Pavement Management System in Austria

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28. – 29. listopadu 2017, České Budějovice

Motto: Asfaltové vozovky – bezpečná cesta k prosperitě









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Introduction

Objectives

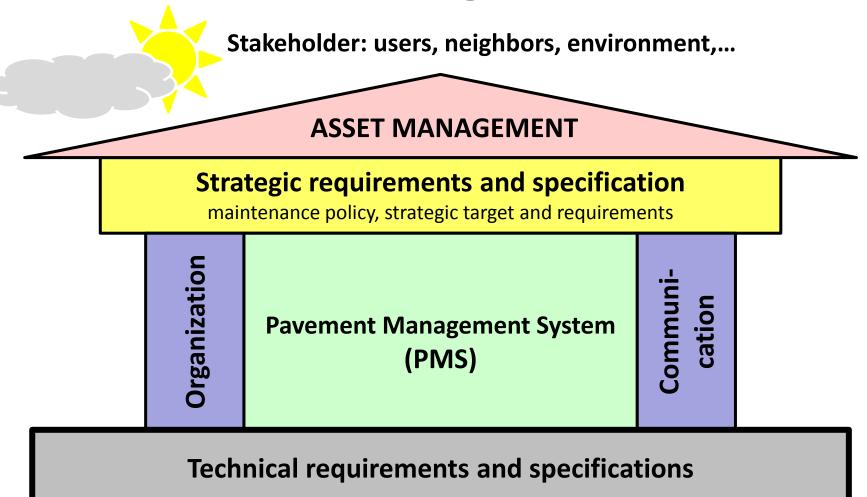
Pavement management

process

- Data management
- PMS analysis
- Results
- dTIMS software solution Outlook



Asset and Pavement Management



The pavement management process at a glance



Objectives of the Austrian PMS

- Increase of efficiency based on a systematic and objective planning of maintenance treatments
- **Basis = knowledge about the pavement construction**
 - Inventory (length, areas, construction types, etc.)
 - Condition from condition inspections
- Integration of strategic targets into the maintenance process

Output

- Which maintenance treatments?
- When is the best point of time for the treatments?
- Where should it be done?

Basis for Infrastructure Investment and Maintenance Program







Datamanagement - Overview

Inventory data

- Network data
- Referencing information (LRS, GIS)

Traffic data

Pavement construction data

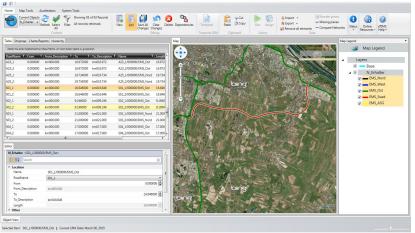
- Materials and type of layers
- Thicknesses
- Year of placements

Condition data

 Condition measurements and visual inspections

Information actual maintenance program and new constructions





Pavement condition data

Pavement surface characteristics

- Rutting (rut depth under 2m straight edge)
- Longitudinal evenness (IRI)
- Cracking (% of cracked area)
- Surface defects (% of surface defects)
- Skid resistance (longitudinal friction coefficient)
- Basis: Austrian standards RVS 13.01.15 and RVS 13.01.16
- Collected on each single lane on ASFINAG network and on state roads in one direction in form of 50m sections
- Interval: 5 years
- Main input information for analysis







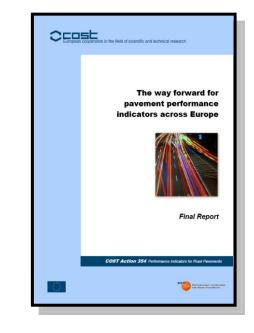
PMS-analysis – assessment pavement condition

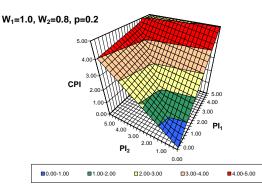
Single condition indices

 Transformation of technical parameters into dimensionless indices (scale 1-very good to 5-very poor)

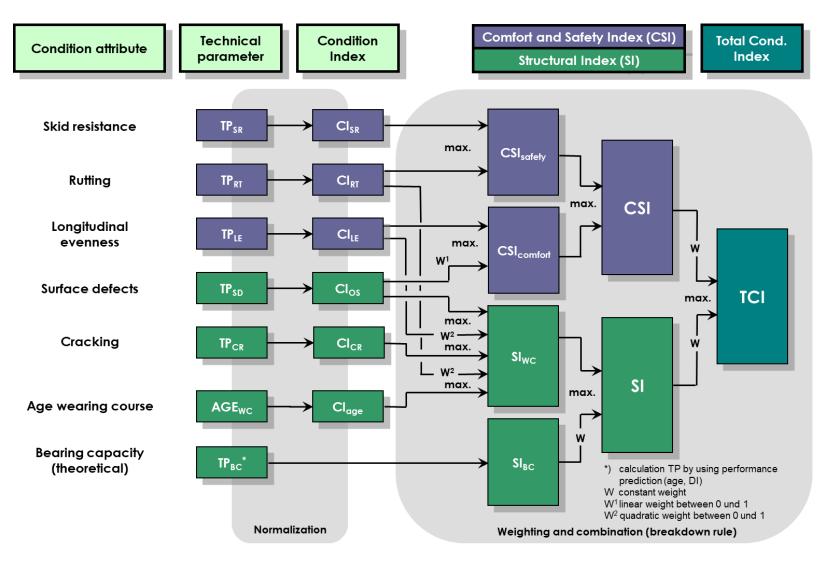
Combined indices

- Comfort and safety index (CSI)
- Structural index (SI)
- Total condition index (TCI)
- Basis: COST 354 "Performance indicator for road pavements" (2008)





PMS-analysis – assessment pavement condition



PMS-analysis - method

Life-cycle-cost analysis (LCCA)

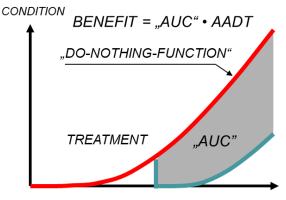
- Cost-efficiency analysis
- Incremental cost-benefit-ratio technique

Performance prediction

 Deterministic performance functions of single technical parameters (based on national research projects)

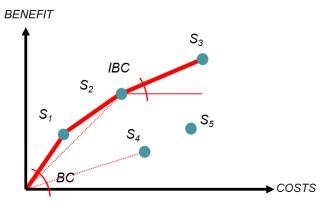
Optimization

- Target function: maximizing benefit
- Restrictions: budget
- Heuristic optimization procedure



"AUC" = Area under the curve

CALCULATION OF BENEFIT FOR EACH INDIVIDUAL TREATMENT STRATEGY



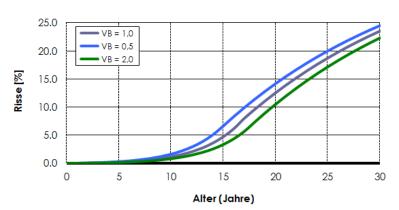
COMPARISON OF TREATMENT STRATEGIES AND SELECTION OF MOST EFFICIENT STRATEGIES FOR OPTIMIZATION

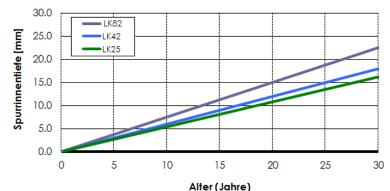
PMS-analysis – performance prediction

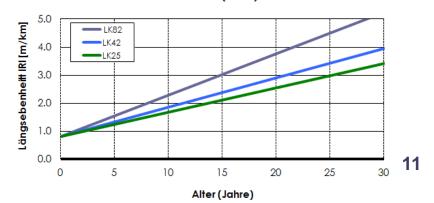
- Deterministic functions with different input parameters
 - → Age
 - ESALs
 - Design index
 - Frost index

Calibration steps

- Model parameters (a, b) as function of pavement construction (history)
- Section based calibration using pavement condition data (factors & vectors)







PMS-analysis – treatment catalogue

Heavy maintenance treatments

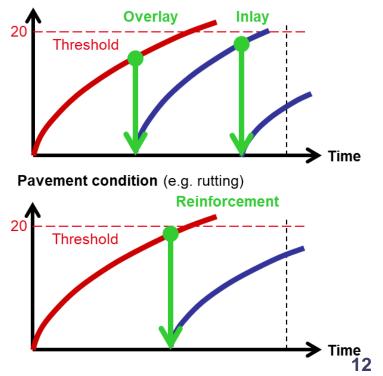
- Surface
- Wearing course
- Reinforcement
- Reconstruction

Minor maintenance treatments

- Intensive routine maintenance treatments based on risk assessment (CSI and SI)
- Comparison of maintenance treatment strategies on each single section as basis for LCCA and optimization



Pavement condition (e.g. rutting)



Results of the Austrian PMS

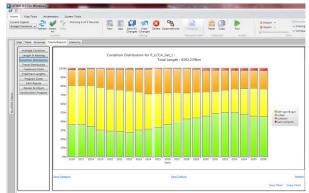
Section based results

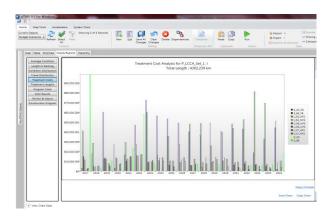
- Type, year and location of treatment
- Treatment prioritization
- Basis for further investigation on project level

Network level results

- Total network or sub-networks
- Condition distribution
- Cost distribution
- Comparison of scenarios
- Treatment distribution
- Maintenance backlog
- Development asset value



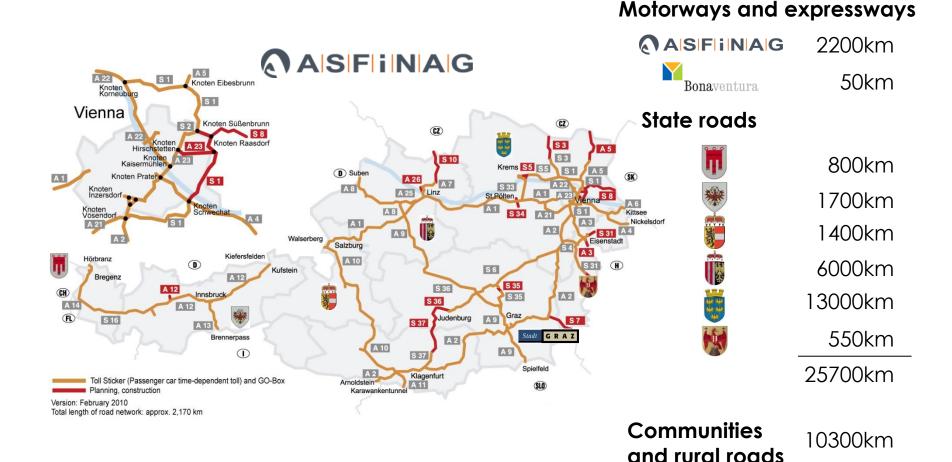




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PMS-application using dTIMS in Austria (national solution)



Thank you for your attention!