



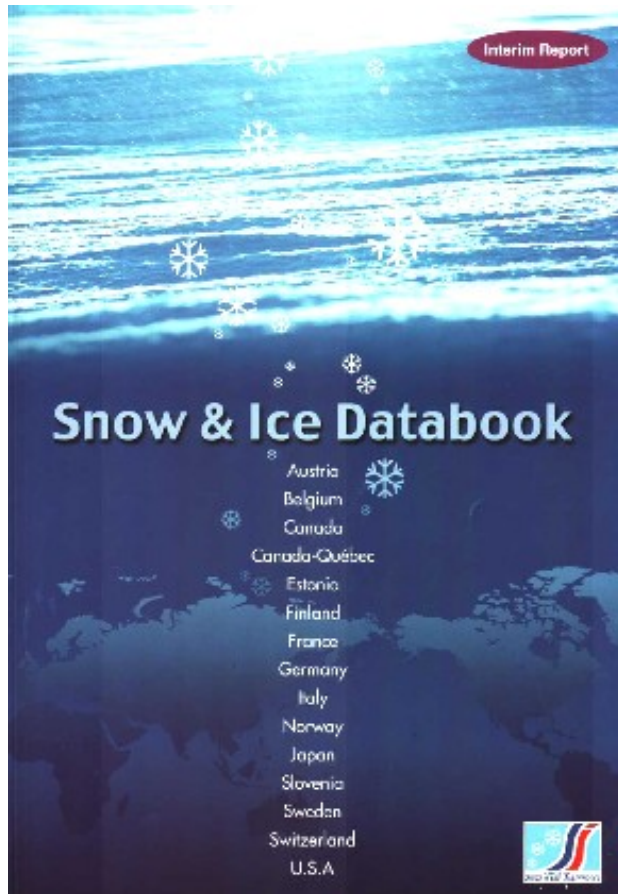
## Snow and Ice Databook – Edition 2006: a tool to share knowledge and support sustainable winter maintenance through country reporting

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## Starting point : Snow & Ice Databook 1st edition



- XI<sup>th</sup> International Winter Road Congress – Sapporo – Jan. 2002
- Initiative of the Japanese Organizing Committee to commemorate the congress
- With participation of the PIARC/TC3.4 members
- Objective: sharing knowledge & good practices
- 15 participating countries
- “Interim report”

## **Objective of the (2002-2006) Technical Committee**

**Improve the winter road management practices around the world by supporting the knowledge exchanges between countries**

- Update the Snow & Ice Databook
- Include new topics about economic and environmental issues, public-private partnerships, training and new technologies
- Documenting practices in other countries
- deadline : XIIth International Winter Road Congress – Torino/Sestrière – April. 2006

**PIARC Strategic Plan 2004-2007 (extract)**

Issue 3.4.2 Provide Sustainable Winter Maintenance

<b>Strategies</b>	<b>Outputs</b>
Analysis of public and private sector roles in the delivery of optimal winter road maintenance services.	Survey report on contracting.
<b>Update the review of winter road maintenance practices around the world.</b> <b>Include the context and extent of customer orientation in the conduct of winter road maintenance operations.</b>	<b>Second edition of the Snow and Ice Data Book.</b> <b>Include examples and comparative approaches to the inclusion of user needs in winter road maintenance.</b>
Explore sustainability of winter road maintenance practices with particular focus on balancing environmental impacts with mobility and safety considerations.	Main topic specifically on the 'Environment' for the XIIth International Winter Road Congress.

**Task group members:**

- Mr Martin HOBBS (UK)
- Mr Tom ROELANTS (Belgium)
- Mr Frank RIZZARDO (Canada)
- Mr Arnold PREVOT (Belgium)
- Mr Keishi ISHIMOTO (Japan)
- Mr Xavier COCU (Belgium)

And

- Country reports Authors from 22 countries


## To achieve this objective:

1. S&IDb reviewing Taskgroup
2. Contact experts from more than 20 countries proposing them to submit a country report - strict structural guidelines and Lay-out -
3. Technical reviewing and Languages reviewing
4. Final design for publication

### BELGIUM

1. Demographics & Roads

1.1. Information about country



Belgium is a country small in size (30,500 km<sup>2</sup>) but, densely populated (10.2 million), situated at the heart of Europe. The country occupies a privileged position in between the Netherlands, France, Germany and Great Britain, and borders on the North Sea, the busiest sea route on the globe. Brussels, the country's capital, is also the capital of the European Union and an international financial centre. The country's flourishing economy is largely directed to export (2/3 of production is exported). The prospects and prosperity of Belgium depend to a large extent on its transport infrastructure. So, the motorway and railway network is one of the densest in the world.

The country is a federal state with three regions: Flanders in the north (5.9 million people), Brussels at the centre (0.95 million people), and Wallonia in the south (3.35 million people). These three regions have autonomy in several branches, including the construction, management and maintenance of the motorways and expressways on their territories. Flanders and Brussels are flat regions (0 to 100 m), whereas Wallonia contains the Ardennes, a group of plateaus 400 to 500 m in altitude.

1.2. Road network & Traffic

Area	30,500 km <sup>2</sup>	
Population	10.2 million	
Length of road	Motorways	1,700 km
	Regional main roads	13,000 km
	Local roads	131,000 km
Latitude (capital)	50° 50' N	

The road network comprises 1,700 km of motorways, 13,000 km of regional main roads and 131,000 km of local roads, amounting to a total of 145,000 km of paved roads. The national fleet of 5.5 million vehicles includes 4.5 million passenger cars each traveling an average distance of 15,000 km a year. Traffic is also important during the night, particularly commercial traffic. Road transport accounts for 71 % of total freight transport. The economic importance of roads can, therefore, not be denied, even in winter. As a result, one of the tasks of the road authorities is to keep the road network serviceable at all times, among other things by setting up a full organisation for winter maintenance. The winter season extends from November to April.

2. Climate

2.1. Overview of climatic areas

2.2. Statistics on temperature

The country has a temperate maritime climate characterised by a relatively high number of rainy days (one in three) giving an annual rainfall of 700 (in Flanders) to 1,500 mm (at certain points in the Ardennes). The number of days of snow varies considerably from one point of the territory to another: from 14 days a year on the coast to 63 days a year on the Ardennes plateaus. The number of days of frost in Brussels remains acceptable: 59 days a year. What characterises the winters, at least in Flanders and Brussels, is the existence of numerous daily cycles of frost and thaw. The further we move towards the Ardennes plateaus, the more temperature falls and the number of freezing days increases – to a mean value of 115 per year.

2.3. Winter indexes

## Technical Content

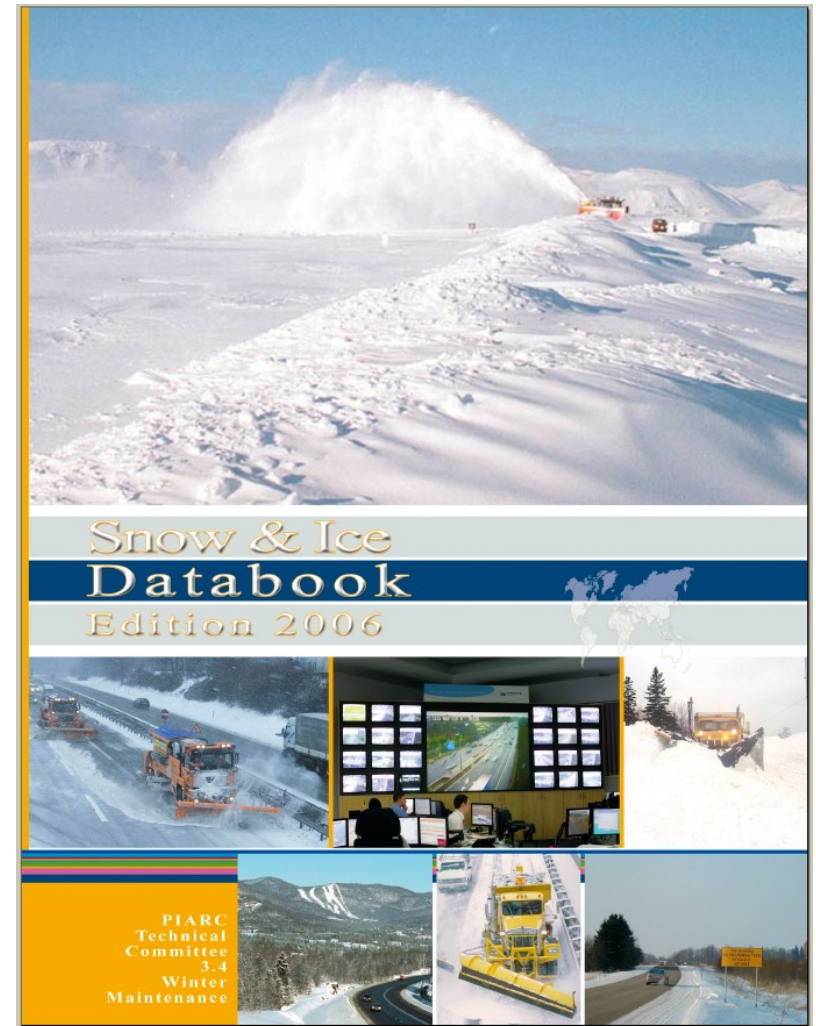
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# Snow and Ice Databook – Edition 2006: Methodology & Content

(4)

## Participating countries

Austria	Japan
Belgium	Latvia
Canada	Lithuania
Canada – Quebec	Norway
Denmark	Slovenia
Estonia	Spain
Finland	Sweden
France	Switzerland
Germany	The Netherlands
Iceland	United Kingdom
Italy	U.S.A.

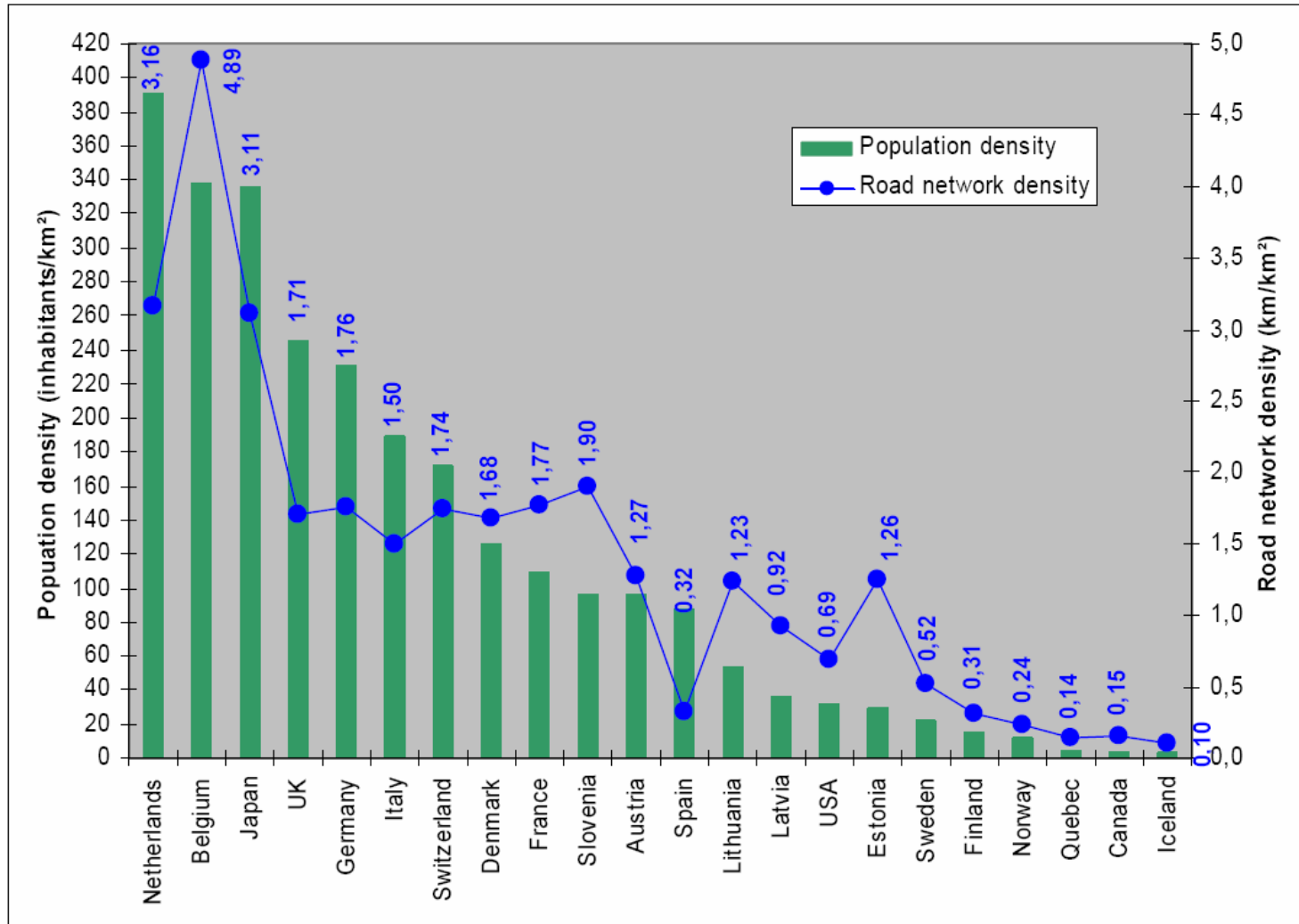




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**Demographics & roads**



Population and road network density by country (trunk, county and local roads)

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# Snow and Ice Databook – Edition 2006: Comparative approach

(4)

## Climate

### Winter weather conditions on roads and population density

Population density	Main types of winter weather conditions									Maintenance needs
	Freezing fog	Severe and long frost	Temperature fluctuating around 0°C	Moderate snowfalls	Short heavy snowfalls	Snowdrift	Black ice	Big snowfalls	Avalanches	
High (>200 inhab./km <sup>2</sup> )	Belgium Germany Netherlands UK	Japan	Belgium Germany Netherlands UK	Belgium Germany Netherlands UK	Belgium Germany Japan	Japan	Belgium Germany Japan Netherlands UK	Japan	Japan	Higher
Medium (<200 but >80 inhab./km <sup>2</sup> )	Austria Denmark France Switzerland		Austria Denmark France Italy Slovenia Spain Switzerland	Austria Denmark France Italy Slovenia Spain Switzerland	Austria France Italy Slovenia Spain Switzerland	Austria Slovenia Switzerland	Austria Denmark France Italy Slovenia Spain Switzerland		Austria Italy Switzerland	↑ ↑ ↑ ↑
Low (<80 inhab./km <sup>2</sup> )	USA	Canada Finland Norway Quebec Sweden USA	Estonia Iceland Latvia Lithuania Norway Sweden USA	Norway Quebec USA	Canada Norway Quebec USA	Canada Iceland Norway Quebec Sweden USA	Canada Estonia Finland Iceland Latvia Lithuania Norway Quebec Sweden USA	Canada Finland Norway Quebec Sweden USA	Norway USA	Lower

Maintenance needs

Lower

→→→→

Higher

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## **Assessment of the Snow & Ice Control measures**

- Cost and benefit of winter maintenance activities: e.g. measures to minimise the use of de-icing agents, including the measurement of efficiency
- Winter indices correlate winter activities and costs to winter severity or winter events (tools for performance monitoring)

e.g. from US  
Indiana DOT

$$WI = 0.71839 * Frost + 16.87634 * FreezingRain + 12.90112 * Drifting - 0.32281 * Snow + 25.72981 * SnowDepth + 3.23541 * Hour - 2.80668 * AverageTemperature$$

- Record historic data about winter maintenance activities (daily basis, annual overview – on board logging & connected database)
- Monitoring the performance of private contractors (random daily check, skid resistance measurement, road user feedback, etc)











## Traffic safety & Road Users Information

- Information sharing about road conditions with drivers improves safety and the smooth running of road network
- Information dissemination through the Traffic Information Centres which also maintain contact with road authorities, Met institute and emergency services (data collection & traffic management)
- Dissemination of information by various means including dynamic VMS and Web based information systems (e.g. cross border road information project [Balticroads.net](http://Balticroads.net))

## Traffic safety & Road Users Information

- Growing use of advertising campaign to educate the road users about road safety in winter conditions

*Example from Ministère des Transports, Québec*

		Visibility ▶	<u>Good</u>	<u>Reduced</u>	<u>Zero in places</u>	<u>Zero</u>	
Road ▼							
<u>Clear</u>		GOOD Be careful!					
<u>Snow patches or Ice patches</u>		FAIR Do not be caught off guard! Allow extra time!					
<u>Partly snow-covered or partly ice-covered</u>							
<u>Snow-covered</u>							
<u>Icy</u>							
		SORRY Road closed!					



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## **New operational methods, new technologies**

- New technologies are implemented to improve the machinery performances, to develop the on-board equipment, etc
- New spreading methods are being tested
- Road Weather Information Systems and other management systems are continuously improved and move towards Integrated Maintenance decision Support Systems
- On-going studies concerning the skid resistance measurement, the road surface assessment, the modelling of residual salt, etc

## **New management & organisation approach**

- Road administrations are refocusing their role in the winter maintenance process
- Extended Public Private Partnership is considered as an alternative
- Where private contractors are already managing the road winter maintenance, the road authorities are developing their supervision and assessment methods

## Conclusion

### The today's “winter road maintenance equation”

$$\begin{aligned} & \text{Available \& safe roads during winter +} \\ & \text{Demographic and climatic constraints +} \\ & \text{Costs \& benefits regarding safety, mobility, environment} \\ & = \\ & \text{Human, material, equipment means +} \\ & \text{Public private partnership +} \\ & \text{Decision support systems} \end{aligned}$$

Items included in the databook fulfil all these key topics and offer the opportunity to study and compare the winter maintenance practices around many different countries

Thanks for your attention

Xavier Cocu (BRRC)

And more very interesting practices to discover with the

## *Snow & Ice Databook - Edition 2006*

**PIARC/TC3.4 – Winter maintenance**



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