TDR
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INSIDE: ***Technical Topics:*** *2014 RAM Turbo Diesel introduction.*

From The Shop Floor

In previous TDR magazines we've had input from repair shop locations and we've scattered the articles throughout the magazine. In this issue my thanks again goes to Andy Redmond. Andy operates a one-man, specialized repair shop in the north Dallas, Texas, suburb of Plano. I'm hopeful you'll enjoy the insight that Andy brings to the magazine.

TAP-PY TAP-PY NOISE

by Andy Redmond

Recently I received a call about an engine noise. The customer's comment, "My '99 makes a tap-py, tap-py noise."

Each time I hear this I have to hold my laughter. Immediately, I recall scenes from a 1990's movie "Happy Gilmore" starring Adam Sandler. Sandler's role is that of a minor league hockey player who learns that his grandmother's house is nearing foreclosure. His get-rich-quick scheme to solve grandma's financial woes is to join the PGA golf tour. How different can golf and hockey be, right? He quickly learns putting a golf ball requires different skills than a slap-shot. Thus, we see his golf coach urging him to carefully putt, with the catch phrase, "tap-py, tap-py."

What is the Noise?

After checking the fluid levels, the engine was started momentarily. It certainly tapped, and it had a dead cylinder miss. So off comes the valve cover.

What was found? Cylinder number five's rocker bridge was missing. I found it down in the valley near the valves so it was moved into the photo. It must be in place for the push rod and rocker arm to depress the exhaust valves.

Looks like the crossover bridge is broken.

Now, how and why did the bridge break? Several potential causes: bent push rod(s); stuck, bent or broken valve(s); broken valve spring; etc., I used the barring tool to find top dead center (TDC) for this cylinder. [Other popular methods to rotate the crankshaft and observe valve operation include: a 22mm socket on the alternator (turns engine backwards) or a 18" pipe wrench turning a 15mm socket on one of the bolts holding the vibration damper.] While turning the engine over, if the engine stops moving find out why, or you will break more "stuff." To find TDC we need to know the firing order of an inline six cylinder: 1-5-3-6-2-4. It is also helpful to know the companion cylinders, which are 1/6; 2/5; 3/4. If cylinder number 1 is at TDC (valves closed) companion cylinder 6 will have valve overlap. The companion concept and also a tenet principle of the four cycle engine.

Compare the exhaust valve springs, do you see any differences? There is a problem. The spring on the right is broken and not able to hold the exhaust valve closed. Now let's repair the "tap."

The broken parts.

To strip a cylinder head for the exhaust spring removal it was necessary to remove the cap screws for both the intake and exhaust rocker arms (10mm head); the rocker bridges; and also the rocker arm pedestal. It is prudent to inspect the push rods. So, locate the rubber plugs under wiper cowl and remove the plugs so that the push rods can be removed with the cylinder head on the engine. The push rods are visually inspected and rolled on a flat surface to ensure they are not bent. If they are bent, often it will be where the upper follower is welded to the tube.

The tool requires the fuel injector to be removed. Notice the 3/8" drive extension holding the loosened fuel line away from the head so the connector tube can be disengaged from the injector inlet.

The injector hold down and both fasteners are removed so the base of the spring compressor can be installed. Since the injector is removed, it's simple to peer down into the cylinder. I told you that the piston is at TDC.

The push rods were checked and re-installed. Notice the rag covering the push rod openings? Why tempt fate with an errant valve stem retainer? The tool will smoothly depress the valve springs and stays centered on the springs. Keep a pencil magnet and a magnetic parts bowl handy to hold your parts.

Close up of the compressed springs without the valve stem retainers.

Next loosen the stud nut on the compressor tool, remove the tool and also remove the broken valve spring.

The valve spring retainer, broken valve spring and new spring on right.

Tork Tools makes quality products! The Tork tool is certainly easier to use than the Miller SPX tool (a special dealer tool). One of many features is that it seems to self-center vs. walking around on the valve springs. It is also made in the USA!

Specification Chart	
Intake Valve Lash	.010”
Exhaust Valve Lash	.020”
Rocker Arm retention bolts	27 ft. lbs.
Rocker arm (valve lash adjuster lock nut)	18. ft. lbs.
Valve Cover / Cylinder Head Cover screws	18 ft. lbs.
Injector hold down bracket fasteners	89 in. lbs.
Injector line nuts	30 ft. lbs.

Part Numbers (Mopar)	
Tork Tools—Model year 1998 to present Valve spring compressor tool (616) 298-9103	CVSC010 / $89.99
Injector seal (nozzle to cylinder head)	4798375
Injector O-ring (outer seals to cylinder head)	5012558AA
Connector Tube O-ring (seals to cylinder head)	5011885AA
Valve Spring	5011441AA
Valve stem retainer (valve spring retainer lock)	5011878AA
Valve spring retainer (upper)	5011455AA

Conclusion

So why did the exhaust spring break? We may never know. The odometer showed in excess of 300,000 miles. The owner of the truck never recalls the valves being adjusted. All of the valves were adjusted after this spring was changed and many were quite loose. The scary thing is that other extensive damage can occur if a spring breaks—such as bent valve(s), damaged valve guide, cracked head/seat and piston/cylinder wall damage. It is difficult to be certain if a valve was bent, since the head was not removed. However, this truck’s owner was willing to gamble, and won. That’s the rest of the story for ole tap-py- tap-py.

Andy Redmond
TDR Writer