

GLLC Snow Run 2007



Special thanks to everyone who took the time to take pictures and share them.

Dana 60's Under An FJ40

Dar Howard

Is it 9 or maybe 10 I have lost count, but I have broken a lot of birfields and a few inner shafts on my 64 Fj-40 over the years. I won't even count the early 10 spline stuff with the funky zeppa joints instead of birfields. Although the Toyota design is definitely overbuilt compared to Jeeps, it comes up short when saddled with bigger and bigger tires, increasingly tougher terrain and fuel injected small block Chevy engines.

I started thinking about larger axles right after my first breakage, but sometimes I like to over think and over research things. (ask my wife about that) Years later I came across a 79 Ford Dana 60 steering axle which offers some nice amenities in an axle...high pinion and an inboard center section...unfortunately the differential is on the wrong side... Later on when I was able to find someone who wanted to trade the 79 Ford Dana 60 for a Chevy axle with 4:10 gears and the buildup began.

Front Axle Customization

After lots of research it became evident that the way to shorten my axle was to take 4.5" off the long side....this is a VERY common length to shorten a full size 60 to fit under a Bronco/Jeep/Cruiser type vehicle and makes for common spares with all my buddies running a similar setup...This amount of shortening allows for the cast in spring perch on the center section to line up perfectly with the Land cruiser spring width...I just removed and re-welded my driver side spring perch to match and I was in business...I then enlisted the help of Jon Darrow at [Chips & Sparks Fabrication](#) to shorten and respline three long side shafts 4.5 " shorter as well. Jon has a full boat of services available for customizations of all types at his home based shop.

Rear Axle Considerations

I had several sets of aluminum wheels and a set of Bead lock wheels that I wanted to be able to continue using on my rig...I had originally planned on shortening the front 60 to match my rear cruiser axle but I just could not make the width difference work. A rear axle became my next quest. I wanted to go with a GM 14 bolt, but I could not fit a 6 bolt pattern around the big full-floating hub of the 14 bolt. I considered Eaton's and full floating 60's as well but had same problems.....I then found that the Dana 60-2 was a little used axle but had all the things I was looking for...Semi Floating 5 bolt pattern that could easily be changed to the Toy/Chevy 6 bolt pattern it was exactly the same width as my cut down front axle, factory Dana 44 disc brake parts bolt right on with a little lathe work on the rotors, and best of all was 35 spline....It was an easy choice... the only bad thing was the tubes are only 1/4" thick,+ not the normal 1/2" thick 60 tubing. So I bent up a custom truss on my hydraulic bender to strengthen the axle and to give me a place to attach an anti spring wrap device. I also designed it as a good foundation for a four link suspension if I ever decided I needed one in the future



Jon Darrow, Chips & Sparks Fabrication
Howell MI

Gearing Ratio Upgrade

Next I decided the axle needed a 4.55 gear ratio instead of the 4.10 gear that was already in both of the axles...boy did I miss the simplicity of the Toy style 3rd member....I bought a Strange spool for the rear and used 4.55 Spicer gears off ebay....and the rear went together pretty well....but when I got to the front I had to call in the Big Gun...My buddy Jon Darrow....Jon was stumped for a while as well, and then Jon completely disassembled the r&p and restoned the carrier...sure enough he found a small high spot on the carrier that we had missed at midnight the night before that was throwing the run out of the ring gear too far and was causing our problems..... after five minutes with a sharpening stone flattening out the high spot it went right together.



I then picked up a Lock Right and a set of 6 bolt hubs on ebay and then built a custom disc brake bracket to work with Dana 44 calipers and the new 6 bolt rotors I machined to fit the hubs. I then built a set of heavy duty tie rods and fabbed up the mount for the hydro assist. I shaved both axles about an inch (about the same ground clearance as a Toy axle). I did all this before buttoning up the axle and sliding it under the rig.

The rear axle allowed for easy changing to the 6 bolt pattern I disassembled the axle and welded the 5 bolt pattern holes shut...then used my buddy Frank Gobright's Bridgeport with a digital readout that was programmed to a 6 bolt circular pattern and drilled away....boy is it nice to have friends with cool toys.



Bonus... Equal length Driveshafts

I knew I wanted to stay with the Toyota driveshaft's as they are far superior in strength to the Dana stuff, plus I had a half a face cord of them stacked in my barn, so with some lathe and tig welder work I was able to come up with some nice Toy/60 drive flanges. I also drilled them for the multiple bolt patterns that different year Toy driveshaft's can come in. One thing that was very handy was that my front and rear driveshaft's ended up being the same length....so I only needed to carry one spare....a nice benefit when your driveshaft's are sleeved with .250 wall DOM tube and weigh a ton.



Increased Wheelbase

The new axles added about 5 inches to my overall width and I wanted to increase my wheelbase length as well so I turned my leaf spring around which gave me 3 inches on each end then I drilled multiple holes in my spring perches and u bolt top plates to allow for even more length.... when I finished I gained approximately 7 inches in length.

After a few days of sitting around with weight on the rig, light driving and cycling my suspension on my rock and sand piles I felt my springs had settled enough for a final weld of the rear spring perches. I was then also able to build a custom anti wrap device to finish up the project.

Test Run

My first trip with the new rig was an April trip to Canada for some winter camping....If you think April is not winter....go to Canada. We like April because there is plenty of challenging snow, yet the snowmobile season is pretty much over, in fact the main trails had all closed the week before we were up there because of all the ice crossings were becoming unsafe. The rig worked GREAT! Although the extra width took some getting used to (I kept hanging up on tight trees). When I got back I decided to swap on my taller, skinnier 38" swamper I had bought a couple years back. I miss the Boggers they had served me well but the swamper SX's work well in other ways.



The next trip was to Drummond Island with the Great Lakes Land Cruisers. This was my first trip on the rocks with the new setup. It had been a long time since I had been to Drummond Island and it was a great time, we met a lot of great new people, and the new setup worked very well on the rocks as well.



Follow Up:

My 4th transfer case started making noise and decided it was time to ditch the old toy three speed transfer case....I was going to upgrade into the Toyota split case as it was the same gear ratio (2.3 : 1), used a very similar bolt pattern onto my adapter, and the driveshaft's would bolt right up....I had bought my seals and was in the process of building the t-case back up and I found out that I had two of the earlier style 2.00 : 1 low range case....since I did not want to go backward in gear ratio I started looking for other alternatives. Obviously the NP205 was 1st on the list, 100% pure American beef! It also gives the possibility for front wheel drive only (front dig), Problem is it has only 2 : 1 low range like the toy case. I did however consider using a 203 doubler to get a 4 : 1 out of it but I knew I could not package that long of a drivetrain under my short cruiser.

**Transfer Case Considerations**

The only other two cases that come close are the Dana 300 and the Atlas II. The Atlas II is based on the Dana 300 but way stronger. Since an Atlas is completely out of my budget the 300 was the next quest. It has a great 2.6 :1 low range has front dig capabilities, and has a beefy cast iron case. I was able to find a pair of 300's for a partial trade for my old atlas lathe and one had a short and one had a long output. I chose to build up the short output case for better driveline angles and it already had a currie twin stick mounted on it. I modified my old toy/sm465 adapter so I could mate the 300 adapter to it. Essentially two adapters stacked...not that uncommon actually even by the oem's. I turned down the output shaft of a two wheel drive model sm465 down to the same diameter as the input of the Dana 300 on my lathe then enlisted the Big Gun again and Jon Darrow splined my 35 spline sm465 output down to a 32 spline to fit the input of the 300 case. I then shortened it to the proper length before assembly.



Next was to make drive flanges to match my toy shafts (again). I did this again by turning the parts down separately on my lathe and tig welding them again although differently than the Dana 60 pinion flanges as the dimensions are smaller on the 300....later I found out that np 241 BR transfer cases came with an output flange that bolts on to the 300. That could have saved me some machine work.

Now I had to make it all fit...what a nightmare! I planned on running the trans and transfer case as high as possible so I cut into the floor for more clearance. Since the rear output on the 300 is centered and higher than the double offset toy case, I had to trash my custom anti wrap device, and cut my spring perches on the rear axle and turn the entire pinion skyward. I added three more quarts of fluid to keep the pinion lubed before turning the axle up since my original fill plug was mounted so low. Next I moved the engine over toward the passenger side about 1". I then rebuilt another antiwrap device, rewelded the spring perches, and built four heavy duty driveshaft's (the rears with double carden joints) because now my lengths are all different. WHEW I hope it works!

**2nd follow up**

After a couple hard core runs To Flat Nasty in MS. and Canada I still had a couple tweaks to make... I took apart and drilled a 3/8" center pin hole in another set of rear leaf springs to allow for the military wrap to be on the spring hanger side instead of the shackle side for increased strength. I bent the first set pretty good at Ron's and broke a couple 5/16" center pins. That should cure my issues only time will tell how the rest of the engineering will perform.