Which came first, the chicken or the egg? A troubled 2008 Dodge Avenger with a 41TES recently made me ponder this age-old question. My version was which came first: engine misfire or converter clutch slip? I found the answer to my dilemma while performing simple, routine checks.

I’ll never forget a seasoned tech in the shop telling me many years ago: KISS (keep it simple, stupid). The customer complaint was a bucking or shudder-like sensation during light cruising speed. The condition was easily duplicated.

A check of service bulletins revealed a match of the complaint in Chrysler bulletin 21-003-08. The vehicle, being under warranty, was taken to the local dealership and a new torque converter installed for purposes of what the bulletin described as “revised frictional composition.”

That’s where I expected the story to have a happy ending. But this story wasn’t at all happy, especially since this was my Avenger and within two days the shudder was just as bad as before.

Thoughts raced through my mind:
• Did they get the fluid right?
• Did they get the wrong part number?
• Did they initiate the quick learn procedure with the scan tool?

It felt weird not working on my own vehicle, but it was good for me to see things from the customer’s point of view. This vehicle actually has a fluid dipstick, so it was easy to check the fluid level.

Ironically, that same week, another bulletin, 21-003-09, had been issued to flash the PCM for numerous transmission improvements that seemed close to the issue at hand. I dropped the car off at the dealership again for what was supposed to be a quick flash. I became concerned when I didn’t hear anything for a while… a long while.

Turns out that even after the PCM update, the vehicle was still shuddering during light cruise. I didn’t know the guys at the dealer nor them me, but I was pretty much convinced at the time that the converter was at fault.

I kept emphasizing that the problem only occurred during lockup. The guys at the shop rightly disagreed with me and insisted the issue was driveability-related. But they wrongly started to replace parts… lots of parts. After they became frustrated they returned the car, hoping that corporate tech support would soon come up with a fix. They said they’d call me.

I dusted off my pressure gauge and installed it on the converter-off pressure tap (figure 1). This is where I learned a few things. For one, the torque converter entered lockup at speeds lower than I was used to; as low as 24 MPH.

I also drove with and without the variable line pressure connector connected to eliminate that as a variable. It was interesting that no DTCs set with the variable line pressure connector unplugged. In any case, pressures were
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right on the money: Zero PSI from the converter-off tap during lockup (figure 2), but still plenty of shudder.

With the hydraulics right, I was convinced the converter clutch was the culprit. With the scan tool, I monitored the “which cylinder is misfiring” screen while duplicating the problem (figure 3). I occasionally got stray misfire counts, randomly across all cylinders.

Like most vehicles, the misfire monitor uses crankshaft speed fluctuations to determine misfire. I started to wonder: Could converter clutch slip induce crankshaft speed fluctuation and fool the system into random misfire counts? I intended to prove my case.

[Editor’s Note: Yes it can. In fact, even a rough roadway can create enough of a crankshaft speed fluctuation to set a misfire code on some systems.]

I set up some data recording templates on the scan tool and went for a drive. By comparing the engine crankshaft RPM (CKP) with the turbine shaft RPM, the PCM calculates converter slip. I included this and other values on the recording template.

While playing back the recordings, I observed the converter clutch was slipping during light load in both partial (EMCC) and full converter lockup. The amount of slip in full lockup was at times over 40 RPM (figure 4). I thought this was excessive but I’d never monitored slip value that closely before.

Just to be sure the converter was the root cause, I proceeded to check other suspects from a driveability point of view. I monitored electronic throttle values, EGR, emissions purge, A/C pressure and even the charging system generator field. All PIDs, including ethanol % and fuel trims, were within textbook perfect range.

Next I decided to perform an engine cylinder leakage test. That’s when I stumbled upon the needle in the
As I removed the spark plugs I noticed a reddish coating on the electrodes (figure 5). Could that fouling cause an intermittent ignition misfire? Perhaps the misfire was light enough not to be noticed at low speeds or even heavy load because the unlocked converter would act as a cushion.

I remembered working on a Thunderbird with an AOD and a bad plug wire causing a shudder in overdrive (remember, the intermediate shaft locked directly to the converter cover in overdrive). I also remembered the guy at the dealer mention something about the red color on the plugs. He thought it was the fault of the coils and replaced them.

Seeing the red fouling for myself gave me flashbacks to plug condition charts in school and I remembered it could be certain metallic-based fuel additives. I’d recently added a bottle of octane boost to get a little more oomph out of the engine via spark advance. I returned to the store and checked the brand of octane boost (which shall remain nameless), but the contents didn’t list any metallic additives.

I still don’t know if the fouling was a result of additives from the gas or the bottle of octane booster. And I’m still shocked at the amount of plug fouling, especially given the coil-on-plug ignition system.

After installing a fresh set of manufacturer-recommended spark plugs, the vehicle was happy again. The shudder was gone.

I remained a little curious though about the converter slip. I elected to make additional data recordings and monitor clutch slip now that the car was fixed. Under the same type of conditions I found the converter clutch slip value to be much lower. It was fluctuating less than 10 RPM (figure 6).

So apparently (at least on this vehicle) the chicken-or-engine misfire can cause the egg of converter clutch slip. All attributed to something simple like fouled plugs that got overlooked for too long. The low speed lockup points all seem to work just fine, as long as the engine is happy.

I’m glad this one is fixed. Now I can ponder other important questions, such as: Why did the chicken cross the road?

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Figure 6: Without engine misfire, the calculated converter slip never exceeded a few RPM.