Mighty AUTO PARTS **Tech Tip**

MISFIRES 198

DIAGNOSING ENGINE MISFIRES

Would You Have Considered Engine Coolant or Oil Leaks?

When diagnosing a misfire condition most automatically assume an ignition or fuel related condition as the culprit. This would involve a defective spark plug, ignition wire, ignition coil, fuel injector, etc. While these components are the most likely candidates that would result in a misfire, some other conditions must also be considered with today's engines when making the diagnosis.

Coolant leaks or oil leaks would most likely be the last checkpoints you would consider when making a misfire diagnosis. Normally, when we consider coolant or oil leaks, we focus on external leakage like something oozing from the engine components, a puddle on the pavement, or the distinct odor of oil or antifreeze on a hot engine. Some leakage conditions that can promote a misfire condition can be resolved with the replacement of a gasket, grommet or a valve cover. Other extreme conditions may require a cylinder head gasket, new cylinder head or a complete engine exchange to resolve the complaint.

FORD RANGER

The Ford Ranger equipped with a 2.3L engine would repeatedly encounter a misfire condition on the same cylinder. Each time, the technician would remove the spark plug and observe a spark plug and spark plug wire boot totally encapsulated with oil. He was convinced that a major engine problem was the reason for the presence of the oil. Later it would be determined that a defective valve cover gasket was the cause of the oil drenched components and the misfire symptom.

On this engine design the spark plug boots pass through the valve cover where they are attached to the spark plugs mounted in the cylinder head. They are shielded from oil by an internal valve cover gasket (see Fig. 1). If the gasket fails to properly seal, oil will pool in the leaking cavity, shorting out the spark plug on that cylinder. A new valve cover gasket will restore the firing on that cylinder and will prevent a recurring event.

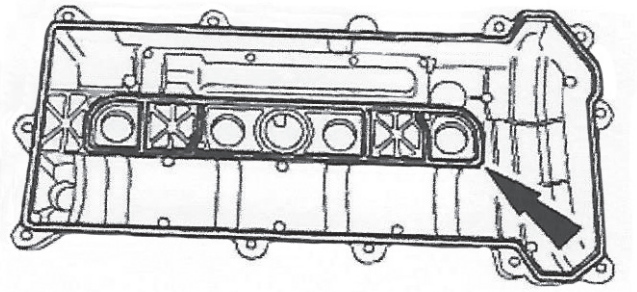

Fig. 1 - Internal Valve Cover Gasket

NISSAN MAXIMA

The 3.5L engine in the Nissan Maxima had a history of oil leakage from the valve covers. In fact, the customer just encountered an expensive alternator replacement due to oil leakage from one valve cover. This can be a labor-intensive exercise as the alternator is mounted low on the engine, requiring removal of the radiator and electric fans for topside removal, or the AC compressor if the alternator is removed from the bottom. When installing the new alternator, reinstalling the lower alternator bolt can change your vocabulary.

The oil leakage had progressed to the point of seeping into a spark plug tube, shorting out a spark plug, resulting in a misfire condition. The repair would require new valve covers to eliminate the leakage. The reason is the grommets that seal the spark plug tubes are not a replacement item and can only be obtained through the purchase

of new valve covers (see Fig. 2). Even if they were available as a replacement item, most Nissan techs would recommend replacing the valve covers, as the plastic covers have a history of warpage or cracks from the intense heat. This is a labor-intensive repair and certainly not a job that you want to do over, at the shop's expense.

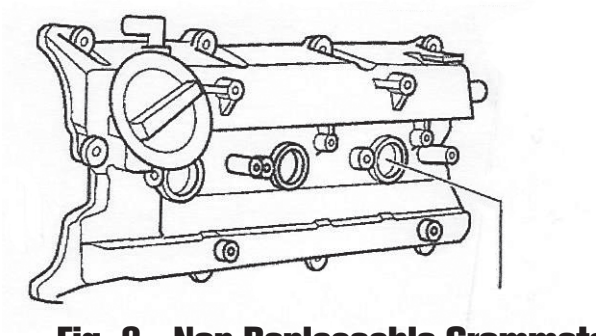

Fig. 2 - Non Replaceable Grommets

OIL AND COOLANT LEAKS

Fluid in Spark Plug Tubes…GM TSB #PIP5095D references sixteen vehicle models produced from 2010-2017 equipped with 3.0L and 3.6L engines where customers may encounter a Service Engine Soon light with misfire codes. The symptoms may be due to oil or coolant leaks into the spark plug tubes.

If you identify oil or coolant in the spark plug tubes, first determine if the leakage is coming from a source above the tubes. Once that is ruled out as the source, replacement of the cylinder head, spark plug, and ignition coil will be necessary.

The leaks are the result of porous spots in the cylinder head, a condition created during manufacturing. The spark plug tubes are permanently sealed into the head and are not replaceable.

Coolant in The Combustion Chamber…GM advises that the same applications mentioned in the above TSB may encounter a cold start misfire or engine roughness following a cold start. The Service Engine Soon light may be illuminated with PO300 misfire codes stored in diagnostic memory.

Misfires following a cold start with high misfire rates confined to one cylinder may be the result of coolant entry into the cylinder. This condition occurs where the cylinder liner meets the deck face of the block due to flaws or pinholes in the casting.

To diagnose this condition, add dye to the cooling system and warm the engine to operating temperature. Then pressurize the cooling system and allow the engine to cool (preferably overnight). Inspect the cylinder in question with a borescope for evidence of a coolant leak. GM states that it may be difficult to see the actual pin hole that is causing the leak, but coolant usually streams down the liner making it visible with a bore scope. If porosity is present, there is usually a break in the carbon ring at the top of the cylinder. In some cases, removal of the cylinder head for a thorough inspection may be necessary.

Do not confuse residual fuel on the piston as a coolant leak. Some residual fuel may be present and that is the reason that dye should be added to the coolant. The use of a black light is recommended.

Replacing the cylinder head will not eliminate this this condition. If porosity is determined to be the cause of the leak, an engine replacement will be necessary.

Summary: Make coolant and oil leakage a part of your diagnostics. The presence of these chemicals in the wrong place can result in the failure of some expensive components, in addition to eluding the technician attempting to make an accurate diagnosis.

LARRY HAMMER, Technical Services
Mighty Distributing System of America