EVALUATION OF THE ACCURACY AND PRECISION OF THE MULTIANGLE SUBMERGED JET TEST DEVICE

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Abstract In some watersheds, excessive streambank erosion can contribute as much as 85% of the total stream sediment load. Quantification of this load is required for the development of Total Maximum Daily Loads (TMDLs) and sound watershed management strategies, as required by the U.S. Clean Water Act. The multiangle submerged jet test device (JTD) is a relatively simple, inexpensive technique for measuring soil critical shear stress (τ_c) and erodibility (k_d) *in situ*; however, field testing with the JTD indicates these parameters can vary over orders of magnitude at any given site. The goal of this study was to advance our understanding of the natural variability in τ_c and k_d by first examining the accuracy and precision of the JTD. Multiple remolded samples of two cohesive soils (clay loam and clay) were tested to determine τ_c and k_d using the JTD. Testing continued for each soil until the variance in test results did not change significantly with additional tests ($\alpha = 0.05$). In addition to determining the test precision, JTD results were compared to results from traditional flume studies. Preliminary study results indicate the standard deviation of τ_c is 0.16 Pa and 0.37 Pa for the clay loam and clay, respectively. Similarly, the standard deviation for k_d was 0.35 cm^3/N-s and 0.33 cm^3/N-s, respectively, for the clay loam and clay. The small variation in these two soil erosion parameters for uniform, remolded samples suggests the jet test is precise and the JTD can be a useful tool in erosion studies. These results also indicate the wide range in τ_c and k_d observed in the field are the result of the natural variability in soils and environmental conditions.