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AMERICAN IRON OFFROAD BALLJOINT DELETE

Words & photos by John Herrick

The balljoints used in many axles found in Jeeps and trucks, and the axles being sourced for projects like tube chassis buggies, are a potential failure point but the acquisition cost is often far cheaper for these axles than their kingpin counterparts. Balljoints are generally considered to be inferior in hardcore use versus a kingpin setup and become a maintenance issue as they need to be replaced on a regular basis if used aggressively. Many companies have tried to design better offroad balljoints; American Iron designed a product to delete the upper balljoint altogether.

I spent the day with Chris at Rockhound Offroad in Auburn, California. He's a fan of the Ford Super Duty D60 found in Ford's heavy duty trucks 2005 and newer. The axle he has in his wife's 4Runner is from a Ford truck. The unit bearings are massive, the 1550 U-joints are huge and the overall strength of the piece is quite impressive. But the truck axle was never designed for impacts and hardcore offroad use, instead it was built to support weight and do 300,000 miles hauling stuff. It has many great attributes for an offroad axle under a light vehicle but Josh Dodsworth at American Iron thought he could improve on the upper balljoint that takes the heart of the abuse. Josh and Chris were introduced and I went to Auburn to watch the install and get Chris' opinion on this product after Josh sent him a Race Series balljoint delete kit.

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In its basic form, the balljoint delete kit comprises six pieces in the '05 Super Duty units we got. There is a 7075 aluminum split tapered bushing with a steel cone washer, a 170,000psi tensile strength through bolt and low profile vibration resistant nut, a 7/8" FK spherical bearing and a direct fit machined cup for the bearing that is welded to the knuckle. These pieces make up the Race Series delete kit.

The split tapered bushing is designed to allow the installer to set the caster by grinding the edge of the bushing in advance of install, based on what caster needs to be used. Chris had already marked the bushings for left and right and had chosen a grind profile that would give him +3 degrees of caster. He gave this a fair amount of thought, especially as it relates to home shop installers, and thinks that American Iron should have their CNC mill actually make marks on the bushing indicating +3, even, and -3 degree cut marks. This would make it easier to get it right.

The first steps involved getting the knuckles off the rig. It's a straightforward process of removing tire & wheel assembly; remove the rotor, then four bolts holding the unit bearing prior to prying the axle shaft assembly out of the axle. Then the knuckles are ready to be unbolted. Once that was done Chris went through and verified everything was the way he wanted it with how the new bushing would be cut. This was a cut once after measuring about six times, type of process. He's a smart guy and was thinking about the potential pitfalls of someone that might not have his experience.

The process itself is fairly simple. It goes like this and will be detailed in the captions to the photos.

Step 1: Weld the machined cup into place on top of the knuckle.

Step 2: Insert the bushing into the C.

Step 3: Attach the knuckle to the C and put the nut on the lower balljoint.

Step 4: Place the steel cone washer on top of the bushing.

Step 5: Insert the bolt through the bushing in the C and bearing in the knuckle.

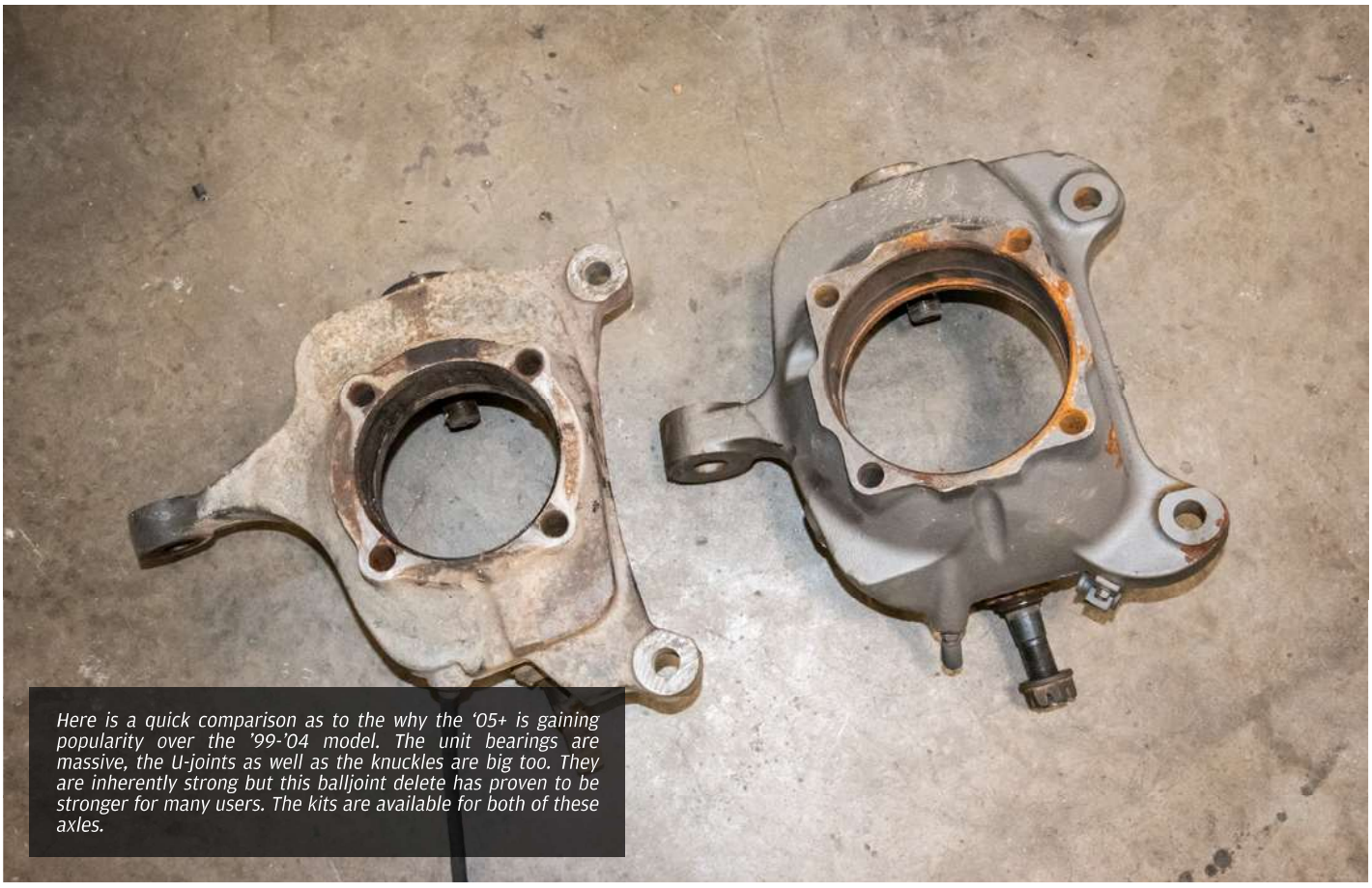
Step 6: Torque the locknut onto the bolt.

Chris gave me an almost immediate assessment driving down the road and said they had a nice feel, like having new balljoints, but they were solid. Turning was good and he's hopeful that his offroad and street use of the 4Runner will give him a good idea about the longevity of the product with real world use. The delete kit in the Race Series is designed to be adjusted over time as the split bushing and steel cone washer can be further compressed if there is any wear. It seems reasonable to assess these on a regular basis with the thought that they would only need to be torqued to spec.

If you have a Ford '92+, '99-'04, '05+ Super Duty D60 or F450/550 setup, or a Jeep JK D44/30, American Iron has a balljoint delete system for your front axle.

Contact Josh at www.facebook.com/AmericanIronOffroad or call him at (660) 415-7909. **[C]**

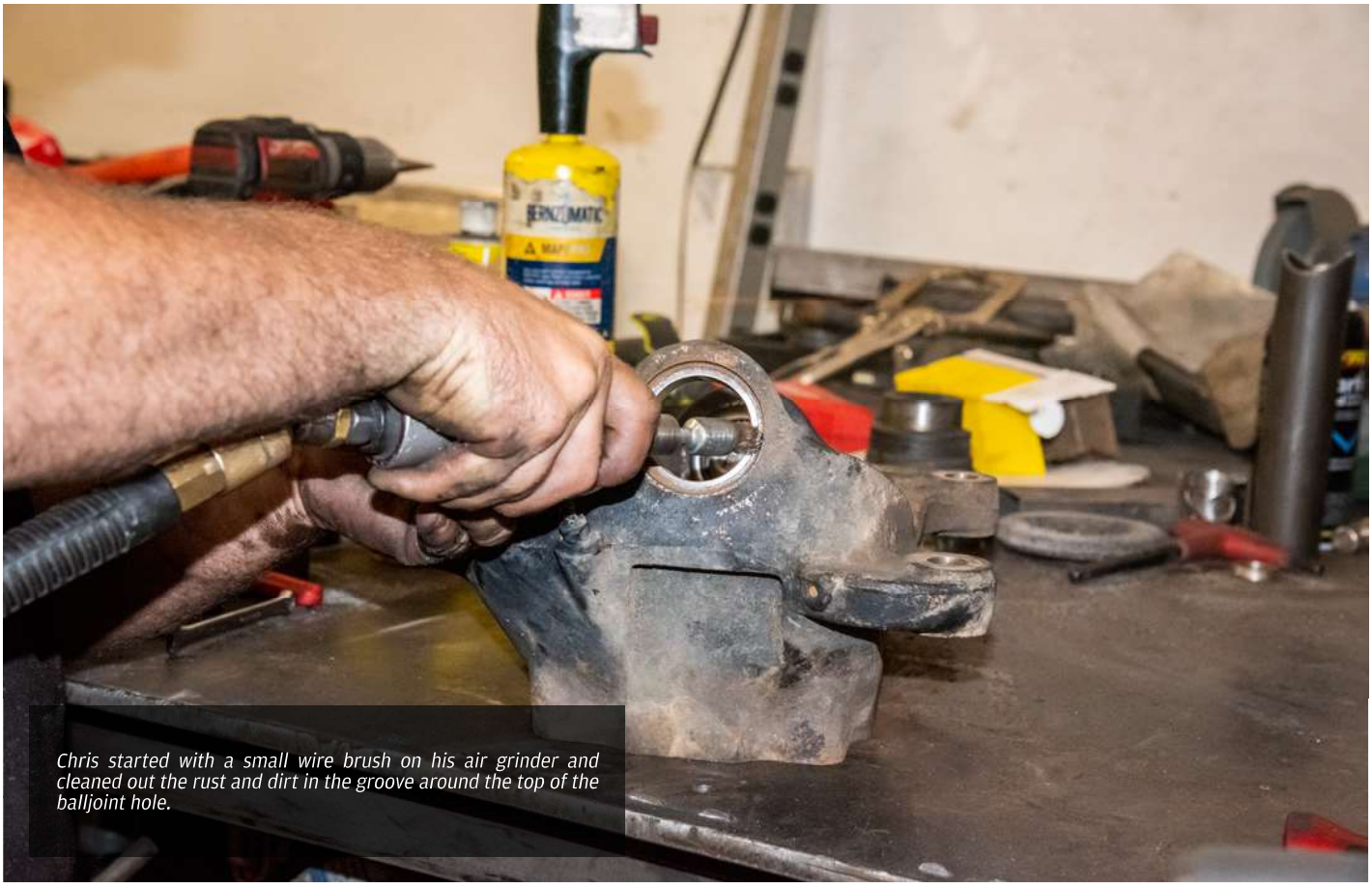
This is a view of the top of the stock knuckle & C on the '05+ Super Duty axle. The balljoints are big but they were never meant to run into rocks and take big impacts.



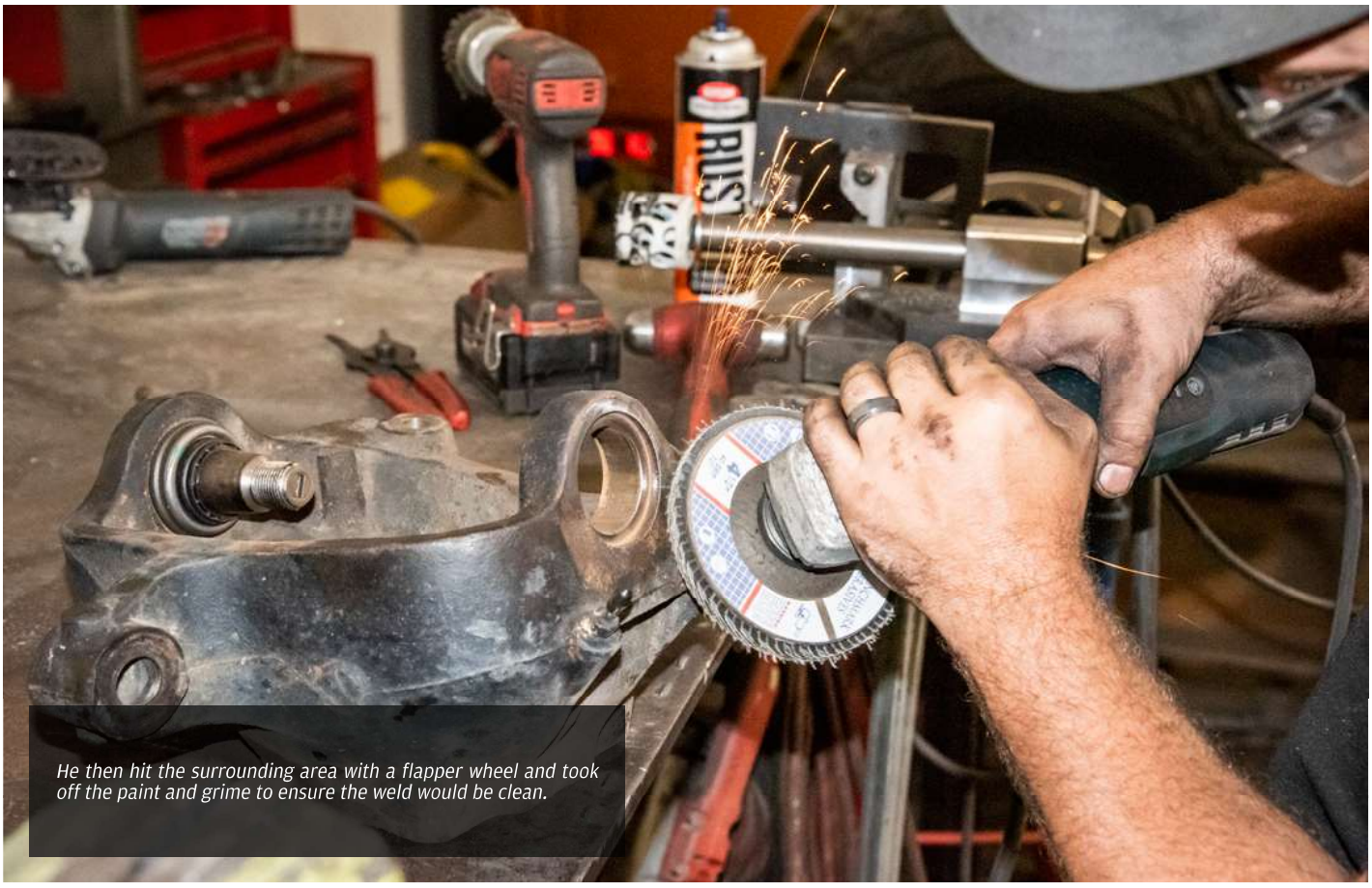
Here is a quick comparison as to the why the '05+ is gaining popularity over the '99-'04 model. The unit bearings are massive, the U-joints as well as the knuckles are big too. They are inherently strong but this balljoint delete has proven to be stronger for many users. The kits are available for both of these axles.

This is the FK spherical bearing that rides at the top of the knuckle and provides the pivot point for the balljoint delete. These are about the best available bearings on the market and should prove durable.

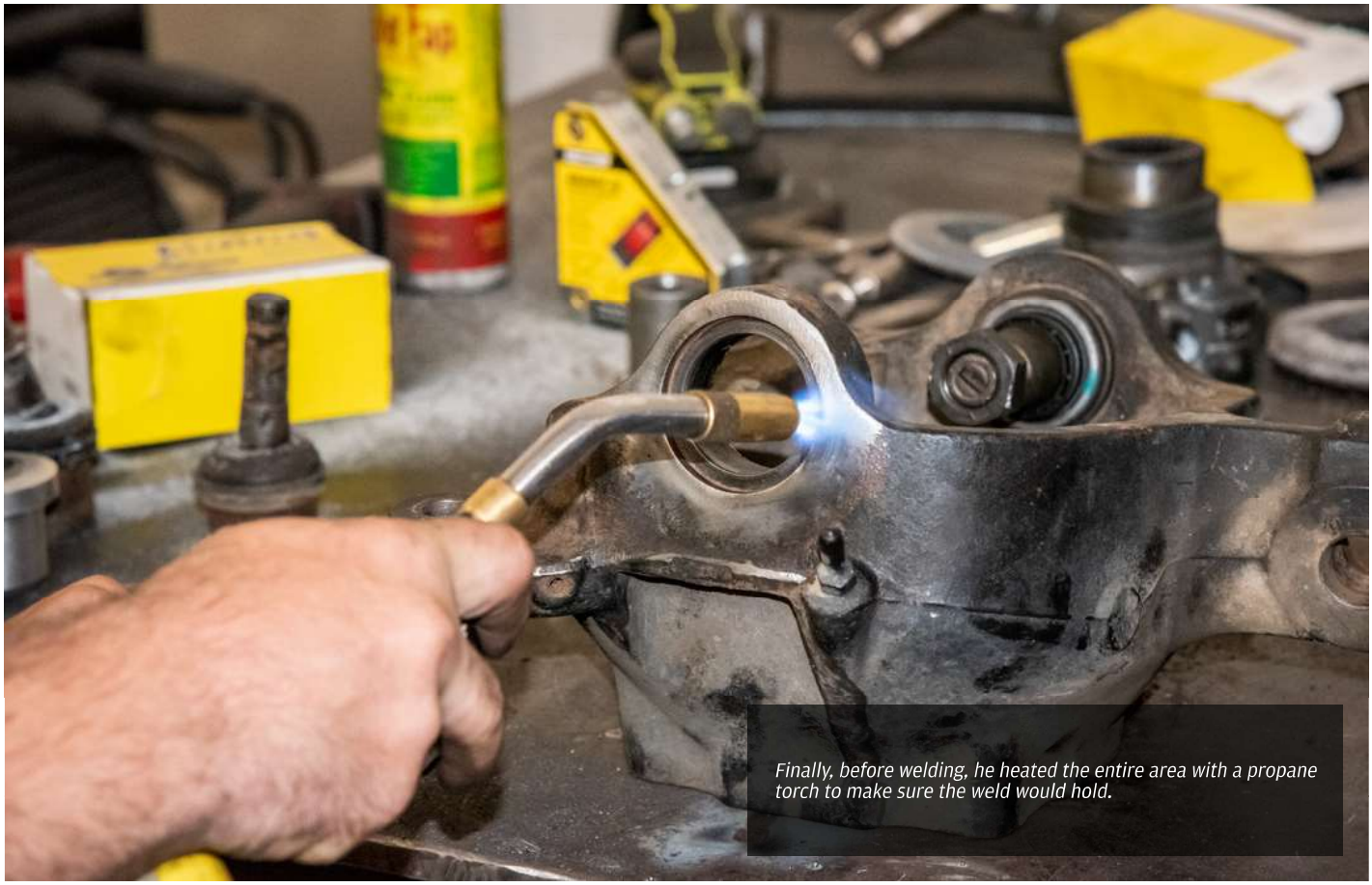
The cup and spherical bearing will ride here on top of the knuckle and the cup is the only item that requires welding. Chris did some prep to ensure the weld would be strong.



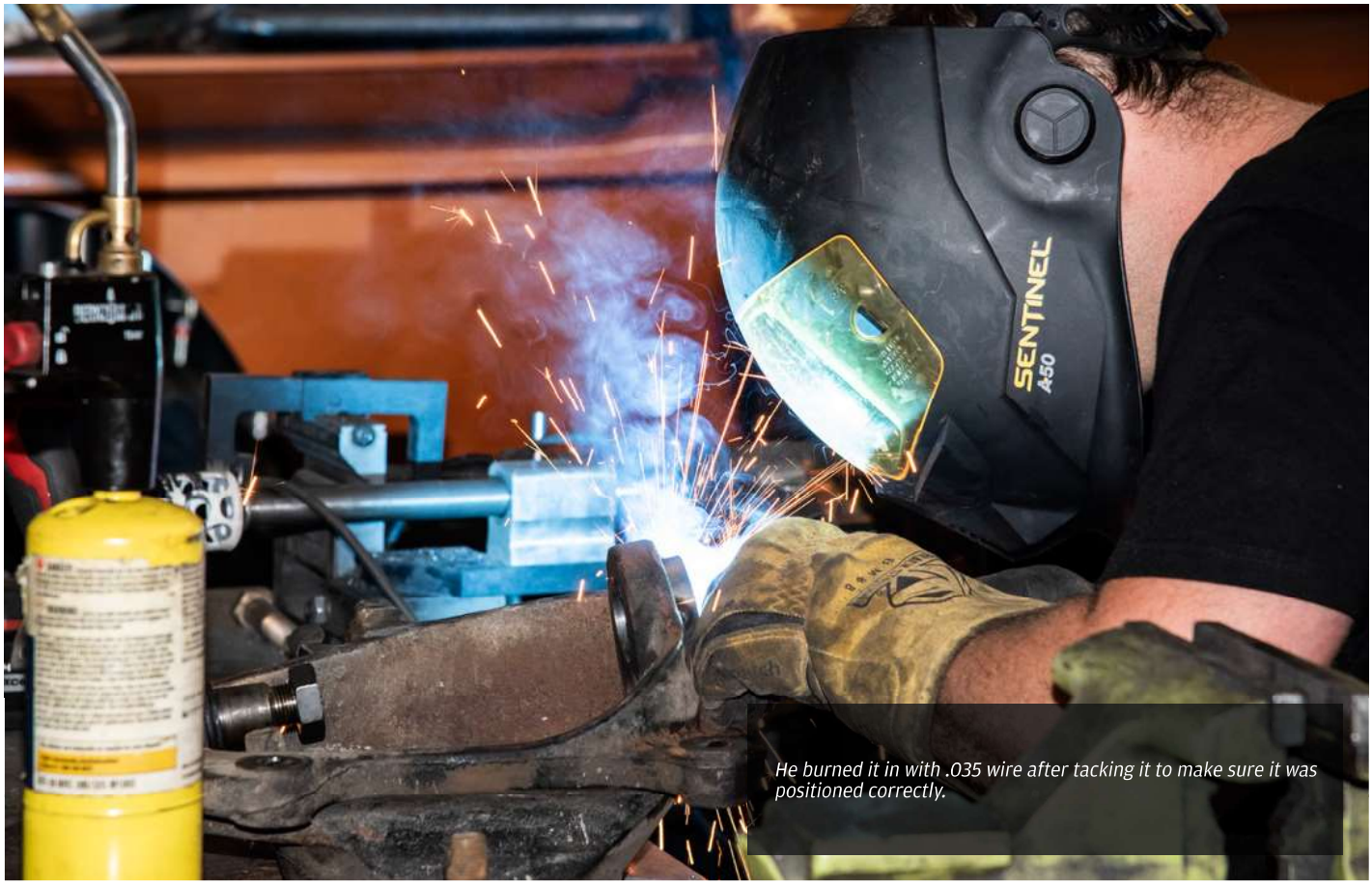
Chris started with a small wire brush on his air grinder and cleaned out the rust and dirt in the groove around the top of the balljoint hole.



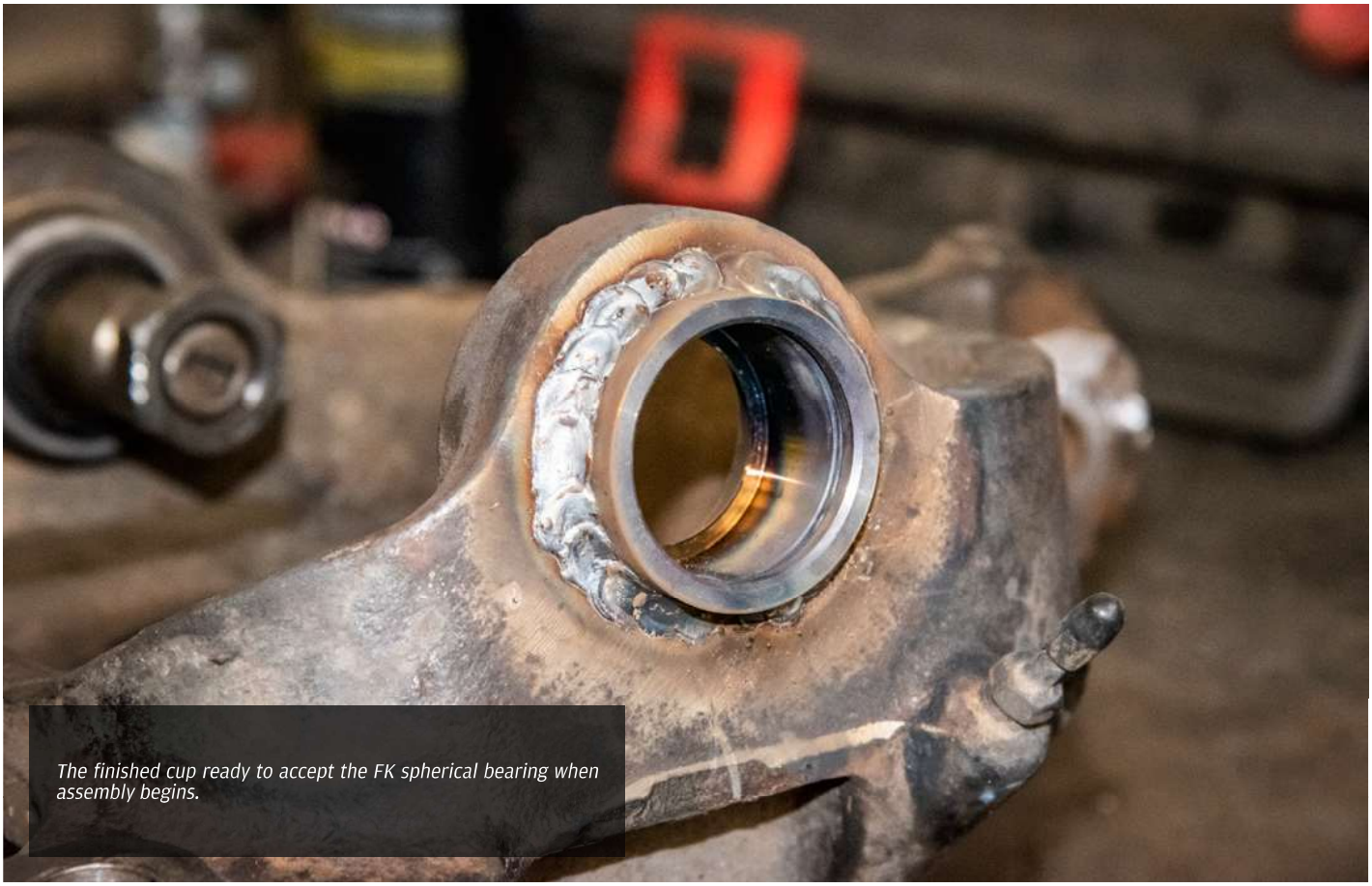
He then hit the surrounding area with a flapper wheel and took off the paint and grime to ensure the weld would be clean.



Finally, before welding, he heated the entire area with a propane torch to make sure the weld would hold.



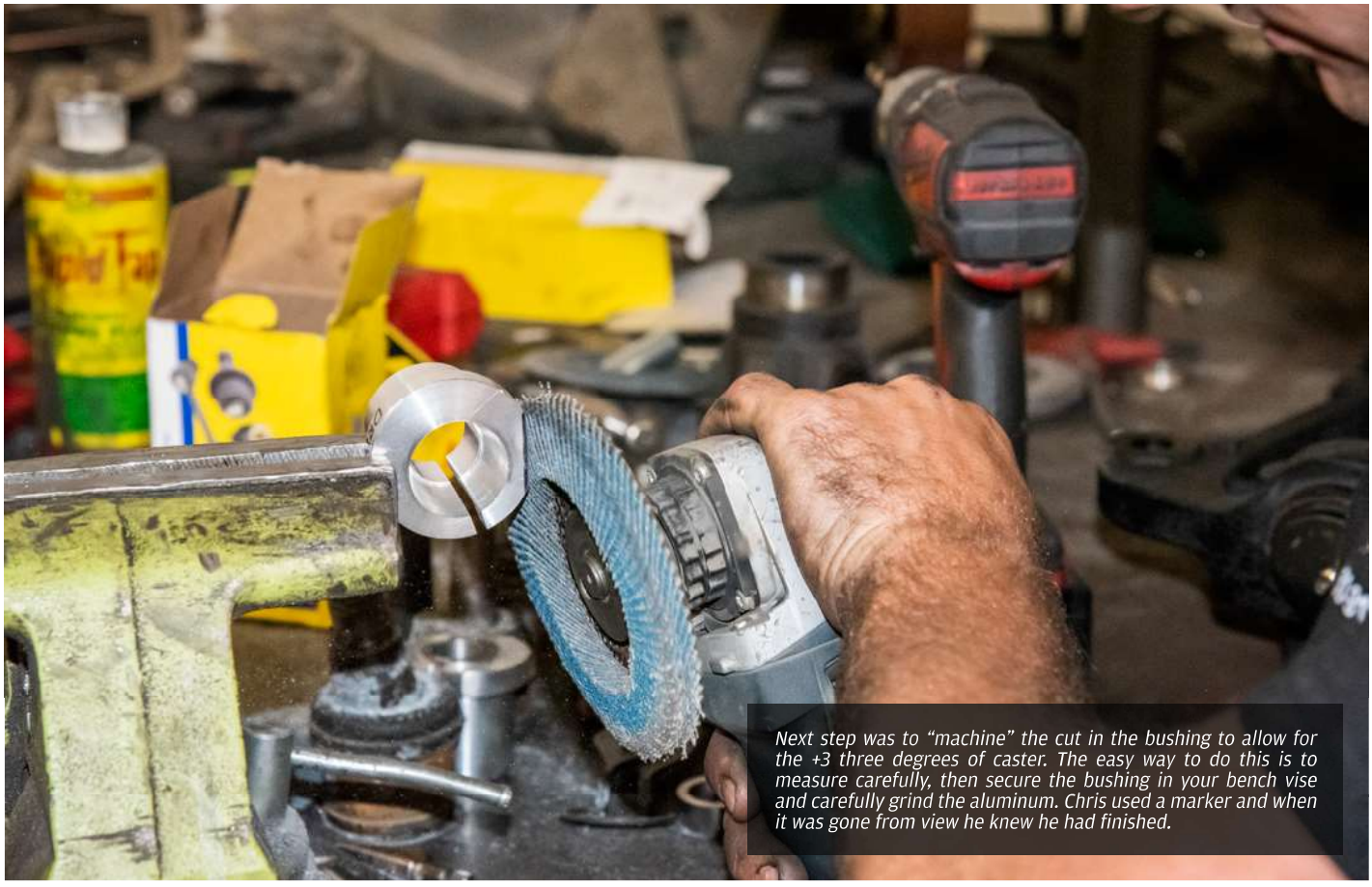
He burned it in with .035 wire after tacking it to make sure it was positioned correctly.



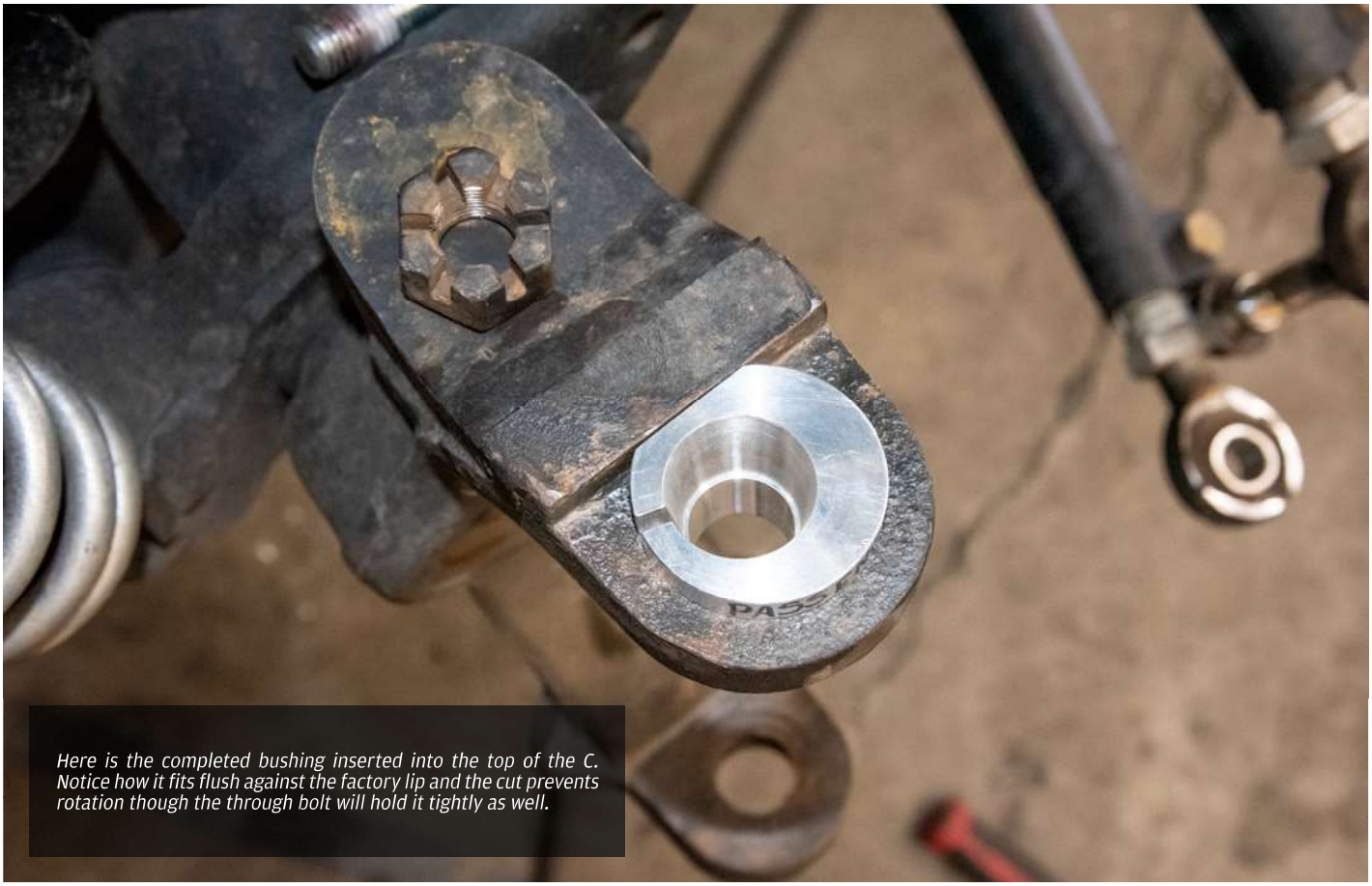
The finished cup ready to accept the FK spherical bearing when assembly begins.

Meanwhile, the bearing is spending some time in the refrigerator cooling so that it fits more easily in the cup that was just welded.

Chris decided to swap in new lower balljoints while he had the knuckles apart. He prefers the Moog units as they provide good service in his application.



Next step was to "machine" the cut in the bushing to allow for the +3 three degrees of caster. The easy way to do this is to measure carefully, then secure the bushing in your bench vise and carefully grind the aluminum. Chris used a marker and when it was gone from view he knew he had finished.



Here is the completed bushing inserted into the top of the C. Notice how it fits flush against the factory lip and the cut prevents rotation though the through bolt will hold it tightly as well.

Because the bolt is a large Hex head, Chris had to make a tool from a bolt, some nuts and a bit of welding to make sure the bolt could be turned. Ultimately, you'll want to get the right size Allen head socket for this job.

Once everything is torqued to spec, Chris runs a line from the bolt to the bushing with a paint pen. It's a cheap and easy way to see if anything has come loose and it can be checked at a glance. It's a worthy way to spend about $3.

All finished, Chris gave the ride a thumbs-up and has promised to give us feedback over the next several months to let us know how these work for him and how they hold up in this rig. Keep in mind it's a Toyota 4Runner, on 40s, wheeled fairly hard in the Sierras. Chris regularly hits trails like the Rubicon and Fordyce, as well as others that are equally difficult. This will be a good test for the balljoint delete kits.