

## Oral Presentation Abstract

**Title:** “Stream Stability at Highway Structures”: more than just a bridge engineers reference manual

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**ORGANIZED SESSION TITLE:** Where Rivers Meet Roads

**TOPIC:** Where Rivers Meet Roads

**ABSTRACT:** Bridge engineers must balance a wide suite of interests and needs at road stream crossings such as the safe transportation of goods and people, structure stability to river changes or seismic events, socioeconomically appropriate structure types and materials, the passage of flood water and debris, and the movement of aquatic and terrestrial wildlife. Aspects of design include how high, wide, deep, and long should the structure be? What are the greatest risks to bridge stability and safety? To help answer some of these vast and diverse questions, bridge engineers look to reliable and up-to-date technical resources. Two primary resources have recently been updated – HEC-20 and HEC-18 – and, because of changing needs, a new manual on hydraulic design has just been released as well.

In April 2012 the Fourth Edition of HEC-20, "Stream Stability at Highway Structures" was completed by FHWA and Ayres Associates. The primary purpose of HEC-20 is to provide guidance to bridge designers, owners, and inspectors on identifying stream instability problems at highway stream crossings. This significantly revised document includes policy and guidance on stream stability evaluations at bridges. New material is included on stream stability of cohesive boundary channels and gravel bed channels. Assessment of debris accumulation potential, channel migration and updated information on the rapid assessment of stream instability have also been included. Although HEC-20 is not specifically intended to provide guidance on channel restoration, there is expanded coverage of channel restoration concepts, including design considerations by the U.S. Army Corps of Engineers and Natural Channel Design procedures. Expanded discussions of sediment properties and sediment transport concepts have also been included.

The update of HEC-20 coincides with the update of HEC-18, “Evaluating Scour at Bridges,” and publication of a new FHWA manual HDS 7, “Hydraulic Design of Safe Bridges”. HEC-18 now includes alternative pier scour equations for piers in coarse, cohesive, or erodible rock materials, and scour caused by debris accumulations on piers. A new abutment scour procedure has been included that provides a total estimate of contraction plus local scour at an abutment. The update also includes contraction scour equations for pressure flow conditions and in cohesive or erodible rock materials. The HDS 7 manual provides detailed guidance on the use of one- and two-dimensional modeling as well as criteria for when to use two-dimensional modeling.

Even if you are not a bridge designer, these references provide useful information for anyone involved in a stream crossing-related project. The sections most relevant to river restoration will be highlighted in this presentation.

HEC-20, HEC-18, and HDS 7 can be downloaded from:

<http://www.fhwa.dot.gov/engineering/hydraulics/>