THE GOOD
THE BAD
THE UGLY

2016 North American Snow Conference
Diana Clonch
Diane Watkins
Good

- Resource management
  - Doing the right thing at the right time
  - A carefully crafted written plan and policy
  - Highly trained staff
  - Reliable equipment
  - Sufficient materials and storage capacity

Snow and Ice Plan

- “…one of the most important things a highway maintenance agency can do…”
  - For itself
  - Its governmental entity
  - Its community
  - Its customers

Duane E. “Dewey” Amsler Sr.
PE AFM Engineering Services
• Supports Planning Ahead
  – Avoids chaos
  – Framework for efficient and effective operations
• Higher Level of Service (LOS)
  – Increased safety
  – Higher mobility
  – Fewer “lost days” for business, education, transportation and manufacturing
• Improves communication
  – Policy, operational procedures and operational issues
  – Informs public and reduces complaints
• Limits exposure tort liability
  – Reasonable plan, realistic goals, resource driven
• Provides for continuous improvement and a basis for comprehensive training

Training

• Tools of the trade……
  – Equipment
    • Operation
    • Maintenance and cleaning
  – Weather
    • Surface temperatures
  – Materials
    • Solids and liquids
  – Treatments
    • Removal, solids, liquids
    • Application rates and timing
  – Safety
Equipment Readiness

- Specifications and timely orders
- Routine and preventative maintenance
- Calibration
- Cleaning
- Technological advancements

Materials and Storage

- Specifications and procurement
- Quality control
- Storage capacity
- Proper storage facilities and techniques
- MSDS
- Regular routine inspections
- Good housekeeping
“Good” Resources

• APWA
• Salt Institute
• Clear Roads
• FHWA
• SIMA
• PNS
• LTAP

Best Practices

• Use strategies and tactics that support LOS goals
• Proper chemical applications (determined by surface temperatures, weather and road conditions and LOS)
• Calibrate equipment
• Weather and road technology
• Use liquids
• Storage & Yard Practices including regular facility inspections
• Loading & Handling Practices
• Equipment Maintenance and Cleaning
• Good Housekeeping
• Training
• Technology (Liquid Chemicals, AVL/GIS, Cutting edges, etc.)
• Materials Specifications and quality control
• Spread Patterns and placement
• Snow Disposal
• Continuous Improvement Philosophy (applies to all aspects of operations)
Pavement Temperatures

• Determines the **Timing, Type & Duration** of Snow and Ice Treatment Operations

• Impacted By:
  - Air Temperature Trends
  - Subsurface Temperatures
  - Time of Day
  - Cloud Cover
  - Wind Speed

Treating Surfaces…..Pavements, Walkways and Paths

**Surface Temperature**

- Determines the **Timing, Type & Duration** of Snow and Ice Treatment Operations
- Impacted By:
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Pre-wetting Systems

Truck-Mounted for V-box, Pick-ups & Flat Beds

Top Dressing

Stock Pile Treating

Agriculture based products
- 3 to 5 gallons per ton
- Separate storage
Prewetting Salt: Benefits

- Less bounce & scatter
- Faster reaction time
- More effective melting action
  - Less resources to achieve goal
- Less salt needed resulting in:
  - Reduced costs
  - Reduced environmental concerns

Anti-icing

Direct application to the surface prior to the event
Chemicals

Chemicals applied to:

- **prevent** bonding of ice and snow to road surface
- **prevent** ice or frost from forming
- **prevent** buildup of snowpack
- melt ice that has formed

Bonding Prevention

It take 4 times more salt to remove ice than prevent it!
Anti-icing...........

PARKS Dept. anti-Iced Day
Before w/cars parked, they
were able to use their
resources at other parking lots

Expanded Use of Liquids....

Butler County Ohio, February 2015 – Application … 300#/rock salt per lane mile pre-wetted with a blend
of 80% salt brine, 15% beet juice, 5% calcium chloride
Opportunities and Risks……

• Alternative Treatments
  – Manage resources during supply shortages
  – Expand upon service options
  – Flexible and timely treatments

• Economical
  – Increase effectiveness and efficiency
  – Cutting cost

• Risks
  – Learning curve for a new tool
  – Investment in new or upgraded equipment
  – User buy-in from the employees, administrators and customers/citizens
Integrated Facility

Brine Production and Application

Initial start-up $27,000
Auglaize County

In 2011, began building in house:

- 15 prewetting units @$700 per unit
- (2) – 100 gallon anti-icing tanks
- 5000 gallon organic capacity
- 5000 gallon salt brine capacity
  (brine obtained from State facility)
- 2500 gallon blended product capacity

In process…installing pump for filling and blending

Cost of (5) 2500 gallon tanks and electric pumping station $8500

Automated Controllers

- Ground speed controllers – Correlate output of material with vehicle speed to maintain constant application rates
  – Ensure accuracy of material application
  – Allow for accurate adjustment of rates to conditions
  – Provide data related to material applications
  – Measure outcomes for process improvement
Ground speed controllers

“Regardless of the type of spreader/controller used, it is extremely important to calibrate the system ………..” 2009 Clear Roads report

When to Calibrate………..

• New equipment when received
• Annually
• Following vehicle maintenance or modifications (hydraulics, controller and/or auger)
• Upon change of material being applied
• Any signs of application issues

Calibration relates to the entire system..the controller, the vehicle, and the material
Calibration Cruise-In

SW Ohio APWA
Over 70 attendees, 2 dozen agencies,
16 trucks calibrated, 5 controller types

What Do Others Say?

• Farmington Hills, Michigan – Cut overall material usage by 25%
• Plain Twp Stark County, Ohio – 40% reduction in salt use
• Auglaize County, Ohio – 20% reduction in overall cost
• Private Contractor – Salt savings of a minimum of 25% and up to 40%
• Private Contractor – Reduced salt application by 50% through pre-treating stock pile
GPS Benefits.....

• Resource planning
• Improved production
• Cost effectiveness
• Customer service
• Safety
• Improved dispatching
• Improved reporting
Equipment Upgrades and Enhancements

• Wing Plows
  – Improve production by 20% to 30%
• Improved Cutting Edges
  – Reduced life cost
  – Better performance
  – Less down time
  – High benefit/cost lasting from 3 to 4 times longer*

*Source: 2015 Ohio DOT Plow Blade Investigation

The Lifeblood of the Operation......
Facts of Life….

- Snowy driving increases corrosion rates….. By 90%
- Chloride chemicals pose significant corrosion risk
  - Electrical wiring and harnesses
  - Frames, bracket, and supports
  - Brake air cans, drums, and disk
  - Spreader chutes and hoppers
  - Fittings
- Corrosion is costly…. estimated at $6 million annually
- S&I fleets = 10%-15% of all repair cost

Washington DOT Repair Cost…

Underside = 32%
Attachments =
22%
Engine = 18%
Electrical = 16%

88%
Maintenance Practices

• Consistent washing after each event
• Regular rinsing and fast drying
• Indoor (dry) storage
• Component protection (wraps, covers, shields)
• Power wash with a quality salt remover
• Apply spray-on inhibitor (several times per year) following cleaning and drying
• After market rust proof coatings

Cleaning Guidelines

Available at Clear Roads website:
http://clearroads.org/
Bad

Stopping Distance

- **Dry Surface:** S.D. = D
- **Wet Surface:** S.D. = 1.7D
- **Slush:** S.D. = 2.0D
- **Soft, Loose Snow:** S.D. = 3.0D
- **Compacted Snow:** S.D. = 4.0D
Over Application?
Infrastructure Impacts

- Structures (bridges, buildings)
- Roadway pavement & walkways
- Vehicles & equipment

Bridges
Freeze and Thaw (Frost Heave)

Concrete Surfaces
Vehicles & Equipment

Corrosion...on Metal

• More corrosive
  – Calcium Chloride
  – Sodium Chloride
  – Magnesium Chloride
  – CMA
  – Urea
• Less Corrosive
Environmental Impacts

- Soil
- Animals
- Vegetation
- Water
- Air
- Human Health

Groundwater
Snow Plowing
(Super-elevated Curves)

• Snow or ice accumulation on the high side shoulder of super-elevated ramps and super-elevated curves, especially those without reverse shoulder slopes, is a significant hazard to motorists. Snow stored on the high side of curves is subject to melting and refreezing, creating sheets or patches of ice on the once cleared road surface.

Accumulated snow is not in a plowable condition
Anti-Icing Prevents the Snow and Ice Bond to the Pavement
Bridges

Snow Plowing (bridges)

- During snow removal efforts, snow often gets plowed against bridge barriers, parapets and rails. Hard-packed snow piled at two-thirds the height of the bridge parapet or rail changes its shape and creates the potential for vehicle ramping.
  - Use Tandem Plowing when possible
  - Straighten plows where possible
  - Haul snow away.
Snow Plowed Barrier Curb

Plowed snow against a bridge parapet/barrier curb
Clearance issues...........

Material Properties........and Knowledge

• Accidental Mixing
  – 4,300 Gallons of agriculture product off-loaded into a tank containing 1,500 gallons of liquid calcium chloride
  – Agency elected to sell the product “very cheaply” to get rid of it
Blended with salt brine producing 20,000 gallons of “hot” blend for roughly $0.20 per gallon………..

Cincinnati, Ohio - Anti-icing Program
Salt to Brine

Change in conditions and chemical effectiveness
Liquids........
Storage Tank Failures…
Poor Equipment Cleaning and Maintenance

Corrosion

- Frame Corrosion
- Electrical
- Tire Rim Corrosion
Safety

ICE & SNOW
TAKE IT SLOW

Work Safety

DW Clonch, LLC
Matching solutions to needs

It Happened to Joe...

• Severed off arm
• Punctured lung
• Broke 4 ribs

Joe Barbachyn | (Retired) Driver
KCRC North Complex
PREVENT SLIP-AND-FALL ACCIDENTS

An ounce of prevention is worth a pound of cure.  
-- Benjamin Franklin
Questions????

Diana Clonch  
614-989-0316  
dwclonch@gmail.com

Diane Watkins  
513-206-4761  
ladydi61115@yahoo.com