

TACKLING CLUTCH FAILURE IN THE GM 6L80/90



by Steve Garrett
members.atra.com

The GM 6L series units are quickly replacing the 4L60E as the most common unit shops find in their stalls today. Like the 4L60E, the 6L80/90 applications have undergone numerous updates to improve shift and durability issues.

A lot of updates have occurred to the parts to address the problems you may be experiencing. Like the 4L60E, trends have developed that make diagnosis and repair easier as we begin to see more repeat issues.

The 1234, 35R and 456 clutches are the most common apply components to experience problems. Some failure modes are common across all three clutch assemblies, while others are restricted to just one clutch.

STATOR SUPPORT GASKET AND TUBE

The stator support supplies the apply oil for all three clutches (figure 1). In addition, it supplies the compensator feed oil to the clutch compensator circuits. Fluid from the valve body feeds into the pump via the flat surfaces and feed passages where the valve body contacts the pump. The fluid flows down the support and into the appropriate circuit.

The stator support bolts to the pump body and seals with a gasket. If the gasket leaks, clutch failure is imminent. Which clutches fail depends on where the gasket is leaking.

In addition to clutch failure, leaks between the clutch circuits can also occur, leading to tie-up issues. If the compensator feed circuit area of the gasket leaks, it'll cause shift feel issues. Gasket failure is common on high mileage units, as hot/cold cycling of the parts tends to etch the gasket, leading to leaks.

If you refer to a GM factory repair manual, it tells you, in large, bold print, never remove the bolts attaching the support to the pump. If the gasket leaks, they want you to replace the pump.

As we discussed in numerous ATRA seminars, engineering was very concerned with your ability to follow the instructions regarding replacing this gasket. As we outlined, you can replace the gasket if you follow a process, preload the support correctly, and torque the bolts. Since the gasket is a problem area, vacuum testing or air testing the support will help you isolate gasket troubles.

When you're working on the pump assembly and want to replace the gasket, pay attention to the pump orifice cup plugs. Sometimes, when washing the pump parts, a cup plug will fall out, which can lead to major problems later.

STATOR SUPPORT

Here are stator support areas to focus on: sealing rings and stator tube cracks. The back of the stator support houses sealing rings, which seal the feed oil circuits for the 35R and 1234 clutches. Early units had issues with the ring design, which lead to leaks, especially during cold operation. Generally, the customer would complain about a delayed or slipping engagement, usually going into reverse.

GM updated the sealing rings on the support to address the issue. The updated ring design won't fit previous design pumps, so you'll need to either replace the pump or have it machined, allowing you to install the updated rings.

A lot of the 6L applications that enter your shop are high mileage units. Although not common, we've seen issues with the stator support tube/liner developing cracks. Depending on where the crack is, it may cause clutch failure, generally to the 456 clutch.

Cracks in this area aren't something you'd normally take time to look for, but since we've seen some issues here, take the extra minute or two to examine the ID of the stator support.

PUMP FAILURE/ PRESSURE REGULATOR WEAR

One of the more common problems with GM 6L series units is with the pump or the pressure regulator valve (figure 2). Either pump or regulator valve issues can damage one or more clutches.

Most shops have seen both of these failures, but some aren't aware of their causes. Pump damage in this application is primarily due to issues within the torque converter. TCC lining wear can result in metal-to-metal contact between the TCC apply piston and the converter cover.

Stator clutch outer race spline failure is also a common issue. Either of these situations will lead to pump failure, as metal from the converter will migrate into the pump.

The solution is to replace the damaged pump parts and the converter, but keep in mind two very important things:

1. The pump slide and rotor are selective in this application, so checking the pump internal component clearance is critical, even with factory parts.
2. Replacing or flushing the cooler properly is also critical if you don't want a repeat failure.

Pressure regulator valve wear in this application can also lead to clutch failure. Worn regulator valves are common, with some of the valve lands looking more like camshaft lobes. Several companies have solutions for this, so the one you choose will likely be based on your experience and product preference.

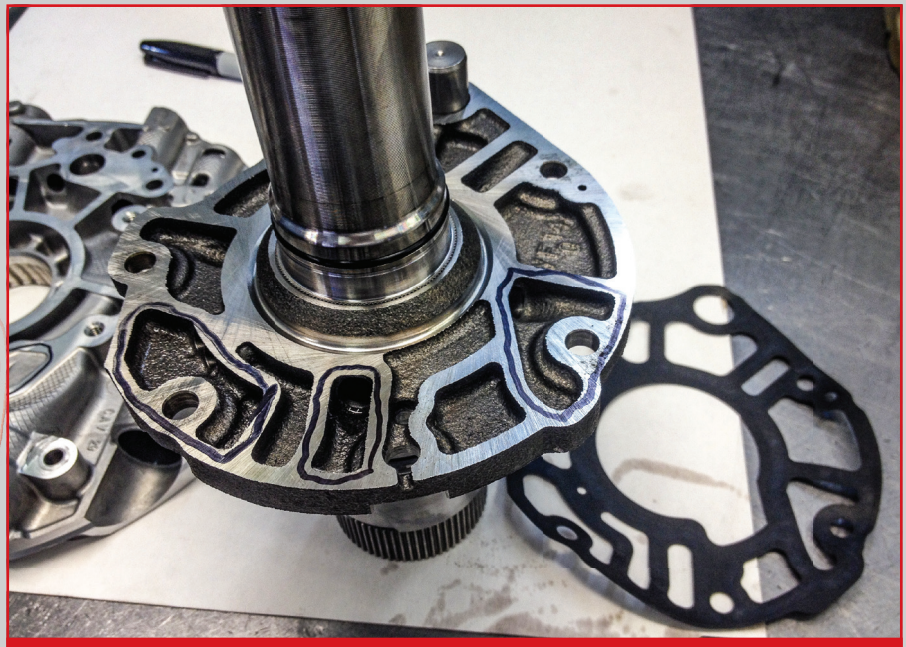


Figure 1

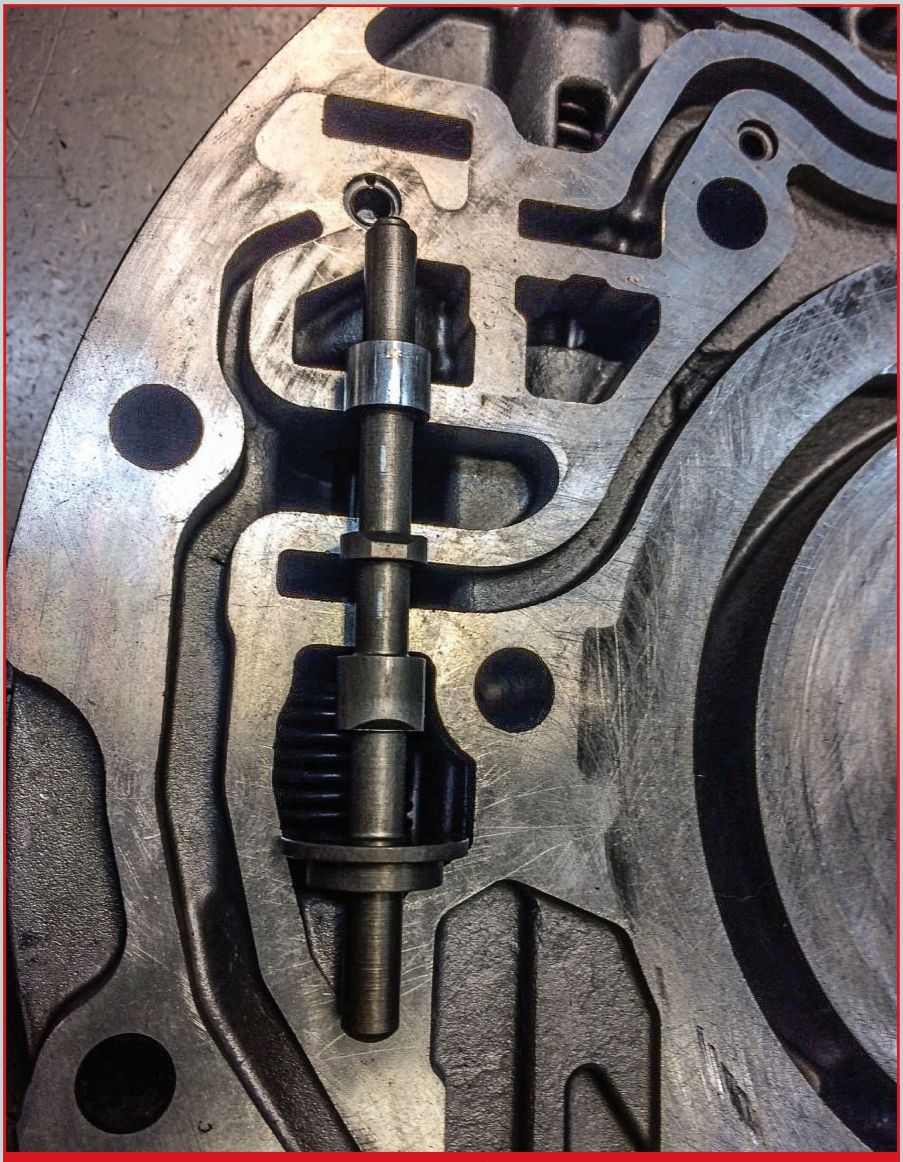


Figure 2

1234 PISTON AND PISTON HOUSING

The 1234 piston is a known issue with these applications. The piston can develop cracks, which may lead to clutch failure (figure 3). GM updated the piston, so, if you're working on an early application, always update the piston to the later design. These updated pistons are available from GM and the aftermarket.

The piston housing also has a tendency to crack, although it isn't as common as the piston itself. The inside diameter of the housing will develop a crack and can even completely break away from the housing, causing 1234 apply issues. Like the piston, GM also updated the housing to address this problem.



Figure 3

CRACKED DRUM

One of the more common issues on early applications is a crack that develops in the drum weld. This will typically result in 35R clutch issues or failure. GM updated the drum because of this. You can identify the updated drum by the dot matrix QR label printed on it (figure 4). Some shops are gun-shy of the drum, so they weld the area that develops cracks in an attempt to prevent future problems.



Figure 4

LOW SPRAG

High mileage applications may experience problems that appear to be related to the operation of the 1234 clutch, but actually have nothing to do with clutch operation.

The 6L transmissions use the low sprag to hold the output carrier stationary during vehicle launch in 1st gear. Unlike some older transmission designs, the 6L80/90 applications also apply the Low Reverse (L/R) clutch to aid the low sprag during take-off.

If the sprag develops a problem, the L/R clutch will hold the output carrier initially. Once the vehicle reaches about 2 MPH, the L/R clutch releases. If the sprag fails to hold, the vehicle will seem to drop into neutral, leading you to think the 1234 clutch failed.

This type of failure is easy to overlook during inspection, so make sure you inspect the elements and the races closely (Figure 5).

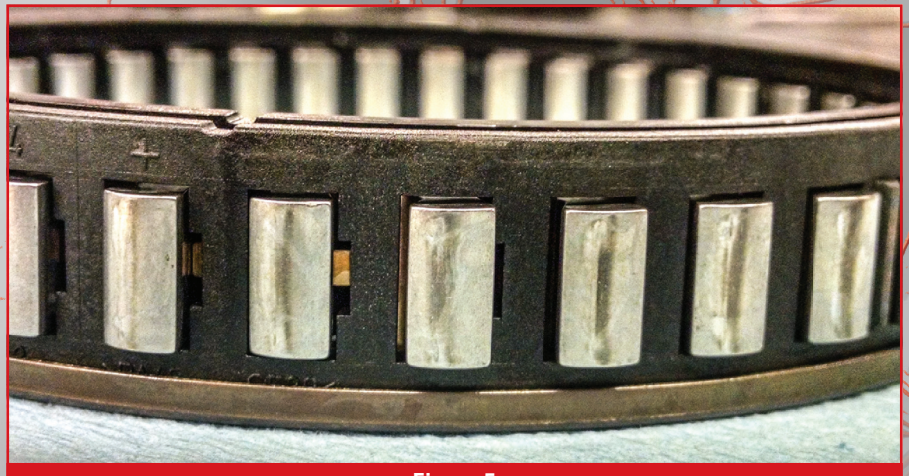


Figure 5

456 DAMPENER

The 456 dampener helps dampen engine-firing pulses when the TCC and 456 clutch are applied. If the shaft fractures, it'll seem like the 456 clutch is no longer applying. In severe cases the shaft will snap off the drum (figure 6). GM has updated the manufacturing process to address this issue, so just replace the shaft/dampener.



Figure 6

COOLER BYPASS VALVE

Similar to some other transmissions, the 6L80/90 may use a cooler bypass valve to improve transmission warm-up (figure 7). As with other manufacturers, the GM cooler bypass valve can fail. In this application, the 456 clutch will typically fail due to overheating. Replace or bypass the valve will address the issue.

CHECKBALLS

On early applications, checkball wear is a major issue. As the checkballs wear, they can migrate throughout the valve body, which can cause a lot of problems, including slipping and clutch damage issues. The balls were updated because of the wear issues and are included in many quality overhaul kits.

As you can see, with the 6L series units, there are a lot of items you'll need to be aware of when it comes to inspection and repair. Until next time remember, "What comes easy won't last, what lasts won't come easy."



Figure 7