

**AASHTO Winter Maintenance Technical Service Program (WMTSP)
Snow and Ice Cooperative Program (SICOP) Pooled Fund
2015 Triennial Review**

Background

The WMTSP/SICOP program was created in 1994 by AASHTO in response to recommendations from the International Winter Technology Scan of Japan and Europe. The purpose defined in AASHTO Administrative Resolution 3-94 remains as relevant today as it did then: “In order to experiment with snow and ice control technology and systems not now in use in this nation, to determine their suitability to the United States and help introduce the use of those with most promise, the AASHTO Board of Directors endorses the concept of establishing a voluntary AASHTO Snow and Ice Pooled Fund Cooperative Program, under which testing by AASHTO Member Departments volunteering to sponsor and conduct tests can be supported financially with public sector funds voluntarily contributed by AASHTO Member Departments, Federal agencies, toll authorities, counties and cities.” The program was directed to work towards establishing a sustainable, systems approach to snow and ice control in the United States—involving the vehicle, the driver, the equipment, the materials and practices, and the receiving environment. With an eye toward new operational technologies being used around the world coupled with the research outcomes here in the US the WMTSP is positioned to guide the development and implementation of improved snow and ice control equipment, materials and practices, and enhanced work force development techniques. The result has been that many states and local governments have made improvements in their equipment, retrained their workforce and incorporated strategies and tactics to create a sustainable winter maintenance program improving highway safety, mobility and reliability of the transportation network while reducing negative impacts to the environment.

Accomplishments

Performance management of winter maintenance

Map 21 has drawn attention to the need for performance management metrics for winter maintenance. The WMTSP has been involved in the discussion of several methods for quantifying the performance of both self-performed and contracted winter maintenance. This has become increasingly important as states strive to improve transparency and report performance to users. WMTSP serves as a clearinghouse to gather information regarding the various methods of measuring performance and sharing that information with other developing programs and member states. WMTSP is represented on the NCHRP project panel for Project 14-24: Performance-Based Winter Maintenance: Developing a Toolkit of Measures, Standards, and Monitoring Tools. WMTSP is also represented on Aurora project 2010-03 that is a pre-cursor to this one: Results-Based Winter Road Maintenance Standards

Strengthen workforce development

Initially developed in 2004, the RWIS/Anti-icing Computer Based Training (CBT) program provides the foundation for an expanded suite of training modules incorporated from the results of NCHRP projects and latest best practices. Currently there are a total of eight modules included in the CBT suite. The WMTSP has taken steps to ensure the CBT remains an effective tool for workforce development by transitioning from CD based delivery to one that is web-based and Shareable Content Object Reference Model (SCORM) compatible. This enables the CBT to operate from, and work with, standard SCORM Learning Management Systems (LMS) in place in many DOTs. Initiated in November 2010, this conversion has been completed and remains compatible with the variety of web browsers being utilized. A total of 30 states along with the Aurora and Clear Roads consortia contributed to this project. Coordination and support is ongoing as states implement the CBT for their winter maintenance workforce development.

The WMTSP is also represented on the project panel of the NCHRP Synthesis topic 46-17, Training and Certification of Maintenance Workers.

Promote national and international research and assist in technology transfer

Identification of the “Top 10” practices necessary for a world-class winter maintenance program

In 2010 winter maintenance research thrust areas were identified in the “Grand Challenges: A Research Plan for Winter Maintenance”. Building on the Grand Challenges report, the WMTSP undertook a project in 2013 to identify the top 10 practices necessary for a world-class winter maintenance program. Utilizing the Snow and Ice List Serve and the Permanent International Association of Road Congresses (PIARC) Winter Service Technical Committee membership, winter maintenance professionals from across the globe provided input into the process. Through a process of voting the list of over 200 was paired to the top 11. This process and results were documented and presented at the Highway Subcommittee on Maintenance (HSCOM) Highway Safety & Reliability Technical Working Group (HS&R TWG) meeting, at the 2015 TRB Annual Meeting and at several APWA conferences, and the basis for the 2015 National Winter Maintenance Peer Exchange.

Co-sponsor of the National Winter Maintenance Peer Exchanges

Bringing state DOT snow and ice experts together with winter maintenance professionals from across the US has been a key element for technology transfer in the WMTSP work plan. Held every other year, the last National Winter Maintenance Peer Exchange (NWMPE) was held in Vancouver, Washington in 2013. The Peer Exchange provides an opportunity for winter maintenance professionals to hear the latest advancements in equipment, chemistry, strategies, tactics, and sustainability from the researchers and states who have implemented their results. In addition, breakout sessions are held where participants with common interests can discuss and identify gaps in research and implementation that would further advance the state of the practice in winter maintenance. In 2013, like previous Peer Exchanges, the WMTSP took the lead in organizing, contracting for facilities and meeting logistics and preparing the final report and research needs statements (RNS). A total of 37 states were represented at the 2013 Peer Exchange.

International Technology Transfer

WMTSP provides a connection to the PIARC Winter Service Technical Committee, a mirror committee to the WMTSP. During the past four years a WMTSP member has served as the English Secretary to this technical committee providing opportunities to exploit synergies in the winter maintenance research agendas in the US and abroad and encourage cooperation and communication. The WMTSP represented US winter maintenance at 3 PIARC sponsored events: International Winter Road Congress in 2014, seminar on Winter Maintenance at High Altitudes and Extreme Zones and the workshop of Mobile Road Condition Measurements in 2013, and the Workshop on Mobile Road Surface Condition Measurements in Winter in 2015. Participating WMTSP members provided briefings on International work at winter maintenance consortia meetings as well as for the HSCOM HS&R TWG meetings.

Facilitate communication between winter maintenance practitioners

In 1996 the WMTSP created a subscriber-based list serve to facilitate communication between winter maintenance practitioners. This has proven to be an effective means to connect individuals from state and local government agencies, contractors, vendors, academia, and others with an interest in winter maintenance. This list serve remains an effective method to seek advice and answers to topical questions and to promote research results, meeting notices and webinars, and to convey other news and best practices to the winter maintenance community. Threads are archived for future reference. The WMTSP provides support and maintenance of the list serve, which currently serves approximately 900 members.

Support the Highway Subcommittee on Maintenance (HSCOM), Highway Safety & Reliability Technical Working Group (HS&R TWG) and other AASHTO subcommittees

The WMTSP works closely with the leadership of the HSCOM to provide support to the HS&R TWG throughout the year, including promotion of winter maintenance research needs and advancements.

The WMTSP assists in the planning of future events supported by HS&R TWG such as the annual meetings and other maintenance meetings with a connection to winter maintenance. During the last three years assistance was provided regarding issues with the intellectual property associated with Maintenance Decision Support Systems.

Provide assistance to individual member states

The WMTSP provides assistance directly to member states in the form of brief technical reports, e.g. active deicing technologies and route optimization; and identification of research reports and other reference material on specific winter maintenance topics. The WMTSP provides expert input to public relations projects and press releases to ensure accurate representation of winter maintenance practices.

Part 2: Goals/Objectives

Future Outlook Statement

Provide member states with a world-class Winter Maintenance Technical Service Program to support their winter maintenance needs. Advancements in technologies utilized by road users like intelligent vehicles, connected vehicles, and even autonomous vehicles are making an impact on the winter maintenance landscape as well. The winter maintenance community worldwide is utilizing these and other technology developments to improve winter maintenance performance and the changing demands of the motorists. Increasing importance of sustainability, resilience, and the changing climate is influencing the evolution of winter maintenance strategies and techniques. The WMTSP is positioned to ensure the necessary research is conducted and member states are aware of these opportunities and have information necessary for implementation.

As states become more oriented towards Transportation System Management and Operations (TSMO) there is a growing need to integrate winter maintenance operations into the broader operations environment. The WMTSP will play a critical role in bringing the TSMO and winter maintenance communities together to improve network operations during weather events.

Guiding and Focusing WMTSP

To accomplish the program objectives outlined in AASHTO AR-3-94, the WMTSP works closely and collaboratively with HSCOM HS&R TWG. The WMTSP Four Year Program (2015-2018) approved at the July 2014 WMTSP meeting and subsequently presented and accepted at the HSCOM HS&R TWG meeting in July, 2014 provides a roadmap to guide the WMTSP for the next three year period.

The WMTSP utilizes the National Winter Maintenance Peer exchanges, collaboration with the HS&R TWG, and participation on the PIARC Winter Service Technical Committee to identify emerging, critical and cross-cutting issues and technologies listed in the work plan. The WMTSP remains poised to contribute to the winter maintenance agenda of other consortia and organizations for the mutual benefit of our member states. Improving communications with member states remains a goal through the use of other mediums like targeted emails and social media.

Part 3: Financial Assessment

States making the \$4,000 voluntary annual contribution to the SICOP Program (6455) were:

- FY 2012=AK, AL, AZ, CA, CO, CT, ID, IL, IN, KS, KY, MA, MD, ME, MI, MN, MO, NC, ND, NH, NV, NY, OR, PA, RI, SD, TN, TX, UT, WA, WV, WY
- FY 2013=AK, AZ, CA, CT, DE, GA, IA, ID, IL, KS, MD, MI, MN, MO, NC, ND, NE, NJ, NV, NY, OH, OK, OR, PA, RI, SD, TN, TX, UT, VT, WA, WI, WY
- FY 2014=AK, AL, AZ, CA, CO, CT, GA, IA, IL, KS, KY, MD, ME, MI, MN, MO, NC, ND, NH, NV, OH, OK, OR, PA, RI, SD, TN, TX, UT, VT, WI, WV, & WY

States making contributions to the AI/RWIS CBT Program (6456) were:

- FY 2012=Aurora Consortia.

Table 1 Financial Statement Summary

SICOP 6455	FY12	FY13	FY14
<i>Revenue</i>	132,000	132,000	132,626
<i>Expense</i>			
Consultant	75,702	52,520	57,063
Travel	27,034	20,702	17,562
Administration	0	1,434	13,481
Other	0	5,942	8,601
<i>Total Expense</i>	102,736	80,598	96,707

AI/RWIS CBTs 6456	FY12	FY13	FY14
<i>Revenue</i>	50,000	3,750	0
<i>Expense</i>			
Consultant	93,043	3,735	0
Administration	0	402	983
Other	661	324	633
<i>Total Expense</i>	93,704	4,461	1,616

Identification of needs, additional resources, and opportunities for funding

- Needs—although significant progress has been made in implementing pro-active snow and ice control practices, additional effort is needed on “system concept” set forth in 1994 in AR-3-94 and solutions for the emerging, cross cutting issues associated with “sustainable transportation” and resiliency in winter operations.
- Additional resources—increased and enhanced collaboration with both the TSMO community is needed. This might necessitate a modest increase in the \$4,000 annual voluntary contribution; however, none is contemplated at this time.
- Opportunities for funding—WMTSP members actively participate on boards and committees of TRB, Aurora, and Clear Roads, PIARC and have representation from FHWA at each of the WMTSP meetings to avoid duplication of efforts and leverage funding for research and implementation of findings.

Benefit/Cost Analysis—The utilization of technology in winter maintenance operations is rapidly advancing from the introduction of Road Weather Information Systems (RWIS), Maintenance Decision Support Systems (MDSS), and mobile road condition data systems. Several studies have demonstrated favorable benefit-cost results for these technologies. Combining technological advances with proactive response and trained workforce utilizing the RWIS/Anti-icing CBT yields very effective and efficient winter maintenance programs. Below is a brief selection of the benefit-cost studies:

- The WMTSP participated in the Strategic Highway Research Program Reliability focus area; particularly project L-07, which created a Design Guide for Addressing Non-recurrent Congestion and an Analysis Tool for Design Treatments to Address Non-recurrent Congestion. Insuring weather related design treatments to help mitigate the effects of weather on traffic; the spreadsheet-based design tool provides agencies a tool for estimating the effectiveness and comparative benefit/cost of weather related design treatments.
- RWIS remains an important element of winter maintenance practices, particular when used to support Maintenance Decision Support Systems (MDSS). A recent study published in March 2014 by Chien, et.al. for the New York State DOT titled “Road Weather Information System (RWIS) to Support NYSDOT Operations and MDSS Applications” showed that investments in RWIS sites can yield benefit cost ratios of 10.8 to 15.52
- A Benefit-Cost Analysis Toolkit for Road Weather Management Technologies completed in June 2013 for Clear Roads showed agency specific results of implementing RWIS in Iowa at 3.8 and RWIS along with MDSS in Indiana at 3.1