

National Bridge Scour Evaluation Program

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Conference

By:

Jorge E. Pagán-Ortiz, FHWA Senior Hydraulics Engineer

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Why Do We Need It?

Because it is a widespread problem!!!

☞ 484,272 bridges over water

Status of Program

- 484,272 Bridges Over Water (As of 11/15/02)
 - 342,515 (70.8%) Low Risk
 - 26,186 (4.3%) Scour Susceptible
 - 89,323 (18.5%) Unknown Foundations and Tidal
 - 26,248 (5.4%) Scour Critical
- Database posted at: www.fhwa.dot.gov/bridge/hyd.htm

Scour Database

- Database continues to be updated twice a year using Item 113 of the FHWA's Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges

HECs-18 and 20

➤ Updated in 2001

- New technology from scanning tours implemented
- HEC-18 reorganized
- NHI Courses 135046 and 135047 updated in 2002

HEC-23

Updated in 2001

- Primary publication on countermeasures
- NHI 135048 updated in 2002

Revisions to Items 60 & 113

- Implemented by FHWA's April 27, 2001, Memorandum (Mr. James D. Cooper)
 - posted at: www.fhwa/dot.gov/bridge/memos.htm
- Coordinated with National Bridge Inventory Steering Committee
- Revisions won't affect scour database

Goal

- Provide new guidance for coding bridges over waterways for:
 - Observed and assessed scour condition
 - Scour and stream instability countermeasures

Objectives

- Make coding of Items 60 and 113 consistent when a rating of 2 or below is determined for Item 113.
- Expand description of Item 113 codes 1, 2, 3, 4, 5, 7, 8, T and U.

Objectives (Continuation)

- Encourage bridge owners to develop a plan of action for:
 - Scour critical bridges
 - Bridges coded “7” and “U”
 - Improve communication between the engineer and inspector

Highlights of Changes to Item 60

- Description changed to emphasize that rating factor given to Item 60 should be **consistent** with the one given to Item 113 when:
 - Rating factor of 2 or below is determined for Item 113

Highlights of Changes to Item 113

- Description changed to emphasize that:
 - Rating factor of 2 or below requires revising Item 60 and other affected items (load ratings and superstructure rating).
 - Plan of action should be developed for each scour critical bridge.
 - Coding is based on an engineering evaluation, which includes consultation of NBIS field inspection findings.

Plan of Action (POA) for Scour Critical Bridges

Should be Developed for Each Existing Bridge Found to be Scour Critical

- Per FHWA guidance contained in Technical Advisory T 5140.23, “Evaluating Scour at Bridges” dated October 28, 1991.
- Provide guidance for Inspectors and Engineers that can be implemented before, during, and after flood events to protect the traveling public.

Elements of the POA

- Management Strategies
- Inspection Strategies
- Closure Instructions
- Countermeasure Alternatives and Schedule
- Other Information

Management Strategies

- Location of Bridge
- Bridge Identification
- Type of Foundation and Foundation Material
- Source of Scour Critical Rating
- Importance of Roadway to the Transportation Network
- Programmed for Replacement (may suggest a risk-based analysis)

Inspection Strategies

☞ Type and Frequency of Inspection

- Normal frequency is 2 years
- 5 years for general underwater inspection

☞ Need for continuous Monitoring

- When to start and when to stop?

☞ What Constitutes a Scour Critical Condition?

☞ Instructions for Action when Critical Condition is Reached

Closure Instructions

- Can be Load Restrictions, Lane Closure or Complete Bridge Closure
- Criteria for Closure should be Established by Scour Team based on one or more of:
 - Observed scour, movement of riprap, monitoring bed movement, water level, discharge, rainfall, flood forecasting, debris build-ups
- Identify Authority for Closing and Reopening a Bridge
 - Communication and coordination

Countermeasure Alternatives

- Alternatives Considered
 - More intense monitoring can be one of the alternatives
- Preferred Alternative
- Engineering Feasibility
- Schedule for Timely Design and Construction

Other Information

- Author and sign-off on POA
- Media Alert Instructions
- Sources of Emergency Repair Riprap
- Detour Instructions

Generic POA

- **Bridge Identification:** _____; **Location of Bridge:** _____; **Year Built:** _____; **Replacement Plans (if scheduled):** _____
Foundation Type: _____ **Foundation Soils Types:** _____
- **ADT:** _____; **Service to Emergency Facilities or Evacuation (Y/N):** _____
- **Sources of scour critical rating (Assessment, Analysis, and/or Observation):** _____
- **Comments about rating (e.g., analysis did not account for erosion resistant material; emergency riprap placed after last flood, etc.):** _____
- **Inspection and Monitoring:**
 - **Increase inspection frequency:** _____
 - **Types (Probing, diving, inspection of banklines):** _____
 - **Special Inspection Criteria (after bankfull events, during major events):** _____
- **Monitoring Type (Fixed instrumentation, Portable instrumentation):** _____
- **Criteria for monitoring:** _____
- **Closure Plans (Limit loads; Lane closure; Full closure):** _____
- **Criteria for Closure (Discharge; Floodwater Elevation; Flood Forecast; Scour Soundings):** _____
- **Authorization for Closure (Bridge Maintenance engineer; Inspector; Police; Statewide Bridge Closure Procedure):** _____
- **Detour Route:** _____
- **Criteria for reopening bridge:** _____
- **Countermeasures considered:** (1) _____ ; **Cost:** \$ _____
(2) _____ ; **Cost:** \$ _____
(3) _____ ; **Cost:** \$ _____
- **Countermeasure Recommended:** _____ ; **Status:** _____
- **Author(s) of POA:** _____ ; **Date:** _____
- **Concurrences on POA:** _____, _____, _____

Summary

93.2 % of Bridge Scour Evaluations Completed

- Database will continue to be updated twice a year

5.4 % of Bridges Identified as Scour Critical

- POA should be developed for scour critical bridges
- Only a few DOTs have developed their own POA
- DOTs should consider developing a POA for bridges with unknown foundations

FHWA plans to disseminate its Generic POA to DOTs through its Field Offices in Spring '03

Questions?

e-mail: jorge.pagan@fhwa.dot.gov

phone: (202) 366-4604

