Innovative Winter Maintenance Practices of High Performing Agencies

Presented for the 2009 APWA Public Works Congress & Exposition, Columbus Ohio

Outline

- A view from the Winter Maintenance 1st U.S. Domestic Scan Program
  - A preview of advancements across the US at both state and local levels
- A view from the Ohio Department of Transportation
  - Documented best practices and contact information
- A look into your agency

Your Presenters: Diana Clonch and David Ray

Learning Objectives

- Achieve better results in your agency through innovative winter maintenance technologies
- Assess your knowledge on what research is ongoing and what areas still need to be developed
- Determine how some technologies might work in your agency
- Hear from those in attendance what innovative practices they use
Winter Maintenance 1st U.S. Domestic Scan Tour Team Members

Winter Maintenance 1st U.S. Domestic Scan Tour Locations Visited

Basic Steps in Scanning Process
- Focus Areas
- Desk Scan
- Places To Visit
- Amplifying Questions
- Scanning Tour
- Summary Report and Presentation
- Final Report
Focus Areas

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

Initial Findings

MDSS

- Data Transmission capability, real time with truck
- Cost-Benefits becoming identifiable
- Marketing strategies vary from top down to bottom up

MDSS

In-Cab Displays @ InDOT

- Three Items for Success
  - Give the driver a sense of knowing where co-workers are
  - Let the driver know what weather is coming
  - Help the driver with real time information such as usage rates and suggested application rates
Initial Findings

AVL

- Several vendors into AVL equipment and software
- AVL has multiple purposes
- Benefits and acceptance are increasing

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 vehicle's GPS unit 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
- Automated Spray Systems on Bridges and Pavements
- Replacement Funding
- RWIS Stations
- Friction Measurement
- Chemical Storage
- Brine Making

Initial Findings

Training & Development

- Flexible Workforce
- Simulators
- Academies and Boot Camps
Initial Findings

Management Issues

- Maintenance Operations Research Funding
- Winter Performance Measures
- Outsourcing vs. In-sourcing

Initial Findings

Integration of Weather, Traffic and Maintenance Operations

- Variety of Disciplines locating together in Traffic Operation Centers
  - Maintenance Operations Dispatcher
  - Meteorologist
  - Highway Patrol Dispatcher
  - 511 Coordinator
  - Traffic Signal Control Coordinator
  - Private and Public Media Announcers
- Some are Full-time; some just during events

Outsourcing

Virginia DOT

Integration of Weather, Traffic and Maintenance Operations

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Recommendations

MDSS

- Several examples of successes in Winter Operations
- Growing potential in year-around Maintenance operations
- Marketing and implementation strategies

Recommendations

AVL

- Multiple Applications to Year-around Maintenance
- Beneficial to Employees as well as Management

Recommendations

Equipment Technologies

- Tow Plows
- Hydraulic-assisted Systems
- Composite & Poly Blades
- On-board Video Cameras to Enhance Operator Safety
- Laser Beams
- Salt Brine Runoff Control
Plow Blades
Three-Blade Plow

Front Steel Blade
Center Serrated Blade
Trailing Rubber Squeegee Blade

Rear View Camera
as assist for truck operator

Mn/DOT Tow Plow Truck

 Liquid Chemical Spreaders
Slide In & Truck Mounted Tanks

CDOT
City of Ft. Collins, CO

Mn/DOT
VDOT Rental Trucks
Available off season
Laser
For defining for the operator where the end of the wing or tow plow is extended out onto the shoulder.

Fog Busters
Utah DOT Technology

Utah DOT
Recommendations

Training & Development

- Flexible Work Force
- Cross Training
- Simulators

Recommendations

Management Issues

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

Chemical Storage Buildings

Solid Chemical

City of Ft. Collins, CO
Recommendations
Integration of Weather, Traffic and Maintenance Operations

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

Story Boarding for the Final Report

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

ODOT Statistics

- 43,000 Lane-miles
- Roads carry the 5th largest volume of traffic in the US
- $1.3 trillion in freight crosses Ohio annually
- 33,664 Snow and Ice related accidents annually
Ohio Associated Costs
Annually:
- Spend $50 million on snow and ice control
- Use 600,000 tons of salt
- 6,000,000 gallons of brine
- 500,000 gallons of other chemicals
- 3,000 employees involved in snow and ice control
- 1,700 trucks
- 200 garage facilities

45% Of the Total Operating Budget

Operational Practices
- Continue with learning curve involved in implementing new processes and new material use
- Communication and employee buy-in
- Monitoring application rates at driver level
- Increased use of liquid Calcium Chloride for lower temperatures
- Manual and electronic calibration of equipment
- Utilizing contract weather forecasting service
- Increased awareness and use of Road and Weather Information System (RWIS)
- Pre-treatment ahead of weather events per application guidelines
- Encouraging pre-wetting of all solid material
- Continued use of route prioritization maps
- Adherence to existing policies regarding route treatment and priorities
- Procurement of additional wetting systems for current fleet
- Use grit in the right conditions
Guidelines
- Material Applications Guidelines
- Route Application Guidelines & Goals
- Pre-treatment Plan

Priority Routing
Ohio Department of Transportation
Snow & Ice Priority Routes

Innovative Practices
- A sample of best practices from across the state:
  - Equipment
  - Training & Communications
  - Forecasting & Technology
  - Storm Management
- Method overview and contact information
Equipment Innovative Practices

- Pre-Treatment Tanker
- Multi-Purpose Trailer
- Real Time Traction Tool (RT3)

Training & Communications Innovative Practices

- N. E. Ohio Snow & Ice Technologies Workshop
- Buckeye Traffic
- Local Salt Assistance Plan

Forecasting and Technology

- RWIS, Scan Web, and Pavement Forecast
- Statewide Weather Forecasting and Annual Weather Training
Storm Management

Snow and Ice Dashboard – Displays and summarizes critical data on a district wide basis

Proposed Strategies

- Level of Service Plan (Guidelines and Goals)
- Statewide Media Campaign
- Pre-wetting salt
- Calibrating equipment
- Anti-icing pavements
- Storm monitoring and management
- Education of workforce
- Anti-idling in dump trucks
- Weather and pavement temperatures
- Proper use materials
- Effective communications

US RWIS Sites
Resources

- SICOP - http://www.sicop.net/?siteid=88
- AASHTO - http://www.transportation.org/
- Aurora - http://www.aurora-program.org/
- Clear Roads - http://www.clearroads.org/
- Salt Institute - http://www.saltinstitute.org
- Midwest Snow and Ice Group - http://midwestsnowandicegroup.com

Review of your Agency, Comments, and Questions