



Why Is Everyone So Quick To Pull The Transmission?

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The most-important skills we have to master as transmission technicians are testing and diagnosis. To be successful in this trade means learning to use every means at our disposal to locate the CAUSE of the failure or problem. If you don't discover the root cause of the failure, the new parts you just installed soon will fail, because the parts you replaced were the effects of the problem and not the failure.

Although this column is dedicated to standard-shift transmissions and transfer cases, this situation is universal and applies to automatic units as well. As long as I have been in this business (and I hate to think back that far), the first instinct a shop has is to pull the trans back out of the car. Unless you have found a part on the bench that was left out during assembly, this always will be a mistake. If you don't know the precise cause of the problem, don't be quick to pull the box. There is no better dynamometer than the car itself.

For those of you who have dyno experience, I am sure you have seen units that passed all bench and dyno tests yet failed to work properly in the vehicle. Use the car as your test bed, and be methodical in your approach to finding the cause of the problem. Many times the problem will be outside the gearbox. When using a pressure gauge and an ohmmeter on an automatic unit, or trying to find a noise in a gearbox or a transfer case that is doing strange things, resist all temptation to yank out the trans. Learn to look at the whole picture. This means understanding the powerflow and theory of operation of the unit.

Obtain access to the service manuals and specifications for the trans in question. Learn to create the

proper sequence of diagnostic steps. Your mental outlook should be to ask questions of the unit. What is it doing correctly? What is wrong with it, and when does the fault occur? Assume nothing, and clear your mind of preconceived notions and "remember that one we had two years ago?" thinking. Each situation is different, and a logical step-by-step process of elimination is the only way to obtain consistent quality results.

The following will reflect a few common scenarios that occur all across the country every day in which curing the problem does not require transmission disassembly. We all should have the amount of money that is wasted every day by shops tearing down units because of improper diagnosis and testing. The other side of the coin is the terrible sinking feeling that goes with taking a unit apart only to find nothing wrong inside, which creates frustration and immediately puts shop morale into the toilet.

Common Trans Problems That Will Not Be Solved By Taking Apart The Unit

- Noise in neutral with the clutch engaged. The unit shifts correctly and does not have the same noise in gear. The most-common response is to tear the unit back down if it has been repaired, or to try to repair the unit if it is a fresh job. The first test that should be performed is to start the vehicle, put the trans in neutral with the clutch engaged and re-create the noise. Now raise the idle slowly to 1,500-2,000 rpm. Does the noise go away? If it does it is NOT inside the unit. The "effect" is neutral-gear rattle, and the cause is a harmonic vibration induced by a problem in the engine or the clutch. The clutch disc may have a worn or mismatched damper assembly; the dual-mass flywheel, if the vehicle is so equipped, is worn or not

functioning, or the injectors, engine timing, etc. need work. This type of noise, although unpleasant to hear, will in no way harm the trans or affect its operation. On units equipped with a PTO cover, you actually can watch the gears dance until the vibration floats out at increased idle. I speak with at least two shops a week that have experienced this problem, and the conversation always begins with, "I just took this trans we rebuilt back apart, and I can't find a thing wrong with the bearings."

- A Toyota 4-Runner is brought into the shop with a customer complaint of the transmission falling out of third and fourth and a strange feel to the stick in 3rd and 4th; all other gears operate correctly. The shop road-tests the vehicle, feels the problems and gets permission to inspect the trans internally. End result: No internal flaw can be found in the unit. The problem lies underneath the shift lever itself. Removing the stick, the shop will find the green nylon seat for the ball of the stick to be disintegrated, looking kind of like cracker crumbs. All that was needed was to replace this seat, which would have corrected the height of the stick and aligned its geometry, and all shifts would return to crisp detents without any gear jump-out.

- A Chrysler front-wheel-drive standard-shift car is brought in on a tow truck. The owner complains of the stick being jammed and says that after putting it into reverse he could not shift the vehicle. The car is taken off the roll-back and the shop test pilot climbs aboard, only to find all is well with the unit. No amount of driving will re-create the condition, until the customer leaves with the vehicle and goes to work the next day, when the situation reappears. The cause is in the transmission shift cover and requires replacing some

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springs and detent rollers without removing the unit. Refer to Chrysler Technical Service Bulletin #21-27-94.

- A 1997 Ford SUV is brought into the shop with a complaint of a shudder on take-off. The truck is tested and the problem is thought to be the 4405 automatic all-wheel-drive transfer case. The unit is taken apart, and there is nothing internal that could cause this problem. After much discussion the unit is reassembled and put back into the vehicle. This time it is filled with synthetic ATF, and the R&R tech makes a slight error and overfills the unit. When it is road-tested, the shudder symptom is gone. All that was needed was some fresh synthetic fluid – and about ½ quart more than the book calls for.

- A shop is asked to repair a shift problem on a Ford Explorer with a 1356 electronic transfer case. The 4WD High light will function, but there is no engagement in four-wheel-drive. The next thing you know, the transfer case is on the bench being disassembled and the shop has no clue as to whether the problem is mechanical or electrical. The right move would be to take the electric shift motor off the transfer case and tie it in place, then with a pair of pliers shift the transfer case into 4WD high and road-test. Now shift the unit into 4WD Low and road-test again. If the transfer case works correctly mechanically, there is no need to go inside the unit. The fault is electrical and should be addressed through the diagnostic procedure in the service manual.

Countless vehicles are brought to shops with a wide variety of shift problems and the transmissions wind up being taken apart because the shop follows no step-by-step procedure to separate fault by cause. In our current marketplace, many units have very specific fluids for proper operation. A good first step with any standard transmission with shift problems is to check the fluid level (you would be surprised how badly they shift without oil in them), then drain the fluid and refill with fresh lube that is specified for the transmission. Many times you will find units that are full of gear oil but require ATF. Anytime the lube is not matched to the unit, shift problems and noise will occur. The first step in any diagnostic procedure is to verify that the unit is filled with the proper lube.

Noise complaints are always difficult to solve, but they become impossible if you can't test the unit in the car. Can you see a noise? You may be lucky enough to find some parts that show contact wear, or a failure that will create a noise, but without being able to re-create the conditions in the vehicle your job is impossible.

Typical scenario: Pete Customer pulls up to the shop with a unit in the trunk of his car and asks you to fix his noise. Anytime you are doing work over the counter your chances for success will be cut in half. The right way to handle this, particularly if the complaint is noise, is to tell the customer right up front that you want the whole vehicle. Why chase

your tail trying to fix an unknown problem? When you eventually get the vehicle you will find that the mounts are no good, the clutch is gone, the driveshafts and U-joints are shot, the dowel pins are missing from the block, the tires are mixed sizes, the cam needs bearings, the transfer case is dry, the rear end has a quarter turn of slack in the pinion, and there is 3,000 pounds of firewood in the back of a half-ton pickup.

How come there is always time to do it over, but there is never time to do it right the first time? Don't be in a rush to take things apart. Use the vehicle for your testing laboratory, and – step by step – eliminate the possible causes for the problem until you have reached a conclusion. Then and only then will it be time to put the R&R man to work. You can run your life or your life can run you.

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