



**INSTRUCTIONS AND TIPS TO BUILD CRADLE DOLLY**

By: Rick Kauffmann, Quispamsis, NB Canada  
 "Ricker" on Pennock's Fiero Forum  
 ukauff@nbnet.nb.ca

**General:**

The objective of the design was to:

- Provide a cradle dolly for an '88 cradle
- Able to be dismantled and stowed away
- Fully open on the sides and bottom (no triangular braces)
- No machining required, other than sawing and drilling

**NO-NONSENSE DISCLAIMER IN PLAIN ENGLISH**

This design was created by myself for my own interests and needs to have a means to mount the engine/transaxle at a convenient working height and to be able to wheel it around the shop on casters. I have built one and it works fine for me. I have been asked to share the specifications and drawings with other Forum members and am happy to do so. If this design provides you with a useful product, that's great and I am happy for you. If this design does not provide you with a useful product, or you don't like the design, that's tough. You are getting what you are paying for. Good luck.

I have one request. If you share this design with others, please forward the complete package, including these instructions.

**WHAT YOU NEED TO KNOW BEFORE STARTING**

This design is based on the "field fabrication" principle. That is, components are clamped or temporarily bolted into position,

then tack welded or through-drilled and match marked. This allows you to use size-on-size holes with almost zero clearance, and still allows easy assembly and disassembly. While it is possible to do the welding operations and drill all holes beforehand, I do not recommend this approach. You would have to work to VERY close tolerances and even then the end result may not be satisfactory. You can't beat having parts set up, squared and aligned perfectly, and then tack weld or through-drill the holes. There is no real machining required, just some accurate saw cuts and drilling, and of course the usual deburring and filing of corners, etc.

NOTE: You will need the cradle out of the car, or borrow another cradle to build this design. You will actually have the cradle sitting on the temporary structure to tack weld the posts and drill the critical Bottom Support holes.

#### MATERIALS:

Please refer to the text file "Bill of Material.txt" for a complete listing of all components that are needed. Most parts are made from square hollow bar stock, either 2" or 2 1/2" with a 3/16" wall thickness.

If you are buying new steel from a supplier, I recommend that you get all parts cut to the proper length. It is important to have nice square cuts on all components. I was able to get the supplier to cut the Front Cradle Supports, Rear Offset Supports and Bottom Supports on his band saw at no extra charge. This way I only had to do the drilling operations.

#### General steps to take:

- A. Purchase materials, fabricate 4 Bottom Supports, 2 Front Cradle Supports, 2 Rear Offset Supports, 8 Reinforcing Channels
- B. Fabricate Crossbars and bolt Base Frame together.
- C. Fabricate Front & Rear Posts
- D. Final Assembly

A. All of these parts can be made without any "real" machining. The top and bottom supports are all made from square hollow bar stock. All that is needed are some accurate band saw and drilling operations. I was able to get my steel supplier to cut all parts to the proper length, including the "transverse" cuts to create a channel shape out of a square bar. Just refer to the drawings and work as accurately as possible.

#### B. BASE FRAME (Refer to "Crossbar Ass'y" drawing)

1. Lay Base Frame Bars on a level Floor.
2. Position the Crossbars and End Plates, so that the End Plates are about 5" from the end of the Base Frame Bar (See Assembly Drawing) This works for a standard 5" caster. Make sure the caster you are using will fit between the Bottom Support and the Crossbar. Refer to the drawing "Post Fabrication Details". You want the Crossbar Assembly to be as far apart as possible. You just need to provide enough room to mount the caster.
3. Once you have verified that the position of where the Crossbar Assembly will bolt on is correct (by ensuring there is enough room to bolt on the caster), use a large C-clamp to clamp the End Plate to the Base Frame Bar. Refer to Crossbar Fabrication Drawing. With the parts clamped, drill the two 1/2" holes through the End Plate and Base Frame Bar. (You will likely drill a smaller hole first, then finish with the 1/2" drill bit)
4. Install 1/2" bolts and tighten nuts. Remove C-clamp. Do this for all 4 End Plates.
5. Now place the Crossbars into position. Use a large Carpenters Square to make sure the Crossbars are at right angles to the Base Frame Bars. When everything is lined up square, you are ready to tack weld the Crossbars to the End Plates. It is a good idea to use a couple of ropes or strong Bungee Cord to "compress" the Crossbars between the Base Frame Bars. You don't want anything to shift when the tack welding is going on.
6. Tack weld the Crossbar to the End Plates. Now mark the position with a stamp punch or drill small holes, so you will know how the Crossbar will go together again. Then, remove the 1/2" bolts and weld thoroughly all around. Don't get any weld on the face of the End Plate where it will be bolted to the Base Frame Bar. Refer to Crossbar Ass'y Drawing.
7. Now, bolt the Crossbar Assembly to the Base Frame Bars. Bolt on a caster at each corner, leaving about 4.25" clear at the ends

of the Base Frame Bars. You are now ready to fabricate the vertical posts.

#### C. FABRICATION OF FRONT AND REAR POSTS (Refer to drawing "Post Fabrication Details")

1. With the Base Frame bolted together and supported by 4 casters, place a Bottom Support at each end of the Base Frame. If there is clearance between the Bottom Support and the Base Frame Bar, add a suitable sheet metal shim on both sides. It is important that the Bottom Support sits snugly and squarely on the Base Frame Bar.
2. Attach the Front Cradle Supports to the cradle sleeves with a 12mm bolt. Attach the Rear Offset Supports to the cradle using a 3/8" bolt and nut
3. Place the front and rear posts in position on the Bottom Support at each corner. Bolt a pair of Reinforcing Channels around each post. If this action does not securely clamp the post to the Bottom Support, then you have likely omitted or forgotten to shim up any clearance between the Bottom Support and the Base Frame Bar. When all 4 posts have been clamped to their Bottom Supports, your structure is ready for a test fitting of the cradle.
4. Before lifting the cradle onto the posts, make sure the Front Cradle Supports and Rear Offset Supports are bolted to their positions on the cradle. You can now lift up the cradle and position it on top of the posts. Because the bottom is clamped, and top supports are bolted to the cradle, the cradle will sit quite stably on the posts.
5. With the cradle resting on the posts, you can tap the Bottom Supports with a nylon hammer to move them into the perfect position. If necessary, loosen the tension on the Reinforcing Channel bolts. All posts must be vertical. Rear posts should be aligned so that they are flush with the outside surface of the Rear Offset Support. Front posts should be centered under the Front Cradle Supports.
6. When everything is square and aligned, tack weld the posts to the top & bottom supports. When all posts are tack welded, identify each one with a metal stamp, or drill small match marks. After final welding, each post will be returned to the same position, to locate and drill the Bottom Support holes.
7. Remove the 12mm bolts at the front cradle sleeves, and the bolts holding the Rear Offset Supports. Then, lift the cradle off and set it aside. Now remove the bolts holding the Reinforcing Channels to the posts. The posts are now ready for final welding.
8. Take care when welding the Bottom Supports to the Posts. You don't want to get any weld or weld splatter where the Reinforcing Channels will be bolted on again. You can weld all around, but just make sure the weld will not interfere with the future clamped joint. At the top of the posts, there is no interference situation, and you can weld thoroughly all around.
9. When the posts are fully welded, you are ready for the final assembly.

#### D. FINAL ASSEMBLY

1. Place the Posts at their original location when they were tack welded. Don't forget to install the shims, if they are needed.
2. Bolt on the Reinforcing Channels, just fairly snug for now. You will need to be able to move the posts along the Base Frame Bar.
3. Lift the cradle up and place it in position. Align the Front Posts and install the 12mm front cradle bolts. The cradle will now pivot around the front cradle sleeves.
4. Now have a look at the rear cradle mounting situation. It is quite likely that the rear holes will not line up 100%, and that one of the posts may be taking all the weight. This can easily be corrected.
5. Align the Rear Posts so they are square and vertical. It may be necessary to enlarge the hole in the Rear Offset Support, or use a smaller bolt. If one post is shorter than the other, add a suitable washer between the top of the Rear Offset Support and the bottom of the cradle. When this has been done, tighten the bolts that hold the Rear Offset Support to the cradle.
6. Now, with the cradle bolted to the top of the structure, we can perform the final critical operation. We are going to locate the hole center and make a size-on-size hole to enable clamping the Bottom Supports to the Base Frame Bars. The reason we have left this to the last, is the basis of the very rigid and strong bolted connection that we need at the bottom of the posts. We want the full 4" of the Bottom Supports to be resting on the Base Frame Bars before we locate and drill the hole through the Bottom

Support and Base Frame.

7. Now tighten the 3/8" bolts that hold the Reinforcing Channels to the Posts. This will clamp and hold the posts in position.

8. Now we want to use the 3/16" pilot holes in the bottom of the Reinforcing Channel to act as a drill guide. It will be convenient to place the structure on 4 axle stands to provide easier access to the lower corners. You will need an assistant to help lift the structure + cradle up onto the axle stands. First, use a 3/16" drill bit to drill through the Bottom Support and Base Frame Bar, FROM EACH SIDE.

9. Now you have a choice. You can either drill the 1/2" holes in place, using a 1/2" hand drill, or disassembly the structure and open the holes up to 1/2" on a drill press. Since we have provided an accurate 3/16" pilot hole, either method will work.

10. Once the 1/2" holes have been drilled install the 4" long bolts (3.5" is long enough, but my supplier did not stock this length) and torque up VERY TIGHTLY. Also check that the 3/8" bolts through the Reinforcing Channel are also torqued up tightly. You will now have a very rigid and strong connection at the base of the posts. This is important, not because of the weight of the cradle/engine/transaxle, but in case you run one of the casters into an obstruction while wheeling the dolly around.

11. The structure is now complete. You may want to disassemble and paint all components, or provide some rust protection.

#### SOME FINAL COMMENTS

>From a safety standpoint, it is important that the cradle is bolted firmly to the top of the posts. This adds a great deal of strength to the structure, since any lateral forces, such as running one caster into a hole, will be transmitted to all posts. The cradle is reinforcing the structure. The limiting strength of this design is the impact force of the caster hitting an obstruction, when you are wheeling the dolly along. So, use care and common sense when manhandling the structure over uneven ground.

Finally, feel free to email me with any questions or comments. This is not necessarily the only or best way to build a cradle dolly, but I have described this design in a lot of detail, so that just about anybody with basic hand tools and a buddy who can weld, should be able to build it.

Good luck, and happy wheeling...

...Rick Kauffmann  
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