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CONCRETE RESEARCH AT OSU MAKES BREAKTHROUGH

(STILLWATER, Okla., May 16, 2012) – Oklahoma State University has developed a concrete mixture that reduces the carbon footprint and costs, contributing to a \$16 million, 2.2 mile project near Fort Worth, Texas.

The mixture design developed by an OSU team headed by Tyler Ley, assistant professor of civil engineering, reduced the carbon footprint of the concrete by 25 percent and reduced cost by 10 percent, while providing a pavement with a longer life-expectancy and satisfactory strength.

This work was sponsored by the Federal Highway Administration with its Highways for Life program. Oklahoma State University was assisted by additional research teams at Texas A&M and Texas Tech, along with Texas DOT and Ed Bell, the general contractors, to showcase improvements in road construction and design.

Concrete is composed of rock, sand, cement, water, and other admixtures. This mixture is designed to use rocks of different sizes and shapes so that they pack tightly and dominate the volume of the mixture. The more rock used in a mixture, the less sand and cement is needed to fill the remaining volume. Cement is the most expensive ingredient in concrete, causes the most complications in the long-term performance, and is the biggest contributor to the carbon footprint. Therefore it is desirable to minimize the ratio of cement to the other ingredients.

The OSU mixture is called Optimized Graded Concrete. The concepts have been published for almost 100 years. However, the research team at OSU developed several new design techniques that have yielded even greater improvements in cement savings and produced practical concrete mixtures.

With a greater focus on cost, long term performance, and sustainability the use of optimized graded concrete has become more prevalent. Oklahoma has shown strong interest to adopt optimized graded concrete.

Ley's research group has received grants from the Oklahoma Department of Transportation, the Oklahoma Transportation Center, and the Concrete Pavement Center totaling over \$250,000 to study optimized graded concrete further.

The team hopes to implement this work in concrete pavements in 2013 and concrete bridges in 2014 for the state of Oklahoma.

Photo cutline - Placement of Optimized Graded Concrete Mix Design on a 2.2 mile Stretch of FM 1938 in Fort Worth, Texas

Oklahoma State University is a modern land-grant system of interdisciplinary programs that prepares students for success. OSU is America's Brightest Orange. Through leadership and service, OSU is preparing students for a bright future and building a brighter world for all. As Oklahoma's only university with a statewide presence, OSU improves the lives of people in Oklahoma, the nation and the world through integrated, high-quality teaching, research and outreach. OSU has more than 36,000 students across its five-campus system and more than 24,000 on its combined Stillwater and Tulsa campuses, with students from all 50 states and around 120 nations. Established in 1890, OSU has graduated more than 245,000 students to serve Oklahoma, the nation and the world.