

AIT

**AUSTRIAN INSTITUTE
OF TECHNOLOGY**



ERPUG

BUDAPEST,
HUNGARY
2015

ROSANNE – Results after 2 years of project duration
Roland Spielhofer, AIT

ROSANNE project



- **Project overview**
- **What has been achieved so far?**

ROSANNE project



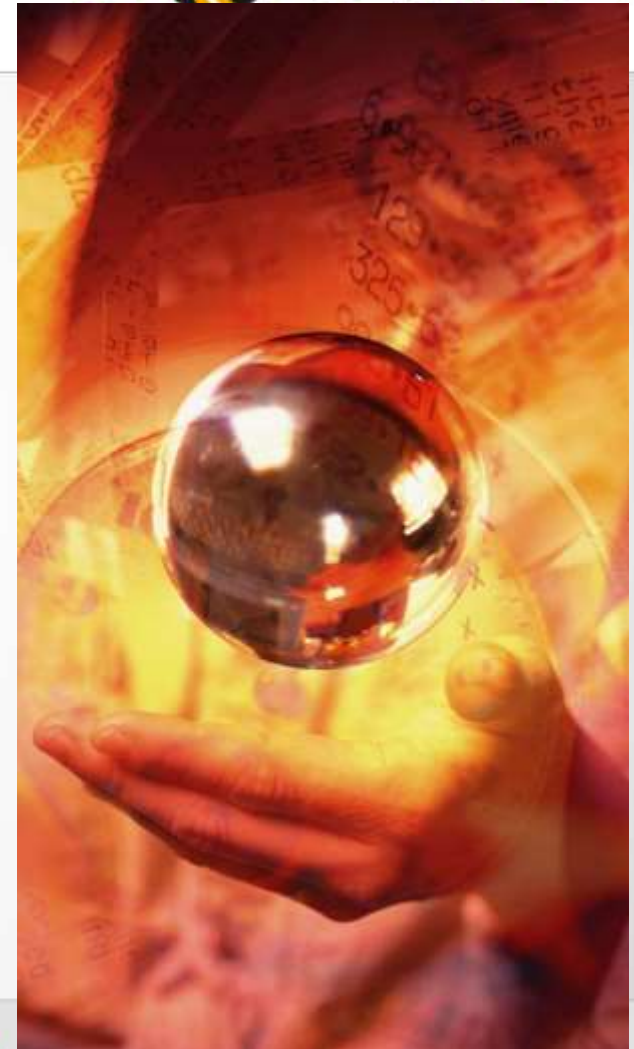
- **FP7 Small Collaborative Research Project**
- Coordinator: AIT (Austria)
- Partners:

DRD (Denmark)	BRRC (Belgium)
TRL (UK)	TUG (Poland)
VTI (Sweden)	ZAG (Slovenia)
BASt (Germany)	FEHRL (Belgium)
IFSTTAR (France)	DIN (Germany)
- Third parties: CETE Lyon, CETE de l'Est

- Budget: EUR 3,016,938
- EC contribution: EUR 2,395,413
- Duration: 36 months
- Start: 1st November 2013 End: 31st October 2016

Objectives

- Advanced harmonization/standardization of measurement methods for
 - skid resistance
 - noise emission
 - rolling resistance of road pavements
- Prenormative research creating the technical basis for draft standards
- Adapted strategy for each parameter
- Close cooperation with CEN TC227/ WG5

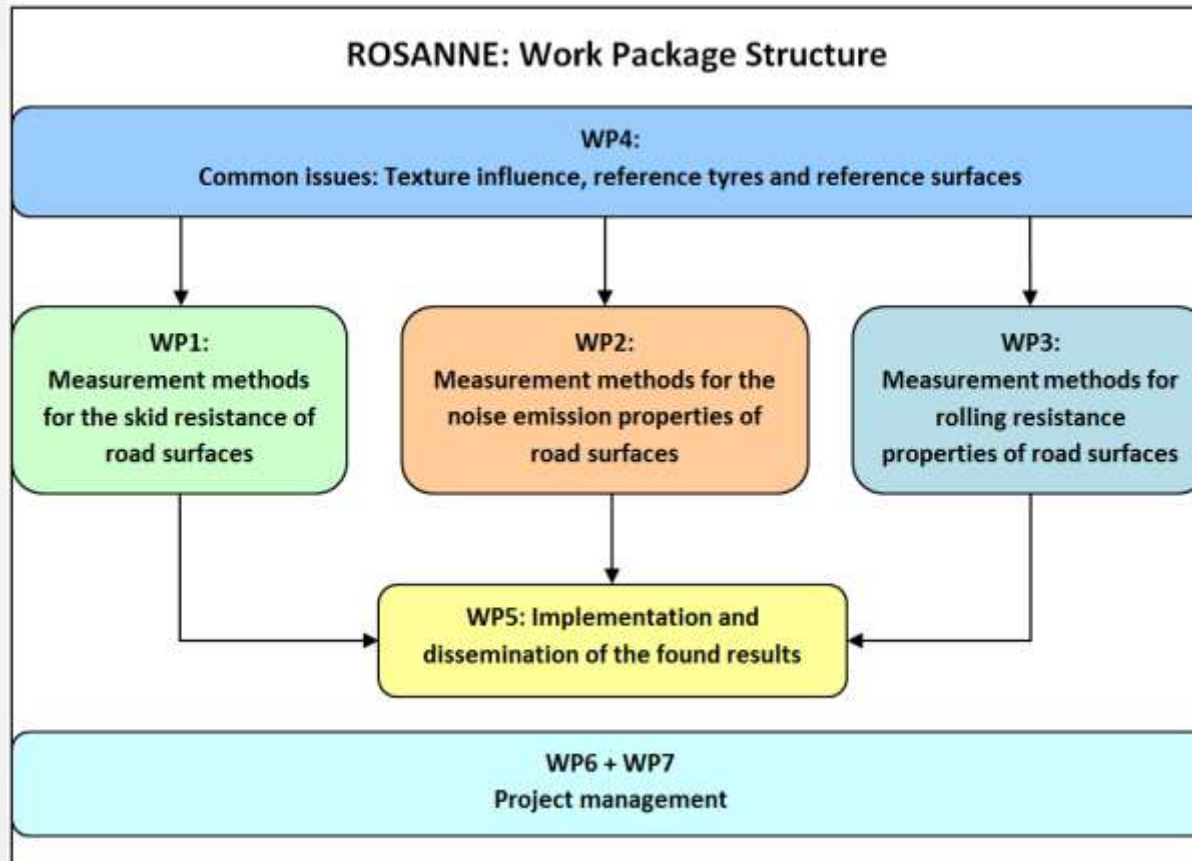


ROSANNE project and standardization



- ROSANNE is a project on pre-normative research
 - Creates the technical basis for standards
 - Creates a draft document which can be used for standardization
 - Presents status of this document to WG5 at every meeting
 - Delivers final draft document to WG5
 - Standardization process remains with CEN and WG5
- Close cooperation with CEN TC227/WG5 (and ISO TC43/SC1/WG 33) planned

Work packages



WP1 Skid resistance



Objective

- **The harmonisation of skid resistance measurements across Europe**
- Following the TYROSAFE Roadmap
- Deriving conversion factors for friction indices based on similar groups of devices
 - Side-force
 - Longitudinal fixed slip
 - Low slip
 - High slip

WP1 Skid resistance



Task 1.1: Setting boundaries for harmonisation

- Completed (deliverable D1.1 submitted)

Task 1.2: Planning and execution of test programme

- 1st round of data collection completed May 2014
- 2nd round of data collection completed April 2015
- IFSTTAR test track and surrounding roads
- 11 devices at first trial (6 LFC, 5 SFC)
- 18 devices at second trial (10 LFC, 8 SFC)
- All devices from 1st trial also attended 2nd trial



WP1 Skid resistance



Task 1.3: Analysis of data from test programme (ongoing)

- Analysis of data from 1st test programme completed (deliverable D1.2 submitted)
- Analysis of data from 2nd test programme started Aug 2015
- Repeated same analysis as used for 1st trail
- Basic correction (at individual speeds)
- Full SRI approach (accounts for speed dependency)
- Similar results from both trials
- Reproducibility std dev, σ_R , around 0.04-0.05
- Work ongoing until February 2016

Task 1.4: Quality Assurance and draft Standards



WP2 Noise



Objectives of WP2

- Combine available measurement methods like SPB and CPX into one consistent and harmonized characterization procedure
- Facilitate comparison of road pavement noise emission data on the European level
- Enable standardized measurement of noise emission data that can be included in European road noise prediction methods



WP2 relations between measurement methods



- The average relation found in the data collected for ROSANNE at a microphone height of 1.2 m is Cars: $L_{AFmax,80} = 0.95 \cdot CPXP_{80} - 15.6 \text{ dB}$ (20.5 dB average difference between the two measured quantities and with almost 90 % of all data being within ± 1 dB around this trend line)
- The average relation between multi-axle truck pass-by noise levels and CPXH80 is: **Multi-axle trucks: $L_{AFmax,80} = 0.65 \cdot CPXH_{80} + 24.0 \text{ dB}$**
- At 1.2 m microphone height the same relation was found for cars and heavy vehicles between the maximum vehicle pass-by noise level L_{AFmax} and the sound exposure level L_{AE} : $L_{AFmax} - L_{AE} = 2.272 \cdot \ln(v) - 13.1 \text{ dB}$
- The measurements carried out in the ROSANNE project show good correlation between maximum noise levels and sound exposure levels
- The comparison of pavements may depend on the microphone height used for pass-by noise measurement

WP2 Noise



- Research on temperature influence and possible corrections
- Decision taken based on the main results of Task 2.1: choice of the measurement method for road surface classification, for product characterization and type approval testing:
 - The CPX method will be the only method proposed by ROSANNE for acoustic characterization of a road surface
 - For type approval testing only the CPX method should be used
 - The SPB method can be used in addition to CPX, but the suggested method by the ROSANNE-Consortium will be the CPX method: any link to noise mapping (CNOSSOS-EU) should be made with additional measurements (according to SPB) or applying the formula from D2.3

WP3 rolling resistance



- The objective of this work package is to prepare for International and European standardization of measurement methods for representative and accurate characterization of road surface rolling resistance properties.

WP3 rolling resistance



Round Robin Test (RRT)



5 RR trailers



Alternative methods

Road Surf. Charac.



WP3 rolling resistance



- Deliverable 3.1
- State of the art on rolling resistance measurement devices including draft standard outline: This is the first outline for the draft standard on rolling resistance including an overview of the existing devices.
- Deliverable 3.2
- Results of rolling resistance laboratory drum tests: This report presents the results of the drum tests with replica road surfaces.
- Deliverable 3.3
- Parameters influencing rolling resistance and possible correction procedures: This report described the necessary correction procedures for the method.

WP3 rolling resistance



- Deliverable 3.3
- Parameters influencing rolling resistance and possible correction procedures: This report described the necessary correction procedures for the method.
- Deliverable 3.4 Final draft delivered
- Comparison of alternative test methods and theoretical models: This report links the trailer-based method to other rolling resistance measurement methods and to models for the overall vehicle fuel consumption.

WP4 Common issues: Texture influence, reference tyres



- Influence of texture properties and common descriptors
 - Measurements were performed 2014 at IFSTTAR test track in Nantes (11 different tracks measured), texture measurement equipment: two 3D and two 2D measurement devices were used
- Reference tyres – tyre to tyre differences, age, hardness
- Reference surfaces – for noise and rolling resistance
- Texture and other geometric variations in and between wheel tracks. A 6000 km “circle” from Linköping, Sweden, through northern Poland, northern Germany, through southwestern Denmark and back through southwestern Sweden to Linköping.



Deliverables, Deliverables



No.	Name	WP	Partner	Status	DL (M)
D1.1	Definition of boundaries and requirements for the Common Scale for harmonisation of skid resistance measurements including draft standard outline	1	BASSt	Accepted by EC	4
D2.1	Outline of a draft standard for a procedure for the characterization of noise properties of road surfaces	2	AIT	Accepted by EC	4
D3.1	State of the art on rolling resistance measurement devices including draft standard outline	3	BASSt	Accepted by EC	4
D5.1	Draft roadmap for the standardization process	5	BASSt	Accepted by EC	4
D5.2	Website	5	FEHRL	Accepted by EC	4
D5.3	Exploitation Strategy plan	5	FEHRL	Accepted by EC	4
D7.1	Quality Assurance Plan	7	AIT	Accepted by EC	4
D4.1	State of the art concerning texture influence on skid resistance, noise emission and rolling resistance	4	BRRRC	Accepted by EC	6

Deliverables, Deliverables



No.	Name	WP	Partner	Status	DL (M) old/new
D2.2	Report on temperature influence and possible corrections for measurement of noise properties of road surfaces	2	VTI	Accepted by EC	12 / 18
D3.2	Results of rolling resistance laboratory drum tests	3	TUG	Accepted by EC	12 / 18
D2.3	Report on the analysis and comparison of existing noise measurement methods for noise properties of road surfaces	2	DRD	Accepted by EC	14 / 18
D3.3	Parameters influencing rolling resistance and possible correction procedures (report)	3	TUG	Accepted by EC	14 / 17
D1.2	Analysis of data from the first round of tests and initial development of the common scale	1	TRL	Accepted by EC	16 / 18
D4.2	Texture-based descriptors for road surface properties and how they can be used in the appropriate standards (report)	4	BASt	Delayed	16 / 29
D5.4	Report on feedback from and cooperation with CEN TC 227/WG5 and updated standardization roadmap	5	DIN	Accepted by EC	18 / 18
D7.2	Mid-term work plan review	7	AIT	Accepted by EC	18 / 18



Thank you for your attention!

Website: www.rosanne-project.eu

Coordinator: **Manfred Haider, AIT**
manfred.haider@ait.ac.at