



# NUTC NEWS

AT MISSOURI UNIVERSITY OF SCIENCE AND TECHNOLOGY

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## A MESSAGE FROM THE

### DIRECTOR:

### JOHN J. MYERS

Happy New Year from the Center for Transportation Infrastructure and Safety has come to a close. We hope your holidays were pleasant and the year 2011 has had a smooth start.

We want to congratulate NUTC Student of the Year, Kandi Spraggs. Read more about her research and activities at Missouri S&T on page 4. Congratulations Kandi! Thank you for your dedication and hard work.

Last, but certainly not least, learn more about specific aspects of our work on the MTI/MoDOT Structural and Geotechnical Research Programs on pages 2 and 3. These initiatives are nearly complete and will mean large changes for our state's transportation department.

Happy reading!

Warm Regards,  
John

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# NUTC NEWS

## MTI/MoDOT STRUCTURAL COLLABORATIVE RESEARCH UPDATE



In 2008, to address MoDOT's and the nation's needs in developing better, faster, and cheaper solutions for transportation structures with superior long-term performance, innovative construction technologies, and effective maintenance and preservation strategies, Missouri Department of Transportation (MoDOT), with administrative oversight from Missouri Transportation Institute (MTI), collaborated with University of Missouri (UM) Structures faculty to cooperatively conduct research on transportation structures.

In order to comprehensively and effectively complete work within these areas, research was divided into tasks and sub-tasks to be conducted by those researchers with the appropriate expertise.

### PROJECT 2C: ALTERNATIVE AND COST-EFFECTIVE BRIDGE APPROACH SLABS

The objectives of this project is to find cost-effective alternative solutions for bridge approach slabs that will be ready for field implementation at the completion of this project. The primary objectives of this task are to: 1) investigate and recommend alternative design solutions with the aim to reduce the cost of construction of a bridge approach slab and 2) develop remedial measures or alternative designs for a replacement.

It is clear that the problem of cracking and riding discomfort due to the "bump at the end of the bridge" stems largely from geotechnical considerations. In many instances compaction of soils under uncertain conditions when the bridge is being constructed may not be properly achieved. This study will be focused on cost-effective structural solutions, provided that differential settlements cannot be entirely mitigated by geotechnical solutions.

The anticipated results from this study can provide data that could potentially assist MoDOT engineers evaluate the performance of bridge approach slabs and the causes behind the bump'. The results will also provide MoDOT engineers with alternate structural solutions when a bridge approach slab is being considered.

To learn more about the scope of work and objectives for individual projects and the researchers involved, visit <http://utc.mst.edu/research/2007.html>.



## MTI/MoDOT GEOTECHNICAL TRANSPORTATION RESEARCH UPDATE



In 2008, in order to achieve significant and recurring cost savings for MoDOT (Missouri Department of Transportation) a collaborative project was undertaken by expert researchers within the University of Missouri (UM) system. The execution and completion of this program will address many of MoDOT's most pressing research needs while making notable improvements to the state of the art and practice of geotechnical engineering at a national and international level.

In order to comprehensively and effectively complete work within these areas, research was divided into tasks and sub-tasks to be conducted by those researchers with the appropriate expertise.

### TASK 3: QUANTIFYING RELATIONSHIPS BETWEEN COSTS AND RISKS

The objective of this project is to quantify the relationship(s) between costs and risks and identify optimum risk-cost balances and minimally accepted risks for bridge foundations and earth slopes to accurately reflect MoDOT priorities. Specifically, this task will establish generally accepted target risk levels for different limit states and structure types based on the costs and consequences involved.

This specific portion of the work focuses on analyses of appropriate target risk levels for bridge foundations and earth slopes in different conditions. Analyses will include economic and risk analyses to develop preliminary recommendations for target risk levels that achieve a balance between cost and risk. These recommendations will then be vetted among top level MoDOT leadership to invoke agency priorities. Following this vetting process, final target risk levels will be established and subsequently used in other portions of this work to develop design specifications that will achieve the target risk levels.

Fundamental analyses performed for this task to balance the target risk levels for different limit states and structures with the costs associated with reducing the target risk level will allow MoDOT to routinely make the most effective and reliable use of limited funds both possible and practical.

To learn more about the scope of work and objectives for individual projects and the researchers involved, visit <http://utc.mst.edu/research/2008.html>.



# NUTC NEWS

## KANDI (WIEBERG) SPRAGGS 2010 OUTSTANDING CTIS-NUTC STUDENT OF THE YEAR AWARD

**K**andi (Wieberg) Spraggs has been named Outstanding Missouri S&T UTC Student of the Year. The award was made based on her excellent academic performance, the technical merit of his research topic and her service to both Missouri S&T and the surrounding community.

**S**praggs earned a B.S. degree in Civil Engineering with Magna Cum Laude honors from the Missouri University of Science and Technology (Missouri S&T) in December 2008 and graduated from the Missouri University of Science and Technology (Missouri S&T) with her M.S. degree in Civil Engineering in August 2010.

**D**uring her undergraduate career, Spraggs was a member of the Missouri S&T chapters of the American Society of Civil Engineers (ASCE) and Chi Epsilon (the National Civil Engineering Honor Society). She was also highly involved as a varsity athlete (softball) where she served as

Team Captain, M-Club Vice-President, Academic All-American, 2nd Team All-American, President of the Student Athlete Advisory Committee, and Student Assistant Coach.

**A**s a graduate student, Spraggs was involved with the American Concrete Institute (ACI) and was awarded the Missouri S&T Woman Student of the Year Award in 2009.

**A**s a graduate student, Spraggs studied the causes of spalling in partial-depth precast prestressed concrete bridge decks using

non-destructive testing techniques. Her work advances the current state of knowledge on these bridge deck systems including field investigation techniques to evaluate bridge deck deterioration. This work has been sponsored by the Missouri Department of Transportation (MoDOT) and the CTIS-NUTC at Missouri S&T. During her graduate work, Spraggs has been advised by Dr. Lesley H. Sneed.

