one week process.

For code approval, we used an independent building surveyor and would encourage anyone to do the same. Our surveyor was familiar with the qualities of cordwood and had no issues with approving it. Another simple one week process.

The building surveyor is responsible for paperwork and answering any questions that YouTube can't. The Building Code of Australia only requires an on site visit from the (council) building surveyor three times: to inspect the footings prior to concrete slab pour, the framing prior to walls and roof, and a third visit for final completion.



Framework

Cordwood can be used structurally (Earthwood is an example of this), but we took Rob's advice and built post and beam frame infilled with cordwood. We did this mainly because it is so much easier to have a post and beam frame approved by council, but the frame was also an advantage in other ways, providing attachment points for the roof, helping us keep the alignment of the cordwood walls true, and meaning that future projects such as attaching a porch roof to the house will be straightforward.

The framework of The House that Worked Out is made up of 24 Australian hardwood posts, plus a monster 900mm-diameter stringybark eucalyptus central



Top: The house sits snugly on its site with easy access to both levels.

Centre: Bedrooms are upstairs.

Left: View from kitchen to living area.



column weighing three tonnes. The central column came from a tree on our property, which needed to be moved for our house site, and when we found out how much a steel column would cost, we asked our engineer if we could use our monster tree instead. Sixteen (much smaller!) stringybark posts are arranged in an outer ring of the timber frame, which is enclosed in the cordwood walls, and a further eight round posts of celery pine form an inner ring, which is mostly left exposed and visible inside the house.

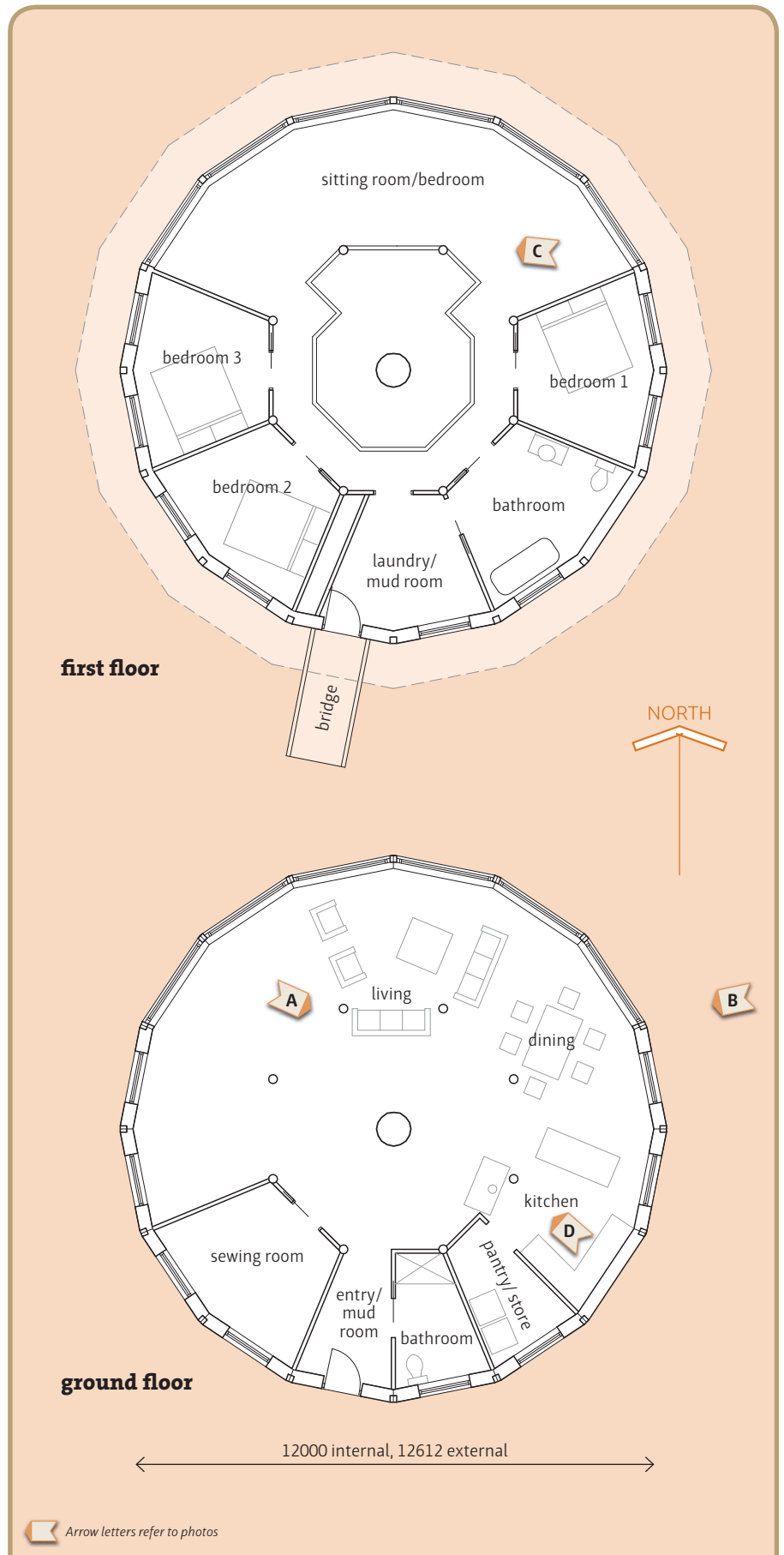
Earth roof

Getting a roof on after the posts meant that we were then able to commence building the walls regardless of weather conditions (though there were many cold winter mornings when we wished this was not the case!).

It took three months to build the house frame with the roof waterproofed in five months. The roof didn't become an earth roof for a year; we had more urgent jobs to do than carry soil in buckets onto the rooftop. After the walls were completed, we went back to the roof.

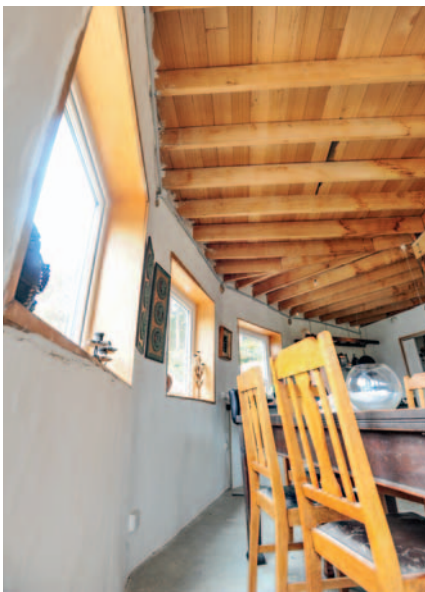
We cut expanded polystyrene insulation to fit our 16-sided roof. We would have preferred extruded polystyrene, which is firmer and can tolerate more compressive forces than expanded polystyrene, but the price was astronomical. After discussing pros and cons with a polyfoam specialist, we decided to risk the expanded polystyrene. It was very time-consuming, cutting the rectangular pieces to fit, but, finally, it was done and we covered the roof in a layer of gravel for drainage.

It is recommended that an earth roof have at least 100mm of soil to support life, but our engineer was worried about the weight of saturated soil and only approved us for 20mm. We currently have some *Carpobrotus rossii* on the roof, a native succulent plant commonly





Anticlockwise from above: A serious test of thermal performance; massive central pole; internal walls have been rendered.



known as pigface. It appears to be coping with such a thin covering of soil and has recently started flowering.

Cordwood walls

Cordwood is a building process whereby 'cords' of wood are laid transversely across two rows of mortar; insulation is placed in the gaps between the mortar walls.

After building a 'test-run' cordwood cabin, we *seriously* considered not building our main house out of cordwood. It is very time-consuming, both in the initial build as well as in the post-build work; the cordwood logs shrink in the

mortar over time and the gaps that form need to be re-filled. We investigated many other types of building, including straw bale (no thermal mass in walls), poured earth (no insulation in walls), and monolithic domes (great mass and insulation, but more specialised equipment required and difficult to use internal space effectively).

In the end, we came back to cordwood; it is cheap, the combined mass and insulation of the walls provide an excellent internal climate, and cordwooding is so easy, even no-clue-city-folk (i.e. us) can learn to do it. We have built other outbuildings with cordwood and will continue to do so.

We stopped counting after our 850th wheelbarrow of mortar for The House that Worked Out. The mortar was mixed in a mixer; some alternative builders extoll the virtues of mixing mortar and mud by hand, but we've tried that, and we both preferred the noise of the mixer to the noise of each other grumbling and groaning whilst mixing by hand. We had trialed a lime mortar before building this house but settled on a concrete mortar for the House that Worked Out and are much happier with the results.

Native Australian wood is almost wholly hardwood and not suitable for cordwooding, so we used plantation pine logs (Radiata pine, also known as Monterey Pine in North America). The logs came to us already mostly debarked, which was an unexpected bonus. We

chainsawed them into 300mm lengths and split the logs; we had used whole rounds in prior cordwood projects and experienced large gaps in the mortar around the logs after drying, so this time, we only used splits with better results. We used rice hulls for the insulation infill. The cordwood process took us a year.

Rendering

One of the benefits of cordwood walls is that no extra finishing is required: no plasterboard, no plastering, no painting. Many people get very creative with their cordwooding, including coloured glass bottles and interestingly-shaped logs in the walls, even shells and pebbles. We love the look of cordwood externally but prefer a plainer look inside the house, so we rendered the internal walls with a lime plaster.

There is little information on the internet about rendering cordwood walls; it was a trial-and-error process, but we love the finished effect, which is quite like adobe. The walls dried to a coffee colour, which was quite pleasant, but we decided we wanted the house to be lighter, so we covered the walls with a homemade limewash.

Internals

There are many advantages to a round house, but internal design layout is not one. We talked vaguely throughout the build about what would go where, but our main focus was to build a structure; the interior would just have to work itself out. The house is mostly open plan, but we wanted a few separate spaces: the



bathrooms, the bedrooms, the laundry. It was easiest to build internal walls along the lines of the joists and rafters, radiating out from the centre of the building.

The resulting rooms are oddly shaped, without a 90 degree angle to be seen. This made furniture placement very challenging and in some cases, we built the furniture in. The internal walls are standard plasterboard. Early in our project, we discussed internal straw clay walls, but towards the end, we were keen to take the quickest option. The northern aspect of the house is all open plan, both upstairs and downstairs, with standard 'closed-in' rooms built in a semi-circular fashion on the southern aspect of the house.

Features

ACCESS

The House that Worked Out is cut into a slope and has an external bridge which allows level access to the second storey. This was a godsend for getting the logs and mortar to the second level. It also ensures we can access the whole house if we ever have difficulty with stairs.

A bridge was on our list of something every house should have. It cost about \$50 and is made from three treated telephone poles about 300mm in diameter purchased for \$10 each. The crane truck delivering the three poles hoisted the two poles across the ravine of the slope and into place. The third pole was cut in half to be uprights out on the slope. We used bush poles from the property next to the house as balustrading.

Above and right: The balustrade on the upper level overlooks the living areas below through the central void space.

SOLAR PASSIVE DESIGN

The living areas are in the northern aspect of the house, and the bulk of our double-glazed windows are on the north side. We notice a massive difference in the warmth of our house compared to neighbours' homes where solar orientation has not been taken into consideration.

SERVICES

We are solar powered and completely off the grid.

Our water catchment and tanks are up a hill so that water is gravity-fed to the house. Solar hot water and a wet jacket in our combustion stove supplies our hot water in winter.

Living in the house

We have lived in the house for two years. The thermal mass in the walls keeps the house cool in summer. The house is easy to heat in winter; on sunny winter days, no extra heating is required and we smugly notice smoke coming from chimneys of other houses in our valley. Every room of the house is light and airy.

There is a feeling of connectedness in a round house; we visit the peripheries but we are never far from the main hub. We believe this contributes to our closeness as a family.

We owe a lot to Rob Roy. His books on everything from timber framing to



cordwood masonry were invaluable; they gave us the motivation to 'give it a go' as well as giving us all of the practical information we needed to actually build a house – PLUS, they are personally signed by the author! We recommend them highly.

We tried to think of any changes we would make to our house if we could, but we couldn't think of anything we would change. It truly is The House that Worked Out. ♦

You can find more information and photos of Peter's cordwood house on: www.thehousethatworkedout.com



Links & resources

♦ The House That Worked Out

The story of how our family escaped the city and made a life in the country. Book in progress!

www.thehousethatworkedout.com

♦ Alan Kirk

Architectural drafting and energy rating, Bonnet Hill, Tas.

03 6229 2202

♦ Rob Roy

Earth building school and related publications.

www.cordwoodmasonry.com