

# Iowa DOT Deploys GeoSLAM Survey Solutions to Monitor Salt Stockpiles and Improve Service Provision

## Monitoring Stockpiles

Question: When ‘Mother Nature’ determines demand for road salt consumption in winter, how does a State Department of Transportation (DOT) strategically balance reserves? Answer: Iowa State DOT invested in Simultaneous Localisation & Mapping (SLAM) technology from GeoSLAM to accurately measure salt stockpiles in 109 maintenance areas in order to streamline salt distribution across 24,000 lane miles of state and federal roads.

*“It is our job to make sure Iowa State DOT roads remain clear and safe to use in winter.”* Commented Tina Greenfield, RWIS Coordinator, Iowa DOT. *“If we don’t have full insight into our salt stockpiles in all maintenance areas we may find ourselves forced to make snap decisions about redistribution which is both costly to the state and inconvenient to residents and businesses alike.”*

Across snow-prone states, road salt is stored in thousands of huge buildings which hold up to 1200 tons of the granular ice-melting material. Throughout the winter, road salt is loaded onto trucks and spread on roads to stop the surface from freezing; pay loads are measured in weight; as salt in, salt out, and salt remaining, and as supplies run low, orders are placed to replenish the salt that has been used; a process, according to Greenfield, that only works to a point.

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*“Over time your eyes start to tell you that the volume of salt in the shed is different from the volume of salt on paper.”* explained Greenfield. It is not reliable to just look inside a half-empty shed and assess how much road salt remains. The surface of the stockpile is very uneven with lumps on one side and big cliffs on the other where loaders have dug-out salt for spreading.

*“With this approach we can never be sure if our paper trail for stock remains accurate and when we get it wrong the costly process of salt redistribution across maintenance areas becomes necessary.”*

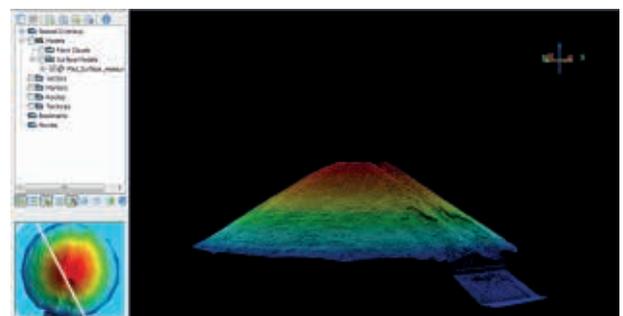


Snowplow Clears Snowy Roads in Iowa

*“That’s why we bought ZEB1 from GeoSLAM, to accurately measure our salt stockpiles in every maintenance depot across Iowa.”*

Early experiments with GeoSLAM’s hand-held laser scanner are proving good for Iowa State DOT. Using ZEB1 to scan the three-dimensional environment of the stockpile inside the shed, the team can very quickly capture a point cloud.

Then using Quick Terrain Modeller software, transform the points into a surface model. Thereafter it’s easy to accurately measure the true volume of the stockpile.



Quick Terrain Modeller software transforms points into a surface model

As all road salt is tracked by tonnage and as the granules vary in size, the Iowa State DOT team then applies a density value to the volume to calculate the available tonnage. This new level of insight far surpasses that which was previously available to the DOT team.



Salt Stockpiles in Iowa DOT Maintenance Area Shed

Greenfield explained, *“Our best guess used to be based upon walking into a shed and looking at the stockpile against some markers on the walls of the shed which didn’t always work out well for us. Due to harsh winters and limited supplies, in 2001 and again in 2008 we almost ran out of road salt in Iowa State. The situation was really bad as we recorded our highest consumption in recent history.”*

**Key facts**

- Iowa State DOT has 109 maintenance areas
- Distributes salt across 24,000 road lane miles
- DOT buildings store upto 1,200 tons of salt
- ZEB1 bought to accurately measure stockpiles
- Eliminates guesswork for calculating volumes
- Reduces costs associated with re-distribution

Iowa State DOT’s decision in 2014 to purchase GeoSLAM ZEB1 from Qntfi Inc., a GeoSLAM reseller, came hot on the heels of the most severe winter since 2008. Winter 2014 was severe and many US States froze as salt reserves ran out. The water in the Great Lakes turned to ice, halting shipping and stalling salt supplies. Iowa State DOT had stopped buying road salt in early January 2014 as budgets ran out. Soon after, other States stopped buying too because the supply chain froze. While Iowa State DOT made it through that winter with what little road salt they had left, they resolved to develop new, more reliable measurement processes for managing salt stockpiles in future.

Greenfield investigated the market and discovered the game-changing SLAM technology from GeoSLAM. A quick demo later and the ZEB1 proved its worth; the deal was done.

**About ZEB1**

The ZEB1 is the first truly mobile lightweight hand-held laser scanner which is suitable for use in a number of applications including: mining, forensics, architecture, forestry, stock piles and for rapid visualisation.



ZEB1 Data Logger with Hand-Held Laser Scanner



“Survey in Motion” ZEB1 ‘Nodding’ Laser Scanner



High-Quality Product Assembled in UK

With ZEB1 in hand the user can simply walk through the target survey environment while rapidly recording more than 40,000 measurement points per second without the need for external positioning data such as GNSS. The ZEB1 works best in feature-rich environments while on the move, so there is typically no need for targets and absolutely no need for a tripod. Once the data has been collected, it can be uploaded to the GeoSLAM Cloud, where SLAM software transforms the survey measurements into a fully registered point cloud. Thereafter, the data can be downloaded (on a pay-as-you-go basis) for use inside all major CAD software. With this finance-friendly business model, the GeoSLAM solution eliminates the need for upfront software costs and annual maintenance charges.

**About GeoSLAM**

GeoSLAM develops game-changing survey solutions including ZEB1, for the measurement and mapping of multi-level three-dimensional environments. Backed by winners with a track record for innovation, GeoSLAM is a joint venture between CSIRO (Australia’s national science agency and the inventor of WiFi) and 3D Laser Mapping (the UK’s leading provider of LiDAR solutions to the mining industry and the inventor of ‘Street Mapper’ – the world’s most accurate mobile laser mapping system).

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