MAKING BRINE and ANTI-ICING PAVEMENT
### FACTS

<table>
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<tr>
<th>FARMINGTON HILLS</th>
<th>WIXOM</th>
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<td>Maintains a network of more than 58 miles of major roads and 243 miles of paved and unpaved local roads.</td>
<td>Maintains 51 lane miles of major and local roads by cleaning all streets curb-to-curb.</td>
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<td>9(^{\text{TH}}) largest municipal street network in the state of Michigan and the largest in Oakland County.</td>
<td>Clears 9 miles of safety paths.</td>
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<td>If snow accumulation is less than 4”, subdivision streets are spot sprayed or salted, with focus placed on hills, curves and intersections.</td>
<td>Clears all municipal parking lots including the downtown.</td>
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<td>Fleet consists of 5 dump trucks, 3 pick-up trucks and 1 tool cat.</td>
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TRAINING-EQUIPMENT READINESS

- Calibration of **liquid** and granular equipment. (Utilizing “catch” tests and scales, grid)

- Pre-winter meeting: refresher for procedures and “game plan” for the winter, **including operator input**.

- Training of personnel (PowerPoint, maps, webinars, etc.)

Do your best to get **BUY IN**...
LIQUIDS IN OUR PRE-WET PROGRAM

- The application of brine, calcium, or a mixture directly to the salt at the spinner or with an overhead spray bar
- Lowers working temperature of salt
- Reduces salt bounce
- Reduces amount of salt required
- Best results are achieved with 10 + gallons per ton applied
- Achieves ‘wet pavement’ faster
- Accelerates the brine process
LIQUIDS IN OUR PRE-WET PROGRAM

PRE-WET METHODS:

- Overhead spray bar (for older equipment)
- At the spinner, or in the chute on V-box inserts. Currently applies 8-20 gallons per ton.
- Work in progress for upgrades on all of our equipment for pre-wet and controllers (FH’s has 3 pieces of equipment that have 300+ gallons of pre-wet).
ANTI-ICING = TIMING – MATERIALS – PROPER APPLICATION FOR EVENT

- A proactive measure of applying liquid chemicals to the road surfaces before a snow/ice event
- Prevents bonding of ice or hard pack to road
- Best results are achieved with 35 - 50 gallons per lane mile
- Ineffective if storm comes in as rain
- Choose the right liquid blend for the forecasted conditions
TOOLS TO HELP THE DECISION PROCESS
(Pavement vs. Ambient TEMP)

- Simple Handheld Infra-Red, Equipment-Mounted
- Weather Reports/Service/Network
TEST MATERIALS – RESEARCH & DEVELOPMENT – LIQUIDS

- You have to start somewhere …
- Use a hand sprayer, existing equipment
- Start “small” and consider **Shared Services**
TYPES OF TANKS – EQUIPMENT – LIQUIDS

- Start small and keep it simple
- Use and/or modify existing tanks
- Try small vehicles, pick-up trucks
- Use self-contained skid units
Check within yours and other departments that have “seasonal” vehicles and or trailers for use

Use a simple electric or self-powered gas motor

Simple on/off controller

Use lower application rates at the beginning of the season (for Anti-Icing) Oils, Chemicals in the road surface “Snotty” condition
TEST MATERIALS – RESEARCH & DEVELOPMENT – ANTI-ICING

- Spot treat problematic areas
- Hills, curves, BD’s
- Intersections, etc.
- Consider low volume areas - Shallow ditches
ANTI-ICING – TOOLS – TIME – MATERIALS

• ANTI-ICING: It takes FH’s DPW approx. 8 hours and 8,500 gallons of liquid product using one truck with a specially-equipped tank unit and another tow-behind tank trailer to anti-ice all of FH’s 58 major centerline road miles, when conditions permit.

• Once snow pack/ice has developed, it takes 4x the amount of salt to break its bond to the pavement.
TYPES OF TANK EQUIPMENT – LIQUIDS – Larger Capacity/Uses

As you Expand your Liquid Program consider:

- Management, employees and other departments’ buy-in
- Tanker endorsements (MI 1K)
- Multi-seasonal use justification
- Existing equipment rated for the weight of liquids
TYPES OF TANK EQUIPMENT – LIQUIDS – Larger Capacity/Uses

- Ease of installation/removal and set-up
TYPES OF TANK EQUIPMENT – LIQUIDS – Larger Capacity/Uses

- Multi-Seasonal, Function – Pre-Wet, Anti-Ice, De-Ice, Dust Control, Watering, etc.
TYPES OF TANK EQUIPMENT – LIQUIDS – Larger Capacity/Uses

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TYPES OF EQUIPMENT-COMPONENTS for LIQUID APPLICATION –

- Upgrade controllers, flow meters for consistent application-mat’s, labor, time savings
LIQUIDS – DE-ICING – SPOT SPRAYING APPLICATIONS

- Testing the small DAS unit to spot spray, de-ice and tackle tracking issues onto Major roads.
  (Snowpack that tracks out to the major roads.17.8@ surface)
LIQUIDS – DE-ICING APPLICATIONS

• Examples of using liquids in a de-icing role (parking lots, roundabouts, etc.)
TYPES OF TANK EQUIPMENT – LIQUIDS – Activities

- Liquid Units-Multi-Tasks
LIQUIDS – Activities – Multi-Uses

- **Dust Control**: Great for dead-ends, parks, shoulders, construction sites, smaller road networks, shared services
- Dust control requires more G.P.L.M. (up to 2K compared to 30-50 G.P.L.M. for anti-icing).

*Is your equipment spec’d out for the demands, more volume, output of hydraulics, etc.?*
EQUIPMENT in your TOOLBOX

- Brine maker or supplier of liquids or granular materials
- **800-1K gal’s of salt brine from 1 ton salt**(cost/labor)
- Additives, organics, blending
- Use what’s available to you in your area
BRINE MANUFACTURING –
Manual or Automated

- Initial equipment costs – $ per gal, labor, water, electricity-- quality of salinity vs well brines
- Water supply crucial to manufacturing brine (3/4” vs 1-1/2”+)
SALINITY – ACCURACY

- Salometer: Used for traditional measurements.
- Refractometer: Used for more accurate salinity, which automatically accounts for temperature, air bubbles and calibration which improves productivity. 2 functions-Saturation & Temp.
STORAGE – CONTAINMENT
(Maintenance Issues: Inside-Outside-Roofs)
TANK FITTINGS for recirculation
PUMPS - hp, electric motors, back-ups
ANTI-SURGE TOOLS
BLENDING CONSIDERATIONS

- Spheres or Balls to increase safety, minimize driver fatigue, wear & tear on hauling vehicle
- Blending options, barrels, totes, bulk delivery, pricing
• Designed and built a blending manifold, including a flow meter, anti-foam port
• Modified brine maker for quicker evacuation
TOOLS IN THE TOOLBOX / INNOVATIONS

- Designed and built a blending manifold, w/ a flow meter.
- Modified our brine maker for quicker evacuation and recirculation.
• City of Wixom helped FH’s with brine production and blending.
• City of Southfield provided organics to FH’s to blend and apply on a border streets.
• City of Wixom purchased a scale with FH’s to aid in calibration activities.
• Extended organics bid pricing to neighboring communities.
• FH’s swapped underbody blades with Bloomfield Twp. to test.
• All possible from networking and collaborating together.
Anti-Icing and Pre-Wet programs have provided solutions in today’s challenging economic times:

- 30% cost savings over conventional salting programs
- Reduction in corrosiveness to the infrastructure and vehicles
- Reduction in emergency call-ins—"Buy’s you Time"
- Improved snow & ice control while focusing on the City’s environmental benefits, sustainability and cost reductions.
BENEFITS OF LIQUIDS – Considerations

- Residuals
- Less sod burn, parking lots and sidewalks
- Less salt powder, granular mess
- **NO EVENT IS THE SAME** (ground- air temps, dew points, wind, etc.)
GOALS FOR 2011-12 WINTER
“Think out of the Box”

- Continue testing other liquid/granular products, including liquid colorants to help visually see applications
- Upgrade some of the controllers – explore-AVL systems
- Demo/test new equipment (inserts, joysticks, etc.)
- Try an all-liquid application on one of our major routes
- Upgrade some of our filtration systems-organics