

# How to Replace a Rear Downtube

## 52-72 K & Sportster

By the OSKRG vs.1



### Tools Needed:

- Torch
- Silver Solder
- Welder
- Pipe Wrench
- Punch
- BFH
- Workbench
- Clamps to Secure Frame
- Hacksaw
- Reamer
- Fixture to Properly Position Replacement Tubes

**Note:** The following steps are for the removal and replacement of a cracked/broken rear downtube. For thoughts about the removal of a “Booger Welded” broken downtube see my note about it at the end of this document. The installation of a new tube would be the same after the removal of the old tube.

**Steps:**

- 1. Determine that you have a cracked tube. When you are looking at a frame to purchase carefully check the rear downtubes. In my opinion these are probably the leading frame issue along with cracked kick stand brackets. If only one tube is broke it can be easily missed. As can be seen in the following picture it appears as an ever so slight crack line.**



**You may be able to observe the crack looking down the tube with a light. I was able to feel this one with my finger on the inside of the downtube.**



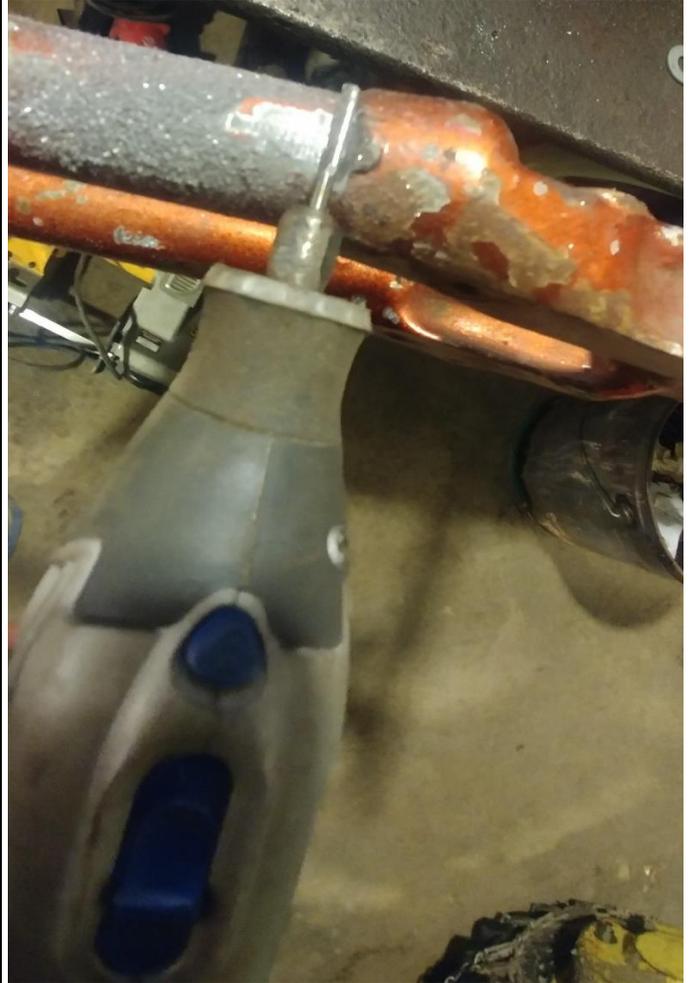
2. Mark the leg to cut a section out. You will want to remove the top and bottom of the old tube separately.



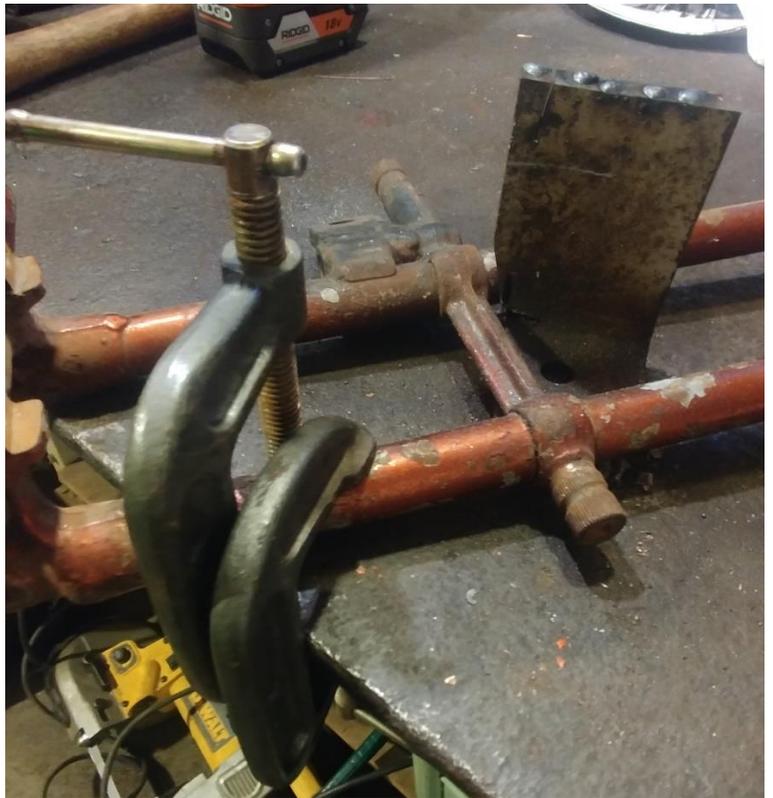
3. As can be seen in the following picture, when I made my first cut to separate the top and bottom pieces of the downtube the top half dropped to the floor. Even though the crack at the top was barely visible it was not secured at all.



4. There are usually two tack welds securing the tube at the top to the seat casting and at the bottom to the "Tomahawks". These will need to carefully ground out. You can go deep into the tube section that is being removed but try not to dig into the castings much. Even though there may still be a slight amount of weld left when you heat the spot out of the casting and tube to melt the silver solder the left-over weld will break loose when a force is applied.



5. You will now need to significantly heat the casting and downtube section. I bring the casting to almost a dull red. It is kind of like tightening a bolt to a quarter turn before it breaks. You want to get the casting and tube hot enough to melt the silver solder but not so hot that when you twist the downtube section with the pipe wrench that you “tear” the casting. You will need to secure the frame in place so that when you turn the pipe wrench the frame stays put. You may need to keep applying heat while twisting with the pipe wrench. Once the tube breaks loose you may be able to twist it up and out or down and out. I had to grip the downtube with the pipe wrench and hammer the wrench up and out while everything was still hot.



For the downtube removal I'm documenting here, only the very top portion of the downtube remained in the seat casting. Since none of the tube was protruding below the seat casting the pipe wrench twisting method could not be used. I first tried, after sufficiently heating the casting, to drive the piece out with a piece of pipe. It wasn't working so I used a punch and the BFH from the top side to pop it out.



Shown to the left are the pieces of the original downtube and the replacement downtube.

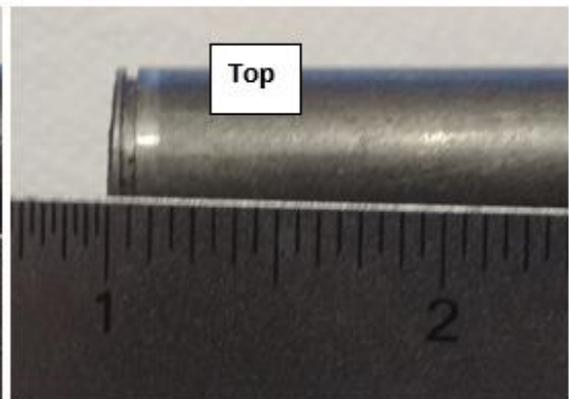
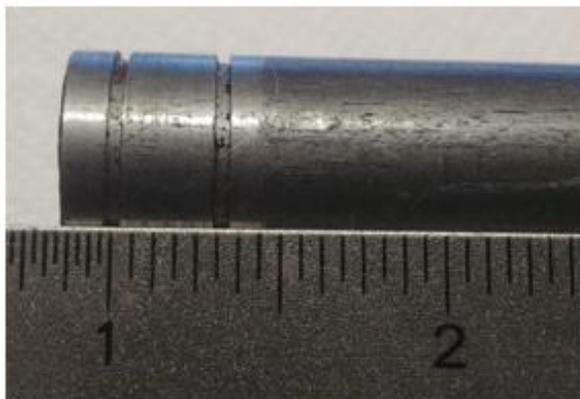
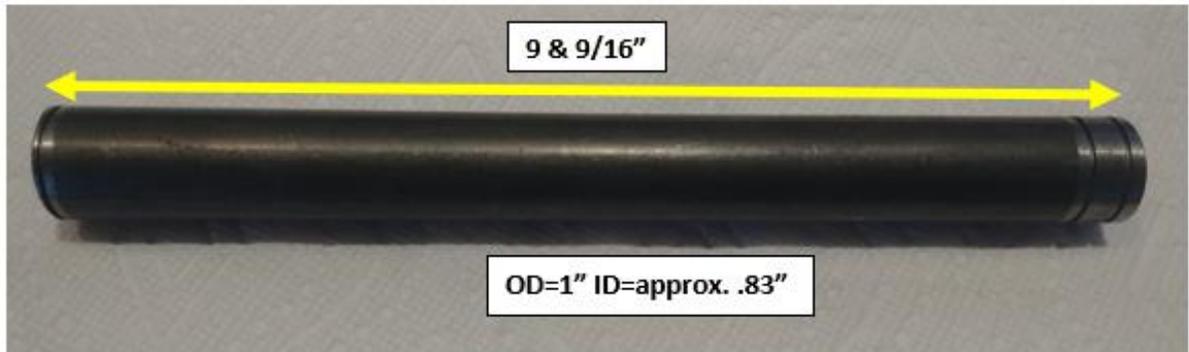
6. Both the top and bottom castings will now need to be reamed out. There will be silver solder or part of the tack welds that will make it difficult to insert the replacement downtube. It takes a 1" reamer.



The replacement tube may not exactly line up from top to bottom. Rather than put strain on the tube by muscling it into place take a 1" drill bit and relieve the top casting ever so slightly. To provide the right angle for tube alignment a minimal amount of adjustment is needed.



I had the replacement tubes made out of Chrome Moly steel. I had a machinist cut the groves and the tubes to length. On the originals the single groove is on the top and the double groove is on the bottom. The dimensions follow for tubes used on 52-56Ks, 57-66 XLs, XLHs, XLCHs & 67-69 XLCHs. I have not measured the replacement tube lengths needed for 67-69 XLHs and 70-72 XLHs & XLCHs.



7. The replacement tube position relative to the top and bottom castings is important. I have a fixture I made that bolts to the top seat casting seat plunger hold down plate bolt holes and to the lower rear motor mount bolt holes. This will set the spacing between the lower "Tomahawk" casting and the upper seat casting. The fixture pictured below has additional appendages because I use it for positioning wedding bands, coil bosses, seat mounting tabs etc. The tube within this spacing has some play up and down that needs to be positioned properly. The top seat plunger bushings need to fit into the top casting and downtube so as to not protrude above the casting or significantly below.



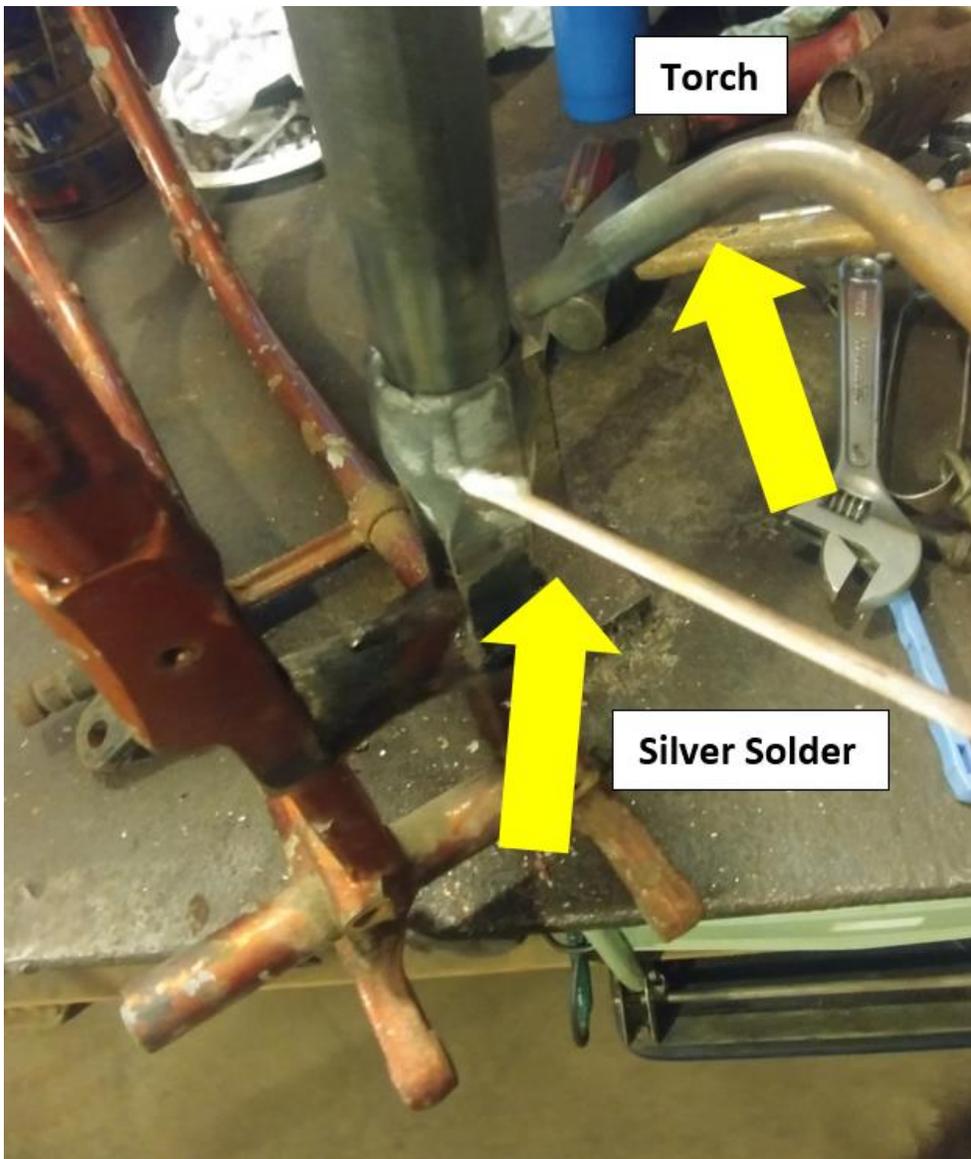
8. Wire brush or use some other method to clean the replacement downtube and the casting holes that the new downtube will be inserted into. After tack welding the tube in place you will need to silver solder it. Your tube and casting will need to be clean.

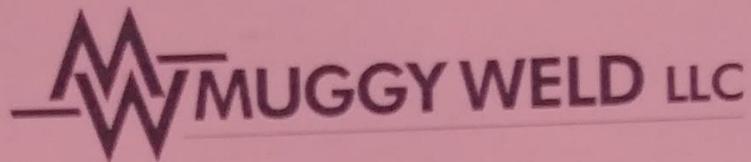


9. With your fixture holding components in place, tack weld the new tube in place. I try to place the tacks in about the same position the original ones were in. I also try to make the tacks look factory. I would practice making your tack welds on a piece of scrap before I would tack the frame.



10. You will now need to silver solder your replacement downtube. I have been using “MuggyWeld” silver solder, it seems to work well. I would recommend looking at the MuggyWeld website on how to use their rod first rather than after you try using it. I also used the flux they sell.





### SSF-6 Instructions

1. Prepare metal using sand paper, emory cloth, wire brush, Dremel tool, steel wool, a sander, or a wire wheel.
2. After cleaning metal, preheat generally to 350° F  
Heat the joint area to 800° F.
3. Melt off some flux and allow it to flow throughout the joint.
4. Add alloy while heating the deposit and the parent metal until the deposit has completely flattened and flowed out.

### SSF-6 Tips

- Clean base metal before soldering.
- Never heat metal bright red, as this can impede the flow of SSF-6.
- The key to any brazing or soldering with a torch is a fair amount of preheating of the adjacent work area. Broadly preheating beforehand reduces the surrounding metal from pulling heat away from the targeted area. This will always ensure a better result.
- Allow the flux to work momentarily before adding the rod.
- Flow out each drop of rod before depositing more.
- If the rod balls up, the base metal is too cold-- back the brazing rod up and heat the base metal in a broad fashion.
- A flat braze will result in the best seal and bond.
- Almost any torch can be used, including: propane, MAPP gas, natural gas and air, straight acetylene, or oxy-acetylene. The cheap brass tips do not work well in most cases. On thin metal or small parts, propane or MAPP gas works fine. Use an oxy-acetylene with heavy gauge metals.
- To build up, use slightly less heat when depositing rod. To bridge small gaps and holes, apply some rod around the hole or gap then use less heat to bridge the desired area. More heat will make the rod flow thinner and it can fall through.
- If the rod is in place and you want more flow, add more flux.
- After brazing, let the part air cool naturally to achieve the highest strength.
- Warm water and a wire brush will remove any remaining flux.

**11.Finished sandblasted product!**



# **Removal of a “Booger Welded” Downtube**

## **Some Thoughts**

The removal of a booger weld “repaired” downtube is more of an art form than a fixed procedure. My approach is to cut out the center portion of the old tube leaving a top and bottom stub large enough to get a pipe wrench on. Using a Dremel grind away as much of the weld as you can without cutting into the casting any more than you must. If you get lucky and have not cut into the downtube stub to the point where it breaks under the twisting force of the pipe wrench it may break loose. Remember you need to get the casting and tube almost dull red hot. As before be careful not to tear loose any of the casting metal.

If the previous approach doesn't work, I would try grinding the tube flush with the casting and by doing so remove most of the weld. I would then take a Dremel and try grinding the tube into two halves. I would then heat it to the point where the silver solder should be melted and try driving the halves out with a punch and the BFH. The top casting will be much easier than the bottom since it is a pass through.

If this doesn't work either it's time to try drilling them out being careful not to remove any/much of the casting. Good luck.