

## Observational Method for Estimating Future Scour Depth at Existing Bridges

A.V. Govindasamy<sup>1</sup>, J.-L. Briaud<sup>2</sup>, D. Kim<sup>3</sup>, F. Olivera<sup>4</sup>, P. Gardoni<sup>5</sup>, and J. Delphia<sup>6</sup>

<sup>1</sup>Staff Engineer, Geocomp Corporation, 125 Nagog Park, Acton, MA 01720  
PH (978) 621-8106; email: agovindasamy@geocomp.com

<sup>2</sup>Professor and Holder of the Buchanan Chair, Zachry Dept. Of Civil Engineering, Texas A&M University, College Station, TX 77840; PH (979) 845-3795; email: briaud@tamu.edu

<sup>3</sup>GIS Developer, Dewberry, 8401 Arlington Boulevard, Fairfax, VA 22031; PH (703) 206-0847; email: dokim@dewberry.com

<sup>4</sup>Associate Professor and Head of the Water Resources Division, Zachry Dept. Of Civil Engineering, Texas A&M University, College Station, Texas, 77840; PH (979) 845-1404; email: folivera@civil.tamu.edu

<sup>5</sup>Associate Professor, Zachry Dept. Of Civil Engineering, Texas A&M University, College Station, Texas, 77840; PH: (979) 845-4340; email: pgardoni@civil.tamu.edu

<sup>6</sup>Geotechnical Engineer, Texas Department of Transportation Bridge Division-Geotechnical Branch, Austin, Texas; PH: (512) 416-2359; email: jdelphi@dot.state.tx.us

### ABSTRACT

Bridge scour can cause damage to bridge foundations and abutments. Bridges with foundations that are unstable for calculated and/or observed scour conditions are termed scour critical bridges. There are approximately 17,000 scour critical bridges in the United States. This designation comes in part from the use of over-conservative methods that predict excessive scour depths in erosion resistant materials. Other methods capable of overcoming this over-conservatism are uneconomical because they require site-specific erosion testing. This paper proposes a new bridge scour assessment method. The new method, termed Bridge Scour Assessment 1 (BSA 1) is the first part of a three level bridge scour assessment procedure that was developed for the Texas Department of Transportation. It does not require site-specific erosion testing and eliminates the over-conservatism in current methods. BSA 1 uses charts that extrapolate or interpolate measured scour depths at the bridge to obtain the scour depth corresponding to a specified future flood event. The scour vulnerability depends on the comparison between the predicted and allowable scour depths. This paper also includes a new hydraulic-hydrologic analysis procedure for the determination of flow parameters required in the scour analysis. This procedure was developed for the State of Texas, and is economical and reasonably reliable from a hydrologic standpoint. This procedure is versatile as it can be applied to any region with sufficient flow gages. The 11 case histories used to validate BSA 1 showed good agreement between predicted and measured values. BSA 1 was then applied to 16 bridges where 6 out of 10 bridges classified as scour critical by current methods were found to be stable. These indicate that the method allows for more realistic evaluation of bridges for scour

Please click here for the full version of this document - redistribution is subject to ASCE license or copyright. <http://www.ascelibrary.org>