



U.S. Department
of Transportation

Federal Highway
Administration

Memorandum

Subject: **INFORMATION:** Guidance on Applying
Risk Based, Data Driven Decision-Making
Process to the FHWA Scour Program

Date: April 9, 2012

/s/ Original signed by

From: M. Myint Lwin, P.E., S.E.
Director, Office of Bridge Technology

In Reply Refer To:
HIBT-20

To: Directors of Field Services
Federal Lands Highway Division Engineers
Division Administrators

Purpose

In 2011, FHWA implemented a risk-based, data-driven (risk & data) National Bridge Inspection Program (NBIP) oversight process. Building on this process, this memorandum provides guidance on applying risk concepts and data utilization to develop strategies for conducting scour evaluations, addressing unknown foundations, developing Plans of Action (POA) and selecting reasonable and appropriate countermeasures for scour critical bridges and bridges with unknown foundations. Collectively, these activities are referred to as the FHWA Scour Program.

The Office of Bridge Technology and FHWA National Hydraulics Team will host a series of webinars in support of implementing and deploying risk & data strategies in the Scour Program. The first priority for the deployment effort will engage appropriate division office staff. Deployment to State DOTs and other bridge owners will follow in spring and summer of 2012.

Background and Discussion

The FHWA strives to enhance bridge safety while improving bridge owners' effective use of resources in managing those bridges needing scour evaluation, classified as having unknown foundations, or determined to be scour critical. The regulations found in 23 CFR 650 Subpart C "National Bridge Inspection Standards (NBIS)" require a POA for all scour critical bridges. In a January 9, 2008, Policy Memorandum, FHWA advised bridge owners that bridges with unknown foundations would be assumed to be scour critical after November 2010, and therefore also require a POA.

A quandary faced by bridge owners in effectively complying with FHWA's Scour Program is determining the appropriate prioritization and level of effort. The risk & data utilization strategy assists bridge owners in establishing a process in managing bridges with known or potential deficiencies attributed to scour and provides the bridge owner a

systematic means to prioritize and apply resources towards those bridges that could pose the greatest threat to public safety and/or disruption of vital services. The bridge owner may compare bridge importance and likelihood/consequence of failure (risk) against a suite of operational characteristics specific to the facility (data).

Characteristics for prioritization may include, but not be limited to, functional classification, average daily traffic, emergency service needs, community connectivity, or evacuation and recovery needs. The bridge owner may incorporate capital expenditure factors such as scour countermeasure cost compared to cost of structure replacement. Additional factors may include remaining life expectancy or a funded replacement schedule.

Applying Risk & Data Strategies to Elements of the Scour Program

Scour Evaluation Element: A risk & data strategy facilitates both the priority and level of analysis required for those bridges that have not yet received a scour evaluation. Clearly, the highest priority would be to ensure that all bridges on the Interstate system meet this basic Scour Program requirement. Additionally, FHWA would expect application of hydraulic modeling (as described in HEC-18 and HEC-20) to these Interstate bridges to estimate scour depths and determine bridge and substructure scour impact. However, at a small local bridge, with low ADT (and not considered to be a critical route) may only necessitate stream stability and assessment approaches (as described in HEC-20) to evaluate scour.

Scour Critical Element: All scour critical bridges shall have a POA until such time that the bridge can be recoded as not scour critical. The POA should develop and implement one (or more) of three categories of scour countermeasures; monitoring, hydraulic, and structural. The risk & data strategy can be applied to developing an appropriate POA. Bridges with greatest risk may warrant installation of structural or hydraulic countermeasures or even replacement. The POA identifies specific criteria and deadlines for implementation of structural or hydraulic countermeasures. Bridges that present lesser risk may be considered candidates for a POA with a monitoring countermeasure component. (Note that bridges with monitoring countermeasures remain scour critical). The monitoring based POA should include information with regards to physical site identification, hydrologic and hydraulic characteristics, persons responsible for decision making and communication, trigger mechanisms for closure to traffic, detour routes, etc.

Unknown Foundation Element: A bridge identified as having unknown foundation in Item 113 of the NBI would incorporate a risk or consequence of failure determination to establish need for further investigation in identifying actual foundation conditions. Risk & data strategies would be used to identify those bridges having sufficiently high risk that would then be candidates for Non-Destructive Test (NDT) evaluation or possible replacement. A bridge having unknown foundation and low level risk may have the required POA consist of a monitoring scour countermeasure.

Summary

Under the NBIP oversight process, any plan of corrective action relative to the Scour Program should look for opportunities to apply risk & data strategies. The NBIP oversight process has considered past scour related information, schedules, and other data (e.g., schedule dates for evaluating scour critical bridge's, development of POA's and

implementation of POA's) previously housed in earlier data bases (i.e., B-Simple and Attachment C). This memorandum rescinds requirements of reporting and maintaining data in those older data bases. The NBIP metrics reviews and resulting plans of corrective actions (PCAs) will be used for determination of compliance.

Please direct any questions to Dave Henderson (dave.henderson@dot.gov), (202) 493-0520, or Joe Krolak (joe.krolak@dot.gov), (202) 366-4611.