ICTCT Conference

DRIVER BEHAVIOR, CRITICAL SITUATIONS AND VEHICLE CONDITION

Evelyn Lindner  Karlsruhe, 17.10.2014

FSD – CENTRAL OFFICE IN GERMANY

- Establishment
- Generation
- Documentation
- Provision
- Validation

of guidelines for the PTI and safety inspection (SP) (system-, test data)

[§ 29 StVZO bzw. 2009/40/EG]
Without regular inspection and service, the effectiveness and thus the accident prevention potential of safety features is in jeopardy.

ACCIDENT HAZARD VEHICLE

THE PTI – BASE OF TRAFFIC SAFETY

- safety level
- individual safety level of the vehicle
- PTI requirement
- degradation of the vehicles’ condition over the years
- years (age of vehicle)
- failure rate of vehicles in traffic (4 weeks prior to PTI)
- failure rate detected during PTI

<table>
<thead>
<tr>
<th>years</th>
<th>preparation for PTI</th>
<th>repair after PTI</th>
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</thead>
<tbody>
<tr>
<td>3</td>
<td>4.04%</td>
<td>26.22%</td>
</tr>
<tr>
<td>5</td>
<td>7.09%</td>
<td>41.17%</td>
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<tr>
<td>7</td>
<td>9.49%</td>
<td>56.61%</td>
</tr>
<tr>
<td>9</td>
<td>17.78%</td>
<td>61.48%</td>
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<td>18.18%</td>
<td>74.07%</td>
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OUR GOALS FOR ANALYSIS

Interaction of maintenance and vehicle systems

DEVELOPMENT OF INNOVATIVE INSPECTION TECHNOLOGIES FOR PTI
in cooperation with government, vehicle manufacturers and inspection organizations
DATA COLLECTION SYSTEM DDS 21

Defect Detection and Driving Dynamics Study
21st century

Start: 2010
100 vehicles

STACKING ARRANGEMENT - COMPONENTS
**DDS-RECORDER – TECHNOLOGY**

- connection of up to 3 CAN-busses
- acceleration sensor (3 axis)
- yaw sensor
- GPS-receiver
- 190 x 52 x 185 [mm]

**CAN-BUS-DECOUPLER – TECHNOLOGY**

- decoupling of the wiring of the DDS-recorder from the vehicles CAN-bus
- reactionless, unidirectional communication
- 63 x 32 x 14 [mm]
**DDS-CAMERA – TECHNOLOGY**

- VGA, monochrome
- up to 15 images per sec.
- 90° field of view
- 67 x 165 x 26 [mm]

**DD-SENSOR – STORAGE CARD**

- **CONTINUOUS recording** of all driving dynamics data onto **ring memory**

- **TRIGGER** transmission of a **30s-sequence** (20s before - 10s after the trigger point)

- from **ring storage** to the **storage card**
**DDS DATA TRANSMISSION**

MONTHLY

storage card

IMMEDIATELY 3G (UMTS) network

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**DATA SET**

Data recording in real traffic situations
Triggered recordings of 30s
Characteristics
DATA RECORDING IN REAL TRAFFIC

triggered recording
result: data recording of 30 s

TRIGGER

abnormalities in condition and function of components and systems,
vehicle dynamic critical situation,
accident black spots
RECORDING

signals for

failure
wear
handling
controlling
movement
environment

What happened here?
What happened here?

What happened this time?
What happened this time?

DDS data

Patterns of brake functioning
DEGRADATION OF BRAKING SYSTEM
DDS DATA

DEGRADATION OF BRAKING SYSTEM
PTI TESTING PROCEDURE

Evaluation of ratio between deceleration and brake pressure as a measure of the braking effect during PTI
FURTHER POSSIBILITIES

Recordings of critical situations
Extreme vehicle maneuvers
Intervention of safety systems

DISSERTATION
DRIVER BEHAVIOR

5.000 recordings – GPS trigger
Accident black spot
Predictor: Lateral acceleration
DISSERTATION
DRIVER BEHAVIOR

DR-a-y FZ-0001-RK-0013

Dresden

Radeberg

DISSERTATION
DRIVER BEHAVIOR

DR-a-y

Max
Average

Latitude

Longitude
VISION ZERO.
KEINER KOMMT UM. ALLE KOMMEN AN.