

Project Title:

Optimize Application of Open Graded Friction Courses (OGFC) in Tennessee (RES #: RES2013-34)

Synopsis:

Open graded friction course (OGFC) is a special purpose mixture intended for higher internal air voids and better friction characteristics. OGFC mixtures consist of an open gradation, mostly of coarse size aggregate with little fines to ensure a higher content of connected air voids. The primary benefit of using OGFC is the improvement of wet weather skid resistance, reduced potential for hydroplaning, reduced water splash and spray, and reduced night time wet pavement glare. Secondary benefits include better wet-night visibility of traffic lane stripes and pavement markers, and better wet weather (day and night) delineation between the traveled way and shoulders.

However, compared to conventional asphalt mixtures, OGFC is more prone to pavement distresses such as cracking and raveling, resulting in a shorter service life. Studies have shown that the performance of OGFC and its service life are affected by many factors, especially the underlying layer and the interface bond between OGFC and underlying layer. Since OGFC is highly expensive than ordinary asphalt mixtures, it is of great importance to improve its performance and to extend its service life.

The objective of the proposed research project is to investigate into the best potential combination of OGFC, interlayer bond, and underlying layer in Tennessee. The properties and performance of the potential candidates of the OGFC combination were tested and compared in the laboratory. The cost-effectiveness of different combinations of OGFC and underlying layers were also evaluated and compared.

Journal papers:

Two papers were published and attached here. One paper was submitted to Journal of Materials in Civil Engineering and is still under review. One paper is submitted to the 96th Transportation Research Board (TRB) Annual Meeting for presentation and publication and still under review.

1. Song, W., Shu, X., Huang, B., and Woods, M. (2015). Factors affecting shear strength between open-graded friction course and underlying layer. *Construction and Building Materials*, 101, 527-535.
2. Song, W., Shu, X., Huang, B., and Woods, M. (2016). Laboratory investigation of interlayer shear fatigue performance between open-graded friction course and underlying layer. *Construction and Building Materials*, 115, 381-389.
3. Song, W., Huang, B., Shu, X., and Woods, M. Influence of interface characteristics on the shear performance between open-graded friction course and underlying layer, submitted to *ASCE Journal of Materials in Civil Engineering*.
4. Song, W., Shu, X., Huang, B., and Woods, M. Effect of asphalt mixture type on interlayer shear properties, submitted to 96th TRB.

Status:

The project is now in its final stage. The research team is currently writing the draft final report and will submit it to TDOT for comments and feedback.

Project Title:

Maintenance Strategies for Open-graded Friction Course (OGFC) (RES #: RES2016-14)

Synopsis:

With the wide application of OGFC in the U.S., good maintenance has become more and more important to keep its function and performance. OGFC has different functions and properties than conventional dense graded asphalt mixtures and needs special maintenance strategies. According to a survey conducted by UT research team and other previous surveys on OGFC, poor maintenance has resulted in short service life and poor performance of OGFC, preventing some state DOTs from continuing use of OGFC. New winter maintenance methods and strategies must be explored and secured for OGFC to ensure its performance during winter.

Like other state DOTs, TDOT has recently adopted OGFC as its standard pavement option for interstate resurfacing. It is anticipated that in the near future, this could also become one of the TDOT's primary options for resurfacing other non-interstate high traffic or high speed routes. As TDOT's network of highways paved with OGFC grows every year, so does its need for methods to maintain the roads. Therefore, there is an urgent need to evaluate the current maintenance methods for OGFC pavements and to explore innovative maintenance methods and strategies so that OGFC performance can be maintained and its service life can be extended.

The objectives of the proposed study are to identify best practices for OGFC pavement preservation/maintenance strategies throughout the entire life of the treatment including type of treatment and timing of treatment and to make recommendations for state specifications and operational guidelines to optimize TDOT's open-graded pavement program.

Status:

The project has just begun and now it's in the second quarter. It is anticipated that the project will advance in accordance with the proposed task agenda.