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XIII INTERNATIONAL WINTER ROAD CONGRESS

QUÉBEC, FEBRUARY 8 TO 11, 2010

SUSTAINABLE WINTER SERVICE FOR ROAD USERS

Winter Service Strategies for Increased European Road Safety – The Results of COST Action 353

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Topics

1. Introduction
2. Winter Service on the European Road Network
3. New and Emerging Technologies
4. Winter Maintenance Management Systems (WMMS)
5. Recommendations for R&D

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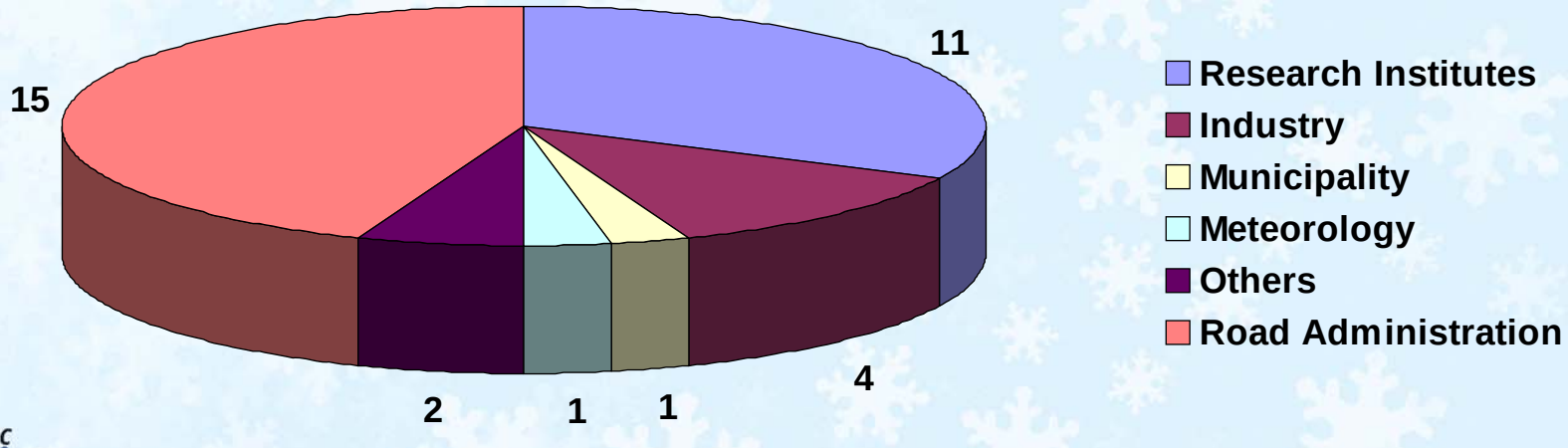
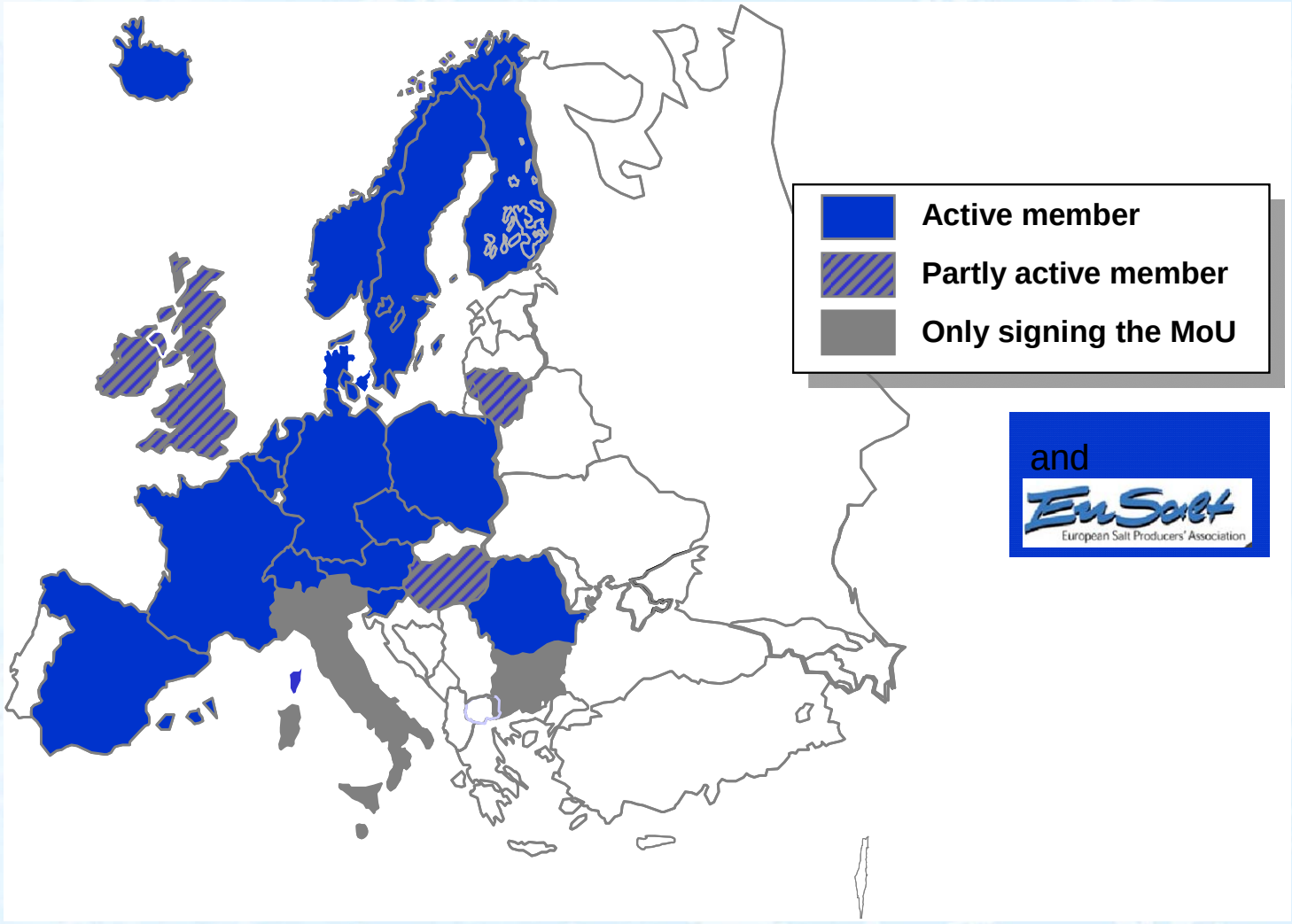
COST 353 - Winter Service Strategies for Increased European Road Safety

- Period: 04/02/2004 – 27/04/2008
- Initiated by United Kingdom as follow-up of COST 344 „Improvements to Snow and Ice Control on European Roads and Bridges“
- Memorandum of Understanding is signed by 22 European Countries
- Active Members: 34 delegates from 17 countries and 2 delegates from the European salt industry



COST 353 – Participating Countries

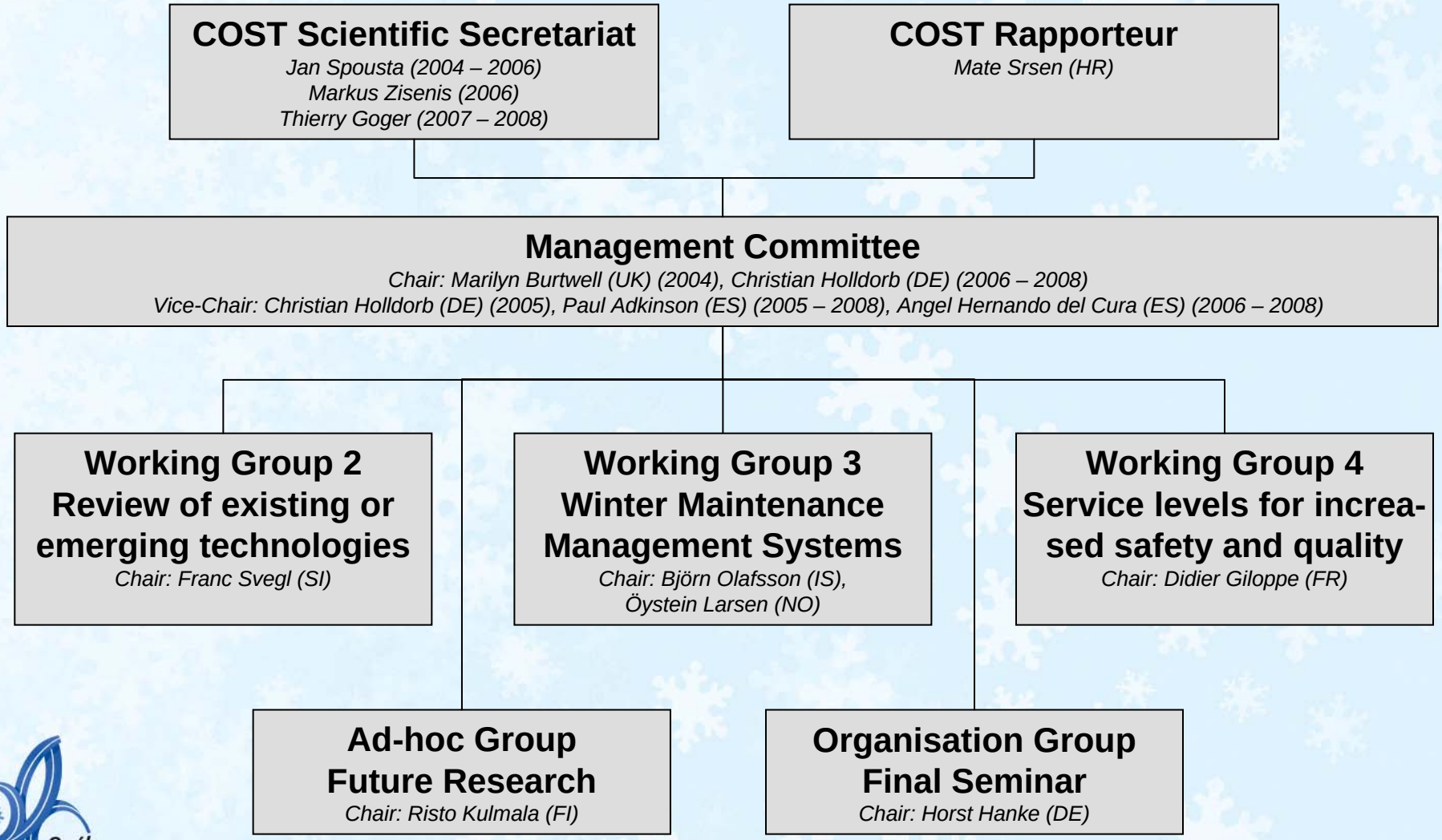


Memorandum of Understanding

Objectives and Benefits:

- **Main Objective:** development of a framework for the management of winter traffic for maximised road safety
- **Secondary Objective:** integration of new methods of winter maintenance management through the use of the latest technologies for data management, communication and vehicle positioning
- Consideration of different demands, differentiated by climatic regions and the different road networks (strategic, rural, urban) to be maintained
- Recommendations on techniques and management practices for improvements of winter services for government, road administration and industry

Organization chart of COST Action 353



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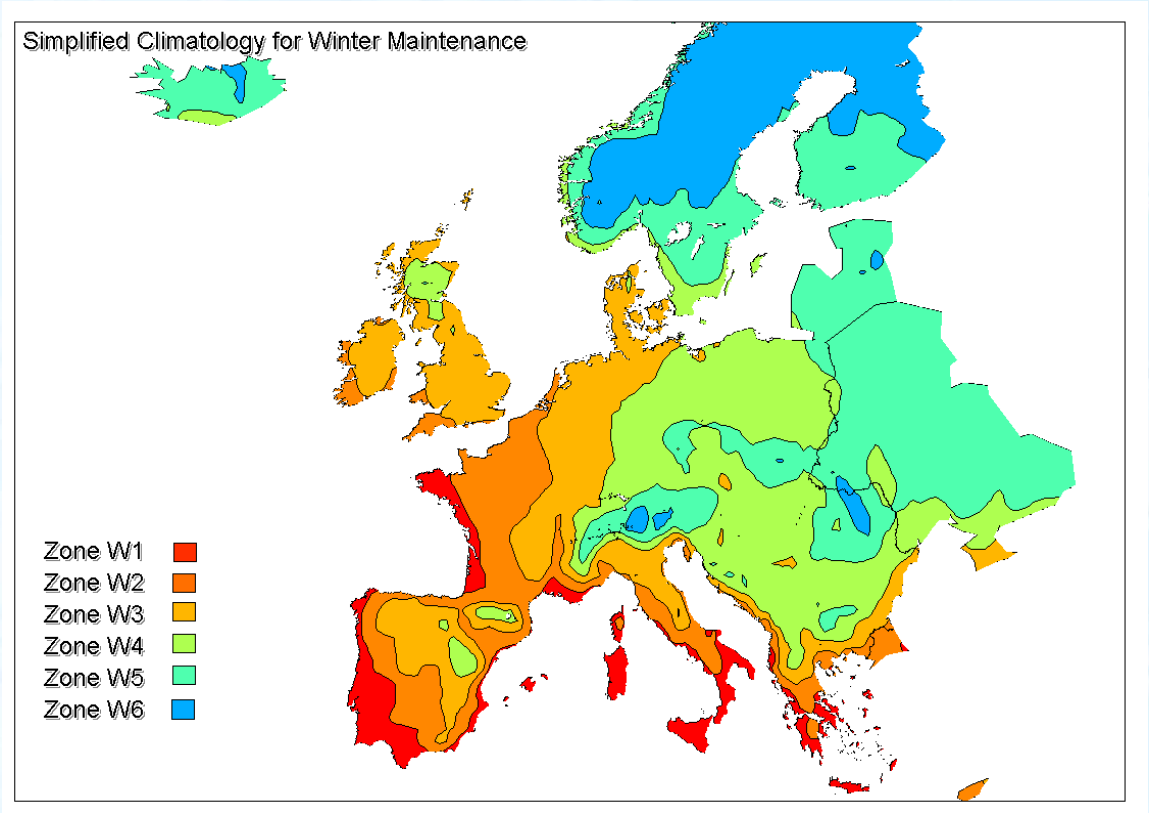
Heterogeneous Situation in Europe

Different climatic conditions



Differences in

- Road network density
- Traffic conditions
- Organization of Road Administration and Winter Service
- Financial Capacity

Recommendations for optimized winter service and road safety in Europe

- Winter maintenance aims at ensuring highest road safety and predictable driving conditions. A socio-economic model supports decision on best winter maintenance strategies.
- Same Level of Service on heavily used European Road Networks (Trans-European Transport Road Network, Pan-European Transport Road Network, International E-Road Network)
- The National Road Administrations provides the road users with information about the driving in winter conditions.
- Innovative road weather and traffic information systems are used to inform road users and contractors of the situations on the roads.
- Environmental effects are being reduced (e.g. by anti-icing with brine and pre-wetted salt).

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New Technologies in limited use - Examples

- RWIS: Sensor developments, Standardisation
- Measuring : Friction measurements, infra-red assessment of road conditions, residual de-icer determination, mobile measuring
- Salt storage management systems
- Use of warm wetted sand / salt
- Jetbroom with a sweeper blower unit
- Use of mobile de-icer sprayers in long term work zones
- Use of algorithm in decisions
- Use of web sites for road information, on board user information
- Avalanche protection

Emerging Technologies needing adaption or further research

- Continuous fertilizer weighing – Precision agriculture
- Sensors involved in cereals yield measurements
- DFIS – Floating car data system
- Driver training
- Intelligent tyre
- Temperature behaviour on bridges
- Spreading (recent researches)
- Electromagnetic sensoring system of soil conductivity
- Surface salinity determination
- Phase change materials
- Nanotechnology

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Components of WMMS

Road Weather Information System

- weather forecasts
- weather radar images
- measuring stations on the roads & mobile stations
- icy road warning system

Call-out System

- incoming information handling
- automated mobilisation and information of service personnel
- event registration

Documentation and Follow-up

- analysis of situations
- winter maintenance statistics
- index calculation
- monitoring quality standards
- invoicing support

Administrative Information System

- personnel information
- duty schedules
- action plans
- tour planning system
- contracts

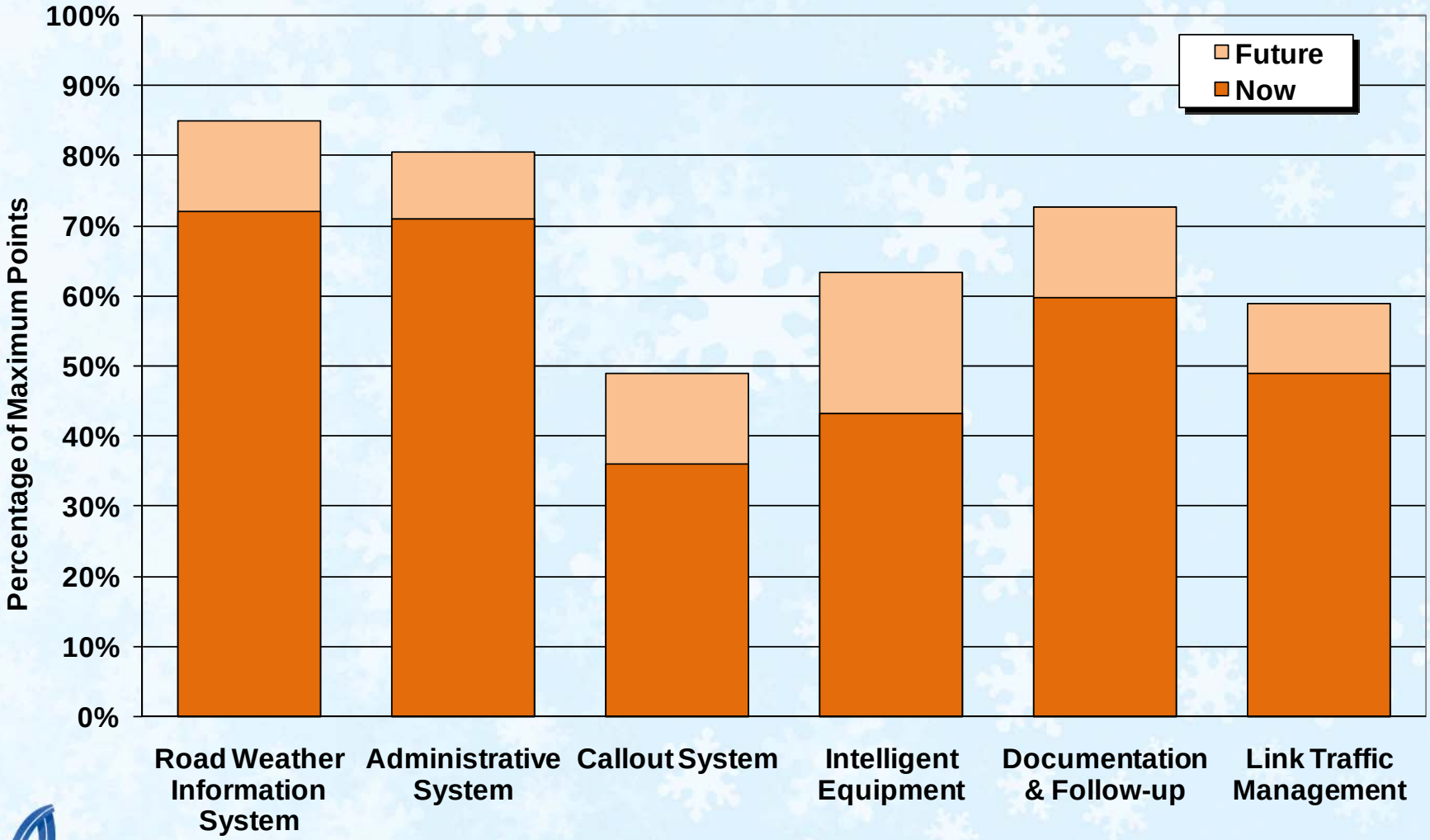
Intelligent Equipment

- data acquisition in vehicle
- presentation of actual situation and action
- detailed documentation
- navigation and GPS controlled spreading

Link to Traffic Management

- information for road users
- contact to traffic information centre
- variable message signs
- internet, radio, TV access

Evaluation of 10 European WMMS



Positive experiences with the use of WMMS in Europe

- Winter maintenance actions will be carried out faster
- Important for preventive actions
- Significant increase of road safety
- Minimizing of operating costs and stand-by duties
- Optimization of the winter service strategy
- Reduction of salt consumption
- Better information of road user and population (esp. in areas with low population density and hard wintry conditions)

Recommendations for an efficient WMMS (1)

- Automated suggestions for the timing and type of winter maintenance actions by RWIS, but the decision about the action should be made by the operator
- Call-out with automated communication and supervision of feed-back from the drivers to assist the operator to increase the number of activities which are controlled by each operator
- Automated data acquisition in winter maintenance trucks (weather and surface conditions, data recording for truck and equipment)
- Assistance for the driver of the winter maintenance truck (flexible navigation, automatic adjustments of the spreader)

Recommendations for an efficient WMMS (2)

- Automated calculation of business and operational key figures on account of increasing demands on documentation (work carried out, actions and their quality, invoicing, salt consumption)
- information for road users about road and weather conditions and the winter maintenance activities
- Modular structure for WMMS with standardized interfaces between the different modules
- Training of the staff (software, management tasks operational tasks)
- Continuous quality management

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Future research and development topics

- Monitoring road surface conditions (residual salt, friction, mobile measuring)
- Optimization of de-icing materials
- Know-how transfer to practice (training, guidelines etc.)
- Effects of wintry conditions on drivers and traffic flow
- Intelligent Transport Systems (ITS)
- Optimal winter strategies considering global warming
- Winter service for pedestrians, cyclists and other unprotected road users

Final Report

- Results of the Working Groups
- Recommendations for Future Research
- Final Conclusions
- Hard Copy 204 pages
- CD-Rom with 13 Appendices
- Download in the internet:

  www.fehrl.org
  Path: file zone \ Projects \ COST 353 \ Public
  File: Final Report COST 353.zip

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Thank you for your attention!

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