Welding

General

- You control slag deposition in 3 ways…travel speed, arc length, and angle of electrode. Experiment with all 3.
- 1.6mm: much flux in relation to metal in the rod, so you have a huge amount of slag and a small weld pool which makes it hard to maintain the arc length properly. 2.5mm are probably the best to learn on as there's a nice ratio of flux to metal in the rod, they burn down at a rate that's not too fast, and don't generate huge amounts of heat like 3.2 or 4.0mm rods do, meaning you don't need thick chunks of steel to practice on. 2.0mm are better than 1.6mm, but still more tricky
- using 1.6mm rods too springy , difficult to control not enough deposition,to much slag , difficult to find the right current settings 2mm is way better but I still prefer 2.5mm, easily weld 1.5mm sheet metal with them using 60-70A DCEP.
- **Try DCEP**, with DCEN the electron flow is from the rod into the fillet/joint the rod is about 2000°c and the metal about 4000°c which puts more heat into the parent metal being welded. If you use DCEP the electron flow is reversed as well as the heat bias, the filler material/rod also melts at approximately twice the rate thus the filler material deposit is approximately twice, which will produce a fillet fill easier. On 2mm steel you can easily run 2.5mm on DCEP with decent results.

Fillet T-joint

- **Higher amp for T-joints** then for flat (2 surfaces). 6013's need to run real hot on an inside corner or you get slag inclusion.
- 80-90A for a fillet (for your av 6013, 2.5mm), and you need to travel right, and get the arc length right. You should see a sort of meniscus forming, like a quarter of a circle, just behind the arc. When that happens, the molten steel is joining both pieces. If that doesn't happen straight away, pull the rod away a touch (lengthen the arc), move very slowly until that shape forms. Once it does, you can shorten the arc again and travel at the right speed to keep it going. It's all in the weld pool, that's what you have to watch.
- In T-joint hold rot 30-35 degrees from horizontal plane, to make sure that enough is deposit on the vertical plane. Gravity will take care of horizontal plane

6013 do's & don't

- Work on clean metal. It's not a deep penetration rod and therefore does not burn though surface contaminants very well.
- Having a slag stringer in the start of a 6013 bead is very common. What you are seeing is the heavy flux on top of the weld pool, and not molten metal. Getting a slightly slower start to the weld bead will solve this problem. A little hesitation before moving the rod will give the puddle time to bridge between both surfaces and solve this problem.
- **Establish a weld pool at start**: Try pausing when you first strike up so that a puddle can form and slow the travel speed down a little for the first inch. Try doing a very small circular motion

at the start.You can see when the pool has formed by the bright semi circular ring at the trailing edge of the arc.
- Small 6013 rods (2.4mm or less) take a different technique. They need a real short arc and up the current to compensate.There is more slag than metal, so you need to keep the rod under the slag. They need to be dragged as the metal burns back more than the flux. Look a a used rod and you'll see the metal is recessed. Keep the angle at about 70 degrees. Too vertical will allow slag to flow ahead of the weld.
- Arc length, electrode angle, current settings, welding speed, can all affect the formation of the pool,
- holding too long of an arc length, and it is difficult to manipulate the metal where to go. Put the rod right into the crack
- **1.6 rods are difficult to learn** 2mm aren't much better. 2.5 are the best place to start, you can get away with a lot, but picking up bad habits isn't easy, with 3.2mm rods you can just drag the end of the rod on the metal and it will weld, try that with a 2.5 and you will find problems. 1.6mm rods burn away faster than a sneeze and are hard to control.
- 1.6 and 2mm 6013's violate the “standard” for arc welding. You need to drag the rods, not maintain a gap. They will maintain their own arc length inside the flux coating. You will find on the back side of the rod, the flux will extend down to the weld pool and maintain the correct arck length. If you lift the rod, the flux will get in front of the weld and you will have problems of slag inclusions.

Alternatives

- 6010
- 7018 (7016)