Road Management System Project in Bulgaria

“Development of a Road Management System in Bulgaria”.

Petri Jusi, Team Leader/Road Management System Specialist

Finnish Overseas Consultants (FinnOC) Ltd.
Background

• The Road Infrastructure Agency (RIA) of Bulgaria has contracted Finnroad Ltd. in association with Roadscanners Ltd. and Ramboll (DK) Ltd. to carry out consulting services entitled “Development of a Road Management System and Design and Procurement of Pilot Contracts for Performance-Based Maintenance and Management of Roads Projects”.

• The assignment falls under the umbrella of the World Bank financed Road Infrastructure Rehabilitation Project (4695-BUL).

• The services were commenced by Finnroad on February 16, 2009 and were completed in May 2010 when the final Consultancy Completion Report was submitted.
Road Management System (RMS) Project Objectives and Scope

- The main objective was to implement a modern and sustainable RMS in the Roads Infrastructure Agency (RIA) in Bulgaria included:

  - Develop and put in operations an integrated Road Management System (RMS) that will provide the planning and programming framework for preparing annual and multi-year programs for maintenance and rehabilitation of the road network
  - Prepare and estimate of annual road maintenance needs for the National road network, and a rolling 3 or 5 year periodic maintenance under a budget constraints
  - Analyze and identify maintenance scenarios based on performance targets, and estimate costs for different types of road maintenance and rehabilitation works
  - Assist NRIA in designing and procuring three pilot contracts for Performance-based Maintenance and Management of Roads (PMMR). In addition, three traditional contracts will be establish for control purposes. The PMMR and control contracts should preferably cover different climatic or terrain conditions
What is Road Management System (RMS)

- Roads are a major economic asset, and the management of this asset is tremendously important for economic development. The functions of the road management process can be categorized as:
  - Planning and Budgeting;
  - Programming; and,
  - Operations.
- Major activities include:
  - Needs Assessment;
  - Strategic Planning, including budgeting for new development and asset preservation;
  - Development, under budget constraints, of multi-year works expenditure programs; and,
  - Collection of Data. All of the above activities need data. Major data items include road network inventory, condition, traffic, and economic data.
- RMS Definition
  - An RMS is any system that is used to store and process road network inventory, condition, traffic and related data, for road network planning and programming. Associated with the RMS are appropriate business processes.
Minimizing Total Road Transportation Costs
Steps of Maintenance Management with RMS

THE STEPS FROM EMERGENCY MAINTENANCE TO OPTIMIZATION OF MAINTENANCE OPERATIONS

- Emergency Maintenance
- Accessibility Maintenance
- Systematic Maintenance
- Optimization of Maintenance

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Key Factors of the Successful implementation of RMS in Bulgaria

- Technology (RMS, Hardware and Software)
- Institutional Set up for RMS
- Funding for implementation of the plans
- Trained Users for RMS
- Funding for data collection and running of RMS

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Road Management System (RMS), Core Components

- RMS - RDB (Road Data Base)
- RMS - HDM-4 (Management and Budgeting Tool)
- RMS - GIS (Geographic Information System)
- RMS - Viewer
- RMS - Web Browser
System Set-Up

- Properties of road
- Road Condition
- Pavement data
- Geometry
- Traffic data
- Accidents
- Road furniture
- Works and costs
- Videos and audiocomments
- Environmental & Social aspects

GIS

1. Reports of the network
2. Traffic report
3. Road Condition report
4. Annual data collection programme

HDM-4

1. Maintenance & Rehabilitation programming
2. Project, program and strategic level planning
3. Long and short term budgeting and forecast
4. Feasibility studies

Theme Maps
RMS - Road Data Base

- Location Reference System
- Road inventory
- Road condition:
  - Roughness
  - Bearing capacity
  - Surface defects
  - Drainage
- Features
- Traffic
- Unit costs
- Parameters

Road Database

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RMS - HDM-4

• The Consultant proposes to use HDM-4 as the Management and Budgeting Tool and the Pavement Management System in the Project. With HDM-4 model it is possible to prepare:
  • i) Short-term (such as annual) and long-term budget/maintenance plans for routine and periodic maintenance, rehabilitation and reconstruction,
  • ii) Setting appropriate maintenance item definitions and maintenance and rehabilitation intervention criteria,
  • iii) Prioritizing actions and allocations for addressing maintenance and road service needs,
  • iv) Scheduling the maintenance works and allowing monitoring of its implementation,
  • v) Developing an effective pavement system capable of life cycle cost analysis,
  • vi) Preparing standardized report for monitoring, reporting and tracking trends on the level of service of the road network and on the physical condition of roads and bridges
  • vii) Analyzing and identifying maintenance scenarios
Each leva spent must be a Carefully considered investment for each kilometer in the long-term conservation of an infrastructure asset.

All maintenance works will have to be qualified before financing.

The “Short Term Focused Plan” aimed at achieving the objectives of “Long Term Strategic Plans”
RMS – GIS, PMMR Pilots

Pilot No. 1 Sofia
Pilot No. 2 Pazardzhik
Pilot No. 3 Haskovo
RMS – Web Browser

Dissemination of RMS Outputs and Inputs through RMS Web Browser

Benefits:

• Efficient data management and transfer between road organizations and other stakeholders
• Access to information is possible from anywhere and at any time through the internet
• Improved transparency
• Updated information available for all the users immediately it is available
• Improved Team communication, collaboration and decision-making
• Raising the awareness of road users

Methodology:

Not all the data is available for all the users. Different user licenses for public and for professional use

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RMS - Viewer

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RMS Annual Cycle and Responsibilities

Road Management System (RMS)

- Data input to RMS RDB
- Transfer to RMS HDM-4
- Data Collection
- Budgeting and Planning
- Stakeholders Consultations
- Implementation
- Final Plan

- RROs
- NIRTNENS
- NIRTNENS
- Petri Jusi, RMS Specialist / Team Leader

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Proposed Institutional Set-Up for RMS

- RMS - RDB
- RMS – HDM-4
- RMS - GIS
- RMS - Viewer
- RMS – Web Browser

- RMS - RDB
- RMS – HDM-4
- RMS - GIS
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RIA
NIRTNENS
Local Provider

Responsibility
Access
Regional Access

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RMS Outputs, Condition

Road Network, Condition

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<th>Km</th>
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Unconstrained Budget Run

Funding Needed to have all the roads in "Maintainable" Condition

- Class I
- Class II
- Class III
- Total

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### Annual Routine (Minimum) Maintenance Costs

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**Note ! Annual average 69,20 million Leva**

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Conclusions

- Institutional Set-Up
- Comprehensive Training Program
- Sustainability