PACIFIC DOME

VITAL STATISTICS

Geometry: 3-frequency geodesic, 5/8 sphere, icosa-alternate breakdown, vertex zenith

Diameter: 24'

Weight: (not including floor) 2050 lbs

Volume: about 4400 cubic feet

Floor area: (not including lofts) 452 sq ft

Note: volume is a far better measure of living space, especially in a dome, as you'll not be confined to the floor area.

Date built: 7 domes, fall and winter, 1968, in California hills

DOME INGREDIENTS

–12 pieces 4' x 7' plywood for small triangles
–24 pieces 4' x 8' plywood for large triangles
–6 pieces 4' x 9' plywood for extra-large triangles
} subtract for windows. You can also use galvanized steel or aluminum.

–about 750 lineal feet 2 x 3's for struts (of 8' and 10' lengths). Figure the proper number of each to order.
–61 hubs, cut from sections of pipe
–about 500' stainless steel strap, about 400 stainless steel buckles
–about 20 lbs 4d or 6d hot dip galvanized nails
–quantity of window material up to you
–12 tubes of caulk
–2 1/2 gallons primer, 2 1/2 gallons finish coat paint
–misc. materials for vent, door, etc.
–floor materials not included
–35 sheets 4' X 8' X 1" Dorvon insulation foam

Type of materials we used

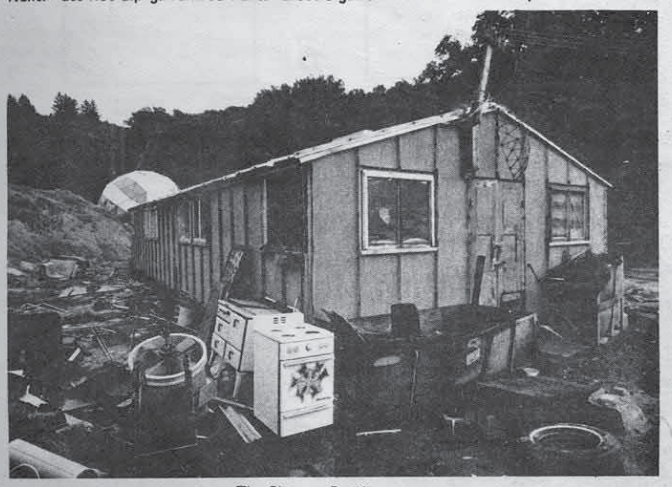
Struts: kiln dried 2" x 3" douglas fir without large knots. You don't need clear lumber, but there should not be knots that will be structurally weak. Kiln dried wood is about twice the cost of green wood. We used it because it will not shrink once in place. However, reasonably dry lumber will do. The difficulty here is shrinkage causing distortion causing leaks.

Plywood: U. S. Plywood "Duraply" is the only plywood I know of that has a lifetime (of the building) guarantee to not de-laminate, etc. It is impregnated with resin and surfaced with a waterproof paper designed for paint application and waterproofing. Any other plywood will not hold up to direct sun exposure for any length of time, so this type should be used unless you are going to cover the exterior with something other than paint–such as sprayed-on fiberglass, or shingles.

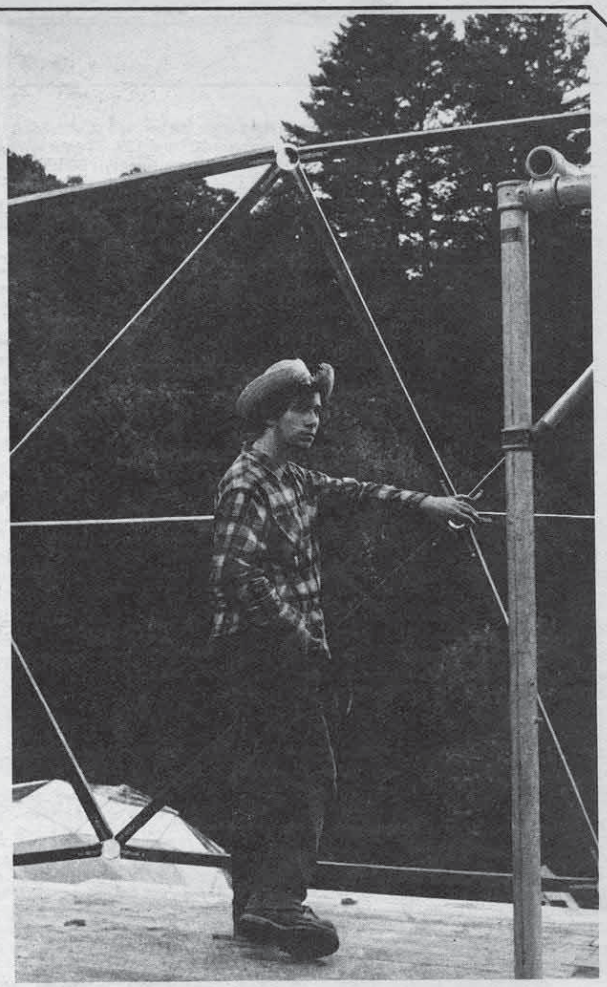
Hubs: we got some 10 lengths of 3, 1/2" (outside diameter) 1/2" wall aluminum pipe from a surplus yard, cut it on a band saw into 2 1/4" lengths, filed down the edges so pipe wouldn't cut into strap or hands.

Straps and Strapping Device: If you can get the strapping tools, and have access to a drill press for drilling struts, this is a simple and quick way to frame. The 1/2" straps and buckles are stainless steel which does not corrode. If you get a strapper, there will be instructions on strapping technique with it.

Nails: use hot dip galvanized nails. Electro-galvanized nails rust badly.



The Shop at Pacific.



BUILDER'S INSTRUCTIONS

Cutting Struts: You need either a radial arm saw or much patience and care. A radial arm saw allows you to cut all pieces exactly the same length.

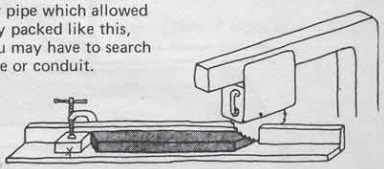
General instructions on cutting

1–First cut boards in half for easier handling.
2–Check carefully the first one you cut at a new setting; the length with a tape measure, the angle with a protractor. If it is perfect, then cut the rest.
3–About every 10 cuts, check stop-table mark. The stop tends to creep along the table as the wood bumps it.
4–Sweep sawdust off table frequently. It tends to collect along fence and against stop.
5–Make some extras of each length just in case.
6–Saw smoothly and slowly.
7–Wear goggles.

Table of struts: make a large, clear copy of this and post by the saw.

Strut	Number to cut	Length, using 2 5/8" diameter hubs *	Axial Angle both ends	Angle at which you set radial saw
A	30	47 9/16"'	80°	10°
B	55	55 15/32"	78°	12° *Check shop yoga*
C	**80**	56 3/4"	78°	12°

Strut lengths here are based on 2 5/8" outside diameter hubs. This diameter is determined by tight packing of six struts of 1½" width (Actual measurements of a 2" X 4" are 1½" X 3½"). In our first domes, however, we used surplus 3½"outside diameter pipe which allowed the struts to slip around; when tightly packed like this, the dome will be much stronger. You may have to search around to find the right diameter pipe or conduit.



Radial saw

Angle: use an adjustable protractor to double check the saw's gauge. Hold it against fence, pull blade out and check to see that blade parallels protractor.

Length: tape measures are made to hook over a piece of wood. For greater accuracy, use the 1" line on the tape measure and line it up with inside of saw blade. Add 1" to total measurement when setting stop. V-mark stop and table and check the stop for slipping periodically while sawing.

Make sure table and fence are made of clear straight wood. Close one eye and sight down the fence.