

A while back, I made an inquiry about replacing the Std. Cirrus brake cable. I received some good responses which sent me in the right direction, but as the job progressed, I ran into some complexities which were a real learning experience. I thought for the possible benefit to others, I'd pass along some of what I learned.

First, on my ship the adjuster tube had corroded and had broken in two so that it was no longer able to hold the cable straight and the adjustment nut could not be used. The only way to replace the adjustment tube with nut is to remove the cable from the airplane and install a new cable and tube assembly. The question, then, is how is the new cable installed with the proper fittings secured on each end.

My original cable had a brass ferrule silver soldered on each end. Since the cable has to be passed through the cable housing which is permanently attached in the fuselage, this necessitates finalizing the installation by soldering the second ferrule at the gear end of the cable after threading the cable through and slipping on the new adjuster tube/nut assembly. Sounds simple enough, right? Well, the rub comes in the attachment of that second ferrule. Accomplishing this on your back under the gear well adds to the challenge.

Now, I had the choice of duplicating the original attachment method (silver solder), or perhaps using a swaged fitting, which was mentioned by one respondent. After talking with a few sources of swaging equipment, I thought the soldering the preferable path for me. In the first place, I would have to make a swaging die of my own to get a dubious result with the stainless fitting available, and second I had soldered before.

Well, What I hadn't done before was silver solder on stainless steel cable. After several trips to the local welding supply store for advice and materials, followed by nothing but negative results (blackened wire and no solder flow), I finally came across a welder who shared his knowledge and technique with me.

I follow with the procedure which finally worked for me, but first I should specify what materials I used. I started with 1/16 stainless steel control cable which I cut to the exact length dictated by using the original cable as a template. I procured my first brass ferrules from a local Harley mechanic who still had one of the old cable building kits, but found that they were a little too large in the bore diameter, so I ended up machining my own on my Unimatt lathe out of 1/4" brass bar stock from the local hardware store (See Diagram 1 below). I found it was important to bore the ferrule out just a few thousandths over the cable diameter to allow capillary action to do its job in drawing the solder into the joint for maximum strength. Otherwise, the other dimensions of the ferrule need only be appropriate to fit into the bracket at the brake arm end and the brass button at the lever on the stick in the cockpit. As for the adjustment tube, I was lucky to find a suitable replacement at my neighborhood bicycle shop, but I had to make the rounds of several other shops, including several motorcycle shops, before finding the right thing. By the way, motorcycle shops proved useless as a source as they only deal in made-up cable assemblies for production bikes, not individual parts. I was only lucky to stumble upon the Harley guy.

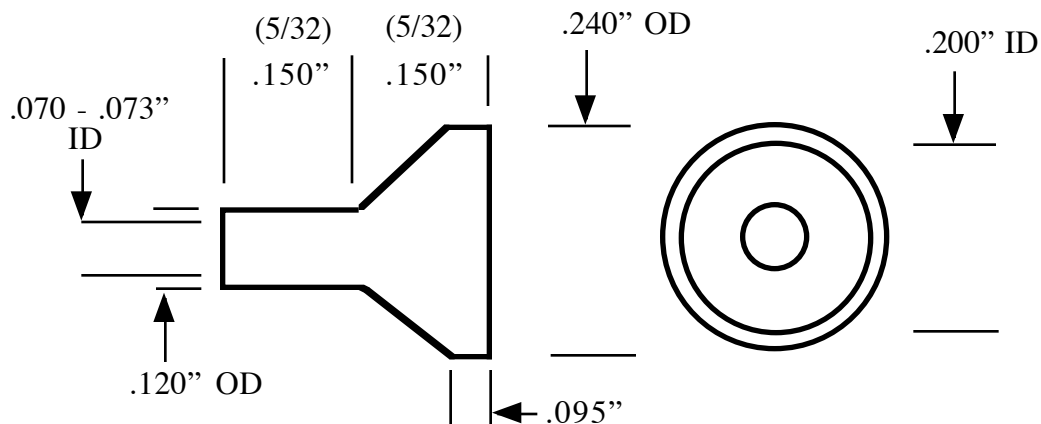
Here's the scoop on the soldering task. To begin with, stainless steel cable is manufactured leaving an oil residue on the individual wires. Any effort to heat the cable to the required temperature for solder to flow produces a black carbon residue on the wire which then prevents the flux from working and, as a result, soldering is impossible from that point on. This necessitates the following procedure:

1. - Pickle the wire in an acid bath (muriatic acid soln.).
2. - Sand blast the last 2-3 inches of the wire with glass beads. Sand blast the ferrule as well, paying special attention to the inside surfaces. Blow off residue with compressed air.

3. - After slipping the ferrule onto the wire, apply flux liberally to all surfaces of ferrule and wire (use the paste form of flux mixed with enough water to make a slurry like peanut butter).
4. - Flare out the individual ends of the wire cable at the end so that you can tip the cable end down and the ferrule can be snugged tight against it.
5. - With the wire and ferrule pointing downward, apply heat slowly and evenly around the ferrule while the flux bubbles and penetrates the wires of the cable (I used a small butane lighter / torch by Lenko) and, when you get the ferrule to a dull glow, apply solder wire at the point where the cable and barrel of the ferrule meet.
6. - Continue to apply solder until it flows down to the end of the cable and and collects around the splayed wire ends in the bowl of the ferrule. Care must be taken while doing this not to allow the flame to heat the wire ends to red or you will get the dreaded blackening.

This procedure gives a very strong result..It was a frustrating experience making what at first appeared to be a rather routine repair, but, then, all good learning involves some adversity. I might have been just as successful with the swaging option, perhaps with soldering involved to boot, but at the time that appeared to be a time-consuming and doubtful route.

Diagram 1



Note: The above dimensions are nominal and only presented as a guide. As mentioned in the text above, the critical ones are the bore and the overall diameter of the bowl. I believe I used a #49 or #50 drill for the bore and relieved the bowl with a 3/16" (.1875") drill bit.