An Actual FirstLook®Case History

An automobile was brought into Ferraris Auto Repair in Syosset, Long Island, New York. The technician Jeff Kogan both uses and teaches the FirstLook® Automotive Engine Diagnostic Sensor model ADS ES 100. The customer complained of a rough engine. Jeff did a quick **cold crank** pre-test of the vehicle's engine with the FirstLook Sensor to determine the base condition of the engine. Jeff was looking particularly at relative compression and valve condition on this four cylinder engine.

It was immediately noted that the engine's exhaust pulse pattern was very irregular. Two cylinders showed essentially no exhaust pulse at the times they should have occurred. There was clearly a compression problem in the basic engine. The customer was advised of a major engine problem. Since the vehicle was still under warranty, it was suggested that he take it into the dealer for repairs, which he did do.

The first thing the dealership service department did was to plug into the vehicle's OBC system and pull the codes. However, as we have seen many times, the on-board computer is unable to tell the mechanic if he is dealing with a bad cylinder or valve problem.

OBD codes are very useful if the condition of the engine is fundamentally good. However, if there are problems with compression, cam shaft timing, cam lobe wear, or valve condition, the OBD system can seriously mislead the diagnostician.

Three attempts were made to fix the vehicle based on the computer codes generated by the OBD system. On the second and third tries OEM Tech Service was called and they recommended additional parts which were replaced in futile attempts to fix the problem.

Yet the very first item on the repair order was "mechanic states compression or valve problem". It was only on the fourth job order in the dealership that compression and leak down were tested, which ultimately verified that the initial diagnosis from a two minute FirstLook examination of exhaust pulse data was indeed correct. The head gasket was replaced, and the reassembled engine ran smoothly. The problem was finally solved!

However, it should be noted that this car was out of the customer's hands for more than two weeks. This inconvenience to the customer does not include the man-hours wasted and the numerous parts that were needlessly put into the car before the job was done.

To Summarize: An accurate diagnosis of base engine condition can allow for the technician to make a better decision as to what branch of the diagnostic fault tree one needs to go to next. The FirstLook Automotive Engine Diagnostic Sensor allows for a decision early in the process to either proceed with OBD diagnostics, or to go directly to the mechanics of compression and leak down testing to confirm the initial exhaust pulse data indications. In the case of this car it would have saved many hours and many dollars in parts and labor that were clearly not needed. But most importantly, it would have served the customer so much better!

Received from: Jeff Kogan, Mechanic at Ferraris Auto Repair
Syosset Long Island, New York

ACTUAL LIST OF PARTS AND JOBS PERFORMED BY OEM ON VECHILE.

Automobile / 4 Door Sedan / 4 cylinder engine
Time spent in shop 12/29/04 to 01/12/05

Received by shop with write up of bad head gasket as diagnosed by Ferriars Auto Repair, Syosset Long Island, New York Per mechanic Jeff Kogan

Job #1
Customer states engine is running rough. Service engine light is on.
Told by outside shop possible head gasket or valve problem?
Internal failure
Performed E.F.I. consult data test settings codes P1320 P0 100.
Ignition primary signal, Replaced four coils cleared code P1320.
Security Plus $50.00 Deductible.

Parts Job#1	4	22448-4M500	coil assembly-ignition	Warranty 0.00

Job#2
Added Operation
Customer states service engine light is on, runs rough internal failure
Performed E.F.I. consult data test setting code P0100 Mass air flow sensor, replaced mass airflow sensor, cleared code P0 100. Security Plus $150.00 Deductible.

Parts Job#2	1	22680-5M020	Plug In Sensor	Warranty 0.00

Job#3
Added Operation
Customer states service engine light is on and engine is running rough internal failure
Performed E.F.I. consult data test – setting codes P0100 P1320. Engine still not running properly, replaced E.C.U. Security Plus $50.00 Deductible

Parts Job#3	1	23740-5M278	Engine Control	Warranty 0.00

Job #4
Added Operation
Customer states service engine light is on and engine is running rough.
Slight crack in head gasket
Performed fuel pressure test, performed compression test
Cylinder 1 125 lbs 23% leak down, Cylinder 2 90 lbs 80% leak down
Cylinder 3 85 lbs 80% leak down, Cylinder 4 120 lbs 25% leak down
Security Plus 50.00 Deductible
Warranty 0.00
Checked valve clearance Cold, Spoke with person at Tech Line. Told head gasket starting to fail removed cylinder head. Replaced Head gasket RE assemble engine is running properly
Security Plus 50.00 Deductible

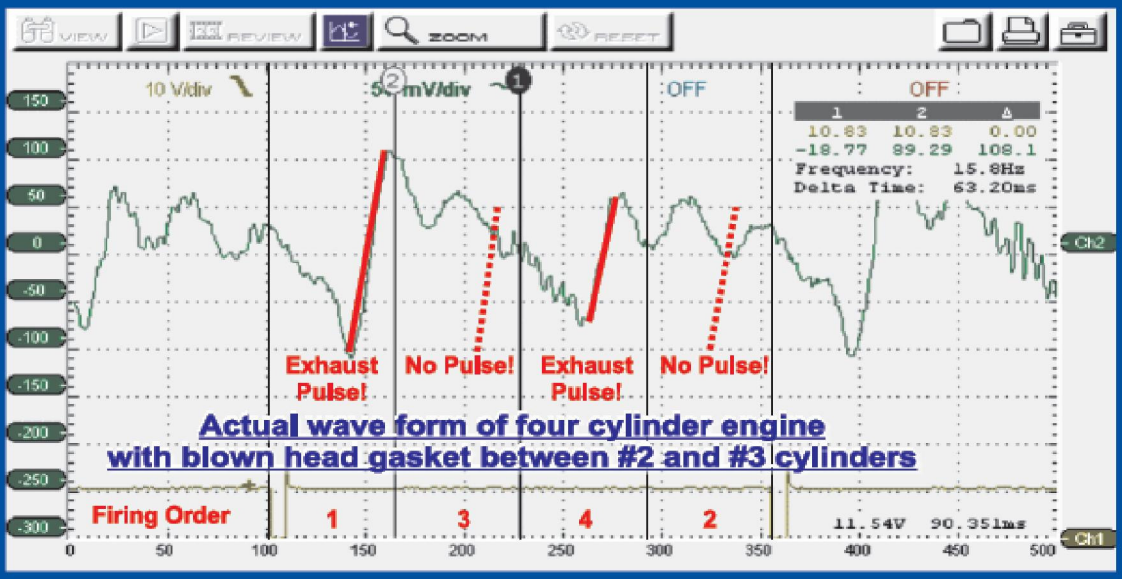
Parts Job#4	2	14036-OM200	Gasket-Exhaust	Warranty
Parts Job#4	1	11044-4M710	Gasket-CYL Head	Warranty
Parts Job#4	1	13270-4Z000	Gasket Rocker Cover	Warranty
Parts Job#4	1	999M9-A7007P	Gasket Silicone	Warranty 0.00

Total Invoice 150.00

The following is a saved scope screen of what Jeff Kogan observed.

Run Cold Crank Test

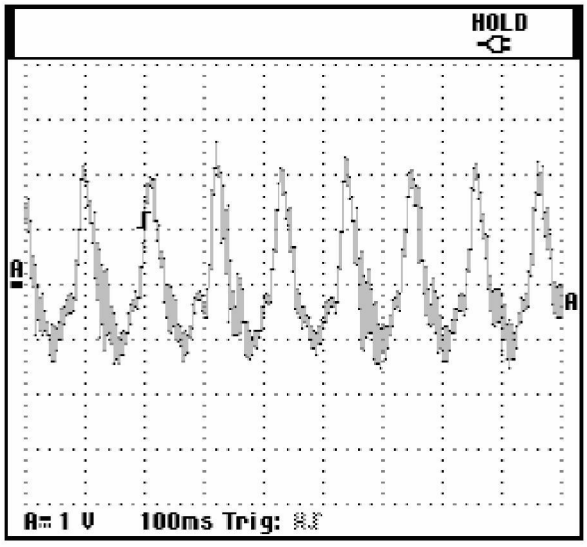
Insert sensor probe into tailpipe of vehicle. Sensor sees the pulses generated by the engine which is acting as an air pump. Connect to any standard automotive lab scope.



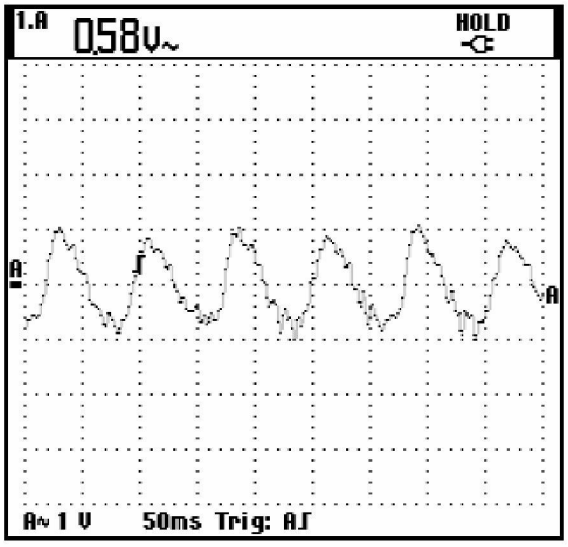
Compare Cylinders

Cylinders #1 and #4 create strong pulses on their exhaust cycle. But adjacent cylinders #2 and #3 do not! A blown head gasket between these two cylinders is clearly indicated.

Below are Cold Crank Tests of known good engines



Cranking, 2004 Ventura 3800, Normal



Cranking, 97 Buick V6