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Building a high pinion Dana 60 for the front of a CJ-7.

It sounds like a good idea but the problem is that all the factory high pinion Dana 60's have the differential on the wrong side of the vehicle. So, a custom axle is the only route to go. Since I had re-tubed a high pinion Dana 44 just a few years ago, making a Dana 60 high pinion a passenger side differential shouldn't be that bad. This time, to simplify the process, I would simply shorten the long side and make it the shorter of the two sides. And then, with the original short side, I would add an inner sleeve, much as I had done when I had built the high pinion D60 rear axle, and add a section of tube to turn it into the long side. In other words, my plan was to make the short side long and the long side short.

So lets start off with the parts that were used (or destroyed) to make this project. A Dana 60 high pinion was salvaged from a 1978 Ford F-350. The brakes, what was left of the factory lock-outs, and the factory inner axle shafts were all scrapped. New spring perches were procured from Lou Fegers Racing. Howe Racing twin disk calipers, Chevy-style mounting, were procured from Behling Racing. A Detroit soft locker, 5.13 gears, bearing kit, and Pro Comp lock out hubs were supplied by Drivetrain Warehouse. The hubs and brake rotors were machined for by a friend of mine in the Black Hills 4 Wheelers. Custom steering arms from Roggy Enterprises. New inner 35 spline axle shafts from Moser Engineering. Other small parts include 1979 F-150 rotors and wheel studs, bearings as needed, and u-joints.

The first step was to strip the factory axle. While doing this measurements were recorded and written down. This done it was time to break out the grinder and start removing welds and unnecessary brackets. First I removed all brackets and spring mounts. Next I went to work on grinding down the welds at the inner knuckles. This is time consuming but you must be sure to remove all the welds or the knuckles won't press off. Once this was done I went to work re-shaping the passenger side of the housing to accept a spring perch near the housing. I did this with the intent of keeping the perch as close to the housing as possible. During this time I also re-worked the spring perch for this side so that it would fit properly. With the preliminary work done, the next weekend was scheduled to actually build the new housing out of the old. The week was spent doing calculations so that the next weekend all that would have to be done is make the cuts; all the numbers would already be crunched.

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The next weekend, the first thing I did was to make two cut just inside the knuckles to free them from the housing. These short pieces of tube were then pressed from the inner knuckles. The next step was to cut the axle tubes to length. All measurements were double- and triple-checked and then the axle was cut to length in a band saw. The long side was cut down to the short side first and the length of tubing was salvaged to be reused on the new long side. This will only work if you are narrowing/shortening the axle at the same time. The long side of the axle was then created from the factory short side by pressing in an 8" piece of 2.125" OD .250 wall tubing as an inner sleeve. Then the salvaged piece was pressed onto the inner sleeve. The two tubes were then welded to make one long side tube. The weld was done in a series of stitch welds to keep the housing cool and avoiding any warping. The weld was cleaned up and the axle smoothed out. Next, the spring pads were added to the axle. They were set in relation to the angle of the pinion that was desired and the angle of the springs. Once this was mocked up and verified they were welded in place. After that, the inner knuckles were pressed on and the caster was set. The knuckles before pressing were set to a rough caster measurement. About halfway on they were removed from the press and mocked up again and set to actual measurements. Then they were pressed all the way on the tubes and again re-verified. Once this was done the inner knuckles were welded to the axle. Again, this was done in a series of stitch welds to avoid heating and warping the axle. Once the housing was built it was just a matter of reassembling the axle as you would any other.

Just a couple of items worth mentioning on reassembly. The hubs and rotors will need the wheel studs pressed into them. Also I found that with the Chevy brakes I used I needed to slightly clearance the knuckle to avoid interference with the caliper. This was easily done with a grinder and still left plenty of material on the knuckle. Also with the steering arms you will need to get longer bolts on the passenger side to hold the steering arm on. One could also use studs here. I was short on time and couldn't find the correct studs so I used grade 8 bolts. One final thought: D60's are heavy. Plan on getting a friend or two over to help you install it.

The inner knuckle after being cut from the housing.The housing tubing is partially pressed out in the picture. The groove that can be see is were the weld needs to be ground off to free the knuckle from the tube.

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The Dana 60 hub after being machined to accept the 5 on 5.5 bolt pattern and to fit inside a 15" wheel. As you can see the outside of the hub needs to be taken down as well as the inside of the hub.

This shows the Ford 1/2 ton brake rotor after being opened up to fit on the machined Dana 60 hub. The inner hole needs to be opened up to slide over the inside of the hub.

The hub assembly as seen from above. You can see the redrilled 5 on 5.5 bolt pattern. Notice that this change requires one of the original eight bolt holes to be plugged.

Here is the hub assembly as seen from the side. As you can see the hub assembly sticks out further than the outer diameter of the brake rotor hat. This doesn't affect anything but you could machine the hub down to match this if you are so inclined.

The long side axle tube being cut down to the new short side tube length.

The short side being prepped for reworking. Notice the angled grind to give a nice groove to fill in with weld. Also you will notice the two notches so that the inner sleeve can be welded in place.

A view of the housing with short side being reworked and the long side cut down. You will also notice the shiny part on the housing. This is were the housing had to be reworked to add a spring perch. A lot of material will need to be removed on the passenger side of the diff.

The inner sleeve prepped and ready for installing into the factory short side. The sleeve is 8" long and 2.125" in diameter. It has a wall thickness of .250" This was then pressed 4" into the factory short side and welded in place.

The salvaged piece from the cut factory long side is then pressed back onto the factory short side.

The two tubes are then welded together. This was done doing a series of short welds until the groove was filled. This took several passes but this stage was not rushed so as to keep the axle cool so that it would not distort.

The next step was to set the pinion angle and the spring perches. Measurements were taken from the jeep and transferred over to the axle on the stands. Care should be taken to get these exact. I have found that making a simple jig out of two carpenter squares set to the width of the springs greatly eases setting the spring pad center to center and the rigidity of the jig allows easier setting of the two pads to same angle.

Next it is time to press the knuckles on and set the caster. Great care should be taken during this step to make sure everything is dead on. This picture shows the axle being mocked up and all the angles double checked.

Once the angles are verified the inner knuckles are welded on. Once again a series of short welds are made to keep from heating the housing and distorting it.

I wanted to use Chevy style brakes so I had custom brake brackets machined. The were first flame cut from 1/2 plate. There were then taken to a machinist to have them drilled to match the spindle bolt pattern and the bolts for the calipers. I had a bit of a problem fitting stock chevy single piston calipers as the large piston was hitting the knuckle. I found that a Howe Twin piston caliper used the same mounting as the stock chevy but the twin piston was 1/4" smaller in the piston area. With a small amount of grinding on the knuckle this fit perfectly. Also they have a slightly greater braking power than a stock single piston and have a better feel to them.

Since I already had high clearance steering on my 44 I decided to do the same with the 60. These arms were made for me to my specifications by Roggy Enterprises. Due to that fact that there were custom built they took a little longer to get. You will notice the drivers side arm has and additional arm to the rear. This is to incorporate a hydraulic assist cylinder on the back side of the axle up out of harms way. Look for a future article on the installation of the hydraulic assist steering. The arms were designed to work with 5/8ths x 3/4" heim joints that have 48,000 lb tensile strength. I had good luck with this set up on my 44 and decided to retain it for my D60.

Checking the gear pattern prior to installation. Looks good.

I chose a set of high quality gears from Yukon Gear. You might think that Yukon Gear is a new name to the driveline parts market. Well, yes and no. It's a new name but the company behind it has been around for a very long time. It's none other than Randy's Ring and Pinion.

The D60 sits complete minus steering waiting to be slung under the Jeep.

The D60 finally finds it way under the Jeep. The steering linkage and driveshaft are then cut down from the Dana 44 for Dana 60. The shock mounts were welded on and everything was checked out and torqued down.

by Mike Knorr
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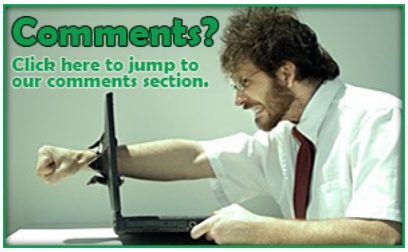

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