

IDENTIFICATION OF SCOUR CRITICAL BRIDGES USING GEOPHYSICAL TECHNIQUES

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The Oregon Department of Transportation (ODOT) entered into an agreement with the U.S. Geological Survey (USGS), Water Resources Division, to evaluate geophysical methods of identifying scour critical conditions at bridge sites. ODOT personnel provided a preliminary list of possible bridge sites based upon the adequacy of scour histories. From this list, fourteen sites were selected for study. ODOT personnel took part in the on-site data gathering and observed demonstrations of geophysical test methods. Field operations were conducted during 1989.

Three geophysical methods -- ground-penetrating radar, high-frequency continuous seismic reflector (tuned transducer), and a color fathometer -- were used to examine 14 bridge sites in Oregon, to determine the usefulness of each method in locating and determining depth of infilled scour holes around bridge piers in Oregon streams. Each geophysical method was capable of detecting infilling around piers, but because of equipment limitations, not every method was effective at each site. The softer infilled material present at nearly all sites was probed by a metal rod to verify data collected by the geophysical equipment. Scour equations were marginally successful in predicting two existing scour holes that were identified as having been caused by a peak flow. Most study sites had local conditions, such as riprap, debris, or remnants of old coffer dams that invalidated the use of equations.

ODOT has determined that the geophysical methods demonstrated by the USGS office do not offer economical alternatives to present scour inspection techniques. Hand probing with a rod will continue to be an acceptable data gathering technique. Probing was used to gather data for interpreting the information obtained by the geophysical methods being demonstrated. Hand probing and the use of a black and white fathometer should adequately satisfy ODOT's bridge inspection needs.

Recently, the results of this study were published in a final report titled "Results of a Reconnaissance Bridge-Scour Study at Selected Sites in Oregon Using Surface-Geophysical Methods, 1989". To obtain a copy of this report, please contact:

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