InteMat4PMS
Integration of material-science based performance models into life-cycle-analysis processed in the frame of pavement management systems
a research project of the
cross-border funded joint research programme
"ENR2011 DESIGN – Rapid and durable Maintenance Method and Techniques"

1) Introduction

"ENR2011 DESIGN – Rapid and durable Maintenance Method and Techniques" is a trans-national joint research programme that was initiated by "ERA-NET ROAD II – Coordination and Implementation of Road Research in Europe" (ENR2), a Coordination Action in the 7th Framework Programme of the EC. The funding partners of this cross-border funded Joint Research Programme are the National Road Administrations (NRA) of Belgium, Germany, Denmark, Finland, France, Netherlands, Norway, Sweden, Slovenia and United Kingdom.

2) Project Facts

Duration:	01/09/2011 – 31/08/2013
Budget:	EUR 305.000,-
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3) Project Description

The overall project objective is to outline an advanced pavement management procedure for asphalt road pavements. Research focuses on the integration of structural parameters and of structural pavement deterioration models in pavement performance prediction accomplished in the frame of pavement management systems (PMS). This shall significantly improve the selection process for maintenance strategies within PMS as well as asphalt pavement design.

Based on performance studies and material investigations on motorway test sections, it is demonstrated, how material-science based parameters can be integrated into the process of performance prediction.

To date, most PMS are based on empiric deterioration models, which do not take into account specific material properties. Maintenance decisions are based on general performance models. Hence, specific choice of material properties, e. g. due to optimized mix design or use of alternative materials, does not affect the results displayed by PMS. Thus, it is impossible to judge specific material settings used for maintenance strategies.

In this project, a procedure shall be drafted that enables impartial management decisions based on comprehensible choice of materials, and of construction and maintenance

procedures. New innovative approaches for PMS solutions in relation to the state-of-the-art shall be developed. Inter alia, this project meets research needs for

- specifying performance models based on material characteristics and structural data,
- incorporating structural parameters in probabilistic performance prediction models,
- employing enhanced structural probabilistic prediction models in PMS,
- and validating probabilistic models and advanced PMS tools on structural data from a test section.

4) Expected Results

From technical, economic and environmental point of view, the objective of this research project is to improve the

- accuracy of performance prediction in the frame of PMS,
- material selection during the design process,
- choice of innovative maintenance or replacement strategies with preventive and added value effects, like less construction time and longer intervention periods, both linked to reduced additional user costs during reconstruction,
- durability, serviceability and environmental compatibility of road transport infrastructures,
- promotion and development of product innovation, and of long-term maintenance contracts.

The project will demonstrate how sophisticated analysis solutions integrating material science and performance modelling can be realized for real test sections.

As advanced mechanistic material models are used in this project, rather than empirical performance relationships, the application of innovative construction materials and advanced pavement structures is encouraged. Hence, this project has the potential for higher performances of pavements, for an overall improvement in pavement durability, and thus, for most cost-effective road maintenance decisions.

The project results will provide missing research expertise and support to road operators involved in pavement management for developing more durable maintenance decisions.