The fifth meeting of TC 2.4—Winter Services was conducted in concurrence with the 14th Winter Road Congress at the scheduled time and place in accordance with the agenda.

The major items of work during this meeting were:

- Final preparations necessary for the Congress, which included final adjustments to the technical session chairs and co-chairs.
- This meeting provided opportunity for briefings on SICOP, TRB, AURORA, PEER Exchange, and other US activities by Max Perchanok and Wilf Nixon. Bine Pengal (Slovenia) made a presentation regarding work being done by the Conference of European Directors of Roads (CEDR), which is similar to the PEER Exchange in the US. There are opportunities to form a liaison with this group and share research and products.
- Opportunity for working groups to meet and coordinate activities and provide briefings of the progress made. The next steps are to form the outline for the final products and create a QA plan for the work.

PIARC XIV INTERNATIONAL WINTER ROAD CONGRESS

The committee meeting was held in conjunction with the WRC. My activities and responsibilities were as follows:

- Attended the plenary session and heard ministerial discussion regarding their views of extreme events.
- Presented the paper “Donner Pass in California: An Examination of Extreme Weather and the Potential Effects of Climate Change on Traffic Safety” by Seeherman.
- Presented the paper “Extreme Storms in the Midwest US: Case Studies” by Nixon, DeVries, Fosse
- Presided over session T4.6: Uses Of Data
  - Intelligently Adding Intelligence by Paul Williams (UK)
  - Holistic Winter Maintenance Model by Markus Hoffman (AU)
  - Winter Road Classification and Reporting-A Risk Based Approach by Ms. Lalita Thakali (Quebec CA) (Presented by Max Perchanok)
  - Traffic Safety Measures with the Development and Operation of the Information Streaming System with the Hailstone Detector by Hirohiko Hattori (JA)

Attended technical sessions:
T1-1 Winter Service and Climate Change
T3-2 Case Studies
T3-3 Operation
T5-6 Management of Winter Operations
T6-1 Mobility in Winter Conditions
T6-3 Informing Road Users

Visited Giletta Equipment vendor and discussed various sizes of equipment and their utilization. Studied their plows with primary and secondary blades.

Visited AkzoNobel Salt vendor and discussed a new, biodegradable additive for salt and salt brines that keep residual liquids from freezing in micro cracks causing potholes.

Discussed the poster by Spain on their application of MDSS on the route A-1 north of Madrid.

TC B.5 – Winter Service Committee Work

Several activities have been accomplished since the last meeting.

- The majority of time since the last meeting was dedicated to the details of the WRC; finalizing technical sessions, securing presenters for authors who could not attend, identifying chairs and co-chairs for the technical sessions and other activities as needed.

- I worked with Mr. Gabe Guevara (FHWA) and Ms. Helena Halvar (Swedish Transport Administration), the co-chairs of TC 2.4.3 Advanced Technologies for Data Collection and Information to Users and Operators, to develop and execute the work plan. This includes the identification of case studies to be included in our report and the creation of a template for data collection to document each case study.

- We have conducted a web conference with Work Group members to coordinate the work of the WG. This has been a good technology to utilize to bring the Work Group together between meetings.

Follow-up Actions

Continue participation in Work Group 2.4.3 Advanced Data Collection by assisting in gathering data to document the IMO case study.

Finalize and distribute the concluding remarks by our Chairman by completing the translation to English.

Perform the administrative functions of the Committee Secretary; finalizing the Andorra meeting minutes, refine the work programs for each working group and assist in the development of the agenda for the next TC 2.4 meeting.

Conduct technology transfer in the US through participation in AASHTO’s Winter Maintenance Technical Services Program and other venues, particularly the AASHTO Subcommittee on Maintenance meeting planned for July 2014.
**FUTURE MEETINGS**

There will be a mid-term meeting of TC and TF Chairs and Secretaries, Strategic Theme Coordinators and the Strategic Planning Commission in Vienna, Austria. This meeting has been scheduled for June 30-July 1, 2014.

The next TC2.4 meeting should be held in the autumn, which should be held at the site of the next Winter Road Congress in 2018, Gdansk, Poland.

The PIARC General Secretary has initiated communications with the First Delegate from Romania to begin planning the TC’s second seminar. This seminar should be held in the spring 2015 in Timisoara, Romania.

Respectfully Submitted,

Richard J. Nelson, P.E., F.ASCE
Assistant Director, Operations
Nevada Department of Transportation

Attachment: Meeting 5 agenda
WRC Technical Session agenda

cc: Gummada Murthy, AASHTO
Lee Smithson, SICOP Coordinator
### TC 2.4 Winter Service

#### Meeting 5- Andorra la Vella

**Draft of Agenda**

**3 February 2014, 9:30-16:30**

<table>
<thead>
<tr>
<th>Item</th>
<th>Document</th>
<th>Rapporteur</th>
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<tbody>
<tr>
<td><strong>General</strong></td>
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</tr>
<tr>
<td>1.</td>
<td>Welcome and opening remarks</td>
<td>Mr…Andorra Giloppé</td>
</tr>
<tr>
<td>2.</td>
<td>Introduction of new members</td>
<td>Mr Giloppé Nelson</td>
</tr>
<tr>
<td>3.</td>
<td>Approval of the agenda</td>
<td>Agenda All</td>
</tr>
<tr>
<td></td>
<td>Approval of the minutes of the 4&lt;sup&gt;th&lt;/sup&gt; meeting in</td>
<td>Minutes of the 3&lt;sup&gt;rd&lt;/sup&gt; meeting Valdecantos All</td>
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<td>4.</td>
<td>PIARC Andorra Congress 2014</td>
<td>Patmijavila Andorran organizing committee all</td>
</tr>
<tr>
<td>5</td>
<td>Report on the situation</td>
<td>Patmijavila all</td>
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<tr>
<td></td>
<td>Information and questions</td>
<td>Congress program</td>
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<td>Opening and closing ceremonies</td>
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<td>6</td>
<td>Organization of the sessions</td>
<td>PIARC Strategic Plan 2012 - 2015 Haaland Working Groups Leader Valdecantos All</td>
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<tr>
<td></td>
<td>(timing, chairing, …)</td>
<td>Organization of the posters sessions</td>
</tr>
<tr>
<td>7</td>
<td>Any other item concerning the congress</td>
<td>All</td>
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**PIARC Andorra Congress 2014**

<table>
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<tr>
<th>Item</th>
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<tr>
<td>8</td>
<td>Terminology</td>
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<tr>
<td>9</td>
<td>WG meetings</td>
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<td>10</td>
<td>Progress Reports</td>
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**PIARC Strategic Plan 2012 - 2015**

<table>
<thead>
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<th>Item</th>
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<tr>
<td>11</td>
<td>Snow and ice data book</td>
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<td>12</td>
<td>Any other item concerning PIARC Strategic Plan 2012 - 2015</td>
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**CEDR And AASHTO Exchanges**

<table>
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<tr>
<td>13</td>
<td>Seminar</td>
<td>Bine, Wilf, Max ALL</td>
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<tr>
<td>14</td>
<td>Next seminar</td>
<td>Giloppé</td>
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</table>
7 February 14:00-17:00

Conclusions of the congress

15 Comments on the congress, exhibition, snowplough championships
   All

16 General Report Draft Version
   Chair, Secretaries, Reviewing Leaders

17 Article Routes/Roads
   Chair, Secretaries, Reviewing Leaders

General

18 Web site
   Kinana

19 Any other item
   All

20 Next meetings autumn 2014
   Palmijavila

21 Summary of 5th meeting
   Nelson

22 Closing of the 5th meeting
   Giloppé
### Technical sessions

<table>
<thead>
<tr>
<th>Theme</th>
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<tbody>
<tr>
<td><strong>T1</strong></td>
<td>Winter service and climate change</td>
</tr>
<tr>
<td><strong>T2</strong></td>
<td>Winter service in a constrained budgetary context</td>
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<tr>
<td><strong>T3</strong></td>
<td>Extreme events</td>
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<tr>
<td><strong>T4</strong></td>
<td>Winter service management</td>
</tr>
<tr>
<td><strong>T5</strong></td>
<td>Operation approaches, equipment and products</td>
</tr>
<tr>
<td><strong>T6</strong></td>
<td>The road users in winter conditions</td>
</tr>
<tr>
<td><strong>T7</strong></td>
<td>Road tunnels in winter conditions</td>
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<tr>
<td><strong>T8</strong></td>
<td>Road bridges in winter conditions</td>
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</tbody>
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#### Tuesday

- **04/02/2014**
  - **17.15 - 18.45h**
    - **T1** Winter service and climate change
    - **T2** Reducing costs
    - **T3** Management in extreme events conditions
  - **8.30 - 10.30h**
    - **T3** Case studies
    - **T4** Interventions

#### Wednesday

- **05/02/2014**
  - **11.30 - 13.00h**
    - **T3** Operation
    - **T4** Management
    - **T5** Dosing deicing products
A METHOD OF ESTIMATING WINTER CLIMATE PARAMETERS USING FUTURE PROJECTIONS FROM THE GLOBAL CLIMATE MODEL

Mr Yusuke Harada
**DONNER PASS IN CALIFORNIA: AN EXAMINATION OF EXTREME WEATHER AND THE POTENTIAL EFFECTS OF CLIMATE CHANGE ON TRAFFIC SAFETY**  
Mr Joshua Seeherman

04/02/2014 17.15 - 18.45

**THE EFFECTS OF CLIMATE CHANGE ON WINTER SERVICE IN GERMANY**  
Mr Peter Hoffmann

04/02/2014 17.15 - 18.45

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**T2 Winter service in a constrained budgetary context**

1  **REDUCING COSTS**  
CHAIR: Roberto Alberola, **President, Spanish National Committee (ATC)** - Spain

- **REDUCING COSTS AND IMPROVING EFFICIENCY USING ROUTE BASED FORECASTING**  
Mr Patrick Sachon

04/02/2014 17.15 - 18.45

- **AN EFFICIENT WINTER ROAD MAINTENANCE IN A LIMITED BUDGETARY CONTEXT**  
Mr Enrique Soler Salcedo

04/02/2014 17.15 - 18.45

- **STANDARDIZATION OF WINTER MAINTENANCE OPERATIONS ON ROAD NETWORK IN THE CZECH REPUBLIC: SUCCESSFUL WAY TO KEEP THE RELATION BETWEEN BUDGET AND QUALITY.**  
Mr Tomas Pospisek

04/02/2014 17.15 - 18.45

- **UTILIZING TECHNOLOGY TO REDUCE COSTS IN WINTER SERVICE UNDER CONSTRAINED BUDGETS**  
Mr Björn Olafsson

04/02/2014 17.15 - 18.45

2  **COST BENEFIT ANALYSIS**  
CHAIR: Skirmantas Skrinskas, **Director of Lithuanian Road Administration** - Lithuania

- **COST-BENEFIT ANALYSIS OF ROAD WEATHER STATIONS ON HIGHWAYS**  
Mr Markus Streich

05/02/2014 8.30 - 10.30

- **INNOVATIONS IN WINTER MAINTENANCE MANAGEMENT IN LITHUANIA**  
Mr Egidijus Skrodenis

05/02/2014 8.30 - 10.30

- **ESTIMATING THE COST OF DISRUPTION TO TRAVEL CAUSED BY SEVERE WINTER WEATHER**  
Mr Karl Johnston

05/02/2014 8.30 - 10.30

- **A STUDY ON THE DEVELOPMENT OF THE EXPRESSWAY TRAFFIC ACCIDENT DAMAGE MODEL IN THE WINTER SEASON**  
Mr Jejin Park

05/02/2014 8.30 - 10.30

- **A BENEFIT-COST APPROACH TO LEVEL OF SERVICE STANDARDS FOR WINTER ROAD MAINTENANCE**  

05/02/2014 8.30 - 10.30
3  **CASE STUDIES**  
*Chair: Skull Thordarson, Iceland Road and Coastal Administration - Iceland*

**BITUMINOUS MICROAGGREGATES AND WINTER SERVICE**  
Mr Julio del Pozo  
07/02/2014 8.30 - 10 h

**OPTIMIZING THE ROAD MAINTENANCE COSTS OF THE NATIONAL ROADS IN POLAND**  
Mr Andrezej Maciejewski  
07/02/2014 8.30 - 10 h

**IMPROVING EFFICIENCY OF WINTER MAINTENANCE IN A CONSTRAINED BUDGET ENVIRONMENT**  
Mr Christopher D. Clement  
07/02/2014 8.30 - 10 h

**TRAFFIC ACCIDENTS ON SLIPPERY ROADS.**  
Mr Jens Kristian Fonnesbech  
07/02/2014 8.30 - 10 h

**A STUDY ON THE ANALYSIS OF THE ROAD TRAFFIC SERVICE CHARACTERISTIC CORRESPONDING TO SNOWFALL AND ON THE ESTIMATION METHOD OF BENEFITS BY SNOW REMOVAL BASED ON THE ANALYSIS**  
Ms Sachiko Ohashi  
07/02/2014 8.30 - 10 h

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**T3 Extreme events**

**1 MANAGEMENT IN EXTREME EVENTS CONDITIONS**  
*Christophe Saintillan, Director of Transport Infrastructures - France*

**MANAGEMENT OF EXTREME WINTER EVENTS IN GERMANY**  
Mr Horst Hanke  
04/02/2014 17.15 - 18.45 h

**MANAGEMENT OF WINTER SERVICE FOR EXTREME EVENTS**  
Mr Michael P. Lewis  
04/02/2014 17.15 - 18.45 h

**CRISIS MANAGEMENT DURING EXTREME WINTER WEATHER EVENTS**  
Mr Martin Hobbs  
04/02/2014 17.15 - 18.45 h

**IMPROVING THE RESILIENCE OF THE UNITED KINGDOM'S ROAD NETWORK TO THE IMPACT OF SEVERE WINTER WEATHER**  
Mr Matthew Lugg  
04/02/2014 17.15 - 18.45 h

**2 CASE STUDIES**  
*Chair: Andrzej Maciejewski, Deputy Director General of GDDKIA - Poland*

**PUYEHUE VOLCANO EMERGENCY**  
Ms Mariela Alejandra Gimenez  
05/02/2014 8.30 - 10.30 h
3 OPERATION

CHAIR: Bud Wright, Executive Director, AASHTO - United States

OPERATIONS UNDER HEAVY SNOWFALL ON HIGHWAYS IN NIIGATA PREFECTURE, JAPAN
Mr Tatsuro Yoshimochi
05/02/2014 11.30 - 13.00 h

WINTER RESILIENCE IN AN UNPREDICTABLE CLIMATE
Mr Brian Gordon
05/02/2014 11.30 - 13.00 h

MULTI AGENCY RESPONSE TEAM (MART) APPROACH TO SEVERE WINTER EVENTS
Mr Hugh Gillies
05/02/2014 11.30 - 13.00 h

4 AVALANCHES

CHAIR: José Miguel Ortega, International Affairs Coordinator, Ministry of Public Works - Chile

MANAGING MOUNTAIN PASSES EXPOSED TO AVALANCHES
Mr Torgeir Vaa
06/02/2014 8.30 - 10 h

ROAD NETWORKS VULNERABILITY AND TERRITORIAL ACCESSIBILITY MODELING FACING SNOW AVALANCHE IN THE FRENCH ALPS
Mr Frédéric Leone
06/02/2014 8.30 - 10 h

FRENCH KNOW-HOW AND EXPERTISE IN NATURAL HAZARDS MANAGEMENT
Mr Thomas Berger
06/02/2014 8.30 - 10 h

A DEVICE FOR PREVENTIVE TRIGGERING OF AVALANCHES ON AN INTERNATIONAL AXIS
Mr Didier Michau
06/02/2014 8.30 - 10 h

Winter service management

1 MONITORING PERFORMANCE

CHAIR: Anne-Marie Leclerc, Deputy Vice-Minister, Ministry of Transport - Canada-Quebec

REAL-TIME MAINTENANCE MONITORING SYSTEM
<table>
<thead>
<tr>
<th>Title</th>
<th>Presenter</th>
<th>Date/Time</th>
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<tr>
<td>HOW DO WE ENSURE THAT WE GET THE QUALITY WE HAVE ORDERED?</td>
<td>Ms Tuovi Päiviö</td>
<td>04/02/2014 17.15 - 18.45</td>
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<tr>
<td>MODERN WINTER SERVICE IN SWITZERLAND</td>
<td>Dr. Thorsten Cypra</td>
<td>04/02/2014 17.15 - 18.45</td>
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<td>PERFORMANCE METRICS AND TOOLS FOR WINTER MAINTENANCE OPERATIONS</td>
<td>Mr John Mewes</td>
<td>04/02/2014 17.15 - 18.45</td>
</tr>
<tr>
<td>PROMOTION METHODS OF MUTUAL ASSISTANCE FOR SNOW REMOVAL ACTIVITY ON</td>
<td>Mr Nozomu Mori</td>
<td>04/02/2014 17.15 - 18.45</td>
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<tr>
<td>the community roads through the communication among the residents of</td>
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<td>the local settlements.</td>
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<tr>
<td>DRILLING WINTER CONDITIONS: EXPERIENCE IN ABERTIS SPAIN</td>
<td>Mr Víctor Blanco Campos</td>
<td>05/02/2014 08.30 - 10.30</td>
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<td>GEO-LOCALIZATION OF THE MACHINES. APPLICATION TO WINTER MAINTENANCE</td>
<td>Mr Jean Taquin</td>
<td>05/02/2014 08.30 - 10.30</td>
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<tr>
<td>DESIGN OF SNOW PLOWING AND DEICING ROUTES FOR URBAN WINTER VIABILITY:</td>
<td>Mr Olivier Quirion-Blais</td>
<td>05/02/2014 08.30 - 10.30</td>
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<tr>
<td>ADDRESSING ACTUAL OPERATIONAL CONSTRAINTS</td>
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<tr>
<td>ASSESSMENT OF EXPERTISE AND SKILLS OF WINTER MAINTENANCE OPERATORS</td>
<td>Mr Øystein Larsen</td>
<td>05/02/2014 08.30 - 10.30</td>
</tr>
<tr>
<td>DE-ICERS STORAGE, MANAGEMENT AND STRUCTURAL DESIGN: A TECHNICAL</td>
<td>Ms Stéphanie Poissonnier</td>
<td>05/02/2014 08.30 - 10.30</td>
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<tr>
<td>GUIDE PRESENTATION</td>
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<tr>
<td>ADVANCED ICT TECHNOLOGIES FOR COSTS OPTIMIZATION AND INNOVATION OF</td>
<td>Mr Fabrizio Dominici</td>
<td>05/02/2014 11.30 - 13.00</td>
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<td>WINTER MAINTENANCE PROCESSES IN THE PERSPECTIVE OF SMART-CITY</td>
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<tr>
<td>WINTER WEATHER OPERATIONS: ADAPTING TO CHANGING TIMES AND ROLES</td>
<td>Mr David Bergner</td>
<td>05/02/2014 11.30 - 13.00</td>
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REAL-TIME CORRECTIONS AND INFORMATION PROCESSING IN MAINTENANCE DECISION SUPPORT SYSTEMS
Mr Luis Azcue Rodríguez
05/02/2014 11.30 - 13.00

A COMPREHENSIVE SYSTEM OF ROAD WEATHER FORECASTING SERVICE FOR WINTER ROAD
Mr Didier Michau
05/02/2014 11.30 - 13.00

4 STRATEGIES
CHAIR: André Horth, Director, DIR Sud-Ouest - France

A STUDY ON USE OF QUANTITATIVE INDICATOR TO SUPPORT THE IMPROVEMENT OF WINTER ROAD MANAGEMENT
Mr Roberto Tokunaga
06/02/2014 8.30 - 10 h

WINTER SERVICEABILITY MANAGEMENT IN ANDORRA
Mr Josep Escaler
06/02/2014 8.30 - 10 h

DEVELOPMENT FOR PREVENTIVE WINTER SERVICE - CLEARING BEFORE SNOWFALL AND SALTING BEFORE THE FORMATION OF ICE
Mr Ruedi Hofer
06/02/2014 8.30 - 10 h

PREVENTIVE RESPONSE STRATEGIES IN WINTER MAINTENANCE IN THE SPANISH ROAD NETWORK
Ms María del Carmen Sanchez Sanz
06/02/2014 8.30 - 10 h

5 CASE STUDIES
CHAIR: Jorge Urrecho, General Director of Roads, Ministry of Public Works - Spain

THE WINTER SERVICE ABILITY IN MOUNTAINS ON AN INTERNATIONAL AXIS
Mr Didier Michau
06/02/2014 11 - 12.30

SAPPORO WINTER ROAD MANAGEMENT PLANS
Mr Takuji Umezawa
06/02/2014 11 - 12.30

A WAY TO OPTIMIZE WINTER MAINTENANCE IN LATVIA
Mr Janis Kastanovskis
06/02/2014 11 - 12.30

A STRATEGY OF ROAD PRESERVATION IN THE FRAMEWORK OF WINTER SERVICE
Mr Jordi Garcia Llevet
06/02/2014 11 - 12.30

6 USE OF DATA
CHAIR: Rick Nelson, English-speaking Secretary of PIARC TC2.4 - United States

INTELLIGENTLY ADDING INTELLIGENCE
Mr Paul Williams
06/02/2014 17 - 18.30

HOLISTIC WINTER MAINTENANCE MODEL
Mr Markus Hoffmann
06/02/2014 17 - 18.30
TRAFFIC SAFETY MEASURES WITH THE DEVELOPMENT AND OPERATION OF THE INFORMATION STREAMING SYSTEM WITH THE HAILSTONE DETECTOR 06/02/2014 17 - 18.30 h
Mr Hirohiko Hattori

WINTER ROAD CONDITION CLASSIFICATION AND REPORTING - A RISK BASED APPROACH 06/02/2014 17 - 18.30 h
Ms Lalita Thakali

7  TOOLS FOR MONITORING
CHAIR: Manel Riera, Director Department of Land Management - Andorra

EFFECTIVENESS OF ANALYSIS OF VISUALIZED SNOW REMOVAL OPERATION RECORDS TOWARD THE ESTABLISHMENT OF SNOW REMOVAL DEPLOYMENT SUPPORT SYSTEM 07/02/2014 8.30 - 10 h
Mr Kazushige Komiyama

RESEARCH ON KEY TECHNIQUES OF STORM WARNING IN EXPRESSWAY 07/02/2014 8.30 - 10 h
Mr Xvguang Zhang

A NEW MODEL FOR A WINTER INDEX TO ESTIMATE AND EVALUATE CONSUMPTION OF SALT 07/02/2014 8.30 - 10 h
Mr Horst Badelt

8  WEATHER FORECASTING
Xavier Flores, Director general Infrastructure of Land Mobility of Catalonia - Spain

TOWARDS TO 2.0 VERSION OF THE WINTER MAINTENANCE MANAGEMENT SYSTEMS 06/02/2014 14.30 - 16 h
Mr J. Pablo Saez Villar

CLIMATIC REGIONING OF LITHUANIA FROM THE POINT OF VIEW OF WINTER ROAD MAINTENANCE 06/02/2014 14.30 - 16 h
Mr Alfredas Laurinavičius

INNOVATIVE METHODS FOR IMPROVING THE PREDICTION OF THE WEATHER CONDITIONS ALONG MOUNTAIN ROADS 06/02/2014 14.30 - 16 h
Mr Gerald Spreitzhofer

USING COMPACT DOPPLER RADAR (WITH RADAR)?NETWORK TO DETECT LOCAL WEATHER PHENOMENA 06/02/2014 14.30 - 16 h
Mr Takayoshi Kawahata

9  PAVEMENT CONDITION - FORECASTING AND MEASUREMENTS
CHAIR: Roy Brannen, Director of Transport Scotland - United Kingdom

DEVELOPMENT OF AN AUTOMATED ROAD SUBSURFACE FROST PROBE NETWORK FOR QUÉBEC 06/02/2014 14.30 - 16 h
Mr Claude Lapointe

CAN MDSS SYSTEMS REALLY WORK? KM BY KM FORECASTING
IMPROVING WINTER MAINTENANCE EFFICIENCY IN THE CZECH REPUBLIC.
Mr Tomas Pospisek

MEASUREMENT OF ROAD SURFACE TEMPERATURE USING THERMAL MAPPING SYSTEM
Mr Dukgeun Yun

OPTIMA (ROAD WEATHER INFORMATION DEDICATED TO ROAD SECTIONS) - SIGNIFICANT DEVELOPMENTS TO OPTIMIZE THE TREATMENT OF ROADS
Ms Odile Coudert

10 ROAD USER SAFETY
CHAIR: Terje Gustavsen, Director General of Norwegian Public Roads Administration - Norway

POTENTIAL OF WINTER MAINTENANCE FOR TRAFFIC SAFETY IN FINLAND
Mr Otto Kärki

CRITERIA FOR CLOSING MOUNTAIN PASSES BASED ON FRICTION MEASUREMENT AND CROSSWIND
Mr Bård Nonstad

SIDEWALK SNOW REMOVAL IN QUÉBEC CITY
Mr Eric Langlois

11 SKID RESISTANCE
CHAIR: Vicente Vilanova, PIARC Strategic Theme Coordinator ST4 - Spain

THE STUDY ON WINTER ROAD MAINTENANCE BY APPLYING PREDICTED FRICTION INDEX
Mr Takayuki Kojima

A TRAFFICABILITY INDEX TO SAFELY OPERATED ROADWAY NETWORK AND VEHICLES DURING WINTER
Mr Chung Younshik

CONTINUOUS SKID RESISTANCE TEST
Mr Taisto Haavasoja

IMPORTANCE OF HARDNESS AND TREAD DEPTH FOR WINTER TRUCK TIRES
Mr Bård Nonstad

12 TREATMENT STRATEGIES
CHAIR: Massimo Schintu, Director General AISCAT - Italy

NEW STRATEGIES FOR WINTER MAINTENANCE IN GERMANY
Mr Horst Hanke
SENSOR BASED ADAPTATION OF TREATMENT STRATEGIES
Mr Peter Nutz 06/02/2014 17 - 18.30 h

RESIDUAL SALT MODEL FOR DAILY APPLICATION IN WINTER SERVICE MANAGEMENT
Mr Michel Eram 06/02/2014 17 - 18.30 h

TRAFFIC IMPACT ON THE ICE MELTING
Mr Michel Eram 06/02/2014 17 - 18.30 h

STUDY TO DETERMINE THE MOST EFFICIENT DEICING MATERIAL DOSAGE FOR WINTER MAINTENANCE PREVENTIVE TREATMENTS ON THE SPANISH ROAD NETWORK IN ORDER TO ESTABLISH A NEW STRATEGY FOR WINTER MAINTENANCE ACTIONS, PROVINCE: MADRID
Mr Vicente Vilanova Martinez-Falero

T5 Operation approaches, equipment and products

1 IMPACTS OF DEICING PRODUCTS
CHAIR: Didier Giloppé, Chair of PIARC TC 2.4 - France

TRANSFER DYNAMICS OF ROAD DEICING SALTS IN A RETENTION POND FOR ROAD WATER TREATMENT
Mr Rémi Suaire 04/02/2014 17.15 - 18.45 h

STUDY ON A SALTING STRATEGY THAT CONSIDERS PAVEMENT TYPES
Mr Shunsuke Tanaka 04/02/2014 17.15 - 18.45 h

ENVIRONMENTAL IMPACTS OF PRACTICES AND CONDITIONS OF ROAD DEICING PRODUCTS STORAGE
Mr Ludovic Burghgraeve 04/02/2014 17.15 - 18.45 h

SYSTEM FOR PROGNOSTIC CALCULATION OF THE OPTIMAL SPREADING DENSITY IN WINTER ROAD CLEARANCE SERVICES
Mr Günter Hausmann 04/02/2014 17.15 - 18.45 h

DEICERS AND ANTI-ICERS COMPARATIVE STUDY
Ms Stéphanie Poissonnier 04/02/2014 17.15 - 18.45 h

2 DEICING PRODUCTS AND TESTING
CHAIR: Jan Olander, Member of PIARC TC2.4 - Sweden

NEW TEST PROCEDURES FOR SOLID AND LIQUID DEICER
Mr Peter Nutz 05/02/2014 8.30 - 10.30 h

FIGHT AGAINST THE ICE: SUGAR DOES NOT REPLACE THE SALT
Mr Pablo Juliá 05/02/2014 8.30 - 10.30 h
A NEW STANDARD XP P98-181 TO CHARACTERIZE THE PERFORMANCES OF DE-ICERS
Ms Ethel Jacquot 05/02/2014 8.30 - 10.30 h

MATERIALS AND TECHNOLOGIES FOR WINTER ROAD MAINTENANCE IN LITHUANIA
Mr Alfredas Laurinavičius 05/02/2014 8.30 - 10.30 h

EVALUATION OF DEICING PERFORMANCE FOR THE ECO-FRIENDLY DEICER
Mr Seung Woo Lee 05/02/2014 8.30 - 10.30 h

USING ORGANIC PRODUCTS FOR LONG-LASTING ANTI-ICING TREATMENTS: ON-GOING RESEARCH IN ARGENTINA
Mr Jorge Segundo Maturano 05/02/2014 8.30 - 10.30 h

NEW ROAD SURFACE MAINTENANCE OF EXPRESSWAY USING AN ON-VEHICLE SALINITY SENSOR SYSTEM WHICH MEASURES THE SALINITY CONTINUOUSLY
Mr Yutaka Suya 05/02/2014 11.30 - 13.00 h

LASTING OF SALT ON RURAL ROADS IN GERMANY
Ms Susanne Schulz 05/02/2014 11.30 - 13.00 h

ODEMIE (OPTIMIZED DOSAGE OF SPREADERS BY SOFTWARE FOR THE RESPECT OF ENVIRONMENT)
Ms Aurélie Lelandais 05/02/2014 11.30 - 13.00 h

STUDY TO OPTIMISE THE APPLICATION OF PREVENTIVE TREATMENTS ON ICE FORMATION AS A MEASURE TO DECREASE THE ECONOMICAL COST AND THE ENVIRONMENT IMPACT, USING A SYSTEM OF SALINITY CONTROL ON DRY ROADS TRATAMIENTOS
Mr Sergi Nieto Ruiz 06/02/2014 8.30 - 10 h

MEASUREMENTS OF RESIDUAL SALT ON A TEST TRACK UNDER CONTROLLED CONDITIONS
Mr Göran Blomqvist 06/02/2014 8.30 - 10 h

HOW TO REDUCE DE-ICING SALTS USING
Mr Luc Duriez 06/02/2014 8.30 - 10 h

DEVELOPMENT, IMPLEMENTATION AND EVALUATION OF REDUCED SALT SPREAD RATES
Mr Christopher Plumb 06/02/2014 8.30 - 10 h

3 DOSING DEICING PRODUCTS

3 IMPROVED USE OF SALT

5 FRICTION
FEASIBILITY STUDY ON FRICTION MAPPING  
Mr Naoto Takahashi  
05/02/2014 11.30 - 13.00 h fra eng

INFLUENCE OF THE GRITTING MATERIAL ON THE PAVEMENT PERFORMANCE  
Mr Dawei Wang  
05/02/2014 11.30 - 13.00 h

DEVELOPMENT AND APPLICATION OF AUTOMATIC WINTER TIRE DISCRIMINATION DEVICE  
Ms Eriko Nakahara  
05/02/2014 11.30 - 13.00 h

SKID RESISTANCE OF SIDEWALK OF RESIDENCE AREA IN WET, SLUDGY AND SNOWY CONDITIONS  
Mr Yongseok Kim  
05/02/2014 11.30 - 13.00 h

EFFICIENT WINTER ROAD MANAGEMENT USING A CONTACT AREA INFORMATION SENSING (CAIS)-BASED ROAD SURFACE CONDITION JUDGMENT SYSTEM  
Mr Tomonori Ohiro  
05/02/2014 11.30 - 13.00 h

6 MANAGEMENT OF WINTER OPERATIONS

WINTER MANAGEMENT ALONG THE ITALIAN MOTORWAY NETWORK  
Mr Massimo Schintu  
06/02/2014 11 - 12.30 h

INNOVATIVE WINTER MAINTENANCE GUIDELINES IN AUSTRIA  
Mr Josef Neuhold  
06/02/2014 11 - 12.30 h

IMPROVEMENT OF ROAD WINTER MAINTENANCE PRACTICES IN ARGENTINA  
Mr Jorge Maturano  
06/02/2014 11 - 12.30 h

TAKING INTO ACCOUNT THE ENVIRONMENT OF THE TRANSPORTATION ROUTES CONCERNING THE CHOICE OF THE PROTECTION TECHNIQUES. AN EXAMPLE IN ANDORRA.  
Mr Jean Francois Meffre  
06/02/2014 11 - 12.30 h

7 WINTER MAINTENANCE EQUIPMENT

A NEW CONCEPT FOR DIMENSIONING SALT STORAGE FACILITIES IN GERMANY  
Mr Christian Holldorb  
06/02/2014 11 - 12.30 h

STUDY ON THE DEVELOPMENT OF MULTI-PURPOSE SNOW REMOVAL VEHICLES  
Mr Sungpil Shin  
06/02/2014 11 - 12.30 h
DEGREE OF OPERABILITY OF WINTER MAINTENANCE MACHINES
Mr Richard Cleveland 06/02/2014 11 - 12.30 h

8 SPREADING OF DEICING PRODUCTS
Tsunomo Yoshigi, Director, Ministry of Land, Infrastructure, Transport and Tourism - Japan

MANAGE SPREADER DISTRIBUTION IN ACCORDING TO THE DE-ICING AGENT MOISTURE CONTENT
Mr Michael Langlet 06/02/2014 14.30 - 16 h

PATENTED RAPID DISSOLVER OF ANTI-FREEZE PRODUCTS FOR ROAD DE-ICING
Mr Marcello Christillin 06/02/2014 14.30 - 16 h

FACTORS INFLUENCING THE SPREAD PATTERN FROM SALT SPREADERS
Mr Krister Persson 06/02/2014 14.30 - 16 h

RECOMMENDATIONS FOR THE CORRECT SPREADING OF MELTING SALT SOLUTIONS
Mr Günter Hausmann 06/02/2014 14.30 - 16 h

9 DATA ACQUISITION
CHAIR: Alan Chambers, Member of PIARC TC2.4 - United Kingdom

ADVANCES IN LASER AND OPTICAL TECHNOLOGIES FOR ROAD STATE DETECTION APPLICATIONS
Ms Marta Ruiz-Llata 06/02/2014 14.30 - 16 h

VEHICLE BASED DATA FOR ROAD WINTER SERVICE
Mr Boriss Jelisejevs 06/02/2014 14.30 - 16 h

LOW-COST COOPERATIVE ROAD WEATHER MONITORING STATION
Mr Sadko Mandzuka 06/02/2014 14.30 - 16 h

10 ROAD EQUIPMENT AND DESIGN
CHAIR: Lahcen Ait Brahim, Director of Roads - Morocco

CONDITIONS UNDER WHICH THE DOWNSLOPE INTERVAL BETWEEN AVALANCHE PREVENTION BRIDGES CAN BE INCREASED AND CONSIDERATION OF CONSTRUCTION COST SAVINGS
Mr Hiroki Matsushita 06/02/2014 17 - 18.30 h

MEASURES FOR PREVENTING DROPPING SNOW FROM ROAD ACCESSORIES ON EXPRESSWAYS
Mr Yusuke Takeuchi 06/02/2014 17 - 18.30 h

ASSESSMENT OF ROAD EQUIPMENTS RESISTANCE TO SNOW PLOUGH LOADS
Mr Matteo Pezzucchi 06/02/2014 17 - 18.30 h

THE EFFECT OF CRASH BARRIER ON THE SNOW DEPOSITS OF
11 **SNOW MELTING METHODS**  
CHAIR: Masaru Matsuzawa, *Member of PIARC TC2.4 - Japan*

**STUDY ON THE INTRODUCTION OF ROAD HEATING SYSTEMS USING RENEWABLE ENERGY IN HOKKAIDO**  
Mr Takahiro Okawado  
07/02/2014 8.30 - 10 h  
eng, fra

**GROUND-SOURCE HEAT PIPE SNOW-MELTING SYSTEMS IN JAPAN**  
Mr Kazuro Bando  
07/02/2014 8.30 - 10 h  
eng, fra

**PRACTICAL APPLICATION OF SNOW MELTING SYSTEM USING NATURAL RESOURCES IN JAPAN**  
Mr Masahiko Katsuragi  
07/02/2014 8.30 - 10 h  
eng, fra

**GEOHERMAL ENERGY FOR ROAD SURFACE HEATING IN WINTER TIMES**  
Dr. Rainer Hess  
07/02/2014 8.30 - 10 h  
eng, fra, esp

12 **PAVEMENT MATERIALS**  
CHAIR: Valentin Anton, *Professor, Technical University of Civil Engineering, Bucharest - Romania*

**APPLICATION OF A POROUS INTERLAYER FOR ROAD TEMPERATURE CONTROL**  
Mr Andreas Schacht  
06/02/2014 17 - 18.30 h  
esp, eng

**FREEZING PREVENTION PAVEMENT USING RUBBER POWDER**  
Mr Toshinobu Sakamoto  
06/02/2014 17 - 18.30 h  
eng, fra

**TOWARDS SUSTAINABLE WINTER ROAD MAINTENANCE: DEVELOPMENT OF ICE-BREAKING PAVEMENT**  
Mr Masahiko Iwama  
06/02/2014 17 - 18.30 h  
eng, fra

**The road users in winter conditions**

1 **MOBILITY IN WINTER CONDITIONS**  
CHAIR: Pär-Håkan Appel, *Director, Finnish Transport Agency - Finland*

**INFLUENCING ROAD USERS DURING SEVERE WINTER WEATHER EVENTS**  
Mr Steve Mornington  
06/02/2014 14.30 - 16 h  
eng, fra

**STUDY ON DRIVER'S INFORMATION ACQUISITION STRATEGY ON EXPRESSWAY IN SNOWSTORM WEATHER**  
Mr Jianping Gao  
06/02/2014 14.30 - 16 h  
eng, fra

**FOUR-SEASON BICYCLES IN MONTREAL: INCREASING THE ATTRACTIVITY OF THIS ACTIVE TRANSPORTATION MEAN**  
06/02/2014 14.30 - 16 h  
eng, fra
TRAFFIC ABILITY FOR HEAVY VEHICLES ON AN INCLINE
Mr Torgeir Vaa  
06/02/2014 14.30 - 16 h  

2 THE RELATION TO ROAD USERS
CHAIR: Joan Torres, President of Association of Catalonia Engineers - Spain

JURIDICAL IMPLICATION OF WINTER MAINTENANCE
Mr Olivier Floris  
06/02/2014 17 - 18.30 h  

COORDINATION BETWEEN THE DIFFERENT AUTHORITIES AND USER TRANSPARENCY.
Mr Eduard Ribó Castells

ROAD SAFETY AND DESIGN STANDARDS IN WINTER CONDITIONS
Mr Daniel Aubin  
06/02/2014 17 - 18.30 h  

3 INFORMING ROAD USERS
CHAIR: Gabriel Sanchez, Executive Vice-President, IRF - United States

DEVELOPMENT OF A SNOWSTORM VISIBILITY INFORMATION SYSTEM FOR ROAD USERS
Mr Manabu Kaneko  
07/02/2014 8.30 - 10 h  

SUPPORT SERVICE FOR PROVIDING INFORMATION CONCERNING DRIVING SNOWY ROADS DURING WINTER
Mr Hiroyuki Hasegawa  
07/02/2014 8.30 - 10 h  

GUIDELINES FOR COMMUNICATING WINTER CONDITIONS AND OTHER WEATHER INFORMATION TO ROAD USERS
Mr Roemer Alfelor  
07/02/2014 8.30 - 10 h  

Road tunnels in winter conditions

1 ROAD TUNNELS IN WINTER CONDITIONS
CHAIR: Ignacio del Rey, Chair of PIARC TC3.3 - Spain

ROAD TUNNELS IN WINTER TIME. MAINTENANCE AND OPERATIONAL CHALLENGES
Mr Rafael Lopez Guarga  
07/02/2014 8.30 - 10 h  

WATER PROOFING AND FROST INSULATION IN NORWEGIAN ROAD TUNNELS - CURRENT STATUS AND FUTURE TRENDS
Mr Harald Buvik  
07/02/2014 8.30 - 10 h  

CHALLENGES RELATED TO WINTER OPERATIONS IN URBAN HIGHWAY TUNNELS
Mr Alexandre Debs  
07/02/2014 8.30 - 10 h
THE ENVALIRA TUNNEL IN WINTER CONDITIONS
Mr Christophe Trias 07/02/2014 8.30 - 10

Road bridges in winter conditions

1  IMPACT OF DEICING SALTS ON BRIDGES AND MEASURES FOR PROTECTION
   CHAIR: Pablo Diaz Simal, Spanish-speaking Secretary of PIARC TC 4.3 - Spain

   RISK MANAGEMENT OF CONCRETE ROAD BRIDGES SUBJECT TO DE-ICING SALTS AND THE POSSIBLE EFFECTS OF CLIMATE CHANGE 06/02/2014 8.30 - 10 Mr Gordon Anderson

   STAGE PROTECTION AGAINST DEGRADATION DUE TO THE USE OF DEICING SALTS OF A STRUCTURE IN ANDORRA 06/02/2014 8.30 - 10 Mr Gonzalo Arias Hofman

   ASSESSMENT AND REPAIR OF BRIDGES SUBJECTED TO DE-ICING SALTS 06/02/2014 8.30 - 10 Mr Ulrik Sloth Andersen

   ASSESSMENT OF THE HARMFUL EFFECTS OF ROAD SALT ON THE STRUCTURAL STATE OF THE BRIDGES IN THE PRINCIPALITY OF ANDORRA 06/02/2014 8.30 - 10 Mr José Luis González Brunat

2  MAINTENANCE OF ROAD BRIDGES UNDER WINTER CONDITIONS
   CHAIR: Pierre Gilles, Member of PIARC TC 4.3 - Belgium

   THE EFFECT OF SILANE-TYPE SURFACE PENETRANTS TO CONTROL SCALING AND SALT DAMAGE OF HIGHWAY BRIDGE WHEEL GUARD CONCRETE IN COLD REGION 06/02/2014 11 - 12.30 Mr Hirotake Endoh

   EXPERIMENTAL STUDY ON DETERIORATION CHARACTERISTICS OF PARTIALLY REPLACED RC SLABS UNDER FREEZE-THAWING AND FATIGUE COMBINED ACTION 06/02/2014 11 - 12.30 Mr Ko Kakuma

   STUDY INTO THE DAMAGE TO VARIOUS CONCRETE BRIDGE DECKS IN AREAS WITH INTENSIVE WINTER MAINTENANCE 06/02/2014 11 - 12.30 Mr Alvaro Navarreño

   WINTER SERVICE ON THE BRIDGES ON A2 MOTORWAY IN CROATIA AS A PART OF SUSTAINABLE DEVELOPMENT 06/02/2014 11 - 12.30 Mr Zrinko Hrzic