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Technicians Service Training

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Upcoming

TST Big Event March 29th 2025

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Editor

"G" Jerry Truglia

"Asian Diagnostics"

This article contains a mixed bag of some common Asian diagnostic tips and techniques on a variety of vehicles. As you read through the different vehicle problems, you will learn what diagnostic route I rode to diagnose and fix the concerns. In some of the different examples I will explain what I used to test and confirm that a component was either good or bad. Never just change a part; but rather test it, then move on to the next logical step in your diagnostic routine. And use what God gave us—our brain, eyes, ears, nose and hands. Combine that with good service information and you will have a successful diagnosis.

Toyota Camry P0171

One of the most common vehicles that shows up in our bays is the Toyota Camry. A common problem that this vehicle will display is an illuminated Malfunction Indicator Lamp (MIL) caused many times by a P0171 (System Lean-Bank 1) Diagnostic Trouble Code (DTC). As part of my usual diagnostic routine, I first performed a visual inspection on this particular Camry. I noticed that the Mass Airflow sensor (MAF) and Air Fuel Ratio sensor (AFS) had been replaced. Seeing a bunch of new parts on a vehicle that other shops have installed without resolving the problem is nothing new to me. Before replacing any sensor or actuator, the first thing to do is "test and not guess," confirming whether the

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What is TST?

TST is a group of dedicated technicians and instructors committed to the continuing education of our fellow technicians. We provide training seminars to technicians at a reasonable price. TST brings our members nationally known instructors and state of the art training.

Our Goal & Mission Statement

- *Keep our fellow technicians up to date with the latest technology.*
- *Provide training seminars for a reasonable price.*
- *Deliver information that the technician can use now.*
- *Keep technicians informed of information affecting our industry.*
- *Increase consumer awareness of what a good technician is.*

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The following are some of TST's regular instructors:

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John Thornton of Autotrain Inc.
Wayne Colonna of ATSG
Jorge Menchu the "Labscope Guru," AES Wave
John Anello of Auto Tech On Wheels
Mark Warren of World Pac / Motor Magazine
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Peter Meier of Motor Age Magazine
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"Asian Diagnostics" (con't from p. 1)

components are operating in the proper range or not.

The important thing to know about the Toyota AFS sensor is at idle on a good running engine, the voltage reading on your scan tool should be 3.3 volts. To check the sensor, induce a vacuum leak to see if the sensor reading changes from the idle voltage reading. If the voltage reading goes up with an induced vacuum leak, the sensor is able to correctly read a lean condition. To check to see if the sensor is capable of reading a rich condition, add some propane to a vacuum port while making sure the voltage goes below 3.3 volts. Since the sensor tested good on both lean and rich conditions, I moved on to testing the MAF sensor.

To perform an MAF sensor test I like to use the EScan scan tool that makes testing the sensor easy. The scan tool has a Sharp Shooter tab that incorporates an easy test feature to test Volumetric Efficiency (VE). In order to perform this test properly all you have to do is input the correct engine size, temperature and elevation. Once the correct information has been typed in, drive the vehicle while depressing the throttle pedal to Wide Open Throttle (WOT) a few times. (Note: Perform this test from a rolling start in first gear, followed by a WOT acceleration through the second gear upshift. Do this in a safe section of road near your shop and always obey local traffic laws in the process.) The tool will display the results based on what the VE table calculations test results currently are compared to the actual results. This is a very accurate and time-saving test that allows me to confirm if I have an induction problem. Problems could be related to a clogged air filter, intake manifold, valve problem including carbon build up and even a clogged exhaust. The tool will graph two lines; the red line is based off the engine size, temperature and evaluation while the yellow line displays the test results. The example **(Figure 1)** displays a lower than acceptable reading along with turbulence on the yellow graph, indicating a clogged exhaust. If the test results were normal the yellow line would be over the red

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line, indicating that the intake system was good.

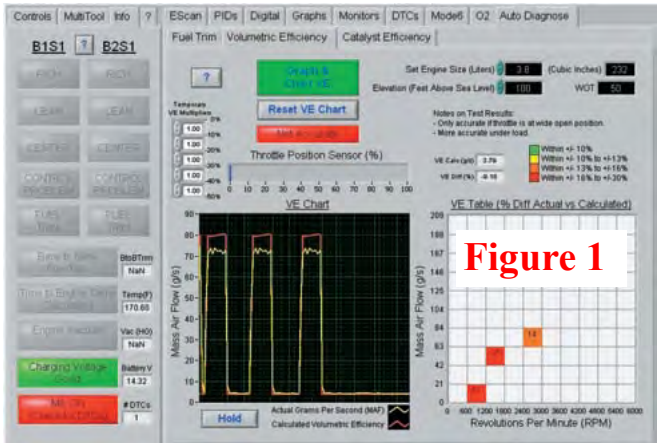

Figure 1

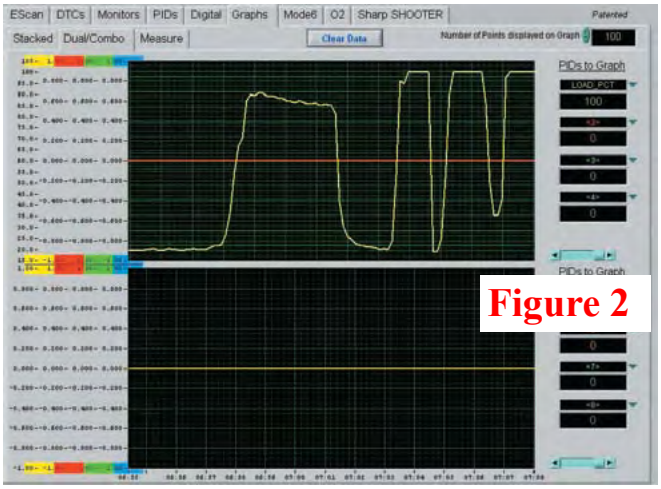

Figure 2

Now if you don't have this tool, don't worry. You can perform a similar test, though not as accurate, by using any Generic/Global OBD II that graphs. Select the Calculated Load Parameter Identifier (PID) from the list and graph it. Once the selection is set up, start the engine and take the vehicle out for a test drive. You will need some clear space so you can depress the throttle pedal to it's WOT limits a few times. For safety reasons, make sure you are in a safe area and that someone else is driving while you are operating and viewing the scan tool test results. After achieving WOT a few times, it's time to view the graphed results of Calculated Load **(Figure 2)**, making sure the graph obtained at least 90 percent at WOT.

a little deeper and do more research. I had completed my visual inspection, scan tool query and checked for Technical Service Bulletins (TSBs), but found nothing that provided information for my P0171. My next step was to check Identifix and iATN to see if there is any information that could assist me in solving this problem. Bingo! Identifix had some good information on the most common problems reported on the 2007 Toyota Camry. It reported the abnormal brake pedal feeling that I had experienced on one of my test drives. The Identifix information stated that sometimes there is a symptom of a hard or harder than normal brake pedal that is caused by a

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few ruptured diaphragm in the brake power booster. The scan tool data on Long Term Fuel Trim in Freeze Frame was at +7, indicating that there was a problem that can be from many different sources. I have come across some Toyotas that had a P0171 due to intake gasket problems, but the DTC usually sets when the engine temperature is cold. The Freeze Frame data indicated that the DTC on this vehicle occurred when the engine was at operating temperature so that ruled that problem out.

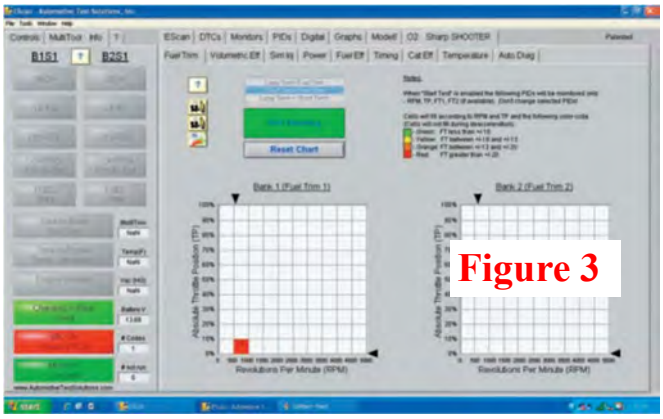
Figure 3


Figure 4

Since I already had the EScan connected to this vehicle, I thought that I would check the fuel trim at idle while I depressed the brake pedal as suggested in Identifix. On the EScan, there is a separate test for fuel trim that is located in the Sharp Shooter tab section **(Figure 3 & 4)** that would allow me to view live results in either Short Term Fuel Trim (STFT) or Long Term Fuel Trim (LTFT) as I depressed the brake pedal. As you can see from the test results on the tool, STFT at idle was high while I was depressing the brake pedal and good when my foot was off the pedal. This vehicle was diagnosed and repaired quickly with a little help from my friends at Identifix and with the replacement of the brake power booster.

Nissan Running Lean

Recently, a 2012 Nissan Altima P0171 came in from another shop that hadal ready diagnosed the vehicle with a P0101 MAF sensor problem. Since this vehicle did not exhibit any driveability problems

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associated with an MAF sensor, the shop made the right decision not replacing the MAF. The tech was sharp enough to avoid a case of tunnel vision and replacing an MAF that had nothing wrong with it. I have seen this shop improve over the years as they have learned not to throw parts at a vehicle and spend more time on research and diagnostics instead. During their preliminary inspection and diagnosis, they found that the MAF should not be replaced before updating the Engine Control Module (ECM) first. They used their service information to search for test procedures and TSBs, and found NTB12-051 for the P0101. This vehicle indeed needed a reflash of the PCM and not the MAF sensor to be replaced. Since this shop does not want to invest the time, money or education in performing reflash/reprograming, they brought the vehicle to me.

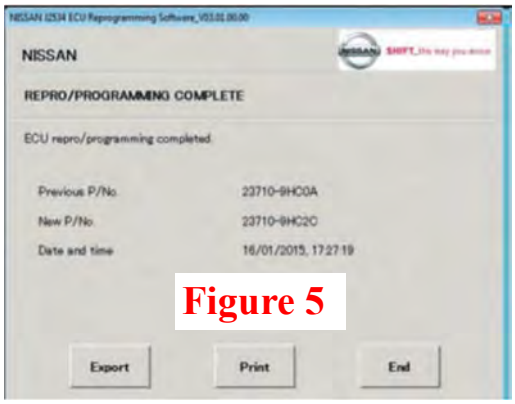

Figure 5

The procedure for reflashing a Nissan vehicle requires a bit more time compared to other vehicles. Since I don't own the Nissan factory tool, I was going to reflash this vehicle using my Drew Tech J2534 box. The procedure for Nissan is a bit different than others since you have to purchase their Nissan ECU Reprogramming Software (NERS) for $270 before purchasing the file needed to reprogram the vehicle. Before reprogramming any vehicle, make sure that the ECM DTCs are cleared, all accessories are off, key fobs other than the one needed to start the vehicle are not in range and most importantly a proper battery maintainer (not a battery jumper pack) is connected to the battery. Do not interrupt the procedure in any way including opening doors, windows, hoods or trunk. Be careful setting up the wiring from the OBD II diagnostic connector to the tool and laptop. On some vehicles during the reprograming procedure, the windows may go up pinching or pulling the wire from the connections. This can lead to bricking a computer and costing you a lot of money.

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The safe thing to do is close the door latch, making it seem to the vehicle that the door is closed followed by connecting the wire to the tool/laptop. The 45-minute reprogramming procedure yielded the proper results, clearing the P0101 DTC **(Figure 5)** and extinguishing the MIL.

Another Misbehaving Nissan

A 2007 Nissan Maxima came in with an illuminated MIL and an idle problem after the vehicle had a throttle body cleaning service. The first step after interviewing the vehicle owner was a visual inspection that yielded no results to the stalling problem. The next logical step is to connect a scan tool to see what DTC(s) is causing the MIL to illuminate. The scan results came up with a P0507 (incorrect idle speed) DTC. I am sure over the years that you have come across an idle problem on Nissan vehicles many times. In some cases there is no illuminated MIL and just a problem with a high idle, making the diagnosis a bit more difficult. Some techs find it very difficult to resolve this problem and get the idle back to normal. Most likely they are only following the procedure that their scan tool displays. If they are not performing a very important step they won't be successful in relearning the idle.

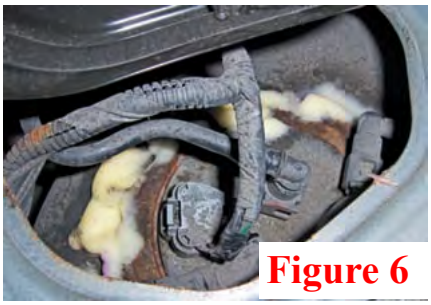

Figure 6

When I am teaching anything about an idle driveability problem on a Nissan, I use an example from Identifix. The suggested procedure is to disconnect one or more fuel injectors. It's always a good idea to turn the key or power button to the off position before unplugging any solenoids/injectors. Depending on whether the engine is a four or six cylinder will make a difference with how many injectors need to be disconnected. I usually disconnect two injectors on a four cylinder and three on a six cylinder.

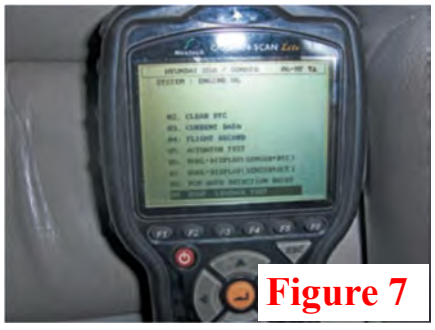

Figure 7

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Since this tank is composite, we ruled out a rust hole in the top of the tank. With the foam on the connectors and around the O-ring and on top of the sending unit we were able to identify the **(Figure 6)** locking ring and gasket was leaking. We installed the new O-ring and locking ring with the special Hyundai fuel tank sending unit tool and retested **(Figure 7)** the system using the Hyundai EVAP test on our scan tool. The customer was happy and drove the vehicle around for a few months and down to Florida.

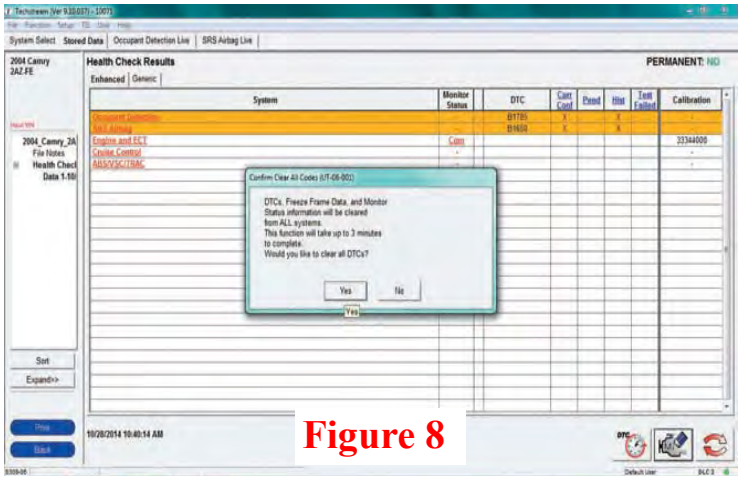

Figure 8

Months had passed by and guess what, the vehicle owner called us up and said his MIL light was back on. We scanned the vehicle and found a P0442 and used the Hyundai EVAP **(Figure 6)** test to confirm the concern was still present. We used the BullsEye tester again and found that this time the fuel pump module had become porous. The leak was coming from the plastic on the **(Figure 7)** fuel pump module. We installed a new fuel pump module and O-ring followed by retesting the system that now passed with flying colors.

I was wondering why there was no smoke coming from the leak area and decided to see if I could determine the reason. As a good practice we baseline our smoke machine before using it so we know the machine is introducing smoke and working properly. We performed this smoke experiment with the fuel sending unit out of the tank while we were flowing smoke into the system. When we looked deep into the tank it seemed that smoke was coming in and being pulled down into the fuel and disappearing. We still love and use our smoke machine, but when we can't find the smoke after resetting the timer button on the machine more than twice we know there is either a leak in the fuel tank or in the canister.

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removed That usually lowers the idle down enough for the idle relearn procedure to start running. After I have been successful in getting the idle lower I follow the procedure on the scan tool and complete the idle relearn. Now the vehicle is back idling normal by just following proper service information.

A Korean Intervention

Our next problem vehicle is a 2007 Hyundai Sonata that came in with a P0442 (EVAP Small Leak Detected) problem. When we encounter a small Evaporative Emissions system (EVAP) leak we know that it's sometimes going to be very difficult to find where the leak is coming from. In the case of this EVAP leak on this Sonata, it may be more difficult than normal to locate the leak. See, we had this Hyundai in before with two EVAP leaks that happened a few months apart from each other. On one occasion, the EVAP leak was very difficult to locate because the leak was barely over 0.020." We were using our normal method to locate the leak by using our smoke machine. The smoke machine was able to show us that the leak was about 0.022" but we could not locate any signs of smoke.

At first we thought that the leak may have been from the charcoal canister, but it was not. We confirmed this by using CO2 along with our smoke machine and gas analyzer. We use this method to look for a rise in CO2, indicating the area of the leak.

As we were moving the gas analyzer probe from the front of the vehicle to the rear we found an area near the upper side of the gas tank where the reading went up. We found dirt and rust on the locking ring of the fuel tank ending unit only after we switched to a new EVAP tool called BullsEye. There was no sign of smoke leaking from this area, but when we used the BullsEye leak detector it went off right at the ring. The next step was to spray on the BullsEye foam that will change color from pink to yellow if a leak is present.

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Toyota SRS

My friend Armine called me about his 2004 Toyota Camry that had an illuminated air bag light on the dash. When he drove the vehicle to the shop, I decided to connect the Toyota Techstream to the vehicle. The following DTCs were stored in the vehicle **(Figure 8)**: B1785 Occupant Detection LH Collision Detection and B1650 SRS Airbag. An attempt by a shop closer to where he lives tried clearing the DTCs, but they came right back. The shop most likely used an aftermarket scan tool that did not have the ability to perform a Zero Point calibration for the B1785. The problem with this DTC was not caused by an accident, but most likely from something heavy that contacted the seat frame. Since there was no damage to the seat frame, I continued diagnosing the B1650 DTC. One way a B1650 can set is if the airbag sensor assembly center receives signals from the Occupant Classification ECU, it determines whether or not the front passenger airbag assembly and the front seat airbag assembly RH should be operated. So after reading the DTC definition in our service information, it seemed like the Zero Calibration would fix both DTCs if the procedure was successful. I performed the procedure successfully, and the vehicle was now fixed. So what caused the problem? Take a look at the rear bumper, **(Figure 9)**. See the two holes? It looks like the bumper was hit by something or hit something hard. Maybe an NYC parallel parking job (I say with a smile)?

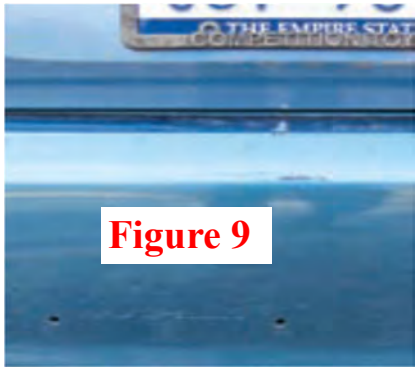

Figure 9

By
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