

Full Circle Shelter in Puerto Rico

Dennis Fry

SIMPLICITY IS WHAT A SMALL HOME IS all about — simple to build, low cost, easy to clean and maintain, no excess or wasted space, and built to fit into its environment.

Our vacation house in the mountains of Southwest Puerto Rico was designed specifically for its location.

Large double doors all around open fully to take advantage of the mountain breezes. A covered outdoor living and dining space provides shade and allows use even when it rains.

Guests can enjoy the warmth of the tropical sun while taking an outdoor shower, or shower indoors when the evening breezes are cool. With a daily temperature range of 60 at night to 85 in the daytime, there is no need for heating, insulation, or air conditioning. Ceiling fans keep air moving and screened transoms allow for good airflow in the humid climate.

This little house is round, or actually a dodecagon (12-sided). The round shape is the strongest shape in a hurricane prone area. The shape is also material- and cost-efficient, requiring less wall area to enclose the same floor space than any other shape. Building as a polygon rather than a true circle allows the easy use of standard commonly available building materials. Each wall is built 5 cement blocks long and 7 blocks high. We used standard 6" blocks with the first course mortared to the floor to establish level. The remainder of the wall blocks are dry stacked with no mortar.

Corners and alternate cores are filled with concrete and rebar. The building is then coated inside and out with a surface bond stucco containing fiberglass strands. The finished walls are then painted. The roof is wood, framed in a spider web fashion with main rafters coming in from each "corner" to a steel ring in the center. Cross rafters 24" on center support the treated T111 used for roof sheeting. The textured, grooved side faces the inside and serves as a finished ceiling. Metal tie straps, stretched over the rafters and attached to anchor bolts in the concrete, tie the roof down to the walls.



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The wood roof was used both for ease of construction and to avoid having concrete overhead in the event of an earthquake.

We taped the outside of the roof joints with mesh tape and roof joint seal compound. The roof is coated with two coats of painted-on elastomeric coating, which provides a white, reflective, water-proof surface.

Roof maintenance is simple — wash the surface down and recoat every 3 to 5 years. A clear Plexiglas dome is located in the center of the roof over the steel ring, which provides a weather seal where all the roof parts come together, as well as allowing natural light into the building.

Doors and windows in Puerto Rico’s tropical environment must allow air and light in, but must also be fully closeable against storms. Our cabin has no glass windows or screens, but rather tongue-and-groove wooden door and window shutters. In our area of the island there are very few mosquitoes or pests to screen out. Glass windows would only block the breezes and would have to be shuttered or boarded in hurricane force storms.

The outside covered patio, as well as a small wooden deck off the main bedroom expand the living area.

A full inside bathroom with shower, two bedrooms, kitchen, and living room area make up the floor plan. The round design allows an open floor plan with no hallways, so there is virtually no unused space.



With a queen bed in the main bedroom and full-size futons in the second bedroom and the living room, there is sleeping space for up to six people. The kitchen is fully equipped with everything except a full-size range. Water is supplied by the municipal water system and heated with an on-demand electric water heater. Electrical service is a standard grid system using an average of 135-kilowatt hours per month while being occupied about 50% of the time.

The whole house has ceramic tile floors and painted walls with a natural wood ceiling, making cleaning and maintenance easy.

The design of this house is very economical to build and is variable in size by simply making each wall and each roof rafter longer. With 12 sides each 5 blocks long,

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the house is 520 square feet. Making the walls each 6 blocks long would increase that to 730 square feet. I have had so many requests for plans that I developed full plan sets for these buildings in 3, 4, 5, and 6 block sizes.

By doing most of the building labor ourselves, we were able

to build this small home for just under \$35 per square foot, completely finished. Labor time to build the cabin was about 8 weeks total, spread out over a year-and-a-half as time allowed.

Floor Area: 512 sq. ft / 48m²

 www.fullcircleshelters.com



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