Québec 2010
AIPCR · PIARC

XIII INTERNATIONAL WINTER ROAD CONGRESS

QUÉBEC, FEBRUARY 8 TO 11, 2010

WORLD ROAD ASSOCIATION
MONDIALE DE LA ROUTE
AIPCR PIARC

Québec

SUSTAINABLE WINTER SERVICE FOR ROAD USERS

Best Practices in Winter Maintenance from the U.S. Domestic Scan Program

Steven M. Lund, P.E.

National Cooperative Highway Research Program

State Maintenance Engineer – Minnesota, USA

steven.lund@state.mn.us

SCAN BACKGROUND

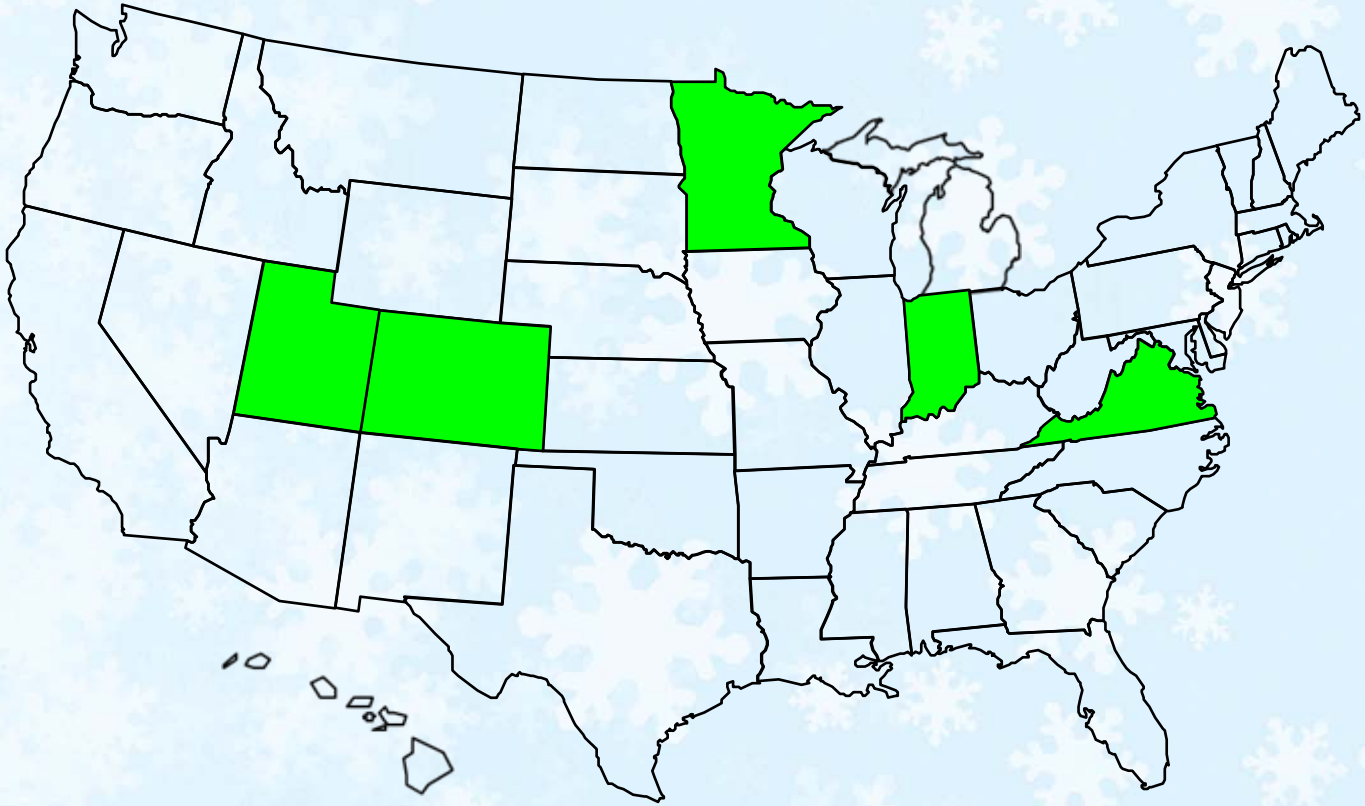
- Recognized success of International Scans
- NCHRP Project 20-36 “Highway Research and Technology – International Information Sharing”

- Initiation of NCHRP Project 20-68A - “Best Practices…”
- Jointly with: Association of State Highway Transportation Officials (AASHTO), Federal Highways (FHWA) and National Cooperative Highway Research Program (NCHRP)
- Wide range of topics
- http://onlinepubs.trb.org/onlinepubs/archive/notesDocs/20-68A_prospectus.pdf

NCHRP PROJECT 20-68A - BEST PRACTICES OF WINTER MAINTENANCE
MARCH 26, 2009 – APRIL 7, 2009

- March 26 (Thursday) - Began in **Minnesota**
- March 28 (Saturday) - moved on to **Colorado**
- March 30/31 (Monday/Tuesday) with Colorado DOT/tunnels
- April 1 (Wednesday) on to **Utah** DOT with City stop
- April 2 (Thursday) with the Utah DOT
- Thursday night on to **Indiana**
- April 1 (Friday) - with Indiana DOT
- Home for the weekend
- April 6 and 7 (Monday/Tuesday) with **Virginia** DOT

2009 Domestic Scan Best Practices in Winter Maintenance



Québec 2010
AIPCR · PIARC

Scan Team Membership

Ben McKeever
Federal Highways

Dave Ray
Ohio

Bill Hoffman
Nevada

Steve Lund
Minnesota

Terry Nye
Pennsylvania

Mike Schwartz
Virginia

ARORA Staff

Rod Pletan
Subject Matter Expert
State Maintenance Engineer
Retired - Minnesota

Armando Perez
American Trade Initiatives (ATI)
Logistics Coordinator

TEAM PHOTO
STORYBOOKING PROCESS

Final Wrap-up Session in Richmond, Virginia on April 7, 2009

AIPCR · PIARC Québec 2010

Scan Team Membership

Bill Hoffman
Nevada

BASIC STEPS IN SCANNING PROCESS
(BEST PRACTICES OF WINTER MAINTENANCE)

- Team And Subject Matter Expert (SME) Selection
- Focus Areas
- Amplifying Questions
- Desk Scan
- Places To Visit
- Scheduling Of Meetings, Travel, etc.
- **Scanning Tour (one or two weeks)**
- Key Findings and Recommendations
- Summary Report and Presentation
- Implementation
- Draft and Final Report

AIPCR · PIARC Québec 2010

SCAN PROCESS - FOCUS AREAS (IDENTIFIED BY TEAM AND SUBJECT MATTER EXPERT)

- Maintenance Decision Support Systems (MDSS)
- Automatic Vehicle Location Systems (AVL)
- Equipment Technologies
- Training and Development
- Management Issues
- Integration of Weather, Traffic and Maintenance Operations

SCAN PROCESS - AMPLIFYING QUESTIONS
(FURTHER DEFINE THE FOCUS AREA)

- For each Focus Area the Team developed 4-8 Amplifying Questions
- The Subject Matter Expert used the Amplifying Questions to conduct a Desk Scan
- The Desk Scan identified the States that were select:

  Minnesota, Colorado, Utah, Indiana and Virginia

Places Visited

STATES:

- Minnesota DOT
- Colorado DOT
- Utah DOT
- Indiana DOT
- Virginia DOT

CITIES:

- Denver, CO
- Ft. Collins, CO
- Grand Junction, CO

plus

I - 470 Toll Road in Denver, CO

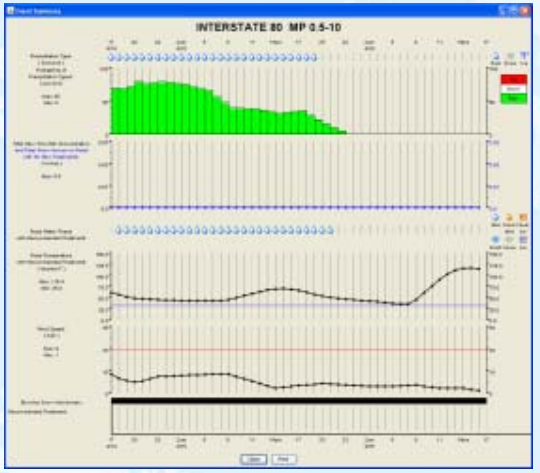
Eisenhower Tunnel, CDOT

Holland Tunnel, CDOT

INITIAL FINDINGS

INITIAL FINDINGS
MDSS – MAINTENANCE DECISION SUPPORT SYSTEM

- Clearly MDSS is being deployed at the state level and at local levels as well
- Real time data transmission from the truck with a wide variety of data elements
- Year around applications are lagging but under consideration and some efforts ongoing
- Cost-Benefits are being documented
- Marketing strategies vary from top down to bottom up



Québec 2010
AIPCR · PIARC

INITIAL FINDINGS

AVL – AUTOMATED VEHICLE LOCATION (GPS)

- Multiple vendors of AVL equipment and software
- AVL has multiple purposes
- Benefits and acceptance are increasing
- Value is dependant on frequency of location updates, i.e., resolution – still uncertainties

By definition, AVL is a means for determining the geographic location of a vehicle and transmitting this information to a point where it can be used.

The geographic location is logged into the vehicles GPS units and transferred with vehicle ID to dispatch center along with time, speed, direction heading and other information retrievable via special sensors.

INITIAL FINDINGS
EQUIPMENT TECHNOLOGIES

- Plows & Wings
- Cutting Edges
- Saddle Tanks
- Spreaders
- Accessories
- FAST Systems
- Replacement Funding
- RWIS Stations
- Friction Measurement
- Chemical Storage
- Brine Making
- Truck Washing Facilities
- Salt Brine Runoff Control

AIPCR · PIARC Québec 2010

INITIAL FINDINGS

TRAINING & DEVELOPMENT

- Flexible Workforce
- Cross-training
- Simulators

- Classroom, Academies, “Boot Camps” etc.

PLOW SIMULATORS

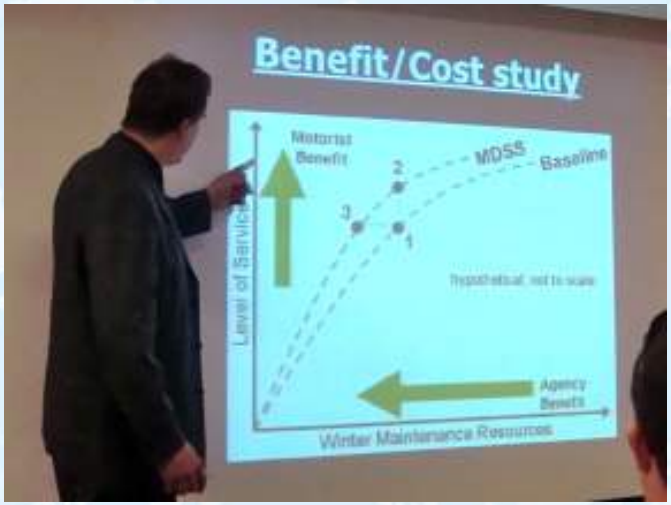
“BOOT CAMPS”

Québec 2010
AIPCR · PIARC

INITIAL FINDINGS

MANAGEMENT ISSUES

- Maintenance Operations Research being funded
- Management and Culture of the Organization
- Outsourcing vs. In-sourcing
- Winter Performance Measures
- Consistencies of Level of Service
- Internal and External Communications



INITIAL FINDINGS
INTEGRATION OF WEATHER, TRAFFIC AND MAINTENANCE OPERATIONS

- Variety of Disciplines locating together in TOC (besides typical traffic operations personnel)
  - Maintenance Operations Dispatcher
  - Meteorologist
  - Snow & Ice/MDSS Coordinator
  - Highway Patrol Dispatcher
  - Motorist Assistance Dispatcher
  - 511 Coordinator
  - Traffic Signal Control Coordinator
  - Private and Public Media Announcers

- Some are full-time; some just during events

REGIONAL TRAFFIC OPERATIONS CENTER

RECOMMENDATIONS

Québec 2010
AIPCR · PIARC

RECOMMENDATIONS
MDSS – MAINTENANCE DECISION SUPPORT SYSTEM

(Several examples of success in Winter Operations)

- Publish Successes in Winter Operations
- Push for Continue use Year-Round - Summer Maintenance Activities
- Continue Efforts to Develop Automated 511 & Maintenance Management System applications
- Continue to Develop Level of Effort Index – “Severity”
- Plan your implementation strategies - marketing and implementation strategies are critical

INNOVATIVE AND STANDARD EQUIPMENT TECHNOLOGIES

- Tow Plows
- Composite & Poly Blades

- Vibrating Wiper Blades and other Operator Aids
- On-board Video Cameras to Enhance Operator Safety
- Laser Beams Guidance
- Fog Busters & New Headlights To Improve Visibility

- Salt Brine Runoff Control and Reuse
- Various salt discard – chutes and skirts
- Various prewetting strategies

RECOMMENDATIONS

TRAINING & DEVELOPMENT

- Flexible Work Force
- Cross Training
- Training Structure - Simulators, Classroom Lectures and Computer Based Training (CBT)

RECOMMENDATIONS

MANAGEMENT ISSUES

- Inter-jurisdictional Relations to Promote Consistency across Boundaries
- Outcome-based & Customer-oriented Performance Measures
- Dedicated Funding for Maintenance Research

RECOMMENDATIONS
INTEGRATION OF WEATHER, TRAFFIC AND MAINTENANCE OPERATIONS

- Integration of multi-disciplines in Traffic Operation Centers
- Conveying real-time traveler information to the public
- Implementation of special signal-timing plans during winter events

PLANNED IMPLEMENTATION ACTIONS

Québec 2010
AIPCR · PIARC

PLANNED IMPLEMENTATION ACTIONS
SHORT TERM

- **PRESENTATIONS AT CONFERENCES**
  - AASHTO Subcommittee of Maintenance (July 09)
  - AASHTO Snow Expo (Aug 09)
  - **PIARC World Road Association Winter Road Congress**
  - TRB Snow & Ice Symposium (2012)
  - PNS Pacific Northwest Snowfighters
  - APWA Winter Maintenance Committee
  - NACE National Association of County Engineers
  - AASHTO Eastern Snow Expo

PLANNED IMPLEMENTATION ACTIONS
SHORT TERM

- **PRESENTATIONS TO POOLED FUND ORGANIZATIONS**
  - SICOP Winter Maintenance Technical Service Program (WMTSP)
  - Clear Roads
  - Aurora
  - Clarus Initiative
  - PNS
- **OTHER MEETINGS**
  - National Winter Maintenance Peer Exchange
  - MDSS Showcase
  - Mn/DOT Operation Division
- **WEBINAR**

PLANNED IMPLEMENTATION ACTIONS

- Identify potential projects with Pooled Fund organizations
- Coordinate activities with SICOP (Snow and Ice Cooperative Program)
- Promote more MDSS (Maintenance Decision Support System) - type showcases
- Problem Statements for NCHRP

Québec 2010
AIPCR · PIARC

THANK YOU

http://onlinepubs.trb.org/onlinepubs/nchrp/docs/nchrp20-68A_07-03.pdf