

AV '17 KONFERENCE ASFALTOVÉ VOZOVKY 2017

Pavement Management System in Austria

Dr. Alfred Weninger-Vycudil



28. – 29. listopadu 2017, České Budějovice

Motto: Asfaltové vozovky – bezpečná cesta k prosperitě



Contents

Introduction

Objectives

Pavement management
process

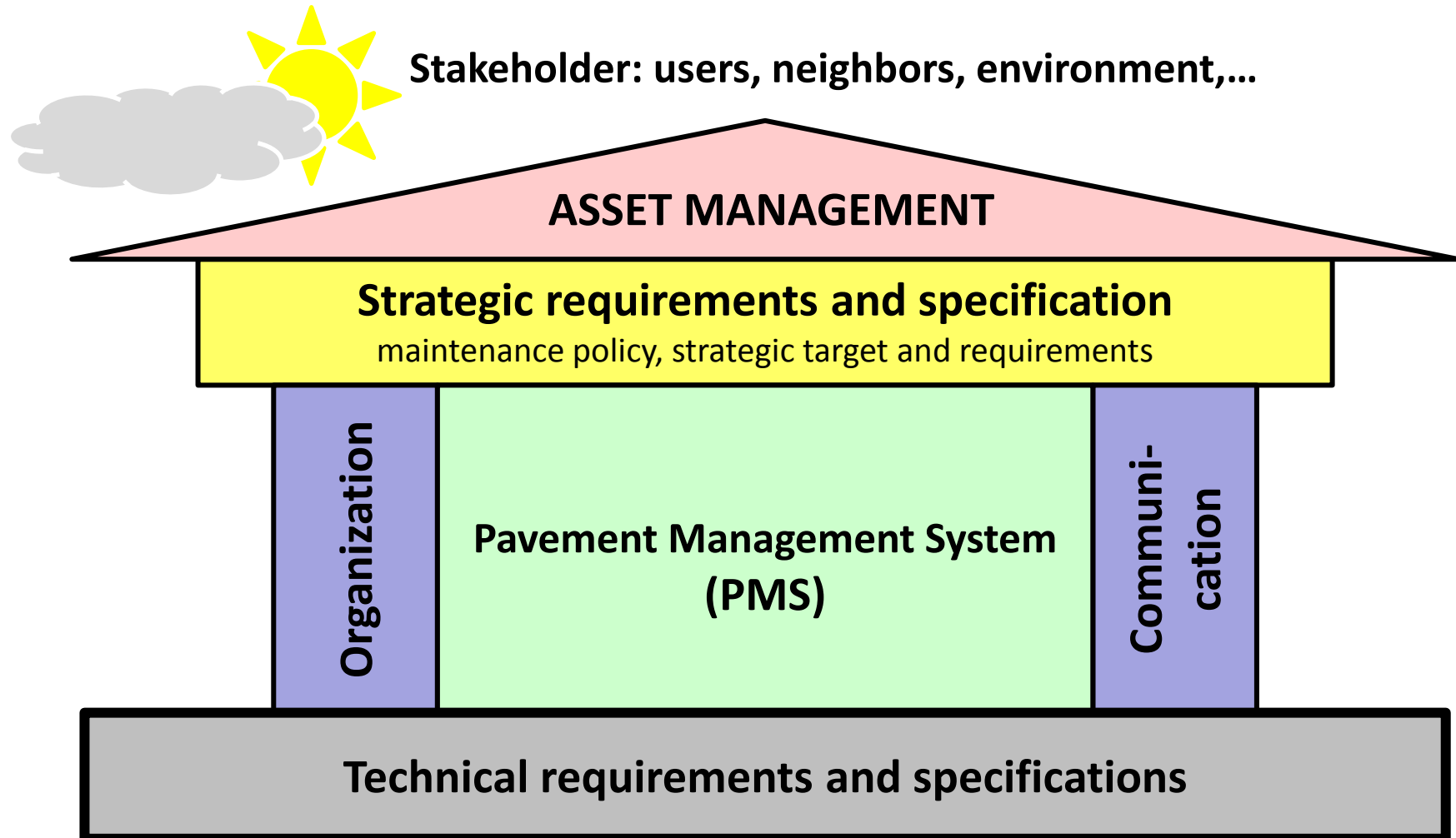
- ➔ Data management
- ➔ PMS analysis
- ➔ Results

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



AV 17 KONFERENCE ASFALTOVÉ VOZOVKY 2017

Datamanagement - Overview

Inventory data

- ➔ Network data
- ➔ Referencing information (LRS, GIS)

Traffic data

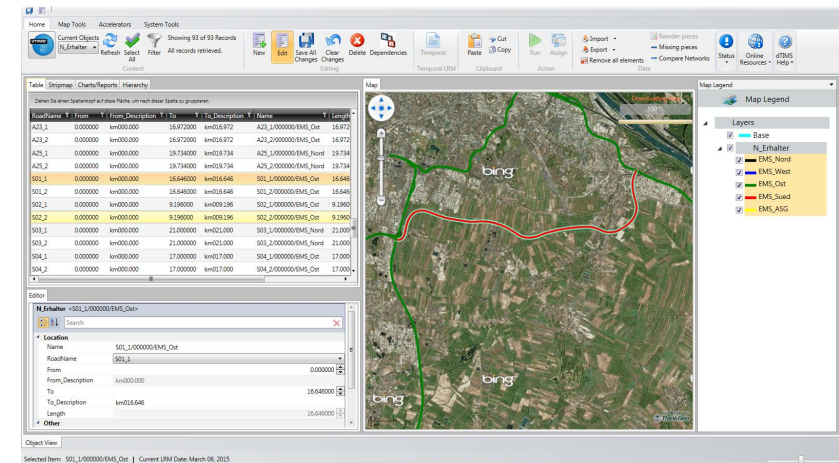
Pavement construction data

- ➔ 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

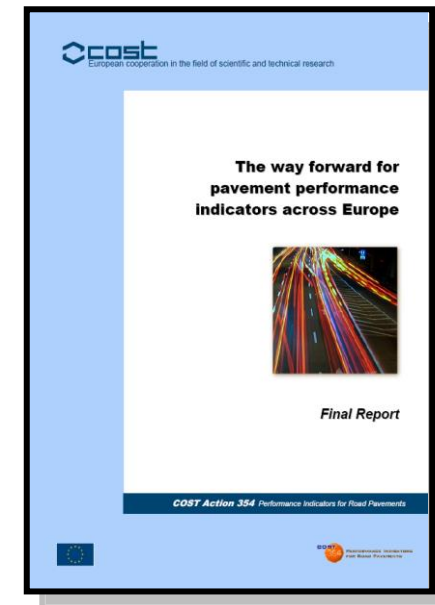
Single condition indices

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

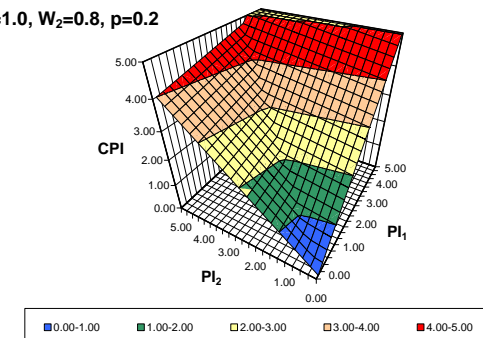
Combined indices

- ➔ Comfort and safety index (CSI)
- ➔ Structural index (SI)
- ➔ Total condition index (TCI)

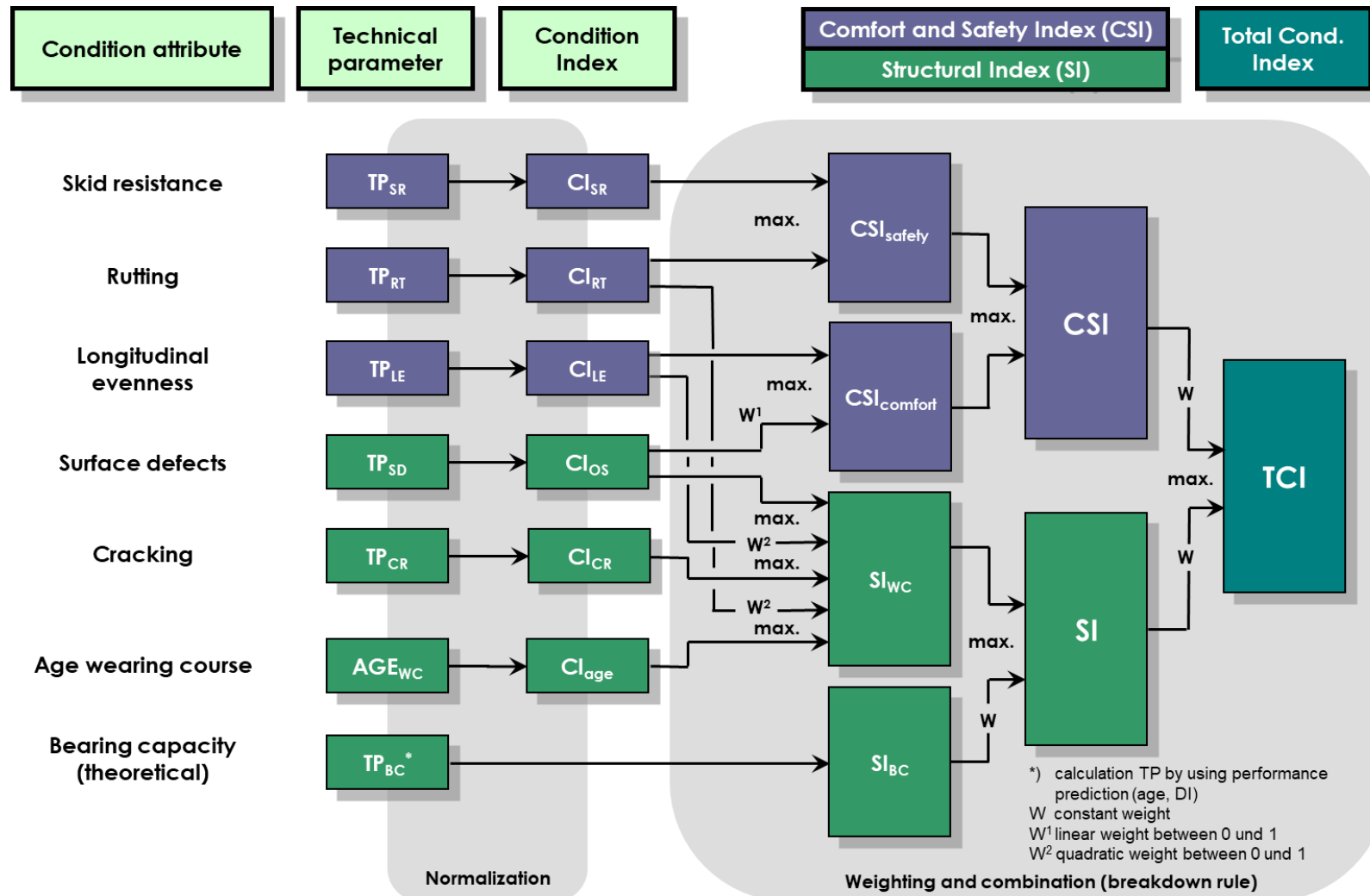
Basis: COST 354 “Performance indicator for road pavements” (2008)



$W_1=1.0, W_2=0.8, p=0.2$



PMS-analysis – assessment pavement condition



PMS-analysis - method

Life-cycle-cost analysis (LCCA)

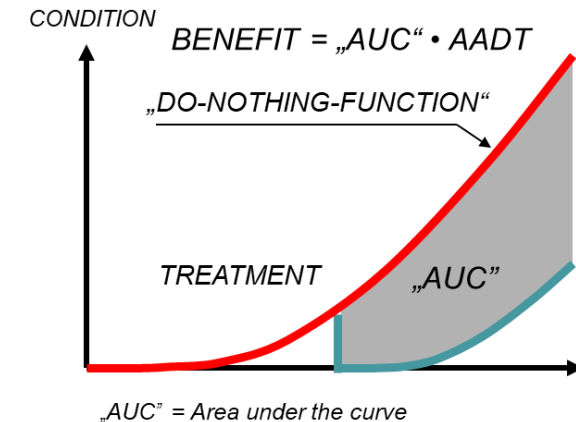
- ➔ Cost-efficiency analysis
- ➔ Incremental cost-benefit-ratio technique

Performance prediction

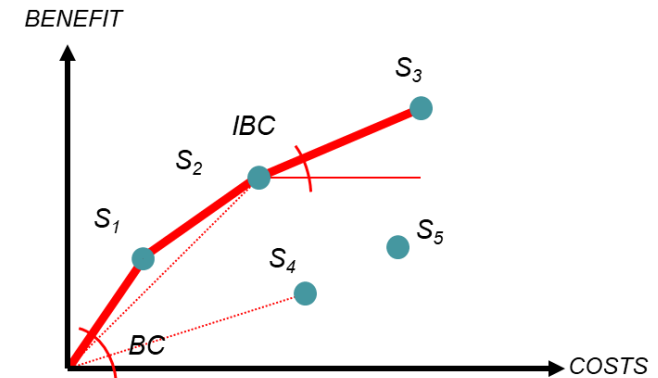
- ➔ Deterministic performance functions of single technical parameters (based on national research projects)

Optimization

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



CALCULATION OF BENEFIT FOR EACH
INDIVIDUAL TREATMENT STRATEGY



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

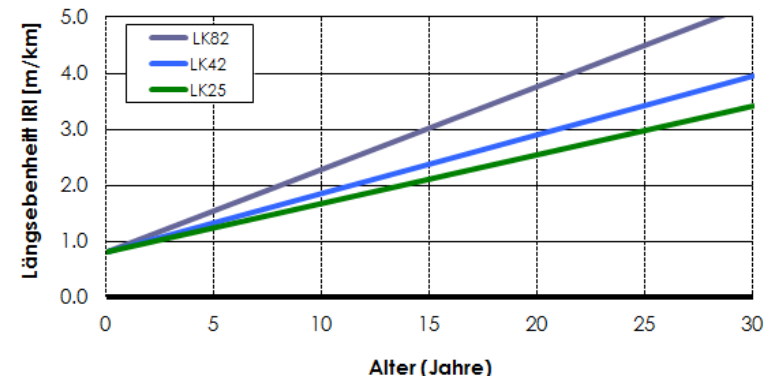
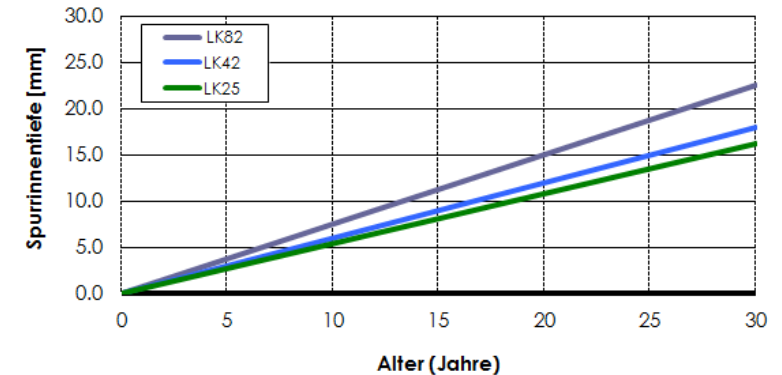
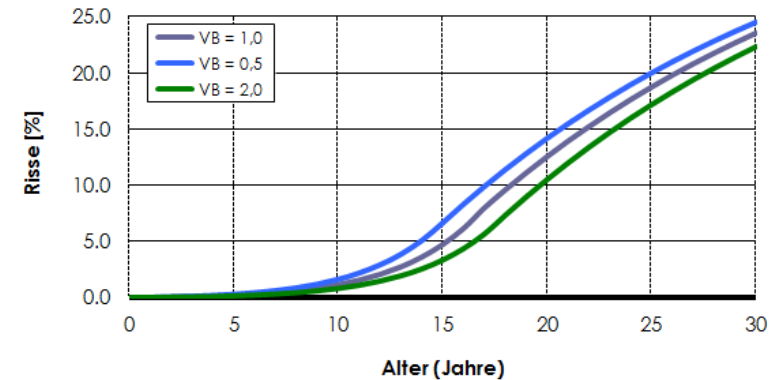
PMS-analysis – performance prediction

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

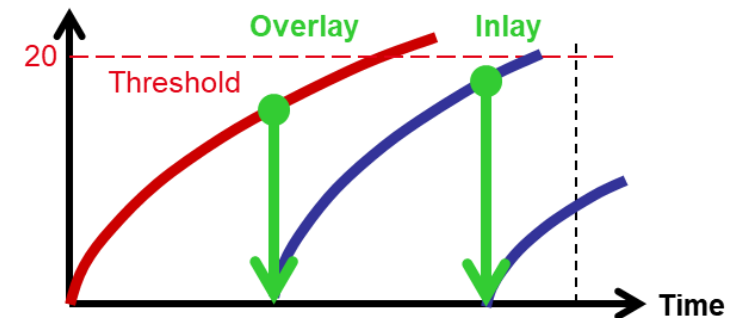
Minor maintenance treatments

- ➔ Intensive routine maintenance treatments based on risk assessment (CSI and SI)

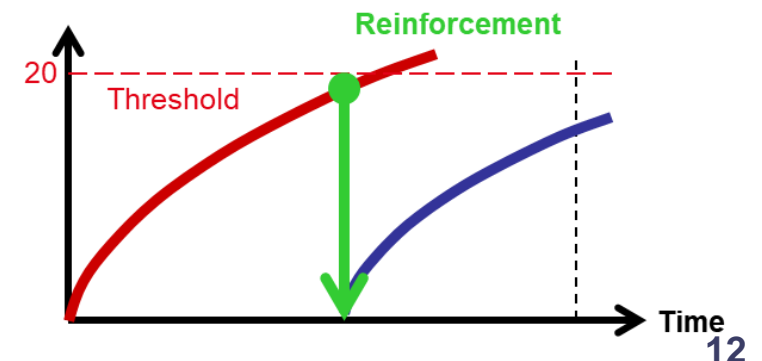
Comparison of maintenance treatment strategies on each single section as basis for LCCA and optimization



Pavement condition (e.g. rutting)

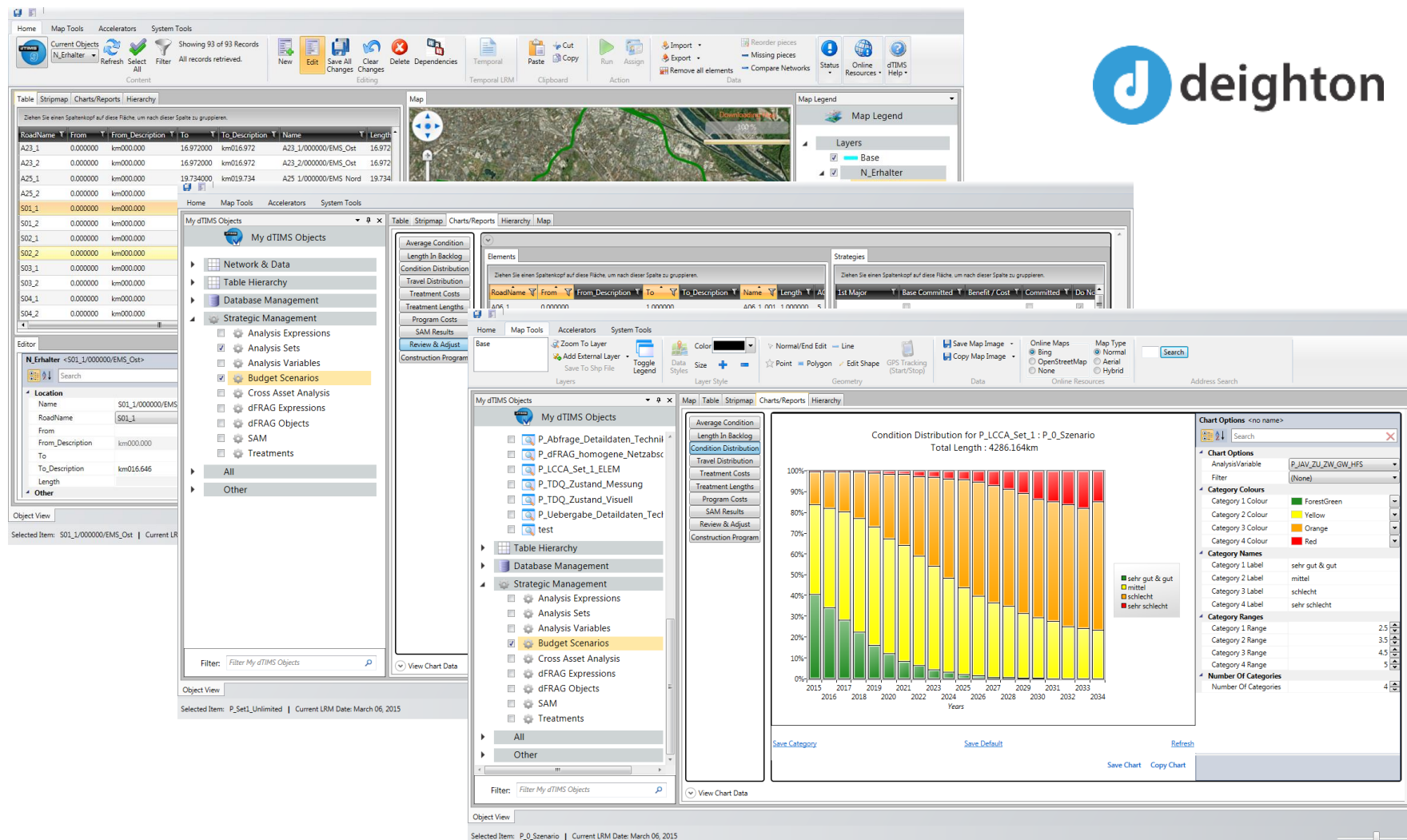


Pavement condition (e.g. rutting)

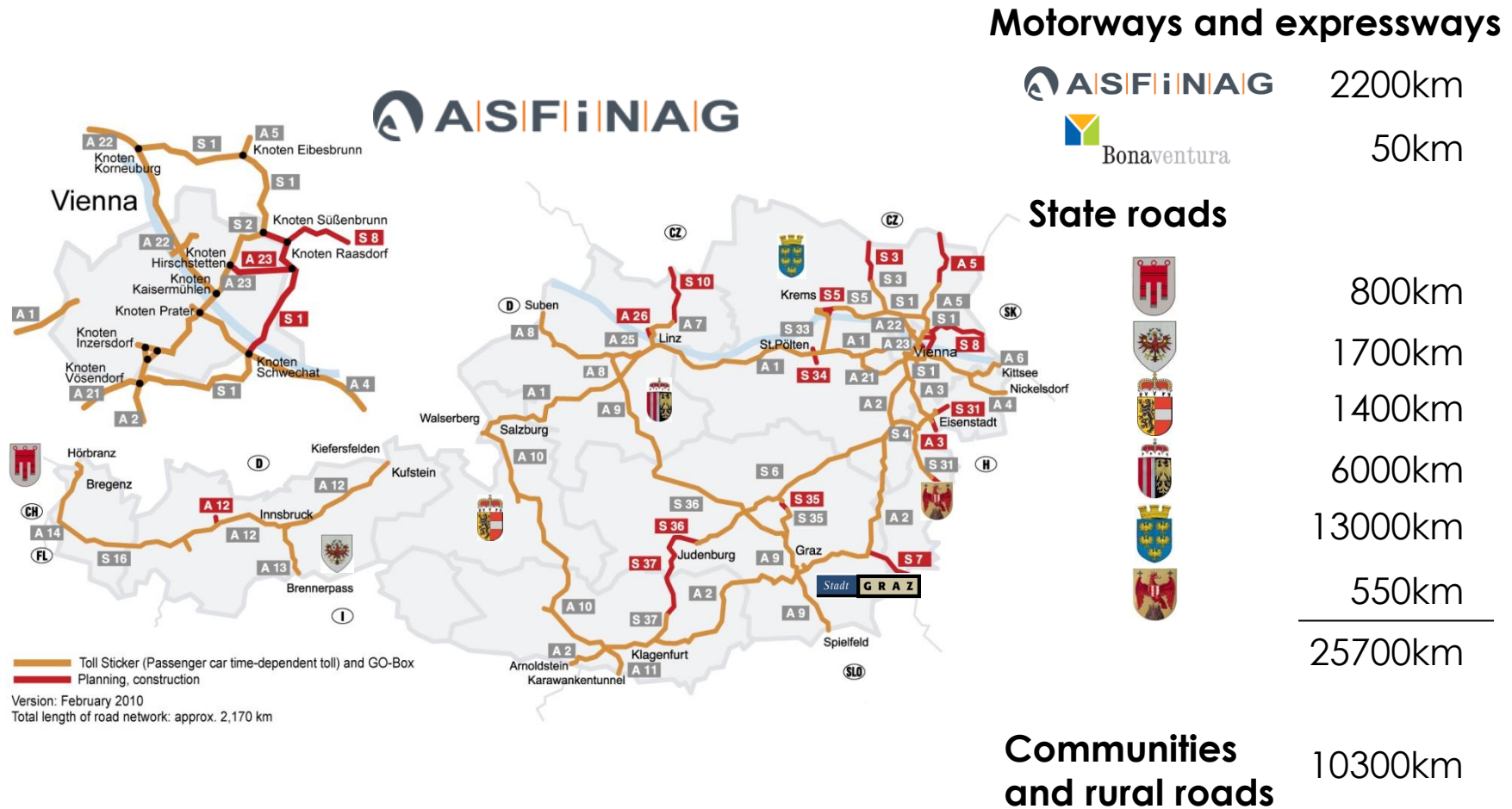


AV 17 KONFERENZ ASFALTOVÉ VOZOVKY 2017

dTIMS (Deighton Total Infrastructure Management System)



PMS-application using dTIMS in Austria (national solution)



AV 17 KONFERENCE ASFALTOVÉ VOZOVKY 2017



Thank you for your attention!