New Nordic Performance Models for Better Roads

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We aim at better prediction of future performance!
Benefits for Road Authorities

- Better predicted performance will form the basis for better decisions on design of pavements, as well as optimal maintenance and repair strategies based on the available budget and the required service level.

From www.pengeinfo.dk
Facts on project

- Participants
  - Norway, Denmark, Sweden and Iceland.

- Length
  - 3 years + 1 extra

- Economy
  - 800,000 Euro
Project Level

- Looking at pavements in detail
- Models depending on specific material properties and construction thicknesses
- Models often used in design programs
- Project focussed on rutting (main reason for new overlays)

\[ \text{Rutting} = \Sigma \epsilon_p \cdot h_x \]
Research approach

- Select relevant material models for calculation of rutting
- Laboratory testing of bound and unbound materials from test sections
- Calibration of models to fit performance observed at test sections
Results

- A set of recommended models
  - Asphalt: MEPDG-model
  - Unbound: The Gidel model and the Korkiala-Tanntu model
- Material data can be obtained from laboratory testing or from material database for commonly used materials
Network Level

- Looking at a network
- Models depending on asphalt layer thickness and previous condition measurements
- Models used in management system for maintenance planning
Model for network level

- Based on known/respected model (HDM-4)
- A general system that can be fitted to every country
- Input from objective condition data
- Data measured at traffic speed
Calibration to fit Nordic conditions
Calibration to fit Nordic conditions

- HDM-4 was reprogrammed, and calibrated to fit Swedish data.

![Rutting](image1)

![Evenness](image2)
Output from MATLAB program
Results

- Recommendation of model and method
- MATLAB program application that can be implemented in existing PM-systems
Continuation – network level

- Model validation
  - by including data from the remaining geographic regions represented by the countries participating

- Improve user interface of MATLAB program
Benefits of cooperation

- Different competences
- Access to database
- Model validated in wider geographic areas