

Field Archery Range Target



Photo By Ron Carmichael

Archery Target Instructions

Introduction:

This target was designed to provide a long lasting solution to a high volume archery range. The target can be assembled on site by one person. The instructions were developed over time as we built a number of targets. Please read all of the instructions, material list and the drawings before starting the project.

The following are general instructions that are designed for a person with an entry level of construction knowledge:

1. All of the wood should be pressure treated (PT).
2. Have all of the lumber cut at HomeDepot or any lumber business under your supervision. See the material list for specifics. The 60" length is important.
3. The material list includes a cut list for the lumber.
4. All of the drilling and layout can be done in a home shop or driveway that is even and level.
5. When drilling holes for lag screws be sure to drill proper size holes. See notes.
6. The target stand should be set on blocks to prevent premature rot.
7. The target should be setup as close to level as possible.
8. Wear gloves when handling pressure treated wood.

Important: All measurements and cuts must be square and accurate. This will allow the assembly to be done on the range with less effort. "Measure twice cut or drill once."

Notes:

2x6 lumber: Drill lag screw holes using a 3/8" drill bit.

4x4 lumber: Use a 1/4" drill bit clearance holes to accept the 3/8" lag screw. Use a 3/8" drill bit to drill the 3/8" carriage bolt holes for the bottom target cross brace.

2x4 lumber: Use a 1/4" drill bit to accept the 1/4" lag screws in the two end roof joists and the rear vertical post supports. Use a 3/16" drill to drill 1/4" lag screw clearance holes in the 4x4s.

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TARGET STAND FEET: Drilling the target feet to mount the vertical Post:



Following the measurements on the drawing, drill a 1 3/8" hole approximately 5/16" deep. This will hide the 1/2" x 8" lag screw head and washer. Do not drill too deep. Then, using a 1/2" or 9/16" drill complete the hole. Hole must be drilled straight to ensure a vertical alignment.



The bottom of each end of the footers are cut at an angle to allow the target stand to be moved more easily. See drawing for details.

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TARGET VERTICAL POSTS:



The top of the two vertical posts are cut to make a 10-degree rear angle. This will set the angle of the roof. (See drawing for details.)



It is very important that the bottom of the vertical posts be square in order to ensure the target is straight. Double check this with a square.

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Each vertical post has a target face tension threaded rod. The rod connects to an eye bolt. In order to keep the wood from splitting install a metal plate on the inside of each post. Cut 1ea. (LSTA12) tie in two. (See material List.)



Place the eye bolt into the $\frac{1}{2}$ " hole and attach the "LSTA12 Tie" with $1\frac{1}{2}$ " deck screws. The eye bolts may be installed at this time.

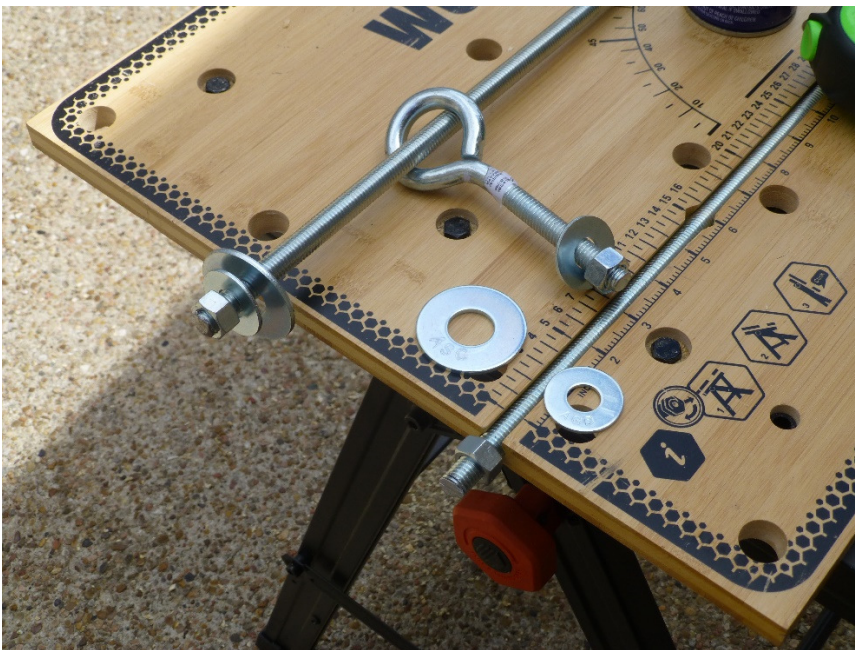
Important: The eye bolts go on the inside of the vertical post.

Whether you install in the field or at home you will need to pound the eye bolt into the 4x4 until the threads are exposed then put on a washer and nut and tighten until the threads are exposed.

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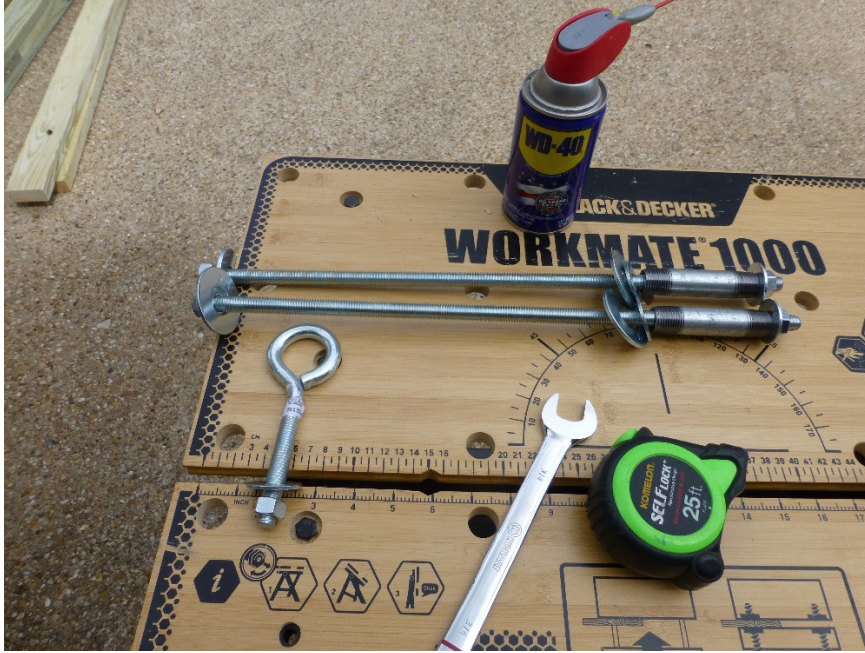
Cut the $\frac{1}{2}$ "x36" threaded rod in half. Place a $\frac{1}{2}$ " nut on each side of the cut. Using a hammer peen over the end of each of the two rods. This will keep the bottom nut from coming off.



TENSION ROD: Cut a $\frac{1}{2}$ ' x 36" threaded rod in half. This will make two 18" tension rods.

It is recommended that prior to cutting the rod you thread two nuts one on each side of the cut. After making the cut hammer or use a cold chisel to damage the ends (PEEN) so the nut will not come off. The peened end will go through the eye bolt.

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This photo shows the components of the tension rod.

PREDRILL THE VERTICAL AND CROSS SUPPORTS:



Layout the target stand on an even level surface. Support the vertical posts with scrap 2x4s. Measure and place all cross supports and drill all of the holes. Use a 3/8" drill bit for the cross supports and a 1/4" drill bit for the holes that the lag screws will be screwed into. The target bottom cross support uses a carriage bolt and all holes should be 3/8".

Be sure to drill the 3/8" retention pin hole shown on the drawing

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Important: Once you have completed each board label and number so that you can put them in proper order.

On the target bottom cross support you will need to drill the back of the rear 2 x 4 to allow for the top bolts that are protruding. Use a wood drill to drill relief holes.



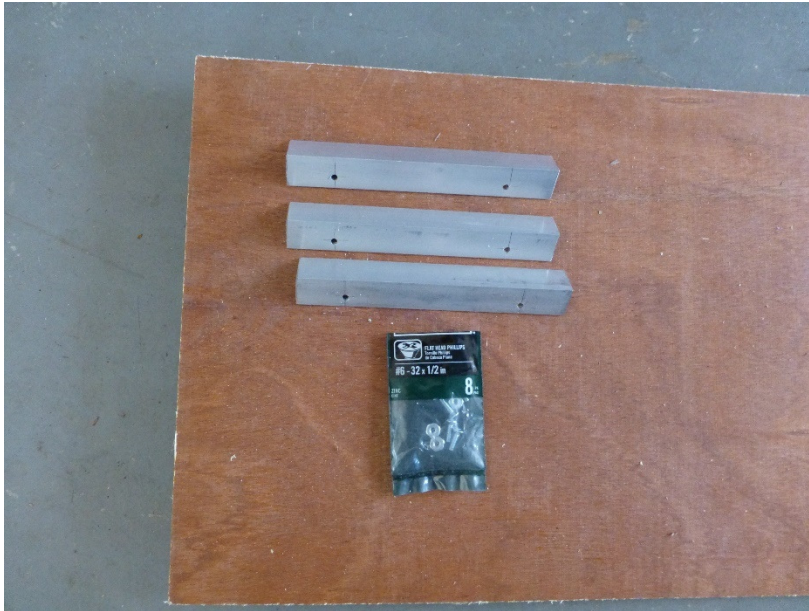
The target bottom cross brace is mounted to the posts with carriage bolts. Drill through the first brace and post. Mount the rear cross brace and drill through that brace. See drawing for details.



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TARGET FACE MATERIAL: Celotex fiber acoustical board in 4' x 8 x 1/2" sheets were selected. This was based on extensive research. It is generally available at commercial building supplies. You can visit the Celotex website to find a dealer near you. Each target will require 12 sheets and you will have to make 96 cuts. Making a pattern to cut the sheets is recommended.

A typical solution would be to use $\frac{3}{4}$ " x $\frac{3}{4}$ " x 6" aluminum angle brackets attached to 1/8" plywood.



The end product will allow for accurate cuts. It is recommended that the pattern be clamped to the sheet.



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Keep in mind that you will need 12 sheets and a total of 96 cuts to make a 48" x 48" target. Using a circular saw you can cut up to 5 or 6 sheets at a time. The key is to use a sharp blade and a straight edge.

To setup the straight edge, measure the 12" cut, place the saw blade on the edge and mark the outside edge of the saw guide.



Note: The photo shown uses a board as a straight edge and deck screws to hold the sheets together.



Use a clamp to keep the sheets together as you setup each group for cutting. This approach generates a lot of dust!

Archery Target Instructions

FIELD ASSEMBLY:

The stand should be set on concrete blocks and level. Set three blocks on each side using a level. You may have to use blocks of different sizes or remove soil. Once the blocks are level front to back and side to side. You can set the feet and attach the lower cross braces.



Important: Stand should be level from side to side and front to back.



Leaving the lag screws loose: (1) Install the front and rear cross braces. (2) Install the bottom cross brace. (3) Install the bottom target cross brace. Check for square then tighten lag screws. (4) Install the rear supports.

Archery Target Instructions



Tip the target stand forward: (1) Install the roof frame to the vertical 4x4s. Place a scrap 4x4 under the roof frame. (2) Install the metal roof.



Once the stand is assembled pin the top target cross bar in the up position and install the eyebolts and tension rods.

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Assemble the 12"x 48" PT plywood sheets on the top and bottom cross brace using 1 1/2" deck screws. Center the sheets between the vertical posts. The sheet should protrude 1" in front of the top and bottom cross braces.

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When installing the Celotex use a level or 2x4 as a jig to align each sheet with the front of the 1'x4' plywood.

The Celotex front edges should be aligned to make a smooth surface to mount targets.

The design makes a 48" x 48" target face. This requires 96 ½"x 12"x 4' sheets.

It is recommended that 3 or 4 sheets are stacked at a time.

The completed stack of 96 sheets weighs 288 pounds.

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MORE NOTES:



This shot shows the $\frac{1}{4}$ x 4" lag screws attaching the roof to the vertical support. The metal roof was run cross ways to reduce cutting. Top Target Cross Brace: Note the 2 x 4 is attached to a 2x6 then into a 4x4 cross brace with a $\frac{3}{8}$ " x 5" lag screws three on each side.



Target cross bar detail:

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Tension Rod: The tension rod goes through the eye bolt then through the hole in the 4x4 cross brace. Tension is applied to the target face using a $\frac{3}{4}$ " wrench.

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INSTALLATION PHOTOS:



View of the 4x4 holding the roof frame. This allows for metal roof installation.



View of bottom support carriage bolts. Lag screws fastening the rear supports.

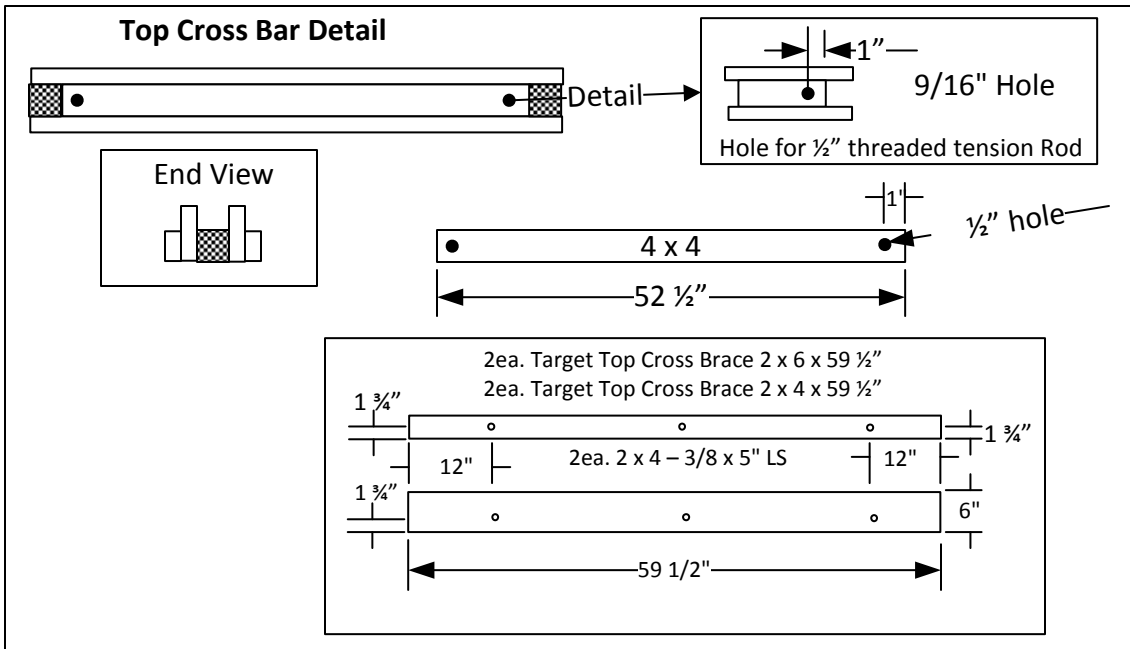
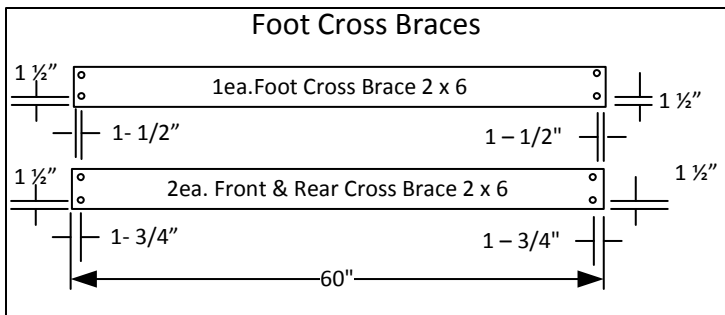
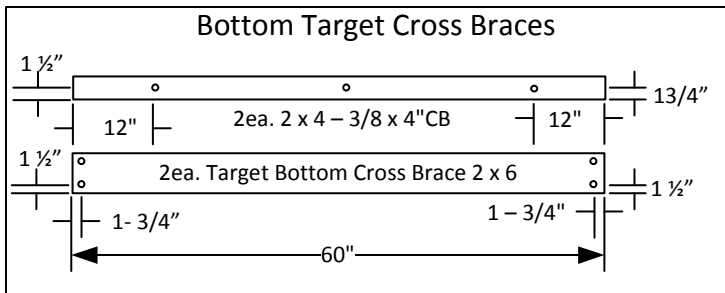
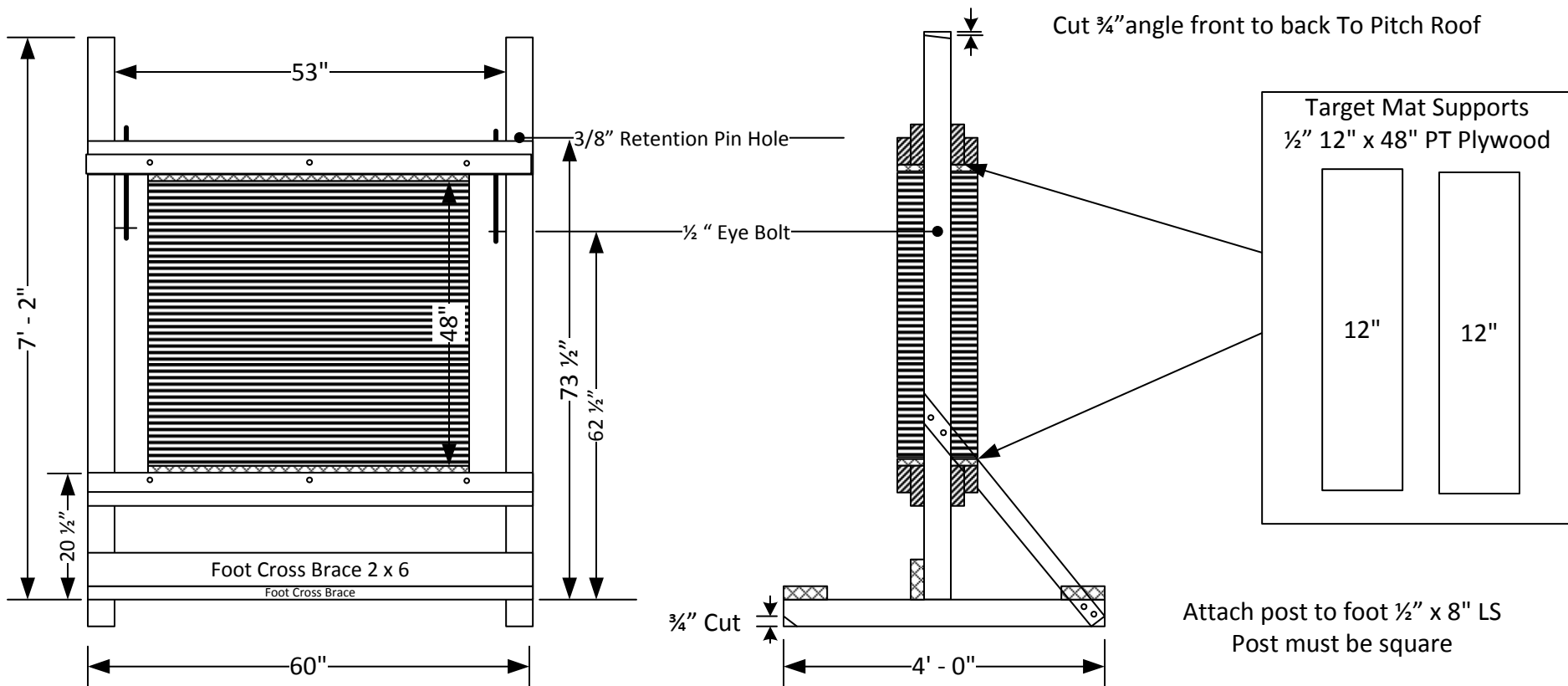
Archery Target Instructions

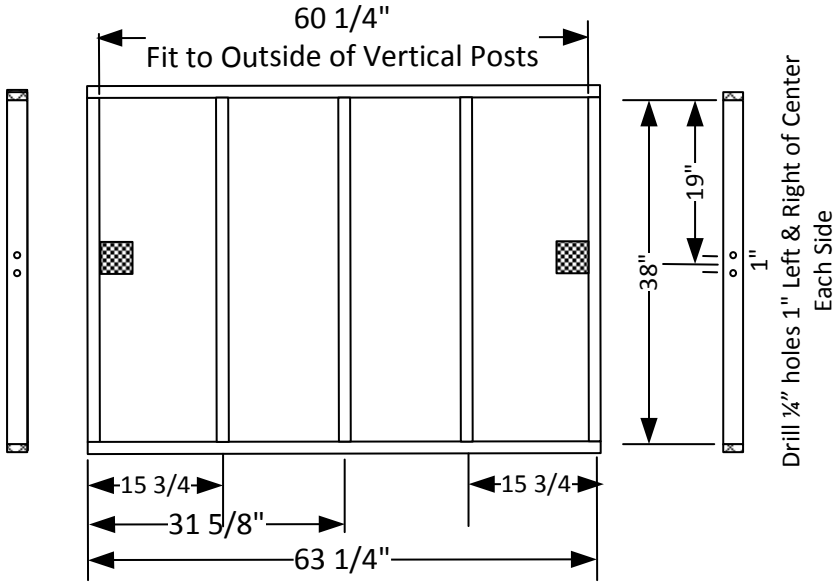
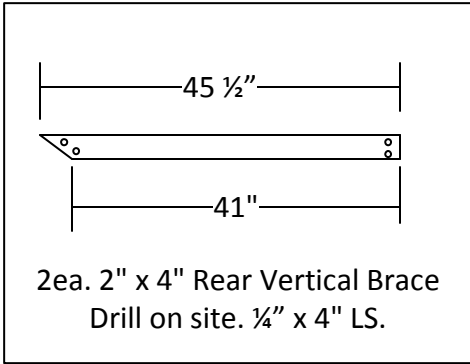
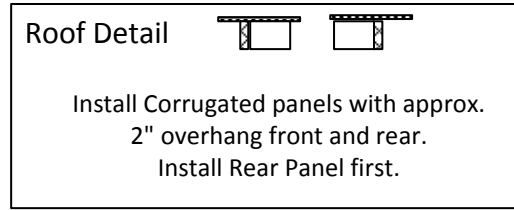
Credits:

The target design has been around for many years. The concept was taken from the Fort Lauderdale Archery Club located in Fort Lauderdale, Florida. The modifications made by the team generated a cost effective solution that will hold a 122cm (48") target. There is also a reference in the National Field Archery Association's Archery Range Guidelines. The project is a collaborative effort of the Austin Archery Club, Texas State Archery Association (TSAA) and the Texas Field Archery Association (TFAA).

Disclaimer: This document provides a general guideline for a field archery target. The Austin Archery Club, Texas State Archery Association (TSAA) and the Texas Field Archery Association (TFAA) accept no responsibility for any target made using this document or recommendation there in.

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Assembly Tools:

- 1/4" Socket Metal Roof Screws
- 7/16" Socket 1/4" Hardware
- 9/16" Wrench 3/8" Hardware
- 3/4" Socket - 1/2" Hardware
- 3/4" Wrench Target Tension Nuts
- Mallet
- Hack saw
- 3/16", 1/4", 3/8" drill bits.
- 1/2", 9/16", 1 3/8" Wood Drill bits
- 12" and 36"+ Levels

Cut List:

- 5ea 2" x 4" x 38" PT Studs
- 2ea. 2" x 4" x 63 1/4" PT Headers
- Attach with 3 1/2" Deck Screws

Archery Target Bill of Materials

QTY	Size	Length	Cut	Description	\$ Each	Sub-total
4	4" x 4"	8' - 0"	2 @ 7' -2"	Vertical Posts	\$9.17	\$36.68
	4" x 4"	8' - 0"	2 @ (48")	Feet	\$9.17	\$0.00
	4" x 4"	8' - 0"	1 @ (52 1/2")	Top Inside Target Cross Beam	\$9.70	\$0.00
4	2" x 6"	10' - 0"	5@ (60")	Bottom Target Cross Beams	\$7.67	\$30.68
	2" x 6"	10' - 0"	2@ (59 1/2")	Top Target Cross Beams		
2	2" x 4"	10' - 0"	2 @ (60")	Bottom Target Cross Beams	\$4.97	\$9.94
	2" x 4"	10' - 0"	2 @ (59 1/2")	Top Target Cross Beams		
1	2" x 4"	12' - 0"	2 @ (63 1/4")	Roof Front Rear Headers	\$5.97	\$5.97
4	2" x 4"	8' - 0"	5 @ (38")	Roof Cross Joists	\$4.17	\$16.68
	2" x 4"	8' - 0"	2 @ 45 1/2"	Rear Vertical Braces (See Drawing)	\$4.17	\$0.00
2	2' x 6'			Corrugated Galv Steel Roofing	\$6.40	\$12.80
1		Simpson Strong Tie		LSTA12 Makes two eyebolt washers	\$0.84	\$0.84
12	4' x 8' x 1/2		12" x 48"	Fiber Sound Board For Target Face	\$10.80	\$129.60
Hardware						
2	1/2 x 6"	Eye Bolt		See Drawing	\$2.41	\$4.82
2	1/2 x 8"	Lag Screw	(CFM)	Vertical Post Screw	\$1.63	\$3.26
6	3/8 x 5"	Lag Screw	(BJP)	Top Cross Beam (2 x 4, 2 x 6, 4 x 4)	\$0.68	\$4.08
4	3/8" x 7"	Carrage Bolt	(BTA) 8"	Bottom 2 x 6 thru 4 x 4 vertical post	\$1.46	\$5.84
6	3/8 x 4"	Carrage Bolt	(BFD)	Bottom 2 x 4 to 2 x 6 front and rear	\$0.61	\$3.66
12	3/8" x 4"	Lag Screw	(BHM)	Foot	\$0.63	\$7.56
1	1/2 x 36"	Threaded Rod	2@ (18")	Tension Rods (Cut 36" Rod)	\$3.57	\$3.57
1	1/4 x 24"	Rod	2 @ (12")	Retention Rod	\$3.47	\$3.47
2	1/2" x 2 1/2"	Pipe	Galv Nipple	Top Cross Beam Spacer	\$1.44	\$2.88
12	1/4 x 4"	Lag Screw	(ASM)	Foot 2 x 4 Support Braces	\$0.38	\$4.56
12	1/4"	Washers	(AAA)	Foot 2 x 4 Support Braces	\$0.11	\$1.32
8	1/2"	Washers	(AGB)	Tension Rod, Eye Bolt, Vert. Post	\$0.20	\$1.60
4	3/4 x 2"	Washers	(ASC)	Tension Rod washers	\$0.35	\$1.40
28	3/8"	Washers	(ACB)	3/8" Lag Screw/ Carrage Bolts	\$0.14	\$3.92
4	1/2"	Nuts		1/2" tension Rod	\$0.20	\$0.80
10	3/8"	Nuts		3/8" CC Washers	\$0.12	\$1.20
20	1 1/2"	Roof Screws		Metal Roof Screws	\$0.10	\$2.00
20	3 1/2"	Deck Screws		Roof Joists (53)	\$0.16	\$3.20
12	1 1/2"	Deck Screws		Target Mat Supports (148)	\$0.06	\$0.72
Estimated Total Cost						\$303.05

	1 1/2"	Roof Screws		Metal Roof Screws (100 per box)	\$9.73	\$0.10	ea.
	3 1/2"	Deck Screws		Roof Joists (53 per box)	\$8.47	\$0.16	ea.
	1 1/2"	Deck Screws		Target Mat Supports (148 per box)	\$8.47	\$0.06	ea.

* Material Pricing was done at HomeDepot.