

# Coming Through *in the* Clutch

**A**fter an astonishing 184,000 miles, the original clutch on this one-owner 1987 BMW 325iS finally decided it had completed its tour of duty. The way it failed was curious, though. Instead of the typical symptoms of gradually slipping and losing engagement, the owner said the car developed a decided ‘crunch’ in the clutch pedal, followed by a loss of about 50 percent of pedal resistance. But even this change produced no clutch slippage, even during the additional 500 miles of driving before he finally brought the car in for a clutch replacement.

As it turned out once we had things apart, the clutch failed because of a crack in the Belleville spring inside the pressure plate. Based on the observed life of the original clutch, there seemed to be enough lining left on the clutch disc to go another 30-40,000 miles. However, enough was enough, and it was clear the car was due for a clutch replacement.

As you’ll see in the photos, the clutch R&R procedure is typical for a front-engined, RWD car. However, there are two steps that can drive you to a career in toaster repair if you’re not prepared for them: the upper starter motor bolt and the forward shifter mount. Pay special attention to avoid what could be profit-killing hours poured down these two black holes in time. You can do the entire job from underneath the car.

## Estimate Carefully

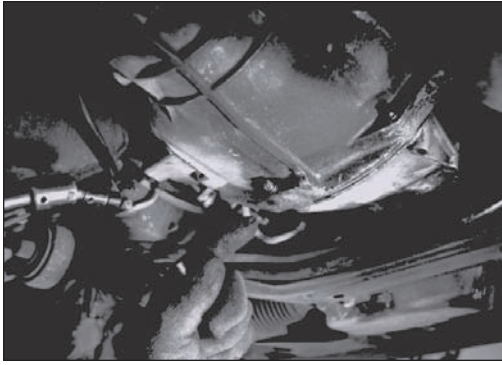
One final caution. According to factory parts manuals, the BMW clutch design was changed during the 1987 model year to a dual-mass (dual-disc) design. Before price-estimating this job, check the vehicle’s VIN number. The replacement parts for the dual-mass clutch assembly are approximately three times more expensive than those for the more conventional design. ■

— By Lou Reichardt



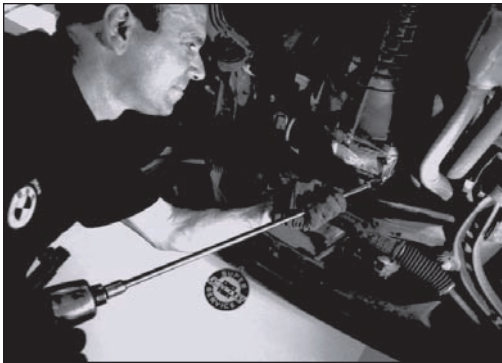
**Photo 1**

Working from front to back, loosen the swaybar subframe bushings to pivot it out of the way, then remove the lower bellhousing cover plate and bolts. Use a T-10 female Torx socket to remove these bolts.



**Photo 2**

You can easily remove the bellhousing bolts with an air ratchet, a long extension, metric sockets and T-12 and T-14 female Torx sockets.



**Photo 3**

The starter motor bolts thread in from rear to front. While the lower bolt is reasonably accessible, the nut on the other side of the upper bolt is certainly not. To remove this upper bolt we used an impact gun, a long extension and a wobble socket until friction caught the nut just enough for the bolt to come out (more on this later).



**Photo 4**

The clutch slave cylinder comes off after you remove the two mounting bolts. It is not necessary to remove the hose or otherwise open the clutch hydraulic circuit. As with any clutch replacement with a hydraulic clutch, it's a good idea to flush the system with fresh fluid just as insurance once you finish all the other work.



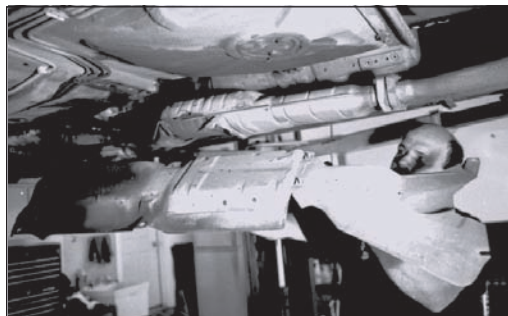
**Photo 5**

Some manuals call for removal of the entire exhaust system from the car. However, to save some time and effort it is possible to leave the front exhaust pipes connected to the manifolds and lower the rest of the system, supporting it at the rear.



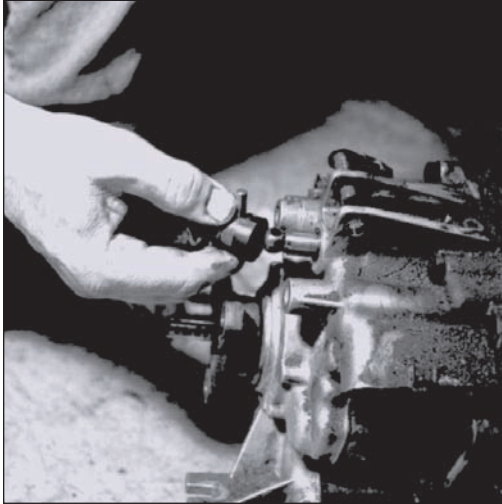
**Photo 6**

Once again, contrary to some manuals, you don't have to remove the driveshaft from the car completely. Remove the bolts holding the Hardy joint (a kind of harmonic balancer for the two-piece driveshaft) to the transmission output shaft flange (pay close attention to how it comes apart: There are several ways to reassemble it, but only one is correct!) It's a good idea to paint- or chalk-mark the components for proper reassembly alignment. Remove the bolts holding the center-support bearing to the floorpan. Then move the driveshaft off to the side to allow transmission removal.



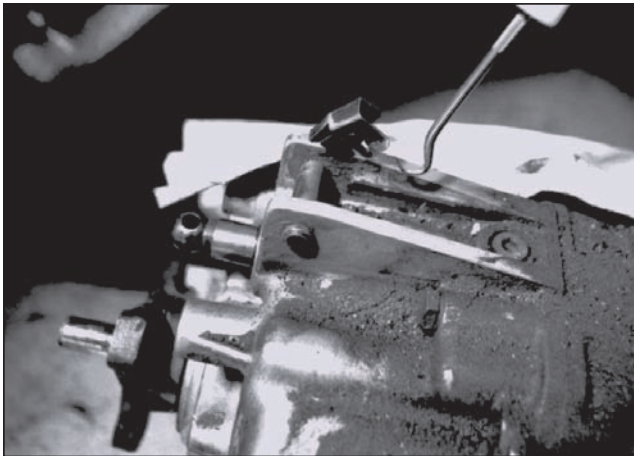
**Photo 7**

Remove the large underbody heatshield after unthreading its attaching bolts. With a little finesse, you can sneak it out between the underbody and the now-lowered exhaust.



**Photo 8**

Disconnect the shifter from its shaft by removing the retaining bolt, clevis pin and clip. That's pretty easy. The forward shifter mount is an entirely different, and sadder story, however.



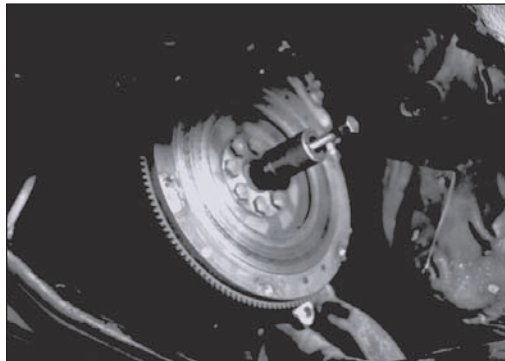
**Photo 9**

The forward shifter mount is attached to the top of the transmission by a clevis pin held in place by a flat U-shaped spring clip with a retaining tang. It is impossible to see this clip from any angle under the car, and very difficult even to touch! As shown in this photo taken after the transmission was out of the car, the trick is to use a cotter-pin puller or other hooked tool to catch under the edge of the clip, pulling upward and outward to dislodge the tang and remove the clip. This is surely the trickiest part of this entire clutch replacement job.



**Photo 10**

After supporting the transmission extension housing with an axle jack, remove the transmission cross-member from the car. Then with the driveshaft, exhaust system and other bits and pieces held out of the way, lift the transmission back and out, and you can unbolt and remove the clutch pressure plate.



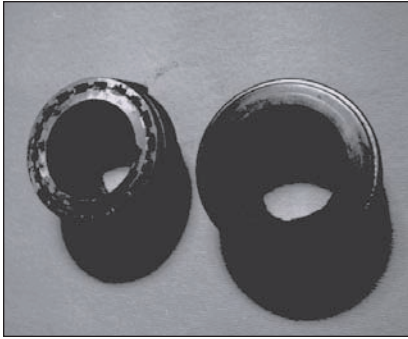
**Photo 11**

Examine the flywheel to determine whether you'll have to resurface or replace it. In our case, the owner had been gentle on the clutch (as we could have guessed from the 184,000 miles on the odometer), so the flywheel only needed to be scuffed with emery cloth and cleaned with brake parts cleaner. To replace the pilot bearing, you'll need a special puller like the one shown here.



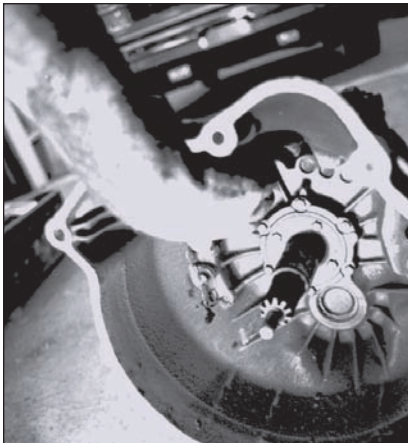
**Photo 12**

Carefully inspect the clutch release fork, especially at the bearing contact points and where the slave cylinder pushrod contacts it; replace it if necessary. Also examine the fork pivot and replace that if needed, using a hammer and drift. Note the worn pivot on the right compared with the new one on the left.



**Photo 13**

While replacement of the throw-out bearing is routine, it is interesting to note the wear pattern on the bearing we just removed. Because of the unusually high number of clutch applications over the course of those 184,000 miles, the clutch diaphragm fingers actually wore notches into the bearing contact surface. The result was a kind of ‘spline-effect’ in which the diaphragm fingers ‘indexed’ into these notches each time the driver pushed the clutch pedal.



**Photo 14**

Having the transmission out of the car affords the chance to easily and inexpensively replace the front and rear transmission seals as well as the tiny shifter shaft seal and to change the trans lube. Especially on high-mileage cars, it’s a prudent idea to install new shifter bushings to eliminate freeplay and rattles in the gearshift linkage.

## Home Stretch

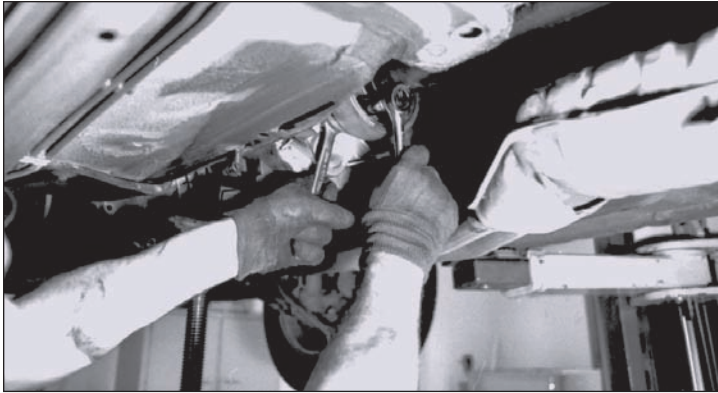
Following the installation of the new pilot bearing, it’s time for reassembly, which, as they say, is ‘the reverse of disassembly’ — except for that one problem. Remember the upper starter motor bolt? Well now’s the time to deal with that, before the transmission is back in place. The problem is holding the nut in place on the forward side of the starter motor, since it is virtually impossible to touch after the transmission has been reinstalled.

Technicians have come up with some very innovative ways to solve this problem. The lead technician on this job used Super Glue to stick the nut in place. He did this while the transmission was still out by cleaning the transmission case, applying Super Glue to one side of the nut, holding it in place by hand and screwing the bolt into the nut while pulling rearward on the bolt until the glue set. Turning the bolt during the drying process helps assure that the bolt does not become glued to the nut. This procedure also assures that the nut will be properly aligned when the bolt is re-inserted — ever so gently so as not to dislodge the glued-in-place nut.

Although the forward shifter mount spring clip can’t be reinstalled while the transmission is removed, its reinstallation does not require any special tools or heroics. You’ll still be working blind, but the clip returns to its proper place much more willingly than it vacated it.



## Coming Through *in the Clutch*



**Photo 15**

When reinstalling the driveshaft, it's very important to reassemble the Hardy joint properly. The large metal cup goes between the driveshaft and the rear transmission flange, with the cupped (concave) end pointing rearward. Also, it is possible to install the joint in the wrong 'clock' position, which will result in substantial vibration. Before disassembly we marked small arrows pointing in the direction the bolts should point in their respective holes. These marks assured proper reassembly.



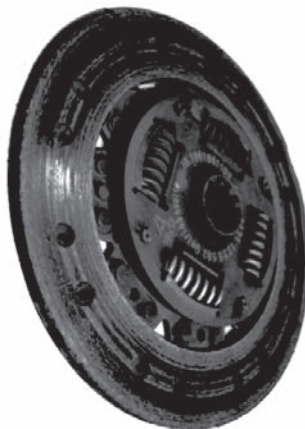
**Photo 16**

If you had occasion to separate the two halves of the driveshaft for any reason, match up the white alignment marks on each of the two pieces again to avoid vibrations. Judging by the condition of the lower exhaust heat shield, the owner has done some 'agricultural touring' a time or two.



**Photo 17**

If you look closely, the crack in the pressure plate spring that triggered this clutch job is clearly visible. This was the source of the odd pedal pressure change we felt at the beginning. For the want of a nail....



**Photo 18**

The original clutch disc was in much better shape than the plate. It might have lasted for a quarter million miles if the pressure plate had held up its end of the bargain.