

Technical Session Summary
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0. Ladies and gentlemen, I would like to summarize the Technical Session on the basis of the topic Coordinators' summaries and the comments from both Secretaries, Mr. Giloppé and Mr. Gustafson. But first, I would like to thank the Session Coordinators, paper presenters, and the audience for their cooperation in leading the Congress to a successful conclusion.

1. Review of the Technical Session and expectations for the next International Winter Road Congress

The sessions were held in relation to the six topics. Both the oral and the poster presentation sites saw active presentations and discussions on issues relevant to winter roads. I am confident that useful information has been exchanged on winter road maintenance among participants.

Importance of winter road maintenance

Winter road maintenance is obviously indispensable in securing winter traffic safety and keeping economic and living activities in good condition.

In the past century, winter road service has been improved to satisfy the needs of road users as much as possible. However, issues have come to be recognized, such as budgetary constraints including limited expenses for personnel and machinery, the pollution of groundwater, and damage to the roadside vegetation caused by anti-freezing agents.

In the new century, we must find solutions to these issues that are confronting us. The general theme of the Congress is "New Challenges for Winter Road Service". Through paper presentations and discussions, goals were identified regarding four winter road maintenance issues that relate to this theme.

The first issues comprise **traffic safety, service level, and cost reduction.**

How traffic safety and sufficient road service level are ensured is an age-old concern. Although safer traffic and higher service level are desirable, costs should be considered. In addition, prioritization of necessary services is also required.

To ensure traffic safety and a good service level, the provision of appropriate information on road surface conditions, traffic, and weather is significant. And, it will contribute to reducing the costs of winter road maintenance.

The second item is **reduction of adverse effects on the environment.**

Winter road maintenance has the following adverse impacts on the environment.

- ◆ Pollution of roadside soil and vegetation, and of groundwater caused by anti-freezing agents, particularly by chlorides.
- ◆ Dust produced by studded tires.
- ◆ The emission of greenhouse gasses generated by the combustion of fossil fuels for road heating and snow removal.

Continued focus should be put on the reduction of adverse effects on the environment, on environmental conservation policies, and on the assessment of these policies' effects.

The third one is **public-private partnership.**

It is not just road administrators who are responsible for road maintenance. Partnership among road users, residents and road administrators needs to be established. Road-information provision to road users and public announcement of road service levels will make such partnership more effective.

As an example of partnership, a case was introduced in which local residents share the responsibility of snow

removal. In this relation, the activities of non-governmental organizations should be noted.

Reduction of the cost and improvement of the efficiency of winter road maintenance will be made possible by contracting out works to the private sector. But, in those cases, the respective roles of public sector and private sector, and their relation should be clearly defined. In particular, the public sector is expected to establish the standards for road service levels. An evaluation system should also be developed to check the service level of road links whose management has been contracted out to the private sector.

The fourth item is **research and development of new technologies and their application.**

Utilization of new technologies will break new ground for winter road maintenance. And, the importance of new technologies is rising remarkably.

What drew special attention was the rapid pervasion of information technologies. The following technologies are very promising:

- ◆ The combination of image-processing technology and information technology that enables more sophisticated monitoring of real-time weather and road surface conditions.
- ◆ The integrated Global Positioning System and Geographic Information System that enable automated snow-removal.

Real-time monitoring of weather and road surface conditions as well as forecasting of these have become possible by integrating image-processing technology with information technologies. This is a great step forward, because it has enabled road administrators to detect the effects of anti-freezing agents and to observe road surface conditions continuously. The combination of these technologies has realized more rapid and proper road maintenance. More effective and efficient winter road maintenance measures will be established by accumulation of these data.

2. Expectations for the future

In the 21st century, sustainable winter road maintenance should be sought, because of the restrictions of limited resources and increasing demands for environmental conservation. The Sapporo Congress is the first International Winter Road Congress of the 21st century. Active discussions were held to address challenges concerning the six topics. We recognize that the issues discussed here should be further investigated.

The Sapporo Congress, as the first in Asia, features many participants from developing and transitional countries, particularly from those in Asia. The issues taken up here are important in these countries, too.

We expect that you, experts in winter road maintenance, will endeavor to find solutions to these issues. And, the next Congress held in Torino-Sestrière, Italy in four years will become a good opportunity for you to present your research results.

3. Acknowledgements

With attendance by more than 2,200 participants from 64 countries, this Technical Session has been a grand success.

I would like to express my deepest appreciation to Mr. Olivier Michaud, PIARC President and other staff of the PIARC Headquarters who have supported us in preparations for the Congress. I also extend my special thanks to the members of the PIARC Technical Committee on Winter Maintenance, C17. They have worked hard to plan the Congress, review the papers, and preside over the Technical Sessions despite their busy schedule. Further, I deeply appreciate the Government of Hokkaido and the City of Sapporo for their great efforts as Congress hosts. The success of this Congress owes much to their generous cooperation. Finally, I would like to thank the English, French, and Japanese interpreters who have made significant contributions to successful Technical Sessions.

Thank you for your attention.