



Uncoated Weathering Steel Components

July 19, 2023 FHWA Memorandum



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Disclaimer



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Non-Binding Contents

Except for the statutes and regulations cited, the contents of this presentation do not have the force and effect of law and are not meant to bind the States or the public in any way. This presentation is intended only to provide information regarding existing requirements under the law or agency policies.

Unless otherwise noted, images in this presentation are sourced from FHWA.



Fern Hollow Bridge Collapse

- January 28, 2022
- Pittsburgh, Pennsylvania
 - Forbes Avenue over Nine Mile Run in Frick Park
- 6 minor injuries
- 3-span rigid (K) frame 442'-8" in length
 - Constructed 1972-1973
- Fracture Critical (NSTM) Bridge
- Poor Condition (annual inspections)
- Posted at 26 tons



NTSB Recommendation to FHWA



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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)



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Fern Hollow Bridge Collapse

NTSB Interim Report (May 18, 2023) Findings

1. The legs of the Fern Hollow Bridge experienced significant deterioration and section loss that were documented in inspection reports. The **deterioration and section loss resulted from the continual accumulation of water and debris**, which prevented the development of the protective patina that would resist such corrosion on uncoated weathering steel.
2. The limited examinations of other Pennsylvania bridges revealed that the problem of incomplete maintenance—**where maintenance was identified as needed in inspection reports but not completed**—was not unique to the Fern Hollow Bridge.
3. Because of the potential for corrosion and deterioration associated with lack of proper maintenance, **it is critical that bridge owners nationwide ensure that follow-up actions addressing the accumulation of water and debris on bridges** with weathering steel components have been completed.

Report does not include a determination of probable cause.

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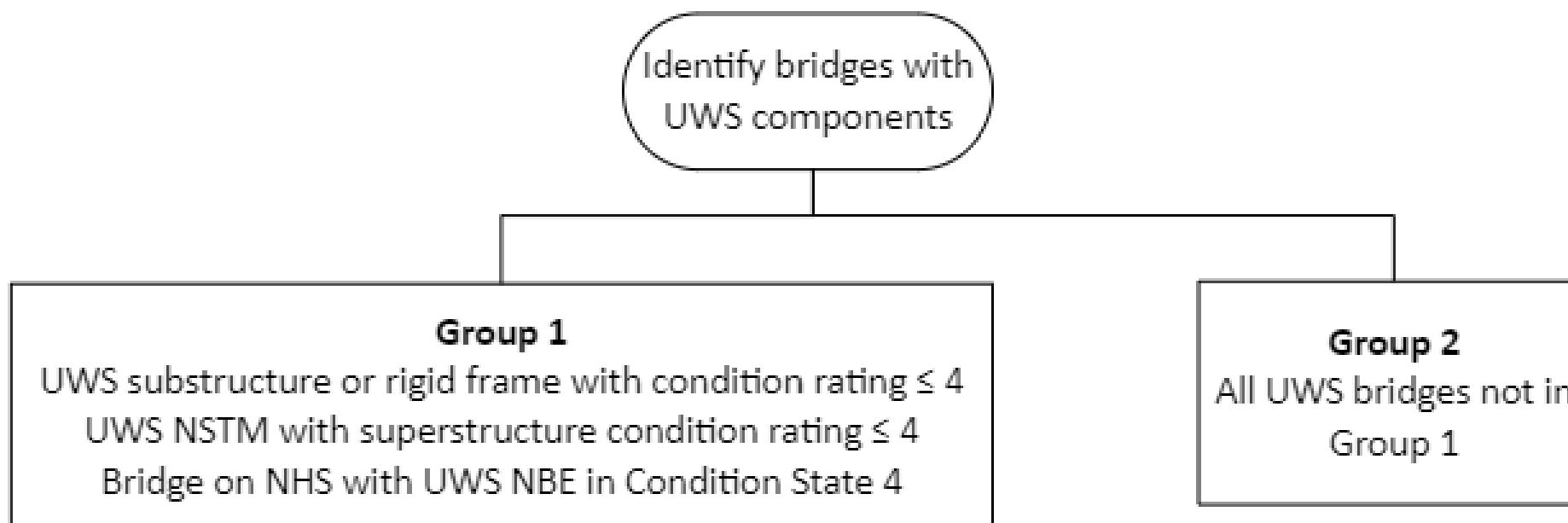
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- https://www.fhwa.dot.gov/bridge/inspection/Memo_July2023_UWS.cfm
- Background
 - Fern Hollow Bridge collapse
 - NTSB Interim report and recommendation
 - FHWA Technical Advisory 5140.22 (1989)
 - Application of UWS - Bridge location
 - Application of UWS - Design details
 - Inspection and maintenance
- Required actions for DOTs under 23 CFR 650.313 and 650.315

Risk Groups



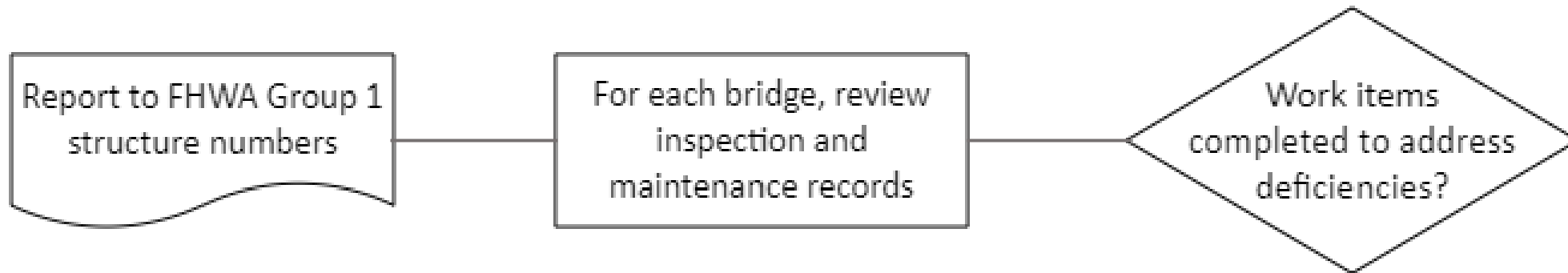
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Group 1 Bridges



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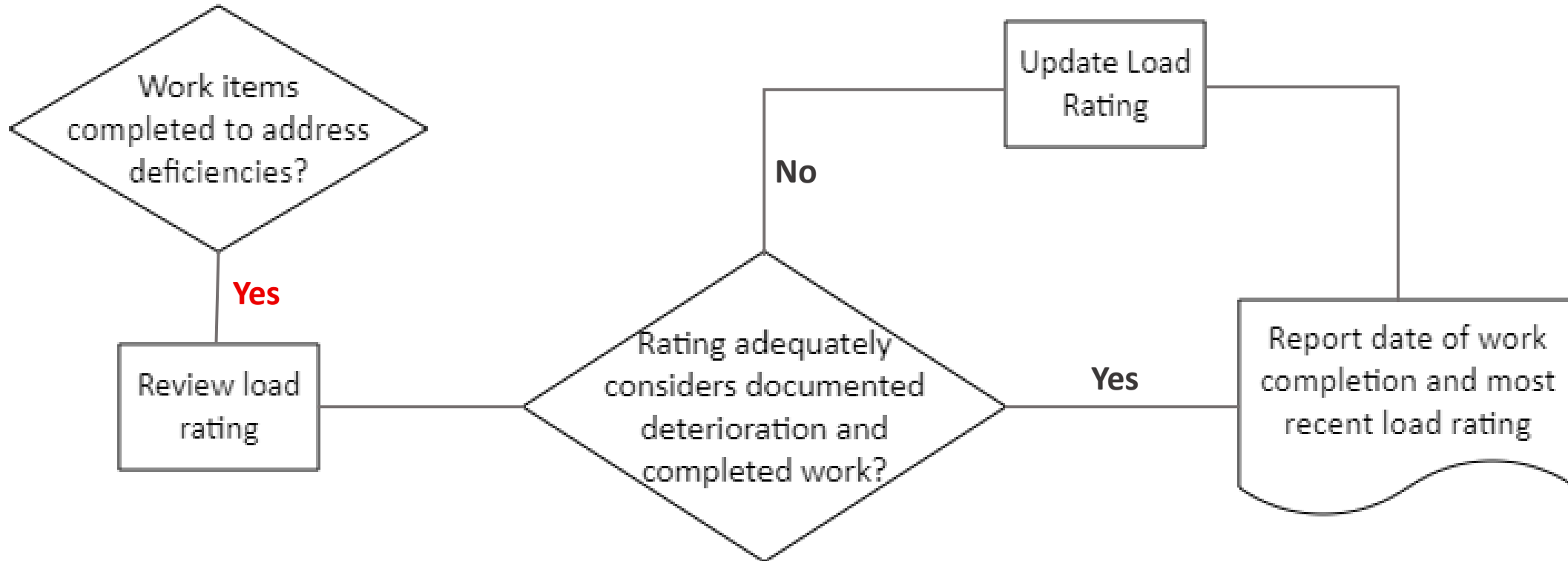


Group 1 Bridges

- With Findings Addressed



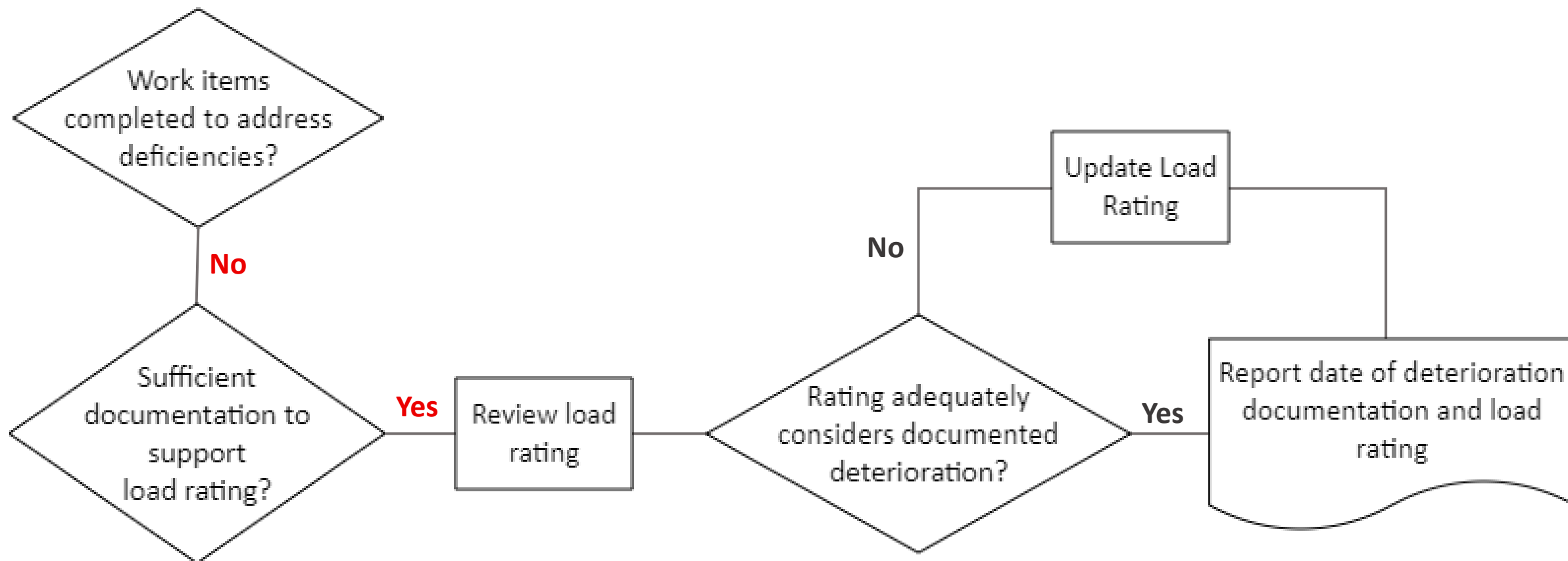
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Group 1 Bridges

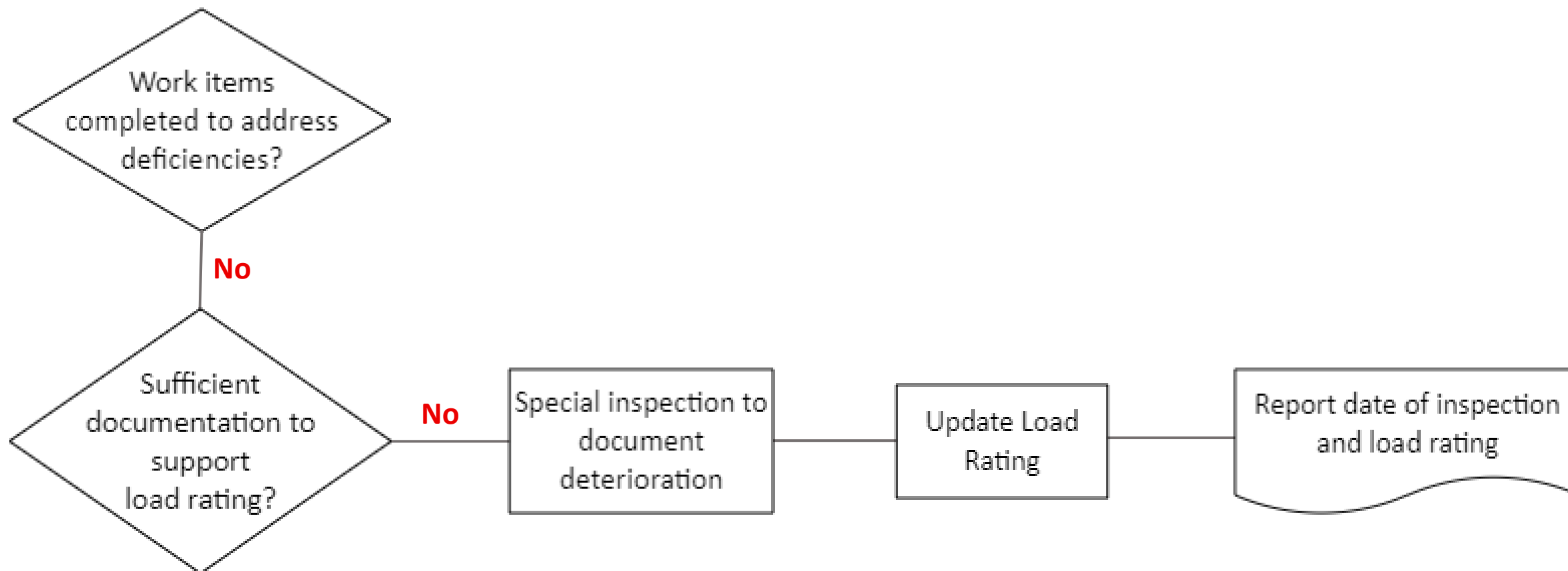
- Without Findings Addressed, AND
- With Sufficient Information to Support Load Rating





Group 1 Bridges

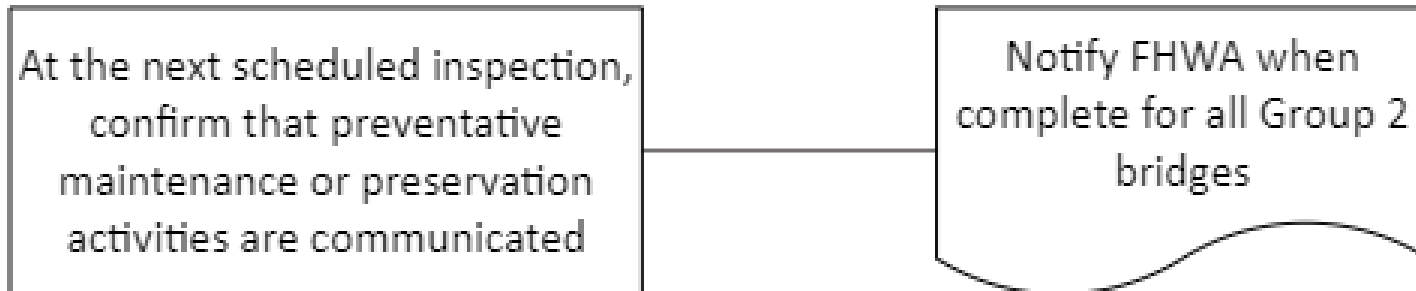
- Without Findings Addressed, AND
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Group 2 Bridges



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Key Dates and Reporting

- October 31, 2023
 - Report Group 1 NBI Structure Numbers to FHWA
 - Item 8 (Coding Guide), Item B.ID.01 (SNBI)
- December 31, 2024
 - Report the completion of follow-up actions for Group 1 bridges to FHWA
 - Date of work completion, OR
 - Date of deterioration documentation, OR
 - Date of special inspection, AND
 - Date of most recent load rating
- Report data to FHWA Division Office Bridge Engineer

UWS Data - NBI

- No NBI (Coding Guide) Item
- SNBI Item(s)
 - B.SP.07 – Span Protective System
 - B.SP.11 – Deck Protective System
 - B.SB.05 – Substructure Protective System
 - B.SB.07 – Foundation Protective System



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Specifications for the National Bridge Inventory



Office of Bridges and Structures

Publication No. FHWA-HIF-22-017

March 2022



UWS Data – Other Sources

- State BMS data items
- FHWA [InfoBridge](#)
 - Special Projects → UWS
 - Data source – 2014 LTBP Program Study¹
 - Survey, not inventory, data
 - Bridge numbers are linked in InfoBridge to current inventory data

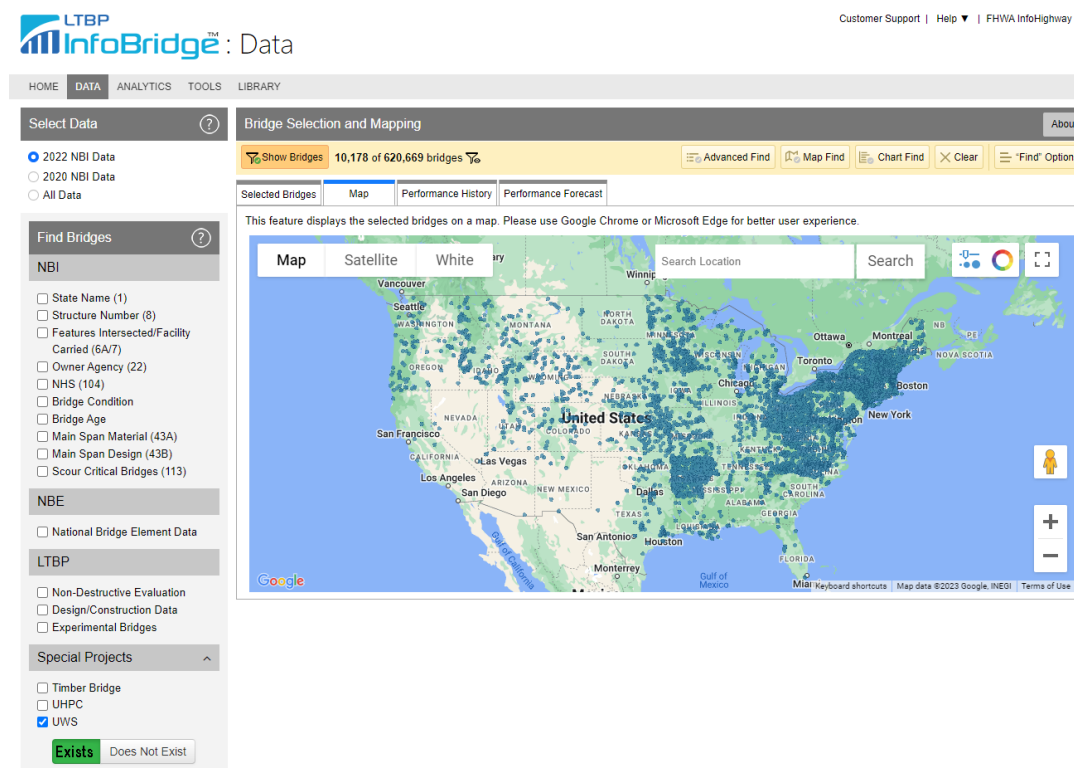


Table version of the map: <https://infobridge.fhwa.dot.gov/Data/SelectedBridges>

¹ [Performance of Uncoated Weathering Steel Highway Bridges Throughout the United States](#)

InfoBridge UWS Data – Current Condition

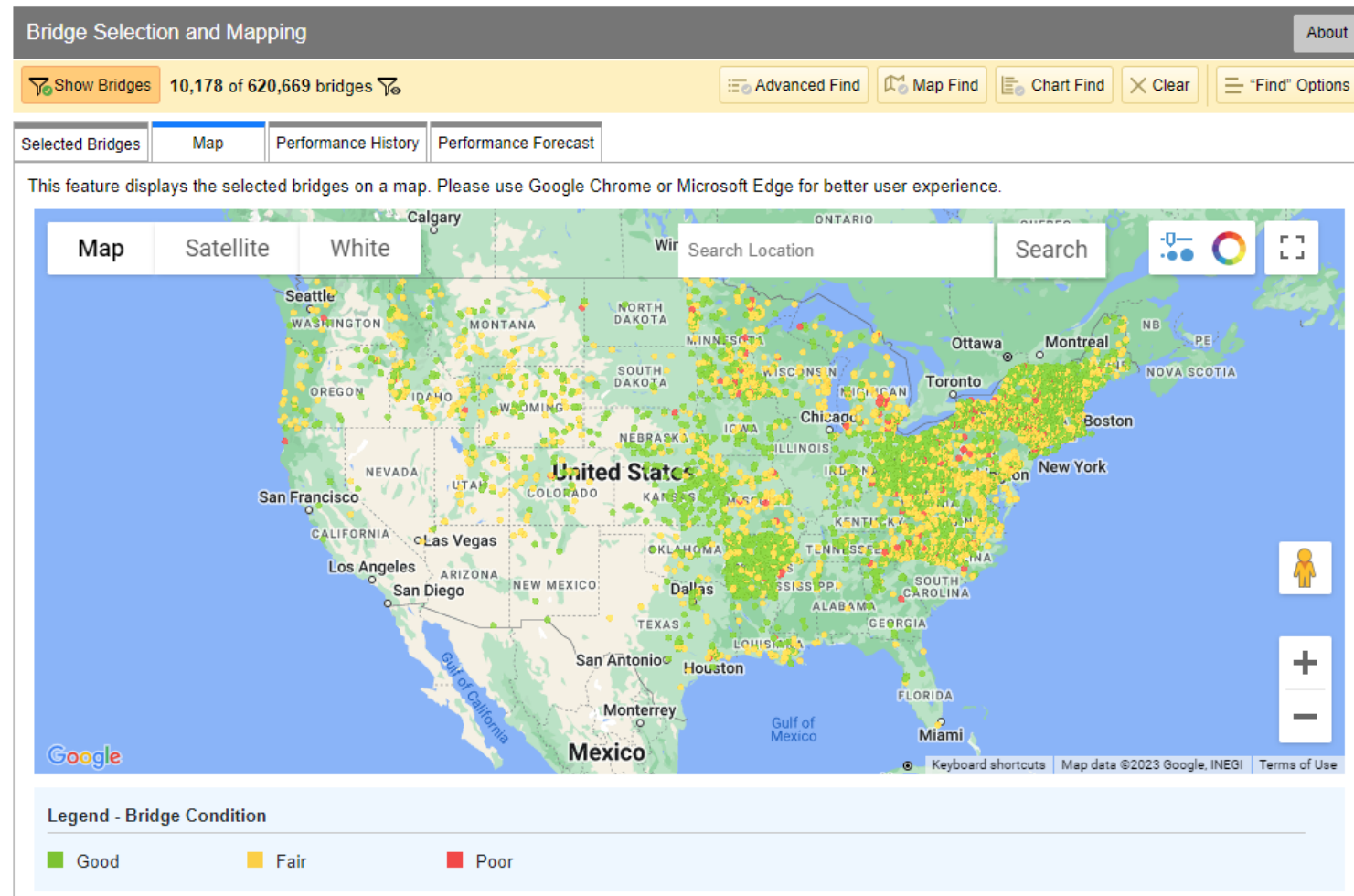


Table version of the map: <https://infobridge.fhwa.dot.gov/Data/SelectedBridges>

InfoBridge UWS Data – Poor Condition Bridges

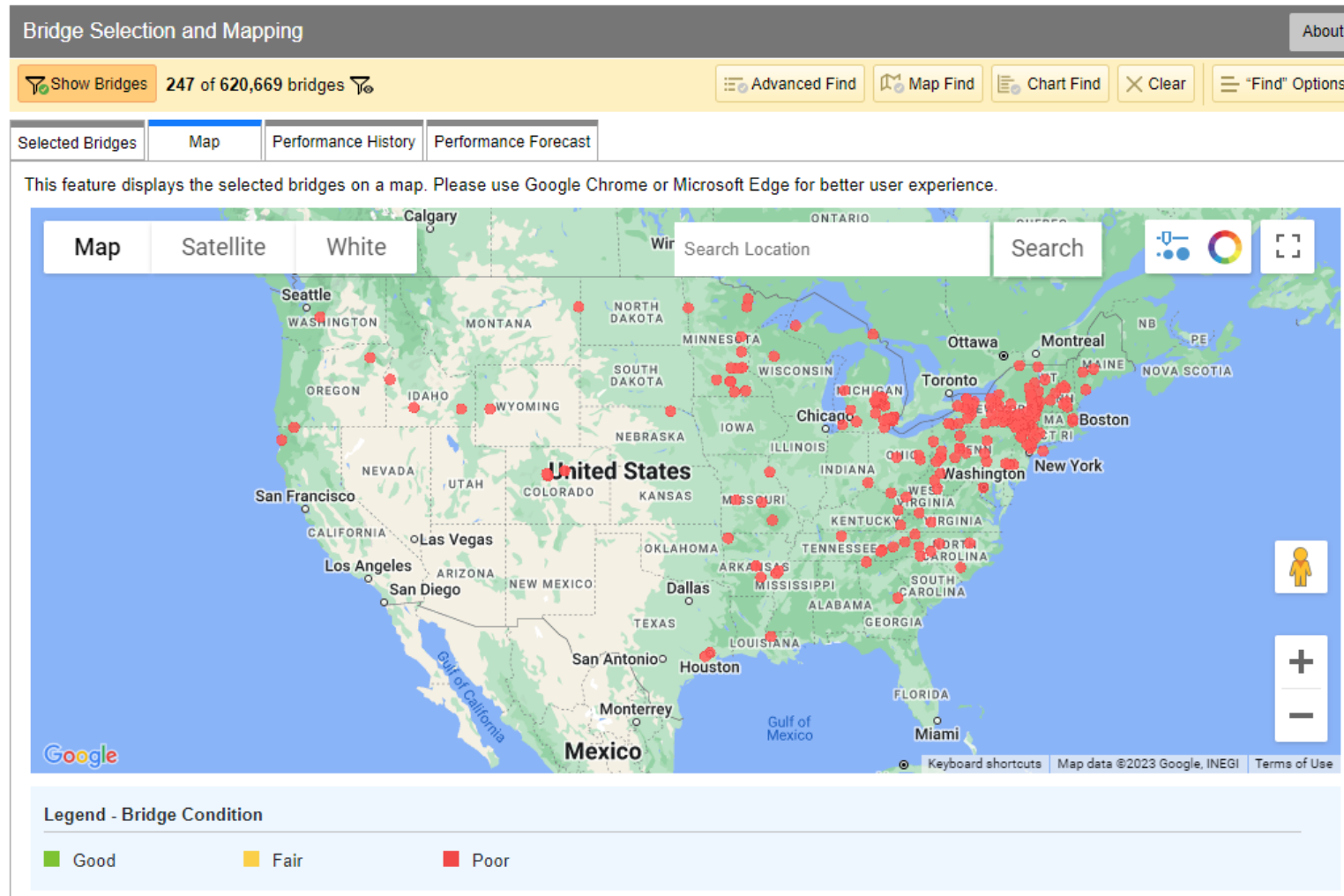


Table version of the map: <https://infobridge.fhwa.dot.gov/Data/SelectedBridges>

Documenting Deterioration



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- Cleaning (MBE Article 4.3.5.2)¹

Steel components exhibiting impacted crevice corrosion (pack rust) or corrosive delamination require chipping with a hammer or other means to remove corrosion down to the base metal in order to measure the remaining section of sound metal.



Source: FHWA

¹ Incorporated by reference to 23 CFR part 650, subpart C per 23 CFR 650.317(a)

Steel Cleaning



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Closed captioned video with narration available: [Inspector removing debris and laminar rust from a floorbeam](#)

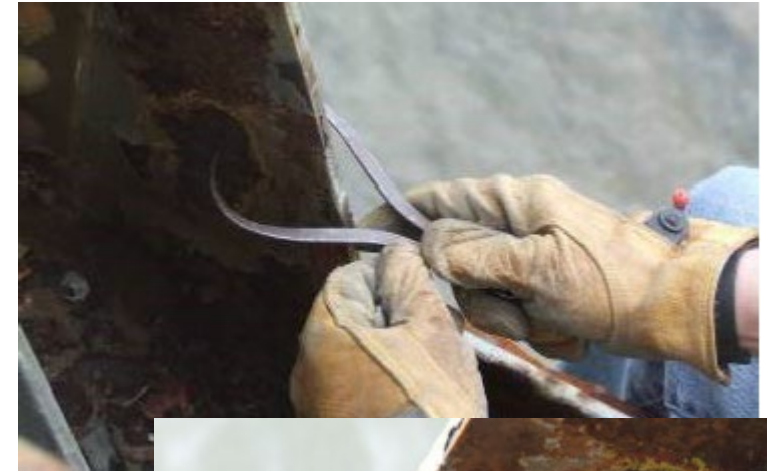
Documenting Deterioration



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- Section Loss Measurement and Evaluation (MBE Article 4.3.5.6.1)¹

Inspect structural steel members for loss of section due to corrosion. Where a build-up of rust scale is present, a visual observation is usually not sufficient to evaluate section loss. Hand scrape areas of rust scale to base metal and measure the remaining section using calipers, ultrasonic thickness meters, or other appropriate method. Take sufficient measurements to allow the evaluation of the effect of the losses on member capacity.



¹ Incorporated by reference to 23 CFR part 650, subpart C per 23 CFR 650.317(a)



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