

Multi-Purpose Maintenance Trailer

In the winter 2006-2007, the Ohio Department of Transportation (ODOT) spent \$65 million on snow and ice control, using over 900,000 tons of salt, 7.1 million gal of brine, 1.1 million gal of other chemicals, and logged over 720,000 man-hours of work.

A year later, in the winter of 2007-2008, District 4 of ODOT alone received 88 in. of snow, but District 4 was ready for the challenge with a secret weapon. After months of hard work and planning, a group of talented District 4 mechanics, including Ron Sharpe Jr., Darren Frantz, and Scott Daley, created a new multi-purpose trailer for both

winter and summer maintenance. This piece of equipment serves as the ultimate snow and ice removal vehicle, but it can also be used all year long for other responsibilities. The multi-purpose trailer can be changed from winter-ready to summer-ready in



Brine, calcium, and other liquids and salt are just a few of the materials that will be used to keep the roads clear in District 4.



The multi-purpose trailer can hold 3,900 gal of liquid. The tank, shown here, actually consists of six, 650-gal tanks.

under a half hour.

When winter-ready, the unit can be used for pre-wetting salt as well as direct application of salt and deicing liquids and plowing. When summer-ready, the trailer can be used to haul slag, salt, dirt, and pavement grindings. Also, a live bottom is being considered for installation in the trailer in the summer, which will allow it to perform berm work.

Trailer Assembly

Tremendous effort has been taken to build the new trailer. A used 1999 International truck with 400,000 miles was purchased by District 4 for \$10,000. A dual hydraulic system was



The trailer is pulled by a used 1999 International truck with 400,000 miles on it, purchased for \$10,000.

installed, which allows the driver to control the ten-ft retractable snowplow, the amounts of material applied to the roadways, as well as raising the bed of the trailer. The advanced hydraulic system consists of a “cross-over relief valve,” which allows the plow to pivot back if it strikes an object.

Three separate steel frames were constructed and galvanized. One frame holds six, 650-gal tanks, which

blend of calcium and other de-icers. The second frame supports the 4 1/2-cu yd hopper and the salt spreader. A third frame is for the snowplow, which is centrally placed underneath the trailer and anchored to the trailer frame. The entire unit cost about \$125,000.

Numerous safety measures were taken into account with the construction of the trailer. For example:



The trailer's ten-ft snowplow is centrally placed underneath the bed.

were combined to create a single, baffled 3,900-gal tank that can hold brine or a calcium chloride and brine mix for pre-treating or direct application. Also on board is a 140-gal tank, which can hold either calcium

- The trailer has new LED strobes for better visibility by vehicles approaching from the rear. ODOT has also installed new LEDs on the front and side of the unit for better long distance visibility. The trailer can now be seen at night from one to two miles away.

- Careful attention was paid to the driver's visibility of the plow during operation. The driver must be able to see if he is plowing snow to the right or to the left, or if the plow is in the upward holding position.

- The main insert—3,900 gal of liquid, the salt spreader, and extra holding tanks—is removed and inserted in three sections. ODOT developed an attachment that fits on both a wheel loader and all three sections of the insert to facilitate handling.

- The belly plow was designed with a built in tripping device. Should it strike an object like a bridge joint, it trips or retracts without allowing damage to the plow or causing loss of control of the trailer. The rubber blade has an adjustable hydraulic pressure valve system to limit downward pressure

- All hydraulic and solution system hoses were placed into tubing trays for protection and for easier access for maintenance.

- The trailer is designed so that when the solution tanks are full, the weight is evenly distributed over the trailer to avoid making it top heavy.

- The dual hydraulic systems eliminate the possibility of the trailer lifting while in operation due to a mechanical or operator error.

While using the formulas of 100 gal of direct application per lane mile and 2.2 lb of salt per gallon, it is anticipated that with its large 3,900-gal tank and with a hopper capable of holding 4 1/2 cu yd of salt, the multi-purpose trailer will be able to treat and plow an average of 30 to 40 lane miles per route.

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