J-21 Tension Rod Brackets *By Bob O.*

IN A PREVIOUS SHOP NOTES article (J-16, "M3 Engine Cradle"), I fabricated a bolt-in replacement engine cradle to move the engine a bit to properly tighten my drive belt. I had to move the tension rod bracket to the underside of the cradle to clear the motor. My approach created a couple of new issues.

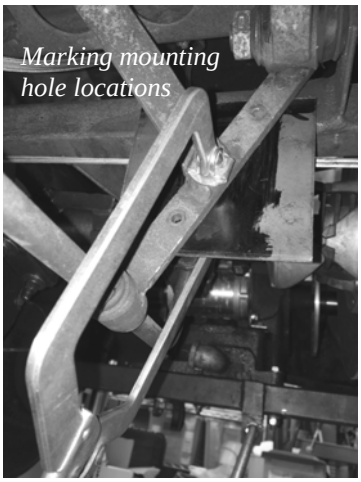
Moving the tail end of the rod down caused it to enter the isolator at enough of an angle to essentially bottom it out on one side. This partially defeated its shock-isolation capability, transferring more vibration into the car than it should, and eventually put so much strain on the isolator that the rubber began to crack and fail. Also, at this angle, the rod needed to be lengthened to fully tension the belt. I made do with a threaded coupler, a bolt, and a couple of jam nuts, but it was an inelegant solution.

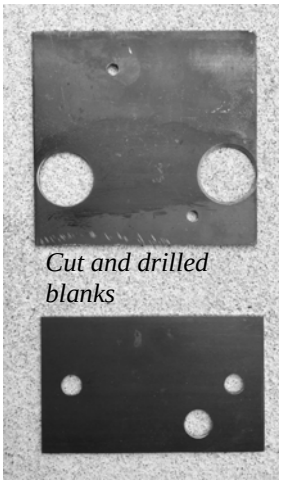
Frame-side bracket: To realign the isolator with the rod, I fabricated a bolt-in wedge-shaped adapter from 1/16" steel so that I wouldn't need to do any permanent alterations to the car. The adapter consists of a square piece that bolts to the frame, a rectangle to accept the isolator (McMaster-Carr p/n 64875K28), and filler pieces to set the wedge angle. This shape creates a "step" to clear the suspension subframe. Step-drilled clearance holes in opposing sides allow bolts to be installed during assembly.

Instead of trying to work this design out mathematically, I used a "cut and try" method. I clamped the square blank to the frame member to which the isolator was originally mounted to establish the mounting hole locations. To determine the wedge angle, I taped the bottom edges of the pieces together, installed the isolator mount, and bolted this assembly to the car. After threading the tension rod into the isolator, I trimmed cardstock triangles to fit as patterns for filler pieces. I fully welded all the seams for strength, and applied a few coats of red oxide primer.

The adapter first mounts to the frame, then the isolator bolts to the adapter using socket-head bolts and locknuts as shown. The adapter corrects the entry angle into the isolator and eliminates the need to extend the tension rod.

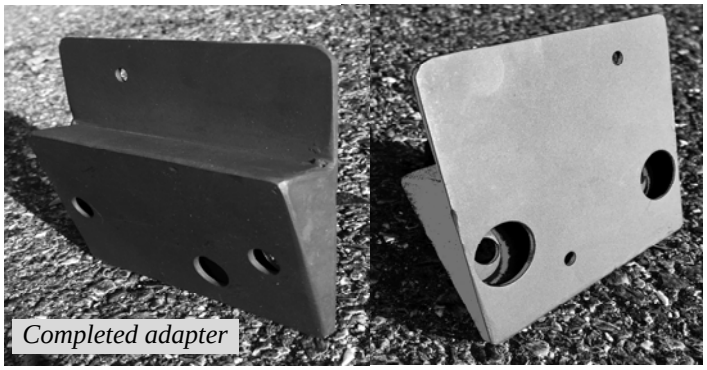
(continued)

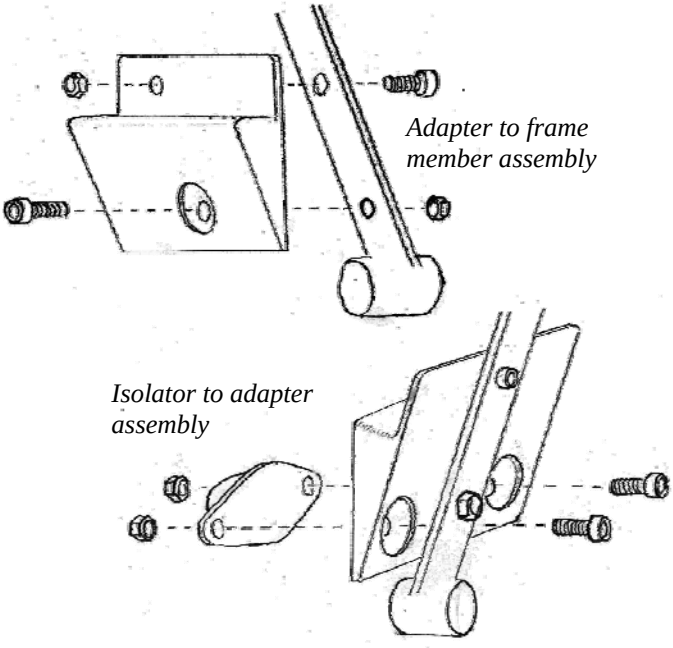

Marking mounting hole locations

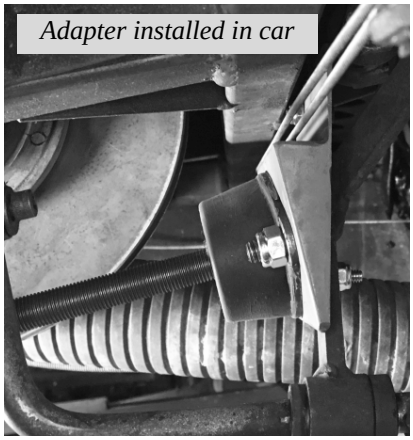

Cut and drilled blanks


Temporary tape hinge

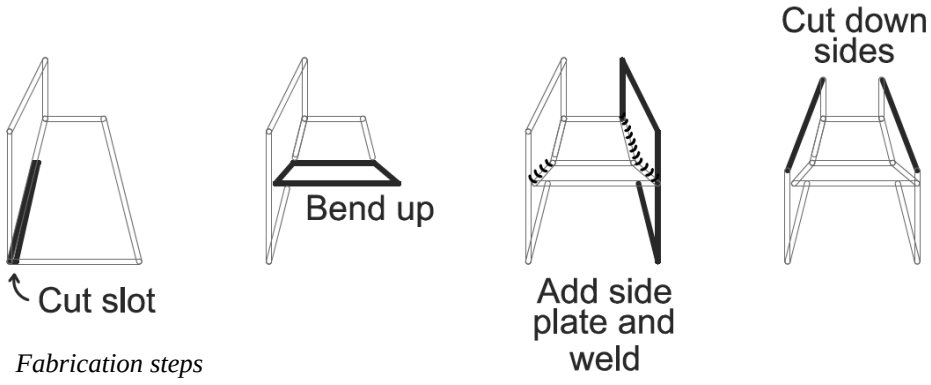

Establishing wedge angle


Completed adapter




Adapter installed in car

Engine-side bracket: I used the new frame-side bracket for a little while before the next weak link was exposed. My first attempt at the engine-side bracket for the tensioner was not strong enough, and it eventually cracked and failed where the rod passed through. Since I had been planning to pull the engine out for some performance and cosmetic improvements anyway, I took the opportunity to replace the bracket with a stronger piece.



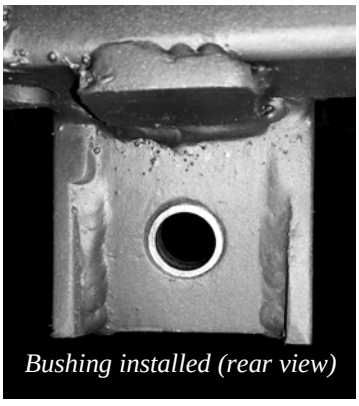
Fabrication steps

Prior to removing the cradle, I noted the approximate angle needed for the rod to meet the bracket at a right angle. Starting with two pieces of ¼ x 1-1/2" angle iron about 4 inches long, I used an angle grinder and a cutoff wheel to remove the "leg" from one of these to make a flat plate. On the other piece, I drilled a 5/8-in diameter hole, then cut a slot at the base of the leg about halfway up the piece. Next I used a vise and hammer to bend the free end up to the appropriate angle. I welded this piece to the flat plate to form a U-shaped channel. Finally, I cut the sides down to reduce weight and improve access to the tension rod hardware.

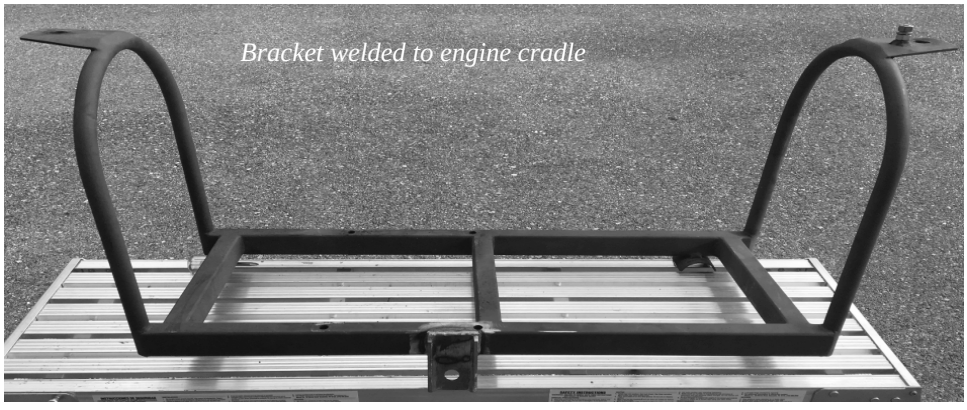
I welded this assembly to the engine cradle and gave everything a coat of paint. I ground down a bronze sleeve bushing (McMaster-Carr p/n 9440T21) to ¼-in thickness, installed it in the 5/8-in hole, and reamed it out slightly to keep the tension rod from binding during adjustment. I used a combination of grade 5 ½-20 jam nuts (McMaster-Carr p/n 94846A525) and a grade 5, steel insert locknut (McMaster-Carr p/n 90619A033) on the aft end to secure the rod.

A note regarding the tension rod: this is a critical piece of the King Midget drivetrain. If this piece bends, deflects, or breaks, it can leave one stranded or at the very least only able to limp home. If you need to replace your tension rod, I highly recommend using a high-strength piece (e.g. McMaster-Carr p/n 90322A166) instead of common hardware-store all-thread. It might even be prudent to slide on a length of ½-ID steel tubing and plug-weld it in a few places along its length to further stiffen the rod. ■

Completed bracket



Bushing installed (rear view)



Bracket welded to engine cradle

J. Engine Accessories