TUZ - Automotive

Periodic Technical Inspection to Control Emission of Pollutant

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Target for Emission Inspection: Diesel Heavy Duty

Heavy Duty Vehicle Inspection Target 1

- Vehicles on road with Diesel Particulate Filters emit low particles number during their use in customer operation
- Stop the collection of high emitting vehicles in cities – Control of emissions of older non-DPF vehicles

Requirements

- Inspection must be efficient:
- Consider inspection time by itself
- Consider lead time for introduction : Must be implemented quick
- Inspection must be efffective

What do do?

- Investigate past and current methods if they really support target 1
- Develop concept for IRAN Emission Inspection

History of customer vehicle emission inspection Germany (Europe)

- 1985: Introduction in Germany for gasoline vehicles; at that time mostly points ignition and carburetor engines: with separate inspection label on front license plate
- 1993 Introduction of Diesel vehicle tests with free acceleration smoke tests with k-value of K=2,5 [m-1], opacimeter tailpipe test
- 2005/2006 New inspection German regulation („AU Leitfaden 3“) for readout of OBD; for Heavy Duty vehicles the EU comission required Nox measurements in vehicle inspection, but did not happen up to today, instead change to OBD readout with high margins because of new technology
- 2010 Emission inspection was integrated back in the main PTI, and separate label was deleted for all vehicles
- 2012 new limits for smoke test <EURO IV smoke value k=1,5 [m-1], test for vehicles starting with built year of 1977 but still opacimeter test
- Periods:
    1. 3 years for new vehicles
    2. 2years for Light Duty Vehicles
    3. Every year for Heavy Duty Vehicles

Emission Inspection : Learn from Europe (EU)?

- Still in 2016: Every memberstate in EU (>20 countries) has their own national directive for emission inspection, Even in Germany
- Technological focus was revised in 2015 by „Dieselgate“; approach to trust electronic controls developed by manufactures was replaced by more transparency and approach to go back to to measurements to be performed and repeated by third parties, like TÜV
- Take: Europe will eventually go back to real tailpipe measurements
- Germany‘s system (lots of money spend) did not prevent „Ultra-Fine-Particle-Alarm“ situation in Stuttgart, November 2016

Ultra-Fine-Particle-Alarm Stuttgart 2016

„USE Public BUS and RAIL"

SOURCE: TZ NEWSPAPER 22.1.2016

Need for a change because of changing technologies

New Emission Legislation : IRAN IV

New Vehicles with new technologies is coming to Iran:

Diesel Partícualte Filters

SCR-Systems with Adblue® dosing into Exhaust to reduce nitrious oxide emission

Engine electronics, that will monitor engine faults and provide engine diagnostic (OBD)

- I am personally working since two years on assisting with the implementation of IRAN IV + DPF
- to support improving air quality
- to accompany new IRAN legislation with periodical inspection measures to ensure emission reduction systems work in customer hands on those vehicles

Past Euro 0…Euro 3

Free acceleration smoke test in certification of Diesel engine	Free acceleration smoke test in Diesel vehicle inspection

EURO IV to V (and EEV) and EURO VI

(OBD) The engine detects ist own level of emissions with elctronics, Faults and limit overrun is certified	Vehicle inspection only reads out engine statements by electronic interface

Technical and human factors deteriorating emissions of in-use vehicles

- Technical
  - Wear of fuel injection equipment
  - Fuel injector fouling or coking
  - Engine wear, loss in compression, loss of oil control
  - Turbocharger wear
  - Catalyst wear, poisening
  - Catalyst or DPF cracked

- Human
  - Manipulation: like fuel injection pump setting
  - Negligence, if you do not perform engine maintenance
  - Removal of parts like DPF systems, SCR systems
  - Installation of wrong parts

Limitations by metrology and methodology

- Limitations to detect high taiplipe emission by metrology
  - For modern Diesel: Opacimetry has a resolution limit, European experience shows the limits clearly with DPF equipped vehicles
  - Onboard diagnostic can not yet measure anything related to particle emissions, so this european approach is also not yet ready

- Limitations to detect high taiplipe emission by methodology
  - Clearly we want a connection between the mesurement principle for homologation emission test and emission inspection, which in Europe is not present any more
  - In engine operation area, for PTI emission measurement are without engine load, just at idle condition
  - PTI is with hot engine: so no control over cold start emissions

Germany / Emission Inspection

At vehicles since model year 2006
only elctronical readout of error codes: On Board Diagnose (OBD)
~7% of vehicles with high emissions, despite passed OBD-Test (Study CITA/VdTÜV)

Prüfnachweis
über Durchführung der Abgasuntersuchung
nach Anlage VIII StVZO

Prüfberichtsnummer

Prüfungsart	G-Kat mit OBD		
Kraftstoffart	Benzin		
OBD-Funktionsprüfung			**Ergebnis**
MI-Status: Sichtprüfung bei Motor aus		#An	i. O.
MI-Status: Ausgelesen bei Motor an		Aus	i. O.
Ansteuerung MI-Lampe		#Aus	i. O.
Prüfbereitschaft			
Unterstützt	011101100101	Alle Systemtests durchgeführt	
Gesetzt	000000000000		i. O.
Fehlerspeicher			
Abgasrelevante Fehler	0		

IRAN Diesel Emission Inspection Test Concept

- Inspect vehicle and create eletronic test report of:

  - **Vehicle Identification**: License Plate, VIN Number, Make, Type, Model Year, Mileage….
  - **Engine Identification**: Engine Type, Emission Stage, Displacement, Engine Power…
  - **Aftertreatment Identification**: DPF; SCR; Catalyst part numers and manufacturers….
  - **Check presence of aftertreatment systems**: Adblue strorage tak, SCR catalyst, DPF
  - **Visual inspection**: exhaust connection, exhaust leakage, exhaust sensors, wiring, Adblue fill level, visible smoke, missing or maipulated parts
  - **Visual inspection**: engine, fuel system, air intake system, for „engine health“ and maintenance, check if Adblue is consumed
  - **Check OBD Engine MIL- Light** (Malfunction indicator), for Option Fit DPF check electronic DPF Control
  - **Perform PN Emission Tailpipe test**
  - **Issue Test report to customer, store data in nationwide database**
  - **Issue Green Label for LEZ** entrance, if Diesel Emission Inspection Test is passed

Additional Measures / Points

- If Emission PTI is failed: Vehicle shall be repaired and rechecked within 2 month
- After 2 month without valid PTI label, a fine by traffic police shall be issued

- Inspection period: Diesel vehicles: yearly inspection

- Please attend tomorrows presentation about Particulate Number Measurements for PTI

- Emission inspection must be efficient to be performed in reasonable time
- Inspection process must ensure, that test data can be created without technical problems: like OBD software connection

Inform Public and Vehicle owners about Future Emission Inspection

- Raise awareness by public and vehicle owners about new truck emission inspection early
- OEM‘s must inform new truck customers about new vehicle technology like DPF and SCR
- We want the reason to be understood: that it is about abient air quality for everybody

And one word from TÜV: (even still in Germany)

The TÜV Inspector gets the blame and resitance from the customer, if the truck fails the emssion inspection:

Let us all understand: that vehicle maintenance and good engine condition, and good emission control is a value for the whole society

Iran Diesel Emission Inspection Implementation

- Develop IRAN nationwide Diesel Inspection PTI regulation document
- Diesel Inspection recommendation is by „Third Party“ testing, means independent organsiation accredited to Iran nationwide PTI regulation
- Partial money amount from each PTI shall be contributed to IRAN national PTI research institute for study and engine data collection for Step 2: improved data collection through OBD connection
- Nationwide PTI test database data evaluation and data mining
- Start process for implementation now!

Thank you for your attention

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