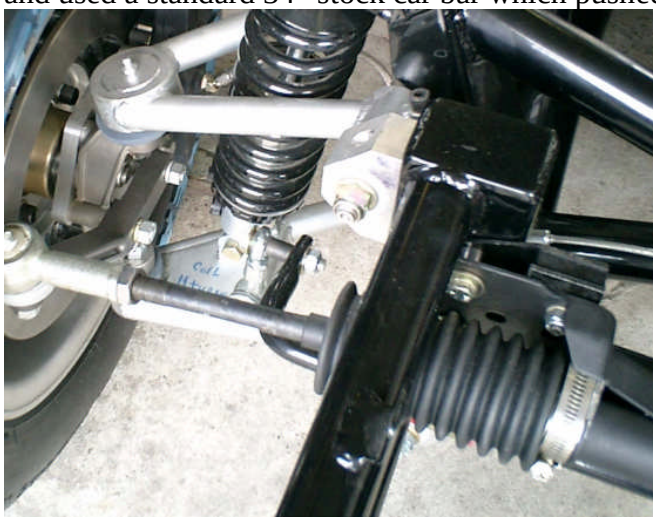
From the Bench September 5, 2006

Have Your Own Private Machine Shop!

During each project you've probably looked up at the ceiling and prayed that you either had a welding outfit – and the knowledge and skill to use it - or a fully programmable CNC machine to go along with your Black and Decker drill. Well the first item is easier to get around as you can always take pieces to be welded to your local Eckhart Trailer shop or if your need welding on your frame there are many portable welding outfits around that will come to your house and do it right in your garage. That just leaves the machine shop. Fortunately my company works with a couple of local "proto" shops and since I know them, it's easier to talk to them about project pieces but that's not the only option out there for us gear heads. Enter the internet, www.emachineshop.com to be exact.

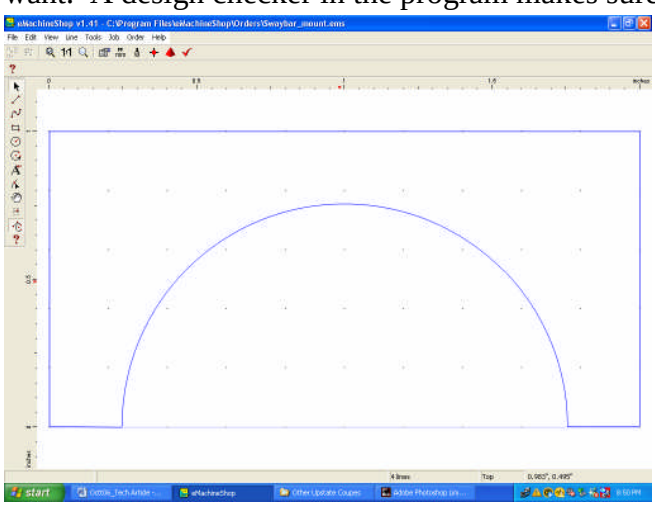
First let's start with the problem statement. On my Daytona Coupe project it was finally time to mount a front sway bar and I didn't like the original method that was part of the kit – it was period correct to a 1965 Daytona - but it was attaching the bar to the front mounting bolts on the suspension, which resulted in a sway bar with a 3.5" arm length. Can you say too stiff? With arms that short the front suspension had limited travel and the anti-roll properties sucked. Ever see a picture of a Daytona coming around a curve? Well first thing was to see how other Coupe owners did it. Other than the factory mount, the only other Upstate I could find welded a bracket to the frame (see above for welding) and used a standard 34" stock car bar which pushed it out further into the wheel well then I liked.

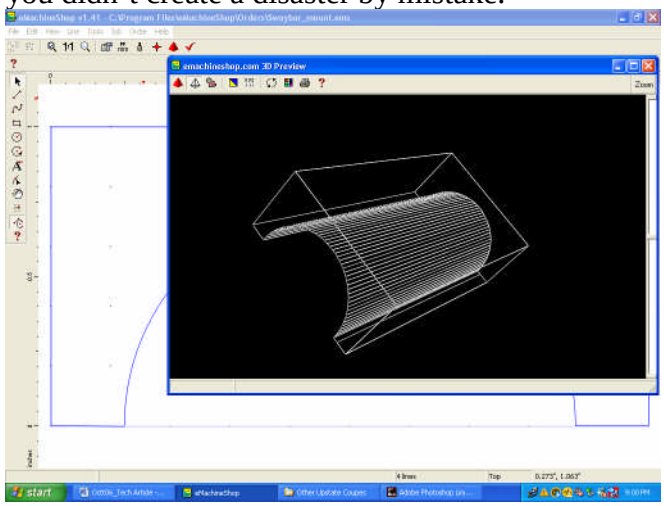


The basic problem with the Coupe is that it's an all tubular frame so there's no "flat" surface to be able to bolt a sway bar bracket to. If I only I had that CNC machine in my garage I could mill a block of aluminum to mold itself to the round bar while providing a flat surface for the mounting bracket. I thought about how to do it easy… maybe get a 2" block of aluminum and drill a 1.5" hole through the center, cut it in half to fit the bar like a sandwich? Well, ever price a 1.5" drill bit? Have a drill press that would do it? Then sand for hours to get the match to the bar correct (powder coat adds from 5 to 10 thousands to the diameter). Ok, now we're ready to talk about your own private machine shop.

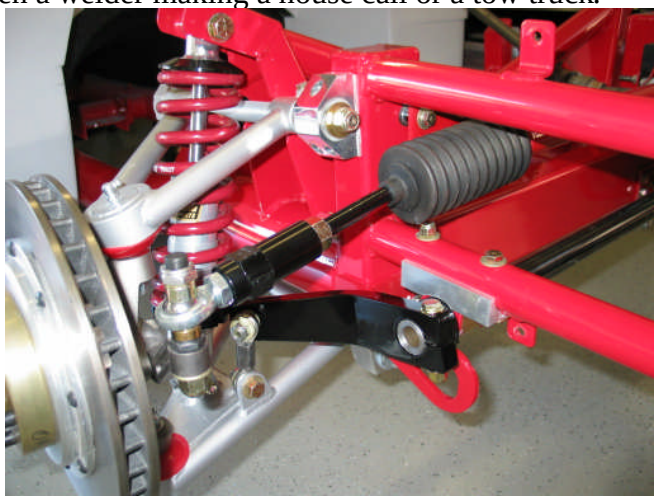
E-Machine Shop www.emachineshop.com is a real machine shop that has made it easy for people like us to get parts machined! Depending on what you want you will pay for the experience but if you remember a few basic tips, it can make a difference in your final project. They offer a down loadable CAD program (mechanical drafting program) that comes with an online tutorial and even a downloaded price list. Downloading it is easy and the tutorial lets you get right into the design. Since I had a good vision of what I wanted I started the layout. I first created a block that was 2" wide, 4 inches long and 1" high (this is one half of the block – 2 would be needed to sandwich the bar) - when you first create the basic part, e-machine forces you to select the material to be used from a downloaded list. I than created a half circle cut out that would be milled into the block and spec'd it at 1.56" diameter (takes into account the powder coat thickness). When you spec something you also need to specify the "machine" type to be used for that measurement or shape – hint #1: More machines used equals more

money. The program also allows you to view your design in 3D and rotate it to make sure it's what you want. A design checker in the program makes sure you didn't create a disaster by mistake.





When you're done you can "check price" which uses the downloadable price list to show you the cost of your part – hint #2: The more you buy the cheaper the unit price is, only one and you pay for it. Buy 10 and the cost drops quickly as the set-up of the machine only happens once so it's averaged against the total number of parts ordered. You can change the design and see the effect. Change the quantity and see the effect. I found I got an acceptable price by ordering 8 units – that's 4 sets of which I would use 2 – and by not having them drill the mounting holes. That added a second machining step which added cost and I still have my Black and Decker in the garage. When you're ready, you submit your order through the internet and they give you a confirming order number along with a lead time for the parts. Cost came out to $32 each which is way cheaper then a welder making a house call or a tow truck.



The parts showed up packaged as you see above with very nice packaging. The finish on the parts was smooth with no imperfections and could easily be polished if you wanted to. When I dry fit them to the bar they slipped right into place without any forcing past the powder coat. Drilling the holes was simple and the entire thing fit together like you see above. After playing with it a little, I decided to not use a top piece and sandwich the bar like I first thought and keep it simple.

I also found a great place for NASCAR style sway bars run by the greatest people. Speedway Engineering www.1speedway.com up in Sylmar were able to take a standard 34" gun drilled bar, cut it down and re-spline it for only an additional $50 so what I got was a 30" bar that doesn't stick out too far and steel arms, all for less than $250. I made a template of the arm offset in foam core and they bent the arms for me on their 20 ton press free. A little black Eastwood powder coat and the arm length is now 7" instead of the factory 3.5", which along with a sway bar that can now be quickly replaced to change the anti-roll rate is a great improvement on the design. I would have gone to a longer arm but the radiator and shrouding gets in the way so the next open space is 20 inches out and that's a little long.

Enjoy and let me know when you get the CNC installed in your garage!