

ROBUST Work Package 5 Introduction

**Workshop
Brussels
30th May 2006**

By Otto Kleppe, NPRA



Norwegian Public Roads
Administration

Draft AGENDA

- **Introduction** **6 min**
By Otto Kleppe, NPRA – Subproject leader
- **Results and comparison** **18 min**
By Kristin Johannessen Force Technology Norway
- **Acceleration transducers on Finite Element vehicle models** **12 min**
By Marco Anghileri, POMI
- **Parametric study** **12 min**
By Gawin Williams, TRL
- **Conclusions and summing up** **12 min**
By Otto Kleppe, NPRA

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Objectives for WP 5

- **Evaluation and enhancement of the use of computational mechanics (CM) to complement experimental activity.**
- **Criteria and procedures for the validation of CM results through comparison with test results**
- **Reconstruction of real life accidents**
- **Identification of the activity needed for further enhancement of the use of CM**

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Tasks

- **5.1 Analysis (simulations) of full scale tests in Task 4 with different models and codes**
- **5.2 Reconstruction of real life accidents to obtain correlation with real injuries**
- **5.3 Comparison and validation of computations made with different modes and cars**

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Partner in Working Package 5



Politecnico di Milano Italy - POMI,
Marco Anghileri



Transport Research Laboratory UK - TRL
Gawin Williams

Cidaut - Centro de Investigación y Desarrollo en Automoción, Spain - CIDAUT, Juan García Peña



Norwegian Public Roads Administration - NPRA
Working Package leader; Otto Kleppe



Force technology, Norway, Kristin Johannessen

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Resultaten

Logg



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WP 5.1

Analyses of full scale tests in Task 4 with different models and codes

- The working programme
- The matrix

Have Type with B1 etc.

Task	Test	Vehicle	Barrier	TRL	Cidaut	POMI	NPRA
4.1	TB11	LV1	B1 (concrete)	x	x	x	x
4.2	TB11	LV1	B5 (steel N2)	x	x	x	x
4.3	Reconstruction of an accident			x NA		x NA	x NA
4.4	TB11	LV1	B2 (steel H3)			x	x
4.5	TB41	HV1	B3 (steel H2)			x	x
4.5	TB51	Bus	B3 (steel H2)			5 x	x 5
Total number of simulations				2 (?)	2 (?)	6 or 7	6 or 7

Logg

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- Light vehicle model GeoMetro/ (mod. NPRA(Force)/POMI)
- Light vehicle model Fiesta(Generic) (established by TRL)
- Buss model Scania (modified by NPRA(Force))
- 10t Heavy weight vehicle model (established by POMI)



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Software

TRL	LS-DYNA, ver. 960 Rel.?
CIDAUT	PAM-CRASH
POMI	LS-DYNA, ver. 960
NPRA	LS-DYNA, ver. 960

All is explicit FE-codes used by the automotive industry

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- Initially; agreement on simulation setup.
- Studies with variation in the simulation setup.

Simulation setup

~~We agree on the simulation setup.~~

~~Later on we tried different setups as well.~~

- ~~The friction~~
 - between wheel / ^{roadway} ~~wearing course~~
 - between barrier and vehicle
- ~~Boundary conditions for the barrier~~
 - The ground condition
 - The anchoring of the barrier
 - The length of the barrier
- ~~The vehicle~~
 - The impact point
 - The speed of the vehicle
 - The weight of the vehicle
 - Spinning wheels
- ~~Instrumentation~~
 - The Mounting Block
 - The location of the accelerometer
 - Accelerometer at other locations
- ~~Other parameter in the setup~~

➤ ~~The barrier~~

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Parametric study

It was

➤ ~~Later we decided to include some~~ *several*
~~parametric simulation.~~ *studies:*

- Impact condition (speed, angle, matr. prop)
- Versions / release of software
- Mass scaling
- Barriers boundary conditions (void)
- Fixation of barrier ends
- Vehicle release
- Friction

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Work approach for

~~The sequence of performing~~ ~~full scale tests and Computational Mechanics~~

➤ All simulations is performed as blind tests.

**That means without knowing the results
from full scale tests before the simulation is
performed**

*This means that ~~the~~ all simulations are
performed without prior knowledge of
the results from the full scale tests*

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Work carried out

- **21 reports**
 - 4 for vehicle testing/verification
 - 3 for special research
 - 14 for simulation
- **3 separate meetings**
- **36 Simulations reported**
plus about the same number unreported
- **Parameter study**

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Vehicle models

- **GM**
- **10t HGV**

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Thank you for your attention

The next presenter is
Kristin Johannessen, Force Technology, Norway AS
With Results from ROBUST WP5



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