

CEDR Task N3 group: Winter maintenance standards



**Conférence Européenne
des Directeurs des Routes**

**Conference of European
Directors of Roads**

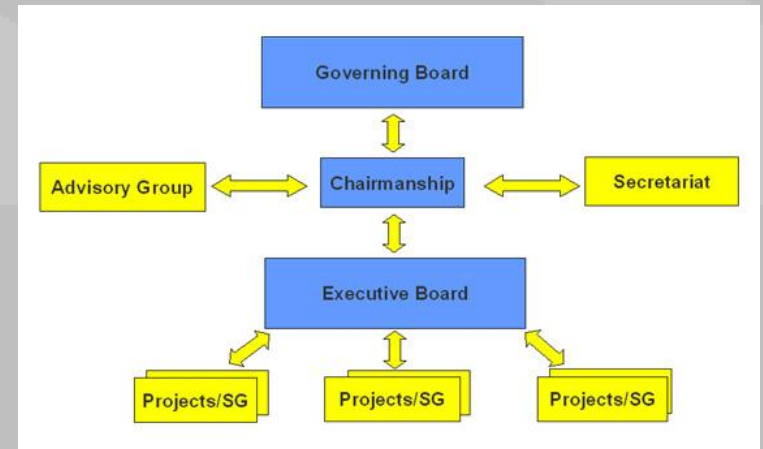
Bine Pengal – deputy of group chairman, mrs. Ljiljana Herga

Mobile road surface condition measurements in winter
Helsinki, 11th March 2015



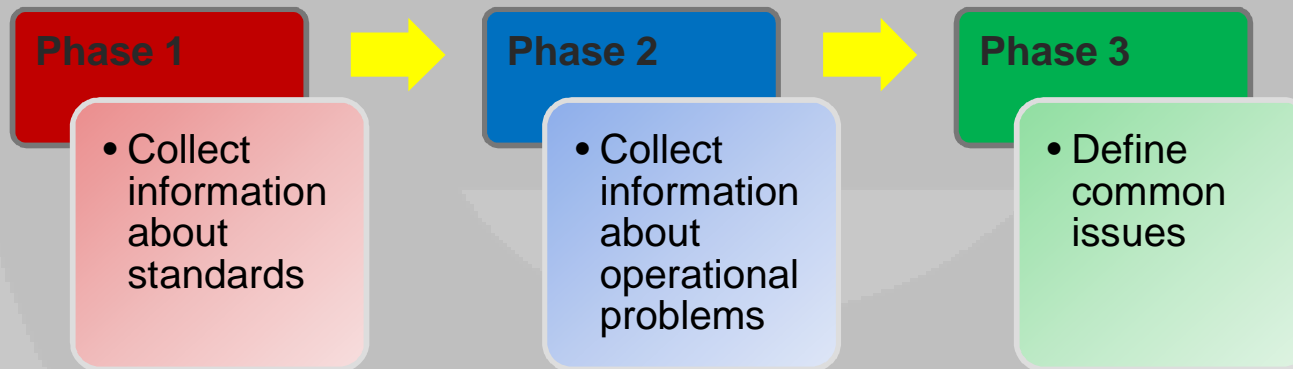
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Conference of European Directors of Roads - CEDR



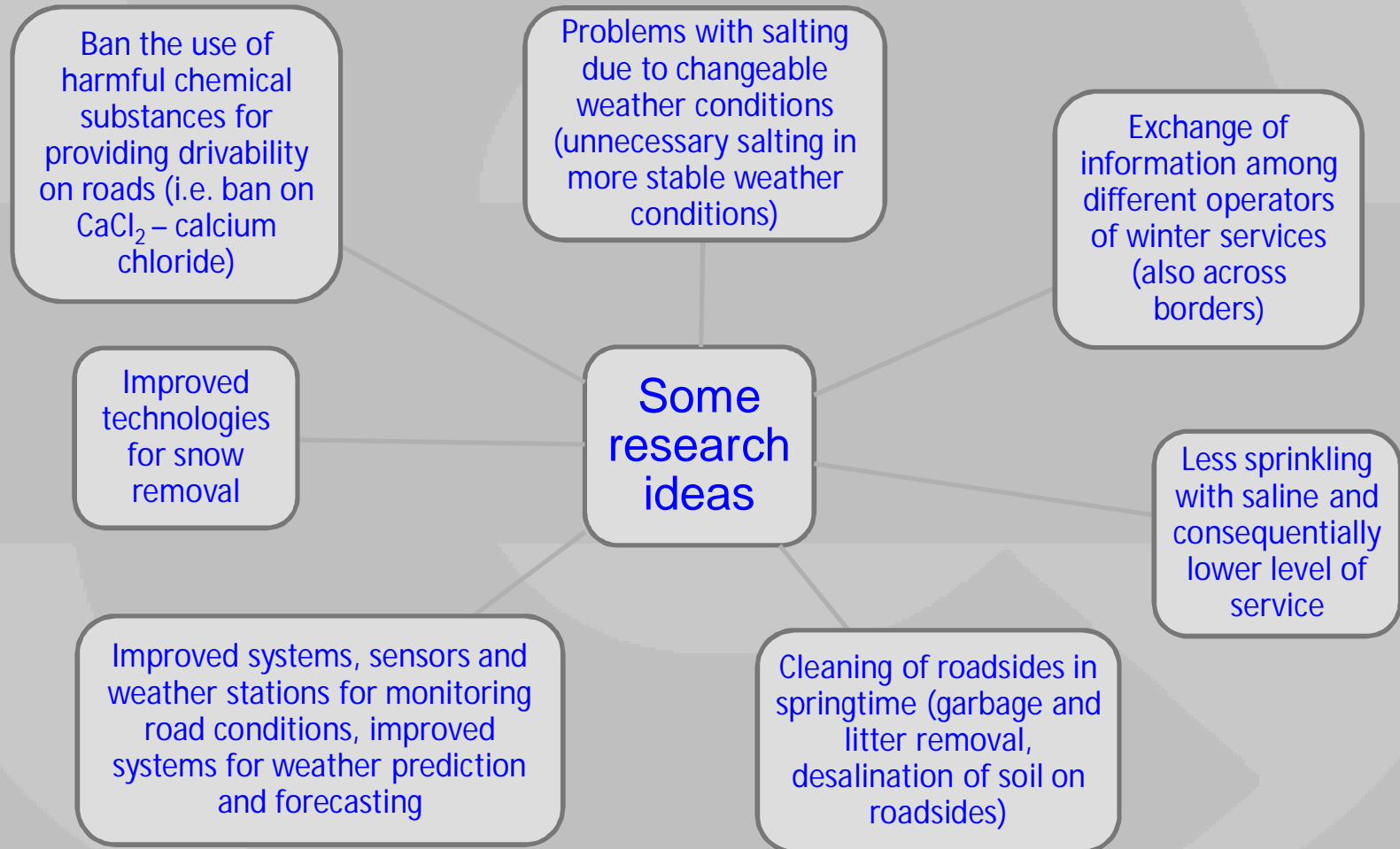
Basic outline of the group

- **Participating countries:** Slovenia (leader), Italy, Latvia, Lithuania, Spain, Denmark 
- **Objective:** „Provide CEDR member states with a list of research issues that are of common interest and where they can jointly invest to improve the situation in winter service“.



- Kick-off meeting 13th June 2013, Ljubljana, Slovenia.

Starting issues



Information were obtained from:

- WRA-PIARC Snow and ice databook (2010).
(not detailed enough for the purposes of the group)
- Debate and presentations of the group members at the meetings.
- Questionnaire (most valuable and detailed information).
- Liaison with PIARC Technical committee 2.4 Winter Service.

The questionnaire

- Very comprehensive
- Altogether 20 pages, 37 very detailed questions, according to 7 main topics of interest:
 - Topic 1: *the meaning of expression “winter service”*
 - Topic 2: *winter equipment for road users*
 - Topic 3: *elimination of heavy goods vehicles (HGV) from traffic*
 - Topic 4: *using standards, criteria and regulation in providing drivability of roads in winter*
 - Topic 5: *comparing different standards, criteria and regulation for ensuring drivability of roads*
 - Topic 6: *organization of operational activities of winter service*
 - Topic 7: *indicating main areas and topics for research*



Snapshot of the questionnaire

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Directors of Roads
TD Network management

Task N3
Winter maintenance standards

Questionnaire 1
(winter maintenance standards, procedures and methods)

Efficient operation of road networks during winter is an important issue for European Road Administrations, including snow removal and anti-accident measures. Legal obligations and operational standards that define the works to be performed differ throughout Europe. Main goal of Task group N3 is to help countries, CEDR members, to be able to compare their levels of services and identify common problems in winter service. After identification of common problems, interested bodies can invest together in research projects that will provide solutions to the most urgent issues.

First phase of activities in Task group N3 is focused on compiling available information about winter maintenance standards and procedures from countries that are active in this group and from other CEDR member states. This information includes in a data sheet applied legal standards and procedures, systematic organization of winter service, operational methods, equipment and resources used, etc. As a result of the questionnaire, a summary report of collected information is expected to be designed, that will give a thorough overview of different approaches toward winter maintenance and winter service.

Please return the completed questionnaire to: **Liliana Herga** (leader of the Task N3) at Liliana.Herga@cedr.eu or **Flavia** (CEDR secretariat) at Flavia.Cedra@cedr.eu.

Your contact data:
Name of organization:
Your name and position in the organization:
Telephone number:
Email address:
Data about country:
Country:
Number of inhabitants:
Area in km²:
Number of regions:
Number of municipalities:
Total length of individual roads, by category of road (in km):
- motorways
- semi motorways
- main roads for motor vehicles
- main roads
- regional roads
- local roads
- urban roads and streets

SYSTEM REGULATION

Classification of winter services:
(Winter service as a set of activities, necessary for ensuring drivability of roads and traffic safety in winter conditions, when as a consequence of winter specific phenomenon (snow, ice, wind and fog) normal traffic flow is threatened)

1.0 How is winter service organized in your country?

Organization Road category	State level	Regional level	Local level	Other - describe
motorways				
semi motorways				
main roads for motor vehicles				
main roads				
regional roads				
local roads				
urban roads and streets				

1.1 Who is providing winter service in your country?

Private Road category	State-owned or private category	By contract	Public-private partnership (PPP)	Other - describe
motorways				
semi motorways				
main roads for motor vehicles				
main roads				
regional roads				
local roads				
urban roads and streets				

Classification of winter service equipment for road users:
Quality, providing of winter service is very dependent on the behavior of road users and equipment of their vehicles for winter driving conditions. Due to inadequate tires and other winter equipment, drivers on roads cause traffic jams and increase the cost of winter service providers. How a winter equipment of vehicles regulated in your legislation?

2.0 What type of tires and equipment is obligatory for given vehicles in winter time? Mark with '+' between the brackets (X)

Type of tires	Private vehicles	Heavy goods vehicles
tires with summer tread pattern	<input type="checkbox"/> yes <input type="checkbox"/> no	<input type="checkbox"/> yes <input type="checkbox"/> no
tires with winter tread pattern	<input type="checkbox"/> yes <input type="checkbox"/> no	<input type="checkbox"/> yes <input type="checkbox"/> no
tires with summer tread pattern and snow chains	<input type="checkbox"/> yes <input type="checkbox"/> no	<input type="checkbox"/> yes <input type="checkbox"/> no

2.1 Are snow chains used on highways in your country?
Mark with '+' between the brackets (X)
 yes no
In which cases?

2.2 What is the minimum allowed tread depth on tires in winter time in mm?
On tires with summer treadmm
On tires with winter treadmm

2.3 Depending on the location of the region, do you have in winter time mandatory different types of tires for different regions? (summer or winter tread, tires with nails) From when to when, lasts the winter period in regard to road traffic?
Mark with '+' between the brackets (X)
 yes no
 we have mandatory the same type of tires for the whole country
 we have mandatory different types of tires for different winter periods
winter period on roads is from until.....
If different winter requirements are mandatory in different regions, please describe the criteria (levelroads, mountainous area, road area, altitude, weather conditions, regions with no snowfall, etc.?)

Clarification of heavy goods vehicles elimination from traffic at snowfall or hazardous snowfalls:
Heavy goods vehicles can cause traffic jams on slopes of snowfall and impede the work of winter service providers, so they must be eliminated from traffic, especially at heavy snowfall periods.

3.0 Who eliminates heavy goods vehicles > 25t on roads, when there is risk that snowfall traffic flow will be interrupted? Mark with '+' between the brackets (X)
 they eliminate themselves on the basis of radio message
 they are eliminated by the police
 they are eliminated by winter service providers
 they are eliminated by the police, with the aid of winter service providers
 they are eliminated from
 they are not eliminated at all (no legal restriction)
Other - describe:

3.1 If they are, where are heavy goods vehicles on highways eliminated to?
Mark with '+' between the brackets (X)
 to highway resting places only
 to resting places and to side lanes
 to side lanes
Other - describe:

Clarification of approach to using standards, criteria and rules in providing drivability of roads and traffic safety on roads:
Comments for maintaining roads in winter conditions or levels of maintenance differ for different categories of roads. They are set by criteria that depend on a combination of equipment and road practice approach. The purpose of this survey is not only to understand but finding out common problems, reasons for which should lead to research with aim of parties would be able to improve conditions for road users and optimize winter service.

Due to different reasons, ensuring drivability of roads can be more or less problematic. Implemented standards for the level of drivability of roads and ensuring the safety of road users can mostly due to lack of financial resources, impede the work of winter service providers.

4.0 By a general evaluation from 1 to 5 evaluate the difficulty of ensuring drivability of roads in winter period?

Difficulty Road category	1 - usual traffic, 5 - road difficulty	Description of difficulty
motorways		
semi motorways		
main roads for motor vehicles		
main roads		
regional roads		
local roads		
urban roads and streets		
cycle lanes		

4.1 Describe main problems in providing winter service for each road category?

Road category	Main problems
motorways	
semi motorways	
main roads for motor vehicles	
main roads	
regional roads	
local roads	
urban roads and streets	
cycle lanes	

4.2 Do you have in your country or in regions roads separated into different areas in regard to the level of difficulty in providing drivability in winter period? (Example: regarding the mountainous area or lowlands, regarding the altitude, AUST (selectivity), weather conditions in winter period, etc.?) (possible, if possible, mark with '+' between the brackets (X))
 yes no
If you have different criteria, please describe them:

4.3 Do standards and regulations for ensuring drivability and traffic safety on roads meet the requirements of road users? Mark with '+' between the brackets (X)

Road category	Yes	No	If they don't meet the requirements, why not?
motorways	<input type="checkbox"/> yes <input type="checkbox"/> no		
semi motorways	<input type="checkbox"/> yes <input type="checkbox"/> no		
main roads for motor vehicles	<input type="checkbox"/> yes <input type="checkbox"/> no		
main roads	<input type="checkbox"/> yes <input type="checkbox"/> no		
regional roads	<input type="checkbox"/> yes <input type="checkbox"/> no		
local roads	<input type="checkbox"/> yes <input type="checkbox"/> no		
urban roads	<input type="checkbox"/> yes <input type="checkbox"/> no		
cycle lanes	<input type="checkbox"/> yes <input type="checkbox"/> no		

4.4 Do you have any priorities or levels of service on roads in your country divided to, and which are they?
Description of priorities or levels of service, according to the criteria you use:

- Questionnaire was send to all 27 CEDR member states.
- Answers to the questionnaire were received from **15 different countries** - **response rate of 55%**, which is quite a success.
- Countries that responded: Austria, Denmark, Estonia, Finland, Germany, Iceland, Ireland, Italy, Latvia, Lithuania, Norway, Poland, Slovenia, Spain and Switzerland.

The analysis

- Given large amount of data, the group decided to make the analysis of the questionnaire on the basis of 10 most important questions, mostly related to operational issues:
 1. How is winter service organized in your country?
 2. Who is providing winter service in your country?
 3. How difficult it is to ensure drivability of roads in winter period in your country?
 4. Which are the main problems in providing winter service?
 5. Do standards and regulations for ensuring drivability on roads meet the requirements of road users?
 6. Do your winter service providers use any kind of weather information system?
 7. From which sources you mainly obtain weather and traffic information?
 8. What are the main measures you use for operational intervention on roads?
 9. Which advanced technologies you use?
 10. Indicate main topics or areas for research?

Snapshot of the analysis spreadsheet

Question / Country	Austria	Denmark	Estonia	Finland	Germany	Iceland	Ireland	Italy	Latvia	Lithuania	Norway	Poland	Slovenia	Spain	Switzerland
How is winter service organized in your country?															
At state level															
At regional level		/	/	/			/	/	/	/	/	/	/	/	/
At local level															
Who is providing winter service in your country?															
State-owned or private company by contract															
Public-private partnership (PPP)	/		/	/		/	/	/	/	/	/	/	/	/	/
How difficult it is to ensure drivability of roads in winter period in your country?															
1 not difficult at all	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
2 minor difficulties	/														
3 difficult	/														
4 very difficult		/	/	/	/	/	/	/	/	/	/	/	/	/	/
5 extremely difficult	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
Which are the main problems in providing winter service?	High intensity of operation (24/7), impact of salt on pavement, imminent accident situations	Inability to spread salt evenly across the road, detection of "black ice", challenges to get all players to implement the plan, traffic jams	Traffic density, keeping roads open during heavy snow and blizzard, lack of resources	Slipperiness and quantity of snow for local roads and urban roads and streets.	Heavy snow, black ice, heavy traffic	Late timing on snow clearing, traffic jams on rush hours	High traffic volumes, high speeds and high user expectations, complicated, free flow junctions, lack of financial resources, equipment and staff	HGVs across the roads impede winter service	High costs of winter maintenance, extreme weather, traffic density and road construction	Salt can't be used during very cold weather; hard to ensure winter maintenance due to road construction in some sections	Salt is harmful for nature and can't be used during very cold weather; long response time by contractors	Traffic congestion and lack of funding.	Improperly equipped HGV, no compliance with legally adopted regulations for winter equipment, relying traffic load to other roads due to traffic jams	High altitude, complicated regional climate, intense traffic, complicated road delineation	Heavy snowfall, accidents, sometimes shortages of salt
Do standards and regulations for ensuring drivability on roads meet the requirements of road users?															
Yes															
No	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
Do your winter maintenance providers use any kind of weather information system?	MDSS and AUSTRO CONTROL with specially designed weather forecasts for winter service units.	It is called Vejvej.dk., owned by the state, covered with almost 400 road weather stations along the road network and 3-4 major radars. The system provides anything from meteorological parameters in real time and forecasts.	Estonian RWS consists of 62 road weather stations, 79 road cameras and 4 VMS signs. Weather forecasts provided by the Estonian Met Office.	Weather stations and weather camera system in addition satellite and radar images	SWIS by German Weather Service	IRCA gathers data into central database, there are approximately 100 road weather stations countrywide, forecast period up to six days is used.	Vaisala Road DSS (Road Decision Support System)	Local weather info. system; other data from National dpt. of Civil Protection	RWS that consists of 53 ESS (Vaisala rosa station), that are equipped with IP weather cameras, we are introducing MDSS	103 Road Weather Stations, meteorological forecast from Lithuanian Hydrometeorological Service	250 Road Weather Stations, the forecast is bought from Norwegian meteorological Institute	Ice sensors, meteorological info., cameras, temperature sensors on and beneath the surface	Road weather information system (RWS) which represents data in web application; special road weather forecasts produced by physical model METRo	Fixed and mobile weather station, other specific weather prediction systems for specific road sectors (MDSS)	Weather stations along the motorways, "SwissMeteo" provides weather forecast

Conclusions of the analysis - 1

Conclusions according to answers to questions 1 to 4:

1. Majority of countries organize their winter service at state level.
2. Winter service is generally provided by a state-owned or private company.
3. Ensuring drivability of roads in winter time is generally speaking difficult for all countries.
4. Main problems when providing winter service are: problems connected with salt spreading, heavy traffic and inadequately equipped HGVs, problems with manpower and financial resources and complicated regional climates.

Conclusions of the analysis - 2

Conclusions according to answers to questions 5 to 7:

5. Standards and regulations for providing winter service generally meet the requirements of road users.
6. All interviewed countries use some kind of system which connects road weather stations and sensors. They also have access to data from meteorological authorities. But only minority use an MDSS system combining all these data and through modelling and computations providing direct advice on winter service activities (salt quantity, route patterns etc.).
7. Weather and traffic information are mainly obtained from National meteorological authorities, weather forecast, road weather stations with floor sensors and weather stations. Other sources (i.e. police, video cameras, information from road users etc.) are used more rarely.

Conclusions of the analysis - 3

Conclusions according to answers to questions 8 to 10:

8. Measures, countries use for operational intervention on roads, are: 1. intervention according to the already prepared scenarios of road conditions, 2. required level of road drivability. 3. intervention on the basis of MDSS and Road Weather Information System (RWIS), 4. required time for drivability of road in throughout the whole day hour-to-hour.
9. Usage of advanced technologies in winter service varies greatly among countries and it seems that only minor part of the available technological solutions is actually in use.
10. Main topics for research, suggested by countries relate to these general research fields: salting of roads, monitoring and evaluating efficiency of winter service activities, new gritting materials, Maintenance Decision Support Systems (MDSS) and new weather forecast technologies.

Identified topics of common interest of CEDR member states in the field of winter service:

- ***Guidelines for winter service***

Research to determine various scenarios on maintenance measures.

- ***Calibration mechanisms of machinery***

A methodology for calibration of machinery for winter service that could be used as a CEDR standard.

- ***New gritting materials***

New gritting materials that could be used instead of salt.

- ***Maintenance Decisions Support System (MDSS)***

A cost/benefit analysis would need to be done for such a system and to solve the problem of “information overflow” into the system.

- ***Salt and gritting material consumption***

Research in optimizing the consumption of gritting materials.

THANK YOU FOR YOUR ATTENTION

QUESTIONS?

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