Information systems for improving winter maintenance and the exchange of information

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Initiative

PIARC 2004-2007 Strategic Plan

Issue 3.4.1 - *Improve winter maintenance and operational information systems*

Strategies :

➢ **Optimize** the decision making process and the use of decision aid tools;

➢ **Promote** the sharing of pertinent winter operations data (eg. RWIS data etc.) across jurisdictions.

Process

REVIEWING CURRENT PRACTICES AND RECOMMENDATIONS

DRAFTING A REPORT TO BE USED AS THE BASIS FOR DISCUSSION

PROVIDING LINKS TO OTHER ORGANIZATIONS

Work Group 3.4.1

Richard Charpentier (Head) – *Canada-Québec*

Paul Delannoy – *Canada*

Horst Hanke – *Germany*

Patrick Hughes – *United States*

Yasuhiko Kajiya – *Japan*

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Jan Olander – *Sweden*

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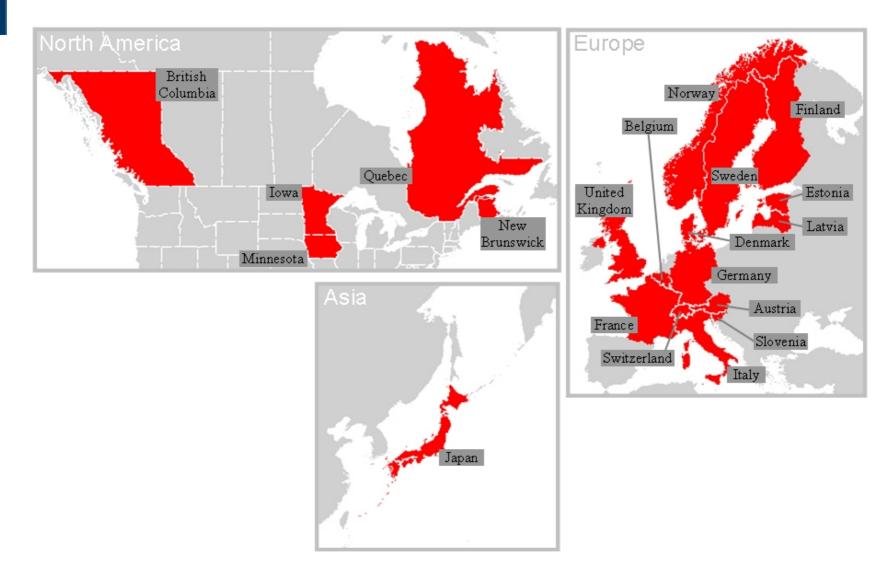
Methodology for the report

Two sections :

➢ The <u>results of a survey</u> of 21 organizations;

➢ A <u>complementary analysis</u> based on the key information that was collected for each topic.

The objective of the report is to provide the reader with an overview and quick links to more specific information.

Organisations surveyed

Themes of the questionnaire

System components and data collection

- ☑ Standards for sensors
- ☑ Type of data collection
- ☑ Construction and maintenance of station
- ☑ Types of sensors
- ☑ Terminology of surface condition sensors
- ☑ Mobile road weather stations

Data processing and integration

- ☑ Data sharing
- ☑ Management indicators
- ☑ Decision support systems
- ☑ Public access to data
- ☑ Impact on costs and consumption of salt
- ☑ Data exchange formats

References used

Reference was made to four main sources :

➢ *Communications and proceedings from <u>international congresses</u>;*

➢ *Work carried out in the context of <u>programs</u>;*

➢ *Summary documents produced by <u>international organizations</u>;*

➢ *Websites belonging to <u>specific organizations</u>.*

Contents of the report

- *Instrumentation for information systems*
- *Management of facilities and data*
- *Standardization*
- *Development of support tools*
- *Use of in-vehicle sensors*
- *Information sharing*
- *Management indicators*
- *Benefits of information systems*

Instrumentation for information systems

Sensors and components of information system are more <u>varied</u> than ever before.

The choices made by organizations correspond to their <u>strategies</u> and to the <u>unique characteristics</u> of their road environment.

Management of facilities and Data

The survey identified several data management methods :

➢ Fully managed by the public sector;
➢ Management shared between the public and private sectors;
➢ Fully managed by the private sector.

Data management depends on <u>the use of data</u> and the level of <u>standardization of the data</u>.

Standardization

Several initiatives aimed at developing standards are currently underway :

➢ A greater number of topics;

➢ International harmonization of standards.
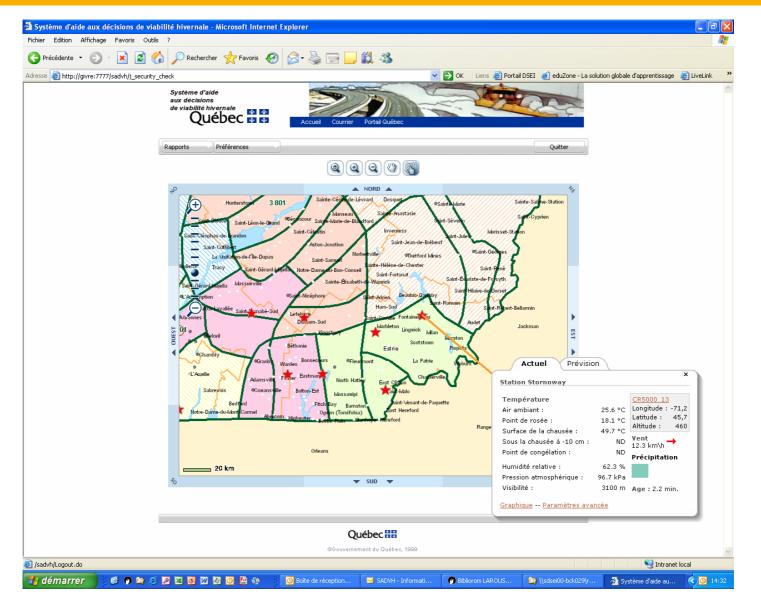
Standardization topics

- TERMINOLOGY

- CHARACTERISTICS OF SENSORS

- RELIABILITY OF DATA

- DATA FORMAT

- METADATA

- COMMUNICATIONS

- INFORMATION MESSAGES

Development of support tools

The <u>collected data</u> can be used at several levels in order to develop :

➢ Decision support systems;
➢ Systems for communicating with users;
➢ Winter maintenance management systems
(for example: post winter economical analysis).

In some countries, reference is also made to expert systems.

Decision support system (Québec)

Use of in-vehicle sensors

Intelligent Transportation Systems can also be used to provide information for improving winter maintenance :
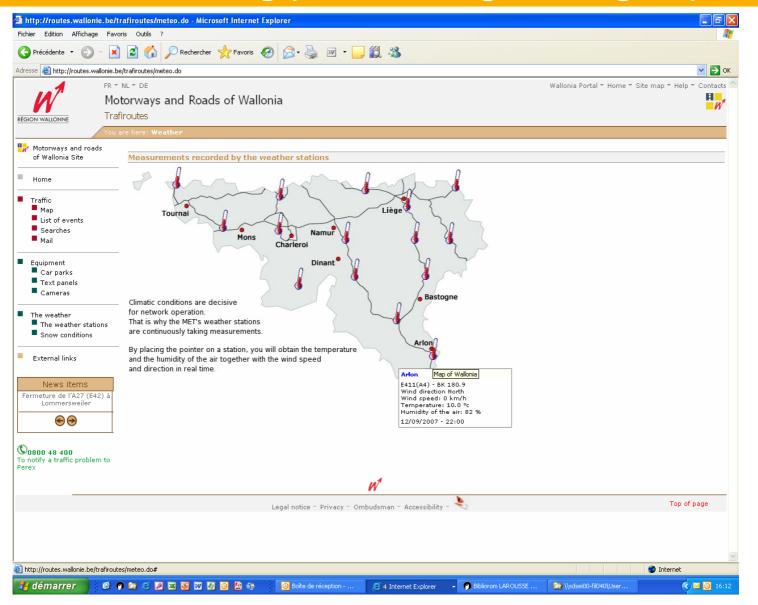
➢ Measurement of <u>atmospheric and road parameters</u> throughout an itinerary;
➢ Measurement of <u>friction coefficients</u>;
➢ Information concerning the <u>travel</u>, <u>functioning,</u> and <u>operation</u> of maintenance vehicles.

Information sharing

Data sharing takes place at <u>several levels</u> :
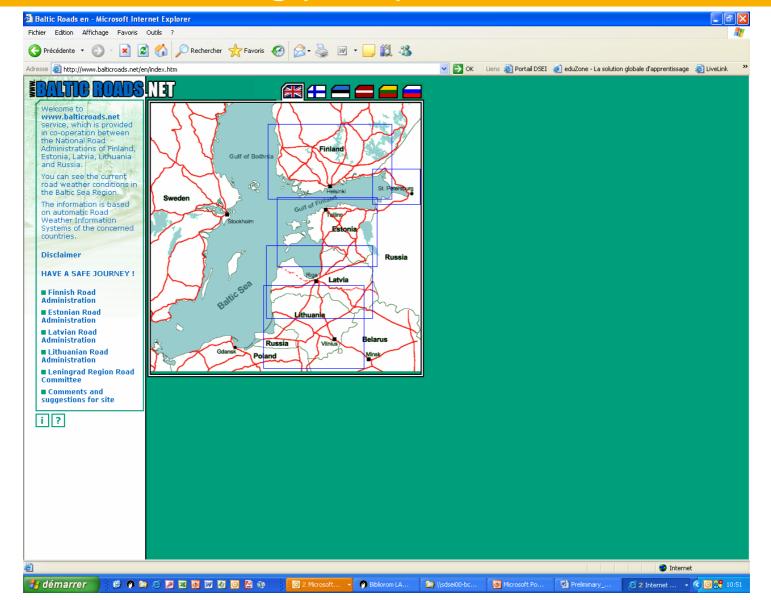
➢ Within an organization;
➢ Between organizations;
➢ Within a province, state, or country;
➢ Between several countries.

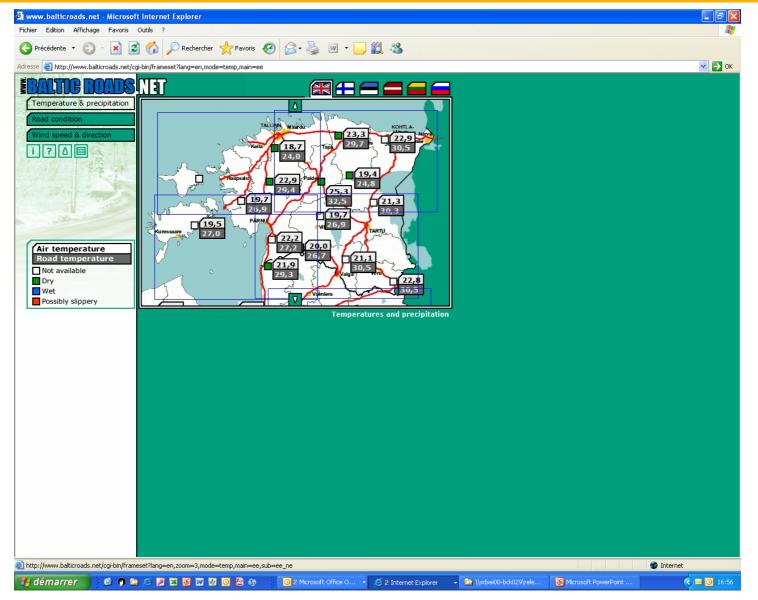*The type of information that is intended for road users varies depending on the country.*

Information sharing (Wallonia Region, Belgium)

Information sharing (Baltic)

Information sharing (Baltic)
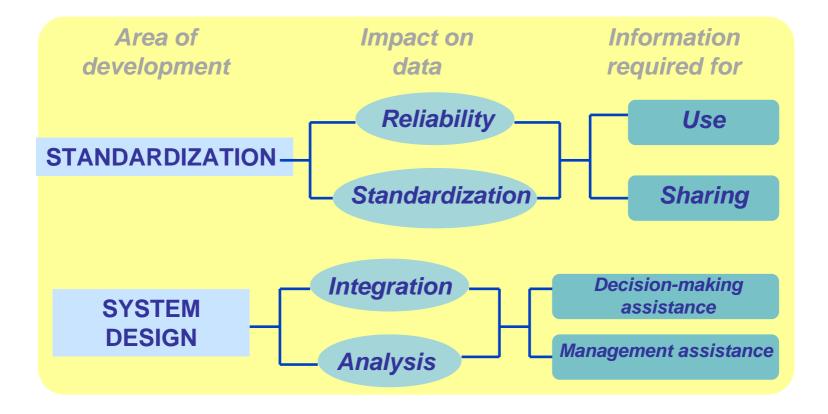
Management indicators

Many organizations currently have or are working toward developing <u>indicators for</u> :

- ➢ Winter severity;
- ➢ Performance;
- ➢ The use of melting agents;
- ➢ Environmental impact.

The data that are generated by information systems are processed using <u>calculations</u>, <u>algorithms</u>, or <u>weightings</u>.

Benefits of information systems

Taking the following factors into consideration, it is very difficult to determine the effectiveness of an information system :

➢ Difficulties in terms of developing <u>indicators</u>;
➢ The constant <u>evolution</u> of winter maintenance;
➢ <u>Other factors</u> that contribute to improving support for winter maintenance.

Conclusions

Area of development	Impact on data	Information required for
STANDARDIZATION	*Reliability*	*Use*
	Standardization	*Sharing*
SYSTEM DESIGN	*Integration*	*Decision-making assistance*
	Analysis	*Management assistance*

Perspectives

Information systems = provide great benefit already and continue to offer the promise of great potential, especially in the following areas :

➢ Production projects that are underway in the context of <u>international harmonization of standards</u>;
➢ The possibilities for <u>using the data</u> that are obtained from the information systems.

Perspectives

The future of the various types of systems now depends on the benefits of the data and the sharing of expertise and information.

Attainment of objectives

Reviewing current practices and recommendations

Providing links to other organizations

Drafting a report to be used as the basis for discussion

Publishing of the report

Publish on the Web site of PIARC –
Autumn 2007

Thanks: *Étienne Morin, Québec*

                 Steve Arsenault, Québec

THANK YOU
FOR YOUR ATTENTION

Technical Committee 3.4 – Winter Maintenance
Work group 3.4.1

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