



## Research Summary

# Improving Winter Maintenance for Open Graded Friction Course (OGFC) Pavements in Tennessee



### ***WHAT WAS THE RESEARCH NEED?***

Open graded friction course (OGFC) is a thin permeable surface layer on pavements constructed with an open gradation asphalt mixture, that serves as an avenue for draining off water from the pavement surfaces. OGFC is used worldwide and in many parts of the United States and has provided many benefits to road users. But winter maintenance is a big

challenge to most state Departments of Transportation (DOTs) that use OGFC including Tennessee DOT. TDOT funded this study to investigate winter maintenance practices from other state DOTs that could benefit Tennessee highways.

#### **Project Number:**

RES2019-25

#### **TDOT Lead Staff:**

Mark Woods  
Asset Management

#### **Principal Investigator(s):**

Dr. Mbakisy Onyango | PI  
University of Tennessee  
at Chattanooga

#### **Project Term:**

May 2019 to April 2022

### ***WHAT WERE THE RESEARCH OBJECTIVES?***

The objectives of this research project include:

1. Document the state of practice in OGFC winter maintenance technologies from other state DOTs.
2. Identify appropriate de-icing agents and techniques for OGFC winter maintenance in Tennessee.
3. Develop OGFC winter maintenance guidelines for the State of Tennessee.

### ***WHAT WAS THE RESEARCH APPROACH?***

A survey was sent to state DOTs to obtain more information on winter maintenance practices that could benefit TDOT. Another internal survey was sent to TDOT's

four regions to obtain the current practices on OGFC winter maintenance in the state. The research team evaluated and analyzed the survey information to gather relevant winter maintenance practices that could benefit the State of Tennessee. This study is limited to literature review and survey information, no data collection or site testing was performed. From the survey and literature review, winter maintenance guidelines of OGFC pavements are recommended.

### ***WHAT WERE THE FINDINGS?***

The findings from this study include:

- The winter maintenance materials used in Tennessee are rock salts (NaCl), salt brine, pre-wetted salts, brine additives (CaCl<sub>2</sub>), and potato juice. Abrasives (sand) are rarely used and are not recommended on OGFC pavements because they clog the pores.
- The use of NaCl before the snow events as anti-icing treatment has shown to improve the ability to clean OGFC roadways faster.
- During the winter storm, dedicate the equipment to stay on a route with a steep mountain. This will reduce the cycle time for the materials to be spread, which results to cleaner road sections providing safe driving conditions.
- Using a latex or tire rubber modified binder in OGFC mix design provides more resistance to stripping and shelling/raveling of OGFC surfaces.
- For a good performing OGFC, mix moisture absorption of aggregates should not exceed 2.5 % ( $\leq 2.5\%$ ) and asphalt binder absorption should not exceed 1% ( $\leq 1\%$ ).

### ***IMPLEMENTATION AT TDOT***

Recommendations to TDOT include:

- For a good performing OGFC mix moisture, absorption of aggregates should be limited to < 2.5% and asphalt binder absorption to < 1%.
- A chapter on winter maintenance of OGFC pavements should be added to the current winter maintenance procedures for TDOT.
- A future study is recommended on how to improve joints between OGFC and bridge ends or at transitions since several sections were identified with either pavement coming up, complete base failure or raveling at transition joints and bridge ends.
- Planning of material and manpower ahead of time for sections CNP292 and CNL957, identified to be challenging, is recommended to timely remove snow/ice in winter events and provide safe driving conditions

### ***MORE INFORMATION***

Find the final report here: [https://www.tn.gov/content/dam/tn/tdot/long-range-planning/research/final-reports/res2019-final-reports/RES2019-25\\_Final\\_Report\\_Approved.pdf](https://www.tn.gov/content/dam/tn/tdot/long-range-planning/research/final-reports/res2019-final-reports/RES2019-25_Final_Report_Approved.pdf).