

VOLUME 1, ISSUE 1

BUILDING A 1/10 SCALE FLATBED TRAILER

BUILT, DESIGNED & WRITTEN BY NATHAN MYERS



FEATURES:

While the design was kept simple to allow anyone to be able to build their own trailer, however, a lot of detail was kept in the design to give the most realistic look possible. Some of these features include:

- 9 degree dovetail for easy loading/unloading
- Tandem axle design for even weight load
- Universal sizing to haul a load of any size
- Aluminum construction to reduce weight
- Enclosed fenders to keep the dirt on the road and off your car

BEFORE YOU BEGIN:

It is important to have all the tools and materials available before you begin. All materials are easy to find at your local hardware store. The following is a list of materials and tools that you will need. The list of tools is based on the basic tools that are needed to complete the trailer.

*Note: You can substitute Pop Rivets for 1/8" or 3mm hardware (i.e. screws, nuts, washers, etc). Also make sure that the threaded rod will slide in the smallest tube, then that the small tube slides into the next tube, and that this tube slides into the largest tube.

MATERIALS:

- 1 - 1/16" Thick Aluminum Sheet (minimum size 10"x22")
- 1 - 1/16" Thick Aluminum Sheet (2 1/4" x 60")
- 1 - 8' Stick of 3/4" Angle Aluminum, 1/16" Thick
- 1 - 4' Stick of 3/8" x 1/2" Aluminum Channel
- 1 - 3' Stick of 1/4" Brass Tubing
- 1 - 3' Stick of 7/32" Brass Tubing
- 1 - 3' Stick of 3/16" Brass Tubing
- 1 - 3' Stick of 8-32 Steel Threaded Rod
- 50 - Aluminum Pop Rivets*, Grip Range 1/16 - 1/8"
- 1 - Tube of Sandable, Paintable Cocking or filler
- 8 - Locking 8-32 Nuts
- 8 - #8 Fender Washer
- 8 - #8 Conical Washer

Tools:

- 1 - Complete Drill Index
- 1 - Power Drill
- 1 - File
- 1 - Pop Rivet Gun
- 1 - Tube Cutter
- 1 - Carpenter Square
- 1 - Pair of Safety Glasses
- 4 - 1 1/2" or larger C-Clamps
- 1 - Pliers
- 1 - Permanent Marker
- Hack Saw
- Tin sheers

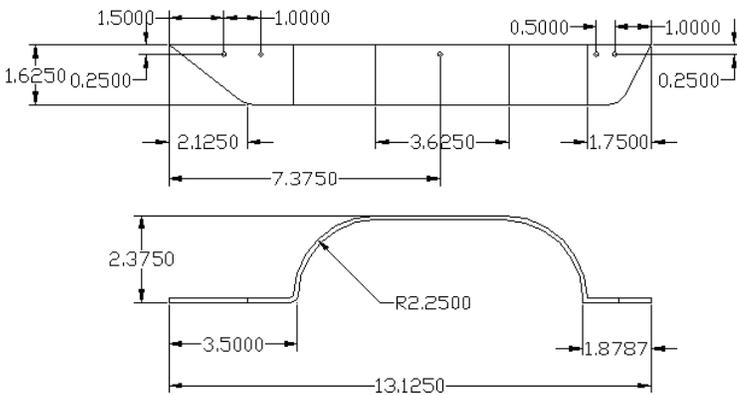
STEP 1: For steps 1-3, refer to figure 1.

The first step is to layout the decking material. Take you 1/16" aluminum sheet and using your square, cut the sheet to 10" x 22".

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STEP 21:

The basic frame of the trailer is now complete, the only parts left to do is to build the fenders and install the axles. The basic design for the fender is shown in the image below, but if you plan to use non-Tamiya tires, with a diameter of 3 3/8", and a width of 1 1/4", then you may want to change the size of the fenders. The wheels that I used have a standard 12mm hex, but you may choose to use wheels with bearings. Decide on the wheels and tires you want to use and adjust plans as needed to make sure that you do not get tire rub on the fenders and on each other.



STEP 22:

Take the fender material and cut 2 length to about 18". This may need to be longer for tires that are much taller than the Tamiya tires. Save the spare material for building the inside of the fender.

STEP 23:

Once you have decided on the wheel/tire combination that you are going to use, cut the fenders to the correct width. You want the fenders to be about 1/2" wider than the tires. Take the fender material and cut 2 length to about 18". This may need to be longer for tires that are much taller than the Tamiya tires.

STEP 24:

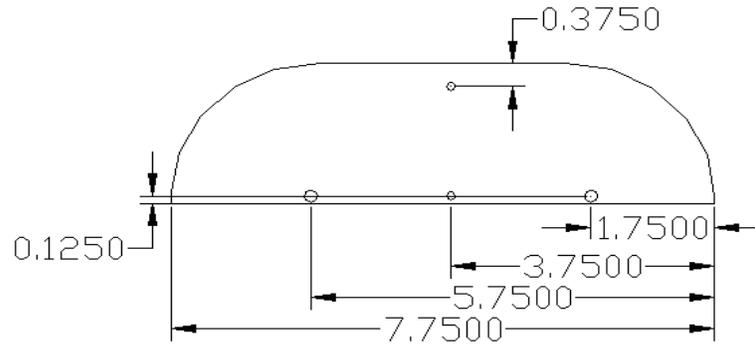
Now starting at the left front of the fender material cut out the shape of the fender you want. Then determine where the curve of the fender needs to start. To bend the quarter circle in the fender, find an object that has a diameter that is a little larger than the tires that you plan to use. I used a roll of packing tape to bend my fenders, but just about anything will work.

STEP 25:

Once you have the fender shaped to match the wheels that you are going to use, drill the holes as shown above. These will be used to mount the fender to the frame of the trailer. The center hole on the top of the trailer will be used to mount the inner fender.

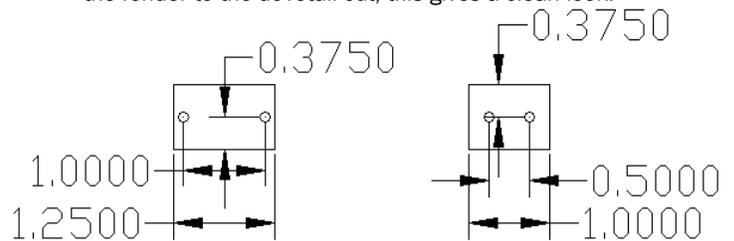
STEP 26:

Now lay the fender flat on a piece of the 2 1/4" material and trace the inside of the fender. Make one for the left side and one for the right side. Then using your tin snips, cut the line. The inner fender should fit inside the fender and be smooth. If it does not fit perfect, you can either try to cut another piece, or fill any holes with a sandable, paintable cocking. Also drill needed holes to mount fender.



STEP 27:

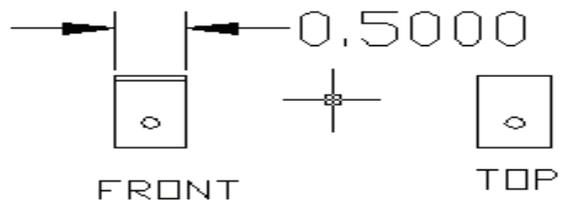
Now you will want to mount the fender to the frame. To do this you need to build four mounting brackets shown below. These will mount to the inside of the frame, and you have a little bit of room to play in mounting them. You have not drilled the holes for the mounting bracket so that you can determine the location that fits your preferences. Make sure while positioning the fenders that you test fit the wheel/tire combination to ensure a good fit. I like to like up the rear of the fender to the dovetail cut, this gives a clean look.



FRONT FENDER MOUNT REAR FENDER MOUNT

STEP 28:

In step 17, you made a bracket to mount the tongue to the frame. Now you need to make 2 more of the 1/2" brackets, to mount the inner fender to the fender itself. See figure 13. The most important thing is to line up the mounting holes that are drilled in the fender and the inner fender to determine the location of the holes in the bracket. Mount the inner fender.



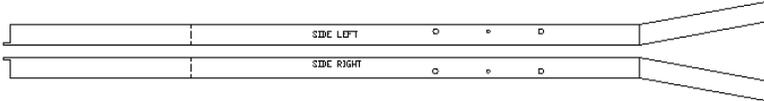
FRONT

TOP

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STEP 13:

Again on a flat surface, we are now going to bend the dovetail at the rear of the trailer. Where we cut the small triangle in the rear of the frame rails, bend the rail until the pieces of metal touch. If the cut is to size, you will achieve a 9-degree dovetail.

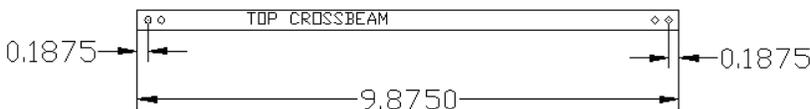


STEP 14:

Now we are ready to bend the decking of the trailer on the break line that we drew in step 3. It is not essential that you get a perfect angle as long as the bend is square, and is within +/- 2 degrees. When the decking is mounted to the frame, the angle will match the angle of the frame. Refer to appendix A for a 9-degree angle template.

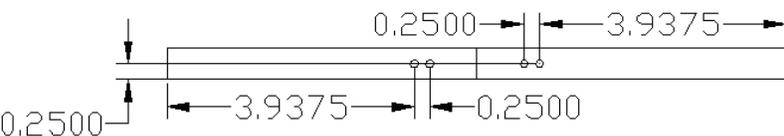
STEP 15

Now we need to cut the aluminum channel to length. They should be $9 \frac{7}{8}$ " long and will be used to connect the left and right frame rails. You will need 3 of these pieces. Remember to double-check the holes you have drilled in the frame rails and the holes in the cross-beams to ensure a proper fit.



STEP 16:

Take one of the beams and label it with an F. This will be your front beam in which the tongue will attach. You need to drill 4 more holes in the face of the beam to allow for the tongue to be mounted.

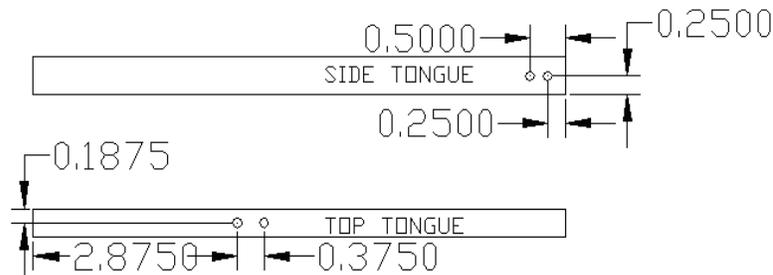


STEP 17:

Using the angle aluminum, cut 2, $\frac{1}{2}$ " wide brackets as shown in figure 7. These will be used to mount the tongue to the front cross member. Drill holes to match the front beam. Then on the other side of the bracket drill 2 holes in the same spot as the other two. It should not matter if the bracket is upside-down or not.

STEP 18

Now cut another piece of the channel aluminum to $7 \frac{1}{2}$ " long. Drill 2 holes on the top of the channel aluminum, one $2 \frac{7}{8}$ " from the front of the tongue on the top, and the other $\frac{3}{8}$ " back from the first hole. These holes will allow you to mount the tongue to the frame rails for added strength. Next, drill 2 holes through the aluminum tongue on the side, both are centered on the aluminum, and one measures $\frac{1}{4}$ " from the back, and the other is $\frac{1}{2}$ " from the back. These will mount to cross member F and the angle brackets made in the previous step.

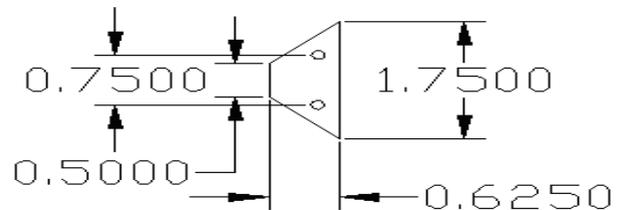


STEP 19:

The parts are nearly all cut and ready to assemble. The fenders will be the last part to make and attach. At this point, start to assemble the trailer. Do not pop rivet the pieces until you have done a dry fit with everything but the fenders. Once the trailer is setup as in figure 9, and everything looks good, you can start pop riveting. **DO NOT POP RIVET THE TONGUE TO THE FRAME RAILS YET!!**

STEP 20:

To add strength to the tongue of the trailer, using a piece of material that is either left over from the decking or that you are going to use for the fenders, cut a shape that looks like the image below. This will mount in the front of the trailer where the tongue and the frame rails connect. The dimensions may change depending on how square the trailer is. If everything is perfect, the following dimensions will fit, but you may need to modify the design just a little bit.



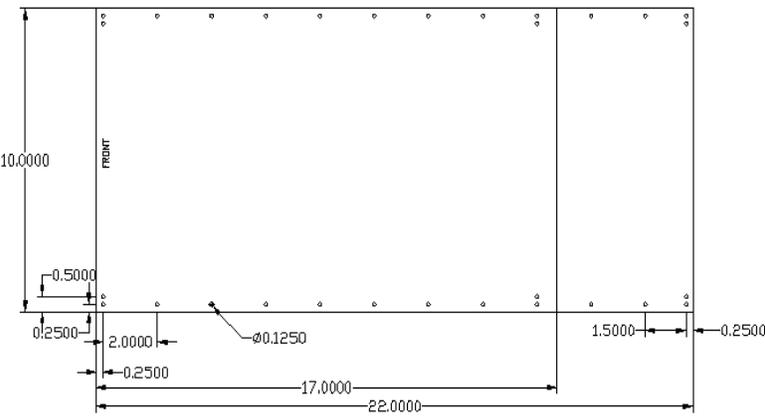
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Step 2:

Once the sheet is cut down to size, then mark and drill the 30 1/8" holes for the rivets. Space the first and last hole 1/4" from the end of the sheet, then space holes evenly at a 2" spacing unless otherwise noted. (Note: Due to differences in rivets, test fit a rivet in the 1st hole to ensure that it fits correctly. If the hole is too small, increase the drill bit size to 9/64")

STEP 3:

Measure 5" in from the rear of the trailer, then using the marker, trace out the place where a 9-degree angle bend will be made. Do not bend this piece until step 14.



STEP 4:

Using the angle aluminum, cut 2, 29 1/8" pieces that will be used to make the right and left frame rails. Both the left and right frame rails will be a mirror image of the other.

STEP 5:

The first cut is 5" from the rear of the trailer. By making a wedge cut in the frame rail, we will later bend the material to make the dovetail. Do not bend the frame material until step 13.

STEP 6:

The next cut is located at the front of the tongue. Make a 45 degree cut in the material as shown in figure 2. This is so when the tongue is bent inward, the tongue will make a flush miter.

STEP 7:

The next cut is located 7 1/8" in from the front of the frame. This cut is also at a 45 degree angle that will allow for the frame to be bent to form the tongue. We will bend the tongue in step 12.

STEP 8:

Finally in the front of the tongue, make an 11/16" deep, 1/4" wide cut in the front of

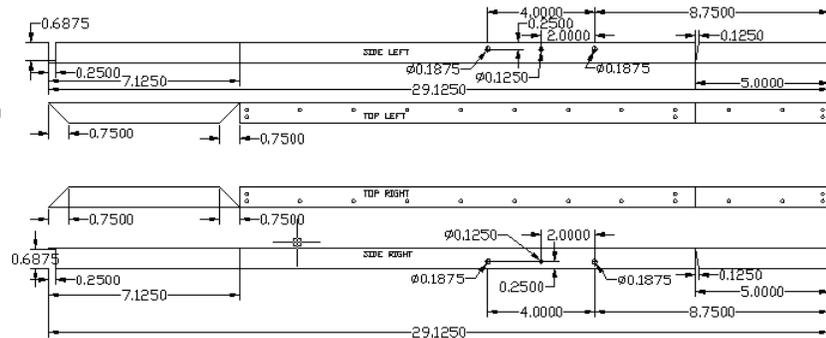
the tongue that will allow for the hitch to come out the front of the tongue.

STEP 9:

Now using the decking that you drilled earlier, and the 4 C-Clamps, line up the decking on the trailer frame, starting at the rear of the frame rails. Make sure that the decking is square on the frame rails and mark where the holes were made on the decking. (At this point, I prefer to leave the decking in place to drill the holes to ensure that they are lined up, but if you prefer remove the decking from the rails before you drill)

STEP 10:

Measure 8 3/4" inches from the rear of the trailer, and 1/4" from the bottom of the frame rail and mark the spot for your rear axle. Then measure 12 3/4" from the end of the trailer, and 1/4" from the bottom of the frame rail and mark for your front axle. Using a 3/16" drill bit, drill the 2 axle holes per frame rail.

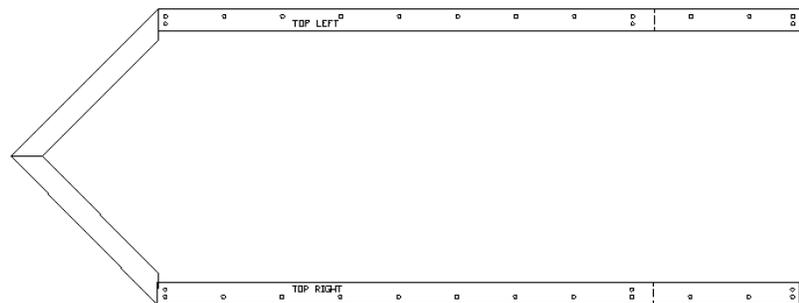


STEP 11:

Finally drill one 1/8" hole 10 3/4" from the end of the trailer rail, 1/4" from the bottom. This will be used to mount the inner fender to the frame rail. Also, this hole is in the middle of 2 axle mounting holes.

STEP 12:

On a flat surface, bend the front of the frame rails in to form the tongue of the trailer.



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STEP 29:

Now you are ready to mount the axles. The material that was obtained should slide inside of each larger piece. Cut the threaded rod so that it is the same width as the fenders mounted on the trailer. It is better to be a little long and then to cut it shorter if you need to later. If you used the stock fenders, you can cut the rod to 13 1/4".

STEP 30:

Cut the smallest piece of tubing to 11", and the larger pieces to 9 7/8". The larger pieces should fit inside the frame, but also should be snug. The smallest piece of tubing should fit through the axle holes drilled in the frame and stick out each side by about 1/2".

STEP 31:

Place the larger 2 pieces of tubing inside one another, and then fit them in the frame. Now slide the smallest piece of tubing through the frame and through the larger pieces of tubing. Then run the threaded rod through the small tube. Finally cut a piece of the 7/32" Brass Tubing to 1/2" and place on the outside of the frame, over the small tubing.

STEP 32:

Thread the 8-32 lock nut onto the threaded rod, tighten both sides and the axle should be able to turn, but without any side to side movement. Place a fender washer, and then the conical washer on the axle. Finally mount the wheels to the axle, followed by another 8-32 nut.

STEP 33:

Only 2 things left to do, the hitch and painting. If the trailer looks good, no large gaps, or spots where the metal did not line up correctly, then you can primer and paint the trailer. However, if you do have some gaps from a slightly bent trailer, then use the cocking to fill the gaps. Once dry, you can sand the contour of the cocking and then primer and paint.

STEP 34:

The final thing that you need to do is to mount a hitch to the trailer. You can use servo linkage, but these can be a little small. I have used the ball links that have a screw through them so that you can tighten them for driving and loosen them for removal of the trailer. The possibilities are endless to what you can use, just use your imagination and see what you find.

