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BRIDGE PIER SCOUR: A REVIEW OF PROCESSES, MEASUREMENTS AND ESTIMATES

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Abstract

Scouring of piers and abutment has been recognized as the main cause of damage and failure of bridges over waterways. The scientific community has produced a number of studies addressing the complex characteristics of the scour process and has provided engineers with several techniques for the estimate of the maximum expected scour depth at a bridge site. Nevertheless, the prediction of scour depths is affected by many sources of uncertainty, such as observation uncertainty, parameter uncertainty, and structural uncertainty. Only a few studies have recently tried to estimate the uncertainty associated to the scour depth prediction.

This paper offers a broad review of the main aspects to be taken into account when analyzing bridge pier scour: 1) processes: to better understand the dynamics triggering pier scour, an analysis of the type of scour occurring at bridge piers, the most influencing factors, failure mechanisms and local pier scour dynamics is carried out; 2) measurements: one of the main difficulties faced in the real world practice is scour data collection; this session reviews the latest techniques available for the measurements of the scour depth at bridge piers; 3) estimates: this session critically reviews different approaches the scientific literature has offered for the estimate of the maximum local scour depth and discusses the difficulty to address uncertainty in the estimates. This review is meant to be a useful reference for scientists and technicians dealing with the bridge pier scour issue.

Key words: bridge failure, pier scour, scour dynamics, scour measurements, scour estimates

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