



**By Mike Weinberg  
Contributing Editor**

All of us have units we don't enjoy rebuilding for one reason or another. Some designs are inherently difficult to work on, some are just very time consuming, and others require special tooling that many shops cannot afford to buy for the few times they may need it.

However, one problem that confronts all rebuilders and is the most difficult to diagnose and cure is noise. Noise is responsible for more hair loss in this industry than all other problems put together. Noise complaints are the

## The Toughest Problem In Standard-Transmission Repair

most difficult to get help for. There is no book that can really help you identify a noise. When I get calls about noise on the tech hotline, there is a limit to how much help I can give over the telephone.

Finding a noise demands a level of expertise that must be developed through experience, an increased sensitivity through "the seat of your pants" and a good knowledge of power flow. Road-testing in noise diagnosis is critical. Pulling the transmission out after hearing a noise is the wrong way to go. Unless the noise is so horrendous that internal destruction seems imminent, leave the trans in the car and make it your rolling laboratory.

A legal pad and a pen and a

tachometer are the tools you will need. The rest is up to your senses, your complete concentration and your knowledge of the transmission operation. If the vehicle is not equipped with a tach, hook up your scan tool and note the rpm at which the evil monster occurs. Is the noise rpm sensitive? Does it increase with road speed? Does it occur in all gears? Is the unit noisy at idle in neutral with the clutch engaged? Is it noisy under load, during coast or both? Do not pull the unit unless you have obtained all the information possible about its occurrence.


### Case Studies

1. A constant steady growl that increases with road speed and is not throttle responsive.

Pitching the car left and right sharply at speed causes the noise to go away or get quieter until the wheel is returned to straight ahead. You can repeat the same sequence with the car coasting in neutral with the engine off. The noise is front-wheel bearings. Loading the wheel bearings with a sharp steering angle momentarily quiets the bad bearing. You would be surprised how many trans and rears are taken apart for a front-wheel-bearing noise. Rear-wheel bearings can produce the same noise but will not change much when steering angles are increased.

2. A steady noise that increases with road speed but gets quiet on coast, with gear selection making no difference.

Look to the rear end first. A loose pinion nut, worn pinion bearings or a damaged ring and pinion may be the cause. Worn carrier bearings will make a similar noise but will not be throttle responsive and will not be affected by turns. Be aware that noise



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*\*Includes New Morse Chain*

migrates through driveshafts and the chassis and sometimes will appear to be right under you in the trans but actually will be farther away than you might expect.

3. Noise in neutral with the clutch engaged.

The noise will stop if you step on the clutch and the input shaft stops turning. The noise will be quieter in gear but still there. With the vehicle in neutral and the clutch engaged, slowly increase the idle 100 rpm at a time. If the noise goes away between 1,200 and about 2,000 rpm, the noise is gear rattle. Gear rattle usually is created by odd-firing or out-of-tune motors, diesels with bad injector pumps, a will-fit clutch disc that does not have the proper damping for the engine, or a worn-out dual-mass flywheel.

Some units, particularly behind diesels, come from the factory with gear rattle as a free factory

option. Don't promise to quiet this down, as you will bankrupt yourself trying. This noise will make the customer unhappy but in no way will affect the durability of the transmission. If you get one of these in a vehicle with a trans that has a PTO cover, drain the oil, remove the PTO cover and start the vehicle in neutral on the lift, and you can watch the gears dance until you increase the idle enough to get rid of the harmonic vibrations. This problem requires a little research into clutch compatibility and engine drivability but is external to the trans.

4. A unit is noisy in all forward ranges except 4th.

Road speed and rpm increase the noise, and the unit is noisy in neutral with the clutch engaged. Here, a knowledge of powerflow pays off. If the noise is present in all gears except 4th (direct drive), we can eliminate the mainshaft

rear bearing as a possible cause, as it is turning in all ranges. The input bearing is a possibility, because when the unit is shifted into 4th, the 3-4 synchro sleeve will help align the input gear and help it to run true. Suspect the countershaft bearings, as they are turning in all ranges but there is no load on the countershaft in 4th. It is just along for the ride.

Now what happens if all the bearings have been replaced with quality bearings (OEM)? You now must envision what happens to the gear train that has been run on failed bearings for a period of time (usually the time it takes for the noises to get so loud they overcome the driver's stereo system). Bearings are the foundation of the unit, locating the shafts along and parallel to the centerline of the gear box. When the bearings no longer are able to hold the shafts

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