

ENGINE CRATE FABRICATION

Bill Rogers

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I have been often asked about building a crate to ship an engine. Below is one crate I built and some information that should make it easier for you to build such a crate. Please be aware that the 600 engine weighs more than is allowed by most of the typical parcel carriers. Neither the USPS nor UPS will ship the 600 engine. The engine I show in this document is crated without the flat floor pans or the heat exchanger / muffler. The 600 engine with crate will weigh about 210 pounds. Most of the normal carriers cut off at 75 pounds. If you are going to ship an engine you will have to take it to a motor freight company like FedEx Freight (not to be confused with FedEx – which also has a 75 pound cutoff limit). Prior to committing to a shipment, I suggest you contact your local freight company and check on rates to ship your engine. They will want to know the weight (estimate 210 pounds) and dimensions (24" x 32" x 28") and the class (85). With that information and the destination, they can tell you the rate. FedEx will provide a 40% discount to all customers – so be sure to ask about that discount. If you go to their web page, you should be able to see what it will cost you with the above information and your destination zip code.

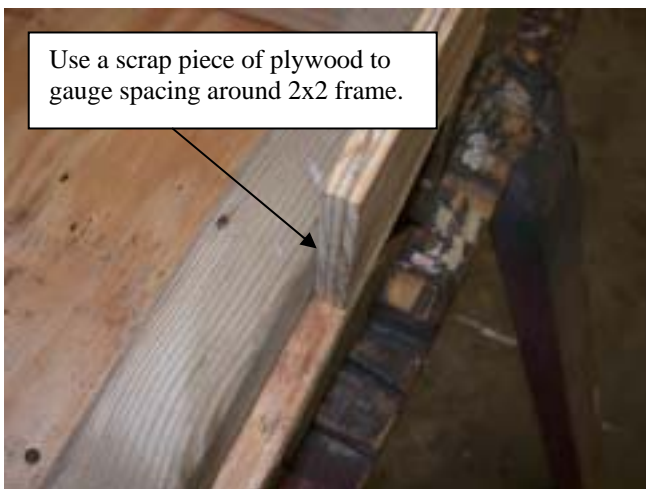
If you plan on shipping your engine with the muffler and heat exchanger you should check and adjust the dimensions as necessary.

I start out by fabricating a base. You can either use one piece of $\frac{3}{4}$ " plywood or two layers of $\frac{1}{2}$ " plywood (which by the way is only $\frac{7}{16}$ " now – remember that, it will make a difference in your measurements). I chose to use two layers of $\frac{1}{2}$ " plywood. Cut the two pieces 24" x 32". Align the four sides of the plywood and nail them together to hold them in place. Cut (2) 2" x 4" x 24" long to make the "feet" for the base. Using 3-1/2" screws, screw through the plywood into each 2 x 4 in four places.



You will need about 28' of corner material. This can be any thickness that is handy. I have found that these pieces vary at different lumber yards, so I won't provide all the cut lengths – since your may be different.

Using 2" x 2" material cut two pieces 31" long. This will make the front and back pieces attached to the top of the crate bottom. Cut (2) more pieces to fill in the sides. You will need to leave a $\frac{7}{16}$ " gap completely around the perimeter of the base so the top can slide down and stop at the base (see next picture).



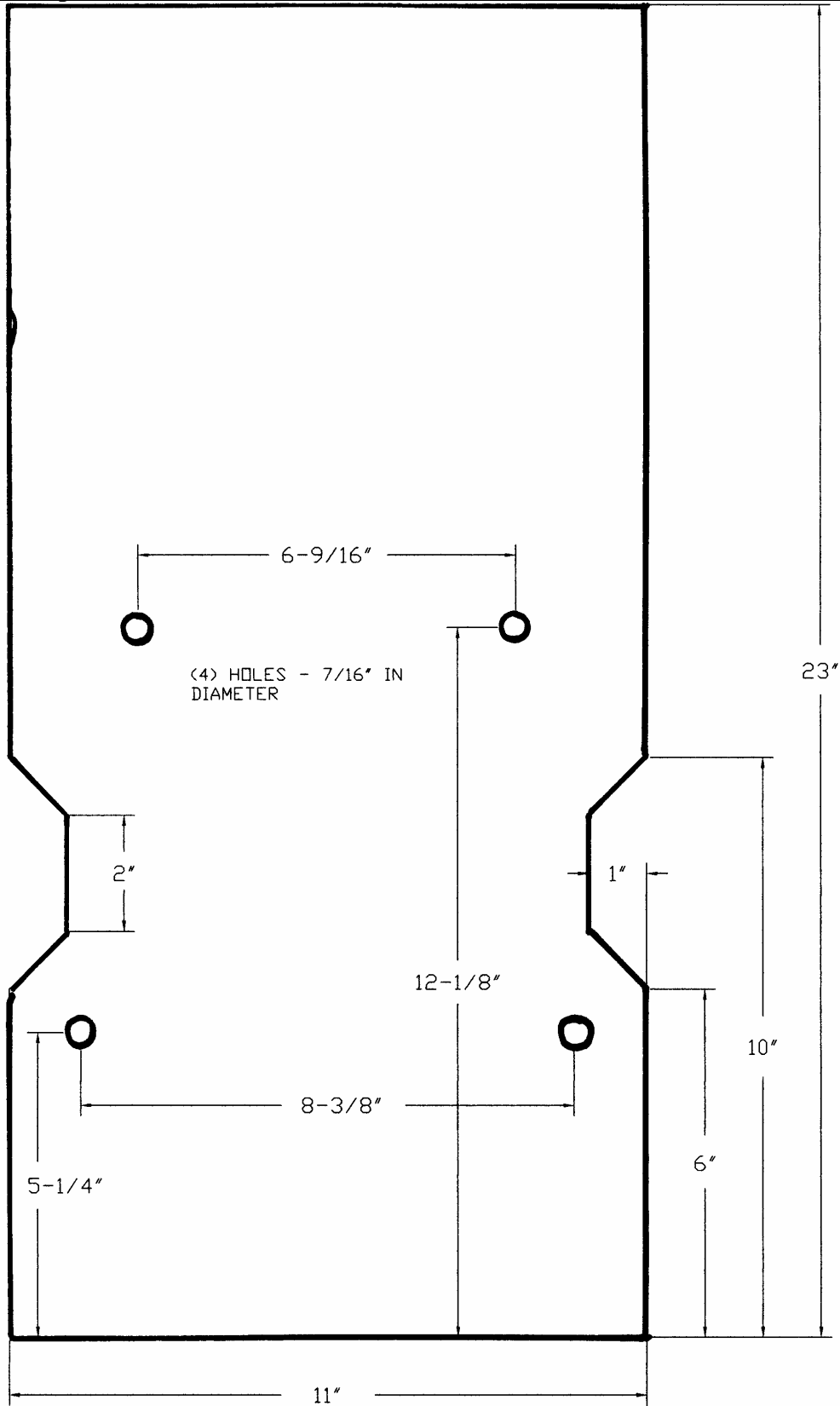
After you have installed the perimeter 2" x 2" boards, cut (2) 2x4 down so they are only 2" high and 18-1/2" long. Install them in the center of the base, 3-1/4" off the centerline (6-1/2" apart). These (2) boards will be the resting pieces for the oil pan.

The upright piece in the photo above is made from $\frac{3}{4}$ " plywood and is used to bolt the engine to the crate. View the drawing below to fabricate this piece.

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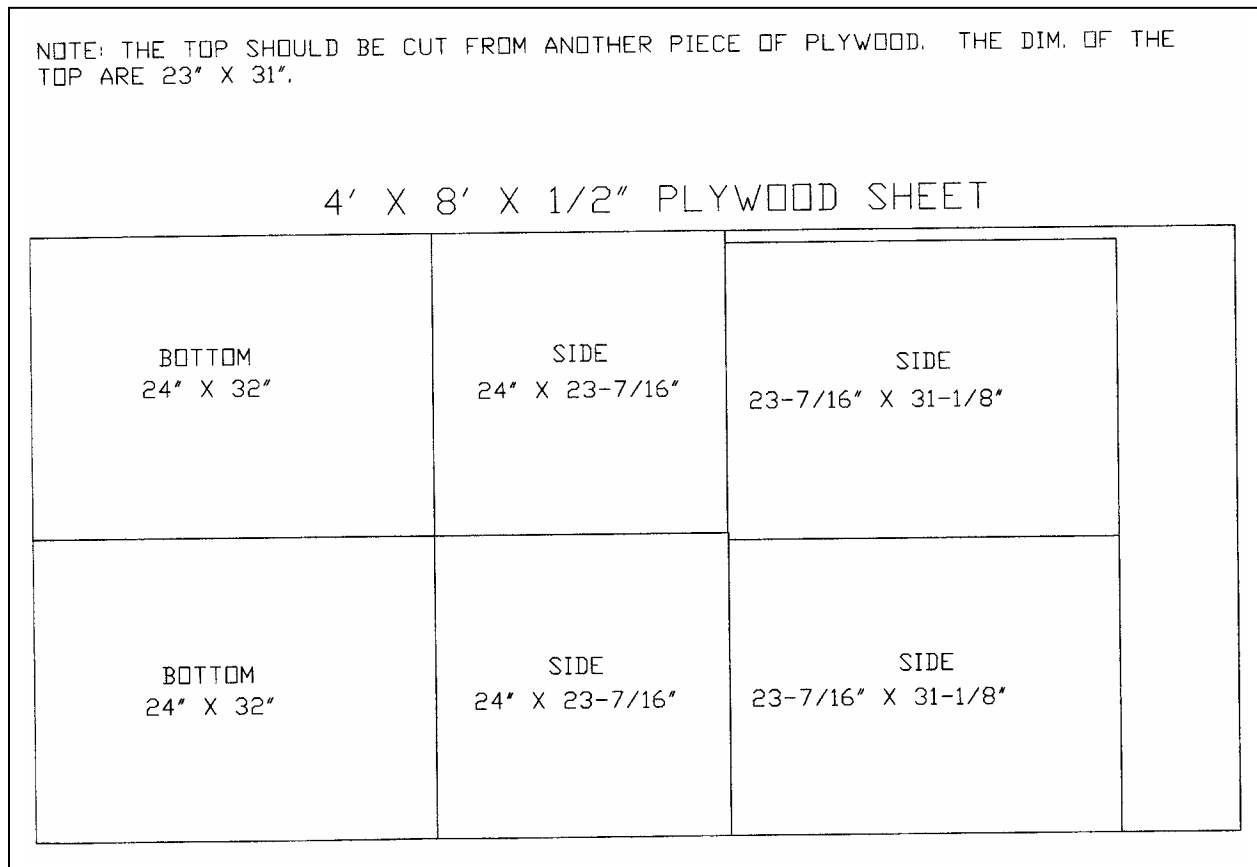
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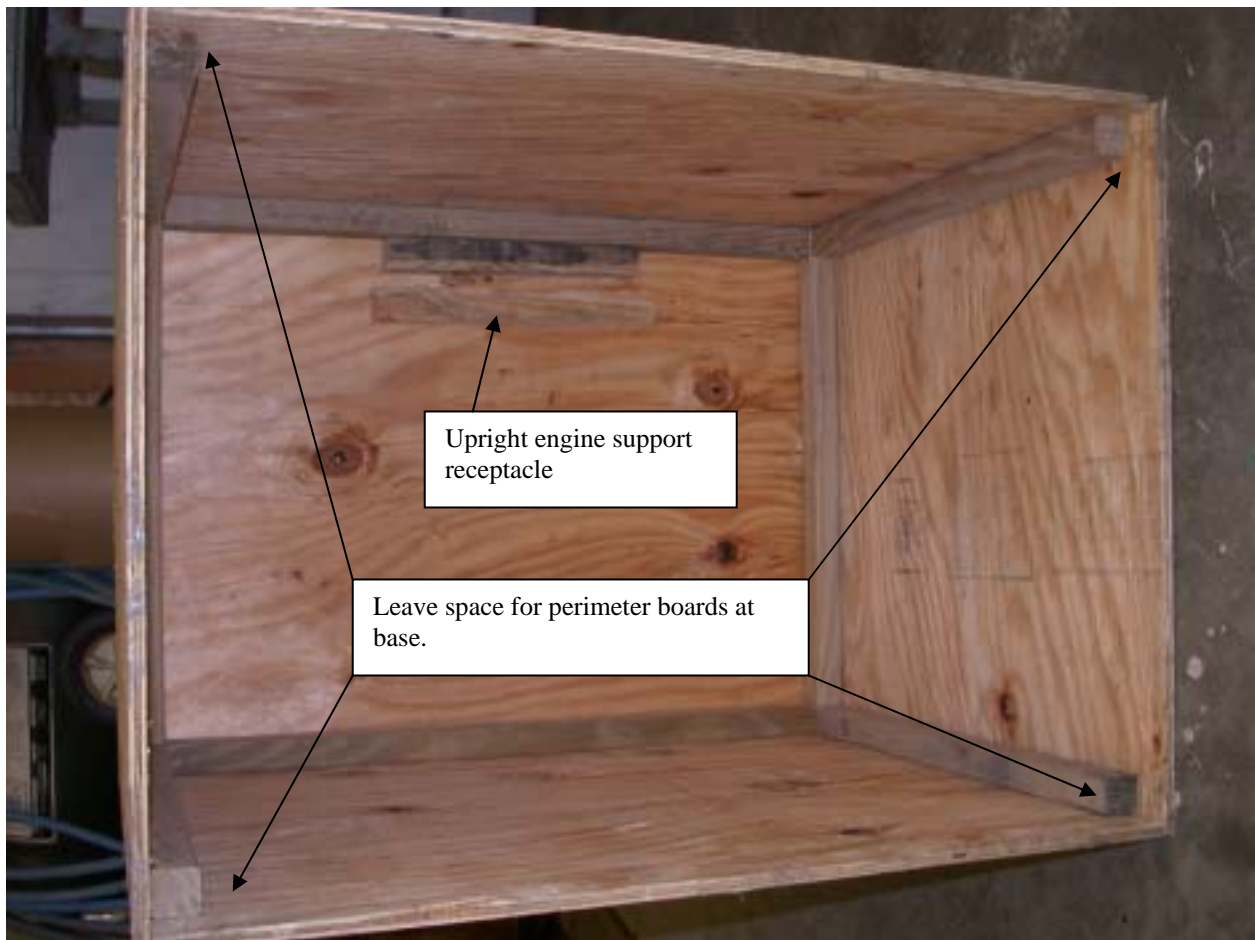
Install (2) screws through the back of the upright engine support into the oil pan supports as indicated by the arrow.

Fill the gap between the perimeter frame and the upright engine support with a piece of filler material. Screw the filler material in place.

Using the guide below cut out the four sides from a sheet of 4' x 8' sheet of plywood.



ENGINE CRATE FABRICATION



Using the picture above as a guide and the 4 sides cut from the sheet of plywood fabricate a top that will slip over the base. The top piece of plywood will have to be cut from another sheet of plywood if you used double sheets of plywood for the base as shown above. The top measures 23" x 31". Be sure to leave a sufficient space at the bottom of the 2x2s corner braces for the base perimeter of 2x2(s).

When building the top of the crate, I normally will assembly it onto the base. I do this by taking one short and one long side-pieces and screwing them to the perimeter 2x2s (on the base) and then cut the corner vertical brace to fit (be sure to leave a 7/16" gap between the top of the side pieces and the 2x2 corner brace – this will be needed to allow the top piece to recess into the top). I continue doing this around the crate until all 4 sides and corner 2x2s braces are in place. I then will fill in the horizontal 2x2s 7/16" below the top of the sides. At this point, the top sheet of plywood can be put in place and secured with screws. I then remove the screws securing the side plywood pieces to the 2x2s around the base perimeter so I can remove the top in one piece. At this point you can add the upright engine support receptacle described in the next paragraph.

The piece of filler and the 2x2 shown in the top part of the picture is used to brace the upright engine support. The filler piece (one at top) should be cut the same width as the filler piece described at the bottom end of the engine upright support. The lower piece is a 2x2 spaced 3/4" below the filler piece. These two pieces make a receptacle for the engine upright support to slide into.

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You are now ready to install the engine into the crate.

Place the engine on the base of the crate with the oil pan spanning the two center runners.



Slide the engine forward until the upper mounting studs of the engine protrude through the upright engine support.



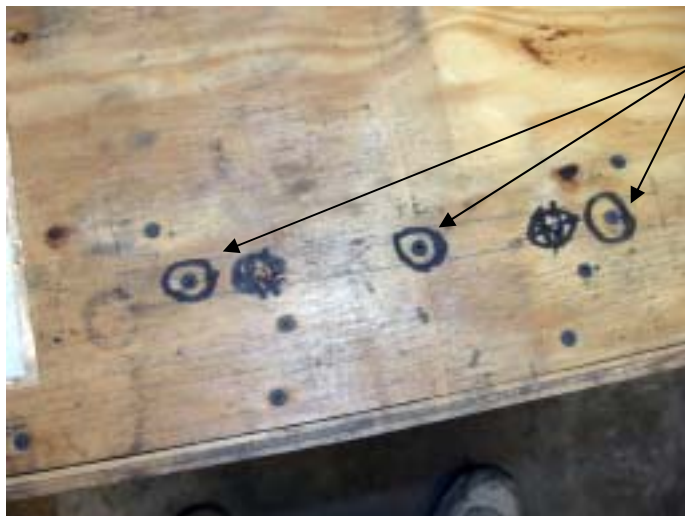
Secure the engine by installing two washers and nuts to the upper studs and installing two bolts, washers and nuts through the lower holes.

Be sure all hoses, wires and other items are within the confines of the 2x2 perimeter boards.

ENGINE CRATE FABRICATION



Now take the top of the crate and lift it over the engine and install it on the base. Be sure that the “receptacle” is properly placed so that it will receive the upright engine support board.



Install two to three screws through the top into the upright engine support to secure it tightly to the top of the crate.



Install three to four screws on each side of the top near the base. These screws should secure the top to the 2x2 perimeter boards.