

iCRASH'24

Current research on passive traffic safety systems in road infrastructure in Germany

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Current research in Germany

Agenda

1. Introduction BAST

2. Project FE 03.0574

Influence of the soil on the performance of road restraint systems

3. Project FE 03.0601

Passive safety of road equipment for motorcyclists

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BASt



Mission:

To improve safety, environmental compatibility, economic efficiency and performance of roads

Organisation:

5 technical departments

Task:

- Research: Annual 260 own research projects and more than 300 research projects by external scientists
- Testing, certification, approval and recognition activities in the field of road traffic
- Participation in around 830 national and international committees



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Current research in Germany

FE 03.0574

***Influence of the soil on the performance of road
restraint systems***

Influence of the soil on the performance of road restraint systems

Motivation

- No consideration of influences from soil conditions in impact tests
- Soil investigations do not address the specific post or system-soil ratio
- In practice in Germany to date: Dependence on soil classes and post driving time
- Many different installation situations and system modifications
- In simulations of impact processes, comparatively simple approaches

Influence of the soil on the performance of road restraint systems

Project goals

- What ground conditions are required for a traffic-safe construction method?
- Soil conditions: no, moderate or significant changes in the performance data of VRS?
- Development of simulation models

Real tests on the bedded single post

Experiments with variation of

- Material and gradation of ground
- Loading direction
- Type of load
- Load intensity
- Embedment length of the post
- Cross-section profile of the post

Real crash tests on VRS

- TB 51 crash,
13 t bus, 70 km/h, 20°
- TB 11 crash,
900 kg car, 100 km/h, 20°
- Comparison with existing tests
- Recording of soil properties

Numerical modelling

Usage of two numerical models

- G-Model (ground) in ABAQUS
- C-Model (crash) in LS-DYNA
- Iterative adjustment
- Advantages of both models in terms of accuracy and calculation time

Parameter studies with simulations

Investigation of the influence of:

- Soils of varying stiffness
- Layer sequences and thicknesses
- Soil compaction
- Position of impact point
- Type of load (static / dynamic)
- Post length
- Modeling techniques (e.g. vehicle model)

Influence of the soil on the performance of road restraint systems

Main results

- Influences can be seen
- Differences in behavior between the test site and practice are "on the safe side" for German soil conditions
- Systems with shorter posts react sensitively to softer soils
- Test sites show very hard soils
- Dynamics are essential for real tests
- Simulation with LS-DYNA is possible to a satisfactory extent

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FE 03. 0601

***Passive safety of road equipment for
motorcyclists***

Passive safety of road equipment for motorcyclists

Motivation

- Accidents with motorcyclists
- Situation of standards
- New products

Passive safety of road equipment for motorcyclists

Project goal

Development of new test procedure

- simple
- cost-effective
- reproducible

Accident analysis

- GIDAS database
- DEKRA accident database
- Official German road accident statistics
- Internet/newspapers

 numerous different constellations

Development of the test procedure

Impact

- Start CEN/TS 17342
- Different impacts
- Exchange dummy
- Harmonise scale curves

Development of the test procedure

Sharpness

- Test finger
- Bumper car

Passive safety of road equipment for motorcyclists

Main results

- New test procedure
- Different steps
- Verification of the procedure necessary

Current research in Germany

All reports will soon be available on our website!



www.bast.de/EN

Inowrocław, 26 - 27.09. 2024 r.

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