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MiscRes: Magazine Articles

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"900 Tranny Fix" - How to Fix a Cracked Countershaft Bearing Boss

OLD IRON**HOW TO****TECH & HOW-TO**

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900 TRANNY FIX

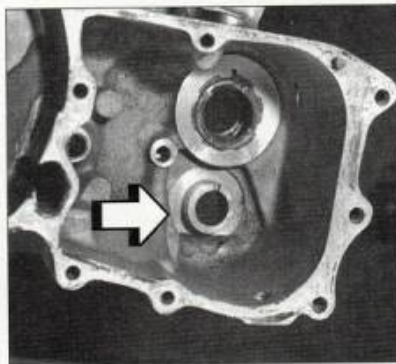
How To Fix A Cracked Countershaft Bearing Boss

Text and photos by Tom Hurd

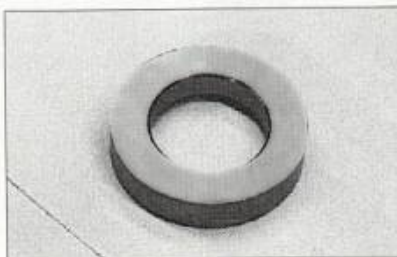
There's something classy about old Sportsters. They have a simplicity and character all their own. Thankfully, many aftermarket companies continue to manufacture new and improved products to make these old warhorses run faster and handle better. But as some owners are finding, an impending catastrophic failure may be hidden in their transmissions. Some owners are lucky to find the problem when they open up the tranny for a rebuild. Others only learn of its existence after the right rear section of the engine case blows off.

The part of the case that we want to look at is the bearing boss for the tranny's countershaft bearing. Sportsters from 1957 to 1972 and 1954-and-up KHs run their speedometer cable drive from the tranny. The countershaft's first (low) gear has a worm gear siamesed onto it that engages a driven gear — the speedometer drive unit, as Harley calls it — on the end of the speedometer cable. Unfortunately, to make room for this worm gear, clearance was engineered as a round hollow around the right case's countershaft bearing boss which created a weak spot in the case. This flaw was eliminated with the 1973 and later Ironheads by removing the worm gear, moving the speedo drive to the front wheel, and redesigning the engine case so there was no longer a hollow around the bearing boss.

Unless your nickname is "Hole Shot Harry," this section of the case should be fine on a stock horsepower/torque engine. But with a mill that has more power and/or there are a few hole shots in the engine's past, there's a chance this bearing boss is cracked. Once the boss cracks enough, the bearing fails, the countershaft cocks, and in a split second your transmission is garbage and parts of your case are on the street mixed with tranny oil.



This small boss (see arrow) is the weak link in the drive line. All 1973 and later Ironheads have more than twice the wall thickness of this boss.



The aluminum ring needed to press around the old countershaft bearing boss needs to be made on a lathe. Be sure to give the machinist your case so he can make the ring fit the case exactly. After all, there are slight manufacturing differences in the Harley case from engine to engine. The dimensions of the ring I made here, just to give you an idea of its size, are about 2 1/16" OD, 1 1/4" ID, 7/16" T.

Thankfully, there is a fix (besides replacing the case). It can be performed as an ounce of prevention or, if it's too late for that, as a solid, permanent repair. This job is going to take some work, but it's a lot easier than replacing the case. To do it, the engine cases must be split and the right case stripped of all components (other than

rices). Leave the needle bearing that's in the damaged first gear countershaft boss because it's needed to help the boss retain its shape during the repair. It will be replaced later.

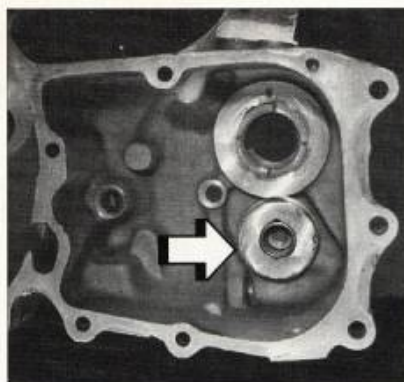
With case in hand, it's time to go to your trusty machine shop. To reinforce or repair the bearing boss, an aluminum ring has to be made on a lathe. It must fit snugly around the old bearing boss and be about the same diameter as the flat area on the countershaft first gear. The ring should also be thick enough so its outside surface can be planed flat with the surface of the case's boss after the ring is pressed on.

This machined aluminum ring must be welded in place. The welds have to be around both the outside edge to the case and the inside edge where the ring and the original boss meet. The heat from the welding will ruin the needle bearing. This bearing is pressed in from the inside of the right case and should be replaced as part of the transmission reassembly after all welding and machine work is completed.

After the ring is welded in, the face of the ring has to be machined flat because it is the thrust surface for the countershaft's first gear. The easiest way to do this is with a Bridgeport-type vertical milling machine.

The hole in the engine case where the speedometer cable is mounted must also be plugged. You can weld it up, use a pipe plug (check the threads with the old drive unit before installing it in the case) or just install the original drive unit with its inside drive gear removed. It's your call.

The parts you will have to purchase, besides the necessary gaskets, will be a 1973 or later first gear (H-D # 35760-73), a new countershaft (unless it's in good shape with not even a hint of bluing where the shaft goes into the bearings) and the



This is the new, improved bearing boss (see arrow). The bearing support area is now much like that of the 1973 and later Ironheads. When pressing in the new bearing, keep it straight to avoid distorting the outside of its housing and be sure to put a little sealer on the outside of the bearing.



Two types of countershaft first (low) gears were used in Ironheads. The gear on the left is the early style (1957 to 1972 and 1954-and-up KHs). It has a worm gear (see arrow) that drives the speedo cable. After modifying the earlier cases, there's no longer room for the speedo drive gear. The gear on the right is the 1973 and later version (H-D # 35760-73). The old style gear can be modified to work but it's not worth the effort or cost.

needle bearing that supports the shaft. This is also a good time to inspect the rest of the tranny for tired bearings or chipped gears.

If you want to retain your speedometer, you can update to the 1973 and later front wheel drive assembly. Parts to perform this upgrade are available from your local Harley-Davidson dealer or many aftermarket parts houses.

If this whole deal sounds like a lot of work, that's because it is. But the most difficult part gets pawned off on the machine shop. (We'll be covering how to overhaul an Ironhead four-speed tranny in an upcoming *Hot XL* issue.) Check out the accompanying photos to see how the repair is done. ■

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