

Overview of the National Bridge Inspection Standards (NBIS) Final Rule



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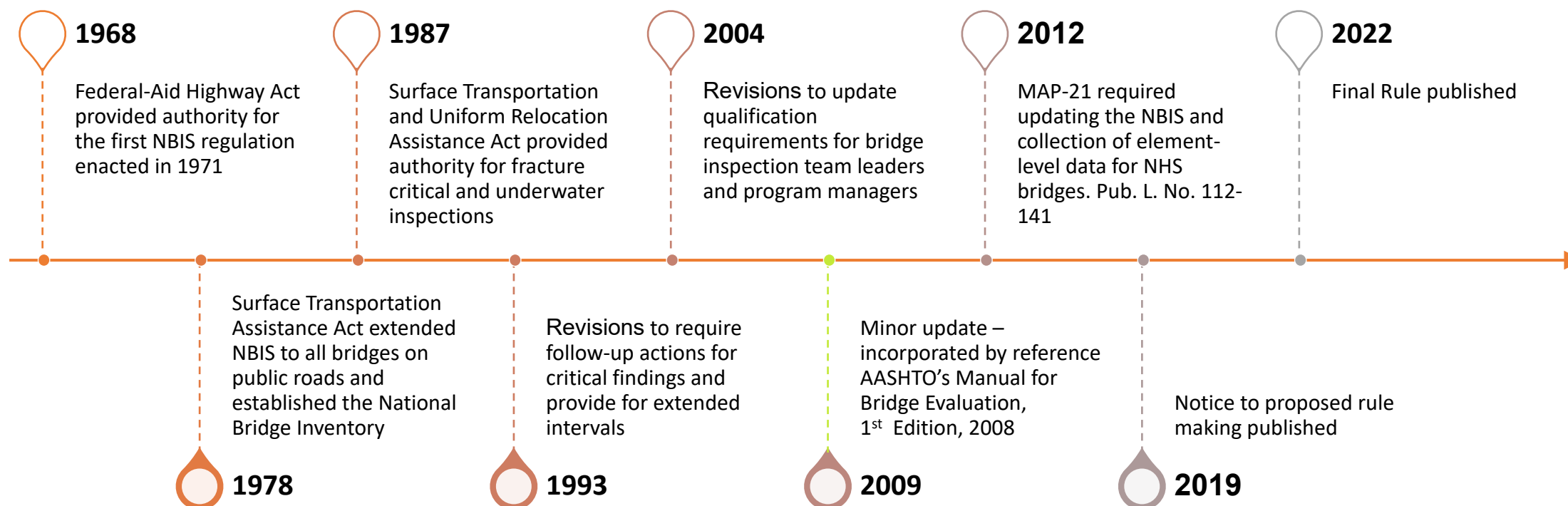


Presentation Outline

- Brief History of the NBIS
- Summary of 2022 NBIS Updates (Section-by-section discussion)
- Key Dates
- Implementation Resources
- Specifications for the National Bridge Inventory



Major Milestones of the NBIS





Updates Required by MAP-21

- Extend applicability to tribally owned bridges
- Update methodology, training, and qualifications for inspectors
- Update frequency of inspection, considering a risk-based approach
- Establish a procedure for national certification of bridge inspectors
- Ensure uniformity of inspections and evaluations (NBIS and National Tunnel Inspection Standards)
- *Establish procedures for reporting and monitoring of critical findings*
- *Conduct annual compliance reviews*
- *Conduct collection of element level inspection data for bridges on the National Highway System (NHS)*

Summary of 2019 NPRM Comments



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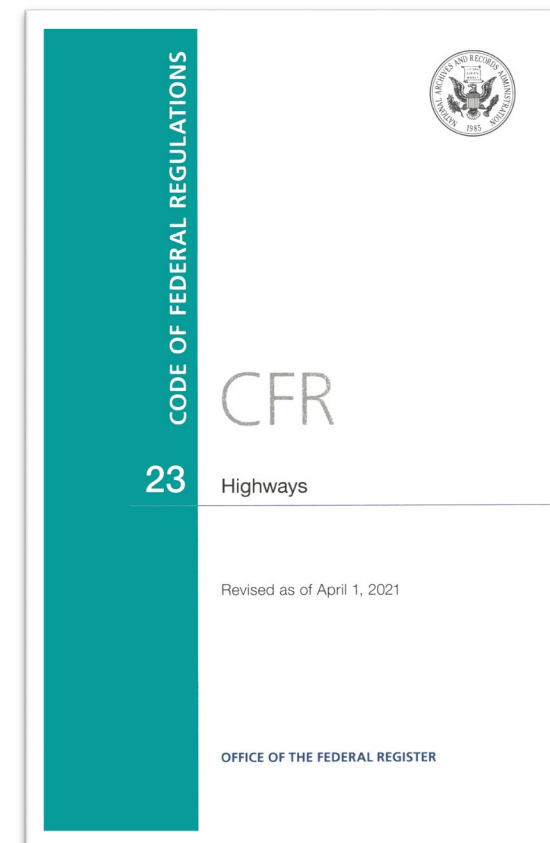
NPRM Section / Topic	No. of Comments
301 – Purpose	5
301 – Applicability	66
305 – Definitions	202
307 – Inspection Organization Responsibilities	102
309 – Qualifications	152
311 – Inspection Intervals	382
313 – Inspection Procedures	505
315 – Inventory	49
317 – Reference Manual	37
T-1 Cost/Benefits	50
T-2 General	75
T-3 Others	22
Total NBIS Comments	1647



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NBIS Sections

- § 650.301 Purpose
- § 650.303 Applicability
- § 650.305 Definitions
- § 650.307 Bridge inspection organization responsibilities
- § 650.309 Qualifications of personnel
- § 650.311 Inspection ~~frequency~~ interval
- § 650.313 Inspection procedures
- § 650.315 Inventory
- § 650.317 Incorporation by reference





§ 650.303 Applicability

Expanded the applicability to include:

- Tribally owned bridges
- Privately owned bridges that are connected to public roads immediately at both ends
- Temporary bridges, and bridges under construction with portions open to traffic



§ 650.305 Definitions

- Clarified/updated existing terms and added new terms, such as:
 - Nonredundant Steel Tension Member (NSTM)
 - In-depth Inspection
 - Load path redundancy
 - Risk assessment panel (RAP)
- In several cases, updated terms to align with the NTIS
- Delete terms that are no longer needed



§ 650.305 Definitions

- Terms changed or added from what was proposed in the NPRM and final rule

Damage mode	Risk assessment panel	<i>NSTM</i>
Initial inspection	Routine inspection	<i>Private bridge</i>
Inspection date	Safe load capacity	<i>Scour assessment</i>
Legal load	Scour appraisal	<i>Scour evaluation</i>
Nonredundant member	Scour critical bridge	<i>Scour plan of action</i>
NSTM inspection	Service inspection	<i>Underwater Bridge Inspection Manual, pub. FHWA-NHI-10-027</i>
Operating rating	Underwater bridge inspection training	<i>Underwater inspection diver Unknown foundations</i>
Program manager	Legal load rating	

§ 650.307 Bridge Inspection Organization Responsibilities



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- State Transportation Departments, Federal Agencies, and Tribal Governments are responsible for proper inspection and evaluation of all highway bridges
- Tribal Governments may delegate responsibilities to BIA or FHWA who can serve as Program Manager for those governments
- Border bridges need joint written agreements
- Delegated functions must be documented

§ 650.307 Bridge Inspection Organization Responsibilities



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- Added new and clarified existing responsibilities, such as:
 - Maintaining a registry of nationally certified bridge inspectors
 - Performing quality control and quality assurance activities
 - Managing the activities and corrective actions taken in response to a critical finding
 - Managing scour appraisals and scour plans of action



§ 650.309 Qualifications of Personnel

Qualifications (Education and Experience) Options:

Program Manager

- Registered professional engineer
- 10 years of experience

Team Leader

- Registered P.E. + 6 months of *experience*
- 5 years of experience
- Bachelor's degree, pass Fundamentals of Engineering exam, and 2 years of experience
- Associate's degree and 4 years of experience



§ 650.309 Qualifications of Personnel

Qualifications (Training):

- Successful completion of comprehensive bridge inspection and refresher training for Program Managers and Team Leaders
 - 70% score required for comprehensive bridge inspection end-of-course assessment
 - 18 hours of refresher training over each 60-month period
 - Made definition more robust with expectation that any alternate training would apply nationally



§ 650.309 Qualifications of Personnel

Qualifications (Training) cont'd:

- Team Leaders for nonredundant steel tension member (NSTM) inspections must have NSTM inspection training
- Underwater Bridge Inspection Divers must have underwater bridge inspection training



§ 650.311 Inspection Interval

Made changes and classified requirements under two methods

- Method 1: simplified assessment of risk
 - Uses similar approach to prior practice (1988 FHWA Technical Advisory 5140.21)
 - Allows up to 48 months interval for routine & **NSTM** inspections
 - Allows up to 72 months for underwater inspections
 - Requires agencies to develop their own criteria for intervals less than 24 months
 - Requires agencies to develop a policy and FHWA notification prior to implementation of extended intervals (longer than 24 months)



§ 650.311 Inspection Interval

- Method 2: rigorous assessment of risk
 - Uses approach outlined in NCHRP Report 782
 - Allows up to 48-month interval for NSTM inspections
 - Allows up to 72-month interval for routine & underwater inspections
 - Requires FHWA approval



§ 650.313 Inspection Procedures

650.313(b) Initial Inspection

- Initial inspection to be performed as soon as practical, but within **3** months of the bridge being open to traffic for bridges that are:
 - New
 - Replaced
 - Rehabilitated
 - Temporary



§ 650.313 Inspection Procedures

650.313(e) and (f) Underwater and NSTM Inspections

- Underwater and NSTM inspection are due within **12** months of opening or completed rehabilitation
- NSTMs with internal or system redundancy, as demonstrated through an FHWA approved process, do not require an NSTM inspection



§ 650.313 Inspection Procedures

650.313(k), (l), (m) Load Rating, Load Posting, Closed Bridges

- Load rate within 3 months of initial inspection and when changes warrant re-rating
- Analyze for routine and special permit loads
- Load post within 30 days of load rating or need is identified
- Develop and document criteria for closing bridges
 - Bridges must be closed when the gross live load capacity is less than 3 tons



§ 650.313 Inspection Procedures

650.313(o) Scour

- Perform a scour appraisal for all bridges over water
- Prepare and document scour POA for deployment of scour countermeasures for scour critical bridges and bridges with unknown foundation



§ 650.313 Inspection Procedures

650.313(p) Quality Control and Quality Assurance

- Section 1.4 of AASHTO Manual for Bridge Evaluation, 3rd Edition, 2018 referenced
- Reviews to be done by someone other than those who completed the original work
- Document results and address findings



§ 650.313 Inspection Procedures

650.313(q) Critical Findings

- Document procedures to address critical findings in a timely manner
- Define critical findings considering the location and the redundancy of the member affected and the extent and consequence of a deficiency. At a minimum, include findings which warrant:
 - Full or partial closure
 - NSTM in serious or worse condition (≤ 3)
 - Component in critical or worse condition ($\leq \underline{2}$)
- Certain critical findings on NHS must be reported within 24 hours
 - Full or partial closure
 - NSTM in serious or worse condition
- Monthly status reports for all critical findings until resolved



§ 650.315 Inventory

- Data to be reported in accordance with Specifications for the National Bridge Inventory
- Data must be updated within three months of field portion of inspection is completed
- Establish and document a process that ensures the timeframes are met



§ 650.317 Incorporation by Reference

Incorporated by reference

- AASHTO Manual for Bridge Evaluation, Third Edition, 2018
 - Sections 1.4, 2.2, 4.2, 6, and 8, excluding the 3rd paragraph in Article 6B.7.1
 - With 2019 and 2020 interim revisions
- AASHTO Manual for Bridge Element Inspection, Second Edition, 2019
- FHWA Specifications for the National Bridge Inventory, 2022



Key Dates

- NBIS was published in Federal Register on May 6, 2022
- NBIS effective date is June 6, 2022 (thirty days after publication)
- Several specific sections in the NBIS take effect 24 months from the effective date of final rule - outlined in the next slide
- Final rule requirements will not be used to make compliance determination for CY 2022



Key Dates

The following sections take effect on June 6, 2024 (24 months from the effective date of the final rule)

Section	Description
650.309(a)	Program manager qualifications for existing PM
650.309(b)	Team leader qualifications for existing TL
650.309(c)	Team leaders on NSTM inspections
650.309(h)(3)	FHWA-approved alternate training under prior regulations
650.311(a)(1)(ii)	Routine inspections, Reduced intervals
650.311(b)(1)(ii)	Underwater inspections, Reduced intervals
650.311(c)(1)(ii)	NSTM inspections, Reduced intervals
650.311(g)	Prior FHWA approved extended inspection interval policies



Implementation Resources

- Questions on the NBIS and SNBI can be submitted to [NBIS SNBI Questions@dot.gov](mailto:NBIS_SNBI_Questions@dot.gov)
- FHWA Bridge Inspection website <https://www.fhwa.dot.gov/bridge/inspection/>
- Developing guidance related to the following areas:
 - Alternate Training
 - Risk-Based Inspection Intervals
 - NSTM Inspections
 - Data Collection and the SNBI
 - Questions and Answers



Specifications for the National Bridge Inventory

Overview



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Incorporated by Reference in the
National Bridge Inspection Standards Final Rule



Abbreviations

- Coding Guide – Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation’s Bridges
- FO – Functionally Obsolete
- FR – Federal Register
- HPMS – Highway Performance Monitoring System
- IBR – Incorporated by reference
- MAP-21 – Moving Ahead for Progress in the 21st Century
- NBI– National Bridge Inventory
- NBIS – National Bridge Inspection Standards
- NHS – National Highway System
- NPRM – Notice of Proposed Rulemaking
- NSTM – Nonredundant steel tension member
- Pub. L. No. – Public Law Number
- SD – Structurally Deficient
- SNBI – Specifications for the National Bridge Inventory
- SNTI – Specifications for the National Tunnel Inventory
- SR – Sufficiency Rating

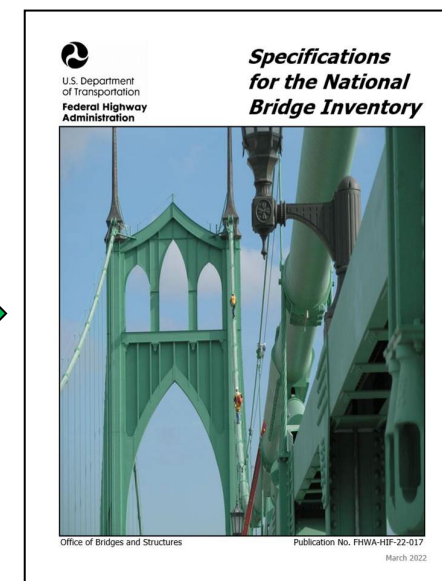
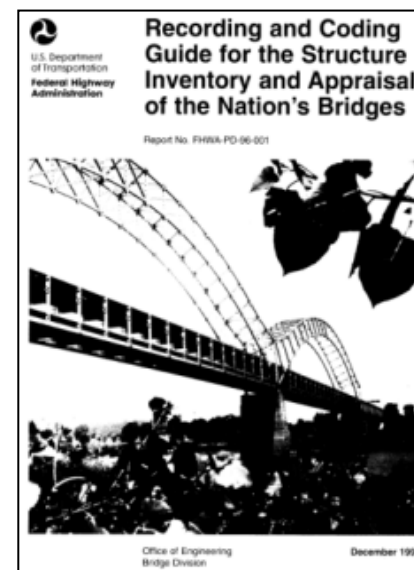


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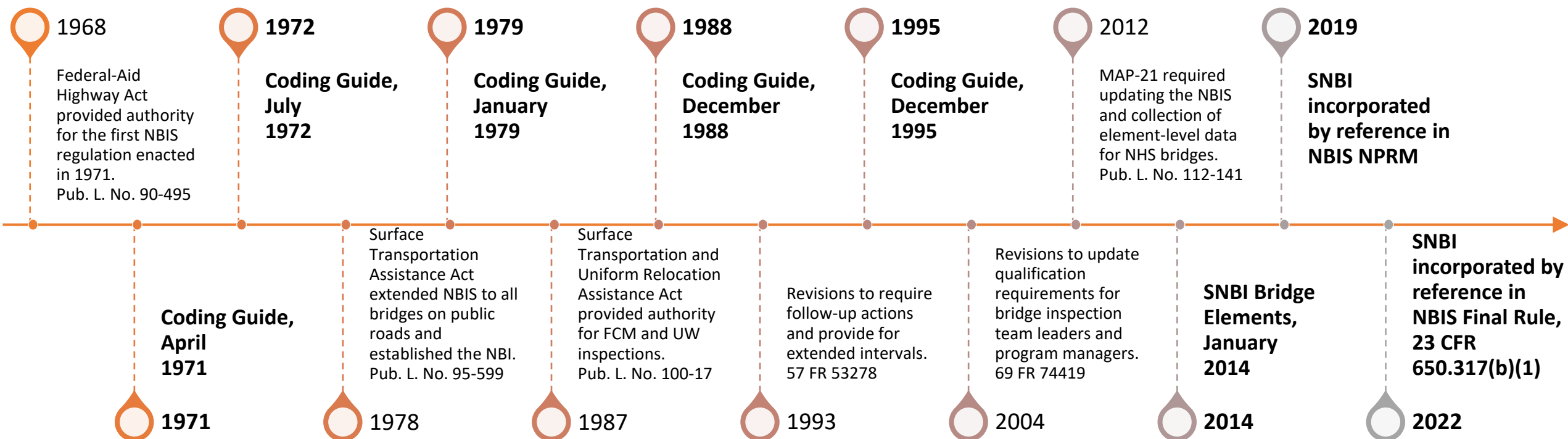
Topics

- Brief history of the Coding Guide
- SNBI development criteria
- 2019 NPRM comments summary & major themes
- Significant changes (1995 – 2022)
 - Global changes
 - Data changes
- Implementation timeline
- Future resources planned





Brief History of the Coding Guide





SNBI Development Criteria

Improve FHWA's ability to:

- Ensure highway bridge safety
- Provide NBIS oversight
- Report to Congress
- Support emergency response
- Administer risk-based, data driven, asset and performance management programs
- Obtain quality data through document clarity and ease of use

2019 NPRM Comments Summary

Data Items – Top 10



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Over 1,600 comments from docket & FHWA personnel

Item ID	Data Item Name	# of Comments
B.C.10	Scour Condition Rating	42
B.PS.1	<i>Load Posting Status (many-to-one)</i>	33
B.H.1	Bridge Railings	32
B.C.3	Substructure Condition Rating	31
B.EP.1	<i>Legal Load Configuration (many-to-one)</i>	29
B.AP.3	Scour Vulnerability	28
B.W.2	Construction Cost	27
B.LO.7	Border Bridge Number	26
B.LO.9	Border Bridge Inspection Responsibility	26
B.H.2	Transitions	26

2019 NPRM Comments Summary

Subsections – Top 10



Subsections	Comments (#)	Data Items (#)	Comments (Avg. #/item)
5.2 - Load Posting Status	41	2	20
2.3 - Roadside Hardware	40	2	20
7.1 - Component Condition Ratings	194	12	16
5.3 - Load Posting Evaluation	60	4	15
2.1 - Superstructure/Deck Material and Type	148	13	11
2.2 - Substructure Material and Type	75	7	11
7.3 - Appraisal	52	5	10
4.1 - Feature Identification	31	3	10
6.1 - Inspection Requirements	40	4	10
7.4 - Work Events	40	4	10

2019 NPRM Comments Summary

Major Themes



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- Implementation cost comments
 - 1 hr. to 10 hrs. per bridge
 - \$40 to \$100 per hr.
 - \$234 per bridge
 - \$200k to \$18m
- Implementation timeframe comments
 - 24 to 48 months for first data submission
 - 4 years to 10 years for full implementation

2019 NPRM Comments Summary

Major Themes (cont.)



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- Proposed removal of culvert bridge type code and general condition rating item
 - *Included Culvert definition*
 - *Included culvert specific code in Span Configuration Designation item*
 - *Included Culvert Condition Rating item*
- Refined general condition rating code descriptions
 - *Removed specific defect severity descriptions from general condition rating code descriptions*
 - *Provided defect severity descriptions in Appendix C*
 - *Kept extent descriptions in condition rating code descriptions*

2019 NPRM Comments Summary

Major Themes (cont.)



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- Crash test-level codes for bridge railings and bridge rail transitions
 - *Kept proposed item and codes as this data is more useful and clearer than the Coding Guide*
- Features above, below, and carried on NBIS bridges
 - *Kept items and codes*
 - *Clarified data is only for NBIS bridges and their associated features*

2019 NPRM Comments Summary

Major Themes (cont.)



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- Refined data for bridge material/type and substructures
 - *Kept items and codes as data provides improved detail about bridge characteristics*
- Border bridge data reported for each agency
 - *Added Border Bridge section to clarify data reporting by Designated Lead State (full bridge record) and Neighboring State (abbreviated bridge record)*
 - *Added Border Bridge Designated Lead State item to identify the lead State code, and kept other related items and codes*

2019 NPRM Comments Summary

Major Themes (cont.)



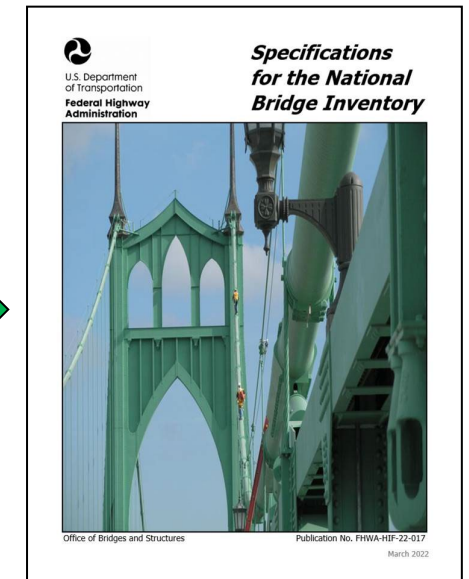
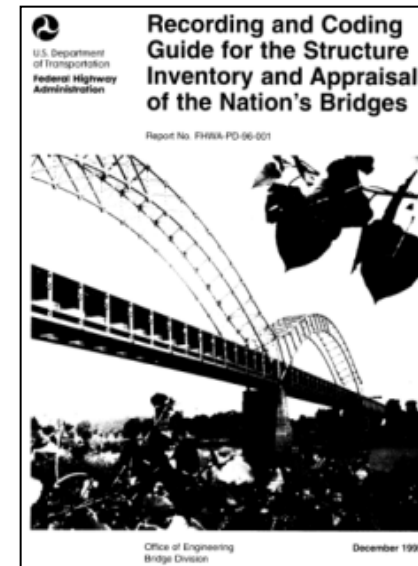
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- Refined data history for inspections, equipment, work events, posting status, legal load ratings, and posting values
 - *Kept items and codes as data is valuable for oversight of the NBIS*
- Load carrying capacity data for “AASHTO Legal Loads”¹
 - *Kept item and codes as data is valuable for NBIS oversight when a bridge has undergone a load rating and posting analysis*

¹AASHTO Manual for Bridge Evaluation, IBR 23 CFR 650.317(a)(1)

Significant Changes – Global

- U.S. customary units
 - E.g., feet and tons
- Specification and Commentary format
- Item grouping – sections/subsections
 - E.g., Features/Highways
- New Item IDs
 - E.g., B.C.01 - Deck Condition Rating
- Comprehensive example
- One item per page where possible
- Condensed and expanded Table of Contents (linked)
- PDF only, no printed copies supplied by FHWA

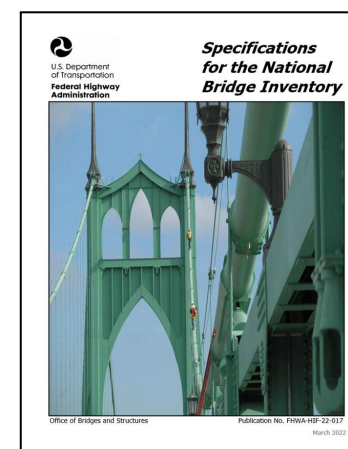
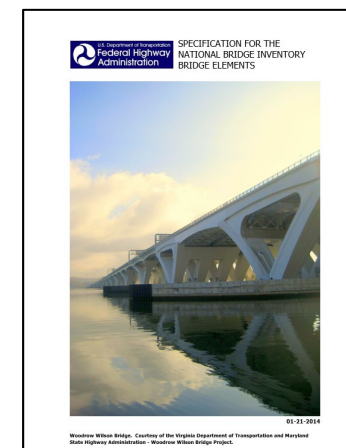


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Significant Changes – Global (cont.)

- Element-level data included (2014 SNBIBE)
- Consistency with SNTI and HPMS
- No non-NBIS structures
- One-to-one and many-to-one data sets
 - E.g., Primary data set - one item to one bridge
 - E.g., Features data set - many features to one bridge
- Data for multiple features, span sets, substructure sets, posting status changes, legal load configuration posting evaluation, inspection events, elements, and work performed
- Data submittal format will no longer be a fixed width text string file

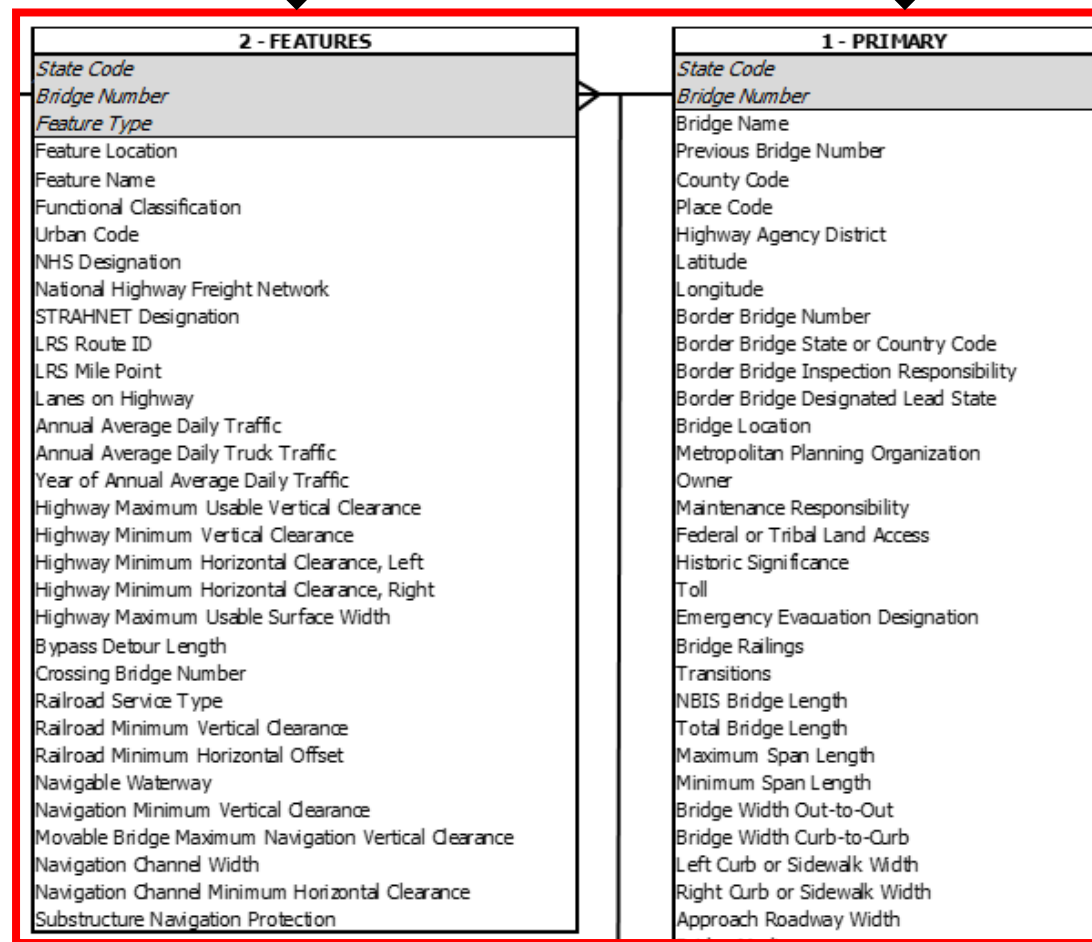
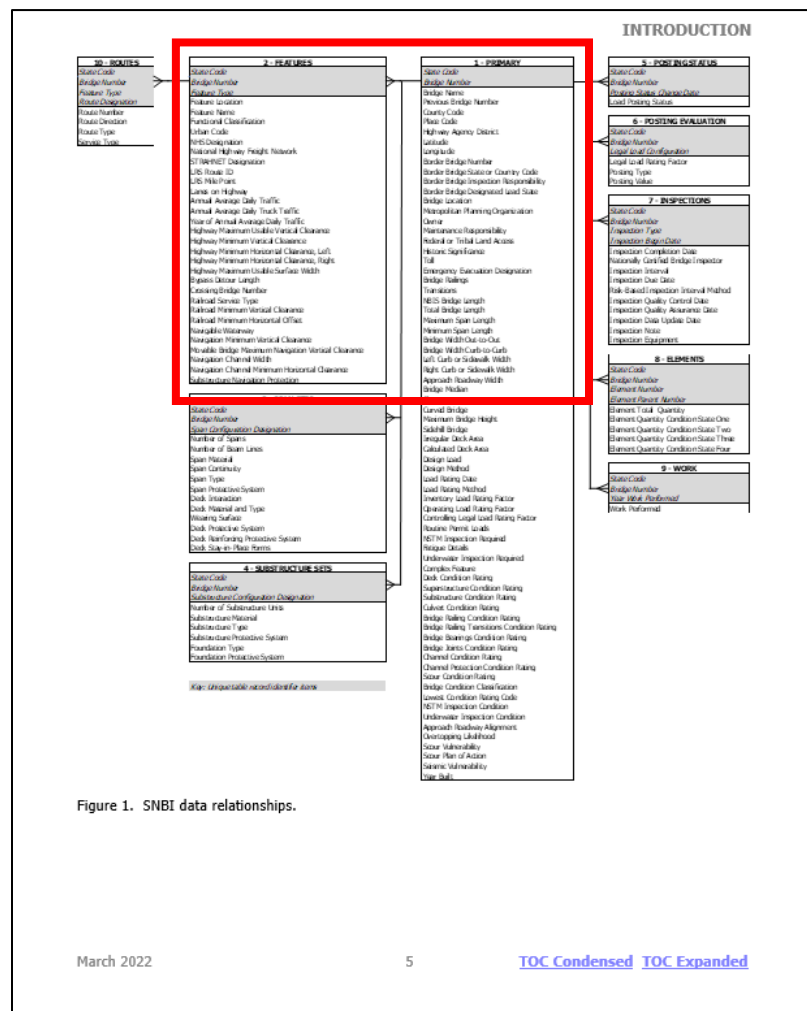




Data Set Relationships

Many – to – One

One – to – One





Significant Changes – Data

- New items 54, discontinued 20, continued 100*
 - Total SNBI items 154: Initial 113, each inspection 37, calculated 4
- New and expanded item codes (e.g., span material and type)*
- Latitude and Longitude in decimal degrees
- Bridge and transition railing crash test-level and general condition rating
- Separate scour vulnerability and scour condition rating
- Removed SR, Status (SD, FO), and calculated appraisal items

*The 100 data items continued from the Coding Guide may have new and/or expanded data item codes.



Significant Changes – Data (cont.)

Discontinued from Coding Guide

- FHWA Region Code (1B)
- Base Highway Network (12)
- Structure Flared (35)
- Approach Guardrail (36C)
- Approach Guardrail Ends (36D)
- Structural Evaluation (67)
- Deck Geometry (68)
- Underclearances, Vt. & Hz. (69)
- Work Done By (75B)
- Length of Structure Improvement (76)
- Bridge Improvement Cost (94)
- Roadway Improvement Cost (95)
- Total Project Cost (96)
- Year of Improvement Cost Estimate (97)
- Parallel Structure Designation (101)
- Future Average Daily Traffic (114)
- Year of Future Average Daily Traffic (115)
- Sufficiency Rating Asterisk
- Sufficiency Rating
- Status (SD, FO, Not deficient, Not applicable)



Significant Changes – Data (cont.)

New SNBI items

- Bridge Name
- Previous Bridge Number
- Border Bridge Designated Lead State
- Metropolitan Planning Organization
- Emergency Evacuation Designation
- Number of Beam Lines
- Span Protective System
- Deck Interaction
- Deck Stay-in-Place Forms
- Substructure Configuration Designation
- Number of Substructure Units
- Substructure Material
- Substructure Type
- Substructure Protective System
- Foundation Type
- Foundation Protective System
- Route Designation
- Crossing Bridge Number



Significant Changes – Data (cont.)

New SNBI items (cont.)

- Railroad Service Type
- Navigation Channel Minimum Horizontal Clearance
- Design Method
- Load Rating Date
- Routine Permit Loads
- Posting Status Change Date
- Legal Load Configuration
- Posting Type
- Posting Value
- Fatigue Details
- Complex Feature
- Inspection Completion Date
- Nationally Certified Bridge Inspector
- Inspection Due Date
- Risk-Based Inspection Interval Method
- Inspection Quality Control Date
- Inspection Quality Assurance Date
- Inspection Data Update Date



Significant Changes – Data (cont.)

New SNBI items (cont.)

- Inspection Note
- Inspection Equipment
- Bridge Railing Condition Rating
- Bridge Railing Transitions Condition Rating
- Bridge Bearings Condition Rating
- Bridge Joints Condition Rating
- Bridge Condition Classification
- Lowest Condition Rating Code
- NSTM Inspection Condition
- Underwater Inspection Condition
- Scour Plan of Action
- Seismic Vulnerability
- Minimum Span Length
- Curved Bridge
- Maximum Bridge Height
- Sidehill Bridge
- Irregular Deck Area
- Calculated Deck Area

Anticipated Implementation Timeline



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Target Date	Action
2022 May	NBIS final rule published with SNBI incorporated by reference
2022 Jul	FHWA publishes Data Crosswalk
2022 Oct	FHWA publishes Data Submittal Schema and Data Submittal Validation Logic (initial version)
2023 Apr	FHWA makes Transition Tool available online
2024 Oct	FHWA makes NBI NextGen available online for Data Validation only
2025 Mar 15	Last submittal in 1995 Coding Guide format.



Anticipated Implementation Timeline (cont.)

Target Date	Action
2026 Jan 1	<ul style="list-style-type: none">• Last date to begin verification of transitioned data and collection of new SNBI data for inspected bridges - Agencies may elect to begin data collection and verification earlier to meet the March 15, 2028 deadline for submittal of a complete SNBI dataset• FHWA makes NBI NextGen available for Data Submittals - Full functionality available, including reports, queries, mapping, downloads
2026 Mar 15	First SNBI submittal – Transitioned/Hybrid Dataset – All bridges submitted with transitioned data except for specified fields required to manage FHWA programs, which shall have collected or verified SNBI data – Continue verification of transitioned data and collection of new SNBI data
2026 Jun	Sunset transition tool
2027 Mar 15	Second SNBI submittal – Transitioned/Hybrid Dataset – Continue verification of transitioned data and collection of new SNBI data
2028 Mar 15	Third SNBI submittal – 100% populated/verified – No temporary codes permitted – First complete SNBI dataset with collected and verified SNBI data for all bridges



Future Resources Planned

- Guidance
 - Updated FHWA Bridge Inspection website
 - <https://www.fhwa.dot.gov/bridge/inspection/>
 - Guidance
 - Questions and Answers
 - Presentations at national and regional conferences
 - Updated Bridge Inspector's Reference Manual
 - Updated National Highway Institute training courses
 - SNBI training development and deployment

QUESTIONS

Email to:

NBIS_SNBI_Questions@dot.gov



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