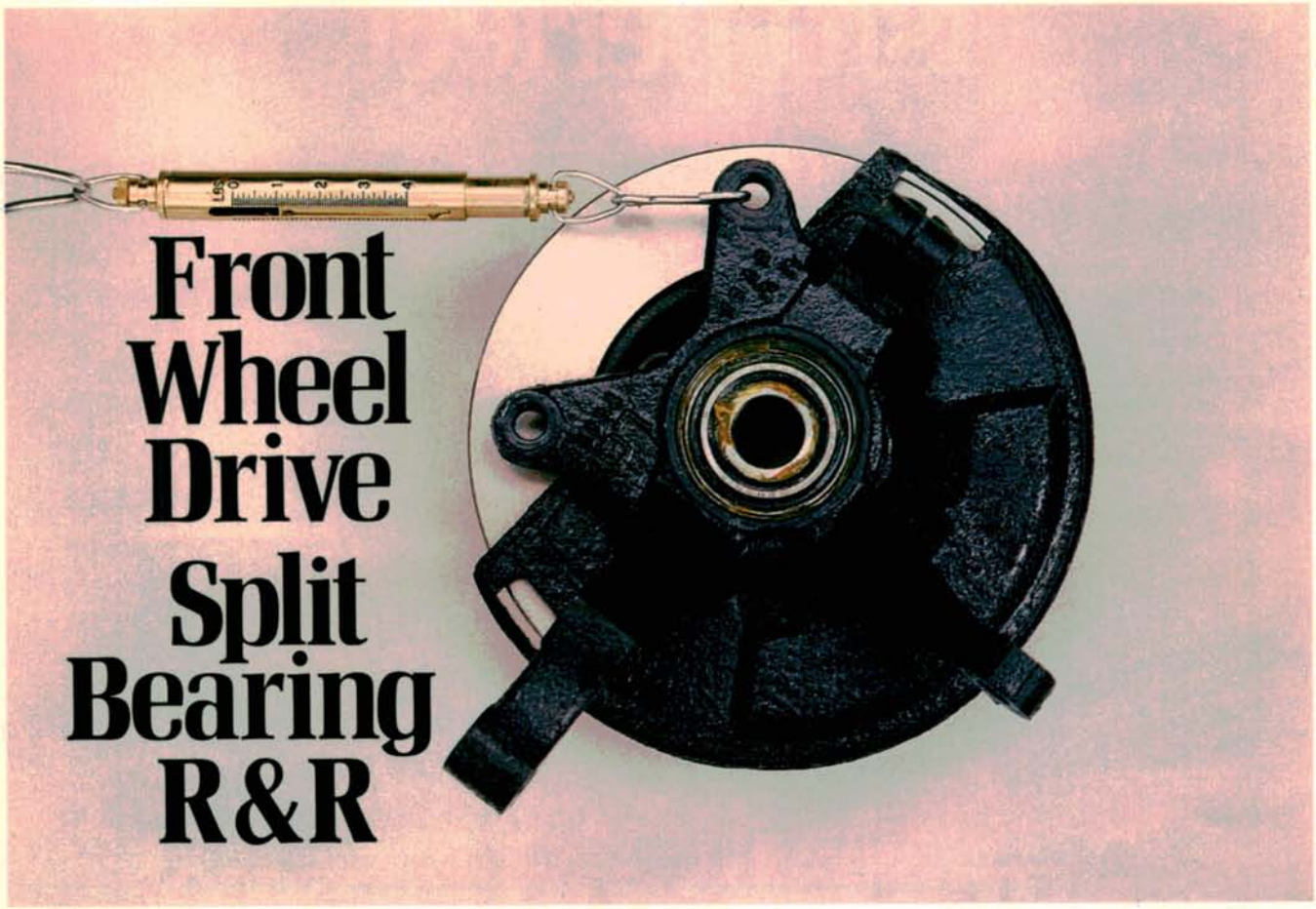


Front Wheel Drive Split Bearing R&R

It's a front wheel drive car and it needs rotors. But you've never seen one quite like it before. The rotors are being held captive by a drive hub that seems to be pressed into the knuckle!

You're very tempted to say some awfully nasty things about the guy who designed it.

Maybe you're used to those pop-off rotors used by more logical thinkers. Now, however, you have to figure some way to get the darn thing apart. Maybe you have a slide hammer or a press. Maybe you remember that your brother was a demolitions expert in the army.

One way or the other, you get it apart, only to find that the outer bearing is still stuck to the drive hub. You also notice that there's a spacer between the inner races of the bearings. What gives? What do you do now?

We're going to look at some examples of front drive vehicles where two separate bearings, hubs, and knuckles are pressed together. We'll look at some alternate ways to disassemble these units. We'll also look at ways to check and correct clearances between bearings and the selective spacers between them. The choice of the correct spacer is important to ensure proper bearing operation and long life.

First, we'll highlight a procedure used with success at the Ammco service/training center. It checks bearing preload with a dial indicator and uses tools that you probably have in your shop.

Manufacturers, on the other hand, generally recommend a procedure that measures turning torque to check bearing preload. You'll need a spring scale like the one we show from Kent-Moore to check the amount of resistance needed to get the hub turning in the bearings. The tighter the bearings, the more force is needed to overcome bearing friction. Looser bearings mean less friction and less force needed to get the hub turning.

Finally, we'll show you some tools that may make life easier. The tools, both purchased and homemade, approached the job differently, but still got the job done.

For photographic purposes we used a front knuckle from a Nissan 310, and one from a Mazda GLC. These will be very similar to the setup commonly found on the Toyota Tercel.

The procedures involved are not all that complicated, but must be followed correctly for the repair to be considered anything but temporary. If your customer complains that the guy down the street has already thrown three sets of bearings in the car this year, odds are the job has been botched somewhere along the line.

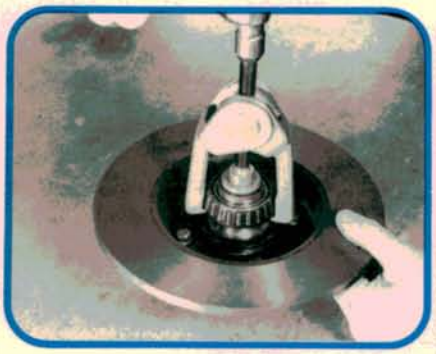
—By Ralph Birnbaum

1

After removing this Nissan knuckle from the car, and mounting it in a vise, a slide hammer was used to pull the drive hub from the bearing. Since you can't support the inner race on the inner bearing, this pounding will probably damage the bearing. The outer bearing and seal are still on the hub.

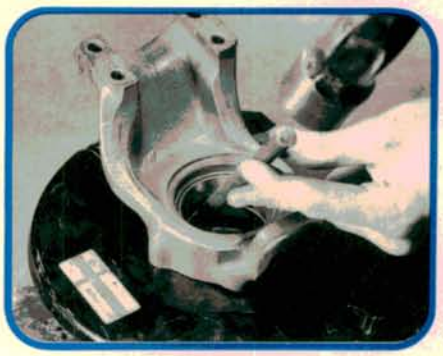
2

Remove the drive hub and clean away the excess grease. Then retrieve this spacer. This little devil sits between the inner races almost like the crush spacer between pinion bearings. Most of the time, if you're only replacing bearings, end play won't change. End play should always be checked, however.



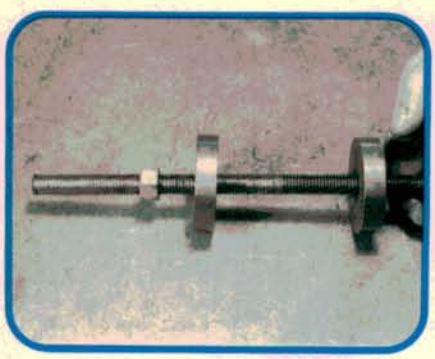
3

The outer bearing will always stay firmly attached to the drive hub. The outer seal is below it. Use a puller or press tool with fingers long enough to grip between the inner race of the bearing and the drive hub shaft. If you grab the cage, you'll ruin the bearing for sure, and it could fly apart.



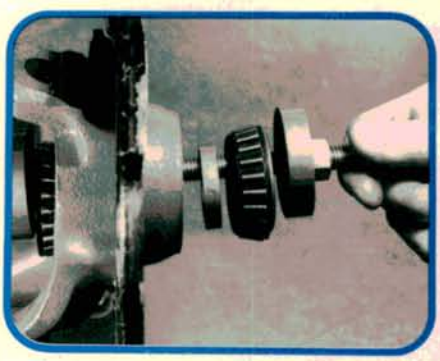
4

If you're replacing bearings, take a punch as shown and drive out the old races. Throw the bare knuckle in the cleaning tank to remove any crud that could keep the new bearings from seating properly in their bores. If you did raise any metal with the punch, carefully file or sand it smooth.



5

Make a special tool like this one from a length of ½ inch rod. You'll need two large washers or discs like the ones shown. The discs have to be just large enough to bear on the inner bearing races. This tool will simulate what happens when the drive axle is inserted through the hub and the nut is tightened.

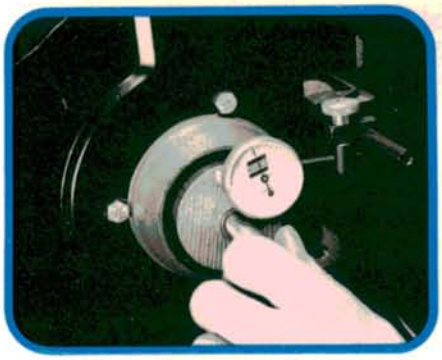


6

Once again. Make sure everything is clean. This is a close tolerance and it won't take much to throw things off. Insert the tool through the bearings and the original spacer. Tighten slowly, keeping the spacer centered between the inner races. Seat the bearings with a torque of about 6-13 Nm (5-10 ft-lb).

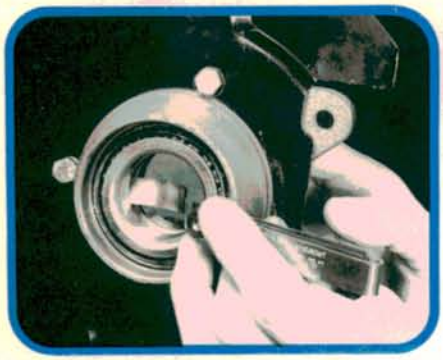
7

With the tool installed and tightened, mount a dial indicator as shown. Rotate the hub to make sure the bearings are fully seated. Then take your reading. You should have 0.01-0.05 mm (0.0005-0.002 in) of end play. If you're right on the money you'll have a reading of 0.025 mm (0.001 in).



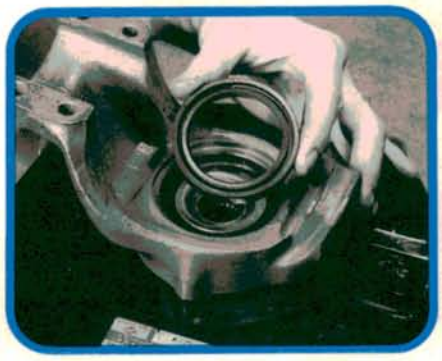
8

If end play is greater than specifications, the spacer is *too thick*. Subtract allowable end play from your dial indicator reading. This is how much *thinner* the spacer needs to be. Write this number down. Mic the original spacer and subtract this number. Select a spacer of that thickness.



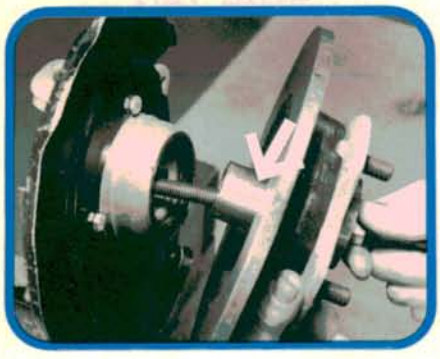
9

If you had too little end play, or none at all, the spacer is *too thin*. You can get a close idea how much *thicker* the spacer needs to be by holding the bearings in their races as shown and checking the gap between the inner races and the spacer. It's either that or start substituting thicker shims at random.



10

Once you've selected the proper spacer, pack the bearings with the recommended grease. Install the bearings, spacer, and the outer grease seal. Always use new seals. Check the sealing band on the outboard drive joint where it rides in this inner seal for rust or pitting that could cut the seal.



11

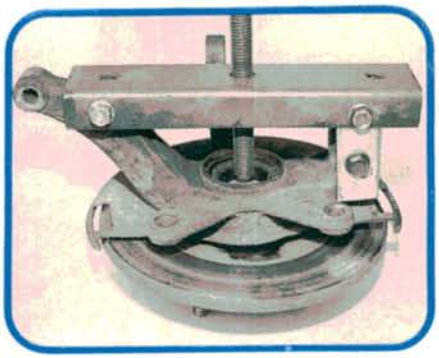
Install the rotor on the drive hub, making sure the locating surfaces between the two are clean. Alternately tighten the bolts that hold the rotor to the hub to their proper torque. Make sure the shaft on the drive hub is smooth and free from rust (arrow) and apply a thin coat of grease to it.

12

Use the threaded tool and spacers to pull the drive hub back into the bearings. The inside spacer has to push on the inner race of the inside bearing. Pressing on the cage or rollers will damage the bearing. Snug things down and install the inner grease seal. Lightly lube the seal lip.

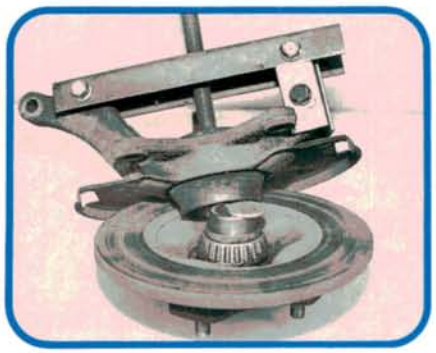
13

If your shop does a lot of this work, it may be worthwhile to stock a selection of these spacers. These checks will be especially important when you replace a collision damaged knuckle. You just can't take the chance that you'll get lucky enough to get a replacement knuckle that uses the same spacer.



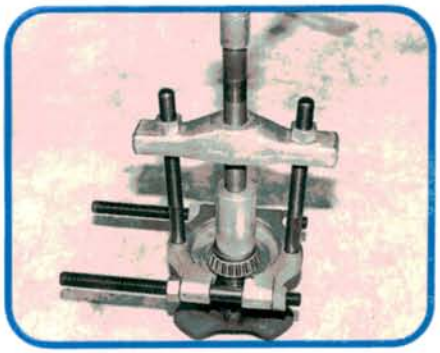
14

Rather than use a slide hammer, we made this portapress to free the drive hub in this GLC. The press bar bolts on at the hole for the ball joint pinch bolt and the lower hole for the strut-to-knuckle attaching bolt. We used an old VW valve adjusting shim between the screw and the drive hub.



15

Looks like the Nissan doesn't it? Don't make the mistake of just leaving the bearing and outer seal on the drive hub and pressing them back in place. The seal will cock and jam in the knuckle and simply won't seal as it should. You'll end up with grease on the pads and water in the bearings.

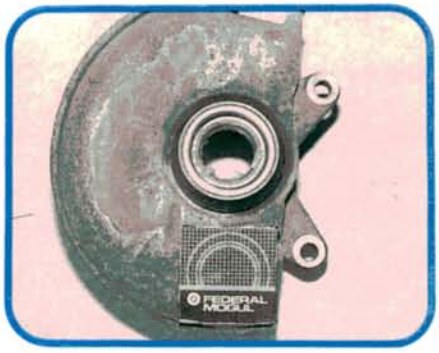


16

Here's another puller you might try using to pull the bearing from the hub. It's the same one from Miller Special Tools we used on the Toyota ring and pinion job in the September issue. It fit between the bearing and seal and pulled against the inner race, removing the bearing without damage to it or to us.

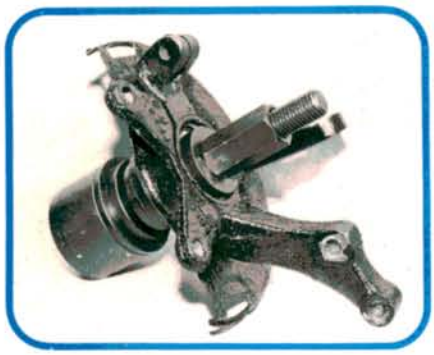
17

The bearing's gone. Remove that old seal and discard it. Thoroughly clean the sealing lip where it rides. Check the hub shaft where it presses into the bearings for pits or rust. Unbolt the old rotor and remove it. Remove any rust or dirt that could keep the new rotor from sitting squarely on the hub.



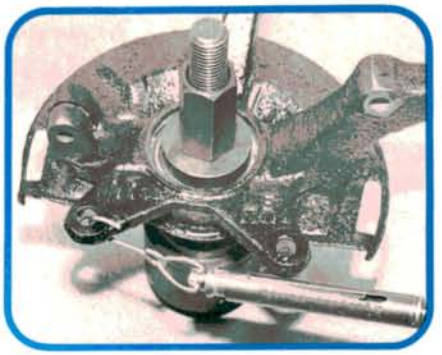
18

Drive out the old races like you would on a spindle type front end. Clean the bores for the races and check for nicks or gouges. Drive in the new races. Pack the new bearings with grease and install them with the original spacer between them. Install the new seal on the drive hub side of the knuckle.



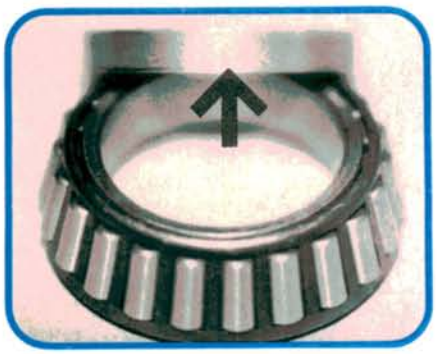
19

Mazda's repair manual says to tighten the threaded bearing loader in steps of 50 Nm (36 ft-lb) to a final torque of 200 Nm (145 ft-lb), checking as you go to make sure the bearings aren't binding. You'd need a heavier threaded tool like this on-the-car bearing installer from Schley Products.



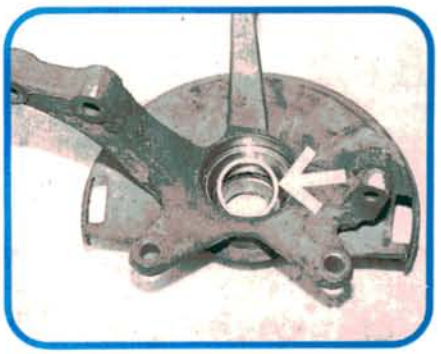
20

The factory suggests this method for checking bearing preload. Bearings and spacer are in place and the bearings loaded. Attach a spring scale as shown and measure how much force it takes to get the drive hub turning from a dead stop. Always compare readings to the specifications for your car.



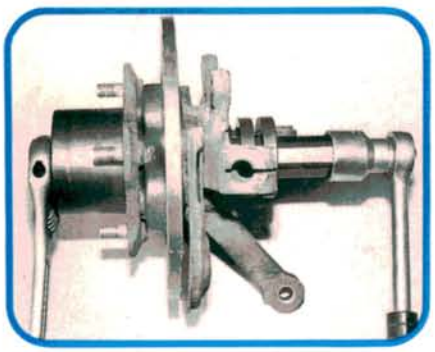
21

Changing spacer thickness changes the preload on the bearings. Mazda numbers their spacers, with each number corresponding to a specific thickness. A change of one number changes spacer thickness by 0.04 mm (0.0016 in) and changes preload by 0.2-0.4 Nm (1.7-3.5 in-lb).



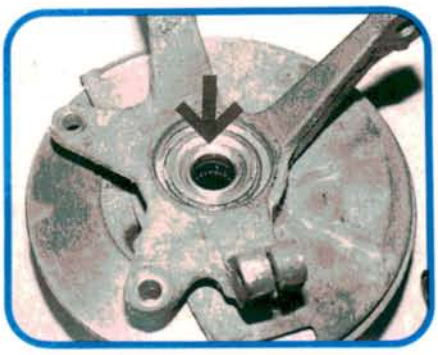
22

If preload is too great, the shim is too thin. If preload is too light, the spacer is too thick. Figure how much thicker or thinner the shim has to be. Then remove the threaded tool and inner bearing. Install the correct shim. Reinstall the inner bearing and tool and double check preload.



23

We used the on-the-car wheel bearing press from Schley Products to press the drive hub/rotor back into the bearings. Set the tool to press on the head of the drive hub at one end, and the inner race of the inner bearing on the other. Then just tighten the big screw and pull them together.



24

When the Mazda hub is fully seated, the inner face of the hub will ride at the lower edge of the chamfer on the inner bearing race (arrow). Take a moment to be sure the hub turns freely in the bearings. Install the inner grease seal. Reinstall the disc brake caliper frame.