

OBD

Technical Training Resources & Opportunities

Session Facilitator:

Mary Jane Rutkowski – [Maryland Dept. of Environment](#)

Session Presenters:

John Cabaniss – [AIAM](#)

Mark Saxonberg – [Toyota](#)

Lorin Munsee – [Toyota](#)

Chuck Gee – [Center for Automotive Science & Technology @ Weber State University](#)

[Link to
OBD 2K2
Conference
web page](#)

Training Factors & Issues: The Big Picture

John Cabaniss
AIAM

- The M side of I/M Provides the AQ Benefit
- OBD I/M is No Different
- Training is Key Element of Proper M

- NASTF standing committee on training
- Not just an emissions issue

- Training Needed for Technicians
- Also for Service Writers & Others Dealing with Customers
- Take Care NOT to Undermine Consumer's Respect for I/M Program or OBD System

Changing Nature of Training

- Classroom Elements Still Needed
- Just-in-Time Refresher is Often Key
- The Future is On-Line Access

Problem #1

- Consumers Often Don't Value Quality Shops
- Constant Consumer Education & Awareness Needed

Problem #2

- Consumers Often Confused About Extended Maintenance Intervals for Some Items on New Vehicles
- Again – Consumer Education & Awareness Needed

Problem #3

- Shops and Techs Need Incentives For Training
- Recognition, Certification, Performance Score Cards, etc. are Needed

Problem #4

- Local Community Colleges/Technical Schools Need Help Organizing Non-Dealer Training
- OEs use Local Schools for Dealership Training
- Same Materials, Training Aids, & Props can be used for Non-dealer Training
- No Need to Re-Invent the Wheel

- Key is Working Together to Find Solutions
- NASTF is Working at the National Level
- Focusing on Generic/Common Training Model
- Pilot & then Transfer the Success

- Working Together Important at Local Level, too
- State Involvement Needed as Facilitator but Not Necessarily the Lead
- Local ASA, STS or Similar Group can Spearhead
- Local Instructors Working Together to Share Information

Bottom Line

- Need Public Education and Awareness Efforts on M, too
- Need Organized Efforts Locally to Address Training Needs Involving State Officials, Service Industry, Schools, and Instructors

OBD Public Awareness & Service Personnel Technical Training

- Public Awareness resources available from many places (with more each day):
 - [Center for Automotive Science & Technology @ WSU](#)
 - [EPA](#)
 - [Individual State sites – easily accessed through the OBD Clearinghouse](#)
- Applicable Customer Service Personnel Training
 - Service Manager/Advisor and others dealing with driving public have need of general OBD knowledge for customer education (customer vehicle Rejected from OBD I/M testing, etc.)
 - OBD I/M Lane Inspector Training
 - Diagnostic/Repair technicians require thoroughly detailed OBD Repair Training for effective service

Chuck Gee

CAST@WSU

- To help solve problems #1 & #2 (listed previously) consumer education using accurate information will need to take place at many levels including testing and repair facilities . This requires those individuals that interface with the customer be knowledgeable of OBD systems and general operational characteristics. Customer confidence in OBD I/M testing and on-vehicle system operation is vital for a successful I/M program.
- OBD I/M Lane Inspectors must be able to perform the I/M test procedure in the correct sequence to avoid false fails or passes of the OBD I/M test.
- Service repair personnel must be able to effectively diagnose and repair OBD vehicles.

Elements of a Service Manager/Advisor or other Customer Service Personnel OBD Training Program

- Introduction to OBD technology
- Basic terminology
- MIL
 - Appearance
 - Location
 - Operation during KOEO and KOER

- An executive overview of OBD technology and it's history helps build confidence in OBD systems and I/M program.
- Correct MIL information is essential for correct driving public response when the MIL illuminates.

Elements of a Service Manager/Advisor or other Customer Service Personnel OBD Training Program (continued)

- Readiness Codes
 - Purpose
 - Operation
 - Not Ready
 - Ready
- Introductory monitoring requirements & strategies

- Accurate information regarding Readiness Codes is essential for confidence in the OBD system and OBD I/M test.
- A familiarization of each emission control system and related monitoring requirements/strategies will enhance communication between service personnel and the driving public, specifically regarding vehicles that are rejected from the OBD I/M test due to too many Readiness Codes “Not Ready”.

Elements of a Service Manager/Advisor or other Customer Service Personnel OBD Training Program (continued)

- DTC five digit alpha-numeric format
 - Standardized
 - Manufacturer specific
- Related Worksheet/VIR generation and discussion

- DTC five digit alpha-numeric format and position related details information explains why DTCs may appear on VIR's with and without associated description.
- Service personnel should be familiar with VIR and related information for customer assistance.

Elements of an OBD I/M Lane Inspector Training Program

- Malfunction Indicator Lamp
 - Appearance
 - Location
 - Operation during KOEO and KOER
 - MIL Command parameter KOEO and KOER (to understand importance of completing the test procedure in the correct order)
- Results of the OBD I/M test based on MIL operation (PASS/FAIL)

•MIL details should be thoroughly covered due to the MIL's involvement with the OBD I/M test PASS/FAIL determination.

Elements of an OBD I/M Lane Inspector Training Program (continued)

- Diagnostic Link Connector
 - Appearance
 - Locations
- Results of the OBD I/M test based on DLC availability and related circuitry functionality (this varies based on individual State Procedures; example: Maryland currently allows the vehicle to be passed or failed based on MIL only if DLC is not able to be found or is obstructed)

•DLC details are an important part of any OBD training, since it plays a key role in accessing on-board information for OBD I/M testing and for diagnosis/repair work.

Elements of an OBD I/M Lane Inspector Training Program (continued)

- Readiness Codes (optional information, to used to enhance the Inspector's understanding of the OBD system operation and to be able to explain the difference between OBD I/M test results of REJECTED and FAILED)
 - Purpose
 - Operation
 - Not Ready
 - Ready

•General Readiness Code information may be covered but as an enhancement to the core elements required of lane inspector training

Elements of an OBD I/M Lane Inspector Training Program (continued)

- Diagnostic Trouble Codes (optional information, to be used to enhance Inspector's understanding of variations in displayed DTC information on VIR)
 - Structure
 - 5 digit alphanumeric format
 - Standardized
 - Manufacturer specific

•DTCs may be covered in a general discussion to help the lane inspector understand where there are differences in how DTCs are displayed on the Vehicle Information Report (VIR)

Elements of an OBD I/M Lane Inspector Training Program (continued)

- Demonstration of OBD I/M test procedure
- Lane Inspector worksheet
 - May be used for final certification of Inspector (if applicable)

- The OBD I/M test procedure should be demonstrated in class for everyone to see what is involved in the test procedure. Each step should be reviewed with emphasis on avoiding common mistakes such as establishing communication before the engine is running.
- A separate worksheet should be completed by each Inspector. This could be done in groups or as individuals depending on hardware (OBD I/M test equipment and vehicles) availability and final certification requirements.

Elements of an OBD Repair Training Program

- Basic Requirements of OBD Systems
- Definitions of Unique OBD Terminology
- Malfunction Indicator Lamp (MIL)
 - Associated Details:
 - Purpose
 - Appearance
 - General Location
 - Operation
 - Role in OBD I/M test procedure
 - Verification of proper operation prior to releasing vehicle for retest if initial I/M test failure was due to improper MIL operation
 - Related on-vehicle exercises

•A basic understanding of what the OBD system is required to do is important to avoid misunderstanding and false expectations. Note: Since OBD requirements apply to all vehicle manufacturers, many training elements are common between OEMs or variations that exist are easily accommodated.

•Certain terms such as Monitors; continuous & non-continuous should be defined for proper understanding of information displayed on scan tools.

•MIL details should be thoroughly covered. All aspects of the MIL is important for the service repair technician due to the MIL's involvement with the OBD I/M test PASS/FAIL determination.

Elements of an OBD Repair Training Program (continued)

- Diagnostic Link Connector (DLC)
 - Associated Details
 - Purpose
 - Appearance
 - Location
 - Standardized Terminals
 - Serial Data Communication Faults
 - Role in OBD I/M test
 - Related on-vehicle exercises

•DLC details are an important part of any OBD training, since it plays a key role in accessing on-board information for OBD I/M testing and for diagnosis/repair work.

Elements of an OBD Repair Training Program (continued)

- Scan Tool Capabilities and Operation
 - Data
 - Inputs
 - Outputs
 - Calculated Values
 - Readiness Codes
 - MIL Command
 - DTCs
 - Viewing Confirmed DTCs
 - Viewing Pending DTCs
 - Clearing
 - Bi-Directional Functions
 - Demonstration of Scan Tool operation and use
 - Related on-vehicle exercises

•Scan Tools are essential for OBD system diagnosis. Familiarization with OBD scan tool capabilities is critical for efficient diagnosis, repair and repair validation.

Elements of an OBD Repair Training Program (continued)

- Readiness Codes
 - Associated Details
 - Purpose
 - Operation
 - Emission control system monitors with Readiness Codes
 - Role in OBD I/M test procedure for vehicle Readiness Status determination prior to releasing vehicle for retest if initial rejection was due to too many Readiness Codes Not Ready
 - Role in repair validation
 - Demonstration of Readiness Code operation and use
 - Related on-vehicle exercises

•Readiness Code details should be thoroughly covered. All aspects of Readiness Codes are important for the service repair technician due to the Readiness Codes involvement with repair validation and OBD I/M test REJECTION/CONTINUE determination.

Elements of an OBD Repair Training Program (continued)

- Diagnostic Trouble Codes
 - Associated Details
 - Structure
 - 5 digit alphanumeric format
 - Types
 - Single Trip
 - Two Trip
 - Operation
 - Confirmed
 - Pending
 - Demonstration of DTC operation and use
 - Related on-vehicle exercises

•DTCs need to be thoroughly discussed and demonstrated for complete understanding of this information and how it applies to the diagnostic and repair/repair validation processes.

Elements of an OBD Repair Training Program (continued)

- Stored Engine Conditions (Freeze Frame)
 - Associated Details
 - Purpose
 - Operation
 - Use in fault verification and repair validation
 - Demonstration of Freeze Frame operation and use
 - Related on-vehicle exercises

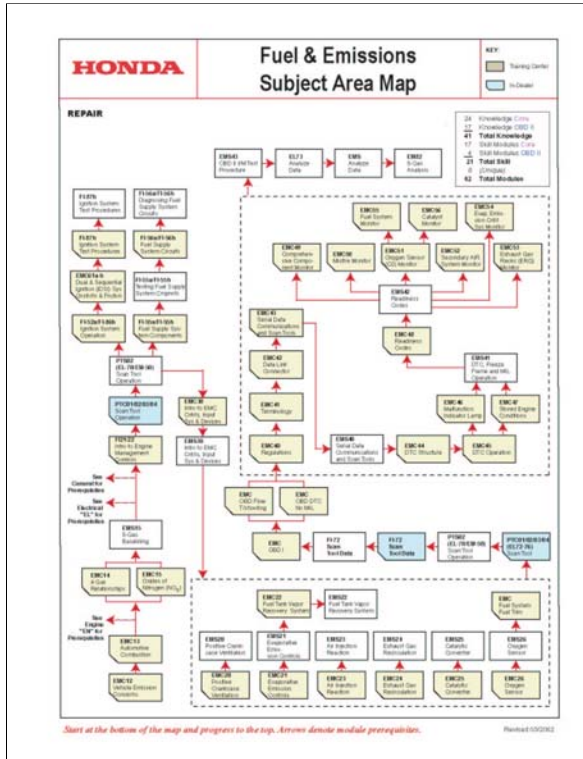
•Freeze Frame Memory should be detailed to help ensure fault identification and repair validation is as effective as possible.

Elements of an OBD Repair Training Program (continued)

- Emission Control Systems and Monitors*
 - Related tests (general and specific)
 - Required enable criteria (general and specific)
 - Related on-vehicle exercises (general and specific)
 - Diagnostic Strategy for Fault Identification, Repair and Repair Verification
 - Where to start with the diagnostic process
 - DTC hierarchy
 - Repair Verification using Readiness Codes and DTCs
- * Note: Although monitoring requirements apply to all OEMs, monitoring strategies vary considerably and OEM specific information enhances training. Efforts are underway to make available OEM specific training programs to repair community.

•Emission Control Systems and related monitors are covered to increase awareness of what type of on-board testing is done and generally when testing is done. Although monitoring requirements apply to all OEMs, monitoring strategies vary considerably and OEM specific information enhances training. Efforts are underway to make available OEM specific training programs to repair community.

•A key item of OBD systems is it's ability to be used as a resource for repair verification. The repair technician should be able to use the OBD system to ensure repairs are effective.



OEM OBD Training Programs

Each rectangle represents either a self-study or skills (on-vehicle) module.

General time average per module is 1 hour.

With prerequisite modules, approx. 112 hrs

Courtesy of American Honda

- OEM OBD Training Programs
 - Honda Course Map including Fuel & Emissions Pre-requisite training
 - Other related pre-requisite training is also identified

OEM
 OBD
 Training
 Programs
 (continued)

Courtesy of
 DaimlerChrysler
 Corporation

2002 Course
 Catalog

2002 TECHNICAL TRAINING COURSE CATALOG
 TECHNICAL TRAINING SKILL CORE CURRICULUM
 AREA #8 / ENGINE PERFORMANCE

Approximately 120 hours
 for OBD training
 (including prerequisites)

8 hours in Training Center

8 hours self study CBT

16 hours in Training Center

8 hours self study CBT

16 hours in Training Center

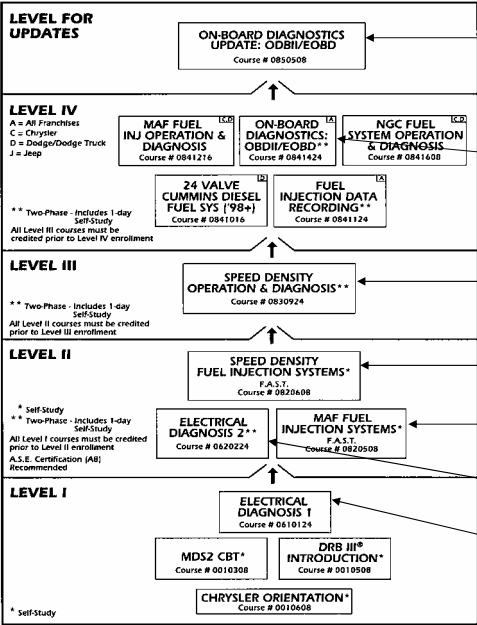
Self-Study CD-ROM

Self-Study CD-ROM

8 hours self study CBT

16 hours in Training Center

24 hours in Training Center



- OEM OBD Training Programs
- DaimlerChrysler Course Map including Pre-requisite training

DaimlerChrysler

WHAT'S NEW FOR 2002

Yearly OBD Update

As part of our commitment to help our technicians stay current with "the leading edge of technology," DaimlerChrysler Academy will be releasing a brand new On-Board Diagnostic Update* on a yearly basis. Technicians will be required to re-certify annually to maintain their OBD certification credentials.

Courtesy of
DaimlerChrysler
Corporation

2002 Course
Catalog

DaimlerChrysler commitment for yearly updates to OBD training

OEM OBD Training Programs (continued)

Courtesy of DaimlerChrysler Corporation
2002 Course Catalog

ON-BOARD DIAGNOSTICS: OBD II/EOBD

COURSE NUMBER: 0841424
 LENGTH: 1 day (8 hours) self-study CBT plus 2 days (16 hours) In-center
 SKILL CATEGORY: 8
 CORE LEVEL: 4
 PREREQUISITE(S): Level I, Level II and Level III
 SKILLS REQUIRED: Significant proficiency with engine performance-related diagnostics and repair

COURSE DESCRIPTION

This advanced two-phase course will give the technician the knowledge and skills that are required to successfully diagnose and repair Chrysler Group vehicles equipped with the Second-Generation of On-Board Diagnostics (OBD II), including successful diagnosis, repair and verification of all OBD monitors (misfire, fuel system monitor, LDP and the brand new Natural Vacuum Leak Detection system, etc.).

The first phase consists of a self-study, interactive Computer-Based Training (CBT) program and a Pre-course Student Workbook. The CBT provides essential knowledge required to understand the operation of the OBD system. The Pre-Course Student Workbook guides your practice of diagnostic skills in preparation of the second phase of the course, a 2 day, instructor-led in-center session.

OBJECTIVES

After completing the se

- Diagnose and ve
- Tap into the pow
- benchmark in s
- Perform in-dept
- Verify your repa
- Analyze the res

% of time "hands-on"
• 50

* European On-Board I

OBJECTIVES

After completing the second-phase of this course, a technician will be able to:

- Diagnose and verify OBD-related repairs
- Tap into the power and capabilities of the DRB III® that make it the industry benchmark in scan tools
- Perform in-depth analysis of OBD data, utilizing each OBD-related DRB III® screen
- Verify your repairs by utilizing the DRB III® Pre-test screens to run the OBD monitors
- Analyze the results of the OBD monitors on the DRB III® "Last Results" screens

% of time "hands-on"

- 50

Featured vehicles

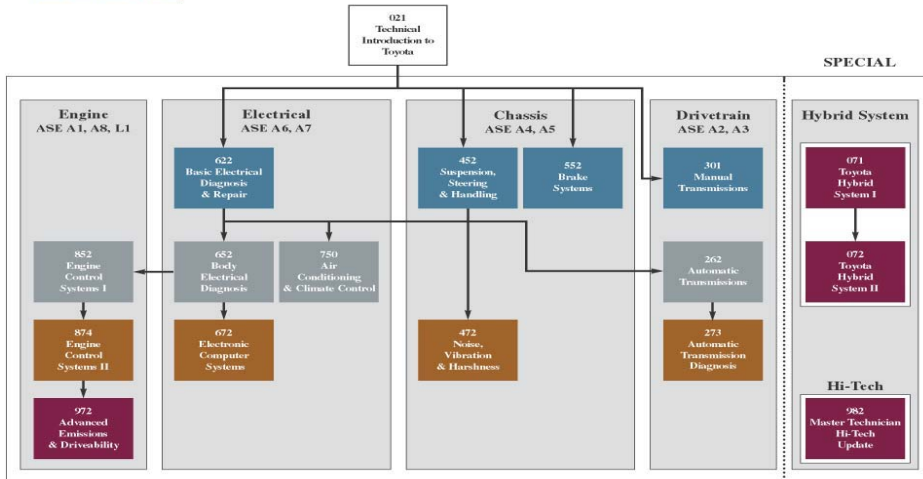
- OBD II or EOBD* equipped vehicles

Important tools and testing

- DRB III®
- MDS2
- DMM
- Lab Scope
- Service and Diagnostic Information

DaimlerChrysler OBD Course Description and Objectives

Technician Course of Study



Where Does Training Fit In?

- Training is the foundation, every good building starts with one
- Techs do not service cars with knowledge and skills alone, you can't know how to go through 30 diagnostic routines on 8 vehicle sub-systems
- Information when and where needed

Technical training is the foundation upon which good diagnosis and repair is built. Without it, success is unlikely. But classroom and lab training is not a panacea. Cars are very complicated and nearly every model is a different variation of another. To further complicated things for technicians, the industry changes things, often significantly, every several years.

Technicians do not, and cannot service cars with knowledge and skills alone. It is impossible to simply remember how to go through 40 different diagnostic routines on 8 different sub-systems on 18 different models (that's just Toyota and Lexus). Furthermore, there isn't enough time in a year to train on every one of these routines. And even if the training contact time were available to do so, imagine a technician trying to remember a complicated subsystem, and an equally complicated diagnostic procedure the was learned a year ago??

So, what does a technician do in this ever increasingly complex world? The answer is master the fundamentals through training and provide a technician with more detailed information, targeted at the specific repair, when and where it is needed.

The near future, JIT

- Service information and procedures will be seconds away from techs when and where the car is diagnosed and repaired
- Techs won't be expected to recall everything learned in class, JIT will help "jog their memory"

Up until recently, a shop that serviced several makes and models of cars had to keep a room full of books, updated annually, to hope to have the information necessary to successfully diagnose even simple problems. And, if the book for the particular vehicle and subsystem wasn't there, it was at least 24 hours and a hundred dollars away. Today, this is all changing.

With service information on the internet, maintained and served up from a central server, every technician in the nation can have access to all of the information necessary to fix the car, swiftly and accurately. And the information is always up to date, and easy to search through. We are about to experience an entirely new paradigm in auto repair where information is just a few seconds and a few dollars away. And, as these on line service information systems evolve, more and more resources will be available, Just In Time.

Technicians will no longer have to rely on memory, search for the latest CD, find a book that Bubba borrowed and took home, or shoot from the hip. In the near future, technicians will be able to get procedures at the point of repair and get some training refreshment, JIT.

Imagine being able to give your self a three minute refresher on how ??
Show video during demo? 98 Supra Variable Valve Timing

The longer term, JIT+

- Techs will supplement their formal “fundamentals” education with JIT information like video snippets and training manual excerpts
- Targeted service information will be assembled for techs without having to “mine” for it
- Information will be automatically sorted based on vehicle and symptom

For the longer term, say over the course of the next 3 to 5 years, technicians will find it easier and easier to get the information they need at the point of repair. Wireless tablets will communicate with the vehicle for serial data and with the shop's local area network for service and Just In Time Training information like video snippets and technical training manual excerpts.

In the not too distant future, searching for information will become easier and easier and technicians will be able to find the information they need for a specific diagnosis or repair without having to “mine” for it.

And in a little further out into the “not too distant future”, technicians will be able to access information as easily as telling the diagnostic system what the vehicle and the symptom is, and the system will return all of the information necessary to diagnose and repair, including links to just in time training and an option to filter the information based on skill level.

What's Here Today (almost)

- OBDII Information on IATN
 - GM
 - Ford
 - Toyota
- Toyota's TIS website

So, what is here today that is empowering technicians to do a better job? Well for starters, IATN hosts an outstanding resource for technicians. In the IATN technical resources, GM, Ford and Toyota all have some great OBDII information easily accessible for reference.

I would like to do a short demonstration now showing you what is possible today from any shop with a PC and connection to the Internet.

First, I would like to show you Toyota's OBDII information on the IATN site, then, I would like to demonstrate some of the features of the Toyota's TIS system on the public internet.