Concrete Steps: LSU Professor Joins with Business for First U.S. Test of Pollution-Cleaning Pavement on Campus

LSU researcher Marwa Hassan has teamed up with CSG Pureti, a worldwide leader in sustainable surface treatments, to battle vehicular emissions in a novel way – by pulling them directly out of the air and into the very road you're driving on.

A close look at the spray applicators for the photocatalytic pavement cover being tested for the first time in the United States.

Hassan, together with CSG Pureti, laid the country's first air-purifying asphalt and concrete photocatalytic pavements on Dec. 22. The test area is a strip of Aster Street near the Kirby Smith parking lot. Measurements and samples have already been taken into the lab for evaluation – preliminary results should be complete soon.

The field study, which will last for one year, is funded through the Gulf Coast Research Center for Evacuation and Transportation Resiliency. Prior to the field installation, Hassan evaluated

photocatalytic technology in the laboratory through funding from the Louisiana Transportation Research Center, or LTRC, and the National Science Foundation. Nanoparticle release potential from the technology will be quantified with the help of TSI Incorporated, a global performance measurement company.

“This is the first photocatalytic pavement in the U.S. capable of purifying outdoor air from nitrous oxides, volatile organic compounds and sulfur dioxide resulting from traffic emissions,” said Hassan, assistant professor of construction management and industrial engineering. “Nitrous oxides are even worse for the environment than carbon dioxide, the gas most people are familiar with when it comes to factors in global climate change.”

Daniel Lunsford, LSU engineering undergraduate; Marwa Hassan, assistant professor of construction management and industrial engineering; Roy Hernandez, technician with LSU's College of Engineering; and Bill McKay of CSG Pureti.

Asphalt absorbs many types of chemicals and pollutants, storing then releasing them back into the environment, which can be severely detrimental to air quality. The photocatalytic pavement cover will absorb pollution such as nitrogen oxides released by traffic or even those already in the air. It can even clean the ambient environment as the exhaust exits a car’s tailpipe.

“The great thing about this self-cleaning product is that it can be used on all roads. So there’s the potential to improve air quality and lessen automobile pollution while minimizing the environmental impacts of the construction of new and existing roadways and buildings,” said Hassan. “We will be monitoring these new pathways to determine the rate of reduction in pollution levels over time, but past applications, such as that at Charles de Gaulle airport in Paris, have shown great success. In fact, it has even helped to keep their buildings cleaner.”

This application and fieldwork represents a big step in the move toward more efficient use of roadways and other commodities.

“I consider this study the first work needed to bring photocatalytic pavement technology to the field,” said Hassan. “During this period, we will monitor the environmental and structural performance of the pavement with the vision that all our roads will be photocatalytic capable of self-cleaning and air purifying.”