



BRIDGE ADVISORY
Construction & Technology Division
Bridge Operations Section

BRIDGE ADVISORY NUMBER: BA-2008-04

DATE: September 4, 2008

SUBJECT: Letter to Local Agencies - National Bridge Inspection Standards (NBIS) Scour Evaluations and Plans of Action for Scour Critical Bridges

ISSUED BY: David A. Juntunen, Bridge Operations Engineer

Contact Information: David Juntunen, Bridge Operations Engineer, 517-322-5688 or juntunend@michigan.gov

This bridge advisory is being issued to catalog and store the July 17, 2008, letter that was mailed to local agency bridge owners having structures in the bridge data base that are identified as either needing to be evaluated for scour, or that have been previously identified as being scour critical and needing a Plan of Action (POA). For these agencies, this advisory does not contain any additional action items.

This bridge advisory is also being issued to request all bridge owners to review their bridge files to determine if their bridges crossing rivers or streams are coded correctly for Federal Item 113 (Scour Critical Structures). If it is determined that a bridge needs to be evaluated for scour, or that it is scour critical, the instructions in the letter need to be followed.

Attachment: July 17, 2008, letter to Local Agency Bridge Owners, titled National Bridge Inspection Standards (NBIS) Scour Evaluations and Plan of Action for Scour Critical Bridges.



JENNIFER M. GRANHOLM
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF TRANSPORTATION
LANSING

KIRK T. STEUDLE
DIRECTOR

July 17, 2008

TO: Local Agency Bridge Owner

National Bridge Inspection Standards (NBIS) Scour Evaluations and Plan of Action for Scour Critical Bridges

In reference to Bridges crossing over streams or rivers, the National Bridge Inspection Standards (NBIS) defines scour as "Erosion of streambed or bank material due to flowing water; often considered as being localized around piers and abutments of bridges." It also defines a scour critical bridge as, "a bridge with a foundation element that has been determined to be unstable for the observed or evaluated scour condition."

On February 14, 2008, the Michigan Department of Transportation (MDOT) received a letter (enclosed) from James J. Steele, the Federal Highway Administration's (FHWA) Michigan Division Administrator, notifying us that Michigan is in non-compliance with the requirements of 23 CFR 650.313(e) and 23 CFR 650.313(e)(3). These sections pertain to the requirement that state highway bridge owners must "identify bridges that are scour critical," and for bridges that have been identified as being scour critical, the bridge owner must "prepare a plan of action to monitor known and potential deficiencies and to address critical findings."

The FHWA letter also included a memorandum from FHWA Washington Headquarters providing additional information and the national disposition on adherence to the scour requirements (see January 4, 2008, FHWA Memorandum, enclosed). The FHWA has asked that MDOT develop a schedule for completing the scour evaluations of all highway bridges over waterways within the state. MDOT has reached an agreement with the FHWA on target dates by which all bridge owners must complete their scour evaluations. The dates are; by December 31, 2009, all bridge owners must complete scour evaluations for their highway bridges over streams or rivers, and by December 31, 2010, all bridge owners must develop and implement Plans of Action (POAs) for their bridges identified as being scour critical (see March 20, 2008, letter, MDOT to FHWA). MDOT has communicated these requirements and target dates to the County Road Association of Michigan (CRAM) and the Michigan Municipalities League (MML) (see March 12 letter, MDOT to CRAM and MML, enclosed).

Through review of Michigan's bridge data base, we have identified your agency as having one or more bridges that need to be evaluated for scour, or you may have one or more bridges that have been previously identified as being scour critical and needing a POA.

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You can access Michigan's bridge database and review a report showing your bridges with scour needs through MDOT's Michigan Bridge Reporting System. MBRS can be found by going to MDOT's website at <http://www.michigan.gov/mdot>. Select "doing business" from the left hand menu, then select "Bridge Operations", then select "Bridge Management", then select "Michigan Bridge Reporting System." You will be asked for your user ID and password. Note: your user ID and password for MBRS is the same one used for the Michigan Bridge Inspection System (MBIS). If you do not have a users ID and password, please call Ron Hafner, Michigan Department of Transportation, Bridge Management Unit, Phone 517-322-6058.

Once in MBRS select "Scour Critical Structures" from the left hand menu. To see your bridges needing to be evaluated for scour, select "Not Yet Evaluated (Item 113 = 6)" from the drop down list for Display Criteria. To see your bridges that are currently listed as scour critical and needing POA's, select "Scour Critical (Item 113 = 0-3)" from the drop down list.

The MBRS report is created using Structural Inventory and Appraisal (S I & A) Item 113 of the FHWA's Recording and Coding Guide for Structure Inventory and Appraisal of the Nation's Bridges (Report No. FHWA-PD-96-001). The coding guide can be found at the following website:

<http://www.fhwa.dot.gov/BRIDGE/mtguide.pdf>

For each bridge listed in the MBRS report, one of the actions below must be taken:

- 1. Review all your bridges needing scour evaluations and/or action plans and send a letter back to MDOT stating your ability to meet the target dates shown above. If you cannot meet these deadlines, indicate the reason why, and provide an alternate date when you can meet the requirements. MDOT will review any requested extensions in cooperation with the FHWA. Please complete this review and respond by August 30, 2008.**

Please send your response to:

David Juntunen
Bridge Operations Engineer
P.O.Box 30050
Lansing, Michigan 48929

- 2. For all bridges with Item 113 coded 6, evaluate the bridge for scour and update Structural Inventory and Appraisal (SI&A) Item 113 appropriately. Please complete this by the agreed upon target dates.**

MDOT provides guidance for performing scour evaluations in the MDOT Drainage Manual, Appendix 6D. The Drainage Manual can be found on MDOT's website at the following address:

<http://www.michigan.gov/stornwatermgmt/0,1607,7-205--93193--,00.html>

Performing a level 2 scour evaluation can be an extensive and costly activity. It can take considerable time and effort to do the needed preliminary investigation, stream survey,

preparing a hydraulic analysis, geotechnical review, and finally complete the scour calculations. This procedure is well defined and certainly suitable for bridges on the National Highway System (NHS), but determining the appropriate level of effort that should be done on non-NHS bridges on low volume routes is much less clear and is subject to the discretion of the bridge owner within the confines of federal regulations. A bridge owner needs to compare the expense of doing a level 2 analysis to the cost and resources needed to monitor the bridge during a flood event, or compare to the cost of mitigation (example – placing rip-rap). Note: Rip-rap designed for the 100 year flood is considered an acceptable scour countermeasure in most instances, but it must be inspected periodically and after flood events to confirm that it is placed properly and it continues to function as designed, however, to appropriately design rip-rap for a 100 year flood event, you will need to complete a large portion of the level 2 analysis.

MDOT has found that when a bridge has a pier or abutment founded on spread footings in the riverbed, a level 2 analysis most often will conclude that the structure is scour critical. The level 2 analysis will show the estimated depth of a scour hole that could develop over a range of flows including a 100-year and 500-year flood event, associated stream velocities, and surface water elevations, which can be used in the development of the POA.

It may be more cost effective for an agency to categorize a bridge as being scour critical using engineering judgment rather than completing a level 2 analysis. In this case, Item 113 would be coded as 3. If a level 2 analysis is not performed, a more conservative monitoring plan may be needed in the POA. For example, monitoring, or closing the structure to traffic may have to be determined by precipitation amount rather than river flow.

- 3. For all bridges currently coded scour critical (Item 113 coded 0, 1, 2, or 3), and bridges that will be coded scour critical after they has been evaluated for scour, develop a POA. Please complete this by the agreed upon target dates.**

MDOT is developing a POA form and process to be used by all Michigan bridge owners to manage their scour critical bridges, both during a flood event and for asset management. This summer, the POA form will be added to the internet based Michigan Bridge Inspection System (MBIS).

- 4. If Item 113 has been coded in error for a particular bridge, please correct the coding and notify MDOT's Bridge Management Unit of the update.**

Failure to complete these requirements may result in MDOT holding your agency in non-compliance and withholding federal funds.

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If you have any questions regarding these requirements, please contact me at 517-322-5688 or e-mail: juntunend@michigan.gov.

For bridge data base coding issues, please contact Robert Kelley at 517-322-1398 or e-mail: kelleyr@michigan.gov.

For MBRS ID and password questions, please contact Ron Hafner at 517-322-6058 or email hafnerr@michigan.gov.

If you questions regarding how to perform scour evaluations, please contact Kristin Shuster at 517-335-1919 or e-mail schusterk@michigan.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "David Juntunen". The signature is fluid and cursive, with a long horizontal flourish extending to the right.

David Juntunen, P.E.

Engineer of Bridge Operations