UTC Project Information	
Project Title	MPC-688 – Response of Bed Shear Stress in Open-Channel Flow to a Sudden Change in Bed Roughness
University	South Dakota State University
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Funding Source(s) and Amounts Provided (by each agency or organization)	USDOT, Office of the Assistant Secretary for Research and Technology $80,872 South Dakota State University $84,665
Total Project Cost	$165,537
Agency ID or Contract Number	69A3551747108
Start and End Dates	May 24, 2022 to July 31, 2023
Brief Description of Research Project	Sudden change in bed roughness can occur in many situations in open-channel flows including flow through culverts, flow around bridge piers and abutments, and overtopping of roadways in the floodplain, where bed materials can change abruptly from that of the original riverbed to riprap protection, and vice versa. A sudden change in bed roughness also occurs frequently in the laboratory when soil erosion is studied using a sediment recess in an open-channel flume or water tunnel. In all the above, the bed shear stress is a fundamental hydraulic parameter that must be determined accurately. The proposed research will investigate the evolution of fluid velocity profile and bed shear stress near bed roughness transitions. Velocity measurements will be obtained over smooth-to-rough and rough-to-smooth transitions in an open-channel flume using a Particle Image Velocimetry (PIV) system. The measured data will be used to evaluate different methods for determining the bed shear stress around roughness transition. Bed shear stress will be determined using the channel slope, from the measured velocity profile using the logarithmic law, from the measured Reynolds stress distribution, and from direct measurement of bed shear stress (on a smooth bed) using a hot-film anemometer.
Describe Implementation of Research Outcomes (or why not implemented) Place Any Photos Here	

Impacts/Benefits of Implementation (actual, not anticipated)	
Web Links • Reports • Project Website	