

Stan Howe Notes on Ruckstell Rebuilding

Here are a couple more thoughts on Ruckstell rebuilding.

There is no neutral in a properly assembled Ruckstell. If you have a neutral, you have a problem.

The entire carrier assembly is held in place by the ball bearing inserted into a boss in the housing. The ball bearing is pressed on to the bronze plate. If this plate is bent or worn it affects all other clearances. Quite often the face of the plate is bent in. You can obtain the correct measurement of the distance from the face to the edge of the ball bearing thrust edge and check the height of yours. If it is not correct, repair or replace the bronze plate.

I am leery of reusing ring gear bolts. A new set is a little over fifty bucks. Cheap insurance. DO NOT use standard bolts for ring gear bolts. They WILL shear and let the ring gear come loose.

Mark the internal differential before you remove the six bolts that hold it together. This may be unnecessary but I like to do it anyway.

Assemble it in the Ruckstell housing with it standing straight up and down. Put the outer roller bearing in and stick a cap on to hold it there. Stick the thrust washer in the off side housing with grease. Install the thrust washer on the outer end of the Ruckstell bell. Install the inner roller bearing in the off side housing and install it over the axle. You can see inside through the driveshaft hole and measure the distance for the thrust washer. It SHOULD be .200 but that doesn't mean it will be. If you have more than that your housing is worn, your bronze thrust plate is bent or your bearing is not correct. The other possibility is that the end of the bell is worn. I find that most of them will come in at around .180 (I have a set of split thrust washers from .145 to .200 that make it easy to install and check clearance.)

Get that clearance right. It is going to control the ring and pinion clearance.

Here is a free tip. When assembling the axles in the internal differential housing, assemble them without the pinion gears. Stand the assembly on end and measure the clearance between the back of the axle gear and the housing. That is the thickness of the washer you should put between the ends of the axles. It will vary quite a bit depending on the wear on the axle gears, the wear in the housings, etc. It is worth while to put a bit of time into getting that washer right.

When you are ready to assemble the whole thing, before you install the clutch gear, take your flashlight and a screwdriver, align the gears so the clutch gear with the lock plate installed will slide all the way in, place a nylon zip tie around the axle to hold the clutch gear in. That keeps it from coming out and sliding down the axle tube when you assemble the unit. Makes it easy to install the shift lock, too.

Don't use the gasket. Use copper infused RTV type gasket maker. I use Permatex but any

brand would do. It is far easier than trying to get that gasket to fit and will seal up the leaks better.

When you are ready to tighten the parting line bolts, install an old driveshaft bearing housing. That will line up the edges of the surface, tightening the parting line bolts will keep it all in place.

There are a few things that make the Ruckstell rear end rebuild much more likely to go together easily and with correct clearances.

1. Straight housings. The easy way to make sure they are straight is to cut four wooden disks from 3/4 plywood with a hole saw the diameter of the boss in the housing with the sleeves removed. Not smaller and not bigger. Find a wood lathe if you need to. Press fit. Insert the disks. if you can see light all the way through the center holes that the pilot of the hole saw left you are probably straight or straight enough.

2. Clean the boss the sleeves fit in with a good flap sander and make sure there are no bumps sticking up or ridges that are holding the sleeves away from the surface when you put them in. Then run a cylinder hone in the boss on an hand drill and smooth them up. Those holes were probably the roughest machine work on anything done to a T. Virtually every one I've ever seen needs to be worked on to get the sleeves to seat right.

3. When you put the sleeves in, do it right. TWO radiator hose clamps around it nice and tight. line up the bump that drops in the hole and tap them in. If you are using those oil retainer things, you probably will have to machine or grind 1/6 - 1/8 of an inch off the end of the sleeve to get it all in there and have the bump seat in the center of the hole.

4. When you get the sleeve in, hone it slightly with the cylinder hone. Just enough to make sure it is all in place and seated correctly.

5. Instead of screaming and moaning in anguish if the bearing are too tight, hone the sleeve a couple thousandths. They are designed to wear and a little honing will just smooth them up and make them fit.

6. All the modern drive shafts seem to have problems with the hole being in the wrong place. I have not seen the new ones John is making.

Make sure you are not bottoming against the bushing at the top of the drive shaft tube. There should be a couple thousandths clearance between the back of the U joint and the bushing surface.

There are 4 flat surfaces on the shaft. Put it all together, BOLT the bearing sleeve to the bottom end of the driveshaft so it holds it in place and centered, put the U joint on 1/4 turn from the hole that is in the shaft, mark it with a transfer punch and drill a new hole. It is inside the U joint, you can't twist it off, make it fit and put it together.

7. The problem with the pinion/ring gear being too tight is easily solved.

A. Remove the new bronze plate. Check to make sure you pressed the bearing on tight against the surface. That is what is wrong 90% of the time.

B. If it is tight. Remove the bearing. Chuck the plate in the lathe. Remove .010 to .015 thousandths off the surface that the bearing presses against. Reinstall the bearing and the bronze plate and assemble it in the housing. You will have all sorts of clearance.

C. The bronze plates all vary a little, even the new ones. .010 there will move the ring gear back .010 away from the pinion gear. Before you start cutting on the new bronze plate, chuck it on the bearing boss and see how much wobble there is at the surface that mates to the planetary outer gear. You might be surprised. Clean that up if you need to, then take some off the bearing pressure surface.

I've had to take as much as .020 off the bronze plate to get the backlash right. It's a 15 minute job. It beats the hell out of paper shims, brass shims, profanity, anguish, late night phone calls, irate emails and calls to suppliers, etc.

8. The problem that I saw with a lot of Ruckstell work that came my way for a re-do after somebody worked on it or gave up and brought or sent it to me was that they never took time to see how the thing actually works and how it needs to go together, etc. The number one thing I think you can do to make one go together easily is to understand that every other clearance, fit/no fit is in one way or the other controlled by the distance the bronze plate is being held away from the boss that bearing fits into. Get that right and the rest of it is pretty much a shoo in.

Back to the shop.



Stan Howe just arrived to Chickasha Pre-war swapmeet in March 2010 with a freshly rebuilt Ruckstell.