



U.S. Department
of Transportation

Federal Highway
Administration

Memorandum

Subject: **ACTION**: Inspection Finding Follow-up Actions for
Uncoated Weathering Steel Bridges

Date: July 19, 2023

From: Joseph L. Hartmann, Ph.D., P.E.
Director, Office of Bridges and Structures

In Reply Refer To:
HIBS-1

To: Division Administrators
Directors of Field Services

The purpose of this memorandum is to provide direction regarding the in-service inspection, inventory, and evaluation of bridges and bridge components fabricated from uncoated weathering steel.

Constructed between 1972 and 1973, the Forbes Avenue Bridge over Fern Hollow in Pittsburgh, Pennsylvania, suffered a complete structural collapse on January 28, 2022. The Fern Hollow Bridge was a 442'-8" long rigid frame bridge consisting of three spans (138'-4" – 166'-0" – 138'-4") and fabricated from uncoated weathering steel. Investigation of the collapse by the National Transportation Safety Board (NTSB) is ongoing and **the probable cause of the failure has yet to be determined.**

On May 18, 2023, the NTSB issued an interim report and recommendation related to the Fern Hollow Bridge collapse titled "Improving the Identification, Prioritization, and Completion of Follow-up Actions on Bridges with Uncoated Weathering Steel Components" (NTSB/HIR-23-07). That report detailed three findings related to the condition of the legs of the Fern Hollow Bridge rigid frames, incomplete maintenance items on the Fern Hollow Bridge and other bridges in Pennsylvania, and the potential for corrosion and deterioration of uncoated weathering steel bridges associated with a lack of maintenance. The report made the following recommendation to the Federal Highway Administration (FHWA):

Develop a risk-based, data-driven process and encourage its use by state Departments of Transportation, as well as highway-bridge-owning federal agencies and tribal governments, to help them identify, prioritize, and perform follow-up actions documented in inspections of bridges with uncoated weathering steel components. (H-23-13)

In 1989, FHWA issued [Technical Advisory 5140.22](#) "Uncoated Weathering Steel in Structures" (TA5140.22) that provides guidelines for the proper application of uncoated weathering steel (UWS) and recommendations for maintenance to ensure continued successful performance of UWS bridges. The Fern Hollow Bridge was not located in a marine, high rainfall and humidity, or industrial environment where TA5140.22 recommended that owners exercise caution in using UWS. However, being constructed prior to the technical advisory, the bridge did incorporate deleterious design details, such as deck drainage that allowed runoff to flow onto to the legs and numerous debris traps,

that TA5140.22 later recommended that bridge owners avoid in order to eliminate conditions where excessive oxidation could occur in UWS bridge components and where corrosion could occur in both uncoated and coated steel. Lastly, regardless of the environmental and detailing considerations made in the design and fabrication of a UWS bridge, TA5140.22 urges owners to implement routine inspection and maintenance actions to ensure that UWS bridges remain safe and serviceable. The NTSB interim report noted that maintenance actions identified in inspection reports for the Fern Hollow Bridge during an 11-year period leading up to the collapse were not performed.

Four vehicle occupants were injured, two seriously, in the Fern Hollow Bridge collapse, and a National Highway System route was placed out of service for 11 months. As a result, to best ensure a similar event does not again occur elsewhere, pursuant to 23 CFR 650.313 and 650.315, the State DOTs shall take the following actions:

1. Identify all bridges in their inventory, regardless of ownership, with uncoated weathering steel components in the primary load path.
2. Categorize the identified bridges with uncoated weathering steel components into the following groups:
 - a. Group 1, including:
 - i. Bridges with uncoated weathering steel components in the substructure, or that are a rigid frame, and have a condition rating of 4 or less for the component (superstructure or substructure) containing the uncoated weathering steel element(s); and
 - ii. Bridges with uncoated weathering steel nonredundant steel tension members in the superstructure that have a superstructure condition rating of 4 or less; and
 - iii. Bridges on the National Highway System with any uncoated weathering steel National Bridge Element (except bridge railings) with quantities in Condition State 4.
 - b. Group 2: All bridges with uncoated weathering steel components not categorized into Group 1.
3. By October 31, 2023, report the National Bridge Inventory structure numbers of all bridges in Group 1 to FHWA.
4. By December 31, 2024, for each bridge in Group 1, perform the following actions:
 - a. Review inspection and maintenance records to confirm that bridge inspector-recommended or otherwise recommended work items have been completed that address deficiencies resulting from poor performance of uncoated weathering steel, and that the current load rating for the bridge adequately and appropriately considers the documented deterioration and any completed work.
 - b. Where completion of the recommended work items can be confirmed, but the load rating for the bridge does not adequately and appropriately consider the documented deterioration and completed work, update the load rating accordingly.
 - c. Where completion of the recommended work items has not occurred or cannot be confirmed:
 - i. Review the inspection records for the bridge to ensure that all deterioration of the uncoated weathering steel is documented in sufficient detail to support a

- load rating, and that the current load rating for the bridge adequately and appropriately considers the documented deterioration.
 - ii. Where the deterioration is sufficiently documented but the load rating for the bridge does not adequately and appropriately consider the documented deterioration, update the load rating accordingly.
 - iii. Where the inspection records do not show sufficient documentation, conduct an additional one-time special inspection to document the severity and extent of the deterioration, and update the load rating considering the documented deterioration.
 - d. Work with their FHWA Division Office to update the inventory data reported in paragraph 3 on a quarterly basis until all follow-up actions and documentation are completed, to include:
 - i. If completion of the work has been confirmed, the month and year when the bridge inspector-recommended or otherwise recommended work items addressing deficiencies resulting from poor uncoated weathering steel performance were completed in accordance with paragraph 4.a,
 - ii. If completion of the work has not been confirmed, the month and year when the extent of deterioration was documented in accordance with paragraph 4.c.
 - iii. The month and year when the bridge load rating was updated considering the severity and extent of the documented deterioration and any completed work.
5. For each bridge in Group 2:
- a. During the next scheduled inspection, confirm that all preventative maintenance or preservation activities necessary to ensure the satisfactory performance of the uncoated weathering steel, as described in Technical Advisory 5140.22, are identified and communicated to the appropriate authority.
 - b. Notify FHWA when this task is complete for all bridges in Group 2.

Attachment A includes a flow chart of the above requirements.

Please convey the important requirements of this memorandum to your respective State DOT to ensure they take the actions listed by the required deadlines. These actions are critical to maintaining safety and serviceability of bridges for the traveling public.

Should you or your staff have any questions, please contact Derek Soden at (202) 493-0341 or derek.soden@dot.gov, or Samantha Lubkin at (202) 366-1575 or samantha.lubkin@dot.gov.

Attachment

cc:

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Directors of Field Services

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HIBS-10

HIBS-30

HIBS-40

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Attachment A Process Flow Chart

