Comprehensive Winter Maintenance Management System to increase Road Safety and Traffic Flow

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## Goals

### COST TU0702:
Real-time monitoring, surveillance and control of road networks under adverse weather conditions

- **Safety**
  - 24% of all crashes occurred on slippery pavement or under adverse weather.

- **Mobility**
  - About 25% of non-recurring delays on highways is due to weather.

- **Environment**
  - Chemical anti-icing and deicing account for roughly 1/3 of expenditures for snow and ice control.
Goals

- Safety
- Environment
- Economy

⇒ Need of modern Management Systems
Winter Maintenance Management System

BORRMA-web

General overview

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Surface Condition Management

by boschung

Surface Condition Assessment
Surface Treatment Devices
Surface Data Management

GFS 3000
FAST
BORRMA web
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On-board-sensors
Vehicles
Vpad

KT Luzern - Einsätze Februar 07

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What is MDSS? – key players

Winter Maintenance Management System

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Information for educated decision making

- Centralised database
- Visualised information
- Appropriate prognoses

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Dynamic Display

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Road Weather Information Systems (RWIS)

- Measured data: real time status of the road network
  - Pavement status
  - Temperatures
  - Precipitation
  - Freezing point temperature
  - …

Map of Switzerland with more than 300 RWIS
Source: Boschung SWIS Central

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Forecasting tools

Point Measurement
Nowcasting
Weather forecast 3h
Precipitation Forecast 2h
Parameters specific to RWIS location

Point forecast
Forecasting
Weather forecast 72h
Thermal mapping
Decision tree (parameters)

Road segment forecast

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Forecasting tools

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Thermal mapping

Forecasting

Decision tree (parameters)

Road segment forecast

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• Road Weather Segments are colored against 4 levels of danger
• Warnings about oncoming dangerous events are issued (escalation at -12h, -6h, -2h, -1h)
• Information is broken down into 4 areas (weather, pavement, snow drift, bridges)
• Information is summarized over 72 hours
Winter Maintenance Management System

Forecasting

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Maintenance vehicles

- Data acquisition and transmission (real-time)
  - Current status of tools
  - Colored trail showing used tools
  - Current position of vehicles (GPS-based)
    - Dynamic management of operations
    - Knowledge base for further recommendations

- Measurement of operations (off-line)
  - Operation reports, statistics, etc.

Winter maintenance operations
Source: BORRMA-web Lucerne (Switzerland)

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Centralization of vehicle data

- List of events in one operation
- List of operations in a period of time
- Detailed breakdown of carried-out services per road category, road name, area
- Export capability for further data treatment

Winter maintenance operations
Source: BORRMA-web Lucerne (Switzerland)

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Fixed Automated Spray Technology - FAST

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