

Heavy Duty Diesel Vehicle Inspection and Maintenance (HDDVIMWG) Presentation by HEM Data



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Rick Walter

HD-OBD Standard

- Defined by CARB, implemented using SAE J1939 & J1979
- Phased in during 2013 – 2015 MY for vehicles > 14,000 lbs.
- Intended for inspection and maintenance
 - Monitors performance of emission control systems
 - Reports malfunctions and diagnostic information for repairs
- Many key OBD parameters reported during 2010-2012 period required by EPA for OBD
- Some key emission parameters reported as early as 2008 for DPFs

Key Elements Required for I/M Data

1. Tool acquires the necessary data using both J1939 & J1979
2. A convenient way of mating the tool with the vehicle
3. Provide real-time feedback – if preferred
4. A way to transmit the data to a server
5. A database on the server, including DM data with a variety of formats
6. A website to analyze and display the data in varying formats
7. Determine whether vehicle passes inspection and whether there was tampering with emission equipment

HEM Data Introduction

- Acquiring OBD-II data since 1996 for LD vehicles.
Acquiring HDV data since 2002.
- HEM Data has a 5 year contract with US EPA for products, support, and enhancements
- EPA has 400 DAWN Mini Loggers™ from HEM Data
- CARB also has 400 Mini Loggers™
- HEM Data taught an SAE seminar for 12 years
 - has written two books published by SAE on acquiring in-vehicle network data for LD and HD vehicles based on the seminar.

HEM Data I/M Tools

- **DAWN Mini Logger™**
 - OBD Mini Logger acquires J1979 and J1939 (with adapter cable when needed)
 - J1939 Mini Logger acquires J1939 data & older J1708 data
 - Transfers data via WiFi or cellular
- **DAWN Mini Streamer™**
 - Transfers real-time data to a PC, iOS or Android device
 - Transfers data via WiFi or cellular
 - Acquires J1939 and J1979 data
- Medium & HD trucks use either J1939 or J1979



Data Acquired by HEM Data's Tools

- All data on HD diesel vehicles
- All standard J1939 and J1979 parameters
- All Diagnostic Messages
 - DTCs
 - Non-DTC data, e.g. monitors, intermediate test results and controller firmware versions

Methods for Testing the Vehicle

Mobile inspectors (Mini Streamer)

- Third-party inspectors go to fleet facilities

Testing at a physical station (Mini Streamer or Logger)

- Repair shop or fleet depot
- Kiosks: Drive up, plug in, and transmit data
- During opacity testing acquire OBD data

Permanently connected device (Mini Logger or Streamer)

- Software subscription service
 - ELD
 - Tracking device

Summary of HEM Data's Test Tools

- Inspection test data acquired in one minute
- Options
 - Real-time feedback to an inspector or owner with mobile device
 - Simply plug in the logger
- Transfer data using WiFi to a device or local network
- Transfer data from logger to a website using cellular
- The Mini Streamer and Logger are applicable to a variety of mating options with the vehicle (previous slide)

Required Elements of an I/M Program

1. Tool to acquire the necessary data using both J1939 & J1979
2. A convenient way of mating the tool with the vehicle
3. Provide real-time feedback – if preferred
4. A way to transmit the data to a website
5. A database to store the data on the website, including DM data in a variety of formats
6. A website to analyze and display the data in varying formats
7. Determine whether vehicle passes inspection and whether there was tampering with emission equipment

I/M Analysis Requirements

- Display both J1939 DM data & equivalent J1979 data
- Provide reports
 - Vehicle passes inspection. If not, why?
 - Tampering has occurred with emission equipment
 - Certain engine models have serious problems
 - Vehicles are being maintained

HEM Data's Historical Dashboard™

- 40,000+ HD vehicles in database; growing at 35,000/year
- Primary data source is an HEM Data customer with 100 inspectors
- Using DAWN Mini Streamer™ and iPad app to acquire and transfer data to the Dashboard
- Dashboard generates multiple inspection and emissions reports

Historical Dashboard™

One Database – Several Dashboards

Available Parameters

- Find which parameters of interest are on a HDV model
- Varies with models years and manufacturers
- Use commonly available parameters in I/M program

Focus on a Single Vehicle

- Lists its DTCs, key parameters, and whether it passes inspection or has tampered emission equipment.

Focus on a User-Defined Group of Vehicles

- Identify models with serious problems
- Determine how vehicles are maintained

Vehicle Models on Historical Dashboard™

- Blue Bird
- Capacity of Texas
- Case IH
- Caterpillar
- Ford
- Freightliner
- GMC
- Hino
- International / Navistar
- Kenworth
- Mack
- New Holland
- Peterbilt
- Provest
- Spartan Motor Chassis
- Sterling
- Thomas Built
- Volvo
- Western Star

HEM Data's Historical Dashboard™

Current I/M Features

- Reports whether a vehicle passes emissions inspection
- Identifies if tampering has occurred with emission equipment
- Identifies engine models with serious problems
- Shows whether vehicles are being maintained

HEM Data's Historical Dashboard™

Current Additional Features

- Determines how vehicles are used in the real-world
- Determines what parameters are commonly available
- Improves modeling
- Makes lab testing more realistic

Convergence of Key Factors

- An inspection company requests that HEM Data develop a test tool and dashboard
- The inspection company allows HEM Data to own the data in exchange for telling them what it means
- EPA provides funding and expertise in the development of the I/M tools by HEM Data
- CARB OBD group is an HEM Data customer; provides valuable information to understand the significance of the data

History of I/M Solution by HEM Data

- 2014: Inspection company initially contacts HEM Data
- 2016: First prototype delivered
- 2017: 25 inspectors start to use the tool; data is stored in the Historical Dashboard with basic analysis and display of data
- 2019: iPad app is acquiring all J1939 & J1979 data
- 2019: Historical Dashboard has advanced storage and reports
- 2020: Number of inspectors grows from 25 to 100
- 2020: Should grow to 150 inspectors later this year

Summary

- HEM Data's tools are a proven solution that has overcome many obstacles and has been operational for several years.
- 40,000+ vehicles and growing rapidly by 35,000 per year.
- Key components:
 - Inspection company's inspectors + their data
 - EPA support
 - CARB OBD group support
 - HEM Data hardware, software and Historical Dashboard
- States can take advantage of this to accelerate their I/M program to reduce emissions sooner

Questions / Additional Information

- Questions / Comments
- Request a demo

Rick Walter, P.E.

President, Founder

rickw@hemdata.com

Cell: 248 910-3435

HEM Data

Data Acquisition & Analysis Solutions

HEM Data

17320 Twelve Mile Road

Southfield, MI 48076-2105

248 559-5607 x111

800 436- 4330

www.hemdata.com