



TECHNICAL SUMMARY

Technical Liaisons:

Richard Sanders, Polk County Engineer
sanders.rich@co.polk.mn.us

Farideh Amiri, Mn/DOT
Farideh.Amiri@state.mn.us

Administrative Liaisons:

Clark Moe, Mn/DOT
Clark.Moe@state.mn.us

Bruce Holdhusen, Mn/DOT
Bruce.Holdhusen@state.mn.us

Principal Investigators:

Michael Marti, SRF Consulting Group Inc.
Gary Peterson, EVS Engineering Inc.
Paul Keranen, EVS Engineering Inc.

LRRB PROJECT COST:
\$50,933

Mn/DOT PROJECT COST:
\$88,277



Tying up the spinner before filling the auger is part of the process to calibrate a manual sander controller.



RESEARCH SERVICES

OFFICE OF POLICY ANALYSIS,
RESEARCH & INNOVATION

Putting Research into Practice: Snowplow Calibration Guides for Mn/DOT and Local Governments

What Was the Need?

Winter maintenance operations staff use trucks with manual or automated material delivery systems—referred to as sander controllers—to discharge road salt, sand and other anti-icing materials to the roadway. Manual sander controllers apply material at a consistent rate, meaning that more material will be applied if the truck is moving more slowly, and less when the truck speeds up. Automatic sander controllers adjust the application rate so the truck always applies the same amount of material to the road regardless of truck speed.

Regardless of the type of sander controller used, it is important to keep controller units well calibrated. Improperly calibrated sander controllers can fail to discharge the optimum amount of material to keep the road safe: Too much material can mean wasted resources and increased environmental impact, while too little application can necessitate wasted time from reapplication to meet the agency's desired level-of-service goals.

Before this project, calibration was not being performed routinely by most operators. Calibration guidance has often been limited to information from a technical equipment manual and vendor training provided when a sander controller is new. Winter operations staff at both Mn/DOT and local agencies needed a step-by-step approach to calibration that could be used to introduce new operators to the process and serve as a refresher for more seasoned staff.

What Was Our Goal?

This effort involved two related projects performed by the same investigators—one funded by the Local Road Research Board and one by Mn/DOT—to prepare calibration guides addressing the snowplow sander controllers most commonly used by cities and counties in Minnesota and by Mn/DOT district staff, and to conduct calibration training for winter maintenance staff from local agencies across the state.

What Did We Implement?

This project leveraged the practical experience of Mn/DOT and city and county winter maintenance staff in calibrating snowplow sander controllers. Information derived from surveys and follow-up contacts with experienced Minnesota winter maintenance professionals laid the groundwork for the development of the calibration guides and training sessions.

How Did We Do It?

First, investigators conducted surveys of winter maintenance staff in local agencies across Minnesota and in Mn/DOT districts to identify the calibration equipment currently used, current calibration practices and training needs. Investigators used these survey results to develop calibration guides for the sander controller equipment most commonly used by respondents, using input from sander controller vendors and winter

Investigators created snowplow calibration guides to address the most common types of sander controllers used by Minnesota's cities and counties and by Mn/DOT districts. The guides include step-by-step calibration instructions, one-page quick sheets and other calibration aids.

continued

“The calibration guides and workshops can help increase efficiencies in local governments’ winter maintenance operations. By using the right amount of sand and salt at the right time, local agencies make better use of stretched budgets and limit environmental impacts.”

—Richard Sanders,
Polk County Engineer

“Development of the calibration guides and related training classes was done in partnership with expert agency snowfighters. Their expertise was used to develop and fine-tune a detailed guide and ensure it was user-friendly.”

—Gary Peterson,
P.E., EVS Engineering Inc.

Produced by CTC & Associates for:

Minnesota Department
of Transportation
Research Services Section
MS 330, First Floor
395 John Ireland Blvd.
St. Paul, MN 55155-1899
(651) 366-3780
www.research.dot.state.mn.us



The weight box shown here is a simple-to-use tool that automatically weighs material for sander calibration. The weight box can collect approximately 500 pounds and requires a skid steer or forklift for positioning and emptying.

maintenance experts from Mn/DOT and local agencies. The two manuals were identical in most respects but were tailored to address the equipment typically used by each audience. Investigators then scheduled a series of workshops across the state to offer brief classroom instruction and extensive hands-on calibration training using the LRRB calibration guide as a course book, which was improved from session to session with input from the professionals who attended the course.

What Was the Impact?

The experience-based calibration guides capture tips and techniques learned by experienced calibrators. The guides include step-by-step instructions with images for calibrating the most common types of controllers used: ForceAmerica 5100 in the LRRB guide and DICKEY-john Control Point and ICS in the Mn/DOT guide. A separate document was produced covering Gresen GRS32 controllers for Mn/DOT. Also presented were less detailed instructions to calibrate manual and other automatic sander controllers; one-page quick sheets on calibration and weighing material tailored to more experienced staff; and other calibration aids, including a record to track key calibration settings, forms to verify calibration by weighing material and filling a container, guidance regarding manual sander controllers and troubleshooting tips.

The guides also provide recommendations about when to calibrate or verify that calibration is not required: at least annually, after truck repairs or modifications, on new trucks and after a change in anti-icing materials used.

During fall 2009, investigators conducted 10 workshops for participants from across the state, training Mn/DOT district personnel in the morning and local agency staff in the afternoon. Workshop participants learned practical calibrating tips and shared expertise with other winter maintenance professionals. Most of each three-hour session was spent working with trainers in a variety of hands-on activities—from practice in the cab adjusting calibration settings to monitoring material discharge at the back of the truck.

What’s Next?

These guides have been distributed to all Mn/DOT district offices and made available to cities and counties. Last fall’s training sessions were well-attended and well-received. Discussions are under way to develop a schedule for additional training later in 2010.

This Technical Summary pertains to the LRRB-produced Report 2009RIC08, “Local Government Snowplow Salt and Sander Controller Calibration Guide,” and the Mn/DOT Snowplow Salt and Sander Controller Calibration Guide and Gresen GRS32 Calibration documents, published December 2009. These documents can be accessed at <http://www.lrrb.org/PDF/2009RIC08.pdf>, <http://www.dot.state.mn.us/maintenance/research/files/MnDOT%20Salt%20and%20Sander%20Calibration%20Guide.pdf> and <http://www.dot.state.mn.us/maintenance/research/files/Gresen.pdf>, respectively.