Consideration of Pre-Inspection Activity on OBD-Based Inspections

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Overview

• What is pre-inspection activity?
• Can it be quantified?
• How does it relate to the benefits of the I/M program?
Pre-Inspection Activity

• For most, taking a MIL ON vehicle into an Inspection is (not efficient)
  • Exceptions: People new to the program, and people who need to have the failure documented (repair assistance, retirement)
• People know pass/fail status before going to inspection center
• Something needs to be done before inspection when MIL=on
  • Repair the vehicle
  • Clear codes and hope to get through inspection rules
  • Cheat!
Can Pre-Inspection Activity Be Quantified?

• Yes, it can at least be estimated through:
  • Random Roadside Testing
  • The OBD data itself
Roadside Testing

- Vehicles pulled over from roadside for voluntary inspection
- Smog Check procedures followed
  - ASM Test for 1976-1999’s
  - OIS (OBD) for 1996+
- Sampling Plan Followed
Roadside Testing Data

- Smog Check query time aligned with Roadside records (minimize age/use bias)
- MIL is on much more frequently in Roadside testing
- Smog Check vehicles are more likely to be not ready
- Roadside MIL on rates fall dramatically when tested shortly before Smog Check
- Not-ready rates increase dramatically in same timeframe
Bottom Line Observations

• Real in-use MIL on rates are much higher than the rates recorded at Inspection (about 6X higher)
• Not-ready rates are higher at the time of Inspection compared to real in-use (about 2X higher)
• People generally wait until shortly before needing an inspection to deal with MIL on conditions
Estimate Using Only OBD Data

• OBD data itself can also yield an estimate of pre-inspection repair activity

• Assumptions:
  • Code clearing is not a very common event outside of I/M
    • Battery discharge/replacement
    • Repair work (including code clear) not influenced by SC/reg renewal
  • Therefore, most code clearing within 2 weeks of inspection can be attributed to pre-inspection repair activity.
    • Pre-inspection repair activity indicates that vehicle was in failing condition (i.e., MIL on)
The Specifics

- Use distance and warmups since code clear data (supported on 2005+ MYs) to estimate fraction of vehicles that passed, but experienced code clear within 2 weeks of inspection
  - < 420 miles (14 days at 30 miles per day)
  - or < 28 warmups (14 days at 2 warm ups per day)
- Assume/estimate the portion that had codes cleared due to pre-inspection activity
  - My first guess: 80%
  - Roadside/SC data: 75% (based on 2005-2011 MY average)
- Total in-use failure rate = I/M failure rate + rate passing with pre-inspection activity
The Results

- OBD data estimate for in-use fail rates trends with Roadside rate
- Biased about 45% higher
- Possible Reasons
  - 2 week mileage/warmup assumptions may need to be adjusted.
  - Roadside refusal rate is about 50% which might bias in-use rate lower.
Conclusions

• Most people deal with MIL on conditions before the vehicle is actually inspected
  • (and generally wait until they have to)
• Therefore, inspection failure statistics only reflect a small fraction of the real benefits of the program.
  • The total benefit should be based on the number of motorists that address vehicle problems because an inspection is required.
• States without a roadside testing program can create a reasonable estimate of pre-inspection activity with just OBD data.
• Strong I/M programs are still really important
  • In-use MIL on rates are too high
  • The most common in-use faults continue to relate to “major monitors”