
1965 Corvette Differential Assembly

by Jim Stukenborg

This is the second of the two tech sessions on Jim Stukenborg's 65 Vette coupe.



The previous session covered the trailing arms and wheel bearings. This session will cover the re-assembly of the differential. In the previous session write-up it related that the lack of side yolk snap rings as the reason the Vette was taken off the road for the repair that took 16 years. The broken snap rings were found in the bottom of the case. One can only speculate what cause them both to break. Further inspection of the inside of the differential showed very little gear and bearing wear. The side yolks showed only a little radial grooving on the ends. The side bearings were replaced because they were on hand and with the ring gear

removed they are easily driven from the outside in to remove them. Trying to remove them with out taking out the ring and pinion is almost impossible as they are a tight fit to the case and not easily gripped with a bearing puller. The interference fit is the only thing that holds them in place.

Inspection of the under side of the car showed evidence that the pinion seal was leaking. This required the removal of the pinion nut and drive shaft yoke. We marked the nut position, but during the cleaning process lost our mark. We should have used a hammer and punch and put on an indelible mark. When the pinion nut was retightened by guess to the wrong spot and we ended up with excessive preload on the pinion shaft bearing. The service manual says the proper preload on the pinion is 20-25 inch pounds new and 5-15 used. This is the force it takes to turn the pinion yoke with nothing to

turn but the pinion shaft as the ring gear was still out of the diff. This preload comes from compressing the crush sleeve on the pinion shaft. This crush sleeve is a heavy walled tube that fits over the pinion shaft. The tube has a raised ring rolled into the tube wall that serves as crush point. Checking with



a knowledgeable rear end person confirmed that just backing off the pinion nut was not the correct thing to

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do as the preload is the only thing that keeps the pinion nut tight and

the compressed crush sleeve does not spring back. So a new crush sleeve was installed and the pinion nut was tightened until the preload spec was met. A special wrench to hold the

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pinion yolk helps with this job. The wrench torque needed to get the proper preload is over 100 ft-lbs. Note that there are two lengths of crush sleeves available. Here, we needed the shorter sleeve. Remember to prelube the pinion seal before reinstalling the drive shaft yolk.

The spider gear shaft was replaced although there was



minimal wear evident. In the design of the C-2 suspension, the half shafts are the upper suspension link and the side yokes rest against

the spider gear shaft and the weight of the car is pushing in against them. In normal



operation the yokes and the differential rotate together. Only if one tire is spinning or a small tire is installed on one side at the rear, or the car is in a turn would the yolk be spinning against the shaft. The slight radial grooving at the ends of the side yokes was removed holding the yokes

upright by hand and carefully sanding the end on a sheet of emery paper mounted on a smooth saw table top using long slow strokes.

The ring gear was then put back into the case, the old shims reinstalled, and the bearing caps torqued to 55 ft-lbs (spec is 50-60). The shims are a different thickness so if they are reused make sure they go in the side they came out. The contact pattern between the gears

the snap ring is properly seated the yolk can't be pulled out by hand.

Adapter plates were bolted to the side yokes and a



torque wrench was used to measure the positraction slip force. The torque meas-



ured over 140 ft lbs so the positraction clutches were not replaced. The differential cover was then bolted on the case. A little grease was used to keep the gasket in place while the cover was being installed. It is not

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necessary to use sealer on the gasket.

A new breather tube was installed in the small hole at the top rear of the differential



case. The hole had to be deburred to get the tube to go into the hole. Plug the hole first so metal chips do not fall into the differential. The assembly was then degreased and painted with a coating of Dupli-Color gray cast iron and bolted to the differential cross member in preparation for installation back into the Vette. The big rubber cross member cushions were replaced as the metal outer jackets were significantly corroded. The old cushions were removed with a chisel, but a press is needed to reinstall them.

The author would like to give a big THANK YOU to Larry Linder and all of the other NCRS club members who assisted with the work covered in the previous

article on the trailing arms and this work with the differential assembly.

The car is back together and almost ready to hit the road. One remaining item is the gas gauge. This may be the subject of another tech session.

