



Gateway Air Repair

A Newsletter for the Vehicle Repair Industry

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Understanding the maze that is OBDII repair

By Stan Stephenson, Automotive Body Repair News

(Original article appears at <http://www.abrn.com/abrn/article/articleDetail.jsp?id=154403>)

Since its full introduction in 1996 vehicles, on-board diagnostic II (OBDII) systems have completely changed the way technicians must approach emission system diagnostics. On today's vehicles, there are 17 or more separate subsystems being monitored by OBDII. Also, as many as 11 monitored circuits check on the OBDII system's running condition. What was once the "check engine" light has now become a malfunction indicator lamp (MIL).

As the OBDII system runs its checks on these individual monitored circuits, it will illuminate the MIL to advise the driver or technician of the need for service before performance deterioration results in total failure of the system or component in question, hopefully saving money on expensive repairs.

The complexity of problems detected by the OBDII system in late-model vehicles is seldom confined to just one subsystem needing repair. OBDII runs a complex series of algorithms — programmed mathematical comparisons — continuously on some circuits, periodically on others. The system will illuminate the MIL whenever a monitored circuit indicates any of the emissions gases are likely to exceed 150 percent of the design standard.

Dealing with issues of readiness monitors, along with analyzing diagnostic trouble codes (DTCs) and running a drive cycle, all play an important part in turning off that MIL — and keeping it off.

Ensuring the MIL stays off

Even if the MIL is off, there are two problematic issues in OBDII emissions testing today. One is a vehicle's readiness to take a test. The other is in performing a drive cycle to prepare the vehicle for its examination and to provide a quality inspection on the work

performed, which includes a check to ensure the MIL is out and stays out after the repair.

In some states it is required that any vehicle submitted for an OBDII emissions test must be tested as presented — regardless of the MIL's status. If the vehicle fails because the MIL is on and it is not ready to take the test in the first place, repairs must be made up to at least the dollar-value of the waiver limit of that state.

The system's readiness, of course, applies to the OBDII's 11 monitors. Three of these are continuous monitors that run around the clock. The other eight run intermittently. For OBDII-equipped vehicles, most states follow the U.S. Environmental Protection Agency's (EPA) guidance on unset monitors. The rule of thumb is that two monitors can be unset or not ready in 1996 to 2000 model-year vehicles. For 2001 and newer vehicles, only one unset or not ready monitor is acceptable.

Today, many vehicle owners do not understand why their vehicles may not be ready for an emissions test. For the shop owner, the difficulty lies in trying to explain the problem to a motorist who feels his or her vehicle is operating fine. They have a hard time understanding why their car isn't ready to take the test.

But failure to heed an

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Understanding the maze that is OBDII repair

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illuminated MIL because the vehicle seems to operate normally could be costly. In cases where monitors are being unset or are not ready, the MIL will not always light up immediately to alert the owner that something needs to be checked.

Some motorists, and even some technicians, believe that disconnecting the battery for a few seconds will turn off the MIL. What this actually does is cause all the monitors to become unset or not ready. The only thing that will reset the monitors, or at least the ones that were ready, is to perform a drive cycle — a process designed to help the vehicle relearn all of the sensor values. The problem with this is that the chances of performing a successful drive cycle are slim, especially if the vehicle has not been diagnosed and repaired correctly.

The right tools are crucial

An important part of an OBD repair technician's toolbox is the comprehensive drive cycle manual; the only source is published by Motor Manuals. The latest 1996 to 2004 edition contains a little more than 900 individually different drive cycles for the wide range of engines now in use. Contrary to what many technicians believe, there is no generic drive cycle. A technician also needs a reference book that covers all the many DTCs. At last count, there were well over 800 of them, and that number grows each model year.

Unfortunately, there is no indicator that points to exactly which monitors may be either set to ready mode or be unset and not ready. Some late-model vehicles have a driver indication about a state of unreadiness, but there is no indication as to which monitor or monitors are affected. At this point, DTCs will have to be revealed to determine exactly what part of the emissions control system needs to be serviced.

EVAP monitor demands

Today, one of the most difficult areas of OBD control to tackle is the evaporative fuel vapor control system (EVAP). The EVAP monitor's state of unreadiness must be corrected, and getting this monitor to run is proving to be an involved part of OBD technology — so much so that it is creating a need for specialized training on the diagnosis and correction of EVAP problems.

Despite its complexity, the OBDII system's MIL is most often illuminated because of simple stuff: loose connections, a broken wire or, in the case of an EVAP code, probably a loose gas cap. An EVAP monitor check also calls for the fuel tank to be no less than one-quarter and no more than three-quarters full.

As for that gas cap, some drivers simply fail to turn the cap until it clicks three times, causing the MIL to light up. In some very late-model vehicles, the new screw-on gas cap does not click itself into a secure position.

The key: Enabling criteria

Post-repair drive cycles pose their own set of problems. Several steps must be accomplished to satisfy the OEM's specific enabling criteria and achieve a monitor's state of readiness. All these criteria differ from one vehicle manufacturer to another. Even within an OEM's line of vehicles, there is little commonality. So enabling criteria for any given monitor may differ. Therefore, the drive cycle reference guide for that vehicle must be referred to.

While each OEM's procedure is different, let's look at a general example of what could be involved in performing a typical drive cycle. It is important to note that this is not a specific drive cycle, it is just an example of what one may involve.

First, the vehicle should be warmed up to operating temperature, and then accelerated up to a steady speed of about 30 to 35 mph. Next, the vehicle must come to a complete stop without any brake application. After that step is complete, the vehicle should be accelerated to about 50 to 55 mph for a specified number of minutes, and then coast to a stop — with no braking. These steps, when performed correctly, complete the drive cycle, set all monitors to ready and turn off the MIL.

The difficulty with running a drive cycle like this, however, is finding a stretch of road — especially in areas with large populations — to accelerate, cruise and slow down as prescribed. Some believe they can simulate a drive cycle on a two-wheel ASM dynamometer, but others in the industry

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Is Your Customer's Vehicle Ready for OBDII Testing?

By Haskins Hobson, P.E., I/M Team Coordinator

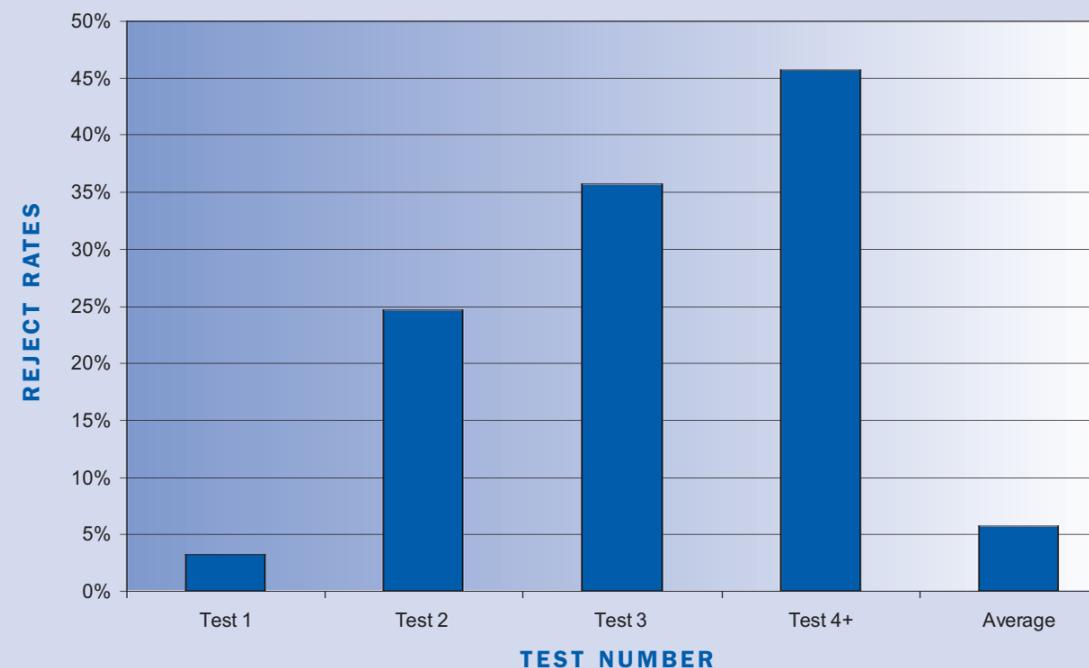
The Department of Natural Resources continues to receive phone calls from motorists asking about why their vehicle received one or more REJECT test results. This will be a frequent question until the majority of motorists have learned about readiness monitors.

The REJECT test result is a new test result for 1996 and newer model year vehicles that indicates the vehicle did not have enough readiness monitors set to be OBDII tested. To prevent a REJECT test result, 1996 to 2000 model year vehicles must have no more than two non-continuous monitors unset, while 2001 and newer model year vehicles must have no more than one non-continuous monitor unset.

Readiness monitors are integral to the functionality of the OBDII system. These monitors ensure that the vehicle's emissions control components are present and functioning as designed. If a monitor is unset, then the integrity of the component that it monitors about cannot be verified and the vehicle cannot pass the OBDII test.

Below is a graph that illustrates the 2006 REJECT rates by test number. The majority of vehicles are ready for their first OBDII test, but the percentage of unready vehicles increases dramatically if they are repaired and retested. *(continued on page 4)*

January - February OBD II Reject Rates by Test Number



Is Your Customer's Vehicle Ready for OBDII Testing?

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As vehicle repair technicians, you can help your customers avoid unnecessary REJECT test results by following one of three paths:

1) After you service a vehicle brought to you with the malfunction indicator light (MIL) or "Check Engine" light on, do not clear the diagnostic trouble codes or extinguish the MIL with a scan tool. In this way, the vehicle's readiness monitors will stay set to ready. Once the monitors see that the repair was effective, the vehicle will turn off the MIL, indicating to your customer that they can have their vehicle retested.

If you do choose this path, then you can save your customers the possibly expensive and time consuming procedure of resetting the vehicle's readiness monitors.

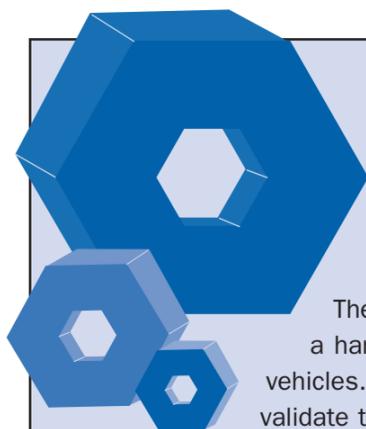
2) After you service a vehicle brought to you with the malfunction indicator light (MIL) or "Check Engine" light on, clear the diagnostic trouble codes and extinguish the MIL with a scan tool. If you do so, you will unset all of the vehicle's non-continuous readiness monitors, and the vehicle will not be ready for its next emissions test. As a result, you will now be responsible for communicating with your customer that the vehicle will not be immediately ready for its next emissions test.

If you do choose this path, you may be responsible for setting all of the vehicle's non-continuous readiness monitors to ready, should the motorist return the vehicle to you after receiving a REJECT test result.

3) After you service a vehicle brought to you with the malfunction indicator light (MIL) or "Check Engine" light on, clear the diagnostic trouble codes and extinguish the MIL with a scan tool. Then, drive the appropriate drive cycle(s) for the vehicle so that the readiness monitors are reset before you return the vehicle to your customer.

If you do choose this path, you will be providing your customers with the most complete OBDII vehicle repair possible.

There are many information resources available to technicians to assist them with setting vehicle readiness monitors, including those that are mentioned elsewhere in the Gateway Air Repair. The department encourages all technicians to access and use this abundance of information to provide the most cost-effective service for your customers. The department is counting on you to prevent a REJECT test result from happening to your customers' vehicles.



OBDII Drive Trace Information Available

Effectively repairing and retesting an OBDII system can be complicated. Clearing all the codes also resets the readiness monitors to "Not Ready." Before retesting can occur, these monitors will require resetting to "Ready," a possibly time consuming process.

The National Center for Vehicle Emissions Control Systems (NCVECS) has available a handy CD that provides NCVECS developed OBDII drive cycles for the majority of vehicles. Performing the specific drive cycle needed allows you, the repair technician, to validate the repair and reset the monitor(s). This leaves all the readiness monitors set, which enhances your customers' ability to acquire a retest and hopefully pass.

The cost for the Drive Trace CD is \$39.95 (plus \$4.50 S/H). To order call (970) 491-7240 or visit www.ncvecs.colostate.edu



Technical Service Providers Needed

The Department of Natural Resources' Air Pollution Control Program (APCP) is seeking repair shops which employ Missouri Recognized Repair Technicians to provide investigative and/or diagnostic services to motorists on behalf of the APCP. The potential work runs the gamut from verifying the repairs made to a vehicle (either by an individual or another repair facility) to performing a complete diagnosis regarding the cause of a continued emissions test failure. If you feel your shop has the interest, the diagnostic equipment and the technical capabilities to accurately diagnose IM240 and/or OBDII emissions test failures, assist citizens in acquiring effective repairs, and to be compensated by the state for

your time and effort, please call Barbara Lee at 314-416-2115 and request a Technical Service Providers contract be sent to you. The APCP cannot guarantee the amount of work you'll receive if you are contracted to be a Technical Service Provider. Vehicle repair work will only be performed by the Technical Service Providers if the motorist pays for the repair. Motorists will be referred to shops within their geographic area, and we are looking for shops throughout the emissions test area. The APCP would like to invite all shops to consider participating.



Hyundai Technical Service Bulletin – 2003 Tiburon

OBD Connector Wire Installation

Technical Service Bulletin 03-01-003-01*

*this TSB supercedes TSB# 03-01-003 to include Underhood Label Instructions

On some 2003 Hyundai Tiburon vehicles, engine control system diagnosis may not be possible when using a generic scan tool (GST) because the OBD connector does not contain the ground circuit necessary for a GST to communicate with the engine control module. Engine control system diagnosis can be performed using the Hi-Scan Pro due to differences between the Hi-Scan Pro and GST.



2003 Hyundai Tiburon

TSB 03-01-003-01 describes the procedure for installing a wire kit to ground the No. 5 OBD connector wire to allow communication with a GST.

Help is a Phone Call (or Click) Away

The following resources are presented for informational purposes only and are not necessarily official productions of the Missouri Department of Natural Resources or the Gateway Clean Air Program. No one affiliated with the Gateway Clean Air Program is responsible for the content or accuracy of any unofficial site listed:

EMISSIONS TESTING INFORMATION

www.gatewaycleanair.com
 Gateway Clean Air Program repair industry
 hotline: 1-888-748-0377
 Gateway Clean Air Program general information
 hotline: 1-888-748-1247
 Missouri Department of Natural Resources:
 (314) 416-2115 - information about Missouri
 Recognized/Qualified Repair Technicians
 (MRRT/MQRT) status and technical assistance.

EMISSIONS REPAIR INFORMATION

Assistance Finding Emissions Parts:
 HELP Smog Parts: 1-800-544-4357
 Brown Recycling: 1-800-367-9271 – for
 information on certified used catalytic converters.
 www.tomco-inc.com or (314) 815-6944

EMISSIONS-RELATED HEALTH INFORMATION

www.lungusa.org
 www.envirosafeshop.com

INDUSTRY SUPPORT

www.iatn.com
 www.asecert.com
 www.acc-online.org
 www.sts.sae.org
 www.theautomotivetechshop.com
 www.carcarecouncil.org

OBDII INFORMATION

www.obdclearinghouse.com
 www.obdiicsu.com
 www.obdii.com
 www.autotap.com
 bob@servicemycar.com (for free OBDII software)

OBDII OEM TECHNICAL WEB SITES

Below is a list of Original Equipment Manufacturer's Technical Web sites that can possibly provide useful information. The information on these Web sites can help increase your successful OBDII repair rate and should be part of your toolbox. Please note that there is a **fee** required to visit the majority of these sites.

ACURA – www.ServiceExpress.Honda.com – \$500 per year, \$20 per 72 hours, \$50 per 30 days (the 30 day option will automatically renew)

BAVARIAN MOTOR WORKS (BMW) –
 www.bmwtechinfo.com – \$2500 per year, \$300 per month, \$25 per day

CHRYSLER GROUP – http://www.techauthority.com - \$1500 per year, \$200 per 300 days, \$20 per day

FORD – http://motorcraftservice.com – \$2499.95 per year, \$19.95 per 72 hour – *OBdII Theory and Operation – FREE OF CHARGE*

GENERAL MOTORS – www.acdelcotechconnect.com – \$1200 per year, \$20 per day

HYUNDAI- www.hmaservice.com – FREE

INFINITI – www.nissantechinfo.com – \$2499.98 per year, \$299.98 per 30 day, \$19.99 per day

ISUZU – www.isuzutechinfo.com – \$1650 per year, \$150 per 30 day, \$20 per day

KIA – www.kiatechinfo.com – \$299 per year, \$29 per month, \$19.00 per week, \$10 for three days

LEXUS – http://techinfo.toyota.com – \$350 per year, \$50 per month, \$10 per day

MAZDA – www.mazdatechinfo.com – \$1500 per year, \$900 per six months, \$199.95 per 30 day, \$19.95 per day

OBDII OEM TECHNICAL WEB SITES (cont.)

MINI – www.minitechinfo.com – \$2500 per year, \$300 per 30 days, \$25 per day

NISSAN – www.nissantechinfo.com – \$2499.98 per year, \$299.98 per 30 days, \$19.99 per day

PORSCHE – http://techinfo.porsche.com – \$5200 per year, \$110 per day, document search is free

SAAB – www.saabtechinfo.com - \$500 per year, \$180 per three months, \$175 per month, \$10 per day

SUBARU – http://saabtechinfo.com - \$2499.95 per year, \$19.95 per day

TOYOTA – http://techinfo.toyota.com – \$350 per year, \$50 per month, \$10 per day

VOLVO – www.volvotechinfo.com - \$3225 per year, \$322.50 per 31 days, \$49.50 per 72 hours

TRAINING and RESOURCES

www.theautochannel.com
 www.aspireinc.com or 1-800-247-1099
 www.caat.org
 www.ccar-greenlink.org
 www.sts.sae.org
 www.secondchancegarage.com
 www.autoed.com
 www.beyondparts.com
 www.fuelline.com
 www.fedworld.gov/pub/auto/auto.htm
 www.aera.org
 www.apra.org
 www.autoshop101.com
 www.toolsforeducation.com
 www.bergwall.com
 www.diagnostichotline.com
 www.learntofixcars.com
 www.asetestprep.com
 www.asecert.org
 www.allexperts.com
 www.asld.com
 www.smogfree.com
 www.car-sound.com
 www.mad-mechanic.com
 www.carleysoftware.com
 www.aecc.be

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Gateway Air Repair

PO Box 1034
 St. Charles, MO 63302-1034

Special Delivery

If you would like to receive the Gateway Air Repair at your home address instead of your workplace, please complete the information sheet on the back of this issue, checking the "new address" box and mail to: **Gateway Air Repair, Attn: Robert Arrol, PO Box 1034, St. Charles, MO 63302** or e-mail information directly to **rob.arrol@esph.com**. If you would like to receive future Gateway Air Repairs electronically by e-mail, contact Rob Arrol with your request and e-mail address.

Training and Special Events



The following is a list of known training available in the St. Louis area. This information is for reference only and is neither endorsed nor sponsored by the Gateway Clean Air Program. To find out what training is currently being offered, please contact any of the training providers listed below. Training providers that accept the \$50.00 (fifty-dollar) MRRT Training Voucher are noted. Please contact trainers to confirm dates, course costs, and to arrange payment.

[CARQUEST](#)

The trainer is Lou Nelson. For more information, contact Chris Chesney at (919) 573-3342 or Mike Mulcahy at (314) 566-4303. Courses are held at 800 N. 17th St., St. Louis, MO 63106. The MRRT Training Voucher is accepted. Verify course desired is MRRT approved.

[Design Technology, Inc. \(DTI\)](#)

The trainer is Lou Craven. For information on training offered by DTI, call (636) 939-5670 or fax (636) 477-9093. The MRRT Training Voucher is accepted. Verify course desired is MRRT approved.

[Federal Mogul](#)

Training Course Information: 1-888-771-6005
Web site: www.federal-mogul.com/training
Contact: Thomas Martin (314) 977-0798;
fax (314) 512-8398

Diagnostic Line: 1-900-486-0400 or 1-866-265-4170 (\$3.95/min.)

The MRRT Training Voucher is accepted. Courses TEC301, TEC304, TEC306 & TEC307 are MRRT Approved

Technical Information / Bulletins: 1-888-819-5681 (no charge)

[Federal Mogul \(cont.\)](#)

[TEC301 Automotive Electronics](#)

Workshop Length: 2 1/2 days (20 hours),
2 CEU's Awarded — \$479 (with hotel room),
\$330 (without hotel)

- This workshop will familiarize the technician with electricity and electronics, from the fundamentals to complex automotive circuits.

Dates (contact trainer for times):

- Session 603 – March 20-22
- Session 604 – July 17-19
- Session 606 – August 28-30
- Session 607 – November 6-8

[TEC304 Domestic Drivability](#)

Workshop Length: 2 1/2 days (20 hours),
2 CEU's Awarded — \$549 (with hotel room),
\$400 (without hotel)

Designed specifically to keep technicians current on changing vehicle management systems for domestic vehicles. Engine controls and components are reviewed as they relate to OBD I & II. Dates (contact trainer for times):

- Session 602 – March 13-15
- Session 603 – May 3-5
- Session 604 – July 19-21
- Session 605 – August 7-9
- Session 606 – September 20-22
- Session 608 – November 8-10
- Session 610 – December 18-20

[Federal Mogul \(cont.\)](#)

[TEC306 Fuel and Ignition Systems Diagnostics](#)

Workshop Length: 2 1/2 days (20 hours),
2 CEU's Awarded — \$549 (with hotel room),
\$400 (without hotel)

- This workshop is designed for technicians servicing drivability, emission and tune-up repair on today's vehicles. Practical instruction focuses on the fuel delivery and ignition systems that are essential knowledge for technicians.

Dates (contact trainer for times):

- Session 601 – March 22-24
- Session 603 – May 1-3
- Session 605 – September 18-20
- Session 607 – November 13-15

[TEC307 Advanced Drivability](#)

Workshop Length: 2 days (16 hours),
1.6 CEU's Awarded — \$439 (with hotel room),
\$340 (without hotel)

- This workshop will concentrate on advanced drivability problems encountered on late model vehicles. Students will learn the function and purpose of engine management systems.

Dates (contact trainer for times):

- Session 601 – March 15-17
- Session 603 – August 9-11
- Session 604 – November 15-17
- Session 607 – December 20-22

[St. Louis Community College at Forest Park](#)

The trainers are Angelo Vitullo and Bob Weil. Contact Angelo at (314) 951-9420 for additional details. To register by phone or for payment by credit card, call Andrea at (314) 539-5341 or (314) 644-9287. All courses are held at St. Louis Community College at Forest Park at 5600 Oakland Ave., St. Louis, MO. MRRT Training Vouchers are not accepted.

[Automotive Service Excellence \(ASE\) Test Prep L1](#)

Crash Course: 4-hour course/one night. All nights 6-10 p.m. This course is not approved for MRRT continuing education. Cost = \$75.00.

- May 1

[Automotive Oscilloscopes and Emissions](#)

Diagnostics: 9-hour course/three nights. All nights 6-9 p.m. This course is approved for MRRT continuing education. Cost = \$100.00.

- March 28, 30 and April 4
- May 18, 23 and 25
- June 19, 21 and 26
- July 19, 24 and 26

[Carbureted Vehicle I/M Failures and Current Topics](#)

Dealing with GCAP Program: 4-hour course/one night. All nights 6-10 p.m. This course is approved for MRRT continuing education. Cost = \$50.00.

- March 6
- March 21
- April 6
- May 22
- June 15
- July 13

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Area Trainers!

Are you currently offering automotive repair training in the St. Louis area? If so, please contact the Gateway Clean Air Program to be included in future issues of the Gateway Air Repair. Please include a detailed description of your course, including topics covered, dates, costs and location. Notices may be sent to Robert Arrol at rob.arrol@esph.com or faxed to (314) 739-2901. If the training is emissions-related and you would like it evaluated as a continuing education course offered to all Missouri Recognized Repair Technicians, please contact the Missouri Department of Natural Resources at (314) 416-2115.



ARTICLES WANTED

The Gateway Clean Air Program wants to continue to bring readers pertinent repair information.

If you have an idea for an article, or have a topic you would like discussed in a future issue, please contact Robert Arrol by fax at (314) 739-2901 or e-mail at rob.arrol@esph.com.

St. Louis Community College at Forest Park (cont.)

Evaporative Emissions System Course: 6-hour course/two nights: 6-hour course/two nights. All nights 6-9 p.m. This course is approved for MRRT continuing education. Cost = \$75.00.

- March 7 and 9
- April 24 and 26
- June 20 and 22
- July 25 and 27

Internet Resources, Electronic Information Systems, Computer Reprogramming: 4-hour course/one night. All nights 6-10 p.m. This course is approved for MRRT continuing education. Investigate three areas of interest: Electronic Information Systems, usage of popular PC software and the Internet to facilitate organization and communication of technical information and Reprogramming of Vehicle Computers. Cost = \$50.00.

- March 23
- April 10
- May 17
- June 14
- July 18

MRRT/GCAP Course: 4-hour course/one night. All nights 6-10 p.m. This course is not approved for MRRT continuing education. Cost = \$50.00.

- March 1
- March 22
- April 5
- April 19
- May 3
- May 24
- June 7
- June 28
- July 12

OBDII and 5 Gas Exhaust Analysis: 4-hour course/one night. All nights 6-10 p.m. This course is approved for MRRT continuing education. Cost = \$50.00.

- March 2
- March 29
- April 3
- April 17
- May 10
- May 30
- June 12
- June 29



Understanding the maze that is OBDII repair (continued from page 2)

say it just isn't possible. A drive cycle could be performed on a four-wheel dyno if the operator follows the OEM's prescribed routine exactly, but it is often difficult to do.

One late-model General Motors 3.6-liter V6 engine is not so easy to run through a drive cycle. This particular engine may have to go through as many as three cold-soak routines over a couple of days in order to accomplish its specified drive cycle.

No easy way out

For virtually all drive cycles, the automakers' instructions state that two people should take the vehicle on a checkout run: one to drive the vehicle, and the other to read the drive cycle instructions. This recommendation is designed to cover any questions of subsequent liability.

Of course, the shop owner is forced to wonder how much he or she should charge to perform a drive cycle, especially if two techs have to make the run as recommended by the OEM. Everyone knows diagnostic time is not cheap, nor is shop labor.

Some shop owners believe they can ease the complexity of running a drive cycle by providing the vehicle owner with a copy of the vehicle's drive cycle, with the expectation that they'll carry it out. Bad idea. If the vehicle owner has

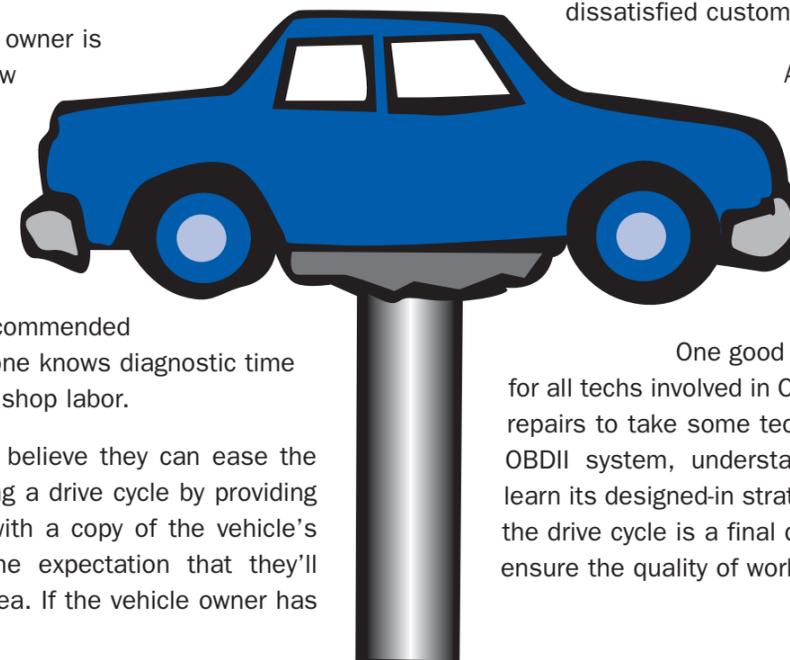
an accident because he or she was reading the instructions a shop owner gave them instead of paying attention to traffic, that shop could be liable.

A change of thinking

Perhaps emissions testers/repair shop owners need to accept the reality that running a drive cycle, though time-consuming and complicated, is a normal part of an OBD emissions repair. And it should be listed and billed as such on the work order.

However, some shop owners rely on telling the vehicle owner to drive the vehicle normally for the next three or four days in the hope the repair was done correctly and the MIL both goes out and stays out on its own.

But if that MIL lights up and comes back in for another check, then a technician must re-check all the monitors, pull codes to determine what really is wrong and run another drive cycle in an attempt to satisfy a dissatisfied customer.



As you can see, the odds for a less-than-perfect late-model emissions repair have now been raised for everyone.

One good defense mechanism is for all techs involved in OBDII-related emissions repairs to take some technology training in the OBDII system, understand how it works and learn its designed-in strategies. And remember, the drive cycle is a final quality control check to ensure the quality of work.

Stan Stephenson is a former editorial director of Automotive Body Repair News (ABRN). He was awarded the Auto Body Association of America (ABAA) Go Tiger Award in 1971, and he holds a 1985 Distinguished Service Citation from the Automotive Hall of Fame. He is now a consultant on industry issues and future technology developments.

Gateway Air Repair
PO Box 1034
St. Charles, MO 63302-1034

PLEASE POST. Please pass on to any Missouri Recognized/Qualified Repair Technicians working at this address.

Count Me In!

I'd like more information about the Gateway Clean Air Program!

Please Print

Name _____ Technician ID Number _____

Company Name _____ Facility ID Number _____

Address _____

City, State, Zip _____

Phone _____ E-mail Address _____

I'd like to receive the *Gateway Air Repair* electronically.

I'd like to receive future issues at home.

Please change or correct my address.

I am interested in:

Send me OBDII brochures

Training opportunities

More information on becoming a Missouri Recognized Repair Technician or a Missouri Qualified Repair Technician

