



SIUE Awarded \$462K from IDOT to Improve Scour Estimate Analyses for Bridge Stability

by Megan Wieser

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EDWARDSVILLE – Research shows that 60 percent of bridge failures in the United States are related to scour — the erosion of soil around the base of a bridge pier from the flow of water.

The Illinois Department of Transportation (IDOT) has awarded a \$462,500 grant to Southern Illinois University Edwardsville for a four-year research project that will analyze scour estimates at bridge sites in Illinois to produce findings that will lead to improvements related to bridge design and maintenance.

SIUE School of Engineering's (SOE) Abdolreza Osouli, PhD, PE, associate professor in the Department of Civil Engineering, is principal investigator on the project, entitled "Developing Scour-Depth Estimation Using the In Situ and Portable Scour Testing Device (ISTD/PSTD) for Illinois Cohesive Soils."

"Our primary goal is to improve the scour estimate analyses at bridge sites in Illinois," Osouli said. "Our work will improve stability of existing or new bridges, help Illinois taxpayers by saving costs of bridge design and maintenance due to an enhanced knowledge on scour estimates at sites with cohesive riverbed, and equip IDOT with state-of-the-art field equipment developed by the Federal Highway Administration (FHWA) in the field of scour measurement."

Project co-PIs include:

Brent Vaughn, laboratory specialist in the SOE Department of Civil Engineering
Paul Rydlund, PLS, CFM, chief, Surface Water Hydraulics and Modeling Section, United States Geological Survey in Rolla, Mo.

Timothy Straub, PhD, PE, supervisory hydrologist, Central Midwest Water Science Center, United States Geological Survey in Urbana

Richard Huizinga, PE, hydrologist, Central Midwest Water Science Center, United States Geological Survey, Rolla, Mo.

Timothy D. Stark, PhD, PE, professor in the Department of Civil and Environmental Engineering at the University of Illinois at Urbana-Champaign

"Our research team has extensive experience in the field of soil erosion and scour analysis," Osouli explained. "This project will use In Situ and Portable Scour Testing Devices (ISTD/PSTD) to extract better load versus erosion characteristics of the riverbed material. Our objective is to establish testing and hydraulic-analysis procedures with ISTD/PSTD data, and to improve reliability of the estimated scour depths in cohesive soils to design bridges more cost-effectively."

Funding also supports several SIUE master's and doctoral students to contribute as research assistants and gain hands-on field and lab experience.

During the award period, the research team will conduct a literature review, fabricate ISTD/PSTD, perform field testing at several bridge sites in Illinois, conduct laboratory experiments on collected samples, conduct 2D hydraulic modeling of the scour at several bridge sites, develop an enhanced scour analyses procedure using ISTD/PSTD field data, and in conclusion, prepare a comprehensive report of findings that IDOT can use for application to its current practices.

The SIUE School of Engineering is one of the largest engineering schools in the region. It offers comprehensive and affordable engineering programs with eight undergraduate degrees, five master's degrees and two cooperative doctoral programs. Students learn from expert faculty, perform cutting-edge research, and participate in intercollegiate design competitions. Companies in the metropolitan St. Louis area provide students challenging internships and co-op opportunities, which often turn into permanent employment. Students gain hands-on experience in the School's state-of-the-art facilities, including the new Fowler Student Design Center.

Photo: SIUE School of Engineering's (SOE) Abdolreza Osouli, PhD, PE, associate professor in the Department of Civil Engineering.