

Mitigation of Local Scour at Bridge Site using Sacrificial Piles

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ABSTRACT

Sacrificial piles can mitigate local scour created at bridge piers or abutments at the expense of losing sediment from their own sites. In previous studies, pile arrangements for scour mitigation have been investigated mainly by attempting to produce a hydraulic condition suitable to reduce the strength of horseshoe vortex or principal vortex. In the present study, a new approach has been adopted in which piles are arranged to reduce and guide the approach flow energy to trap sediment from the pile location into the scour hole at the pier or abutment, accompanied by a hydraulic condition that ensures this process to continue. Several pile arrangements are tested for their effectiveness in scour mitigation, and optimum pile arrangements that maximize scour mitigation at bridge piers and abutments have been sought for. The present approach has been found to be effective in mitigating local scour around bridge piers. For bridge abutments, a generalized effectiveness of this approach has not been found.

Key Words: Sacrificial piles, local scour, bridge pier, abutment
