ASFINAG Asset Management System (EMS)

Gerhard Eberl
(ASFINAG)

Alfred Weninger-Vycudil
(PMS-Consult GmbH)

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Introduction
Austria at a glance

Capital: Vienna
Total Area: 83,872 (115th) 32,383 sq mi
Population: 8,356,707 (92nd)
Roads in Austria

Motorways and Expressways
- 2.200km (50km)

State Roads
- 9 Federal States with 33.600km

[Map of Austria roads]

Toll Sticker (Passenger car time-dependent toll) and GO-Box
Planning, construction

Version: February 2010
Total length of road network: approx. 2,170 km
ASFINAG Asset Management System - Overview

MOTORWAYS AND EXPRESSWAYS

ASSET

Engineering structures

Pavements

Others

PAVEMENT MANAGEMENT

VIAMS Data Management and LCC-Analysis

BAUT Visualisation/Interfaces

OPTIMIZED COORDINATION

ENGINEERING STRUCTURE MANAGEMENT

BAUT Date- and Maintenance management

Version: February 2010
Total length of road network: approx. 2,170 km
Objectives of the ASFINAG-EMS

✓ Net-wide, objective Asset Management under different stakeholder requirements for different decision levels (project level – network level)
✓ Provision of a comprehensive basis for an objective maintenance planning process of all sub-assets (pavements, bridges, tunnels, etc.)
✓ High availability of road network and customer-oriented maintenance strategies
Main elements of the ASFINAG-EMS

✓ Pavement Management System for systematic maintenance of traffic pavements
✓ Managementsystem for engineering structures (bridges, tunnels, retaining walls, etc.)
✓ Managementsystem for the coordination and execution of maintenance measures for the different sub-assets of the whole road infrastructure
Pavement Management System VIAPMS™

Assessment and evaluation of different maintenance strategies by using LCCA and prognosis of pavement condition (rutting, skid resistance, long. Evenness, cracking and other surface defects)
Pavement Management System VIAPMS™

Section based analysis (analysis period = 20 years) → section based treatment recommendations and cummulation to net-wide overview (condition distribution, cost and treatment distribution, return on investment, maintenance backlog, etc.)
Engineering Structure Management BAUT

✓ BAUT
  Information of objects/constructions, inspections, defects and investments

✓ BAUTK
  Information of failures and defects (control element)

✓ EMS
  Calculation and administration of heavy maintenance measures and project with interface to ASFINAG-SAP

✓ Construction site
  Administration of construction sites

✓ Road
  Administration of pavement construction and condition data
Modules Sooftwaresystem BAUT

- BAUT data base
  - Data-warehouse-solution
- Interfaces
  - SAP
  - VIAPMS
  - BMS (VTG)
- Module EMS
- Module construction site
- Module special transports
- Modul strip map
- Online-solution
- Modul analysis
Data of the ASFINAG-EMS (pavement)

- Asphaltbepestigung (Neubau oder Erneuerung) / Asphalt pavement (new construction or reconstruction) - 24%
- Asphaltbepestigung mit struktureller Verbesserung oder Verstärkung / Structural improved or strengthened asphalt pavement - 5%
- Asphaltbepestigung mit Deckschichtmaßnahme / Asphalt pavement with measure on wearing course - 31%
- Betondecke (Neubau oder Erneuerung) / Concrete pavement (new construction or reconstruction) - 20%
- Betondecke mit bituminöser Deckschicht / Concrete pavement with bituminous wearing course - 20%
Data of the ASFINAG-EMS (engineering structure)

<table>
<thead>
<tr>
<th>Objekte / Objects</th>
<th>Fläche / Area [m²]</th>
<th>Länge / Length [m]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brücken / Bridges</td>
<td>5.072</td>
<td>5.495.865</td>
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<tr>
<td>Lärmschutzwände / Noise barriers</td>
<td>5.096</td>
<td>2.726.864</td>
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<tr>
<td>Mauern / Retaining walls</td>
<td>633</td>
<td>290.177</td>
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<tr>
<td>Tunnel / Tunnels [tubes]</td>
<td>252</td>
<td>305.233</td>
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<tr>
<td>Galerien / Galleries</td>
<td>37</td>
<td>7.529</td>
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<tr>
<td>Wegweiser / Gantries</td>
<td>1.315</td>
<td></td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>12.405</strong></td>
<td><strong>8.512.905</strong></td>
</tr>
</tbody>
</table>
Data of the ASFINAG-EMS (engineering structure)

- Brücken / Bridges: 5072
- Lärmschutzwände / Noise barriers: 5096
- Mauern / Retaining walls: 633
- Tunnel / Tunnels [tubes]: 252
- Galerien / Galeries: 37
- Wegweiser / Gantries: 1315
Pavement construction data – Mean age

- Mittleres strukturelles Alter Betondecken / Mean structural age concrete pavements: 17.2
- Mittleres Alter Asphaltddecken / Mean age asphalt wearing courses: 10.2
- Mittleres strukturelles Alter Asphaltbefestigung / Mean structural age asphalt pavements: 19.1

[Bar chart with data points]
## Pavement construction data - Measures

<table>
<thead>
<tr>
<th></th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
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<tbody>
<tr>
<td>Neubau oder Erneuerung</td>
<td>174</td>
<td>153</td>
<td>78</td>
<td>114</td>
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<tr>
<td>New construction or reconstruction</td>
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<tr>
<td>Strukturelle Verbesserung oder Verstärkung</td>
<td>59</td>
<td>59</td>
<td>59</td>
<td>50</td>
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<tr>
<td>Structural improvement or strengthening</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Deckschichtmaßnahme</td>
<td>73</td>
<td>27</td>
<td>48</td>
<td>30</td>
</tr>
<tr>
<td>Wearing course renewal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Graph:
- **Y-axis:** Length carriageways
- **X-axis:** Year
- **Legend:**
  - Deckschichtmaßnahme / Wearing course renewal
  - Strukturelle Verbesserung oder Verstärkung / Structural improvement or strengthening
  - Neubau oder Erneuerung / New construction or reconstruction

The graph shows the length of carriageways for different pavement construction measures from 2006 to 2009.
Prognosis pavement condition - Scenario

Budget scenario with constant investments based on the investments of the previous years (Status-Quo-Scenario)
Prognosis maintenance measures pavement

- Deckschichtmaßnahme / Wearing course renewal
- Strukturelle Verbesserung oder Verstärkung / Structural improvement or strengthening
- Neubau oder Erneuerung / New construction or reconstruction

Length carriageways

km

2010 2011 2012 2013 2014 2015
Prognosis bridge condition - Scenario

Budget scenario with constant investments based on the investments of the previous years (Status-Quo-Scenario)
Actual budget distribution to sub-assets

Distribution of maintenance budget according to the different sub-assets of the ASFINAG network (without extension and new construction)

- Oberbau / Pavement (incl. Generalerneuerung / incl. reconstruction) - 15%
- Brücke / Bridges (incl. Generalerneuerung / incl. reconstruction) - 46%
- Tunnel / Tunnel (incl. Generalerneuerung / incl. reconstruction) - 38%
- Andere / Others - 1%

12.10.2010
Prognosis budget distribution to sub-assets

Prognosis of the maintenance budget according to the different sub-assets of the ASFINAG network (without extension and new construction)
Thank you for your attention!