

Current and Future Uses of On-Board Diagnostic (OBD) in Smog Check

Mike McCarthy, Manager
Advanced Engineering Section, CARB

March 21, 2007
Smog Check Technology Forum and Roundtable Discussion
Diamond Bar, CA

Discussion Items

- OBD Background
- Current uses of OBD
- Potential future uses of OBD

California Environmental Protection Agency



Air Resources Board

What is OBD?

- Software in engine computer that runs diagnostics on emission components
 - Uses existing sensors on vehicle to evaluate other components
- Illuminates warning lamp when it detects fault
 - And stores diagnostic information to assist in repair
- OBDII systems on all vehicles since 1996 model year
 - Over 120 million cars nationwide

California Environmental Protection Agency

OBD Philosophy

- Detect malfunction whenever any component that can affect emissions is broken
 - For major emission controls, when emissions exceed a tailpipe level
 - For other components, when the component is broken (e.g., shorts, opens, rationality)
- Designed to detect malfunctions before vehicle becomes a high emitter/other components are damaged

Current usage in SmogCheck

- All 1996+ vehicles OBD tested
 - Inspector plugs in, info transmitted to BAR-97
 - ~500k OBD inspections every month
- Not yet fully utilizing OBD info
 - Analyzer limitations (hardware and software)
 - Database limitations (appropriate fields)
 - Interim readiness criteria
 - Vehicle population

Usage in other State IM programs

- 33 states with IM in some or all of state
 - 31 use OBD only for 1996+
- Others using OBD data more fully
 - More stringent readiness inspection criteria
 - Collecting more data fields for decisions

Additional data parameters available

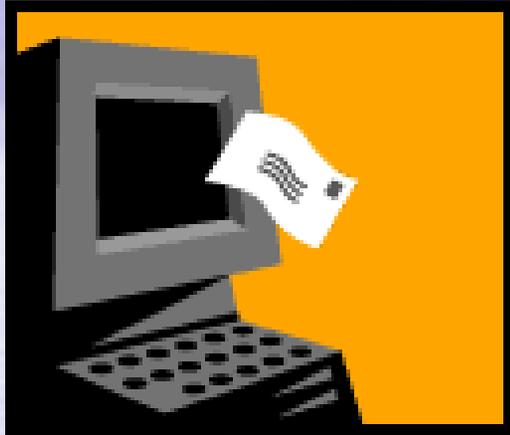
- Distance and trips since codes cleared, permanent fault codes
 - Tightens readiness and inspection criteria
- VIN
 - Avoids manual entry errors, fraud detection
- Calibration ID and Verification numbers
 - Identifies tampered software, fraud detection
- Handful of other parameters identifying vehicle
 - Create an “e-print” uniquely identifying car for fraud detection

Alternate Inspection Methods

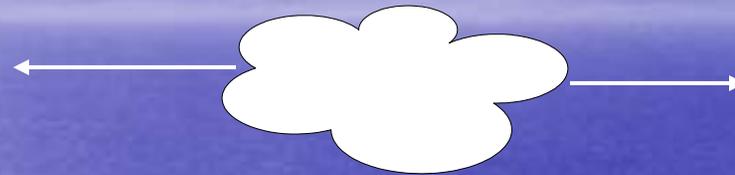
- Oregon, Maryland, others pursuing innovative inspection technologies:
 - Voluntary Remote OBD System
 - RF Wireless Based, Mail-In Transponder
 - 24/7 Self-Service OBD Kiosk
- Goals include:
 - More convenient inspections for consumers
 - Less time inspecting clean cars means more time available to repair dirty cars

California Environmental Protection Agency

Remote OBD Concept



Vehicle owner notified via e-mail of vehicle problem.



From David Amlin, BAR presentation 2/2007 to FACA Workgroup

Remote OBD monitoring

- BAR has also had pilot program (continuous testing program)
 - Used primarily on taxicabs
 - Reports vehicle SmogCheck pass/fail status:
 - When vehicle changes from passing to failing
 - Once every 3 months if always passing
- Benefits could include:
 - Shorter time between occurrence of fault and repair
 - Reduced inspection costs
 - For commercial vehicles, less time out of service

OBD expands testing coverage

- OBD already implemented on 1997+ light- and medium-duty diesels
 - ~350k additional vehicles could be OBD tested
- OBD coming for heavy-duty gas and diesels
 - Phase-in 2010-2013
 - Fleet self-inspection and roadside testing currently only checks for opacity—OBD covers all pollutants
 - May make the most sense for remote systems
 - Never disrupt a vehicle from service for an inspection

Summary

- Over 50% of CA fleet is OBD equipped
- Not yet taking full advantage of OBD
- Potential for tightening up inspection criteria
- OBD expands coverage for vehicles not previously able to be tested

California Environmental Protection Agency



Air Resources Board