JOINT TRANSPORTATION RESEARCH PROGRAM

Principal Investigator: Bob McCullouch, Purdue University, bgm@purdue.edu, 765.494.0643

Program Office: jtrp@purdue.edu, 765.494.6508, www.purdue.edu/jtrp

Sponsor: Indiana Department of Transportation, 765.463.1521

SPR-3618

2013

Total Liquid Routes and Anti-Icing Liquids

Introduction

INDOT has successfully used salt brine in anti-icing efforts as a way to deliver preventative treatment before an event (e.g. bridge deck frost) occurs. In 2011, INDOT wanted to investigate the use of salt brine in de-icing operations. Therefore this study executed a comparative analysis of brine routes and salt routes during two winter seasons (2011–2012 and 2012–2013). There were 21 study routes in the first winter season and 41 routes in the second winter season. Both winter seasons would be classified as “mild” and most winter events would be characterized with low levels of precipitation. The 2012–2013 winter was a month longer with two major events occurring in March.

Another study item designed and fabricated a combination winter vehicle and analyzed its performance.

Various data was collected from different sources and used in the analysis. Data sources used were: Work Management System, weather data, and After Action Truck reports. In any comparative analysis study, the comparative variables need to be minimized as much as possible; this was done by using comparative routes in the same geographical location with similar route characteristics.

The study attempted to provide answers on:

- Liquid routes effectiveness
- Cost comparisons
- Liquid route characteristics
- Combination unit effectiveness

Findings

Findings or conclusions are based on data collected during the two winter seasons. These findings are:

- Interstate routes can save with an approach of alternating brine and salt in successive treatments.

- Brine making equipment and handling costs influence its unit cost. Best practices should be documented and shared with all districts.
- Liquid routes have a smaller cost range variance, indicating that it may be easier to control material distribution rates.
- Liquid routes are economical more times in a direct comparison with salt routes.
- When normal distribution rates are used, liquid (20–40 gallons/mile), salt (#200–#250/mile); liquid routes are more economical in all types of weather events and when pavement temperatures are higher than single digit temperatures.
- Due to the cost of designing and fabricating a combo unit, it may be more economical to use the approach of alternating between salt and liquid treatments on a route.

Combination truck.

- The LaPorte District has the most economical brine routes. These route characteristics should be used when designing other brine routes.
- The online After Action Report website proved to be very useful for managers in winter Operations. A mobile version for smart phones is recommended for the 2013–2014 winter season.

Implementation

The findings can be implemented before the 2013–2014 winter season. Implementation in the form of training can lower costs and improve operations. Cost data indicate some areas are experiencing lower costs with brine; these practices and route characteristics should be used to direct an expansion of brine routes. Another fact data revealed is that brine routes are more cost-effective in most weather conditions experienced in In-

diana. Therefore, an expansion of this program is warranted and should be aggressively pursued by winter Operations.

Recommended Citation

McCullouch, B. *Total Liquid Routes and Anti-Icing Liquids*. Publication FHWA/IN/JTRP-2013/20. Joint Transportation Research Program, Indiana Department of Transportation and Purdue University, West Lafayette, Indiana, 2013. doi: 10.5703/1288284315222.

View the full text of this technical report here:
<http://dx.doi.org/10.5703/1288284315222>

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