

ABSTRACT

Four classes of variables are apparent in the problem of scour around bridge piers and abutments--geometry of piers and abutments, stream-flow characteristics, sediment characteristics, and geometry of site. The laboratory investigation, from its inception, has been divided into four phases based on these classes. In each phase the variables in three of the classes are held constant and those in the pertinent class are varied. To date, the first three phases have been studied.

Typical scour hole patterns related to the geometry of the pier or abutment have been found. For equilibrium conditions of scour with uniform sand, the velocity of flow and the sand size do not appear to have any measurable effects on the depth of scour. This result is especially encouraging in the search for correlation between model and prototype since it would indicate that, primarily, only the depth of flow might be involved in the scale effect. The technique of model testing has been simplified, therefore, because rate of sediment transportation does not need to be scaled. Prior to the establishment of equilibrium conditions, however, depths of scour in excess of those for equilibrium conditions have been found. A concept of active scour as an imbalance between sediment transport capacity and rate of sediment supply has been used to explain the laboratory observations.