



# MAZDA 5-Speed Transmission Repair



When this Mazda 5-speed transmission came growling in the front door of the shop, you'd have thought it was totally trashed. You didn't have to drive 50 miles per hour to make it roar—any forward movement in any gear at any speed and you knew

something was wrong.

In addition, it didn't want to make the trip from gear to gear. The shifter felt like it was embedded in concrete.

The customer was so convinced that the trans in



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the B2000 was scrap, that he first asked for prices on rebuilt or junkyard replacements.

We talked with him a bit, and suggested that a tear-down and inspection were in order before anyone pushed the panic button. We'd seen this situation before, or at least ones like it when the oil change recommendation had been ignored too long.

The bearing on the input shaft was shot. That we knew for sure from experience. If the customer hadn't ignored the obvious for too long, some bearings and fresh oil would fix things.

There are a few things to note when doing this trans and a couple of special tools you'll need to purchase or fabricate, but other than that, this is a fairly

straightforward piece of equipment.

Someone will undoubtedly notice that the sequence we describe varies from the one in the factory manual. I just happened to find these procedures a little easier than what they described. You may have an even better idea along the way. There are always going to be differences in technique which aren't necessarily right or wrong, just different.

This transmission and variations of it will commonly be found in most rear drive Mazda cars and trucks right up to the present time. We tried to provide as much information as possible about problem areas and disassembly techniques. Part two of this article will follow next month.

—By Ralph Birnbaum

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1

Before you raise the vehicle, disconnect the negative battery cable. Open the vehicle door and carefully remove the boots around the shifter. Don't rip or tear any of them. Remove the three bolts holding the shifter to the tailshaft and remove it.



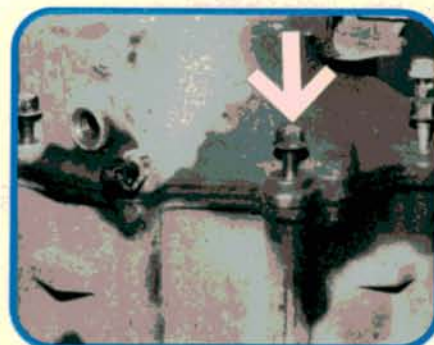
2

Raise and support the truck. Drain the trans. Mark the prop shaft for index and remove it. Remove the clutch slave cylinder (shown here), speedo cable, starter and bell housing bolts. Disconnect the back-up light wires. Support the trans and remove the crossmember bolts. Remove the trans.



3

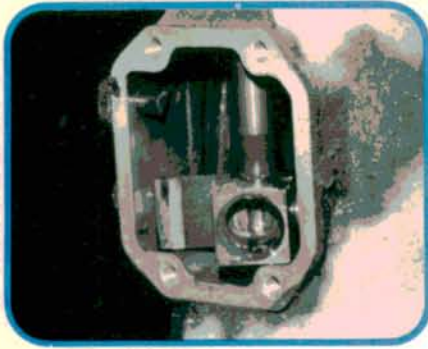
Remove the extension housing (shift tower?) from the tail shaft. Remove the back-up light switch as shown. You don't have to remove the speedometer driven gear unless it's leaking and you want to reseal it. Take a moment to inspect that rear mount for signs of excessive wear or damage.



4

Remove these retaining bolts. Note the relative location of any wiring harness retaining clips for proper reinstallation. These are not to be thrown at the nearest trash can to improve your foul shooting abilities. The bolts are Longfellows and hold all four segments of the trans together.





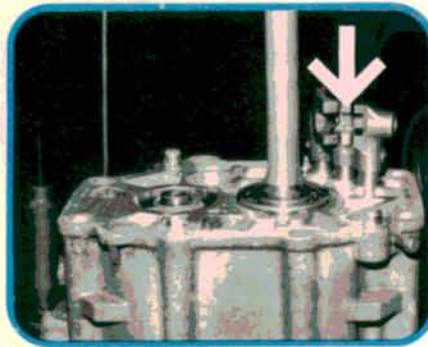
5

This photo shows the shifter socket. There are two stop pins at left that normally prevent the shift rod from rotating this far. With the shifter removed, however, you can guide the shifter rod through these pins without actually removing them. If you do remove them, don't forget them later.



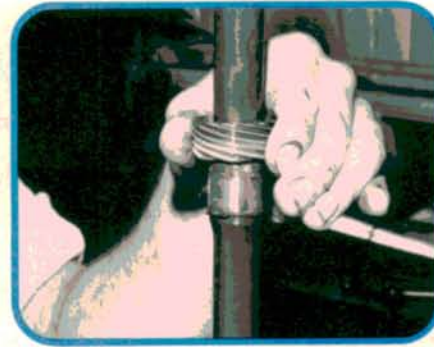
6

Now that we've navigated through those stop pins, we can roll the shifter over all the way. This will swing the selector lever away from the shift hooks on the shift rods. Once the shifter is free of these hooks we can tap the tailshaft with a soft mallet to loosen it and then remove it.



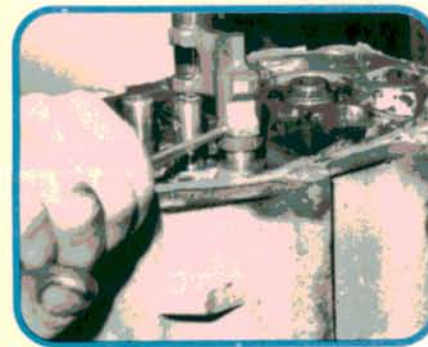
7

With our tailshaft removed, you can see how the three shift rod hooks form a cavity into which the selector rod fits. By rotating the selector rod in the previous photo, we completely clear these hooks. The selector rod stays in the tailshaft. Install in reverse order when the time comes.



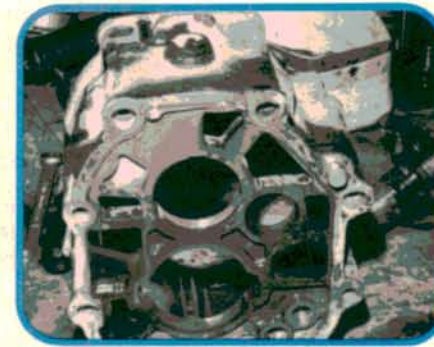
8

The speedo drive gear is sandwiched between two clips on the mainshaft. Remove the top clip and gear. Take care not to lose the small ball bearing sitting in a recess on the shaft. These have been known to hit the floor and vanish into another dimension. Pffft.



9

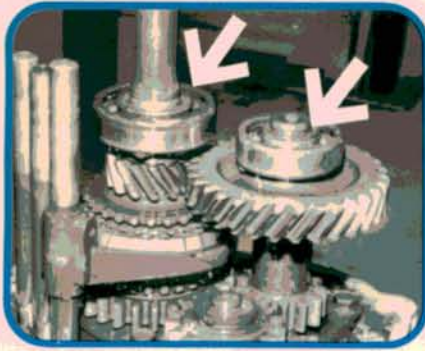
Now drive the roll pins from the hooks on the selector rods. Note the relative position of the hooks. Some variations of this trans used hardened bolts to hold the hooks to the shafts. I always clean the bolts or pins and reinstall them with a drop of thread-locking compound.



10

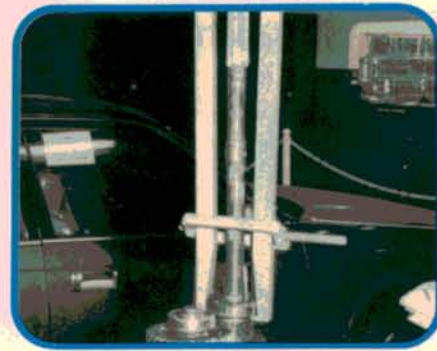
With the shift hooks removed, you can tap the next housing with a dead-blow or other soft mallet to loosen and then remove it. Thoroughly clean and inspect this housing for any signs of damage where the bearings ride. Also check for any signs of severe scoring or galling in the shift rod bores.





# 11

With the intermediate housing removed we see the rear bearings for the main and countershafts. Each is held by a circlip. The mainshaft clip is separated from the bearing by an adjustment washer available in two sizes. Play between the spacer and clip should be no more than 0.1 mm (0.004 in).



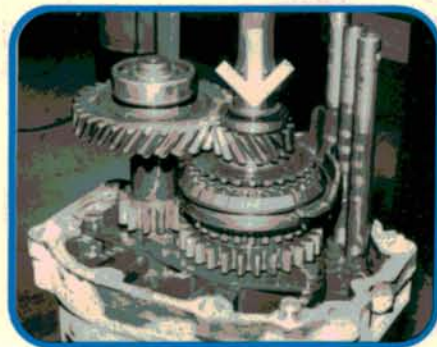
# 12

Sorry about this, but it's special tool time. Even with the clip and adjusting washer removed, this bearing won't just slide off. You'll need a longgg set of jaws for the old puller set and may have to fabricate some from bar stock. Be careful you don't damage the mainshaft output splines.



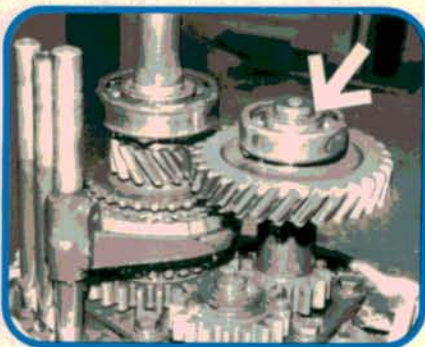
# 13

Here's a closer look at the rear mainshaft bearing being removed. This bearing can really be a tough one, so don't be surprised if removing it takes some force. We recommend a clamp around the puller jaws as shown to prevent them from doing the splits and whacking you in the head.



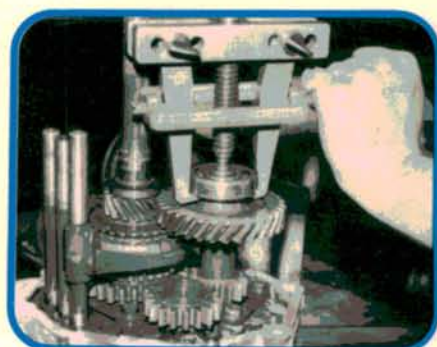
# 14

With the bearing removed we see another circlip and a thrust washer. Check the clearance (0.1-0.3 mm or 0.004-0.012 in) with a feeler gage. Replacement washers are available in four thicknesses from 6.4 to 6.7 mm. Be careful not to lose the ball bearing that locates this washer on the shaft.



# 15

Remove the countershaft bearing circlip and the washer below it. End play between the clip and washer is 0.1 mm. Replacement shims are available in four sizes from 2.1 to 2.4 mm. You'll usually find that you can reuse the old shims and still be in specs even with new bearings. Check it anyway.



# 16

Remove the circlip and thrust washer from the mainshaft. Then remove the washer and rear countershaft bearing. As we proceed, watch for any signs of damage to gear teeth and sliding surfaces. Just because bearings are the most likely culprits here, we don't want to overlook any other damage.





# 17

Now that the bearing is gone, the 5th speed counter gear, spacer, and reverse gear can be lifted off by hand. On the mainshaft, 5th gear and its synchronizer ring will also slide off easily, although we'll have to remove the 5th gear shift fork to get at the synchronizer sleeve.



# 18

The 5th and reverse shift fork is held on its shaft by a roll pin. Select a driver just large enough to drive the roll pin yet still fit through the hole. Support the shaft with your other hand as you drive the pin to avoid bending the shaft. (That other hand is in somebody's pocket so you can see.)



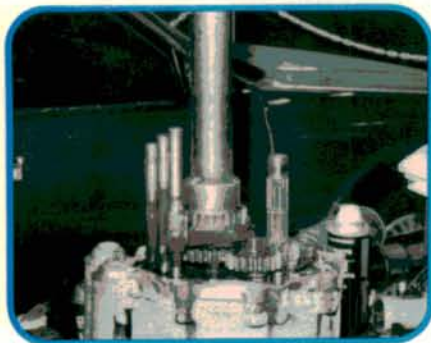
# 19

Note the large nut holding the clutch hub to the mainshaft. Not only is it torqued down (factory spec 94-152 ft/lb) but it's also staked in place. This nut has to come off before we can remove the hub and continue disassembly. Before trying to loosen the nut, pry back the locking tab.



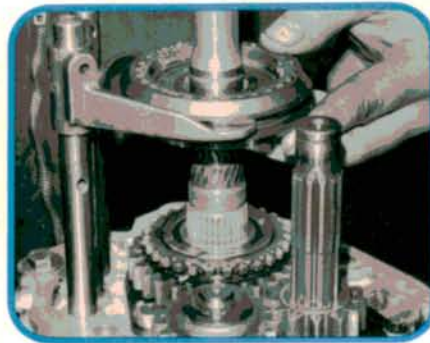
# 20

Here's the special tool Mazda sells for removing that nut. Basically, it's a really deep, deep-well socket that fits over the mainshaft, with a  $\frac{1}{2}$  drive at the other end. If you don't have one or choose not to buy one, you'll have to improvise. I never underestimate Yankee ingenuity.



# 21

The part number for this socket is Mazda P/N 49 1243 465A. The shop manual shows some character trying to remove this nut with an average sized  $\frac{1}{2}$  ratchet. Bah humbug. Unless the hands shown belong to a guy afraid of kryptonite, that photo is a prank. Grab your impact gun and get it over with.



# 22

Roll pin removed? Check. Big nut removed? Check. The 5th-reverse shift fork and synchronizer hub are ready for lift off. Clearance between the shift fork and clutch sleeve should be no more than 0.5 mm. Clearance between the synchro ring and gear should be at least 0.8 mm (1.5 mm new).





# 23

Break the bolts loose on the retaining plate that holds the center set of bearings in place. These bolts have been known to loosen themselves after a while, so don't be surprised if one or more has backed out. When you reinstall them, be sure to put a drop of thread-locking sealer on each one.



# 24

Now lay the trans down. Remove the release arm and clutch release bearing. Remove the bolts holding the front bearing retainer. You don't need to remove the release arm pivot stud. It comes off with the housing. Check the sliding surface for the release bearing for signs of galling or wear.



# 25

Here's the backside of the retainer cover. Note the mainshaft oil seal which is easily replaced at this time. Also note the shim laying against the housing. This shim is used to set end play. It fits between the outer face of the mainshaft front bearing and the cover. More on this later.



# 26

Now grab your snap ring pliers and remove the inner snap ring, the one on the mainshaft. We say "inner" ring here, because if you look closely, you'll see a large snap ring that fits in a groove around the outside of the bearing. This ring is a stop, and keeps the bearing from moving into the case.



# 27

Every time I say special tool, I'm afraid someone will wash my mouth out with soap—but here's another. It screws into two of the front retainer bolt holes. The center screw on the tool (Mazda P/N 49 0305 430) pushes the mainshaft through the bearing. No hammer or air chisels, please.



# 28

Why not just use the press, you ask? This photo shows you why. As the tool pushes the mainshaft through the front bearing, it also pushes this center bearing section away from the bell housing. The only supporting surface perpendicular to the mainshaft has got to move with it.