Paragon Machine Works

Materials

Can I weld 6/4, 3/2.5 and CP titanium together?

- Yes, they are all compatible
- The best filler rod to use is 6/4 ELI

What are my options for brazing stainless steel dropouts?

- *Information courtesy of Dave Boehm at Bohemian Bicycles.*

Stainless steel cannot be brass brazed, but it can be TIG welded and silver or bronze brazed. There are many different types of joints, at least 50 standard brazing formulas in both the bronze and silver variety, and a right way and wrong way to braze them.

Typically the recommendation is to silver braze stainless steel dropouts. There are also bronze based fillers which can braze stainless steel very well. Usually they are a touch higher in nickel to wet out the surfaces of stainless steel. If using silver, one must choose it wisely. 56% is not the best choice for a joint where there will be large clearances to bridge. It can be done, but silvers that are in the 40% range and have high copper and nickel contents are usually preferable.

Designing the joint well is important and depends on the size of the stay versus the size of the dropout. If there is a large gap, you can create a split sleeve out of a piece of rod that fills up the space and leaves a small gap of a few thousands on either side. Silver brazing excels when clearances are low. It can make extremely strong joints with shear strengths that are comparable to a TIG welded joint.

The other thing to consider is cleaning and preparing the metal. Most failures you see in stainless steel brazing result from dirt, contaminates, and not preparing the base metal properly. Stainless steel builds an oxide on the surface that prevents corrosion when exposed to oxygen. This oxide has to be

mechanically removed before brazing or you won't get a well bonded joint. TIG welding is less affected by contaminates as the process is hot enough to blow through the oxide, but preparation of the metal is still recommended.

In summary, when brazing stainless steel, use the proper alloys, design your interface well, and most importantly, clean, clean, clean.

We recommend Cycle Design as a good source for silver alloys, and welding and brazing supplies for the frame builder.

Can you use the same cutting tools to work with steel and titanium?

Our experience with cutting tools is that once a tool is used for steel, it will never do a good job in titanium. There's something about steel that takes the fine cutting edge from a tool. If you can afford to, try and have a separate tool that you reserve for titanium frames. Also, NEVER turn a reamer backwards, it will dull that fine edge you need for titanium. Lubrication is important. The best we've found for titanium is Canola oil, the same stuff you buy at the grocery store. It leaves a gooey film behind, but if you wash the frame promptly it will clean up.