WORKSHOP A

SESSION ONE

Presentation 2

New inspection methods for electric and hybrid vehicles

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New Inspection Methods for Electric and Hybrid Vehicles

BASt research program 2011: Road safety

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Content

- Background and objectives of the project
- Contractor and subcontractors
- Work packages
- Initial findings
- Outlook

Background and objectives of the project

Background:

BASt awards research project entitled:

"Determination of the need for change on the basis of electric vehicles in the Periodic Technical Inspection”

Objectives:

- Proposal on a national level for an adaptation of the requirements for PTI (in Germany) in terms of electric and hybrid vehicles
- Permanent preservation of the safety standards for electric vehicles over the entire period of use
- Detection of unauthorized modification (tampering)

Project participants

Contractor:
FSD Fahrzeugsystemdaten GmbH

Subcontractors:

1. Hochschule für Technik und Wirtschaft Dresden
   (Labor für Elektrische Mobilität)

2. PTI organizations:
   DEKRA, TÜV SÜD, TÜV NORD, TÜV Rheinland,
   TÜV Thüringen, GTÜ und FSP

Start of the project: 15.10.2011
End of the project: summer 2013
Budget: 80.000 € (external)
BASt: 40.000 € (internal)

Work packages

WP1: Analysis of the drive components in the electric vehicle

WP2: Effects on road safety and environmental aspects

WP3: Effects on other components

WP4: Assessment of potential risks

WP5: Adaptation of the legal requirements concerning PTI>D

Field study

- KBA letter to the owners of approximately 36,000 hybrid and 4,000 electric vehicles
- Use of a "high-voltage questionnaire”
- Statistical evaluation of the FSD database regarding traffic safety and defect rates of hybrid and electric vehicles


Formular zurücksetzen

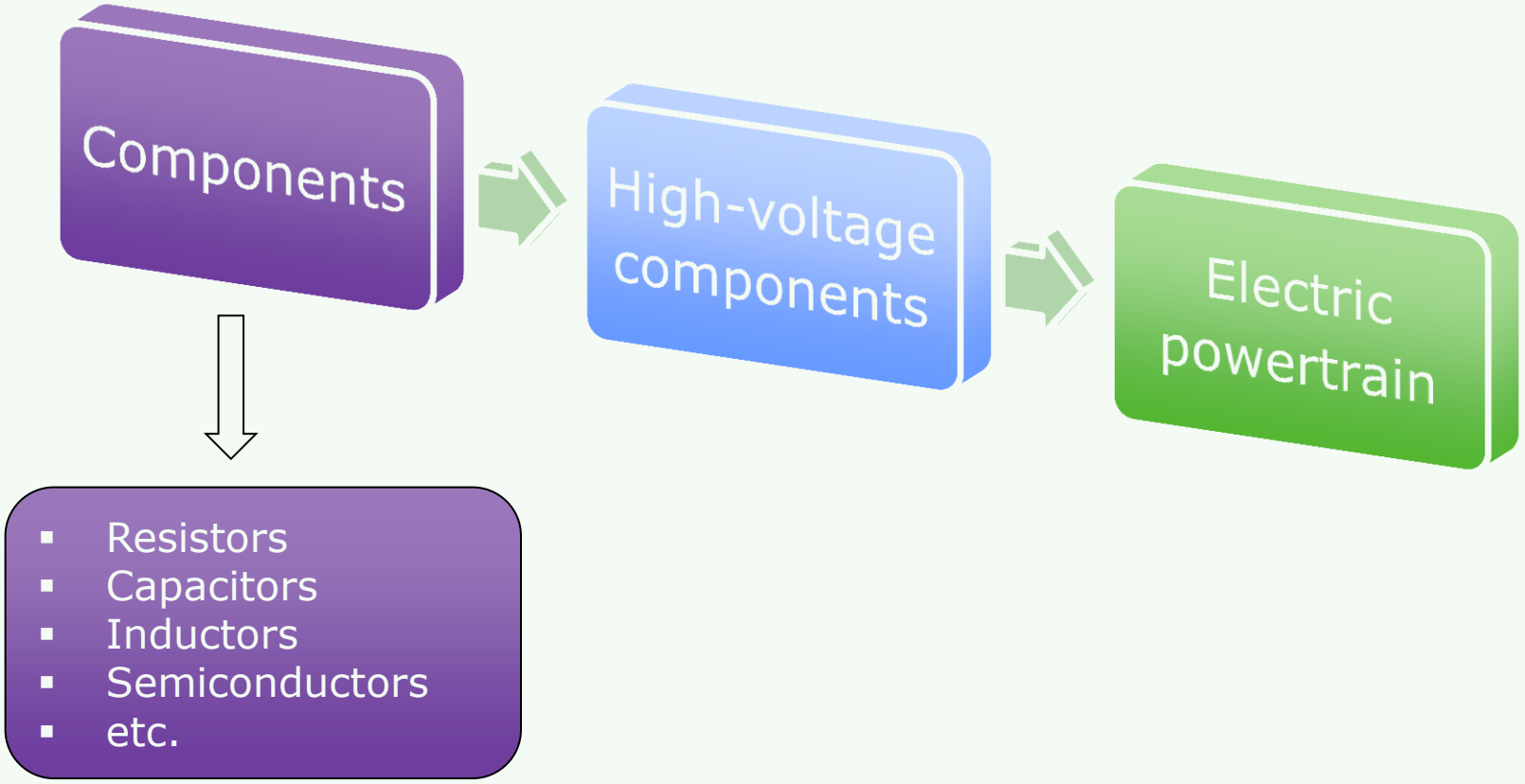
Formular drucken

Ermittlung des Änderungs-bedarfs auf Grund von Elektrofahrzeugen bei der periodisch technischen Überwachung

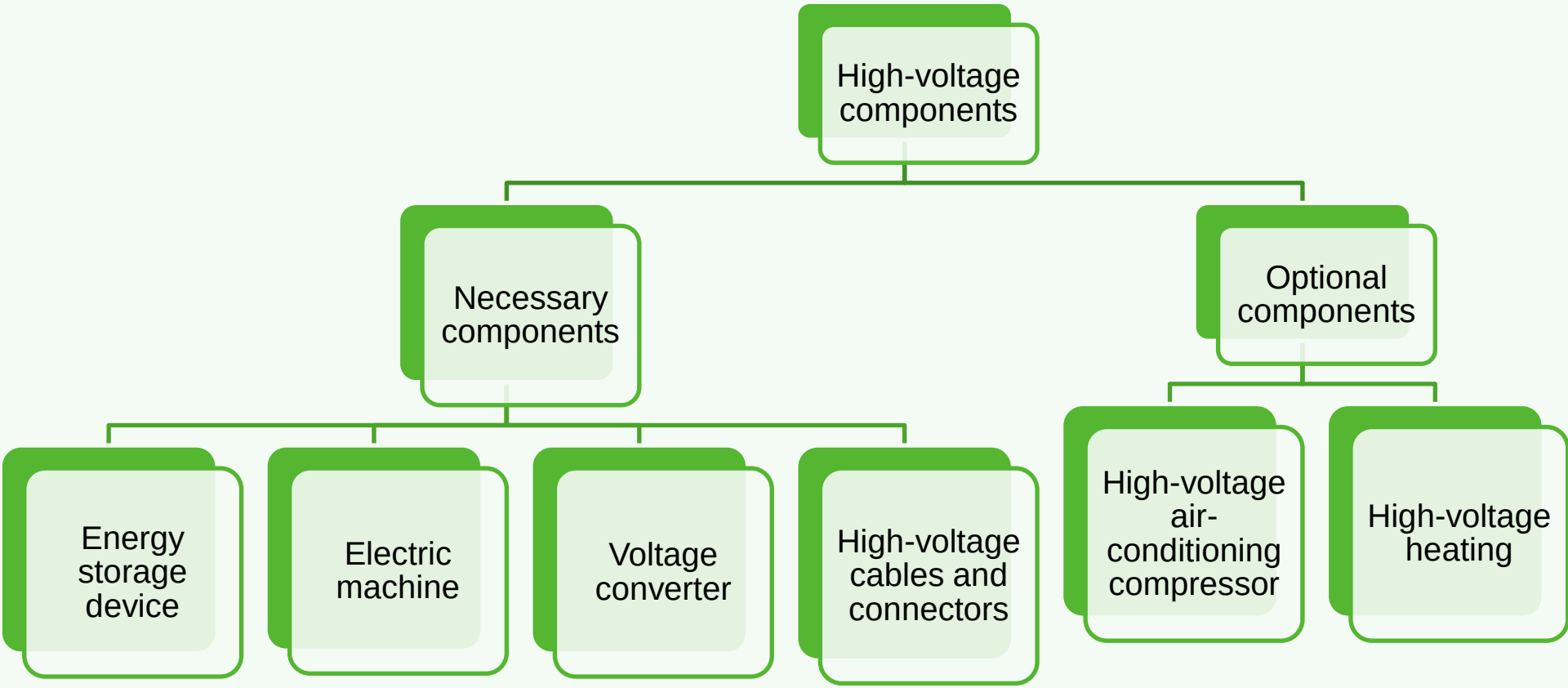
Feldtest - Erhebungsbogen

FSD Fahrzeugsystemdaten GmbH
Version 1.0.0
01.07.2012

WP1: Analysis of the drive components in the electric vehicle



WP1: Classification of high-voltage components



WP2: Effects on road safety and environmental aspects

ageing

wear

manipulation

influence

Traffic safety

Environmental aspects

Examples of components:
Sensors (current, voltage and rotor position sensor)
Actuators (high-voltage contactor, VT)
Energy storage device (battery)

Selection of possible effects:
Failure, short circuit, leakage, thermal events

WP3: Effects on other components

- Brake wear due rare use (degradation)
- Load change reactions in the bearing components
- Electric braking torque characteristic resulting from the wheel on the drive train to the electric motor
- Body structures
- Electrified powertrain can lead to altered stress on the mounting points
- Fixing the traction battery to high mechanical stress
- Lower thermal stresses can lead to fewer problems

WP4: Assessment of potential risks

- Runs: assessment of the risk potential (e.g. ISO 26262)

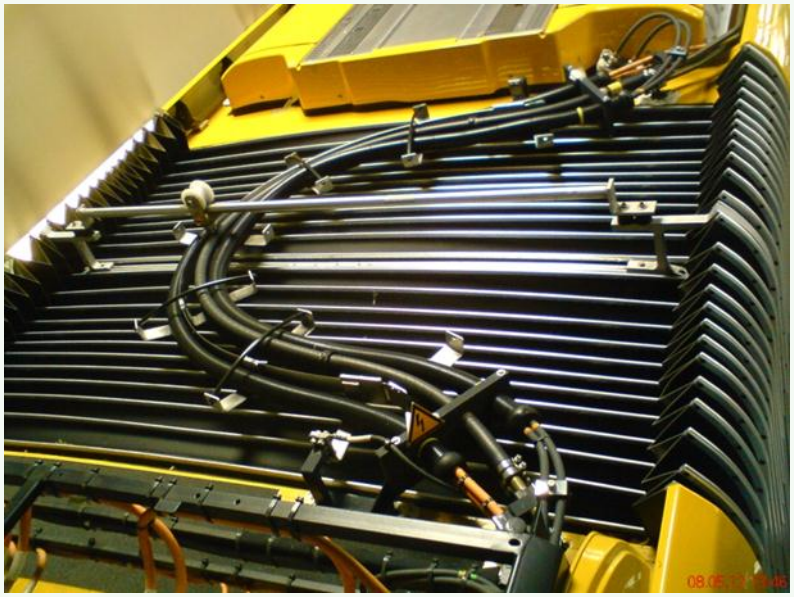
- Validated by long-term monitoring of development of vehicle condition

WP5: Adaptation of the legal requirements concerning PTI>D - safe stand I

Some high-voltage and conventional components are mounted on top of todays hybrid-busses

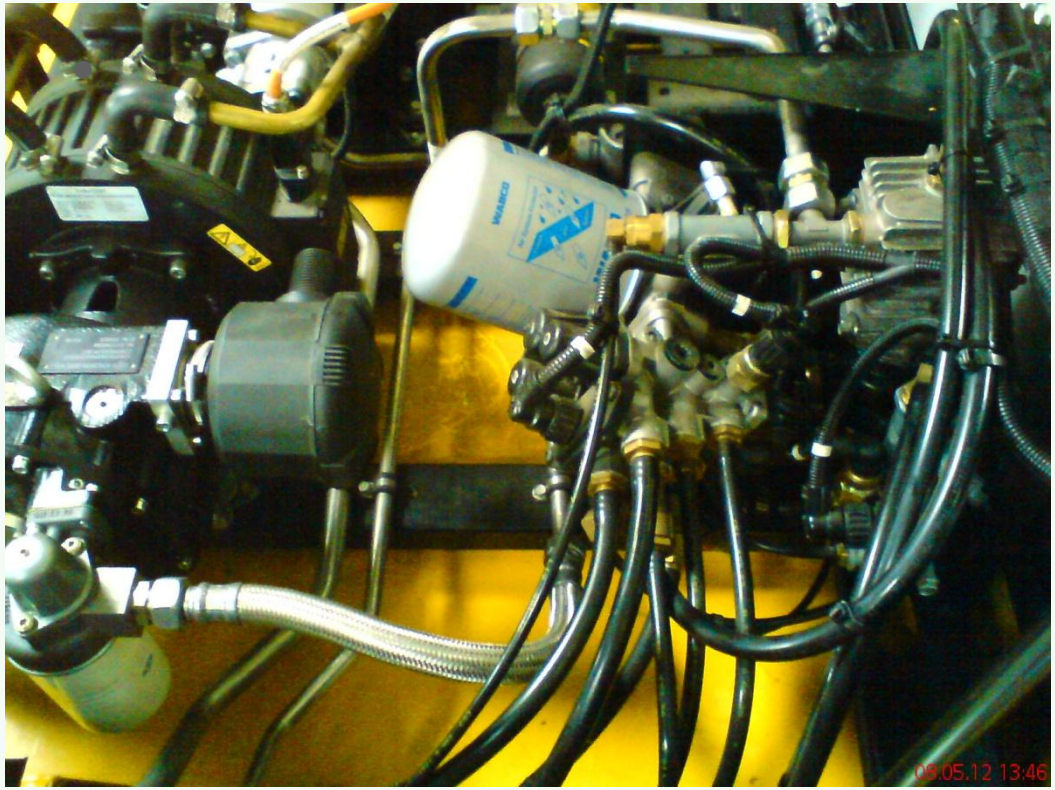
Therefore a safe stand is necessary for the PTI-inspector (a simple ladder is not sufficient due to safety concerns)

Examples:



WP5: Adaptation of the legal requirements concerning PTI>D - safe stand II

Further examples:

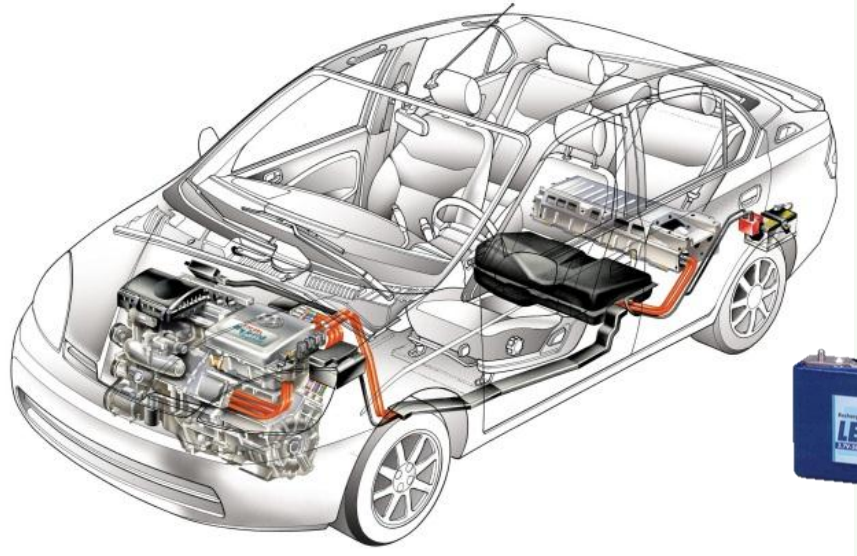


safety platform

WP5: Adaptation of the legal requirements concerning PTI>D - vehicle interface

For the assessment of the high-voltage batteries and other high-voltage components the usage of the vehicle interface is necessary. Amongst others it enables the Inspector to test the:

- Correct function of the battery management system
- Required insolation between the high-voltage-components and the on-board power supply



WP5: Adaptation of the legal requirements concerning PTI>D

For the assessment of the vehicle braking system, the recuperation and the cooling system, the usage of the vehicle interface is necessary. Amongst others it enables the Inspector to test the:

- Reference braking force testing (risk of degradation of the braking system)
- Recuperation testing with reference values
- Activation of the battery fan (increased hazard due to overheating of the high-voltage battery), function, speed of the fan

Visual inspection of the charging device with regard to defects and meeting the legal requirements. Checking of the starting prevention when connected with the vehicle charger.

Outlook

- Further Collection of the relevant facts in regard to aging, wear and manipulation
- Analysis of data from the "high-voltage questionnaire"
- Addressing the potential risk to road safety and inspection personnel
- Proposal for amendments to the national and international PTI-directive(s)?
- Proposals for adapting the type-approval legislation (if necessary)

Other ongoing and new BASt funded research projects in the field of PTI

- Determination of the extent of different emission test results between tail pipe measurement and outcome of the on-board diagnostic system (FE 84.0508/2012)

  results: – approx. End of 2013

- Security aspects of electric vehicle charging (FE 84.0552/2012) start: January 2013

- New: Requirements for dynamic levelling to reduce glare: a review of the headlight adjustment process with the incorporation of adaptive lighting systems and daytime running lights


Thanks for
your attention!