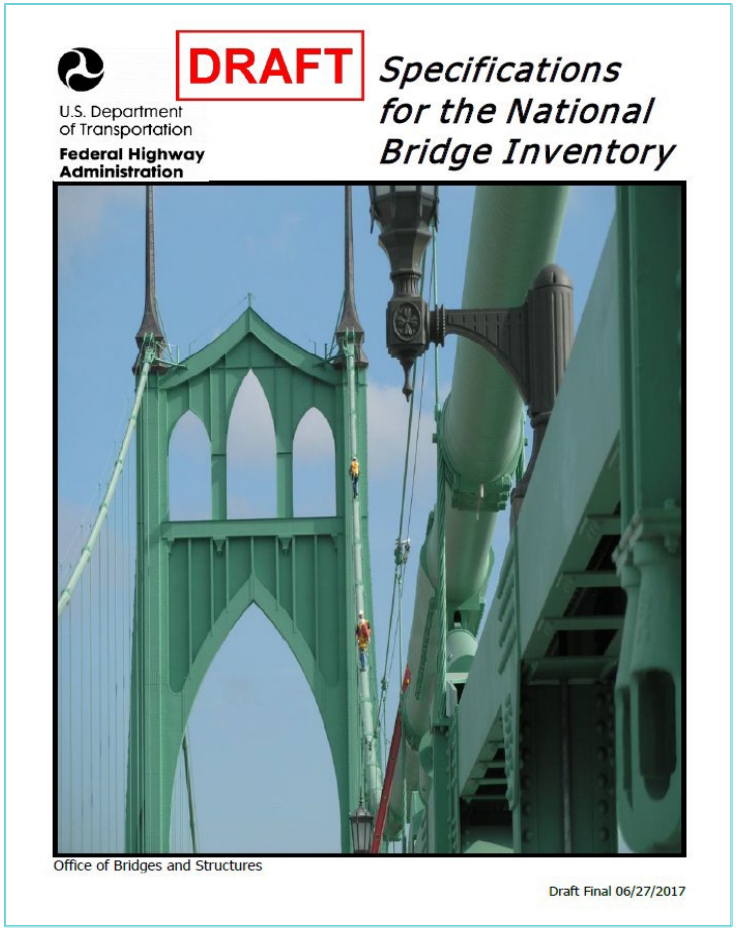
U.S. Department of Transportation
Federal Highway Administration
Office of Infrastructure

Draft Specifications for the National Bridge Inventory (SNBI)

AASHTOWare
Bridge Management User Group
September 2, 2020

Derek Constable
FHWA Bridge Management Engineer

Specifications for the National Bridge Inventory (SNBI)



- Made available for public comment with Notice of Proposed Rulemaking (NPRM) for the National Bridge Inspection Standards (NBIS) update.
- SNBI is an NBIS incorporated reference.
- Comment period: 11/12/19 – 03/13/20

Development History

- October 2006 version: More than 2,000 comments
- Long pause …
- Additional stakeholder outreach
- FHWA independent QC review
- AASHTO T-18 review: More than 500 comments
- Reviewed and updated to align with the proposed NBIS update
- NBIS and SNBI posted in Federal Register for comment (11/12/19)
- Currently drafting the NBIS final rule which will include the final SNBI

Development Criteria

- *Highway bridge safety*
- *NBIS oversight*
- *Consistency with NBIS*
- *Reporting to Congress*
- *Emergency response*
- *Risk-based, data driven, asset & performance management program*
- *Utilize data from existing management systems*
- *Clarity and ease of use (lessen interpretation)*
- *Consistency with Specifications for the National Tunnel Inventory & Highway Performance Monitoring System (where appropriate)*

SNBI Content

- *The following content discussion is limited to the SNBI version that was made available for public comment (although revisions and finalization are underway to address comments).*

Proposed Global Changes – Format

Specification and Commentary format

Data Item Name		
Format	Frequency	Item ID
Specification	Commentary	
Requirements for reporting the data item.	Expanded guidance on the specification.	
Specification Continued, Commentary Continued, or Examples		
Additional space for Specification or Commentary, if needed. Examples are presented to further clarify the specification. Each item typically has brief examples. A more comprehensive example can be found at the end of each section or subsection.		

Proposed Global Changes - Format

Item grouping – sections and subsections

Draft SNBI

- Identification
- Material & Type
- Geometry
- Features
- Loads, Load Rating, & Posting
- Inspections
- Condition

1995 Coding Guide

- No defined sections/subsections
- Appendix A SI&A sheet grouped in logical sections but included items are not in sequence

Proposed Global Changes - Format

New Item IDs

- Identification section examples
  - B.ID.1 Bridge Number (Identification subsection)
  - B.LO.1 State Code (Location subsection)
  - B.C.1 Owner (Classification subsection)

- Material & Type section examples
  - B.SP.1 Span Set Designation (Superstructure/Deck Material & Type subsection)
  - B.SB.1 Substructure Set Designation ((Substructure/Deck Material & Type subsection)
  - B.H.1 (Roadside Hardware subsection)

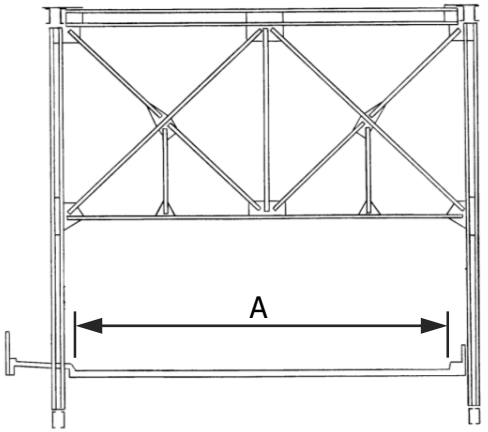
- Geometry section examples
  - B.G.1 NBIS Bridge Length

- Features section examples
  - B.F.1 Feature Type (Feature Identification subsection)
  - B.RT.1 Route Number (Route subsection)
  - B.RR.1 Railroad (Railroad subsection)
  - B.N.1 Navigable Waterway (Navigable Waterway subsection)

And so on

Proposed Global Changes

- More Examples
  - all items (nearly)
  - end of section examples
  - end of document example (comprehensive example)



- U.S. customary units
- Latitude & Longitude in decimal degrees
- Linear Referencing System (LRS) data items match HPMS

Proposed Global Changes – Items

Item changes

- Discontinued items
- New items
- Same items with clarification and expanded coding options
  - (ex. timber superstructure: solid sawn, glulam, nail-lam, stress-lam)

Proposed Global Changes - Items

Discontinued items - Proposed (24 items)

- FHWA Region Code (1B)
- Base Highway Network (12)
- LRS Subroute Number (13B)
- Structure Flared (35)
- Approach Guardrail (36C)
- Approach Guardrail Ends (36D)
- Reference Feature (54A)*
- Reference Feature (55A)*
- Culvert Condition Rating (62)*
- 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)
- Temporary Structure Designation (103)
- Future Average Daily Traffic (114)
- Year of Future Average Daily Traffic (115)
- Sufficiency Rating Asterisk
- Sufficiency Rating

No sufficiency rating, structurally deficient classification, functionally obsolete classification, nor complicated appraisal items

Proposed Global Changes - Items

New items - Proposed

- Bridge Name
- Previous Bridge Number
- Metropolitan Planning Org.
- Emergency Evac. Desig.
- Minimum Span Length
- Curved Bridge
- Curved Bridge Radius
- Maximum Bridge Height
- Sidehill Bridge Indicator
- Irregular Deck Area
- Design Method
- Load Rating Date
- Routine Permit Loads
- Fatigue Prone Details
- Complex Feature
- Railing Condition
- Transitions Condition
- Bearings Condition
- Joints Condition
- Scour Plan of Action
- Seismic Vulnerability
- Construction Cost
- Crossing Bridge Number
- Railroad Service Type
- Nav Channel Min HC
- Number of Beam Lines
- Superstr. Protective Sys.
- Deck Interaction
- Deck Stay-in-Place Forms
- Substructure Set Designation
- Number of Substr. Units
- Substructure Material
- Substructure Type
- Substructure Protective Sys.
- Foundation Type
- Foundation Protective System
- Posting Status Change Date
- Legal Load Configuration
- Posting Type
- Posting Value
- Inspection Completion Date
- Nationally Certified Br. Insp.
- Inspection Interval Type
- Risk Based Insp. Interval Method
- Inspection QC Date
- Inspection QA Date
- Inventory Update Date
- Inspection Note
- Inspection Equipment
- Work Performed
- Year Work Performed

Proposed Global Changes – Data Organization

Features data subset

- A ***group*** of items that are reported for each unique and reportable feature type
- Reportable feature types include highways, waterways, railroads, etc.

Proposed Global Changes – Data Organization

Span groups (configurations) data subset

- A ***group*** of items that is reported for each unique superstructure – deck - deck interaction - continuity combination
  - ❖Item group includes attribute data (ex, Number of Spans, Superstructure Material, Superstructure Type, Deck Interaction, Deck Material and Type)

Google: August 2020;
https://goo.gl/maps/9rDtTzWdcpajqF8w9

Proposed Global Changes – Data Organization

Substructure groups (configuration) data subset

- A ***group*** of items that is reported for each unique substructure - foundation combination

  - Each unique abutment and foundation combination
    - ❖Item group includes attribute data (ex. Substructure Material, Substructure Type, Foundation Type)

  - Each unique pier type and foundation combination
    - ❖Item group includes attribute data (ex. Substructure Material, Substructure Type, Foundation Type)

Proposed Global Changes - Data Organization

"Event" data subsets

- A ***group*** of items that is reported for each occurrence or change (i.e. event) between a specified period

- Examples
  - Inspection events
  - Posting events
  - Work events

Proposed Global Changes - Data Organization

Multi-Value items

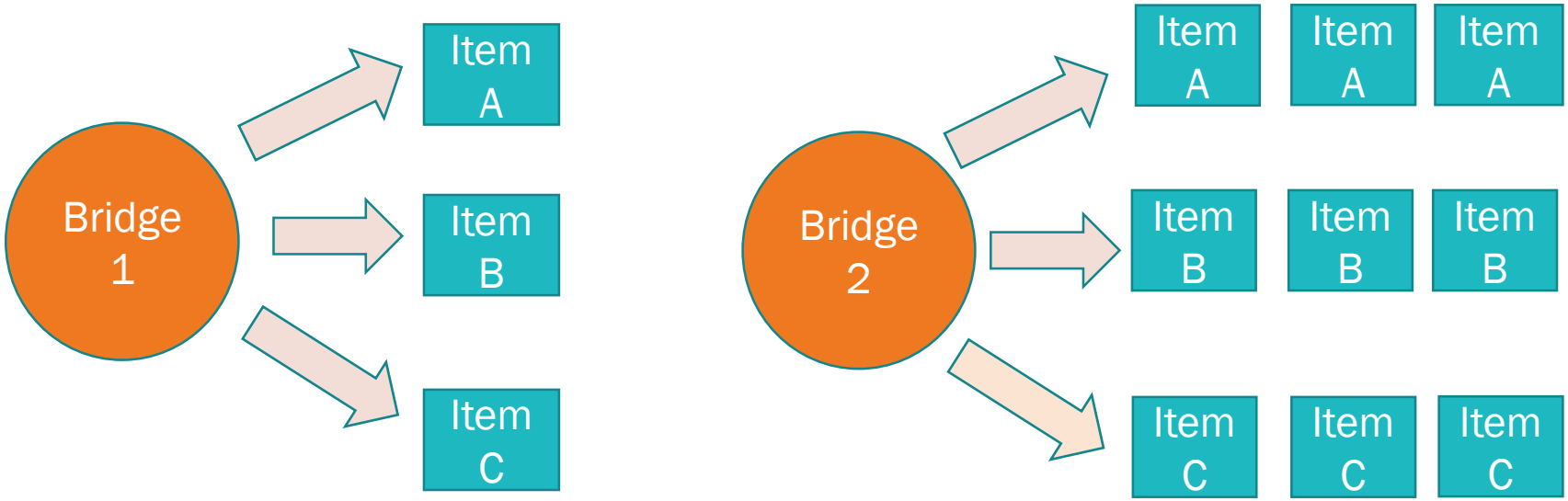
- An item which says report all applicable codes
  - Example: Inspection Equipment item

Code	Description
AN	No access equipment used
A01	Ladder
A02	Bucket lift vehicle
A03	Under bridge inspection vehicle
A04	Rigging
A05	Waders
A06	Boat
A07	Snorkel
A08	SCUBA

Proposed Global Changes – Data Organization

Item relationships

- Some items *one-to-one* relation w/ bridge
- Some items *many-to-one* relation w/bridge



Proposed Global Changes – Data Organization

one-to-one

- reports one value for an item
- current status is always reported

Bridges
Bridge 1
Bridge 2
…
Bridge x

Item A	value
Item B	value
…	value
Item x	value

Proposed Global Changes - Data Organization

many-to-one

- can report more than one value for an item (ex. Inspection Equipment item, Work Performed item)
- can report more than one sub-record for a group of items (ex. Features, Span Groups, Substructure Groups, Events sub-records)

Bridges
Bridge 1
Bridge 2
…
Bridge x

→

Item A
Value 1
Value 2
…
Value x

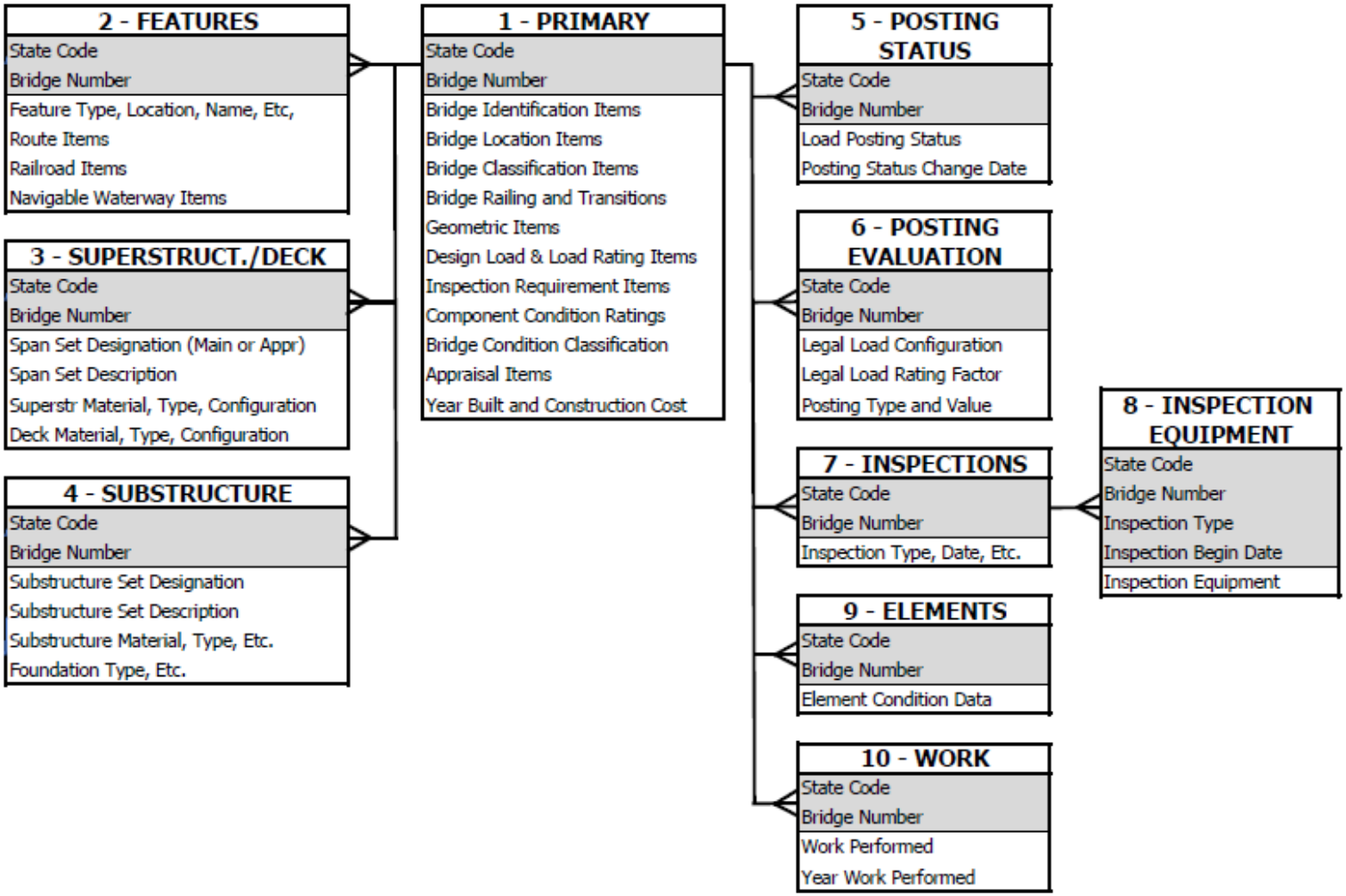
OR

Bridges
Bridge 1
Bridge 2
…
Bridge x

→

Data Subset i	Data Subset ii	…	Data Subset ij
Item A	Item A	Item A	Item A
Item B	Item B	Item B	Item B
…	…	…	…
Item x	Item x	Item x	Item x

Proposed Data Structure (condensed)



Proposed Item Background

- Border Bridges
  - 1995 Coding Guide border bridge items
    - neighboring state code
    - neighboring state structure number
    - percent responsibility (funding)
  - SNBI border bridge items
    - neighboring state code
    - neighboring state structure number
    - percent responsibility (inspection)

Proposed Item Background

- Metropolitan Planning Organization
  - New item
  - Reports name or state specified identifier for bridges that are located within the boundaries of an MPO.
    - Example: Bridge is located within the boundary of the Des Moines Area MPO. Report “Des Moines Area MPO” or report state specified identifier.
  - Would allow MPOs to identify bridges within their boundaries
  - Would allow MPOs to compute baseline values for national performance measures in accord with 23 CFR 490.

Proposed Item Background

- Emergency Evacuation Designation
  - New item
  - Reports bridges that carry emergency evacuation routes as designated by the agency.
  - Included to fulfill 23 USC 144(b) National Bridge and Tunnel Inventories as legislated by MAP-21 Section 1111.

Proposed Item Background

- Bridge Railing and Transitions
  - 1995 Coding Guide traffic safety feature items
    - includes bridge rail, transitions, approach rail, end treatment
    - report sufficiency for site
  - SNBI
    - Reports bridge rail and transitions
    - Reports crash test level (when known)
    - Reports condition

Proposed Item Background

- NBIS Bridge Length
  - Revised item
  - 1995 Coding Guide
    - reports Y or N whether satisfies definition of NBIS length
  - SNBI
    - reports length value
    - would allow confirmation of bridges that are greater than 20.0 feet NBIS length

Proposed Item Background

- Minimum Span Length
  - New item
  - 1995 Coding Guide reports maximum span length only
  - would allow for national/regional screening to more accurately identify bridges that are impacted by proposed changes to legal vehicles or load rating vehicle.

Proposed Item Background

- Curved Bridge
  - New item
  - Reports whether the bridge girders are horizontally curved (curvature either by direct curvature, piecewise chorded, or kinked).
  - Curvature is an attribute that can inform multiple procedures for inspecting, load rating, managing, and maintaining bridges.
    - different procedures and specifications for structural analysis and design
    - load rating analysis for legal and permit vehicles.
    - may also impose permit vehicle size restrictions
    - geometric standards (lane and shoulder width)
    - raise the importance of inspection, maintenance, and repair of certain members
    - vulnerability to seismic events using system-level procedures

Proposed Item Background

- Maximum Bridge Height
  - New item
  - Reports the maximum dimension between bridge and groundline
  - Can inform inspection planning and be related to Inspection Equipment item. Can inform cost estimation of work types or needs. Can inform seismic vulnerability assessment.

Proposed Item Background

- Railroad Service Type
  - New item
  - Reports types freight, passenger, electrified, non-electrified
  - Can inform inspection planning to identify access and coordination needs.

Proposed Item Background

- Railing, Transitions, Bearings, Joints, Channel Protection, Scour Condition
  - New non-major component general condition ratings (0-9 scale)
  - Can inform preservation needs for non-major components. Can inform investigation of major component service life contributors.

Proposed Item Background

- Scour Vulnerability & Scour Condition
  - Reports vulnerability and condition as separate item
  - Displaces Scour Critical Bridge item which was a combined vulnerability and condition
  - Provides more granularity on scour condition and progression over time

What's Next?

- USDOT finalizes
- USDOT forwards to The White House Office of Management and Budget for review/approval
- If SNBI is approved for publishing, that will be followed by roll-out activities that may include:
  - implementation instructions with milestones
  - submittal format (schema) and instructions
  - application/site that migrates data from old to new format where feasible
  - data validation rules and validation application/site
  - etc.

QUESTIONS?