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BRAKE ROTORS AND U-JOINTS

Over the years, I have heard about numerous problems in removing the front brake rotors and hubs on the four-wheel drive Turbo Diesels. After over 100,000 miles of faithful service, I felt it was time to replace my '97 truck's heat-checked rotors and so-far smoothly working hub bearings. This replacement was precipitated by the untimely demise of the right front axle universal joint. This joint exhibited some play and a quantity of rust-colored dust. It was evident that the needle bearings and trunnions were history. Interestingly, no other universal joints on the Ram have shown signs of wear. However, I did feel that changing both front axle universal joints was a good idea.

After debating the merits of solid universal joints (supplied by Spicer, and supposedly a little stronger) versus greasable joints (supplied by Neapco, with a grease fitting in the cross), I decided upon the latter. Occasionally one hears about broken universal joints, usually associated with bad driveshaft angles, high power, and sudden jerks when applying power. The vast majority of universal joint failures I have seen and heard about came from lack of lubrication. In the present case, the failure of my Ram's universal joint was caused by the lubricants either drying out, leaking, or not being adequate from the beginning. With no grease fitting on the original joint, there was no easy way to add any lubrication.

The primary cautions when installing new universal joints are: (1) be sure they are thoroughly greased and with a lubricant compatible with what you will use later; (2) load the grease fittings under compression, not tension; (3) perform the removal and replacement carefully so you don't damage the axle fittings; and (4) be sure the snap rings are properly seated so the universal joint cups can't come out later while the parts are in service.

As with so many maintenance operations, the selection of a premium quality lubricant is critical to the long life of the maintenance or repair operation. It is also critical that the base of the grease compatible with that of other greases that may be used in the future. Grease types include aluminum complex, barium, calcium, calcium-12-hydroxy, calcium complex, clay inorganic (bentone), lithium, lithium-12-hydroxy, lithium complex, polyurea, and 1261/1262. About 90% of the chassis grease out there is lithium complex based. This type of grease is compatible with aluminum complex, calcium, calcium-12-hydroxy, calcium complex, lithium, and lithium-12-hydroxy based greases. You will want to use a premium grease with:

- excellent water resistance (resist emulsifying and washing out, clings to metal)
- broad operating temperature range (won't melt and run out of the bearing or joint)
- high adhesion and cohesion (clingability, won't pound out or sling off)
- superior mechanical stability (won't change in consistency—soften or harden—in use)
- exceptional anti-wear protection (suitable under extreme pressure)
- rust and corrosion inhibitors
- properties meeting NLGI-2 specifications

So, you thought grease was just a slimy, icky substance that could be procured at the local hardware store. Premium grease is not difficult to find and your local auto parts store will be able to help. Again, 90% of all grease is lithium based. When shopping it is best to read the label.

Now, how do you install the universal joint so that the grease fitting holes in the cross are under compression? Hold one part attached to the universal joint in one hand, and imagine trying to twist that part through the joint with the other hand holding the other part. The driving part is trying to twist the universal joint because the driven part resists turning. Two of the four intersections between the trunnions are being stretched and the other two are being compressed. Be sure the grease fitting is at one of the positions being compressed. The accompanying diagram illustrates the point.

Steps for removal and replacement of the brake rotors

I did not experience any problem in removing the brake rotor/hub assembly, possibly because rust is not much of an issue here in the Southwest. However, I did find some helpful tricks that might benefit people in other parts of the country when performing this work. First, before removing the axle nut in the center of the wheel, soak it in rust removal solvent such as Mopar 4318039. Some folks had the threads on the end of the axle damaged when removing the nut, so be sure it is well lubricated with penetrating oil/derusting agent. This 1 11/16" nut is very tight (torque value 175 ft. lbs.) so don't jack up the truck first! I used 3/4" drive socket, breaker bar, and cheater pipe after pulling the cotter pin (a 5/32" by 1.75" or 2" long cotter pin works well for replacement).

Next, loosen the wheel lug nuts a bit and then jack up that corner of the truck. Remove the two brake caliper bolts with a hex (Allen) key or a socket and a ratchet. Remove the caliper and use wire to hold it out of the way where it won't fall and stretch the brake hose.

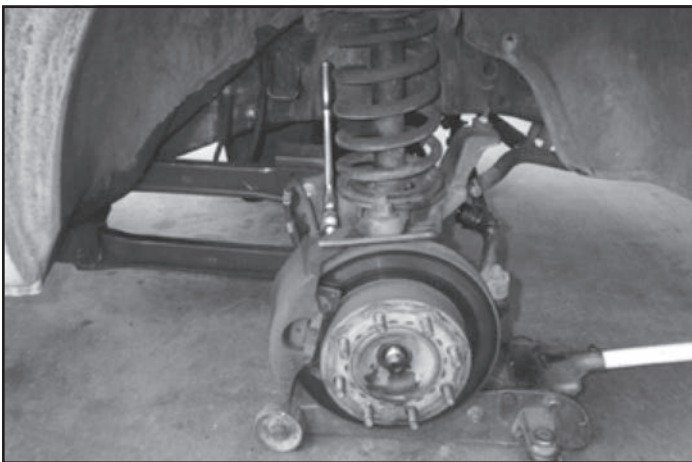


Removing the axle nut.

Remove the four hub mounting bolts. They have 12-point heads and can be found in the general area of the ball joints. If you can't easily pull the hub and rotor off, it may be rusted to the knuckle. You can spray rust removing solvent behind the stamped steel deflector on the axle onto the end of the hub when it extends through the knuckle. Pull off the hub/hub bearing/rotor assembly while leaving the axle in place. When you remove the hub, the stamped steel water deflector shield for the brake rotor will also come off, as well

as a thin spacer ring. Note their positions when removing them so you can reinstall them correctly. The deflector shield and ring must be properly positioned to make room for the brake caliper.

If you will be replacing the axle universal joints (which I recommend), carefully pull the axle while trying not to let it drag along the axle tube. There are two reasons for this caution. First, there is an oil seal at the inner end of the axle shaft and you don't want to abrade it. Second, the axle tube will have dirt in it since it is open to the elements and you don't want to get all that dirt into the splines at the universal cups, and then used the grease fitting to introduce new grease, after removing most of the original grease in the universal joints. As discussed above, I chose a premium grade grease and made sure the grease fittings were installed under compression, with the fittings pointed away from the hubs for easier access with a grease gun.



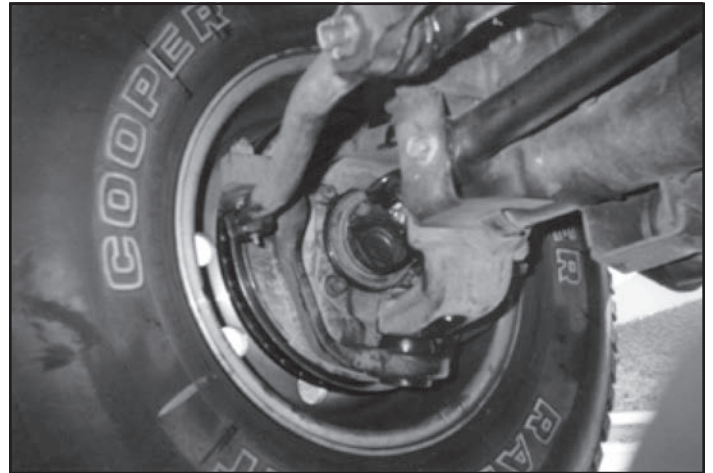
Removing the brake caliper.

Installing the parts generally goes more smoothly than the removal process. The new rotors, combined with new Performance Friction Z-rated brake pads (#459Z; higher performance and speed rated) noticeably improved braking smoothness and performance. Torque specifications are shown in a table. Part numbers are shown in another table.

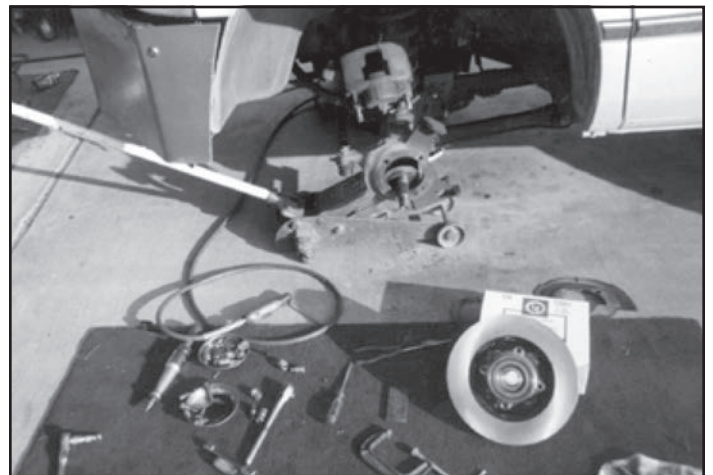
Tools needed for the replacement of brake rotors, and installation torque values:the end of the axle shaft. Of course, this second issue is far more important when replacing the axles than when removing them.

To replace the universal joints, clean around the bearing cups and remove the snap rings. Use the time-honored method with two sockets to press them out. One socket fits inside the cup hole, and the other is slightly bigger than the cup diameter. These universal joints are a tight fit, so you need either a three-pound hammer or a press (or a very large vise to use as a press). If you are not experienced in this operation, it will probably be advisable to take the axle to your favorite driveline shop. I manually put grease into the universal cups, and then used the grease fitting to introduce new grease, after removing most of the original grease in the universal joints. As discussed above, I chose a premium grade grease and made sure the grease fittings were installed under compression, with the fittings pointed away from the hubs for easier access with a grease gun.

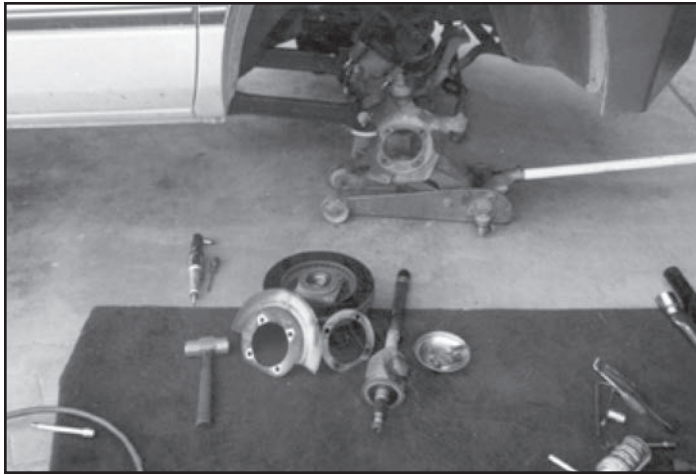
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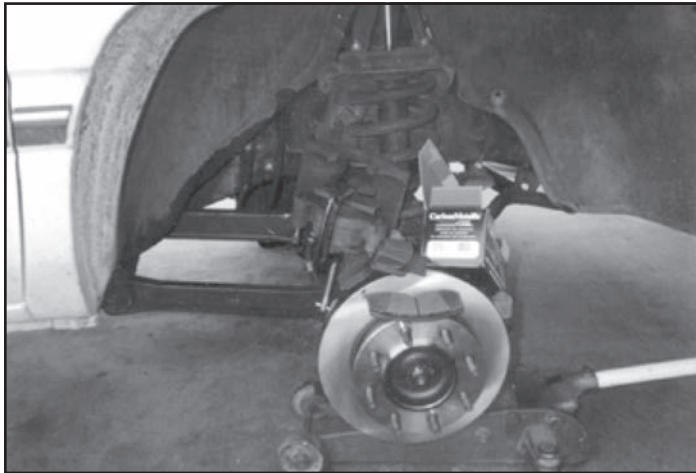
View of the universal joint and hub bolts. Just inboard of the hub bolts is the deflector ring and the part of the hub that extends inward through the knuckle.



Old brake rotor and hub has been removed. New rotor and hub is shown, along with tools used in the procedure.



Brake rotor, shield, spacer, axle shaft in foreground. Knuckle on axle assembly is shown above the floor jack.



New brake rotor installed. New Z-rated brake pad is shown sitting on the rotor.

Tools needed for brake rotor replacement

Tools needed for the replacement of brake rotors, and installation torque values:

Tool	Purpose	Torque
3/8" Allen Key	Brake caliper bolts	38 ft-lb
9/16" or 14 mm socket	12-point headed hub bolts	125 ft-lb
1-11/16" socket	Axle shaft nut	175 ft-lb

Parts used for 1997 4x4 Turbo Diesel:

Part	Brand	Part Number
Front axle universal joint	Neapco	3-0332
Front driveshaft 1.125" cup	Neapco	2-1175
Front driveshaft 1.06" cup	Neapco	2-0355
Front driveshaft at constant velocity joint	Neapco	2-4800
Rear driveshaft 1.125" cup	Neapco	2-1175
Rear driveshaft 1.06" cup	Neapco	2-4800
Rear driveshaft 1.18" cup	Neapco	2-0054
Rear driveshaft center bearing	Mopar	4773014
Hub, bearing, brake rotor	Mopar	52008207

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