Suzuki T500 Exhaust Systems

Part 3

By Glen Morgan

THE CHAMBERS

(resonators or whatever you prefer)

To make chambers, you need cones. You can make your own cones, or you can get them made. If you get them made, remember that all tin benders are not created equal. Most are good, but some may not understand your requirement for accuracy. To work well the cones must be round in section and must diverge at the specified angle.

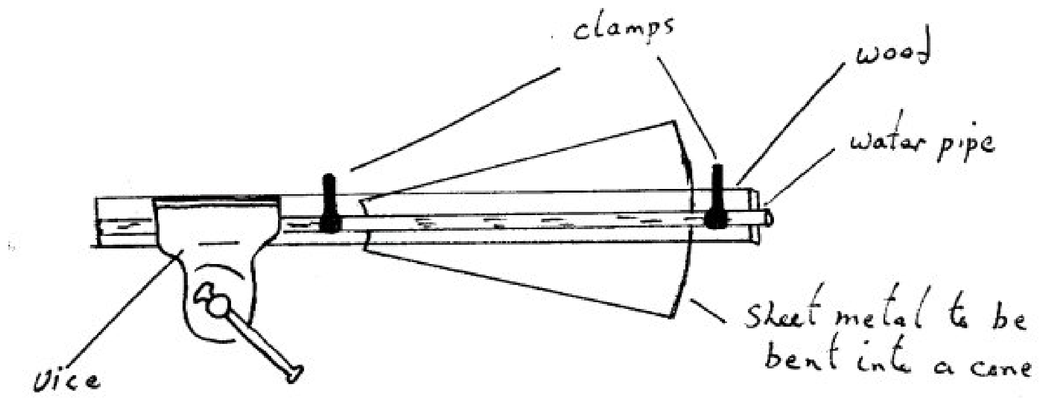
As this is a twin cylinder machine, they must also both meet the specification pretty closely. If they are more than a little bit different, the chambers will perform differently and one cylinder may be using up power to pull the other one along with it at some or all stages of the power delivery profile of the engine.

You can check the accuracy of the work by making a triangle of the specified divergence angle out of something like plywood and shoving it firmly inside the finished cone. This will show both ovality and conformity to your specifications quite clearly. But do make your test piece accurately.

Now to the business of making your cones without a cone roller, or other cone forming device. As I said earlier, I'm assuming that you know how to project the cone on a flat sheet of metal and mark it out because you've read a book about it. However, even the best tuning books that I've read make a heavy meal of explaining how to do it. Seek help if you're stuck. Metal workers and fitters know how to do it and there are sure to be some of these in your motorcycle club.

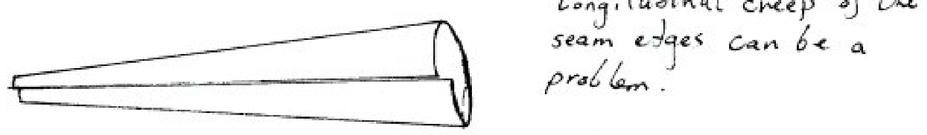
I have found that 20 gauge panel steel is about the upper limit for bending cones up by hand. I have used much thinner steel to make chambers for lightweight bikes without problems, but I have brazed them together, not welded them. If you are not a confident welder and not physically strong, I suggest you take this route for your T500. The difficulty with thin sheet though, is that sectioning it to achieve bends gets tricky. If thin sheet is the road you have to go down, you might consider the forward extending headers previously mentioned.

When I first tried my hand at making chambers, I used a vice with six inch jaws, 3 feet of inch water pipe, 3 feet of 4 x 2 inch timber, two F clamps (G clamps will do) and a lot of sweat and time.



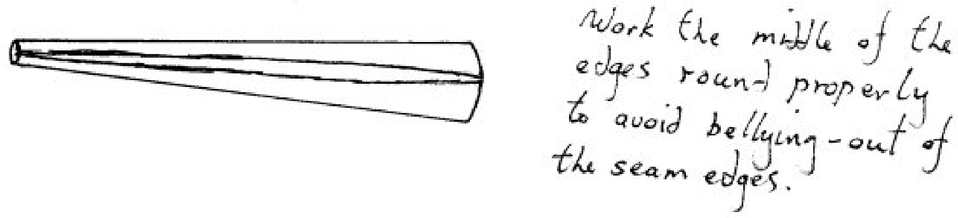
I clamped the wood and the pipe horizontally in the vice, then I slid the piece of metal to be formed between the wood and the pipe, with the smaller end of the cone-to-be at the vice end. The next step was to clamp the pipe and the wood together so that the pipe bisected the metal from end to end.

It is important to bend from the middle outward more or less equally in both directions or the edges will creep longitudinally and you wind up with a step where your seam ends should be flush. Too much of this will change the angle of your cone away from you design specifications.



Now, little by little, work the sheet metal around the pipe clamping and unclamping and moving the metal through a wider arc at the larger end. Then reverse the metal so that the small end faces away from the vice, and work the other half round bit by bit.

Finally, when the cone is pretty well formed, you may find that you need to hold a piece of wood flat against the metal and tap it around with a hammer. This is particulary so for the smaller end of the cone. You also have to be careful to work the middle of the edges around properly or you get a belly-out which makes aligning the edges for welding difficult.



I never said it was easy! Now you know why the books suggest you get a sheet metal shop to make your cones. However, with thinner metal, cones can be bent up round just a pipe with one's hands and a soft faced hammer.

So there it is: if you are a masochist, or just get a kick out of working with metal, what I have described is one way of doing it by hand.

Alright, so you want to weld them yourself too! You can pull the edges together using large pipe clips, or wire loops twisted up tight with a nail, I've even done this with string! Of course, you can buy vice grips and welders clamps, but that's too easy!

****Tack weld the edges. Start in the middle, then do a tack a couple of inches to the right, then a couple of inches to the left and so on out from the middle. There are other sequences. Do what works for you, then weld between the tacks working in a sequence if you must, but I just weld from one end to the other once the tacks are done.**

It's a good idea not to take the welds right out to the ends of the seams. If you have to trim a bit off the ends with snips, it is easier if you don't have to munch through the weld as well.You can button this seam up completely when you weld the headers and the belly section in.

It pays to make your cones a bit longer than you need at both ends. There is nothing worse than finding that your cone openings are too small at the belly section end and too large at the header pipe end!

THE BELLY SECTION

Make this longer than you think you will need it to be. You can trim a bit off if you need. Again, you can make trimming easier by not carrying the seam welds right to the end for now. Roll and weld it as for the cones (only it's a hell of a lot easier).

THE STINGER (bleed pipe)

I hunt around for a bit of pipe of the right external diameter and "dong" the sheet metal around it in the vice with a hammer. A small lap in the joint is fine. Just weld it up (but not with the pipe inside it. You will have the devil's own job getting the pipe out of the middle!)

Why don't I just use a piece of exhaust tube of the correct internal diameter? Well, exhaust pipe tubing is relativly thick walled compared to the sheet metal I have suggested. If there is a big difference in wall thickness it seems to concentrate the stress around where the stinger comes out of the chamber and it cracks at this point.

This may just be because of the extra weight bouncing up and down. Certainly, you have less problems if you have part of your stinger down inside the diffuser cone, where the weight is balanced more evenly across the weld that attaches the stinger. The stinger pipe vibrates at a higher frequency with less amplitude on either side of the weld. [Not the sonic frequency, of course, but lets not get complicated. It doesn't matter as long as the damn thing doesn't break!]