

September 2024 Peer Exchange

- No Boundaries held its second peer exchange of 2024 from September 10-12
 - In-person meeting in Fargo, hosted by North Dakota DOT
- Meeting information at maintainroads.org/september-2024-fargo-nd/
 - Detailed documentation available for members with login



North Dakota DOT Welcome and Overview



- Matt Linneman, Deputy Director for Engineering, North Dakota DOT
 - Overview of NDDOT's organizational structure, strategic focus, and asset maintenance responsibilities
 - 1,001 team members, 8 districts
 - \$2.3 billion agency budget
 - NDDOT maintenance uses more than 1,500 pieces of equipment, including equipment needed for pavement preservation

Round Table 1. Innovations Show and Tell

Selected Highlights

- Bridge bearing replacement (Colorado) ▶
 - Maintenance staff developed a cart that would support 450-lb corbels while they were put into place and anchored to the bridge abutment.
- Herbicide spray drones (Michigan)
 - Requires special certifications and approvals to operate, but drones can spray in hard-to-reach areas.
- Dangle saw for removing roadside “totem poles” (Ohio) ▶
 - This excavator attachment can help remove the “totem poles” that are left after brush and limb removal along steep roadside embankments.



Dangle Saw (28”-42”)



MODELS	D528C
Max Opening:	38"
Single Cut Cap:	30"
Saw Cut:	32"
Saw Chain:	3/4 pitch
Spreader:	5 tooth
Chain Oil Res.	8 gal
Robotics:	Robotics R890C
Motor:	48cc
Weight:	3000 lbs
Carrier:	14-25 ton excavator

Round Table 1. Innovations Show and Tell continued

Selected Highlights

- Heat-shrink covers for equipment quick connects (Virginia)
 - Exposed connections can deteriorate and leak when exposed to elements and winter weather chemicals.
- Innovations Challenge and Showcase (South Carolina)
 - Inaugural event included a show-and-tell and ceremony in July 2024, featuring 18 submissions and 7 winners.
- Moving striping operation (Utah) ▶
 - With a water truck up front, lanes don't need to be closed and it's much safer.



Round Table 1. Innovation Show and Tell continued

Selected Highlights

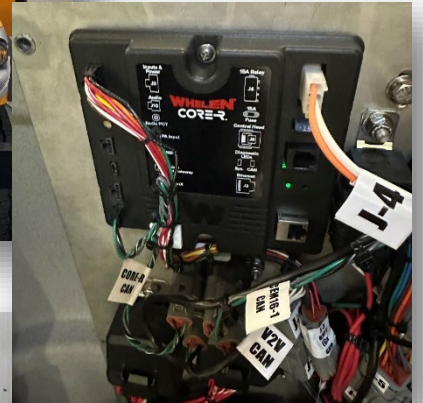
- **Fotokite (North Dakota) ▶**
 - Tethered drones that capture video and send it out where needed for monitoring of any kind from protests to ice jams.
- **Intelligent Attenuator (California)**
 - Can be driven remotely from inside an office. Still in test phase.
- **Salt Wrangler (Idaho) ▶**
 - An inexpensive tool to conserve salt by controlling the bounce.



Round Table 1. Innovations Show and Tell continued

Selected Highlights

- Online equipment mapping tool (Texas)
 - Shows where each piece of equipment is located across the state and how it's being used. Weather data can be overlaid to improve efficiencies during extreme events.
- Grader attachment (Maryland)
 - Prototype skid steer attachment that can go over a guardrail with less manual labor.
- A hybrid solar/AC system for dump trucks (Illinois) ▶
 - System uses a solar unit on top of the truck and light bars all around it. Results in better lighting and charged batteries.



Member Presentation: North Dakota

Selected Highlights

Jesse Kadrmas, Assistant District Engineer,
Grand Forks District

- DOT has eight districts, each with its own HQ and around 2,000 lane miles.
- Operations take place from spring to fall and includes:
 - Crack sealing and pouring (spring)
 - Flood response
 - HMA patching
 - Mowing (spring and fall)
 - Culvert inspection program
 - Transportation Technician Academy



Presentation: North Dakota Innovation Program

Russ Buchholz, Strategy and Innovation Division, NDDOT

Current innovations and programs:

- HAAS Alert
- Raster Master ▶
- ROADZ Armor - Roadside Active Defense Zone
- UAS
- Transportation Innovations Program (TRIP)
- FHWA's STIC Incentive Program
- Connected Vehicle / Platooning
- Safety Corridors

Future innovations and programs:

- Safety Corridor / I-29 SMART Corridor
- Autonomous Vehicle
- EV Infrastructure (NEVI and ATCMTD)



Round Table 2: Outside Vendors for Maintenance Training

- What types of maintenance training topics does your agency contract to outside vendors?
 - Starting in March 2025 we will be using an outside vendor for tractor/mower training. We are also looking into chainsaw and Vactor Truck training. (Illinois)
 - CDOT contracts vendors to facilitate many of our specialty training programs. These training programs include our electricians, mechanics, fiber optics, and CPR certifications. (Colorado)
 - ODOT does not have any contract training for maintenance activities. We do have some vendors provide training on new or unique guardrail installation, if requested. (Ohio)
 - Specialized equipment training when adding to fleet or rentals. Health and Safety (CPR, AED, Peer Defusing, Respirator Fit testing, HAZWOPER training, OSHA 30, Pesticide Spray Certificates) (California)
 - Guardrail/attenuator training and crane training. Also looking into possible heavy equipment training in the future and yearly striping training for paint crews. (Utah)
 - Guardrail training. (Michigan)
 - Virginia has a centralized maintenance training academy that's staffed. A district coordinator works with the academy and district on training, and also does some Train the Trainer things. (Virginia)

Technical Site Visits

- **Big Iron Farm and Construction Show**
 - Largest agriculture event in the upper Midwest, held every September in North Dakota.
 - 900+ exhibitors
- **Grand Farm Field Day**
 - A campus dedicated to advancing research and innovation in agriculture and applied technologies.
 - Cutting-edge demonstrations and tours of field projects.
- More pictures [available on Flickr](#)



Presentation: Virtual Reality Training

Diana Clonch, DW Clonch

- No Boundaries Synthesis: Maintenance Training with Virtual Reality Technologies ▶
 - National survey with 22 states responding as well as a literature search.
 - Found that VR is often used for CDL or other heavy equipment training and snowplow simulators.
 - Benefits include real-world experience with a snowplow or other equipment, lessening the risk of harmful or costly mistakes and reducing wear and tear on the equipment. Realistic scenarios are also good practice to mimic snow and other weather conditions, equipment issues and even driver fatigue.
 - Challenges include cost, lack of adequate VR equipment or time to train all staff, motion sickness.
 - Full report at <https://maintainroads.org/publications-and-presentations>



Round Table 3. New Minimum Retroreflectivity Levels for Pavement Markings

Selected Highlights

- What is your state's plan to meet the new FHWA requirement for minimum retroreflectivity for roadway markings that goes into effect in the fall of 2026?
 - We plan to handle pavement marking retroreflectivity similar to the way we handle sign retroreflectivity, with anticipated life of the product and blanket replacements. We completed research several years ago which developed anticipated lifespans and retro degradation curves for different PM materials on different pavement surfaces. We plan to use this research data to develop blanket replacement cycles for different materials. (Illinois)
 - Based on previous research, we plan to utilize a recurring schedule / replacement frequency to accomplish this goal. This was done through research with a local university. (South Carolina)
 - Bought a Retrotek unit and hired a full-time operator to collect Dry Retros on all UDOT-owned striping (all material types). Hired a consultant to collect Wet / Dry Retros on all of UDOT's "durable" striping sections. Have a rolling 10-Year Plan for "durable" striping installation and a dedicated \$6M/year funding for "durable" striping projects (Utah)

Round Table 4. New Minimum Retroreflectivity Levels for Pavement Markings continued

Selected Highlights

- Is your agency currently collecting roadway marking retroreflectivity data? If so, describe your methodology:
 - Currently retro-reflectivity data is gathered on a spot basis as part of pavement marking pilot trials. (Virginia)
 - ODOT is collecting data through a purchasing contract for MRU Data Collection and Reporting. Acceptable devices for this project are a RoadVista Laserlux G7, Delta LTL-M or approved equal. (Ohio)
 - Hand-held (Strip Master II, LTL -L X, Zethner) and Roadvista Mobile Retro-Reflectometer. (Maryland)
 - We have a mobile retroreflectivity service contract that measures all the longitudinal striper on state highways. (California)

Round Table 4. New Minimum Retroreflectivity Levels for Pavement Markings continued

Selected Highlights

- Is your state moving from 4" to 6" pavement striping even though the most recent revision of the MUTCD didn't make it a requirement?
 - Some districts are going to 6" everywhere, and we are looking at requiring 6" for certain applications involving freeways and other roads above a certain ADT. (Illinois)
 - Virginia has been installing 6" lines on Interstates and freeways by policy for well over a decade. VDOT empowers our District teams to install 4" or 6" lines on arterials based on their engineering judgement (based on safety, weather, other applicable data) in considerations of their available resources (funding, contracts, staffing, etc.). Typically, our rural Districts have decided to use 6" lines on major routes, whereas our more urban/suburbanized Districts use 4" line. (Virginia)
 - Yes, NDDOT decided to move to 6" pavement marking late 2023. The exception is that we are allowed to keep roadways under 40 mph as 4". (North Dakota)

Business and Planning Meeting

- Commitments and transfers; budget and spending
- Update on Phase IV commitments
- Discussion of operating procedures
- Future peer exchanges

Presentation: Highway Maintenance Management Program

Keith Thomas, Maryland DOT

- Front Range Community College - Associate of Applied Science Degree (AAS)
 - Program typically takes two years to complete and awards up to 27 credits for training workers are already doing.
 - Available Challenge Exams and Resource Materials for HWY Program Courses.
 - Transcription Agreements
 - States can commit to accept student workers for 6 to 8 weeks, and to pay for credits. Program provides the model.



Carde McGregg
Online Pathways Advisor
Business & Information Technology

I love this highway maintenance program and am thrilled to be an advisor in it! I look forward to working with you on your goals and collaborating on your unique pathway to a degree. We can meet via online or phone appointments. You can make this appointment in your Navigate portal or by calling 303-404-5513 and making an appointment through our administrative team.

Takeaways

- “Aha moments,” big takeaways and great ideas to borrow or learn more about came from all portions of the meeting
 - Presentations
 - Roundtable discussions and innovations highlights
 - Site visits and demonstrations
 - Informal and offline networking

Next Peer Exchange

- Spring 2025

Name an innovation you saw that you'd like to 'steal' for your own agency...

More Info and Resources on Retroreflectivity

Culvert inspection boat from ND

jcb fastrac tractors

Autonomous mowing

Front Range Program

LIDR for verifying Mowing Quantities

Limb Buster- skid steer tree trimming

North Dakota Remote Control car/Boat for CULverts

Drone spraying

Autonomous mowing

Grand farm innovation partnerships

Limb Buster

Drone spraying