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Under the Hood: Investigating Oil Sludge Accumulation Claims

Automobile engine damage can be a result of sludge formation in the engine oil. When engine damage is claimed, the analyst is charged with determining the reason for the sludge formation since this affects coverage. For instance, engine damage from sludge formation as a result of vandalism (contaminants inserted in the engine) may be covered, while sludge formation-related damage due to poor maintenance may not. The cause of sludge formation that damaged an automotive engine determines whether coverage is extended or denied. This case study illustrates one cause of sludge formation that damaged an automotive engine.

Sludge formation, a form of engine oil deterioration, occurs from a variety of causes such as poor maintenance, vandalism or excessive heating. The insured owner of a pickup truck claimed that vandalism was the cause of excessive sludge formation that damaged the engine.

Figure 1 shows the engine with the valley pan removed and excessive sludge formation. Figure 2 shows the sludge which has characteristics similar to caramelized candy. The owner had documentation that he had changed the oil regularly with a high-quality oil, yet the engine oil was two quarts low in the engine sump with a capacity of five quarts. Approximately 500 miles before the vehicle was brought into the repair shop, the oil had been changed and the oil level was checked and found to be at the proper level.

The insured owner brought the vehicle to the repair shop after hearing an unusual noise in the engine. On such claims, an oil analysis helps narrow down the possible cause of the oil sludge formation. The oil analysis found little metallic debris, but evidence of engine coolant and high readings of oil oxidation and nitration suggesting that the oil had been subjected to high temperatures, most likely through contact with engine exhaust products.

Further examination of the vehicle showed evidence of leakage in the plenum pan gasket (Figure 3). When oil leakage of this nature occurs, it is internal to the engine and leaves no external sign of a problem other than the engine oil level decreases. Engine blow-by gases, vaporized oil and air from the breather system are drawn into the intake manifold through the pan gasket leak, contaminating the engine oil that is recirculated to the oil sump.

Combustion chamber volume decreases from carbonaceous deposits, causing spark knock. This causes rapid sludge development in the engine, leading to severe engine damage. The symptoms of this problem are engine knock or low oil level in the engine oil sump.


Figure 1

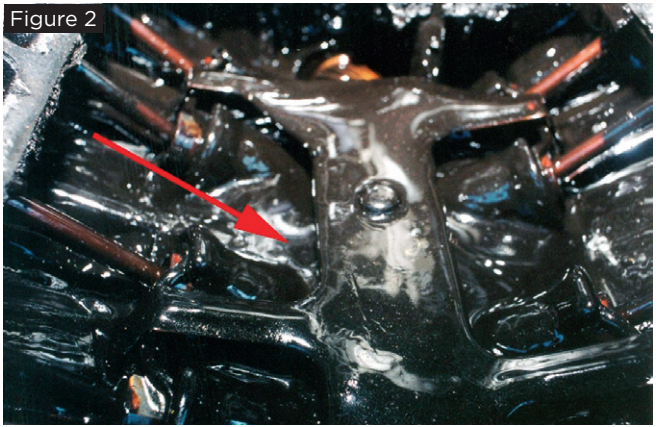
Figure 2

The investigation concluded that the engine problem was not a result of poor maintenance or vandalism, but an engine component failure: premature failure of the plenum pan gasket. The gasket failure was covered by a technical service bulletin issued by the manufacturer of the vehicle, which discussed the repair procedure for this engine defect. The manufacturer repaired the engine at no cost to the insured or the insurer.


Figure 3

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