

# Introduction



Our customer has been using **ProOne Fuel Maximizer** in their underground fuel tanks for about a year and a half. At every oil change their company vehicles receive 10% of the **ProOne Heavy Duty Oil Stabilizer** at each engine service.

This a Case Study where one of their vehicles was driven in with a “Runs Rough” complaint. Which after further inspection, turned out to be more catastrophic than anticipated.



This extreme situation will show and prove the **ProOne's Fuel Maximizer's** unique ability to:

- ✓ **Condition the fuel system**
- ✓ **Remove Carbon and Soot**
- ✓ **Save on Parts**

It will also show the **Heavy Duty Oil Stabilizer's** ability to:



- ✓ **Dramatically reduce heat & friction**
- ✓ **Reduce wear to extend equipment life**
- ✓ **Helps prevent costly down time**
- ✓ **Optimizes equipment efficiency**

The following Case Study occurred January of 2012 and is provided by Russ Slater, General Service Manager of a major construction company.



## Complaint: "Runs Rough"

- Preventative Maintenance Schedule every 4,500 miles
- Transmission Service every 35,000 miles
- Differential Service at 100,000 miles
- Cooling System Service at 100,000 miles

Type	• 4-cycle Water Cooled
Aspiration	• Turbocharged
No. of Cylinders	• 8
Injection	• Indirect
Compression Ratio	• 21.3: 1
Horsepower	• 215
RPM	• 1800
Torque	• 440 lbs
Block/ Head	• Cast Iron/Cast Iron
Max RPM's	• 3400

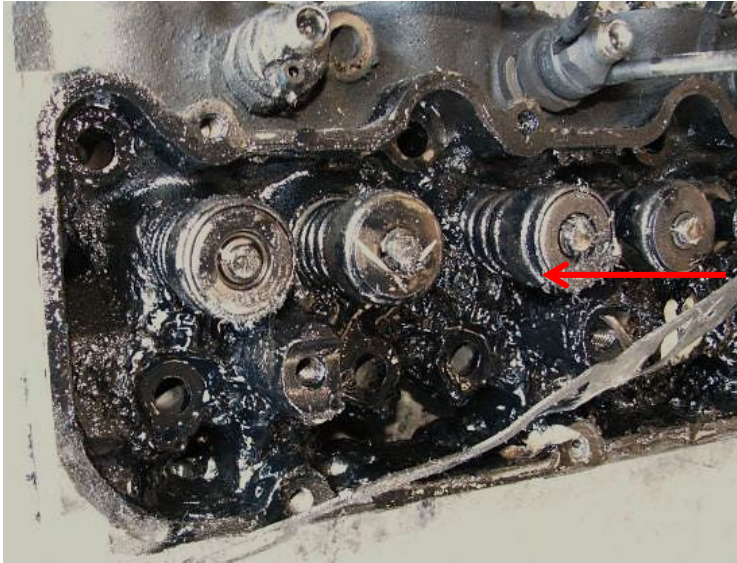


This unit had approx. 50,000 miles on it when we started using the ProOne products. On initial inspection we found a dead miss in the right bank, pulled a glow plug and performed a cylinder leak down test.

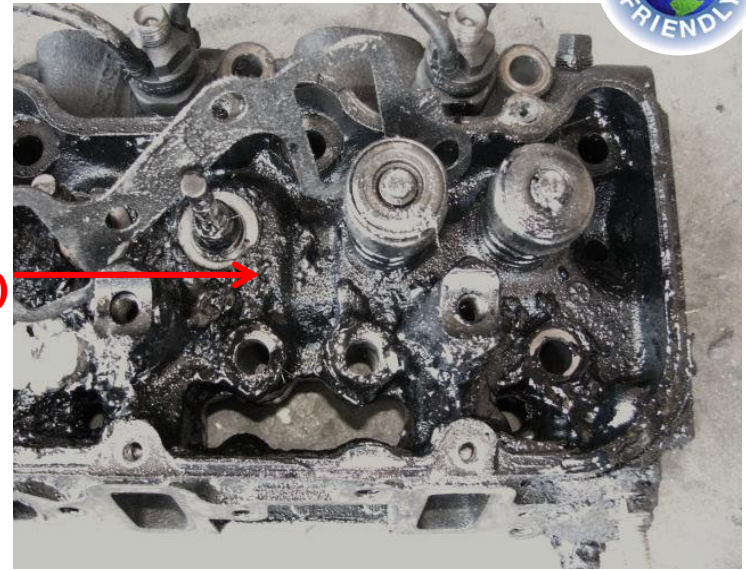


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# Cylinder Head Crack



**“Sludge”**  
(Technical Term)



Cylinder heads are prone to cracking between the valve seats. This is usually caught by a competent operator as they will report loss of coolant with no apparent visual leak.

If this condition is not corrected, the coolant level will continue to drop and severe overheating will occur. If the leak is large enough, when the engine is switched off, the pressure in the cooling system will fill up the cylinders where any head cracks are with water.

This engine was ran for an undetermined amount of time with a cracked head issue until it obviously got to the point of a major failure. As the coolant and engine oil mixed, it congealed making a thick goo of a greasy mess. Normally, this situation breaks down the lubricating properties and film strength of the engine oil, causing bearings and piston skirts to gall and weld together.



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# Hydrostatic Lock

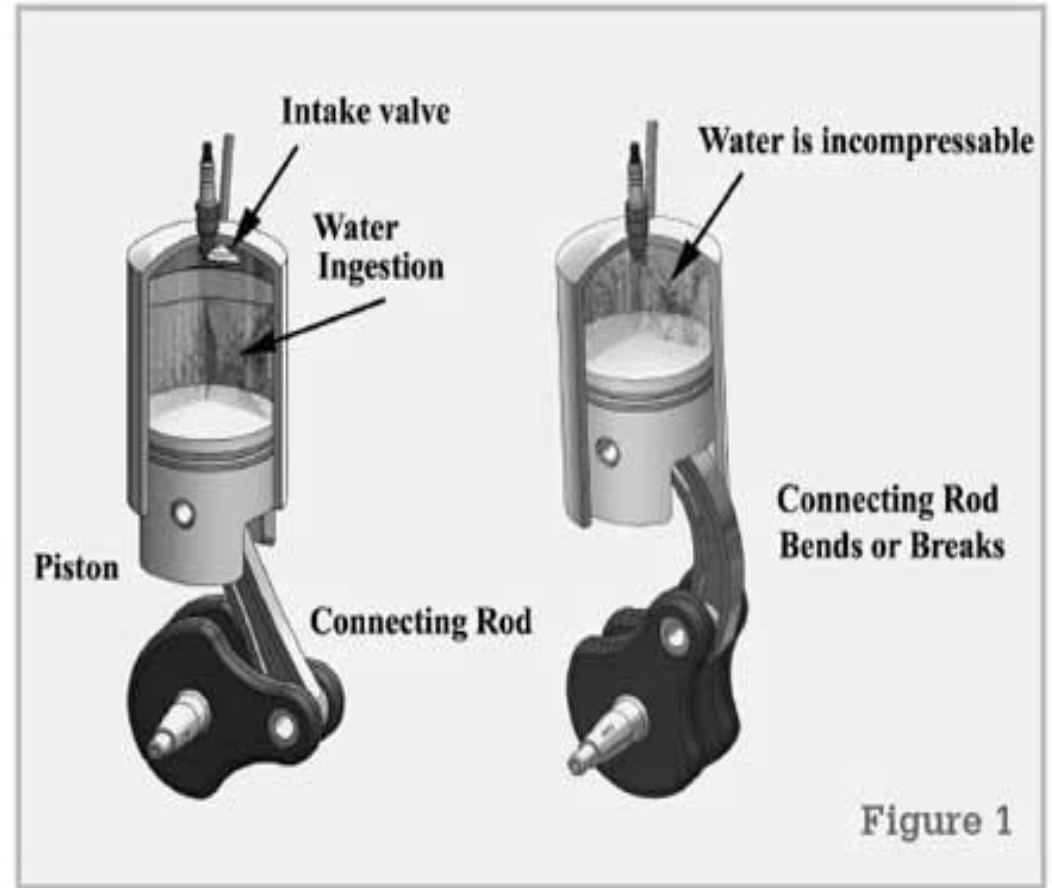


Hydrostatic lock, hydraulic lock, or hydro-lock occurs when liquids enter an engine cylinder. Liquids are incompressible; the presence of a liquid in the engine cylinder during the compression stroke generates destructively high cylinder pressures.

The left drawing shows water entering a typical automotive engine cylinder during the intake stroke.

Water, unlike the fuel/air mixture, is incompressible and, during the compression stroke, locks the piston in place as shown in the drawing at the right of Figure 1.

This condition tends to overload the connecting rod, causing a bending failure of the rod and severe engine damage.





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## Piston Damage – Ring Condition



Here is the main failure. This is a side view of what is left of the piston.

The good news is that the **ProOne Heavy Duty Oil Stabilizer and Fuel Maximizer** clearly worked!

The ring lands, oil ring, and compression ring are fairly clean with little carbon deposits and the sides of the crown are not scored or damaged.

The bad news is we are missing 75% of the piston and there is no rod, wrist pin or keepers attached to the piston.



***Remember that this unit was DRIVEN into the shop in this condition. This piston was not moving for several miles even though the engine was running!***



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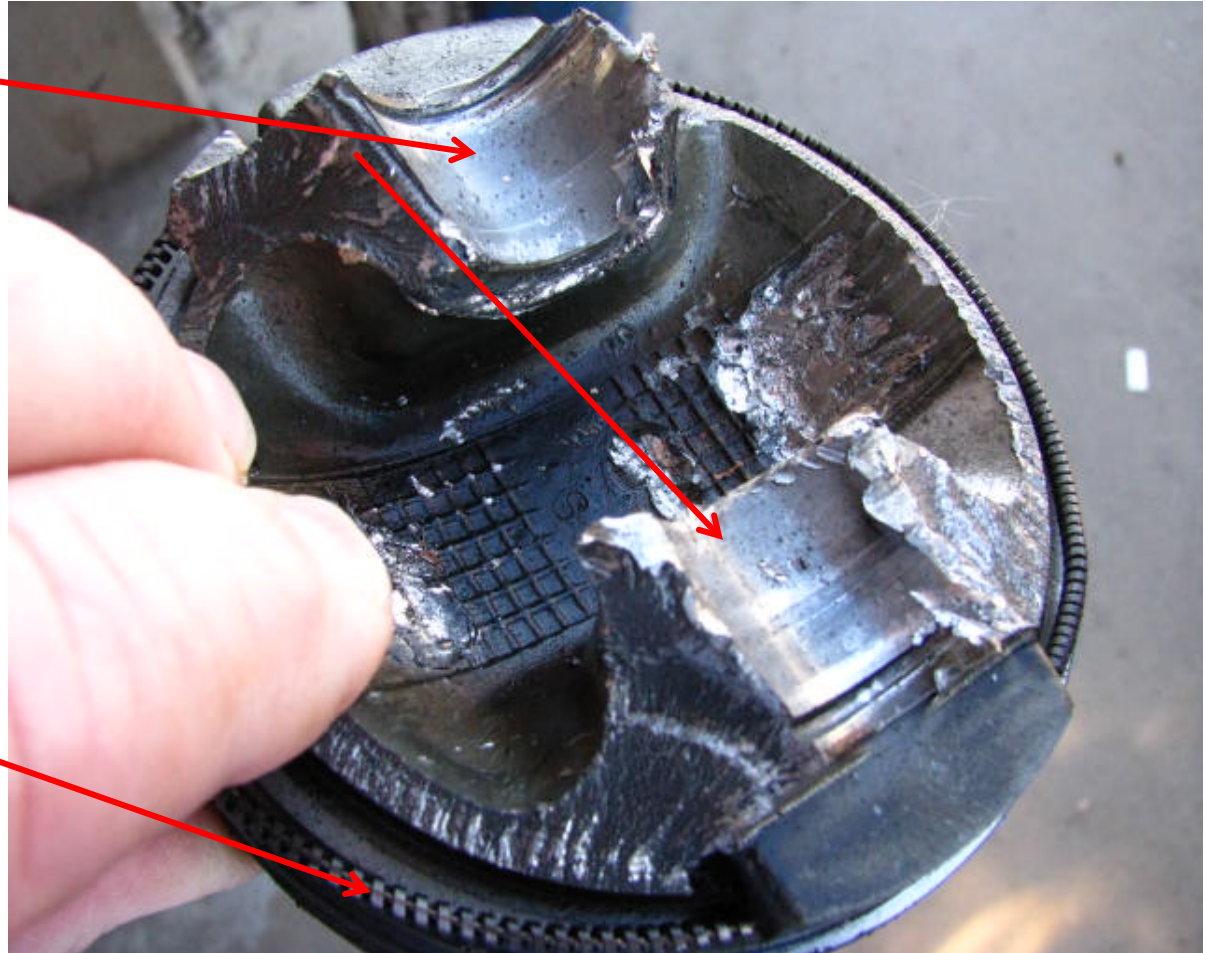
## Piston – Wrist Pin Condition



Note the condition of the **wrist pin** bearing area, still in very good shape.

The area between the wrist pin bearing areas receives a constant spray of engine oil to cool and lubricate the piston – **there is no build up in this area.**

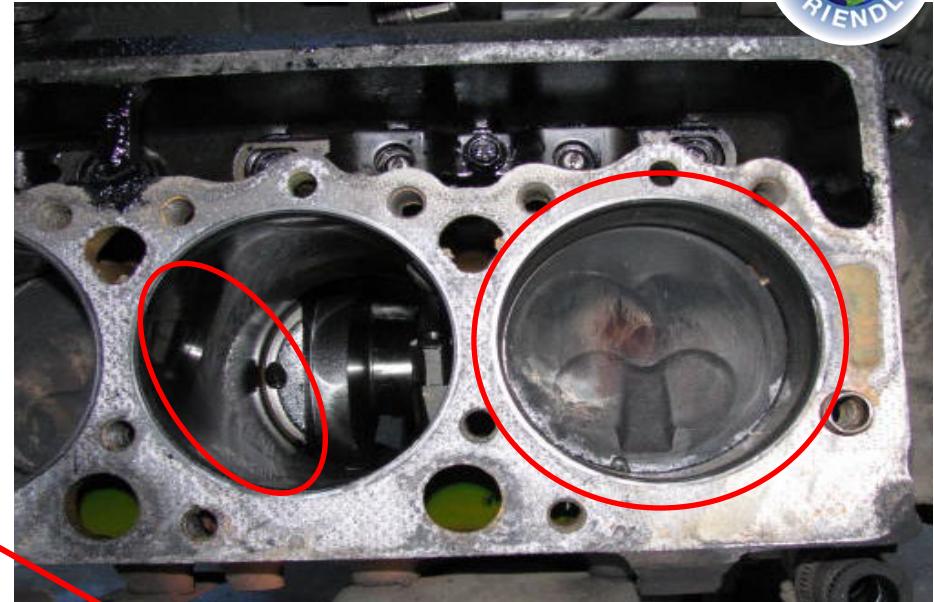
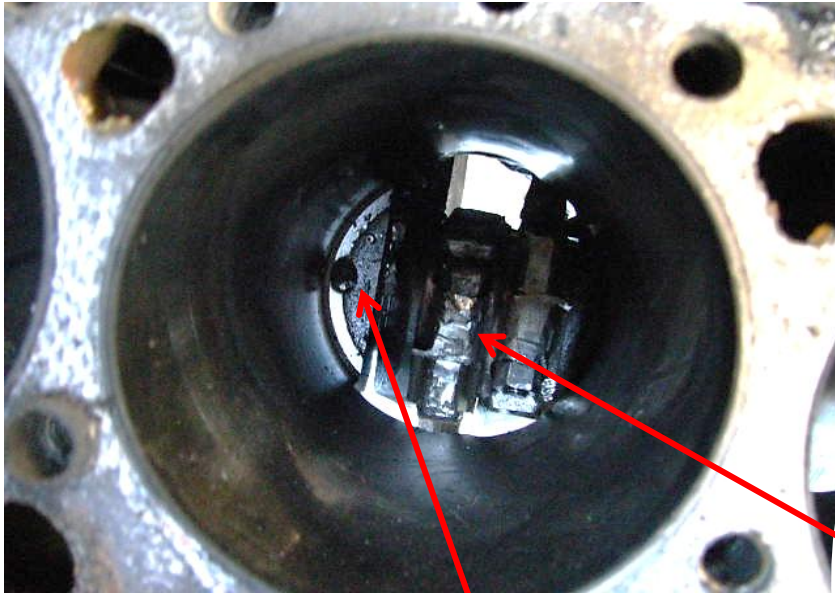
This is a great shot to look at the area behind the oil control ring's expansion spring – very clean with **no build up of carbon.**





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## Left Bank – Piston #5



You can see the oil **spray nozzle** and what is left of the **connecting rod**. The **cylinder walls** are still in good shape, considering what it has went through.

Cylinder walls / perfect condition, very little carbon build up above top compression ring contact area. Top of pistons very clean, very little carbon, burning extremely clean (right bank side) crank area for connecting rod clean, smooth and in great shape.



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# Cylinder Head – Left Bank



Same results on (left bank) cylinders, very clean burning, extremely low carbon deposits on top of pistons, cylinder walls in excellent shape – we have already discussed the condition of engine oil you can see in the lifter valley.





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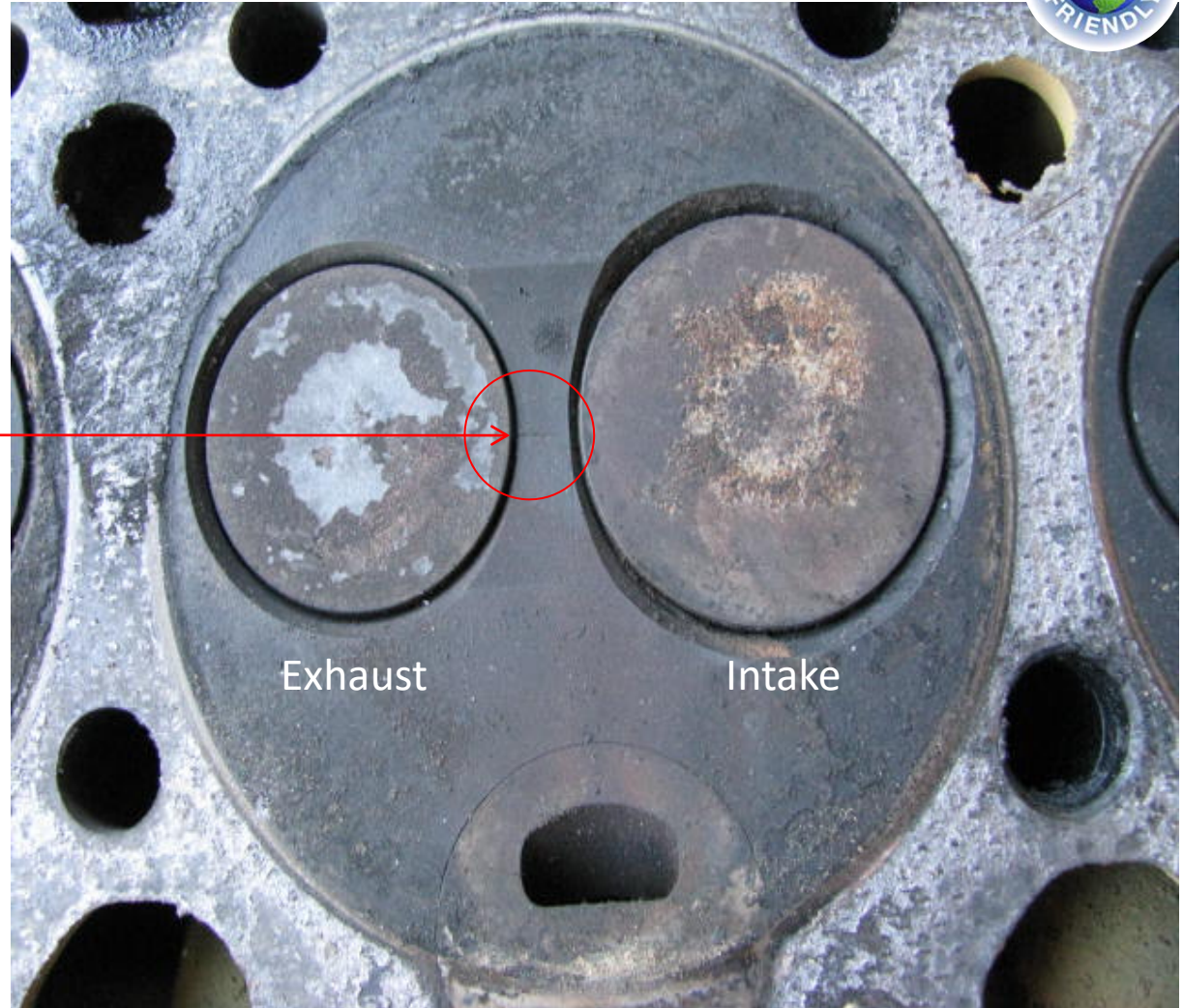
# Intake/ Exhaust Valves



Close up of intake and exhaust valve, fire deck surface on cylinder head.

Note the crack between the valves – we will discuss this in a couple of slides.

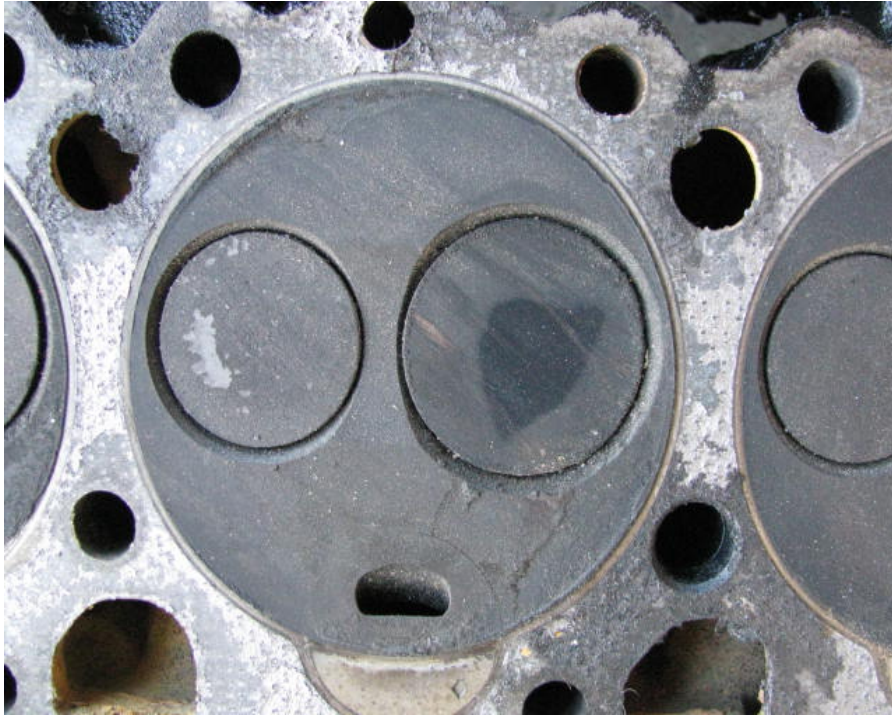
**Extremely low carbon build up** on valves, fire deck surfaces and combustion chamber.





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# Intake/ Exhaust Valves

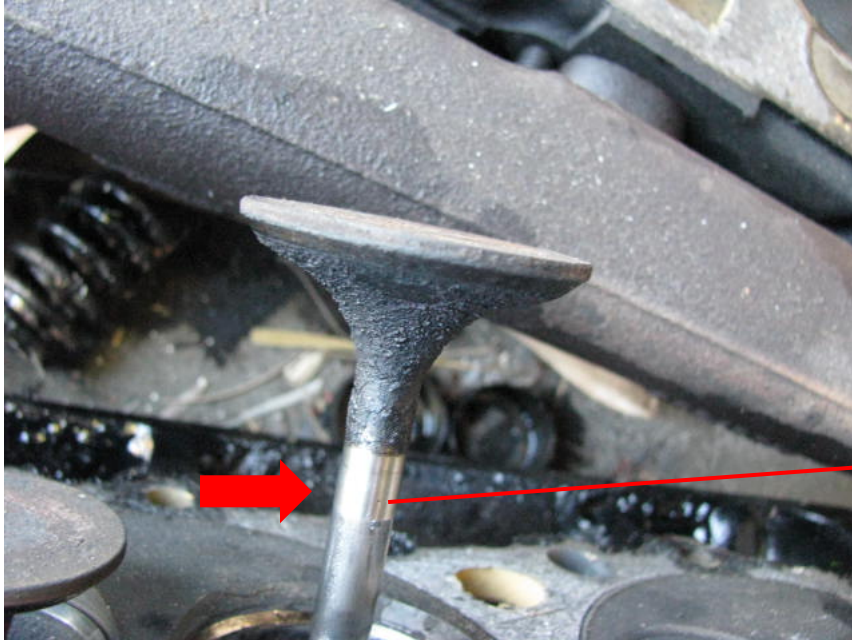


This is another close-up of more cylinders, please examine the low build up of carbon deposits on valves and fire deck surfaces.



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# Intake/ Exhaust Valves



This is a close-up of an intake valve out of the right bank cylinder head. Very little carbon build up on the valve head – Please note there is NO carbon or oil build up on valve stem. Very impressive....



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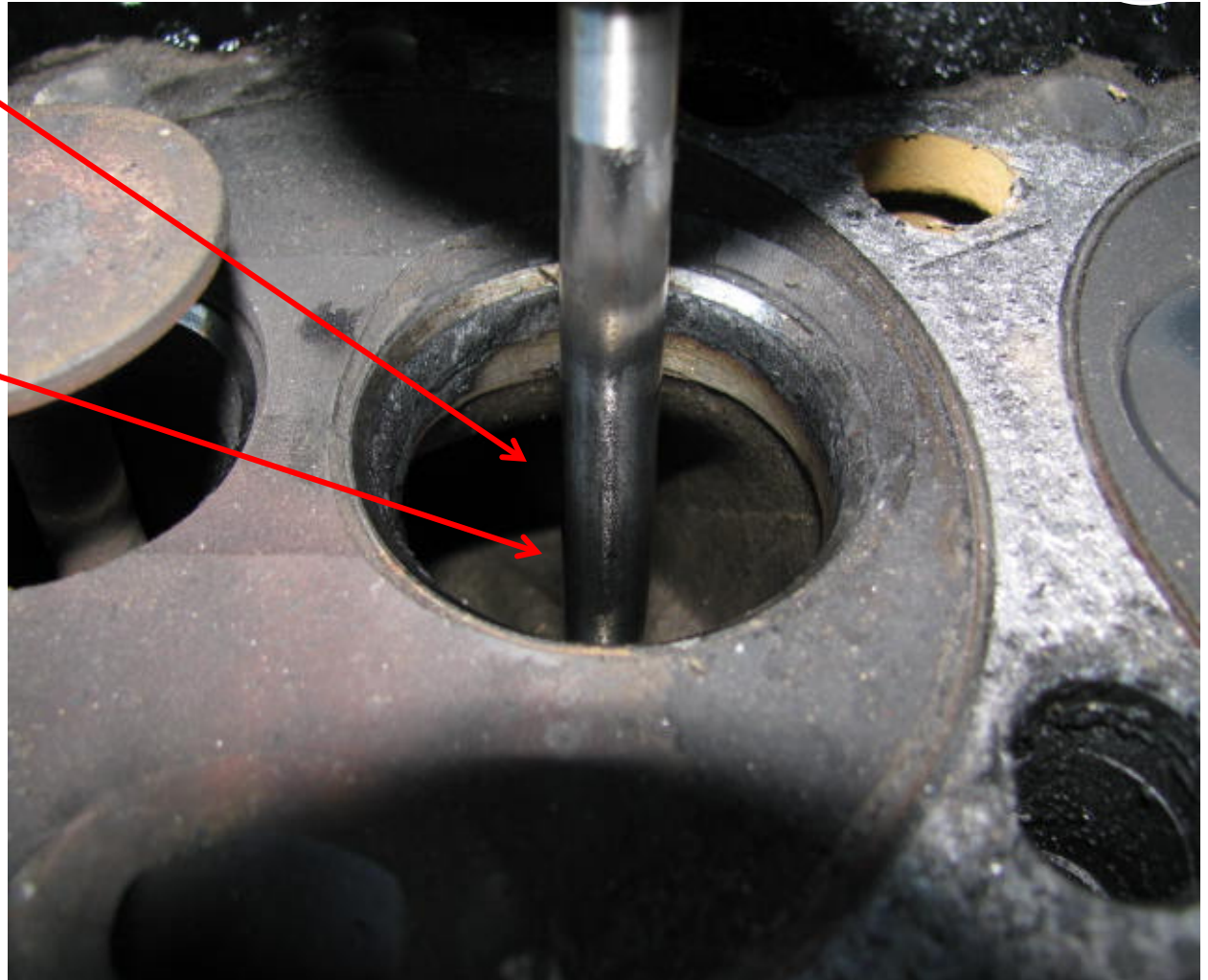
# Valve Stem – No Carbon



Close up of the **intake chamber** of an intake valve, there is basically no carbon build up to notice.

**Valve stem** is unbelievably clean, no carbon, “coke” build up (cooked on oil) in the valve guide area.

Valve seals are obviously in great shape on this engine, or the stem would have oil and carbon deposits on it.





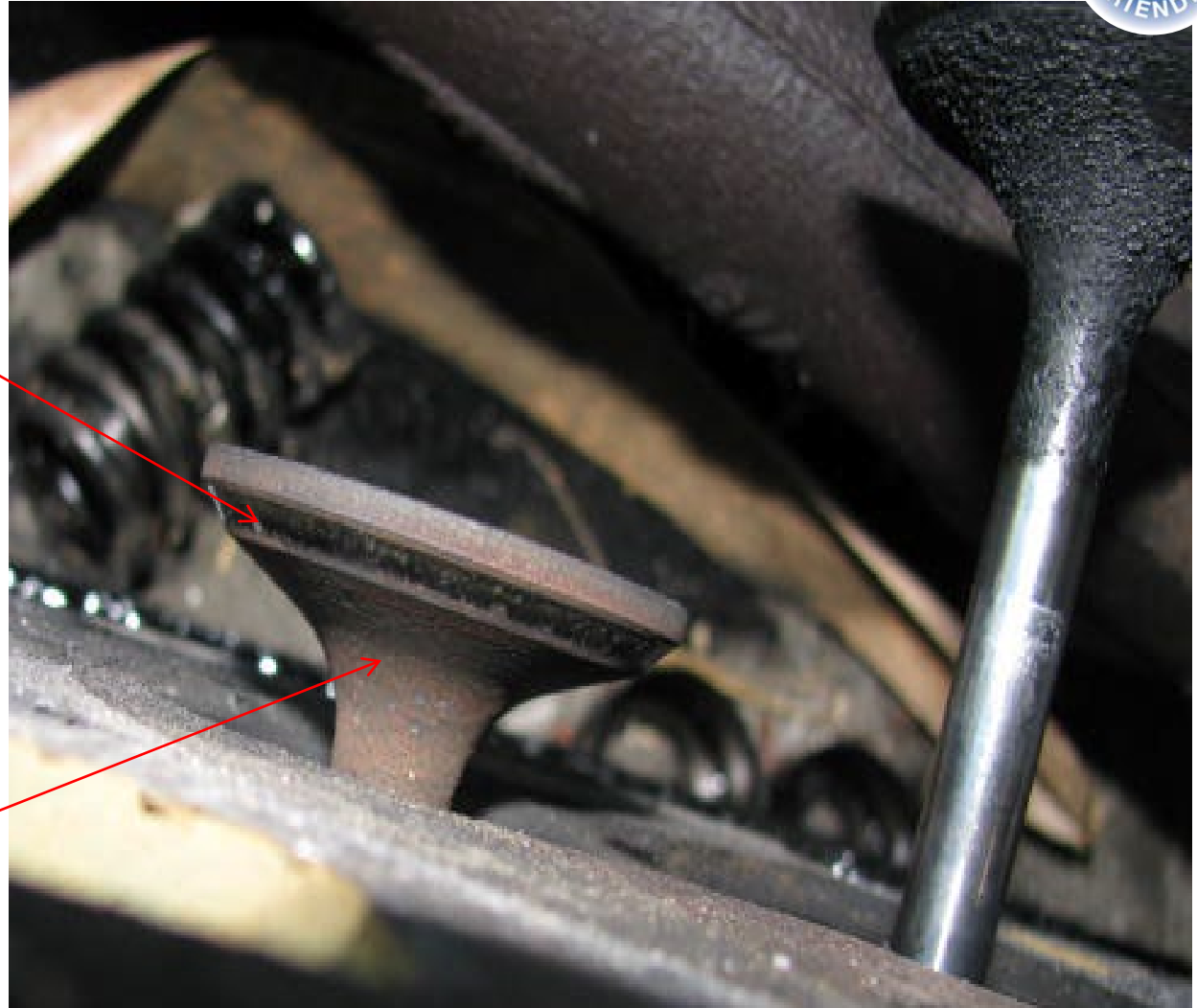
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# Intake/ Exhaust Valves



This is a close up on one of the exhaust valve seating / sealing area and the bottom of the valve face.

There is basically no carbon on this valve, you can plainly see that the fuel mixture on this engine is burning very well – no build up on the exhaust valve .





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# Rod Bearing/ Piston



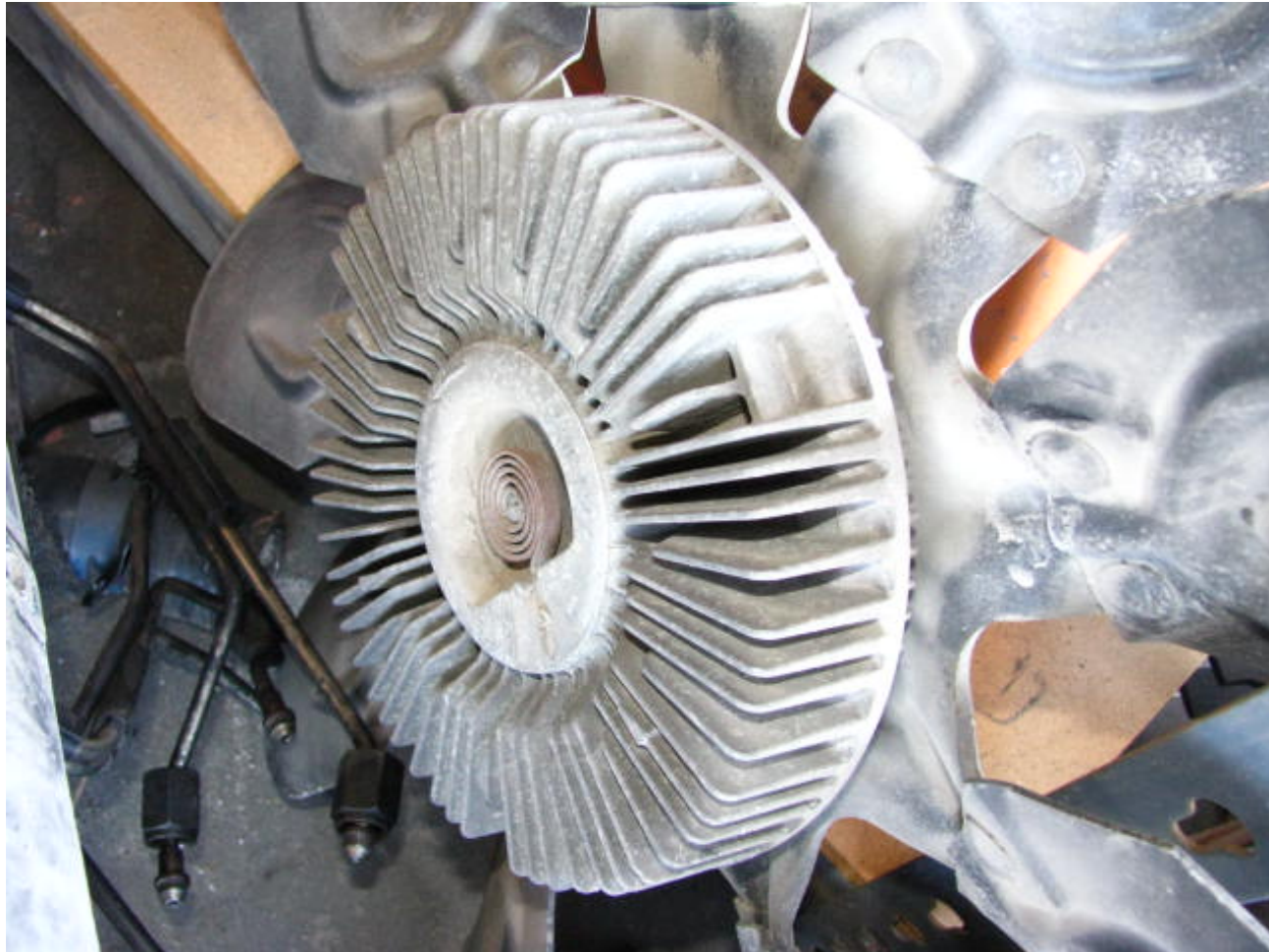
A close up of one of the rod bearings on this engine reveals extremely minimal wear to speak of. The wall thickness clearly shows a very usable bearing with a lot of miles left on it.

Here is a piston out of this engine, look at the oil control ring (bottom ring) and the expander (spring under the oil control ring). There is no carbon or “coking” in this area. There is very little carbon build up anywhere on this piston.



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**Here is the cause of engine failure**  
**\$95.00 in parts // 1 hour labor**  
**DEFECTIVE FAN CLUTCH**



# Cost vs. Savings



New Engine



Core Charge



New Engine - \$3,000  
Core Charge – (+) \$3,000  
Parts: \$2,000

**\$8,000!**

If you are familiar with fleet maintenance – this is a very expensive issue, This usually results in a “locked up” engine you get NO core credit for an engine that won’t turn over 360\* both ways.

Your replacement engine just got about more expensive due to no core credit. That’s \$3,000 plus another \$3,000 you will be charged for not providing a rebuildable core.

As the antifreeze and water congealed with the engine oil, **ProOne** kept the lubrication film from breaking down. This is evident as we review the condition of the piston ring lands, piston skirts, cylinder walls, rod bearings and valve stems. This engine still qualifies for at least 80% core return dollars



# Summary



All I can find here is that thanks to our ProOne products, our truck was able to

1. **Continue to safely function all the way back to it's base location.**
2. **It did not cause a traffic hazard or leave our employee stranded.**
3. **It did not cause a Customer Service failure, in this economy that is a paramount issue. If we decide to replace this engine and get this unit back up**
4. **I have a core that is still worth 80% of it's charges.**

We also have an opportunity to have training reviews on our mechanics and talk to our field crew about the importance of REPORTING any issues with their equipment – This repair without a core charge credit will EASILY reach a dollar amount of over \$8,000.00.

I also had a great opportunity to actually see actual real world results of using the ProOne products in our units. I have proven **oil sample results form CAT labs showing that we get 50% wear metal reductions** on a lot of the lab results. This (unfortunate) engine disassembly proves that the **Fuel Maximizer not only works – it REALLY works**, cleaning the combustion chambers and related parts through continual use, even on engines that have several thousand miles already on them.

If you want to see more unbelievable, outstanding results – ask to see our PowerPoint on the FORD diesel EGR / EVR valve cleaning I demonstrate step by step.

I have been a professional Fleet Manager since 1980 – These PRO-ONE products WORK – ask your Rep for a sample and see for yourself.

Russell Slater