

UTC Project Information

Project Title	Quantification of Surface Micro- and Macro-Texture
University	The University of Texas at Austin
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Total Project Cost	\$209,570
Agency ID or Contract Number	TxDOT Project 0-6822 – Task Order 2
Start and End Dates	December 1, 2014 to March 3, 2016
Brief Description of Research Project	The effect of the aggregate texture (micro-texture) and the effect of the texture of the compacted hot mix asphalt (macro-texture) on the skid resistance of a highway surface are well recognized. However, there is a lack of a fundamental understanding of the individual effect that each of these two properties, micro- and macro-texture, have on the final skid properties of the road. Most research studies in this regard have been based on theory, assumptions and sound engineering judgment. The individual effects have not been quantified and their contribution to skid under different conditions of moisture, speed and highway conditions are not well understood. Recent developments in optics and computers have allowed the collection of high definition 3-D images of the surface of the highway pavement. In particular, it is now possible to quantify micro-texture in the field in an effective and efficient manner. This can be done with the use of laser-based technology that allows measurements below 0.5 mm. Locally, the Texas A&M Transportation Institute has conducted research using the Aggregate Imaging System (AIMS) to evaluate aggregate properties and to establish relationships with skid. The AIMS combines hardware that captures real-time digital images of paving material samples, and software that analyzes shape, texture and ratio characteristics of aggregates. The AIMS is, however, an

optical instrument whose resolution does not allow the accurate quantification of micro-texture to the extent that laser does. Nevertheless, this project offers a unique opportunity to compare the findings of both studies and gain mutual benefit by evaluating the same sections and materials with both technologies and establishing meaningful comparisons.

During this study, we will apply 3-D laser technology to quantify the micro-texture and macro-texture of different pavement surfaces and determine their skid characteristics. We will use a new model Laser Texture Scanner. Through posterior panel data analyses of the information, we will investigate the relative contribution of micro- and macro-texture to skid resistance in the field and develop guidelines for aggregate and mix selection for improved long-term skid. We will carry out field measurements in some of the same sections as the recently completed TTI study to continue to improve on the prediction of skid based on texture measurements.

Describe Implementation of
Research Outcomes (or
why not implemented)

N/A

Place Any Photos Here

Impacts/Benefits of
Implementation (actual, not
anticipated)

The implementation of the findings of this research will provide the Texas Department of Transportation (TxDOT) and other state transportation agencies with a methodology for quantifying micro- and macro-texture in the field and correlating these values to friction and skid resistance. Current methods for predicting skid are based on macro-texture only. The addition of the micro-texture component will increase the accuracy of the predictions.

Web Links

- Reports
- Project website

<www.chpp.egr.msu.edu>