

Inspector Statement from Allan Crabbe FAA IIC, Jackson MS. FSDO

On May 1st 2018, Inspector Crabbe traveled to Hernando, MS with Inspector Albert McCray to witness an engine disassembly. The engine was recovered from the wreckage of N481ZK, an Experimental/Amateur Built Gyrocopter. The aircraft was built from a kit, titled Sparrow Hawk. The engine examined was a converted automobile engine, a Subaru 4 opposing cylinder engine, liquid cooled, and modified with a fixed pitch “pusher” propeller in the rear of the engine. The first four pictures are the “four corners of the engine for reference –



Bottom view of the engine with the front of the engine oriented at the top of the picture.



Left hand side of the engine.



Top of the engine showing the throttle body injection/tubes.

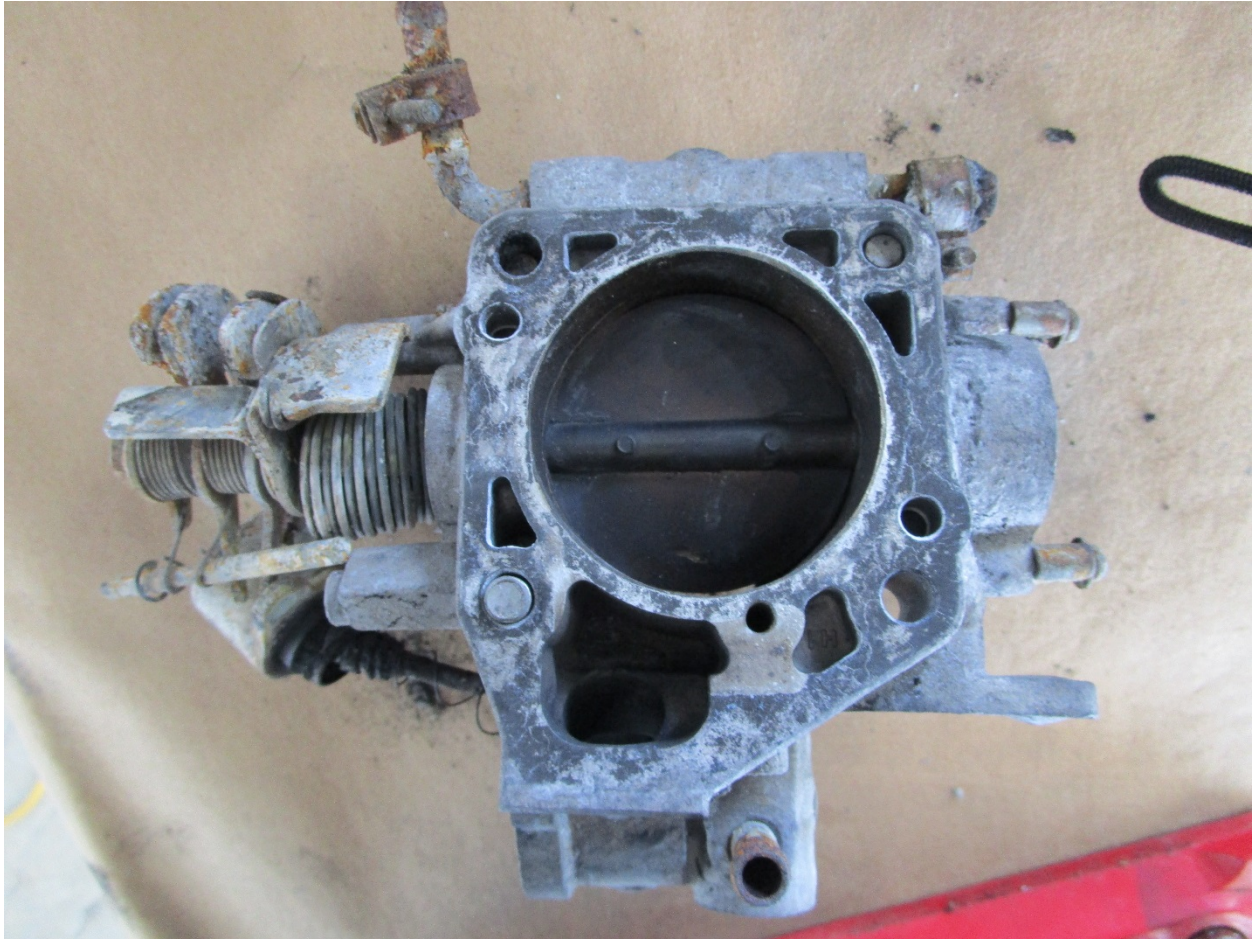


Right side of the engine.

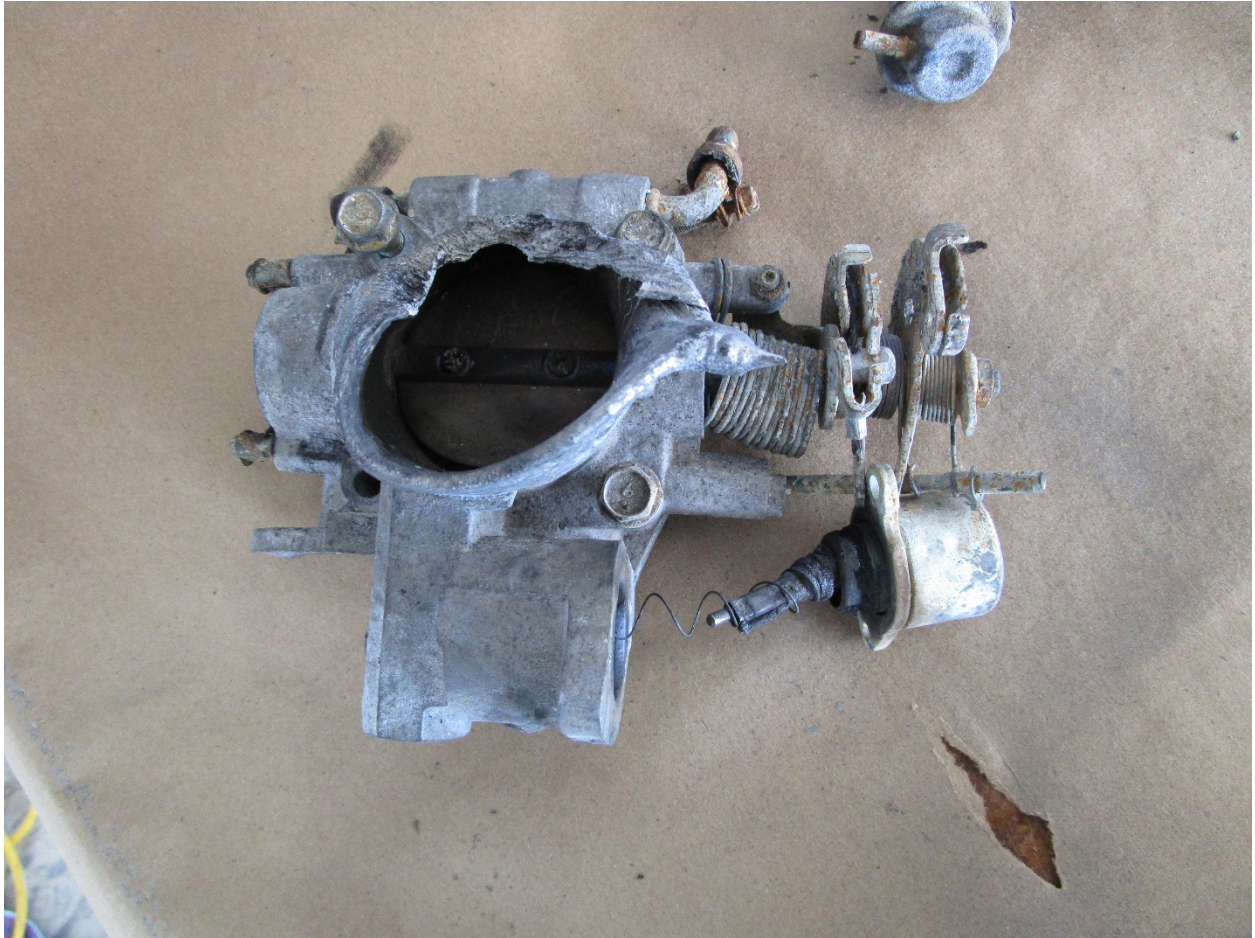




Left hand valve cover, spark plug wires melted completely away due to post crash fire. Near the lower right corner, the valve cover was punctured inward, possibly due to crash/post-crash damage. It is suspected that the damage is not consistent with a valve train malfunction due to the metal being pushed inward rather than outward.



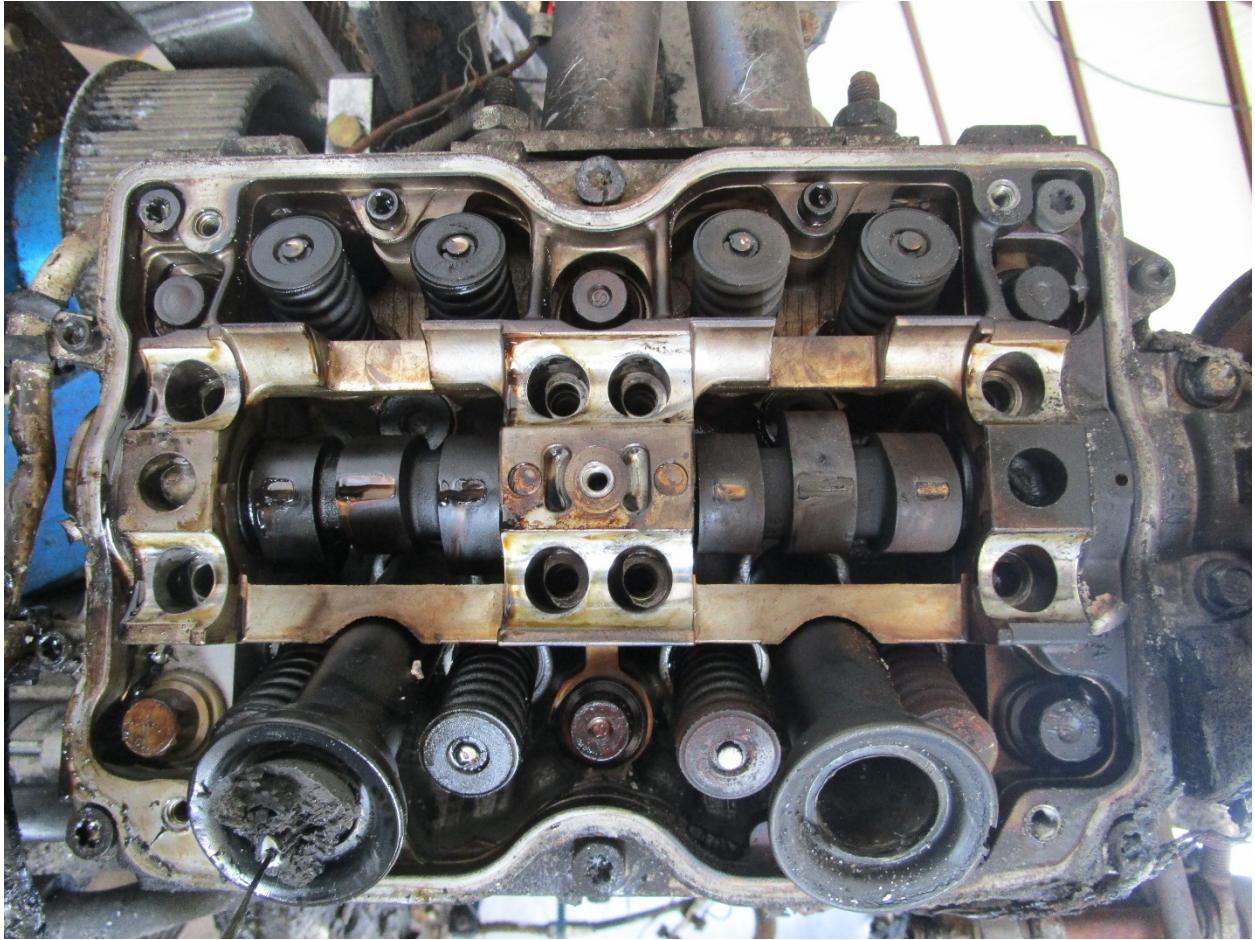
Throttle body removed from engine, bottom view. Of note is the fire damage to the metal.



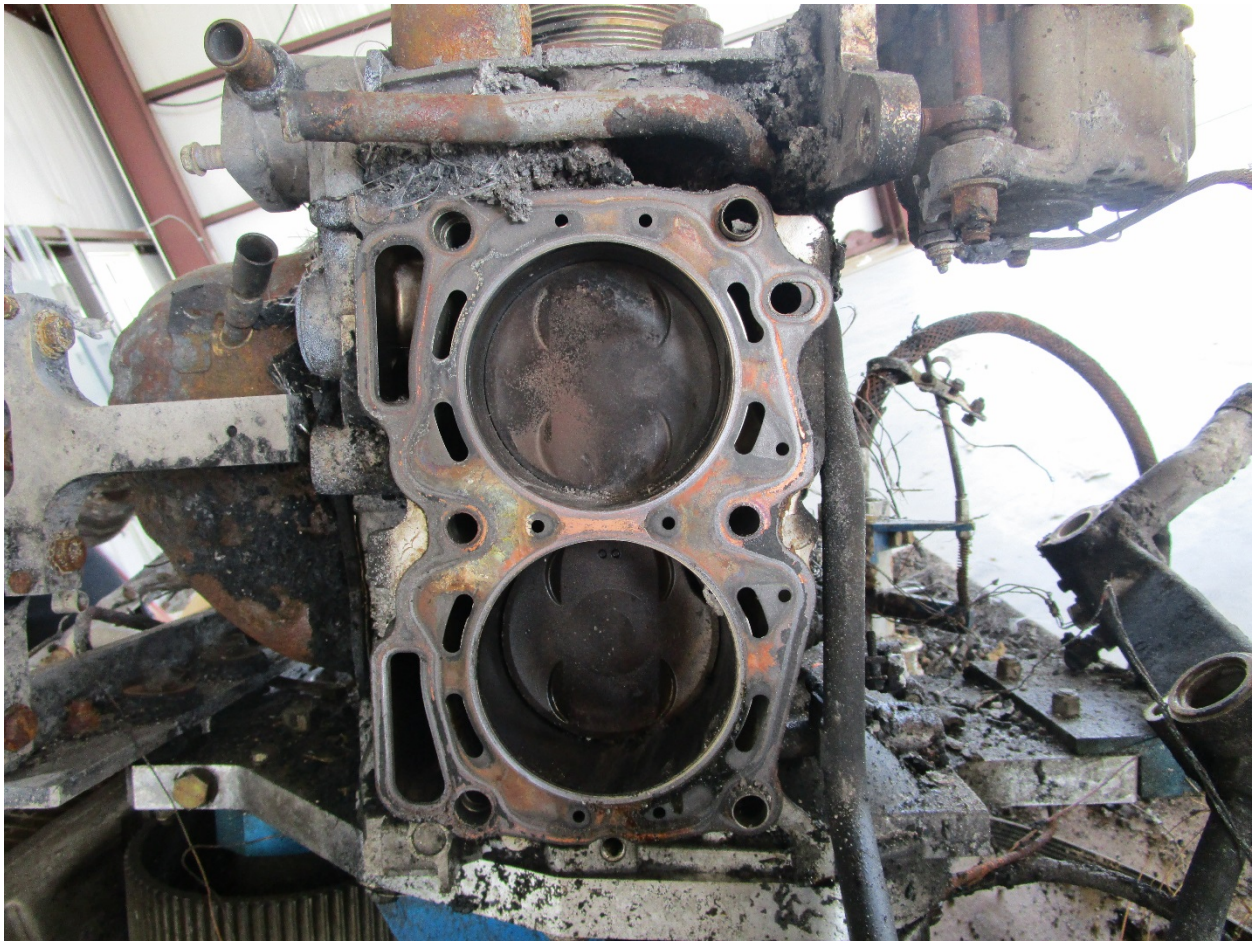
Throttle body from the top looking down, crash damage evident. The component to the lower right is believed to be a choke solenoid.



Close up of butterfly valve in the throttle body top looking down.



Same side with the valve rollers, lifters removed. Cam in center, rollers all functioned smoothly, and cam lobes showed normal wear.



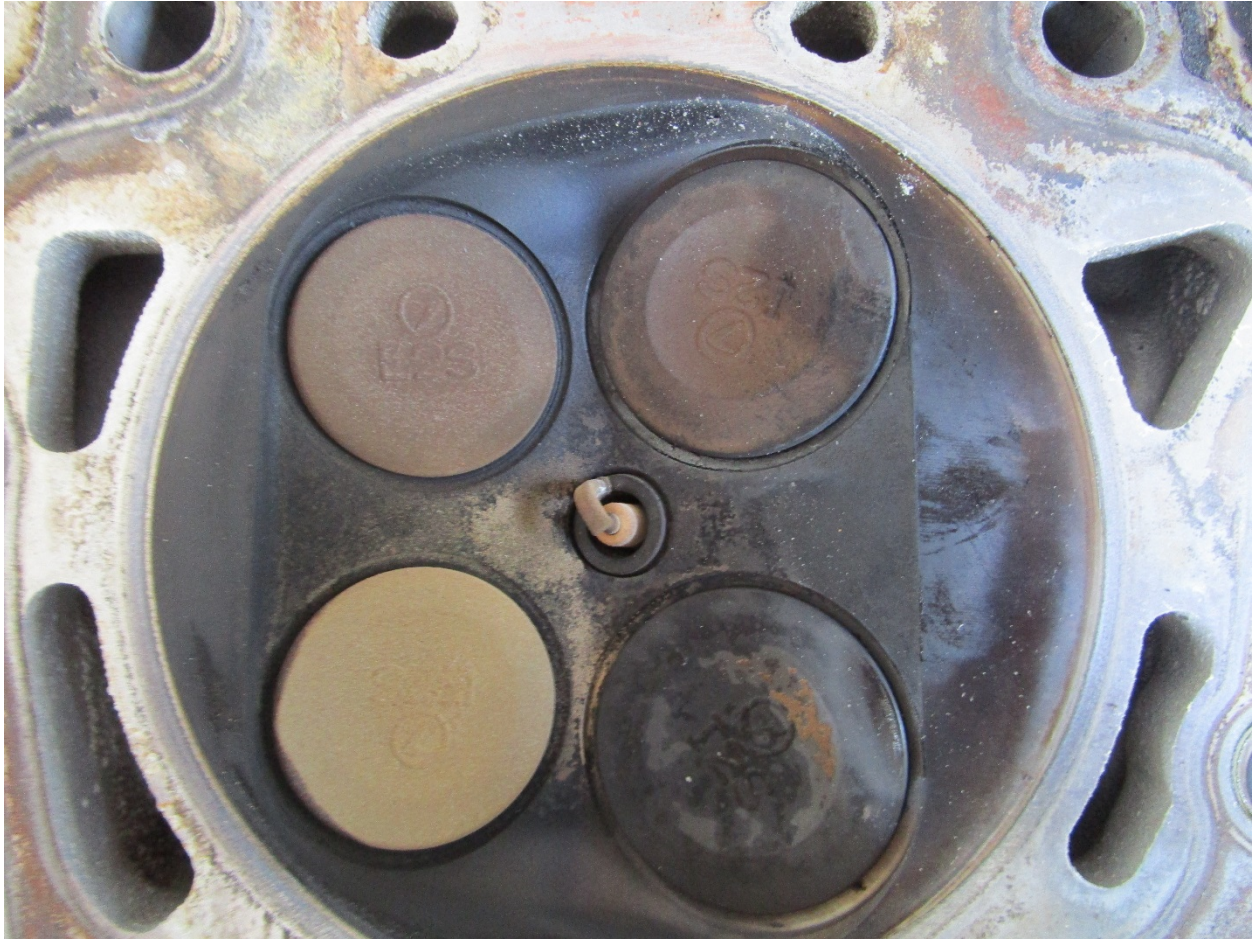
Left cylinder bank with the head removed, head gasket intact with no abnormalities noted. Cylinder sleeves were smooth with no scoring, piston heads showed normal wear, the marks on the piston heads were machined in, and should not be mistaken for valve slap. Debris in the cylinders occurred during disassembly.



Close up of left forward cylinder...



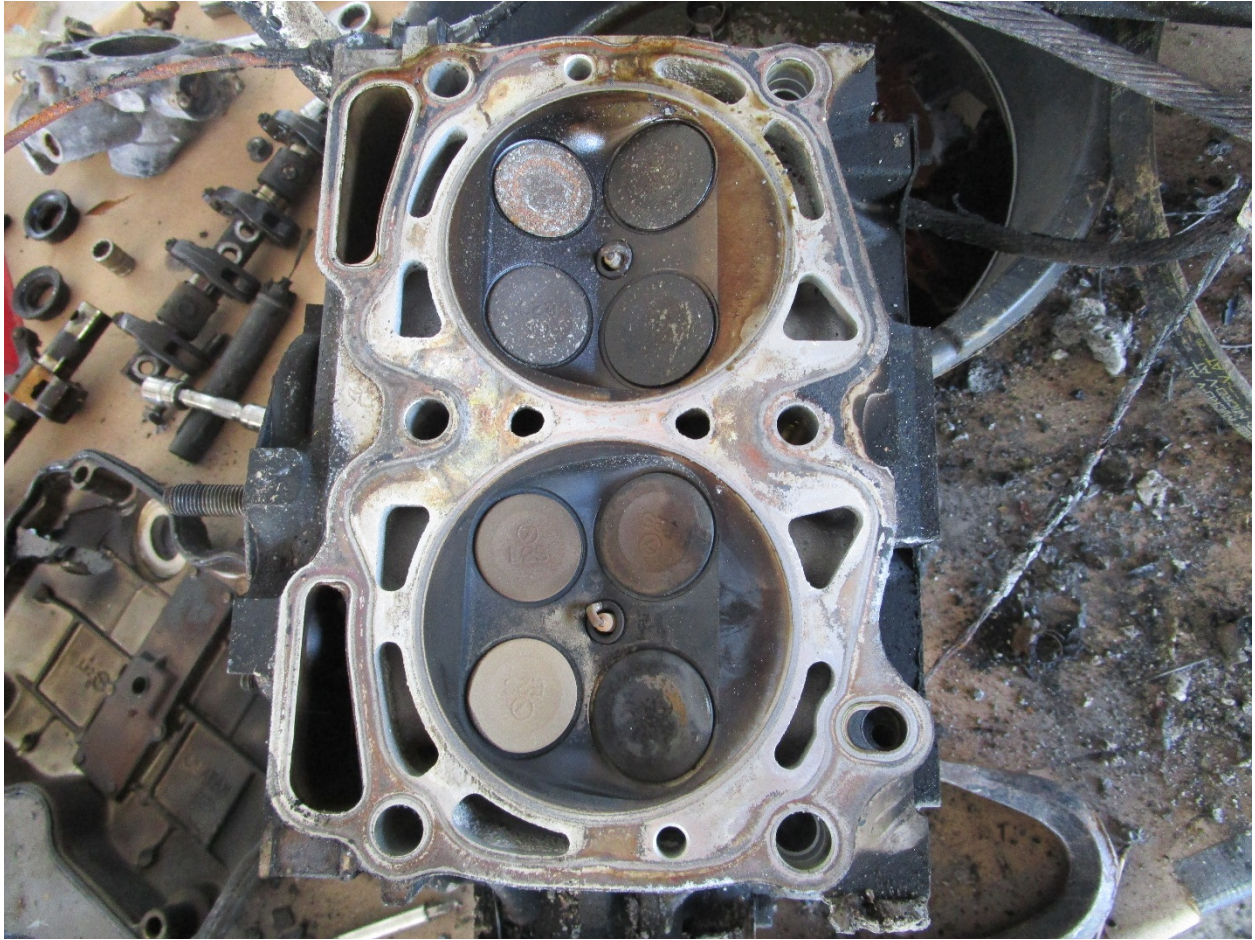
Close up of Left rear cylinder/piston head.



Valves from the forward right cylinder indicated normal wear, opened and closed with normal resistance, spark plug tip in the middle showed normal wear.



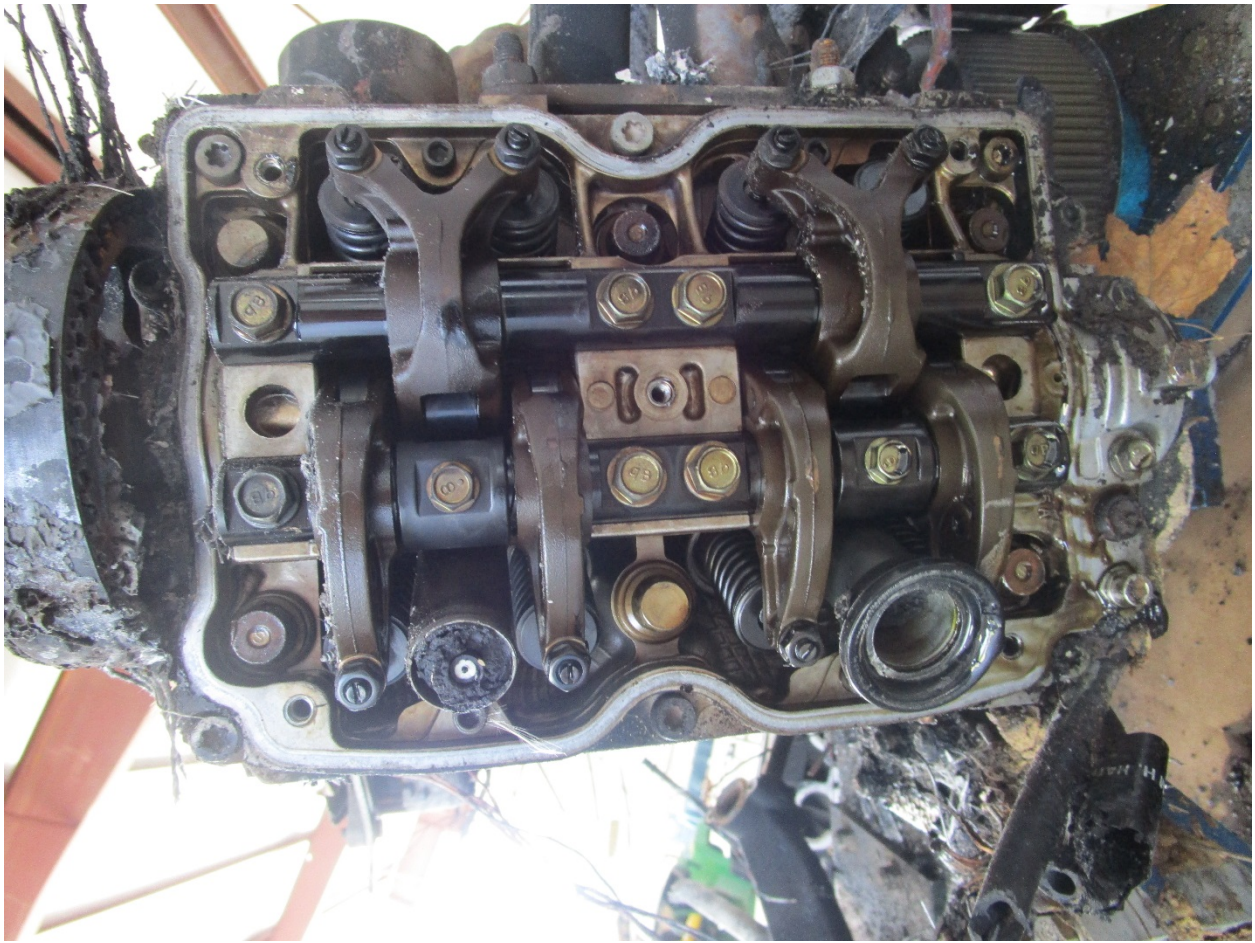
Cylinder head from the right rear cylinder, again indicated normal wear and spark plug tip showed no abnormalities.



Left cylinder head/valves.



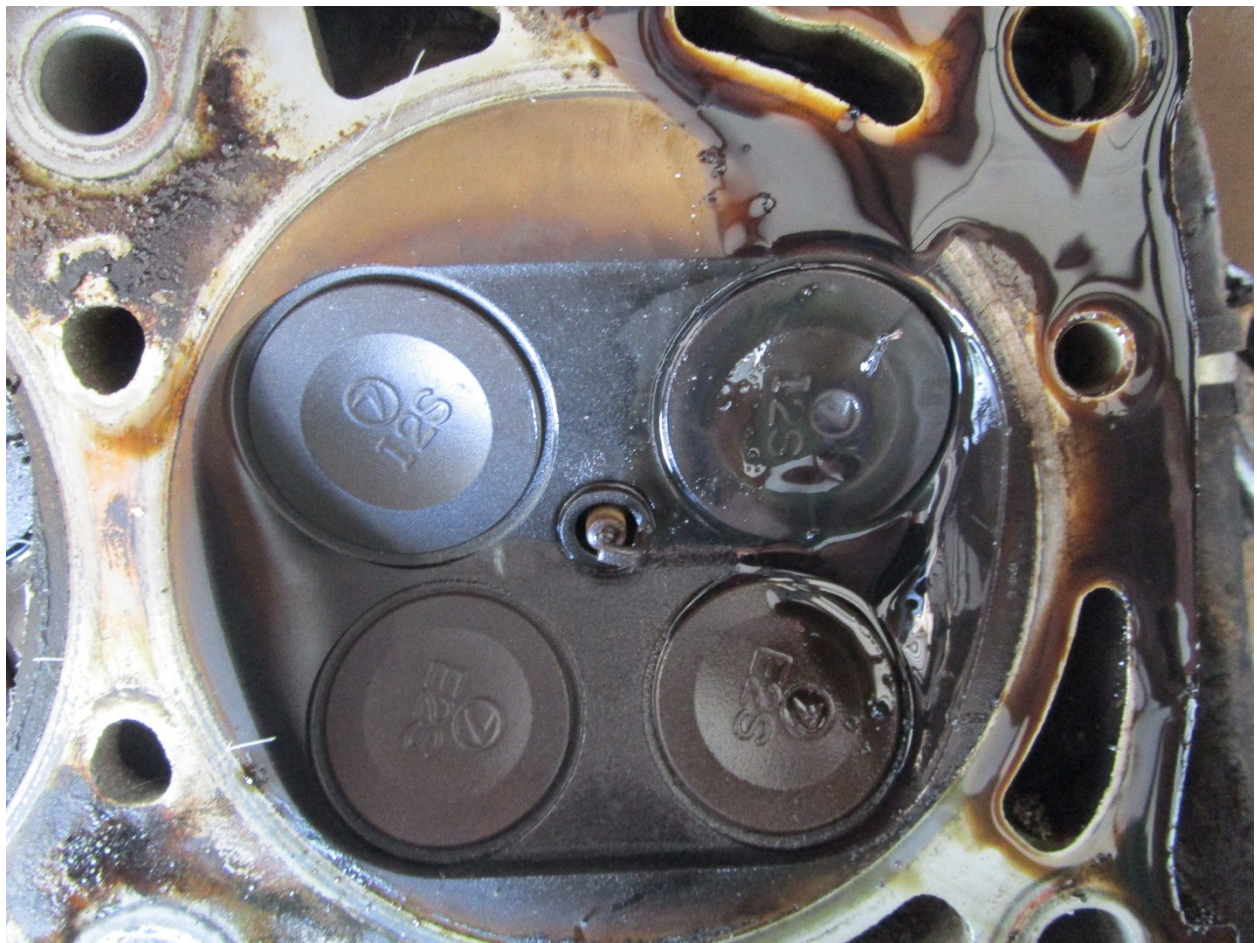
Left head with valve train/rollers/lifters in tact.



Left cylinder head/valve train intact.



Right front cylinder head/valves/spark plug tip. All showed no abnormalities.



Right rear cylinder head, no abnormalities noted.



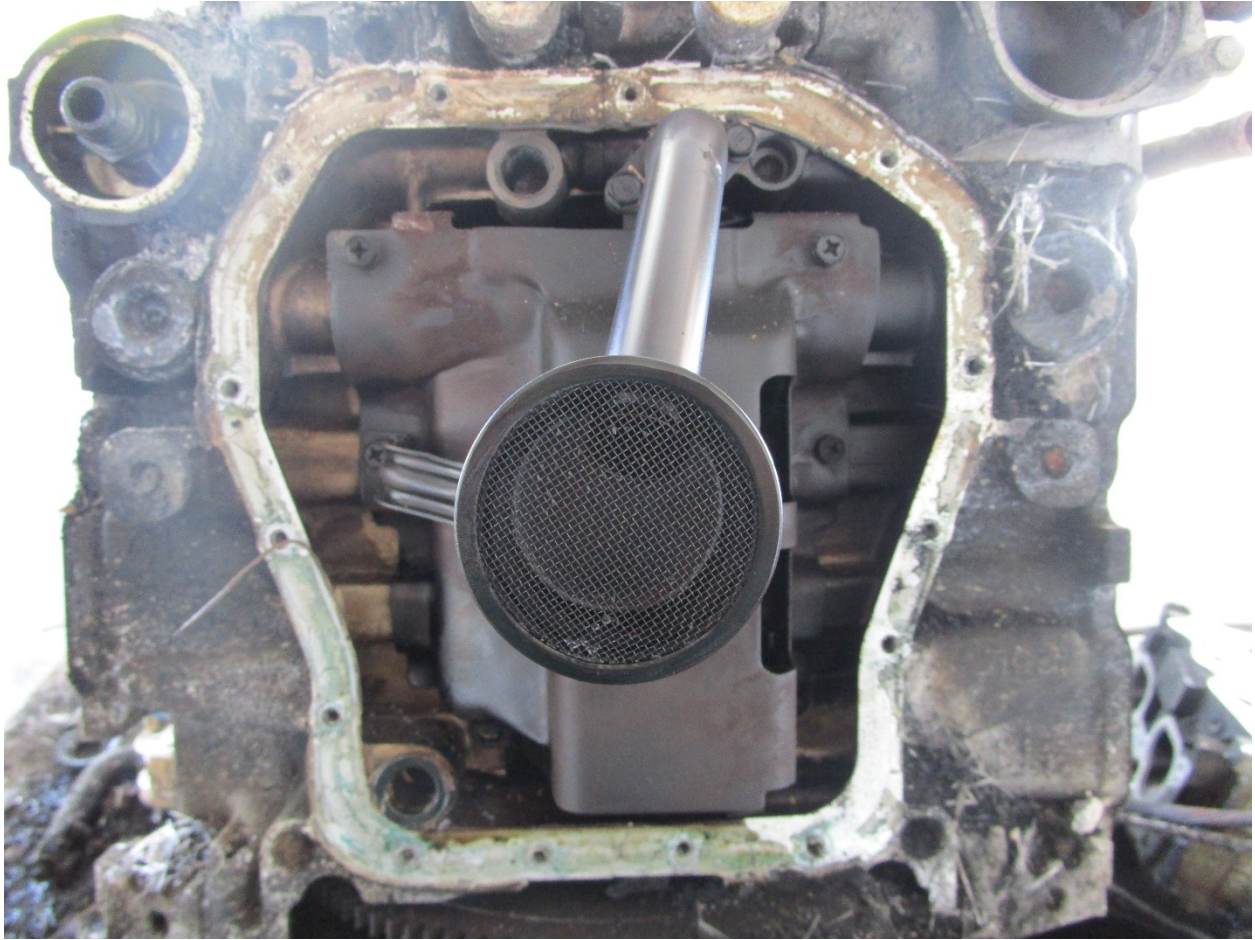
Right front cylinder/piston, again debris was introduced during disassembly.



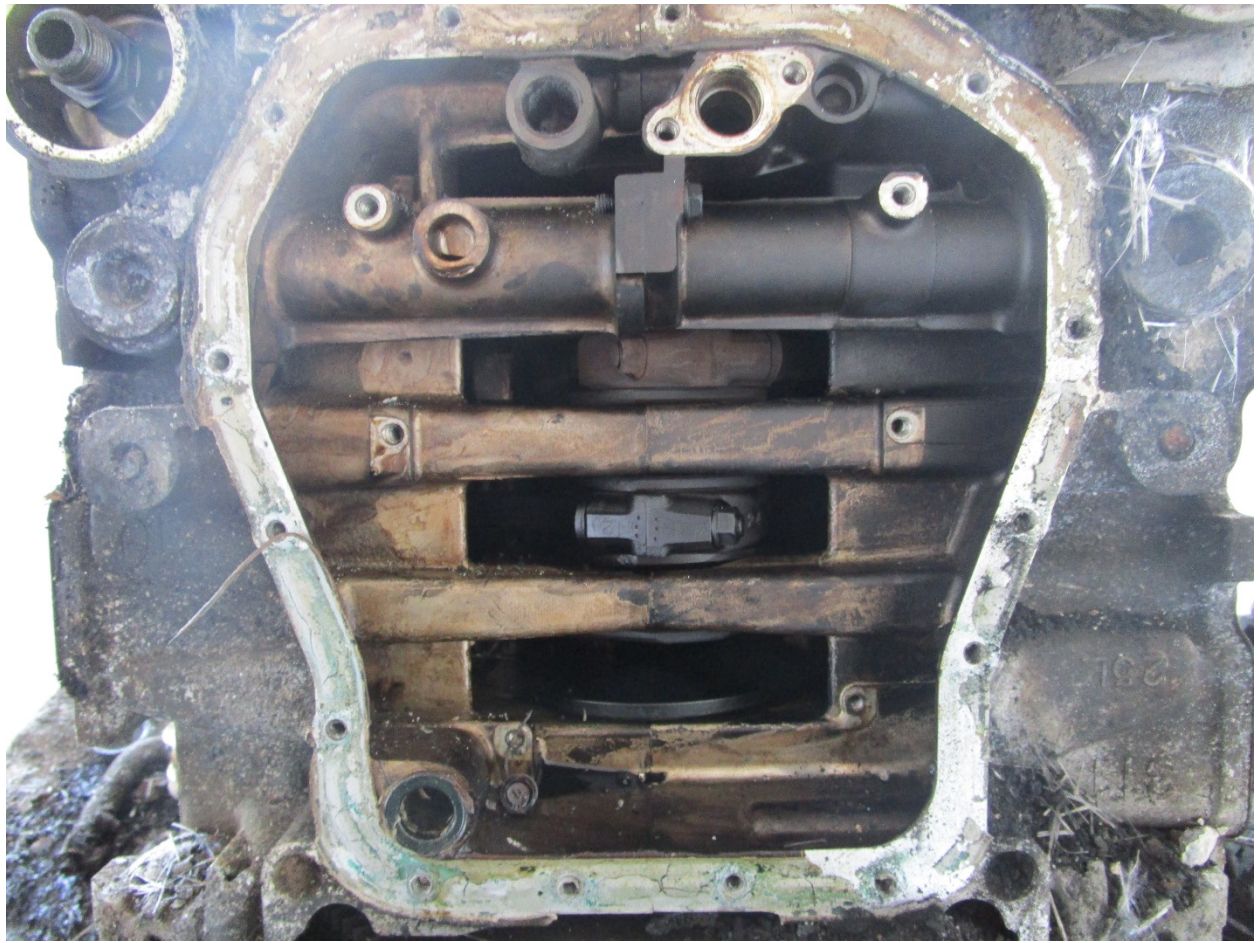
Right rear cylinder/piston head.



Right head gasket showed no breaks.



Bottom of engine with oil pan removed. The screen is at the bottom of the oil pick-up tube. No metal or other debris noted in the bottom of the oil pan.



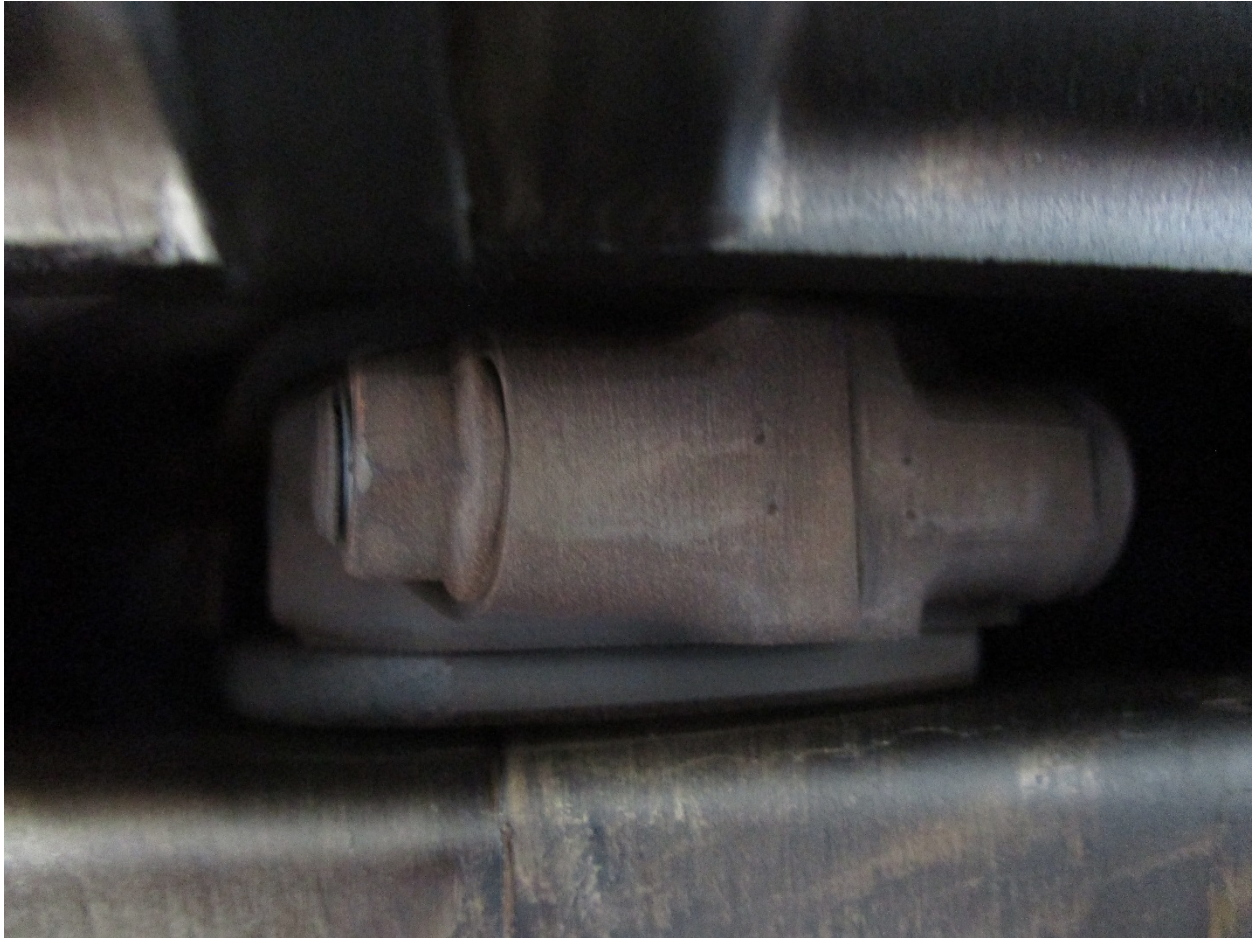
Bottom of engine showing the #2 through #4 connecting rods/crank shaft. Nothing abnormal noted.



Close up of the rod connection to the crank shaft. #4



#3 connecting rod.



#2 connecting rod. The #1 connecting rod was hidden from view, but when accessories were removed from the front of the engine, the crank shaft rotated freely and all pistons moved in order. Continuity positively established through the engine.



Back of engine, flywheel.



Water pump housing on the front of the engine, debris introduced during disassembly.



Water pump assembly, would not rotate due to corrosion and damage from crash.



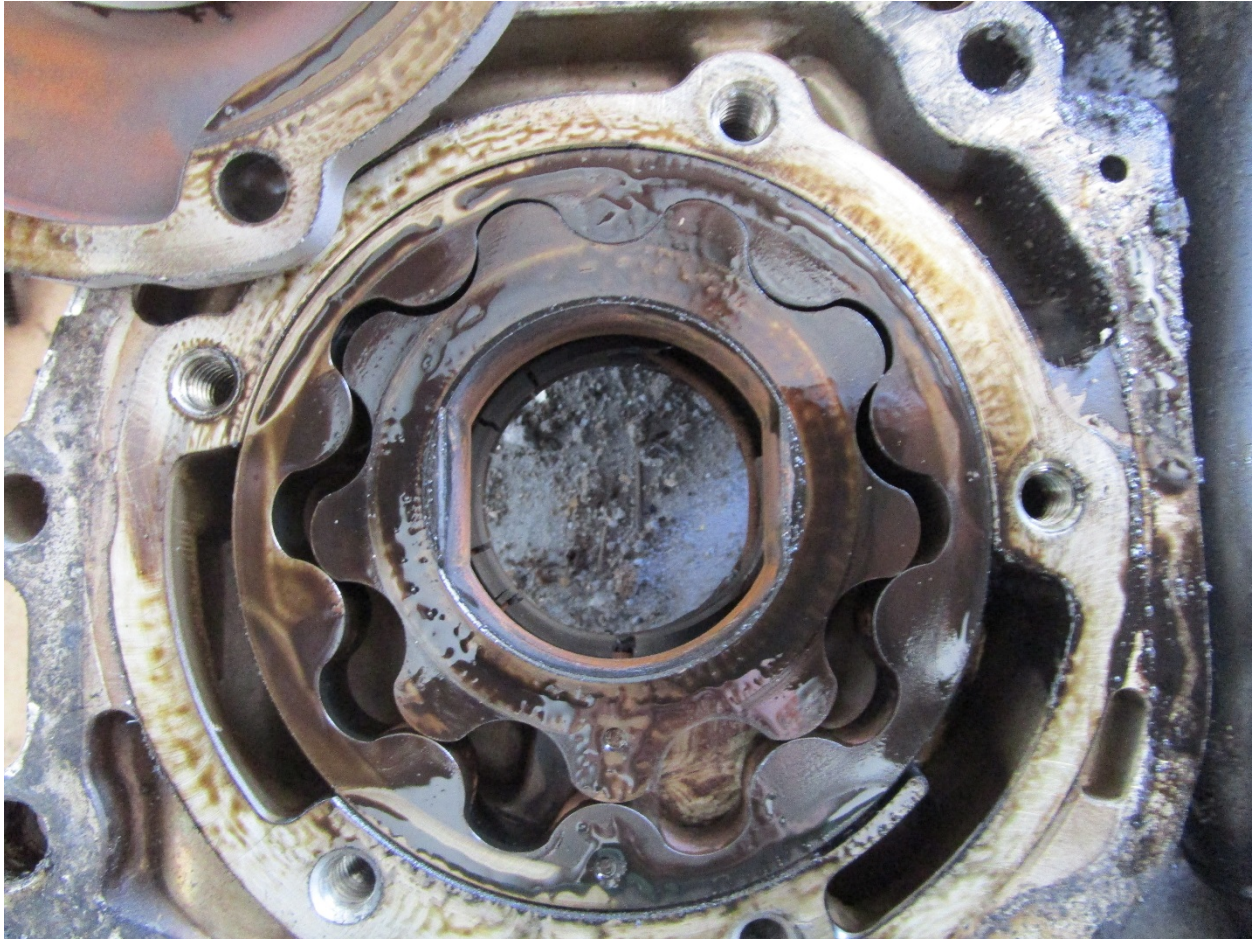
Oil filter cut open, heat damaged due to post crash fire.



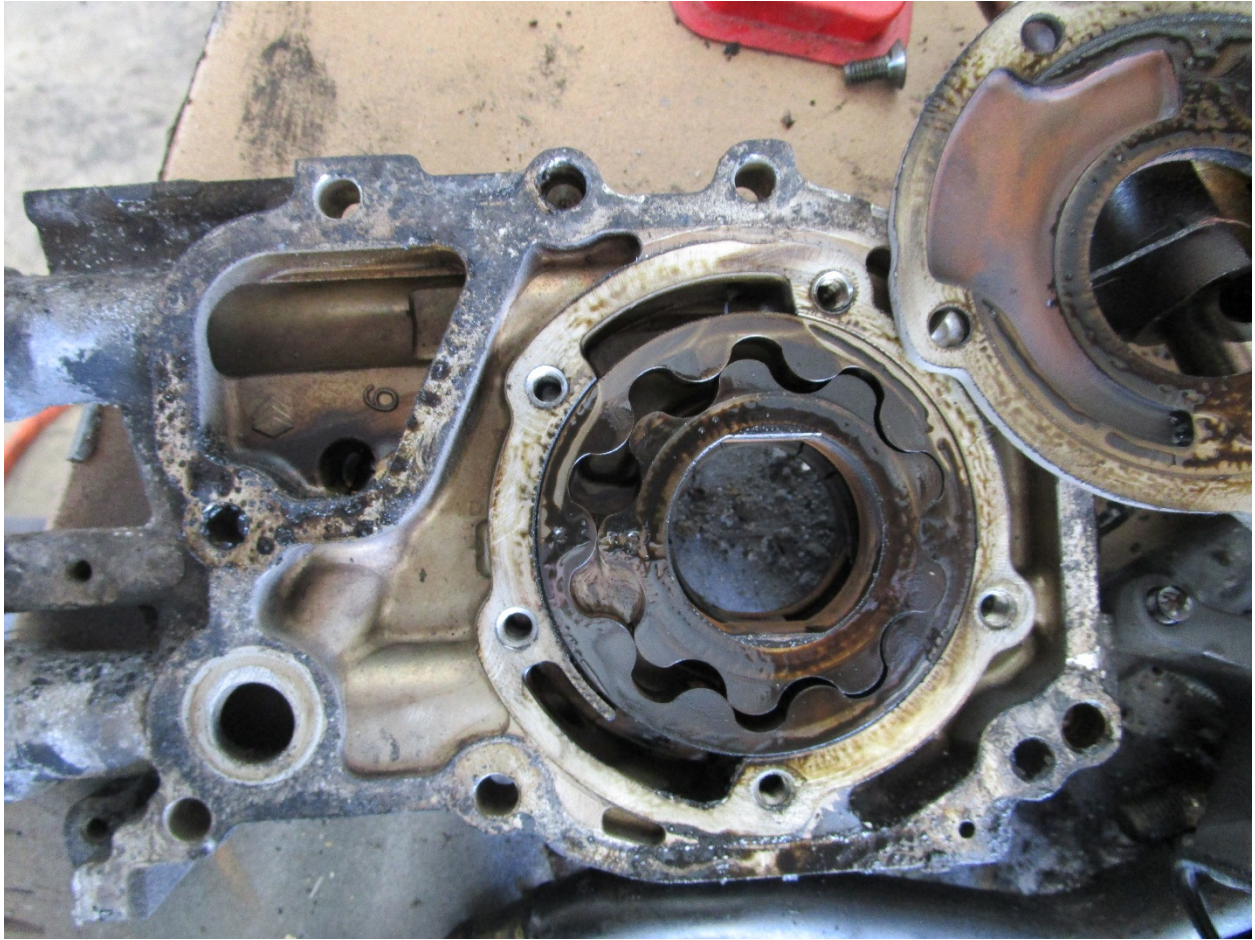
Oil filter element brittle from heat due to post crash fire. No metal found in filter.



Inside of oil filter housing, debris from brittle oil filter element.



Oil pump and element, no scarring or burring noted. Appeared normal.



Oil pump different view.

Conclusions:

No abnormalities were noted, areas looked at: Oil system, drive train, cooling system, ignition system that was intact, valve train, and to a limited extent, fuel system. The electrical system and some of the fuel system were not able to be examined due to being burned away due to post crash fire. Due to the nature of the damage and melting of metal observed, it is suspected that fuel supplied the source of the fire. It is not able to be determined due to the extent of the damage whether the fire occurred in flight or as a result of the crash.