DOUBLE SHADE STRUCTURE WITH METAL ROOF

DIFFICULTY:
VERY COMPLEX

4 VOLUNTEERS

6 HOURS

MATERIALS

PREP

(2) 4x4x12ft boards

(6) 4x4x10ft boards

(16) 2x6x8ft boards

BUILD

(9) 80lb bags of concrete

(6) 4x4x10ft boards

(8) 4x4x36" trapezoids

(16) 2x6x8ft boards

(8) pieces corrugated metal roofing panels

(16) .5"x8" galvanized carriage bolts

(16) .5" galvanized nuts

(16) .5" galvanized washers

5lbs 2 .5" deck screws

(16) H2.5A rafter ties

(8) LS30-R skewable angle braces

2lbs 1 .5" N8 nails

5lbs metal roofing screws

Tools listed on page 2

PREP LIST

1. Sort materials into piles by like items to ensure you have materials needed to complete project. ☐
2. Take (2) of the 4x4x12ft boards. Cut each into (4) 36" pieces, for a total of (8) 4x4x36" pieces. ☐
3. Do NOT cut the following: (6) 4x4x10ft boards ; (6) 2x6x8ft boards. ☐
4. Angled Cuts: Take the (8) 4x4x36" pieces cut in step 2. Set the miter saw to 45° and cut the angle off of both ends of each piece, for a total of (8) 4x4x36" trapezoids. ☐

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TOOLS

PREP

Miter saw
Pencil
Tape measure
Carpenter's square
Safety glasses

BUILD

Level
Marking paint
String line
Drill
Tape measure
Pencil
Hammer
Ladder
.5" long drill bit
Screwdriver bit
.75" socket with ratchet or .75" open-ended wrench
Safety glasses

BUILD LIST

1. Sort materials into piles by like items to ensure you have materials needed to complete project. ☐
2. Use the (6) 4x4x10s as the posts. Each post will be buried 2 feet in the ground with concrete. The footprint of the shade structure is 14′ long by 6 .5′ wide. Holes need to be 24" deep with about an 8" diameter. ☐
3. Your posts need to be level both side to side and front to back. They also need to be in a straight line with proper alignment, a string line can be helpful for this. ☐
4. Allow concrete to set for several hours before moving on to the following steps. ☐
5. Take eight 2x6x8ft boards and lay them on the ground. The 2x6x8 boards will meet in the middle of the center post and run parallel with the long side of the structure stretching roughly 10" past the outside posts. The 2x6x8 boards will run on BOTH sides of the 4x4 posts. ☐
6. Raise the headers to the tops of the 4x4 posts and level them (keep in mind the tops of the posts might not be exactly the same height, it is not necessary). Attach the headers to the posts temporarily with 2.5" screws. ☐
7. Using the long .5" drill bit, drill 1 hole through both 2x6x8 headers and the 4x4 post in order to fit the 8" carriage through this hole. On the center posts, each set of headers will get a bolt (so 2 bolts per center post). ☐
8. Now you'll place a carriage bolt through each hole you've drilled (there should be a total of 8 holes- 1 through each corner post and 2 though both center posts). Put the carriage both through the hole so that the head of the bolt is facing outward and the washer and nut are on the inside of the structure. ☐

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BUILD LIST

9. Next you'll attach the 4x4x36' trapezoid braces. Make sure the 45 degree angle sits flush with the 4x4 post but also passes through the 2x6x8 headers. You'll attach the lower end of the 4x4 trapezoid brace to the 4x4 post using the angled brackets and the 1.5" nails. ☐

10. On the higher end of the trapezoid brace, you'll again use the .5 long drill bit to drill a hole through both 2x6x8 headers and the 4x4x36" trapezoid brace. Place a 8" carriage bolt through this hole and attach using a washer and nut, again making sure the head is on the outside of the structure and the washer and nut are on the inside. ☐

11. Next you'll layout the remaining eight 2x6x8 rafters above the headers. The rafters should overhang the outside headers by about 5.75" on each side. The rafters should be roughly 2'6" apart. The end rafters (red) should be approximately flush with the end of the headers. There are 2 rafters (green), side by side, in the center (to cover the seams where the 2x2s will meet). ☐

12. Use the rafter ties to attach the rafters to the headers. Make sure that 2 rafter ties are used per rafter (one on each end). You'll use the 1.5" nails to fasten the rafters to the headers. ☐

13. Next you'll layout 4 of the 8 corrugated metal roofing panels on top of the rafters you just attached. The panels will run perpendicular to the rafters. It is important the panels overlap, so before you screw any panels down, lay all 4 out first. Once you have all 4 spaced out, use the metal roofing screws to attach the panels to the rafters. Note all panels will lie on top of both center 2x6x8 rafters (this is so the panels overlapend-to-end in addition to side-by-side). ☐

14. Finally you'll place the remaining four metal panels on the second half of the structure. Be sure these are also overlapping side to side as well as on the center two 2x6x8 headers. ☐