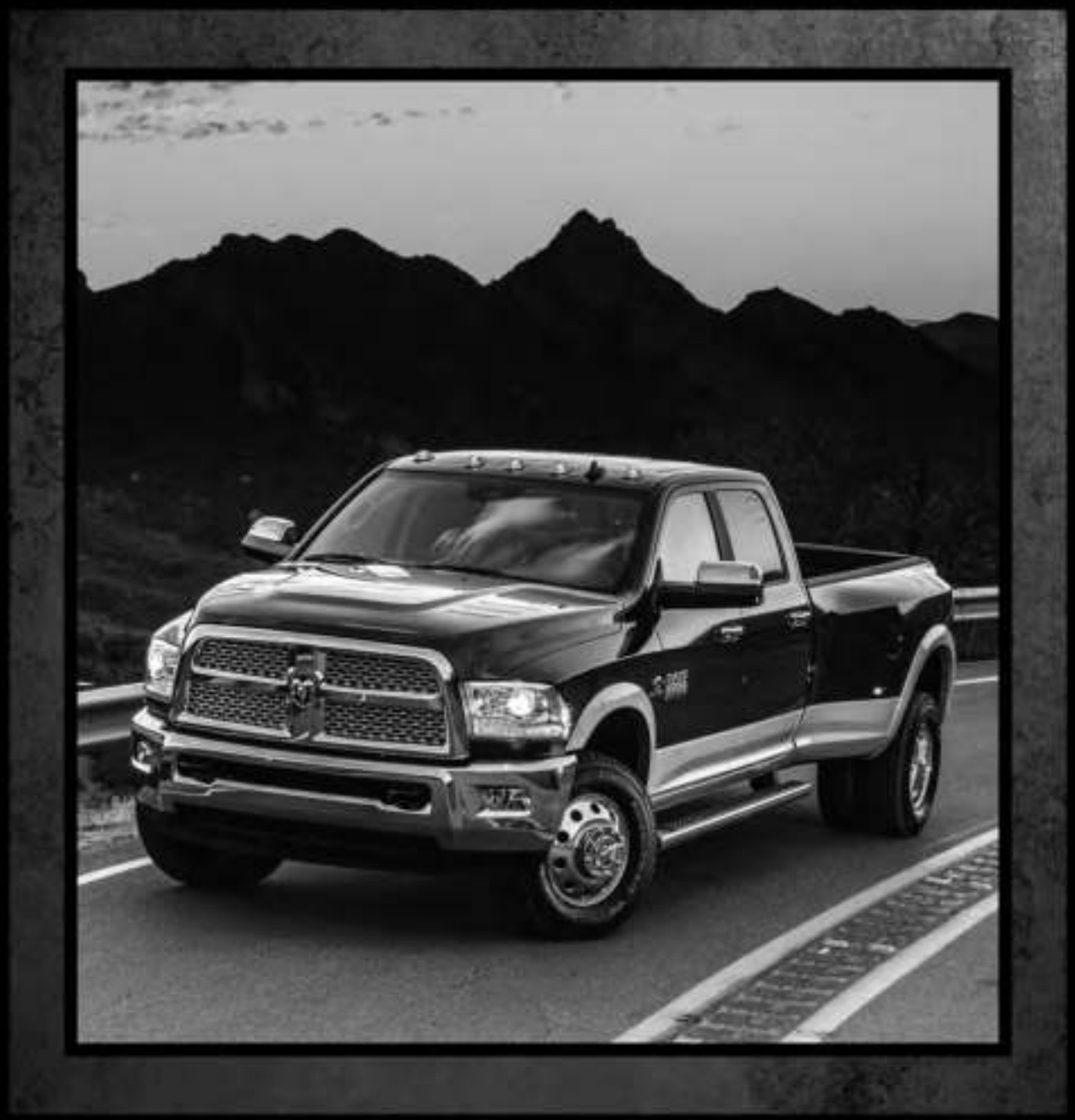
TURBO DIESEL REGISTER



THE NUMBER ONE RESOURCE FOR RAM TURBO DIESEL OWNERS • ISSUE 87

IDLE CHATTER CLATTER

A Review of Previously Discussed/ Frequently Asked Questions
by Jim Anderson

I have been appointed (elected, selected, condemned?) to write a column dedicated to member questions. Member questions range from old users with new problems to new members who are unfamiliar with the care of their pride and joy. The column reviews frequently asked questions and member feedback to deliver the best solutions. We decided to call the column "Idle Clatter." If you don't get my meaning, go stand next to your truck when it's running.

I am also available to answer your questions. Call the TDR offices and they will relay the message. I can best be reached by e-mail at j.t.anderson@att.net and will promptly respond.

INJECTION PROBLEMS

Problems related to fuel injectors have taken an upward jump over the summer of 2014. Truck models affected range from 2003 to 2013 HPCR engines. The older trucks have a lot of miles on them and therefore problems can possibly be expected, but newer trucks are experiencing more problems than has been normal in the recent past. Problems range from an intermittent engine miss, to engine stumbles at certain engine speeds. Replacement of one or more fuel injectors does not always solve the performance problem.

Since all of these models use the Bosch common rail injection system with multiple fuel injection events per combustion event, injector wear can be suspected, especially in older trucks with higher mileage. However, some owner descriptions of their trucks' problems lead your writer to think that some of these problems are electrical rather than mechanical.

It is well known through TDR member experience that these newer engines require very clean fuel to function properly, and many members have installed aftermarket fuel filtration systems that can clean the fuel and, by nature of flow rates like 95 gallons per hour (your truck likely uses about 6gph), the fuel is cleaned and recleaned and recleaned. The 2013 and newer trucks have dual filters that further help keep the fuel clean.

All fuel injection in common rail engines is controlled by the ECM, the engine control computer. The actual fuel injection is controlled by a solenoid on top of the injector. The solenoid is operated by an electrical voltage pulse to the solenoid from the ECM. Therefore, there is a wire that runs from the ECM to each injector, and these wires run through at least two multiple-wire connectors, one at the ECM, and one at the valve cover. Of course, there is also a wire connection at the solenoid itself.

Any wiring connector can be a source of trouble and troubleshooting fuel injection problems should include a complete inspection of injector wiring and connectors as well as testing the injector solenoid. Your writer suspects that a quick diagnosis by a technician of fuel injector problems determines that a fuel injector is bad, when it is actually an electrical problem rather than a mechanical problem. Installing a new fuel injector may temporarily cure the customer complaint, but the true and permanent fix has not been made. The quick and dirty cylinder contribution test used by most dealerships to determine which fuel injector is not operating properly will not determine if the injection problem is electrical or mechanical, so further diagnosis is needed.

That's an overview of the fuel injection system's electrical side. Now, let's explore injector mechanical problems. The clearances inside a fuel injector are very close. There are no gaskets. Fellow TDR writer Joe Donnelly showed a graphic example of these close clearances in an article in Issue 72 on page 49 where he removed the pintle from an injector barrel, made a mark on the pintle with a magic marker, then tried to install it back into the injector barrel. It wouldn't fit due to the thickness of the magic marker's ink stripe. The viscosity of the fuel is enough to keep most of it from traveling along the tiny clearances when a fuel injector is in proper working order.

These tiny clearances between working parts are the reason for the three micron fuel filtration requirement. Any wear in this area will cause fuel injector leakage into an engine cylinder, which can wash the thin oil coating from the cylinder walls, thus increasing cylinder bore wear. This unwanted fuel will also cause fuel dilution of the engine's lube oil which can eventually lead to engine failure. The leakage will also cause the engine to smoke, and the engine will likely be down on power and fuel economy.

Remember that in high pressure common rail engines, full fuel pressure is always present in the fuel injector body, so that when the electrical solenoid is opened, high pressure fuel is immediately available for injection. It is a requirement for exhaust emission strategies in newer engines that the injection event be carefully and precisely controlled, thus the need to have full fuel pressure available in the fuel injector at all times. In older '89-'98 12-valve engines, fuel pressure in the injector is only present during the injection event, the fuel pressure having been supplied by a pressure pulse from the fuel injection pump that causes the injector to open and dispense fuel into the cylinder.

Because fuel injectors in modern engines fire multiple times for each combustion event, injector wear will be greater than in older engines whose fuel injector operated only once per combustion event. Is it reasonable to expect that fuel injector replacement will be needed somewhere between 100,000-150,000 miles of operation?

24-VALVE ENGINE NO-START

A TDR member called to say his truck failed to start when the engine was warm or hot. This truck has the VP-44 fuel injection pump, and after a couple of lift pump failures he had added a FASS fuel pump system to prevent any more fuel injection pump failures. An aftermarket fuel pump system can build too much pressure while waiting on the manifold heater to cycle before an engine start. The VP-44 system requires only 8psi for starting and more fuel pressure than that can cause an engine to fail to start. Then, again, a hard start can also be an indication that the VP-44 injection pump is failing due to an injection pump internal solenoid failing. One method to cure the starting failure is to install a dash switch in the fuel pump wiring to limit the amount of fuel pressure just prior to engine starting. Such a switch would also serve as a theft deterrent by shutting off the fuel supply to the engine. Our intrepid member reported that he simply changed his procedure for starting his engine and that solved the problem at no cost to him.

NEW-OLD TRUCKS

There are always new owners of older trucks entering our ranks, and we welcome you and your questions. The answers to these questions help us all.

What happens when the truck's lights dim? You read the TDR web site's Frequently Asked Questions for an answer.

However, a new member took his older recently purchased truck to a local shop because the lights dimmed, then went back to normal brightness soon after a cold engine start. He said the volt gauge on the dash went down a lot, then returned to a normal reading, and repeated the process for a couple of minutes after starting the engine. The shop's technician found alternator output was normal, but said there may be a wiring short circuit, and he couldn't explain why this was happening. He contacted me for help.

First, and most importantly, this situation can be called "normal". It is caused by the intake manifold grid heaters operating while the "wait-to-start" dash light is on prior to starting the engine. The heaters warm the intake manifold air to aid in starting the engine because a compression ignition engine (any diesel engine) needs the heat assist to ignite the fuel charge at a cold start. The manifold heaters draw up to 120 amps of battery power to accomplish their task.

Immediately after the engine is started, the manifold heaters go into a "post-start" cycle, turning on and off to continue warming the intake air to cut exhaust smoke and to help the engine run more smoothly until the combustion chambers come up to a proper temperature. This cycling of the heaters should end within a couple of minutes or less, depending on outside air temperature. When the manifold heaters cycle, the headlights dim and the voltage gauge on the dashboard goes left and right acting like a windshield wiper until the post start cycle is completed. There is nothing wrong with the truck—the engine is operating as designed, there is nothing to worry about.

The process of operating the manifold heaters and the starter draws quite a bit of power from the batteries, so it will take some time of driving to restore a full charge to the batteries for the next cold engine starting cycle. That's why 1994 and later trucks came from the factory with two large batteries and a large alternator replenishing the batteries to supply the several hundred amps required to operate the manifold heaters (up to 120 amps) and the starter (300 amps) to guarantee a successful engine start at temperatures as low as -35°.

With 12- valve engines, the manifold heaters are not needed to operate in temperatures above 59°. The 24-valve engines have a pre-start and post-start manifold heater as required, depending on engine temperature. Newer 6.7 engines operate the heaters on every start, hot or cold, regardless of outside temperatures. The goal with the newer engines is to cut exhaust emissions as much as possible, regardless of engine operating parameters or outside temperatures.

The new 3.0L VM diesel engine used in the 1500 series Ram diesel pickup trucks and Jeep SUVs uses a glow plug heater in each cylinder to warm the combustion chamber, rather than a single intake manifold heater as found in the Cummins engines. This starting aid results in very short "wait to start" times, but there is the potential for up to six glow plug failures as years and miles accumulate. Both pre-start methods work, but the important point is that any diesel engine needs a reliable assist to get it started and running on a cold winter morning without a lot of engine stumbling and white smoke.

While older diesel engines (1930s-1980) often required a shot of ether to get them running on a cold morning, modern diesels use the above mentioned manifold heater or glow plugs. Ether should never be used to help start these engines for several reasons. First, injecting ether into an intake manifold can cause an explosion in the manifold where a hot manifold heater grid is present. (This is a real BIG deal on your Cummins engine where the grid heaters come on at 59°.) Ether used in an engine with glow plugs can experience enough of a cylinder explosion to blow the tips off of the glow plugs, which then must be replaced. Second, ether can wipe the oil film off of cylinder walls, thus increasing cylinder bore and piston ring wear. At some point, the increased bore and ring wear will prevent the cylinder from building enough compression pressure during starting to cause the fuel charge to ignite. Then an engine rebuild becomes necessary. Old timers say that using ether on a diesel engine during starting is the quickest way to require ether on every start, until an engine won't start at all.

So what's the alternative for an engine that won't start on a cold morning? The answer is regular maintenance which costs you little or nothing but your time. Ensure the batteries are up to the task. You can load test a battery to ensure there is enough electrical capacity to supply the needed juice for a cold start. Ensure battery cables are good, connections are clean, and that the fuel supply system is working properly. Why use a can of starting ether that costs maybe two bucks and can ruin your engine, which can cost up to $12,000 to repair or rebuild?

TRIP NOTES

At the end of September I took a one-week trip from my home base near Knoxville, Tennessee, to Branson, Missouri, a distance of about 750 miles each way. Branson is a scenic and hilly town in the Ozark Mountains and is located on a lake/river. The town is very tourist oriented, featuring many good restaurants and many theaters, mostly featuring Country and Western acts and singers. Of course, you can find many ways to spend money there. The trip's transportation was provided by my 2010 Ram, Crew Cab, long bed 3500 dually. Even with little weight in the bed, the truck provided a comfortable long distance ride. Here are some trip notes:

First, hotel and motel rates are reasonable, but are inflated up to 25% of the room rate by various taxes levied by governmental entities. Campground prices remained at 2013 levels, but governments have increased their taxes to levels similar to those of hotels. For this trip I was using hotels rather than camping.

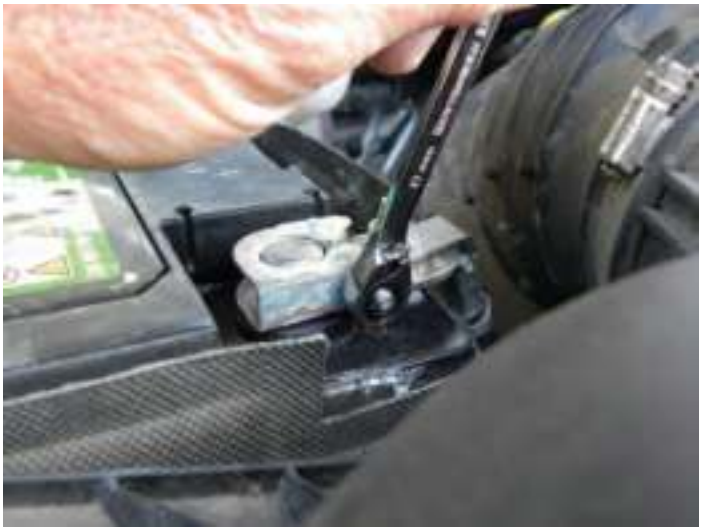
The interstate traffic averaged speeds about 10 miles an hour over the posted limit, often in the range of 80+ mph. Apparently, when headed to a destination, high fuel costs don't matter to drivers. I-40 truck traffic through Tennessee and Arkansas is always heavy since traffic studies show a large percentage of trucked freight moves between Harrisburg, Pennsylvania, and Memphis, Tennessee, where it splits at both ends to various destinations.

Driving into the early evening on one trip segment, I encountered thousands of early fall kamikaze bugs that peppered my truck. The Geno's Garage bug screen in front of the radiator saved the day and prevented a certain radiator clogging. I removed the grille, banged on the screen, and observed a small pile of dead bugs on the ground under the front radiator. Later windshield and body cleanup wasn't fun!

Diesel fuel prices varied between $3.839 in Tennessee and a lower $3.479 in Missouri. Guess where I fueled up? As usual, local stations away from interstate highways offered lower prices than the truck stop chains. Gasoline was similarly priced, but up to 60cents a gallon lower than diesel fuel.

My 2010 truck averaged 17.5-18.3mpg running solo, depending on terrain and headwinds. I ran with the speeds of other traffic.

During the trip, I noticed the battery voltage gauge was reading lower than usual, about 13.9volts instead of its usual 14.2volts. An inspection showed a bit of corrosion on the number two battery's ground post (passenger side battery). I removed both connectors from the battery using an 8 mm wrench and used a pair of large pliers to twist the terminals off of the posts. I soaked the posts and terminal connectors in a solution of baking soda and water, cleaned everything shiny bright with a wire brush terminal cleaner, and hooked everything up again. I repeated the process on the driver side battery, reasoning that if one battery has a connection problem, the other soon will. With all the terminals cleaned, the gauge showed normal readings again with both batteries charging equally. This is important: Battery terminal cleaning should be a part of your routine annual maintenance to avoid this potential problem. Other than the above on-the-spot maintenance my truck ran flawlessly on this trip.



Loosen terminals with an 8mm box wrench; remove by twisting terminal with pliers.

Soak terminal with a solution of 1/2tsp. of baking soda in water. Repeat twice.

Wire brush terminal inside until shiny bright.

Clean battery post with a wire brush until shiny.

Slide terminal fully on post, tighten securely. Check for new corrosion in two weeks.

Although there were various road construction projects along my route, particularly around Memphis, deferred maintenance was the rule. Roads are certainly rougher than on previous trips. Concrete sections of highways were the roughest, with many potholes. My truck took them all in stride, but you have to wonder what the shock loads of hitting potholes does to front suspension components over time.

COMMON COMPLAINT

Owners of newer model trucks with extensive electronic engine and transmission controls complain to your scribe that there is not much that can be done to their truck by the average do-it-yourself shadetree. You can't tinker with this setting or mess with that component since most engine operating parameters are controlled by electronics. And, of course, I frequently hear the question, "What if I mess something up? I'm not up on the latest electrical stuff." It naturally follows that more electrical wiring, sensors, etc., will mean more electrical gremlins down the road. Given enough time, you can find and repair many electrical glitches using only a simple volt/ohmmeter rather than wrenches. Increased use of electronics has certainly made newer trucks more reliable. I'll take a reliable truck any day over one that I have to wrench on constantly to keep it running right. Fellow TDR writer Joe Donnelly certainly doesn't lack for things to do to or on his truck, and you can be involved, too. Some owners say these new trucks don't require much involvement since you change oil about every 15,000 miles and coolant every five years or so. Yes, the oil change and coolant change intervals are longer, but changing axle and transmission fluids are still done at the same intervals as yesteryear. Battery terminal service, as mentioned earlier in this column, still needs regular maintenance to avoid no-starts and other problems. Regular tire rotation, though it can be back breaking work, is still needed every few thousand miles. Regular cleaning, washing, and waxing always help protect your investment. And you get to ride around in a good looking truck every time you drive it! Don't let modern electronics be a reason to become "uninvolved" with your truck. There's more on this subject later in this column.

OLDER TRUCK BLUES – TDR MEMBERS KNOW THIS

Several TDR members contacted me for advice about their trucks' problems. A couple of these trucks had been in various service shops for weeks, with mechanics unable to solve the problem. One truck was at a Dodge dealership while another was at an independent shop, and both had the same problem. Both were mid-1990s models with 12-valve Cummins engines, and the complaint was that the automatic transmission would not shift into overdrive, the alternator would not charge the batteries, and the cruise control wouldn't work. In the case of the dealership mechanic, he was young, new at fixing older trucks, and had only worked on one 12-valve truck before this one. In the other case, the independent shop mostly worked on gasoline powered cars. In both cases the technicians didn't realize the operation of these systems is controlled by a small computer (the powertrain control module, PCM) and these systems won't operate without a signal from the crankshaft position sensor. We've covered these clues and the solution before. In both cases, replacing the sensor cured the problem. In a third case, a member's truck was fixed by repairing a bad ground at the PCM, a much less common problem.

ENGINE FAILURE

Here is an unfortunate story. A TDR member was about 13 miles from home when steam and oil smoke started coming out of the exhaust pipe. After towing the truck and RV to a nearby shop and doing some diagnostic work, it was found that the engine oil had coolant in it, and vice-versa. The source of the mixing fluids was determined to be the engine's oil cooler, which is located behind the oil filter in the engine block. Inspection of this cooler after removal showed a break in the oil piping that allowed coolant to get into the oil. Coolant is a poor lubricant, so engine bearings and pistons were destroyed. The quickest solution to returning this 500,000 mile truck to service was the installation of a rebuilt Cummins engine, quite an expensive repair.

Oil cooler failures are very rare but they do happen. Usually, oil escapes into the coolant because oil pressure is greater than cooling system pressure, so complete engine failures from this problem are rare. The only prevention for this problem is frequent oil sample analysis, which would show a tiny amount of coolant in the oil, thus indicating an impending problem that could be investigated before an engine failure occurred.

Several years ago a close friend of mine noticed he was adding coolant more frequently than he had been previously. An oil sample analysis showed coolant in the oil, so he took the truck to a nearby Cummins distributor. The Cummins technician removed the engine cylinder head and found a small crack between a coolant passage and an open area in the head, the result of a hidden flaw in the head casting. This flaw required 97,000 miles of use to show up. A remanufactured cylinder head was installed and the customer was soon on his way. The technician doing the work said that in his 16 years with the Cummins distributor, this was the first time he had seen a cylinder head casting flaw. The engine had no more problems for the next 90,000 miles or so, when he sold his truck.

OIL

In issue 86, in this column, I cited a government agency's forecast that the price of crude oil will drop by 20%. Well, the drop has been steep as of this writing, and so far has hit a decline of 19%. The price decline is directly attributable to North America's increase in crude oil production and therefore a decline in imports of oil to North America and an increase of exports of refined fuels. U.S. law says that domestically produced crude oil cannot be exported, although refined fuels from U.S. crude can be exported. This price drop means, of course, that the price of fuels will drop at the retail pump, good news for you and me, bad news for energy companies and the Middle Eastern oil cartel. Natural gas from these same wellheads will continue to be inexpensive for the foreseeable future, maybe ten years. Natural gas is fast becoming a popular alternative fuel in several automotive applications.

In other news, since the Keystone Pipeline's proposed route to move tar sands crude oil from Canada to US Gulf Coast refineries is mired in political mud and Nebraska lawsuits, a new pipeline route has been proposed. This route envisions a pipeline running across Canada to an east coast port, entirely bypassing the United States. This would please Canadian politicians who are fed up with US political and environmental rhetoric. From the east coast Canadian port, crude oil can be shipped by rail or ship to US Gulf Coast port refineries, or to anyplace else in the world that offers the best price. The new pipeline is said to be an "almost done deal," since it incorporates an underused gas pipeline for several hundred miles of its proposed route and storage and refining facilities already exist at its eastern terminus. Meanwhile, most of the crude oil presently moves from oil fields in Alberta, the Dakotas, Texas, Pennsylvania, and Colorado by rail to refineries on both coasts and the Gulf. Again, whoever offers the highest price gets the goods.

TRANSMISSION QUESTIONS

TDR member Brent Stephens of Utah emailed about the automatic transmission in his 2012 truck, asking about longevity and possible modifications for longer transmission life. He tows a 32' fifth-wheel trailer. His comparison was with a 1970 GMC truck that he once owned which had a modified automatic transmission valve body and shifted very firmly, while his Ram's shifts are "soft." He wondered if the soft shifts are detrimental to transmission life. Many members have asked the same questions.

I answered that Brent's 2012 truck uses the 68RFE transmission that has long ago proven it is tough and is more than adequate for towing applications just as it comes from the factory. One key to longevity is that transmission fluid temperature is carefully controlled, which is the biggest single contributor to long transmission life. I don't suggest modifying it in any way to give it longer life, but be sure to perform regular fluid and filter changes(there are two filters) every 30,000 miles using the specified ATF+4 fluid. Using tow/haul mode when needed firms up shifts and uses higher engine speeds before upshifting, and you also get automatic downshifting to assist in braking. Be sure to use the exhaust brake even when not towing. Even then, shifts are fairly "soft" as the converter clutch unlocks, then shift clutches operate, then the converter locks again. Thus, there is some cushion during shifts that is absorbed by the torque converter's fluid.

A fairly common cause for 68RFE transmission problems is improper installation of the transmission's pan filter which uses an O ring to hold it in place. Improper installation of the O ring causes the pan filter to fall out, thus starving the transmission of fluid.

I suggested to Brent that he drive it like it is unless he notices something that isn't normal in its operation.

CORRECTION

Fellow TDR writer Bill Stockard of Texas gently corrected me for a statement I made in this column in Issue 86 concerning the cruise control where I said that all trucks from 2003 to present are entirely electronic. He reminded me that 2003-2004.5 trucks still had vacuum operated units with the vacuum actuator mounted under the driver side battery. Vacuum is supplied by a small electric pump located under the passenger side battery with a vacuum hose running across the firewall to the actuator. Thanks go to Bill for setting us all straight.

ISSUE 86 COMMENTS

It was a real pleasure to see pictures and biographies of various TDR writers over the past two issues. After knowing these folks for years, I've now learned more about them, and of course several pictures were of these folks when they were much younger and taking on the world without a clue. Anyway, it has been fun to put faces with names.

AN INTERESTING DEVELOPMENT

The two largest makers of railroad locomotives in North America (General Electric and the EMD division of Caterpillar) have developed high horsepower diesel engines that in testing now meet the latest exhaust emission standards without the use of a urea-distilled water mix (DEF) that is sprayed across a catalyst to cut oxides of nitrogen emissions to acceptable levels. The emissions reduction is mainly accomplished through the use of carefully controlled cooled exhaust gas recirculation (EGR). These engines are also used in marine and power generation applications and make up to 4,400 horsepower. Could this enhancement of existing EGR technology eventually be applied to diesel powered light trucks and passenger cars?

These large locomotive engines and those used in large trucks typically run at constant speed and high load. Light truck and car diesel engines typically run at lighter loads and greatly variable engine speeds, which may make them unsuitable for this strategy. But elimination of the need to add DEF and elimination of that expense would be attractive to all diesel engine users, while still meeting ever-tightening exhaust emissions standards.

CHANGES ARE COMING

Since the start of this column in Issue 23—that's 64 issues and 16 years ago—I have covered questions that arrived by email and telephone from members. I attempted to explain in simple terms the cause of truck problems and their solutions. Lately, these explanations have become repetitive. Therefore, this column and the TDRV column will shrink in future issues for several reasons.

First, other TDR writers have interesting information for your instruction and entertainment that will be of greater value to you than what could be covered here. Since writers Redmond and Langan have rejoined the group of writers, space must be made available for their material while maintaining the current page count of the TDR magazine. The decision to shrink this column is that of mine rather than a directive from the editor, as our shared goal has always been to cram as much good information into the available space as possible. Another factor is my increasingly difficult task of typing as arthritis of the hands advances. For a change, my brain works faster than my fingers, so every third word typed then requires correction. Welcome to old age!

Jim Anderson
TDR Writer