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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Objectives
Pavement management process
  ➤ Data management
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dTIMS software solution
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Asset and Pavement Management

Stakeholder: users, neighbors, environment, ...

ASSET MANAGEMENT

Strategic requirements and specification
maintenance policy, strategic target and requirements

Organization

Pavement Management System (PMS)

Technical requirements and specifications

Communication
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

CONDITION

BENEFIT = “AUC” • AADT

“DO-NOTHING-FUNCTION”

“AUC”

TREATMENT

CALCULATION OF BENEFIT FOR EACH INDIVIDUAL TREATMENT STRATEGY

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

„AUC“ = Area under the curve
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
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
dTIMS (Deighton Total Infrastructure Management System)
PMS-application using dTIMS in Austria (national solution)

Motorways and expressways
- 2200km
- 50km

State roads
- 800km
- 1700km
- 1400km
- 6000km
- 13000km
- 550km
- 25700km

Communities and rural roads
- 10300km
Thank you for your attention!