• Division of Public Works (DPW) maintains a network of more than 58 miles of major roads and 247 miles of paved and unpaved local roads (centerline)
• **250 Major Rd. Lane miles** (some are 5+ lanes wide)
• **9th** largest municipal street network in the state of Michigan and the largest in Oakland County
• Area residents and businesses have high expectations for the City’s public services LOS (Level Of Service)
• APWA 2011 Excellence in Snow and Ice Control Award
• APWA Accreditation 2017
FH’s Road Network

- 58 Miles of Major Road
- 247 Miles of Residential Road
- Includes 22 Miles of gravel
- 750 Lane - Miles
FH’s Calibration Program—Why

- 33 sq. miles
- 6 Major Rd snow routes (approx. 28 LM ea.)
- 5,000 tons of salt annual avg.
- 200,000+ gallons of annual liquid usage
Winter Maintenance/Best Practices

➢ Before the beginning of each snow fighting season, salt trucks must be calibrated to ensure salt distribution falls within department guidelines. The calibration should be rechecked if there are any mechanical adjustments or changes throughout the remainder of the snow fighting season. A must for safety of the public, consistent goals, target application rates and environmental sustainability.
FH’s Calibration Program—Why

“YOU DON’T KNOW WHAT YOU HAVE UNTIL YOU MEASURE IT”

- “Tool” to measure your Materials & Expectations
- Consistent LOS (Starting Point for Each Event, #’s per LM, gallons per ton etc.)
- Budget (Calibrating should save your agency $$)
- Resources (“Shared Services” scale purchase)
- TRAIN, TRAIN, TRAIN
- BUY IN / CHANGE / ACCOUNTABILITY/Better for the Environment
- Equipment Build (Staff Input), Technology, Maintenance & SUPPORT
- Level Of Service (Everyone on the Same Page from the top down)
- In conjunction with AVL…. Equipment not calibrated = not good data
- Helps reporting Material usage for operators, inaccurate reports
- Pre & Post Winter & Storm Meetings / Campfires
- Testing Materials…. Baseline of calibrated applications at different conditions...
- Equipment issues, Sensors, Corrosion etc.
- Your Thoughts?
‘Sustainable’ Solutions Include More Than Just the Environment

• NOT JUST environmental awareness!
• Again a balancing trick
  – Social
  – Economic
  – Environmental
• No one sustainable solution
• One size *emphatically* does not fit all
• But, sustainability does impact all aspects

Credit: mark.devries@vaisala.com
25% to 45% Budget
For the average year for Winter Maintenance
Diminishing Return on Investment other than Public Safety!

Credit: DWClonch, LLC
Single Axle/5 TONS - SALT= $300+

EVERYTIME YOU LOAD UP !!
EVERYTIME
YOU LOAD UP !!

Tandem Axle - 10 TONS of SALT = $600+
TRAINING

Vendors

Potlucks

Workshops
TRAINING

- VENDORS
- IN HOUSE Staff (Potluck)
- LOCAL SEMINARS
- INTERNET RESOURCES
- "YOUTUBE" ETC.
- TEAM UP WITH YOUR NEIGHBORS TO HIRE A TRAINER OR CONSULTANT
- "Clear Roads"
- "AASHTO"
- "Salt Institute"
- MDOT, IOWA DOT, ODOT, MINN DOT, COLORADO DOT......
Support from Vendors / Manufacturers
TRAINING - TEAMWORK

Bloomfield Township
1827

S.E. Michigan Winter Maintenance Team

Farmington Hills, Michigan

American Public Works Association
Michigan Chapter

Michigan’s Local Technical Assistance Program
Bridging the gap between theory and practice
PREVENTATIVE MAINTENANCE

➢ Get the equipment ready for Season / Calibration
### PRE-WINTER CHECKLIST—Truck #_____

#### PLOWS
- Welds
- Shoe adjustment/blade adjustment
- Wear on blade and shoe
- All nuts tight
- Hook plow onto vehicle

#### Hydraulics:
- Couplers—cylinder
- Set pins on plow
- Match plow number to truck

#### TRUCKS
- Grease all fittings
- Hydraulic leaks—couplers--hoses
- Welds
- Lights (all).Mirrors –Backup Camera (if equipped)
- Tires (wear)
- Heater. Two-Way-Radio
- Pre-Wet Tank Primed(If Equipped)-Calibrated for proper Gallons Per Ton
- Winter Gauges (“Low Liquid Indicator” “Road Temp.Gauge” Etc.)

#### AUGER/BELT
- Bearings
- Grease
- Hydraulics—couplers--hoses
- Spill plates
- Spinner—Calibrate Anti/De-Ice Tank (if equipped)
- Proper adjustment for salt—Calibration for pounds per lane mile
- Spinner light

#### REVIEW WITH MECHANIC

---

**Equipment Operator Signature**

**Date**

---

Is Calibration part of your Fall Setup ???
FH’s Calibrating History

- Started Calibrating Winter Equipment in 06’
CALIBRATION

Granular

Liquids
MATERIAL SELECTION for CALIBRATION

- Abrasives (Sand, Grit, Millings etc.)
- Granular (Rock Salt, CMA etc.)
- Liquids (Salt or Well Brine, Calcium, Mag. Etc.)
- All materials flow and spread differently
Sanding vs Rock Salt

Different flow and weight to consider when calibrating different solids – grit, ash etc.
CALIBRATION

Wing
Underbody Scraper
Front Plow
Calibration of Joystick for “Feel” & Control

- Controllers / Joystick does has multi functions
Play a Video – Joystick

https://www.youtube.com/watch?v=cieVpc3VQ3U&t=56s
CALIBRATION

Pump On / Off

Calibrate Liquids w/sizing of tips & nozzles
CALIBRATION

Road Temperature Sensors
CALIBRATION

Infrared Devices to measure pavement temps. *(Pavement)*

Big difference 31 – 33 degrees...
TYPES OF COMPONENTS “Old School” Vs. New Technology

- Manual controllers / Joystick does most of the functions
Manual controllers in combination with modern controller, safety concerns of touchscreen vs “Feel”
TOOLS IN THE TOOL BOX

Versatile
Flexible
Efficient

BEST PRACTICES
Tools/Equipment Needed

- Well Maintained Truck/Slip-In/Tailgate Auger, Vee-Box, Live Bottom etc ...
- Fluids in normal operating range & Temp.
- Scale (human, hunting etc.)
- Bucket
- Tarp, Shovel, Wood, clipboard, forms, watch, calculator (Smartphone)
- Salt, Sand (materials)
- Operation manual of specific equipment
Tools/Equipment Needed

Calibration chart for Manual Controls

<table>
<thead>
<tr>
<th>Feed Rate Dia. Setting</th>
<th>Auger RPM</th>
<th>Lbs. per Revolution</th>
<th>Lbs. per Minute</th>
<th>5 mph</th>
<th>10 mph</th>
<th>15 mph</th>
<th>20 mph</th>
<th>25 mph</th>
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Example:

- Feed Rate Dia. Setting
- Auger RPM
- Lbs. per Revolution
- Lbs. per Minute
- 5 mph
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- 15 mph
- 20 mph
- 25 mph
- 30 mph
- 35 mph

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Play a Video – Granular Drop Tailgate

https://www.youtube.com/watch?v=ilsHIuJW-9M
Tools/Equipment Needed for Liquids

Different connections and sizes such as male & female Camlocks, etc.
Tools/Equipment Needed for Liquids
Drop Tailgate Spreaders

- Huge Difference in a 6” vs. 9” Auger
- May have some issues achieving lower rates (200#'s plm) at slower vehicle speeds.
Live - Bottom Sanders

- Huge Difference in adjusting rear door for material flow
Various Types of Controllers
Various Types of Flow Meters
Components Vary by Manufacturer
Liquid Valves Vary by Manufacturer
Feedback Sensors Vary by Manufacturer & by Installation Position
Play a Video - Liquids

https://www.youtube.com/watch?v=LCERq3wvRoc&t=187s
CALIBRATION Settings

- CLOSED LOOP
- OPEN LOOP
Calibration-Issues
Calibration-Issues

- **Error Messages**

  - 24-NO RCE, CHK CONNECTION
    - Check Cable
    - RCE failure
    TOUCH ERROR MSG SCREEN TO ACK!

  - 31-SOLID UNDER APP
    - Gate Too Low
    - Max Too Low
    TOUCH ERROR MSG SCREEN TO ACK!
Long cable to get the Controller out of cab
Long cable to get the Controller out of cab
APPLICATION-PRACTICES

Typical Scatter Pattern of *Dry* Road Salt

46% in center

15% off road

12%
APPLICATION-PRACTICES

Typical Scatter Pattern of *Pre-Wet* Road Salt

78% in center

9%

2%

off road

1/3 1/3 1/3
MDOT’s Bounce & Scatter Study
1970’s / 2012

20.8% on target
35.4% wasted off target
Utilize a paved area for a grid
Consider safe speeds in testing
Operators run and watch the tests
Visually see for themselves...
Your #1 Resource – The Team!
CALIBRATION LINKS

LINKS TO TRAINING VIDEOS

Last time I checked these worked. If not let me know please. Thanks BP

WINTER MAINT. - (May have to copy & paste links)
Granular Salt calibration w/ manual valves (Drop Tailgate Spreader)
https://www.youtube.com/watch?v=ilsHluJW-9M
Granular Salt/Sand calibration w/ manual valves (Live Bottom Truck-Belt)
https://www.youtube.com/watch?v=zz3JHC9ZhsA
Rexroth CS 550 calibration (Granular)
https://www.youtube.com/watch?v=C1DiB3L6fbg&t=17s
Liquid Calibration w/ a REXROTH CS 550 Controller (PRE-WET & ANTI-ICING)
https://www.youtube.com/watch?v=LCERq3wvRoc
Over view of the REXROTH CS 550 Controller
https://www.youtube.com/watch?v=gkXGLzYul1U
Micro Trak Calibration
https://www.youtube.com/watch?v=mXoOhvTiKGQ&t=1s
Swaploader FH’s
https://www.youtube.com/watch?v=mgqZXaDwAVU

Minnesota Department of Transportation: Clear Roads Project “How to test De-Icers” Training Video
https://www.youtube.com/watch?v=cIPTRCXRBDM

Anti-Icing & De-Icing Products for Parking Lots and Sidewalks
https://www.youtube.com/watch?v=wxNM6EWjgu0
QUESTIONS?
Bryan Pickworth
Road Maintenance Supervisor
City of Farmington Hills, MI
Dept. of Public Works

- 27 years as an employee of the City beginning as a Laborer in 1991, moving up the ranks to Equipment Operator III/Crew Leader and promoted to Road Maintenance Supervisor in 2004.
- 2009 graduate of Michigan APWA’s Michigan Public Service Institute
- Member of national APWA Snow & Ice Committee
- Current Responsibility’s include:
  - Snow and Ice control, Liquids production, Stormwater drainage maintenance, Forestry operations, Inventory of Essential Materials, Safety and Various Training, Street sweeping and various other in-house & contracted services.

  - bpickworth@fhgov.com or 248-871-2865
The Superintendent of the Division of Public Works for the City of Farmington Hills.

Has been with the City for over 33 years. Prior to his current assignment, he held the position of City Traffic Engineer and Senior Engineer for the City.

Licensed Professional Engineer in the State of Michigan and holds a Bachelor of Science degree in Civil Engineering from Michigan State University. Also a 2014 graduate of the Michigan Public Service Institute.

Current responsibilities include the management of 35 Public Works employees conducting roadway, storm-water maintenance, right-of-way maintenance & repair of 300+ center line miles of public streets, waste collection for a population of approximately 80,000 residents and oversees city-wide fleet acquisition, management and maintenance of over 350 vehicles and heavy equipment.

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• mark.devries@vaisala.com

dwclonch@gmail.com

THANK YOU
“First to Respond, Last to Leave”