



Local Operational Research Assistance (OPERA) Program

Snowplow Brine Tank System

Liquid salt brine is a useful tool for deicing winter roads, typically as a treatment applied directly to the pavement or for prewetting rock salt to enhance its effectiveness in melting snow and ice.

The public works department for the City of Rochester, Minnesota, uses a brine system on its plow trucks. But the system frequently has run into problems when the brine level in the truck's side-mounted "saddle" tanks falls below the halfway point. The liquid sloshes around in the saddle tanks while the truck is in motion, particularly when traveling up or down the city's hilly terrain, causing the system pump to draw in air and induce a controller error. This leads to reduced efficiency and operator frustration because the controller needs to be reset before resuming brine distribution.

A gravity-fed nurse tank supplies the brine pump

The department received a \$5,000 grant through the Local OPERA Program to address brine system performance issues on plow trucks with saddle-mount brine tanks. Public works staff considered several options to solve the problem. One was to install a saddle tank with a sump at the bottom, but this proved too expensive. Another option was to install tank ballast balls, which would reduce sloshing but not prevent the system from sucking in air when the tanks were not level.

Department staff ultimately decided to install a third "nurse" tank, positioned lower on the truck than the saddle tanks and directly connected to the system pump. Gravity ensures that the saddle tanks drain into the nurse tank to keep it full, which in turn eliminates problems caused by sloshing or steep inclines. The team first installed the nurse tank system on two prototype trucks for approximately \$1,778 per truck in labor and materials.

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OPERA Funding

\$5,000



Installation of the nurse tank system costs approximately \$1,778 per truck in labor and materials.



Plow operators using the modified brine tank system no longer need to reset the brine controller, making their job more efficient and less frustrating.

The system utilizes the full capacity of the brine in the saddle tanks

As a result, plow operators using the system no longer need to take extra time to reset the brine controller, making their job more efficient and less frustrating. In addition, the department can utilize the full capacity of the brine in the saddle tanks and eliminate the extra time spent refilling the tanks before they are completely empty. Instead, operators can apply brine-treated salt throughout an entire plow event and use less salt overall, since wet salt better adheres to the road and leads to less waste. Wet salt also works faster and at lower temperatures than dry salt alone to melt ice and snow.

Moving forward, Rochester Public Works staff plan to install the brine nurse tank modification on all plow trucks less than 5 years old. They also plan to use more durable stainless steel straps to secure the nurse tank to the truck instead of the fabric tie-down straps used originally for testing the system.

About OPERA

The Local OPERA Program encourages maintenance employees from all cities and counties to get involved in operational, “hands-on” research. OPERA helps to develop innovations in the construction and maintenance operations of local government transportation organizations and share those ideas statewide.

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