Alternative Method for Measuring Real-Time Heavy-Duty Diesel Emissions

24th CRC REAL WORLD EMISSIONS WORKSHOP

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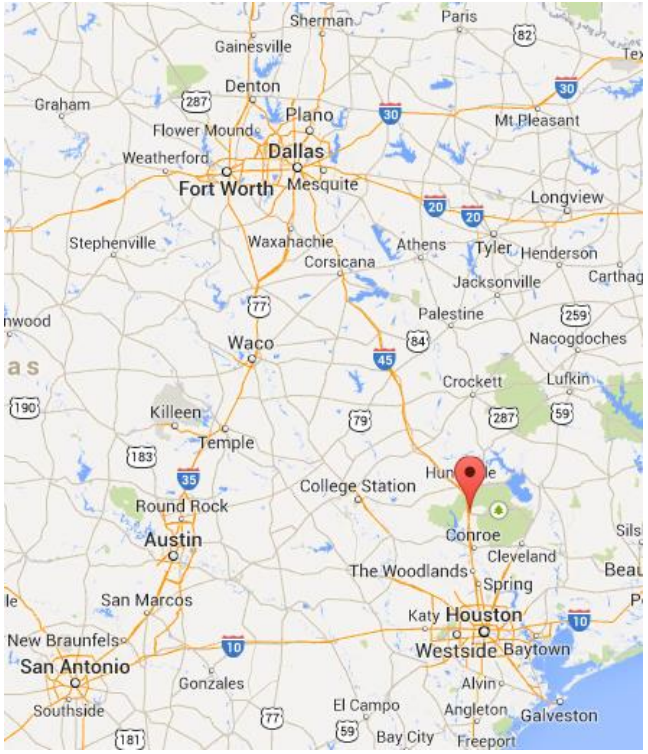
Background

- Project Purpose:
  - Investigate a heavy duty diesel vehicle (HDDV) I/M program for the DFW region
- Funded by:
  - North Central Texas Council of Governments (NCTCOG) and
  - Texas Department of Transportation (TxDOT)
- Work performed by:
  - Texas A&M Transportation Institute (TTI) and University of Denver

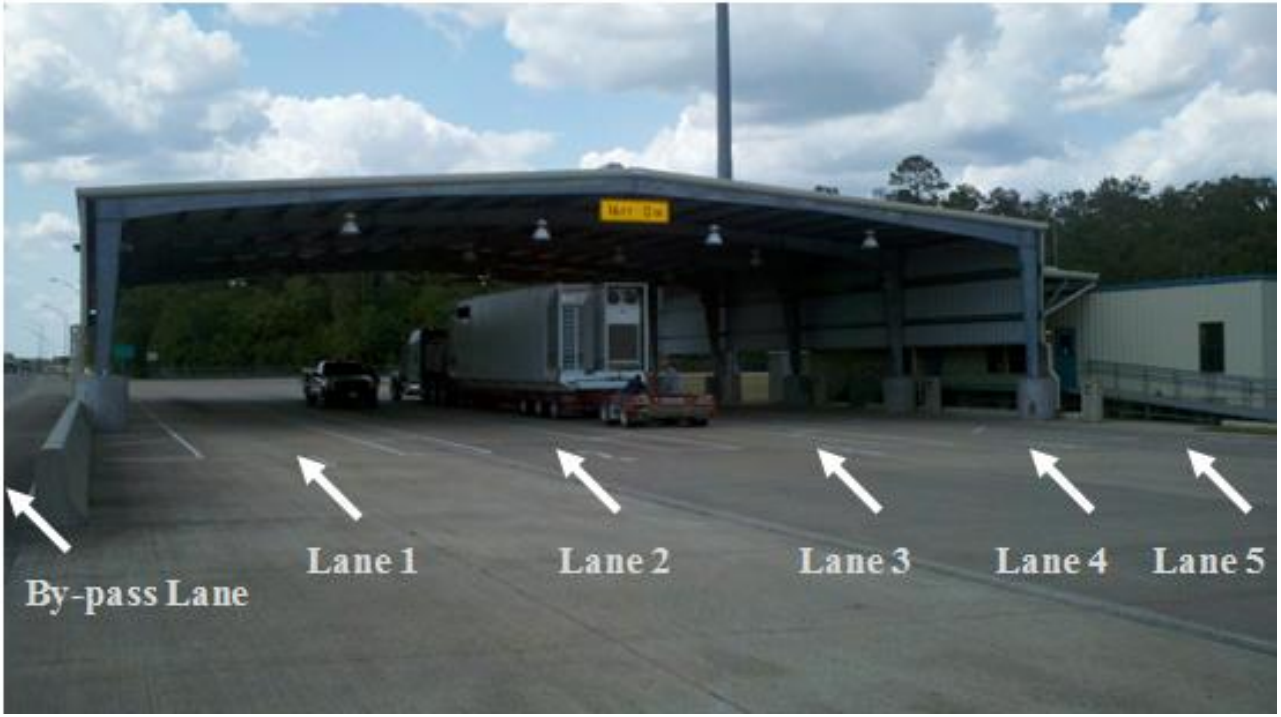
Project Approach

- Investigate HDDV I/M programs and methodologies
- Perform an on-site pilot testing study
- Assess possibilities for HDDV I/M or screening programs

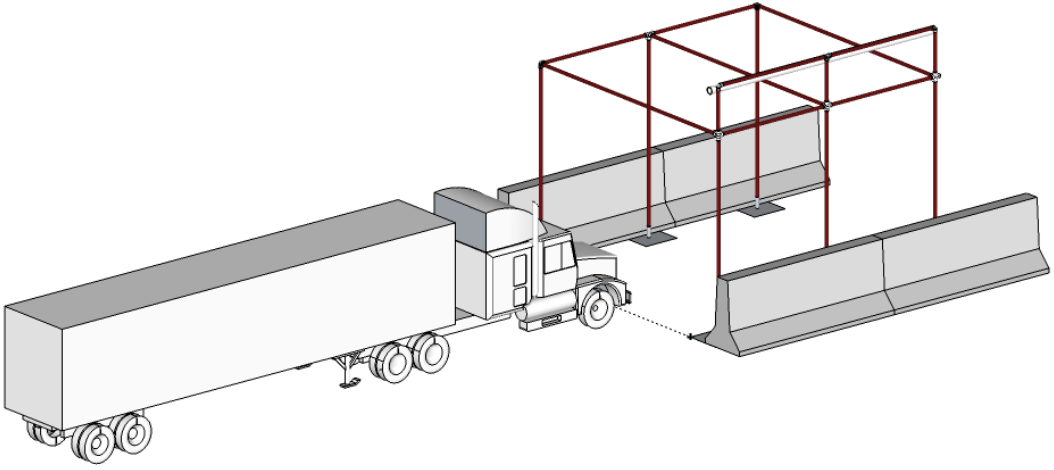


SHED Test Setup *(1)*

SHED Test Setup *(2)*



SHED Test Setup *(3)*

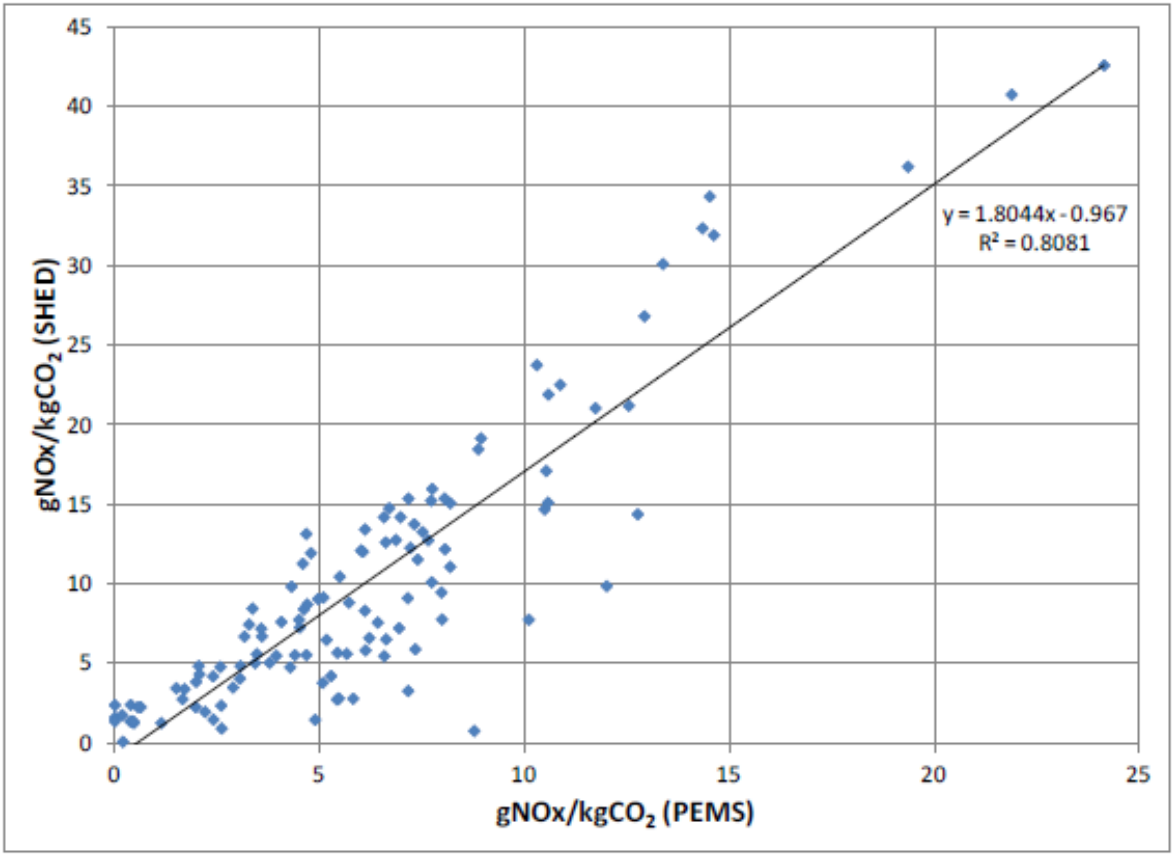


SHED Test Setup *(4)*

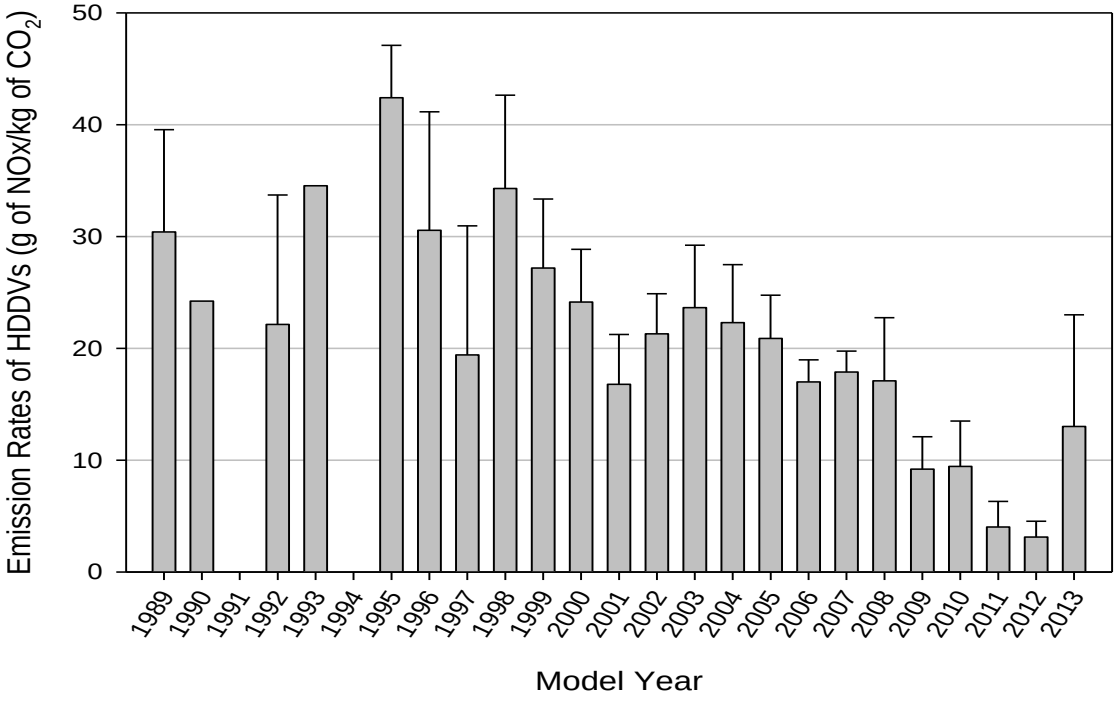
Equipment

Data Analysis Results

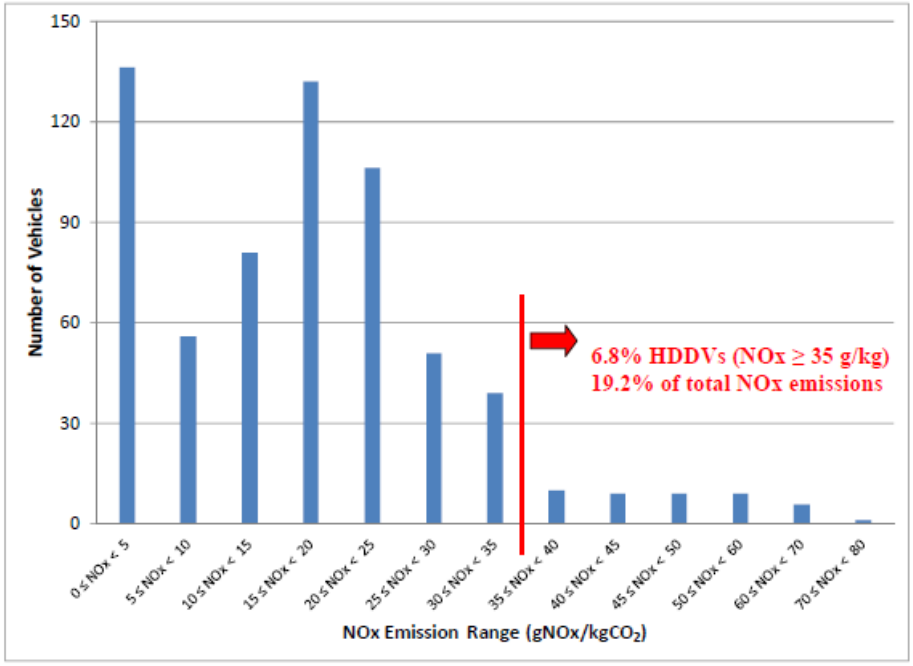
- Very poor correlation between opacity and PEMS for NOx
- Reasonable correlation between conventional Remote Sensing and PEMS
- Good correlation between SHED and PEMS


45
40
35
30
25
20
15
10
5
0
0
5
10
15
20
25
gNOx/kgCO2 (SHED)
gNOx/kgCO2 (PEMS)
y = 1.8044x - 0.967
R² = 0.8081

NOx Emissions by Model Year



Results – High Emitters



Pollutant	Percentage of Vehicles	Percentage of Emissions
NOx	7%	19%
CO	15%	71%
HC	11%	44%
PM	13%	62%

Possible SHED Applications

- SHED approach can serve as a viable HDDV I/M technology
- Other benefits/applications
  - "Clean screening" for fleet PR/marketing
  - Identification of high emitters
  - Evaluation of alternative fuels and technologies
  - Technology compliance checks
- Applications at borders and ports

Proposed Next Steps

- Phase 1: Optimize SHED Technology and Operations
- Phase 2: Pilot Deployment
- Phase 3: Full-Scale Deployment