



TECH TIP

NEW TECHNOLOGY 209

NEW TECHNOLOGY POSES NEW CHALLENGES

Today's Technicians Must Be on Their Best Game

When I started my career as a technician, performance related diagnostics were not that challenging when compared to today's technology. Most symptoms could be isolated to a fuel or ignition related problem with a simple road test. Diagnostic equipment was limited to some basic tools such as a timing light, rpm/dwell meter, compression gauge, vacuum gauge, volt/ohm meter and the necessary carburetor adjustment/rebuild tools. Most symptoms could be resolved with the use of the mentioned equipment. Looking up a procedure in a repair manual was perceived as being inexperienced.

Today's diagnostics involve a maze of electronic components that must be considered and test equipment available to communicate with the electronic systems, plus the ability to re-program. Systems today are so connected that it is difficult to distinguish between a mechanical, electrical, fuel or emission related condition without extensive testing. Access to service procedures and technical service bulletins is very important. Technical service bulletins are a must have, as they can save countless hours of diagnostic time, especially when the vehicle manufacturer acknowledges a problem and provides a corrective action. Following are some examples of those challenges that today's technicians must be prepared to deal with for performance and safety concerns.

ELECTRICAL INTERFERENCE

To further complicate the diagnosis, add some electrical interference referred to as radio frequency interference (RFI) from another source and the technician really has a challenge. These additional signals can really complicate the diagnosis, especially if the symptom is a driveability complaint. The technician can be chasing a condition that may no longer be present, as they may be out-of-range of the electrical interference that created the symptom. It is not uncommon to encounter RFI conditions from such devices as radar detectors, 2-way radios, cell phones and chargers (even though they may not be plugged in), computers and other electronic devices, fluorescent lighting, electronic

advertising signs, add-on aftermarket accessories, LED lighting, high RF traffic areas such as pay-at-the-pump gas stations, or devices from another vehicle in close proximity. Multiple fobs/transmitters should never be placed on a single key ring. These signals are especially a problem for those vehicles equipped with Push Button Start. Any of the mentioned signals can result in a No Fob Detected message, which results in a no-start condition or an engine performance related symptom.

ACCESSORY INTERFERENCE

The technician must question the vehicle owner concerning any accessories that may have been removed from the vehicle prior to receiving it for service. While most associate the Assembly Line Data Link Connector (ALDL) as a test port for system diagnostics, it is often used for other purposes. For example, insurance companies offer reduced rates for those vehicles seldom driven or how the vehicle has been driven. Fleet companies use the test port as a tracking device for maintenance purposes, fuel economy, etc. Performance enhancement equipment is often plugged into the connector. Devices plugged into the ALDL connector can influence the vehicle's electronics. In some cases, vehicle manufacturers have denied engine warranty claims, especially in cases where piston or cylinder wall damage has occurred. The technician must be aware that any monitoring, tracking or performance devices that plug into the ALDL connector can influence the vehicle's electronics. The symptoms may include driveability issues with the engine, transmission, erratic or false gauge readings, Check Engine lamp illumination, battery discharge due to Bus or LAN traffic remaining active, and other symptoms. Make certain the vehicle owner is questioned to determine if the ALDL connector has been used for one of the mentioned purposes and removed prior to bringing the vehicle in for service, as it can save many hours of diagnostic time. It is difficult to come up with a solution to the customer's complaint when the cause of the performance condition has been removed from the vehicle.

LOW VOLTAGE AND ELECTRONICS

A low voltage condition can create some major issues with the vehicle's electronics. A No Fob Detected or a no-start symptom may result when the vehicle is not driven daily. Vehicles parked for a period of 2-3 weeks may encounter a drop in voltage that will affect the vehicle's electronics due to parasitic current drain. A fob left within 25 feet of the vehicle when parked can prevent the computers from entering the sleep mode, resulting in a discharged battery. A low voltage condition can prevent the modules from communicating, resulting in some diagnostic challenges for the technician. Pay special attention to any electrical accessories that have been added. Add-on accessories or devices improperly installed can influence other systems. For example, using a courtesy lamp circuit for a power source for an accessory may result in the power timer in the Body Control Module (BCM) continuously resetting itself. The BCM will remain awake, and the amp draw may rise to 4 amps and then drop to a low milliamp reading momentarily and then continually repeat this cycle, resulting in a discharged battery.

Make battery testing a part of your safety inspection. Identifying a marginal battery will save the customer a service/tow charge that often exceeds the price of a new battery.

LOW SPEED PRE-IGNITION

Technicians have dealt with pre-ignition and detonation since the introduction of the internal combustion engine. Most of these symptoms were corrected with fuel quality changes and timing adjustments.

We have a new challenge in the service bay referred to as low-speed pre-ignition (LSPI). The condition primarily involves turbocharged gasoline direct injected engines (TGDI). LSPI is pre-ignition event that occurs prior to the spark plug igniting the fuel mixture. This condition occurs during low speeds (RPMs) and during rapid acceleration or high load conditions. When this uncontrolled event occurs, a high-pressure condition can result in catastrophic engine damage. When the combustion event occurs prematurely (pre-ignition) during the compression stroke, major damage to the engine components can result due to the expansion of the gases during a time in which the piston is still compressing the gases. This excessive pressure can result in damage to pistons, bent or broken connecting rods, broken piston ring lands, broken rings, battered rod bearings and blown head gaskets.

With the direct injection arrangement, the limited time for fuel vaporization makes these engines highly susceptible to pre-ignition. The fuel is injected into the combustion chambers under high pressure. Fuel mixed with oil (droplets) may vaporize and ignite prior to the ignition spark delivered by the spark plugs. Fuel octane ratings may also be modified due to the fuel and oil mixture modification. These events make pre-ignition highly probable. Lubricant formulations have been modified by the vehicle manufacturers. API SP is the recommended oil specification to address engine component wear, reduce deposit formations and assist in the control of LSPI. To minimize LSPI, avoid heavy acceleration at slow speeds (low RPMs).

SHOP SAFETY

In my early years as a technician in training we were constantly instructed on shop safety. This included injuries that could occur due to turning belts and pulleys that were capable of mangling fingers. Nothing should be carried in the shirt pocket that could become a projectile while leaning over a running engine. A service manager/writer with a tie has no place beneath the hood of a vehicle. If the tie is caught in a pulley, that person may sport a new facial expression. These are common sense precautions that should be practiced to this day.

ACCIDENTAL STARTS

With some of the new technology such as keyless ignition we must implement additional safety measures to prevent an engine from starting while we are making repairs. Imagine performing a repair in the engine compartment from beneath the vehicle with the hood closed. Without warning the engine suddenly starts. Hopefully your fingers are clear of moving belts and pulleys. GM has cautioned technicians that two scenarios could result in a sudden start without warning: 1) While the vehicle is being repaired, the vehicle owner mistakenly starts the engine using the remote start feature of the OnStar mobile app. 2) A mix-up of the key fobs in the service department, resulting in a technician accidentally starting the wrong vehicle. To prevent this, the hood should be fully opened or to the second latch, as this will disable the remote start feature via the key fob or OnStar mobile app. Familiarize yourself with the safety procedures of any vehicle being serviced.

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