On the Line

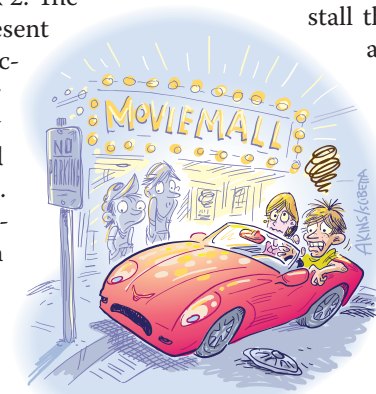
Disturbing the Air Flow

Turbulent Airway Promotes Check Engine Lamp and Trouble Codes

By Larry Hammer
Technical Services

Imagine servicing a vehicle that includes an air filter inspection or replacement. The customer returns the next morning with an illuminated Check Engine lamp, convinced that the problem was related to your services. Later, it would be determined that there was more to the story than what had been told.

The vehicle in question was a 2008 Corvette that came in for a routine service and returned with an illuminated Check Engine light. Scanning the system for trouble codes revealed DTC PO171, which is Fuel Trim Lean Bank 1. It is not uncommon for DTC PO174 to be stored, which is Fuel Trim Lean Bank 2. The technician was convinced that the present condition was not related to any services that he had performed. Much later it was determined that an air flow disturbance through the intake and air cleaner assembly was the culprit. The condition may stem from a modification or a design problem with the original equipment plumbing/air-baffle design. First, let's consider some checks the technician would normally perform when the mentioned codes are stored in memory:



IT'S CRUISE NIGHT. WITH DAD AWAY ON BUSINESS, JUNIOR SNEAKS HIS FATHER'S VETTE OUT WITHOUT PERMISSION. AFTER CURBING THE LOWER RADIATOR SUPPORT..."**AIR TURBULENCE**" IS ABOUT TO TAKE ON A WHOLE NEW MEANING.

1) A fuel pressure test, checking for low pressure.
2) High presence of alcohol or contaminated fuel.
3) Restricted or malfunctioning fuel injectors.
4) Low fuel level in the tank.
5) Check all vacuum hoses for leaks or kinks.
6) Vacuum leaks around the intake manifold, throttle body or injector O-rings.
7) Evaporative system hoses obstructed or leaking.
8) Check PCV system for leaks.
9) Leaking exhaust system components forward of the heated oxygen sensor.
10) Check oxygen sensors for proper installation and damage to electrical wiring.
11) Check for open oxygen sensor signal circuit, shorted to ground, or shorted to low reference circuit.
12) Other engine component/sensor failures.

AIR FLOW DISTURBANCE

GM acknowledges that a problem can occur promoting a disturbance of the air flow through the air intake and air cleaner assembly. Vehicles affected include 2007–2009 Corvettes. The conditions described were due to an air gap between the upper radiator air baffle (directly below the air filter) and the main bumper beam. To complicate the condition, the bumper beam incorporates some holes that will further disrupt the air flow through the intake air cleaner assembly. The separation of the air baffle is due to some dislodged retainer clips. GM recommends installing revised clips P/N 05973400 to secure the mentioned baffle to the bumper beam. To access the existing clips and install the revised clips, it will be necessary to raise and secure the vehicle and remove the three bolts that secure the lower radiator baffle to the bumper beam. The non-functional holes in the bumper beam must be sealed with a good adhesive patch such as a sound deadener patch. To gain access to the holes it will be necessary to remove the air filter housing assembly. No air can be allowed to pass through these holes or between the bumper beam and the air baffle.

DAMAGED RADIATOR SUPPORT

We have identified a second problem that GM has not addressed, which can promote the same dislodged air baffle condition and symptoms. This explains why some of these vehicles may return with the same symptoms, even after the revised clips have been installed.

In the case mentioned in this article, more than revised retainer clips was required to correct the problem. While trying to position the air baffle against the bumper beam, it became obvious that some mechanical damage had been incurred. A close inspection of the lower aluminum radiator support revealed extensive damage, requiring replacement. Earlier I mentioned there was more to the story. The customer failed to mention that he had run the vehicle upon a curb the previous night, damaging the lower radiator support. The damage prevented the air baffle from fitting snugly against the bumper beam, due to the misalignment of the radiator. Every 2007–2009 Corvette that I have examined has shown evidence of ground/curb contact with the rails on the lower radiator support. Air turbulence can affect the performance of any manufacturer's vehicle, especially where damage or system modifications have occurred.