

WORKSHOP A

SESSION TWO

Presentation 2

Options for brake testing at PTI by using OBD- and specific vehicle information

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Options for brake testing at PTI by using OBD- and specific vehicle information

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Options for brake testing at PTI by using OBD- and specific vehicle information

- 1. Challenges for implementation**
- 2. Technical requirements for the use at PTI?**
 - Prerequisites
 - Equipment choices
 - Procedure choices
 - Approach
- 3. Summary and Recommendation**

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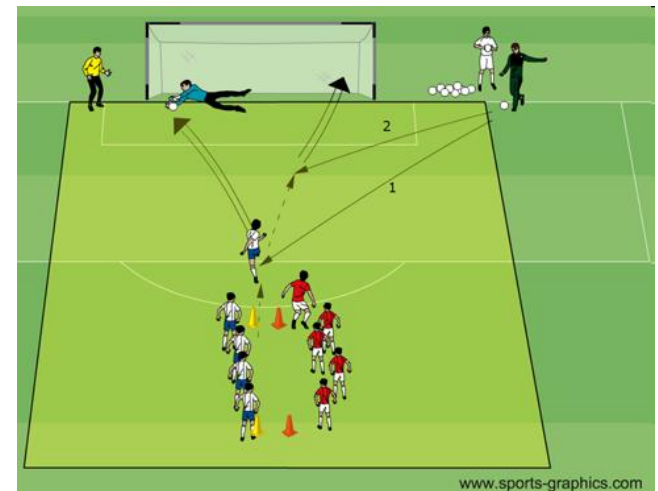
1. Challenges for implementation

To include stakeholders

- Vehicle Industry (VI)
- Tool Manufactures
- Others

Develop functional testing

- Characteristic of the system
- Cost beneficial
- Harmonised approach



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2.1. Prerequisites required for implementation

- a) Free access to the information to be used for the communication with this particular vehicle
- b) Free access to the information on special knowledge about common behaviour of system
- c) A scan tool to access system functions of the vehicle and to trigger actuators:
 - The functionality of the scan tool must include access to PTI trigger function information of the vehicle.
 - This information may be held within the tool, or could be held remotely.
 - The known control criteria for triggering the vehicle brake system would also allow a predictable system functionality

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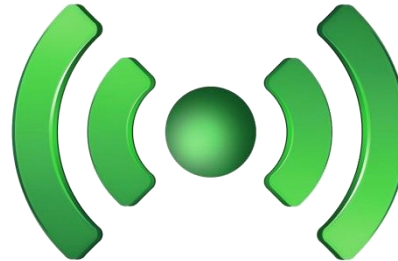
2.2. Technical standards applicable to PTI - Communication Protocols

ISO 13400	parts 2 and 3 DoIP Diagnostic protocol
ISO 15031	Road vehicles – communication between the vehicle and external test equipment
ISO 22900-2	Modular vehicle communication interface (MVCI)
ISO 27145	Road vehicles – Implementation of World-Wide Harmonized On-Board Diagnostic (WWH-OBD) communication requirements
SAE J2534	Pass through programming
ISO 26262	In-vehicle safety system design and functionality

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2.3. Equipment choices

Native Scan Tool?



Generic Scan Tool?



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2.4.Procedures choices

Automatic IT based check

- Independent of user interaction
- Very quick
- Closed circle
- Not flexible
- High cost/benefit potential

Interactive check

- Measurement results from outside
- the vehicle are used (roller brake tester)
- IT supports the inspector
- Flexible in timing
- More time consuming

CITA Conference Seville – brake test methods

For the implementation of the demands of the directive 2010/48/EC into the national legislation are 3 options available:

- Using a load or load simulation test procedure
- Using brake force reference values for M1 and N3 vehicles
- Using a calculation method

Advantages of the reference value method

- Testing directly the efficiency of the braking system
(operating force and braking force)
- Independent of weight, Coefficient of adhesion,

Disadvantages of the reference value method

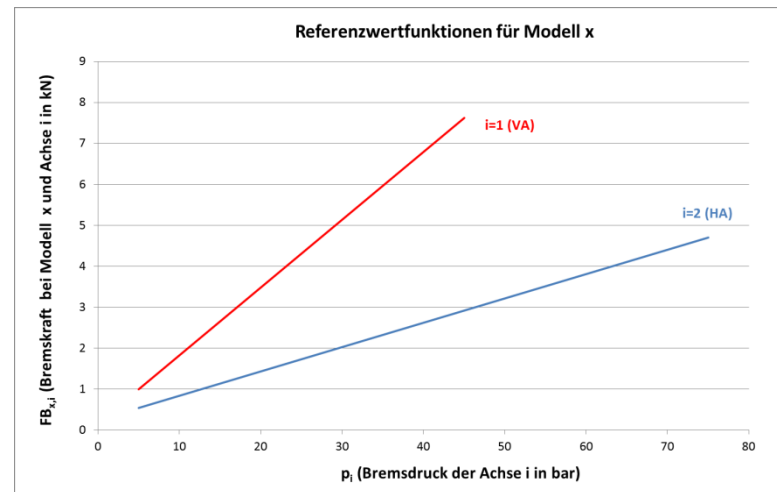
- Manufacturers thresholds need to be available
- The operating force need to be used (electronically information / brake pedal force)

CITA Conference Seville – Approach

Definition

- **Testing at each axle:** The ratio of operating force and braking force (regularly linear interrelation)
- **Testing the actual brake force distribution :** The ratio between front axle and rear axle (according to manufacturers thresholds)

$$FB_{x,i} = m_{x,i} \cdot p_i + n_{x,i}$$



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Required Parameter

- **Reference values from the VM: The ratio of operating force and braking force (equitation) vehicle- and axle specific**
- **Information about the system pressure via a scan tool**
- **User Interface for handling of test equipment, scan tool and information**

Approach:

1. Connecting the Vehicle with the scan tool
2. Using the roller brake tester
3. Charging brake force and brake system pressure
4. Assess and compare these values with VM reference values
5. End of test

CITA Conference Seville – Scenario

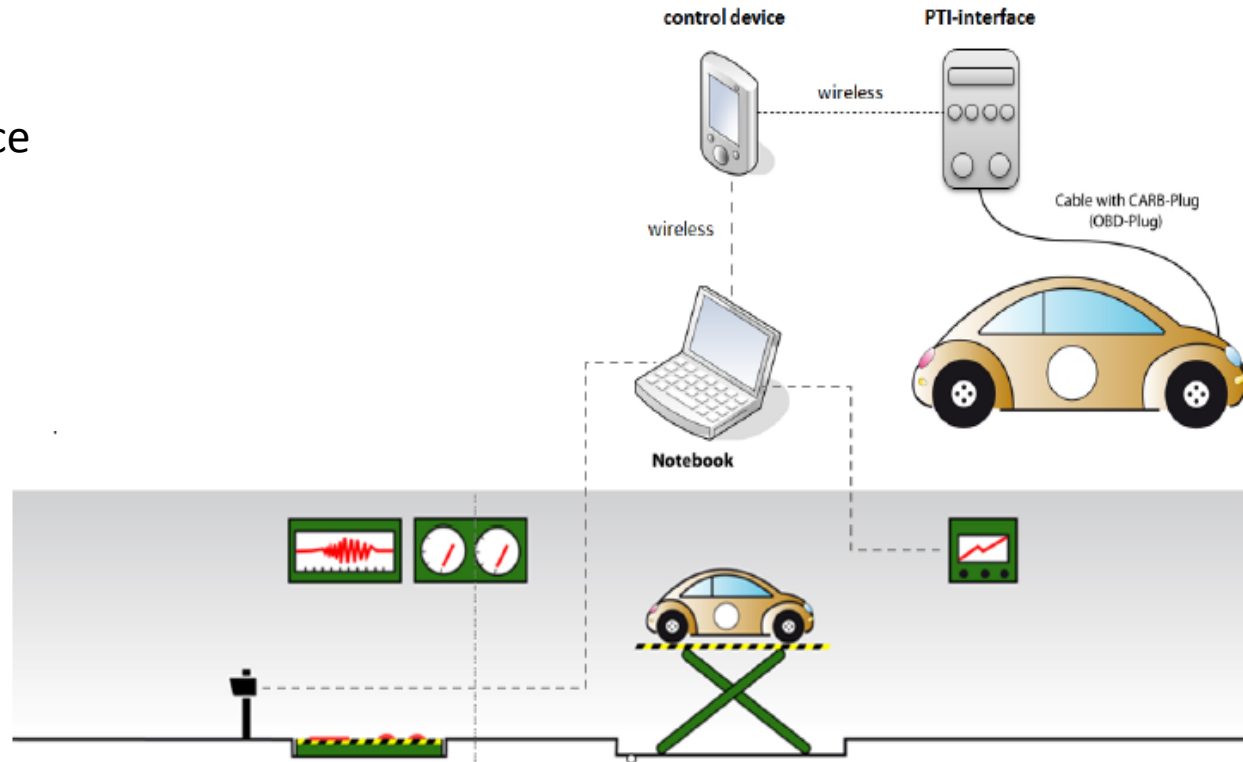
➤ Typical test lane configuration

- Interactive approach

➤ Test lane with equipment

➤ PTI interface

➤ Control device



CITA Conference Seville – Summary / Recommendations

Definition of prerequisites:

- Vehicle industry needs to be involved
- Tool choices (standard)
- Future inclusion in Type approval is desirable

Definition/Development of tools:

- Hardware (standard)
- Communication (standard)
- Cost beneficial (competition)

Definition/Development of procedures:

- Functional testing in various forms
- Appropriate time effort
- Cost beneficial

CITA has the possibility to create this by the ECSS Tender!

Thank you for your attention!