SNBI Section 2 Material & Type

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Bridge Material & Type

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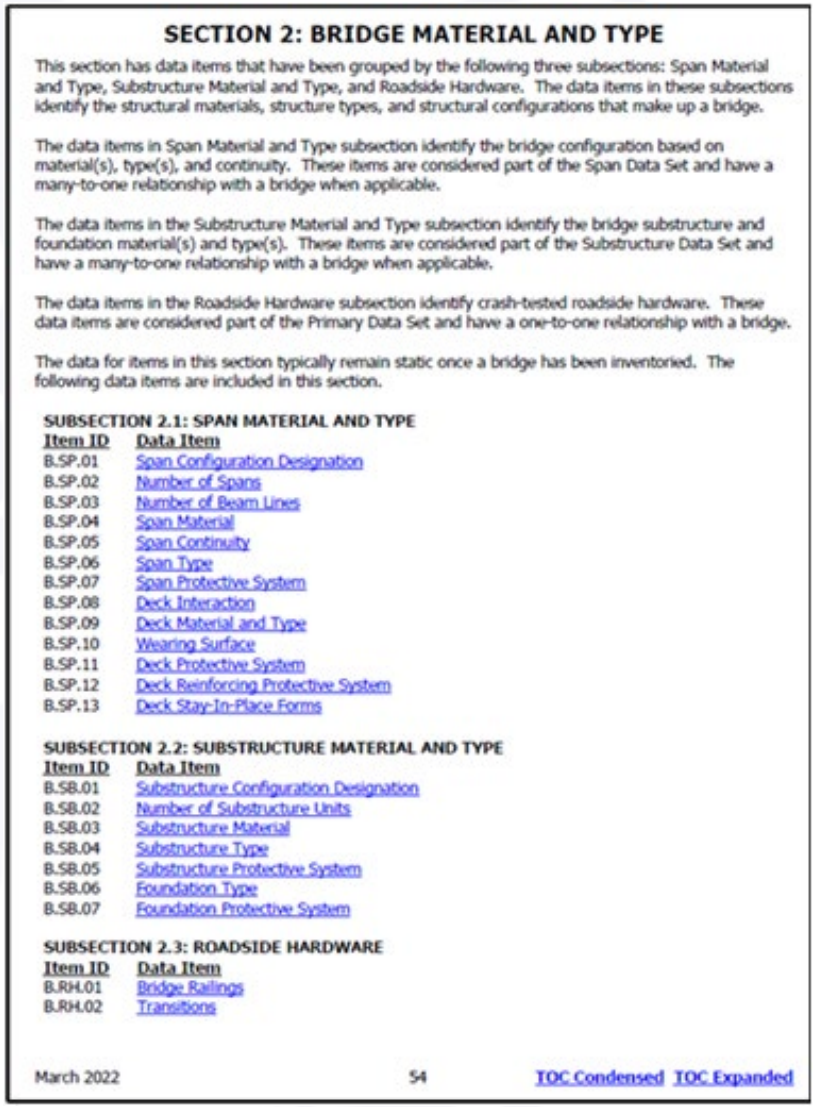
Section 2 – Bridge Material & Type

- Data items grouped in three subsections
  - 2.1 Span Material and Type
  - 2.2 Substructure Material and Type
  - 2.3 Roadside Hardware
- Data identify the structural materials, structure types, and structural configurations that make up a bridge
- Data typically remain static once a bridge has been inventoried



SECTION 2: BRIDGE MATERIAL AND TYPE

This section has data items that have been grouped by the following three subsections: Span Material and Type, Substructure Material and Type, and Roadside Hardware. The data items in these subsections identify the structural materials, structure types, and structural configurations that make up a bridge.

The data items in Span Material and Type subsection identify the bridge configuration based on material(s), type(s), and continuity. These items are considered part of the Span Data Set and have a many-to-one relationship with a bridge when applicable.

The data items in the Substructure Material and Type subsection identify the bridge substructure and foundation material(s) and type(s). These items are considered part of the Substructure Data Set and have a many-to-one relationship with a bridge when applicable.

The data items in the Roadside Hardware subsection identify crash-tested roadside hardware. These data items are considered part of the Primary Data Set and have a one-to-one relationship with a bridge.

The data for items in this section typically remain static once a bridge has been inventoried. The following data items are included in this section.

SUBSECTION 2.1: SPAN MATERIAL AND TYPE

Item ID	Data Item
B.SP.01	Span Configuration Designation
B.SP.02	Number of Spans
B.SP.03	Number of Beam Lines
B.SP.04	Span Material
B.SP.05	Span Continuity
B.SP.06	Span Type
B.SP.07	Span Protective System
B.SP.08	Deck Interaction
B.SP.09	Deck Material and Type
B.SP.10	Wearing Surface
B.SP.11	Deck Protective System
B.SP.12	Deck Reinforcing Protective System
B.SP.13	Deck Stay-In-Place Forms

SUBSECTION 2.2: SUBSTRUCTURE MATERIAL AND TYPE

Item ID	Data Item
B.SB.01	Substructure Configuration Designation
B.SB.02	Number of Substructure Units
B.SB.03	Substructure Material
B.SB.04	Substructure Type
B.SB.05	Substructure Protective System
B.SB.06	Foundation Type
B.SB.07	Foundation Protective System

SUBSECTION 2.3: ROADSIDE HARDWARE

Item ID	Data Item
B.RH.01	Bridge Railings
B.RH.02	Transitions

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Section 2.1 – Span Material & Type

- Data items identify the span and deck configurations based on material(s), type(s), and continuity for the bridge
  - Considered part of the Span Data Set
  - Many-to-one relationship with a bridge when applicable
  - Reported for each span configuration present in the bridge
    - A span configuration characterizes all spans of similar material, type, and continuity
    - Spans of similar configuration do not need to be contiguous to be reported in the same data set

Section 2.1 – Span Material & Type

- All bridges have at least one span configuration
  - At least one data set must be reported for each bridge
  - Additional data sets are reported when applicable
- Data items typically remain static once a bridge has been inventoried

Source: USI Consultants

Section 2.1 – Span Material & Type

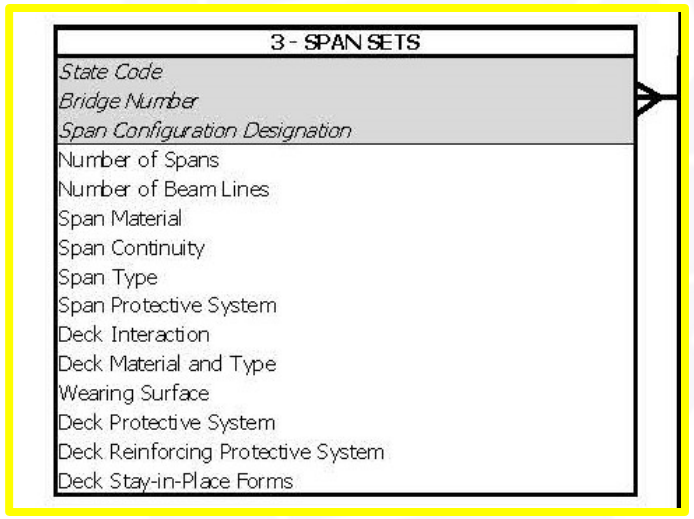
- Data Relationships – Span Sets

Many Span Configuration Designations

to

One Bridge

- Code Description
- M## Main
- A## Approach
- C## Culvert
- V## Culvert extension
- W## Widening



Source: SNBI March 2022

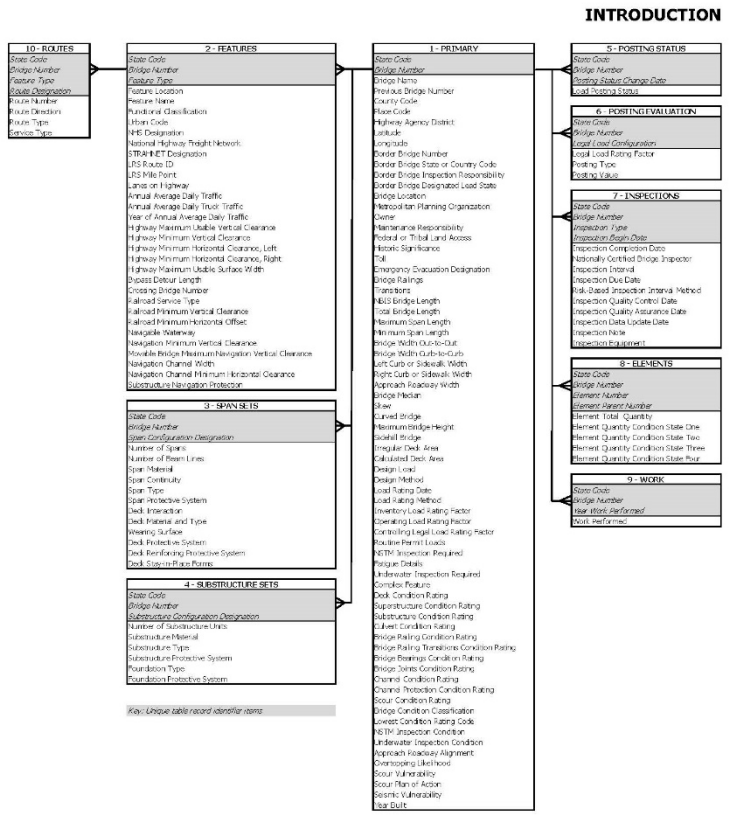


Figure 1. SNBI data relationships.

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Section 2.1 – Span Material & Type

- B.SP.01 Span Configuration Designation (many-to-one)
- B.SP.02 Number of Spans
- **B.SP.03 Number of Beam Lines (new)**
- B.SP.04 Span Material
- **B.SP.05 Span Continuity (new)**
- B.SP.06 Span Type
- **B.SP.07 Span Protective System (new)**
- **B.SP.08 Deck Interaction (new)***
- B.SP.09 Deck Material and Type
- B.SP.10 Wearing Surface*
- B.SP.11 Deck Protective System*
- B.SP.12 Deck Reinforcing Protective System*
- **B.SP.13 Deck Stay-In-Place Forms (new)***

* DO **NOT** REPORT THESE DATA ITEMS FOR BRIDGES AND CULVERTS UNDER FILL

Section 2.1 – Span Material & Type

- Format AN (3), Frequency I [SNBI pg. 56-57]
- Many-to-One
- Item captures how spans of the reported bridge configuration are classified and designated
- Report the assigned span configuration designation using one of the following codes:

  M## Main

  A## Approach

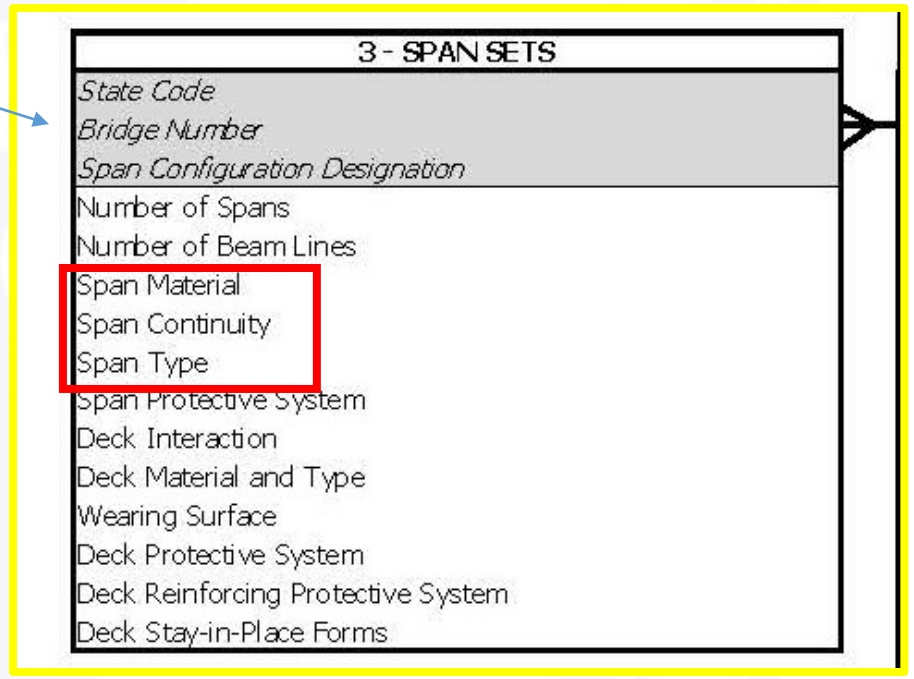
  C## Culvert

  V## Culvert extension

  W## Widening

Section 2.1 – Span Material & Type

- Key Point: Data items are reported for each **unique span configuration**
- **Unique Span Configuration**
  - *Characterizes all span units that have the same* ***Span Material, Span Continuity, and Span Type***



Section 2.1 – Span Material & Type

- Replace “##” characters with sequential numbers, with leading zeros, assigned to each span configuration
  - Replacing the “##” characters in the codes with a sequential number identifies each unique span configuration present on the bridge
    - Examples: M01, A01, A02….
- Except for culverts, each bridge has at least one main span
  - Main spans include all spans of most bridges or the major span(s) of a sizable bridge

Section 2.1 – Span Material & Type

- SNBI definition for Culvert
  - A structure comprised of one or more barrels, beneath an embankment and designed structurally to account for soil-structure interaction
  - These structures are hydraulically and structurally designed to convey water, sediment, debris, and, in many cases, aquatic and terrestrial organisms through roadway embankments
  - Culvert barrels have many sizes and shapes and have inverts that are either integral or open, i.e., supported by spread or pile-supported footings
  - Many culverts take advantage of headwater submergence of the inlet to increase hydraulic efficiency and economy

Section 2.1 – Span Material & Type

- A bridge may or may not have approach spans
  - Approach spans are typically those of a different material, type, or design than the main span and are typically at one or both ends of the main span
- Consider the span(s) of vaulted abutments as an approach span
- Use code C for spans that convey water through or under a roadway embankment and are designed hydraulically to take advantage of submergence to increase water-carrying capacity
- Use code V when a culvert is extended using dissimilar construction
- Use code W for widened portions of main or approach spans with dissimilar construction
  - Widening data sets do not contribute to the calculation of the total number of spans for the bridge

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Section 2.1 – Span Material & Type

- Example 1
  - Steel truss main span bridge. Three prestressed concrete multi-beam approach spans at the north end. Two steel multi-beam approach spans at the south end.
    - Bridge has three span data sets
      - Report ***M01*** for the steel truss data set
      - Report ***A01*** for the north approach data set
      - Report ***A02*** for the south approach data set

Section 2.1 – Span Material & Type

- Example 2
  - Single span reinforced concrete tee-beam bridge widened with prestressed concrete box beams
    - Bridge has two span data sets
      - Report ***M01*** for the reinforced concrete tee-beam data set
      - Report ***W01*** for the prestressed concrete box beams data set
- Example 3
  - Twelve (12) span bridge: Six (6) main spans are weathering steel beams – Six (6) main spans are prestressed concrete I-beams
    - Bridge has two span data sets
      - Report ***M01*** for the steel beam data set
      - Report ***M02*** for the prestressed concrete I-beam data set

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Section 2.1 – Span Material & Type

- B.SP.03 Number of Beam Lines (new)
  - Format N (3,0), Frequency I [SNBI pg. 59]
  - Report the number of principal beam lines
  - Report 1 for bridges where Item B.SP.06 (Span Type) is F01, F02, S01, or S02
    - Frame – three-sided (F01) or four-sided (F02)
    - Slab – solid (S01) or voided (S02)
  - Report 0 for bridges where Item B.SP.06 (Span Type) is P01 or P02
    - Pipe – rigid (P01) or flexible (P02)
  - Principal beam lines
    - Main longitudinal load-carrying members of the superstructure such as beams, girders, trusses, and arches or arch ribs
    - Do **not** include stringers of a floor beam system or spandrel walls of an arch
  - Use the average number of beam lines for bridges with variable number of beam lines within a span configuration, rounded down

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Section 2.1 – Span Material & Type

- B.SP.03 Number of Beam Lines – Examples
  - Example 1
    - Steel through truss bridge with two trusses and ten stringers
      - Report ***2***
  - Example 2
    - Flared three-span tee-beam bridge with 12 beams at the south end, 14 beams in the middle, and 17 beams at the north end
      - Report ***14*** (12 + 14 + 17)/3 = 43/3 = 14.33 = 14
  - Example 3
    - Three-sided frame culvert, lengthened by adding a four-sided box culvert to the end of the barrel. This bridge has two span data sets (i.e., C01 and V01)
      - Report ***1*** for the three-sided frame data set (i.e., B.SP.01 = C01)
      - Report ***1*** for the four-sided frame data set (i.e., B.SP.01 = V01)

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Section 2.1 – Span Material & Type

- B.SP.04 Span Material
  - Format AN (3), Frequency I [SNBI pg. 60-61]
  - Report the principal span material type using one of the following codes:
    - A01 Aluminum
    - C01 Reinforced concrete – cast-in-place
    - C02 Reinforced concrete – precast
    - C03 Prestressed concrete – pre-tensioned
    - C04 Prestressed concrete – cast-in-place post-tensioned
    - C05 Prestressed concrete – precast post-tensioned
    - CX Concrete – other
    - F01 FRP composite – aramid fiber
    - F02 FRP composite – carbon fiber
    - F03 FRP composite – glass fiber
    - FX FRP composite – other
    - I01 Iron – cast
    - I02 Iron – wrought
    - M01 Masonry – block
    - M02 Masonry – stone
    - P01 Plastic – Polyethylene
    - PX Plastic - other
    - S01 Steel – rolled shapes
    - S02 Steel – welded shapes
    - S03 Steel – bolted shapes
    - S04 Steel – riveted shapes
    - S05 Steel – bolted and riveted shapes
    - SX Steel – other
    - T01 Timber – glue laminated
    - T02 Timber – nail laminated
    - T03 Timber – solid sawn
    - T04 Timber – stress laminated
    - TX Timber – other
    - X Other

Section 2.1 – Span Material & Type

- B.SP.05 Span Continuity
  - Format AN (1), Frequency I [SNBI pg. 62]
  - Captures the continuity of the span(s) in the configuration
  - Report the span continuity using one of the following codes:
    - 1 Simple or single span
    - 2 Continuous
    - 3 Continuous for live loads only
    - 4 Cantilever
    - 5 Cantilever with pin and hanger
    - 6 Frame
    - 7 Buried

Section 2.1 – Span Material & Type

- Use code 2 for bridges designed continuous for permanent (dead) loads and live loads
- Also, use code 2 for cable stayed and suspension bridges, and for multi-span arches
- Use code 3 for bridges designed as simple spans for permanent (dead) loads and continuous for live loads
  - When it is unknown if the superstructure was designed as continuous for live loads, code this item consistent with the assumption used in the load rating calculations
- Use code 6 for three-sided and four-sided frames that are not buried
- Use code 7 for pipe culverts and other structures that rely on soil-structure interaction to support vertical loads

Section 2.1 – Span Material & Type

- B.SP.06 Span Type
  - Format AN (3), Frequency I [SNBI pg. 63-64]
  - Report the span type using one of the following codes:
    - A01 Arch – under fill without spandrel
    - A02 Arch – open spandrel
    - A03 Arch – closed spandrel
    - A04 Arch – through
    - A05 Arch – tied
    - B01 Box girder/beam – single
    - B02 Box girder/beam – multiple adjacent
      - Adjacent are those sections that are placed directly next to each other and are touching or nearly touching
    - B03 Box girder/beam – multiple spread
      - Spread are those sections that are spaced so that the deck spans the space between the sections
    - B04 Box girder/beam – segmental
    - F01 Frame – three-sided
      - Use for three-sided rigid frames
    - F02 Frame – four-sided
      - Use for rigid four-sided concrete box bridges
    - F03 Frame – K-shaped
    - F04 Frame – delta-shaped
    - G01 Girder/beam – I-shaped adjacent
    - G02 Girder/beam – I-shaped spread
    - G03 Girder/beam – tee-beam
    - G04 Girder/beam – inverted tee-beam
    - G05 Girder/beam – double-tee adjacent
    - G06 Girder/beam – double-tee spread
    - G07 Girder/beam – channel adjacent
    - G08 Girder/beam – channel spread
    - G09 Girder/beam – girder & floor beam
      - Use for superstructures with girder and floor beam systems regardless of the girder shape
    - G10 Girder/beam – through girder
      - Use for through girder type superstructures regardless of the girder shape

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Section 2.1 – Span Material & Type

- B.SP.06 Span Type (cont.)
  - GX Girder/beam – other
  - L01 Cable – suspension
  - L02 Cable – cable-stayed
  - L03 Cable – extradosed
  - LX Cable – other
  - M01 Movable – vertical lift
  - M02 Movable – bascule
  - M03 Movable – swing
  - MX Movable – other
  - P01 Pipe - Rigid
  - P02 Pipe – Flexible
    - Use for pipes that rely on the stability of surrounding soils to maintain their structural shape
  - S01 Slab – solid
  - S02 Slab – voided
  - T01 Truss – deck
  - T02 Truss – through
  - T03 Truss – pony
  - X01 Other – railroad flat car
  - X02 Other – ferry transfer
  - X03 Other – floating
  - X Other

Section 2.1 – Span Material & Type

- B.SP.07 Span Protective System (new)
  - Report the span protective system using one of the following codes:
    - 0 None
      - Use when the span is unprotected
      - Use when unprotected steels either never were coated or currently have no signs of coating systems, and have no protective systems such as cathodic protection or weathering chemistry
    - A01 Admixture – internally sealed
    - A02 Admixture – low permeability
    - A03 Admixture – polymer impregnated
    - A04 Admixture – corrosion inhibitor
    - A05 Admixture – ASR inhibitor
    - AX Admixture – other

Section 2.1 – Span Material & Type

- Codes (cont.)
  - C01 Coating – paint
    - Use for weathering steel that has been painted
    - Use for paints and stains on timber
  - C02 Coating – sealer
    - Use for sealers such as silanes, siloxanes, linseed oils, etc.
  - C03 Coating – hot dip galvanizing
  - C04 Coating – metalizing/thermal spray
  - CX Coating – other
  - E01 Encasement – concrete
  - EX Encasement – other
  - M01 Membrane – built-up
  - M02 Membrane – sheet
  - M03 Membrane – liquid applied
  - MU Membrane – unknown
  - MX Membrane – other
  - P01 Patina – uncoated weathering steel
    - Use only for weathering grades of steel
  - S01 Sacrificial – cathodic, passive
  - S02 Sacrificial – cathodic, active
  - SX Sacrificial – other
  - T01 Treated – timber preservative
    - Use for oil-based or water-borne timber preservatives
  - U Unknown
  - X Other

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Section 2.1 – Span Material & Type

- B.SP.07 Span Protective System (cont.)
  - Code consistent with the material reported for Item B.SP.04 (Span Material)
  - Non-protective anti-graffiti and aesthetic coatings are **not** considered when coding this item
  - In cases where the span configuration may have a combination of protective systems
    - Use the code for the predominant protective system based on protected area
  - In cases where multiple systems protect the same area
    - Use the code for the outermost protective layer
  - Use appropriate code for span members under fill that have a protective system

Section 2.1 – Span Material & Type

- B.SP.08 Deck Interaction (new)
  - Captures the type of structural interaction that occurs between the bridge deck and superstructure
    - May indicate the importance of the deck to the overall stability and capacity of the bridge
  - Report the type of interaction between the superstructure and deck for the span configuration using one of the following codes:
  - CS Composite – shored construction
    - Indicates the deck acts composite with the superstructure, but without the deck the superstructure requires shoring to carry its own self weight, the weight of the deck concrete prior to curing, or both
  - CU Composite – unshored construction
    - Indicates the deck acts composite with the superstructure, and the superstructure can carry its own self-weight, plus the deck concrete prior to curing
  - IM Integral or monolithic
    - Indicates the deck was cast or fabricated of the same material and at the same time as the superstructure and the two can be expected to act as a unit
    - Use IM for slabs, orthotropic steel decks
  - NC Non-composite
    - Indicates the deck and the superstructure act independently
- Do **not** report this item when Item B.SP.09 (Deck Material and Type) is 0 (i.e., None)

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Section 2.1 – Span Material & Type

- B.SP.09 Deck Material and Type
  - A01 Aluminum
  - C01 Reinforced concrete – cast-in-place
  - C02 Reinforced concrete – precast
  - C03 Prestressed concrete – pre-tensioned
  - C04 Prestressed concrete – cast-in-place post-tensioned
  - C05 Prestressed concrete – precast post-tensioned
  - CX Concrete – other
  - Use code C02, C03, or C05, as applicable, for full depth precast panels only
  - Use code C01 or C04, as applicable, for cast-in-place concrete on partial depth structural panels that are not just considered stay-in-place forms
  - F01 FRP composite – aramid fiber
  - F02 FRP composite – carbon fiber
  - F03 FRP composite – glass fiber
  - FX FRP composite – other
  - S01 Steel – open grid
  - S02 Steel – filled or partially filled grid
  - S03 Steel – plate
  - S04 Steel – orthotropic
  - S05 Steel – corrugated
  - SX Steel – other
  - T01 Timber – glue laminated
  - T02 Timber – nail laminated
  - T03 Timber – solid sawn
  - T04 Timber – stress laminated
  - TX Timber – other
  - X Other

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Section 2.1 – Span Material & Type

- B.SP.09 Deck Material and Type (cont.)
  - In cases where the superstructure configuration may have a combination of deck materials and/or types
    - Code the predominant deck material and type based on the deck area
  - Use the applicable code for superstructure types with integral top flanges that serve as the deck, such as concrete tee-beams and box beams/girders
  - For slabs, and for the slab portion of three-sided and four-sided concrete rigid frame bridges and culverts **not under fill**
    - Use the same applicable material code as used in Item B.SP.04 (Span Material)

Section 2.1 – Span Material & Type

- B.SP.10 Wearing Surface
  - Report the predominant wearing surface material type protecting the deck or slab for the span configuration using one of the following codes
  - 0 None
    - Use when no additional sacrificial concrete thickness or wearing surface is included on the deck or slab
  - B01 Bituminous (asphalt)
  - C01 Concrete – monolithic
    - Use when there is an additional sacrificial thickness cast concurrently with the structural deck or slab
  - C02 Concrete – unmodified
    - Use when an additional placement of concrete of the same concrete material as the deck or slab is placed after the deck or slab has cured
  - C03 Concrete – latex modified
  - C04 Concrete – low slump
  - C05 Concrete – fiber reinforced
  - C06 Concrete – microsilica
  - C07 Concrete – polyester
  - CX Concrete – other
  - CU Concrete – unknown
    - Use when a concrete wearing surface exists, but the specific material composition is unknown

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Section 2.1 – Span Material & Type

- B.SP.10 Wearing Surface (cont.)
  - E01 Earth – gravel or soil
  - P01 Polymer – epoxy
  - P02 Polymer – polyester
  - PX Polymer – other
  - S01 Steel
    - Use when a steel grid deck is fabricated with an additional sacrificial thickness
    - Not intended for temporary steel plates
  - T01 Timber – running planks
    - Use where running planks are added on timber decks or slabs
  - X Other
  - When a span configuration has a combination of wearing surface types, code the predominant wearing surface type based on the deck or slab area
  - Do not consider patching materials when coding this item
  - Do not report this item when Item B.SP.09 (Deck Material and Type) is 0 (i.e., None)

Section 2.1 – Span Material & Type

- B.SP.11 Deck Protective System
  - Report the deck protective system for the span configuration using one of the following codes:
    - 0 None
      - Use when there is no known internal or external protective system in place
    - A01 Admixture – internally sealed
      - Use for internally sealed concrete systems that use wax beads in the concrete
        - After the concrete cures, it is heated to melt the wax and seal the concrete
    - A02 Admixture – low permeability
      - Use when low permeability concrete is used with admixtures such as flyash, microsilica, or slag
    - A03 Admixture – polymer impregnated
    - A04 Admixture – corrosion inhibitor
    - A05 Admixture – ASR inhibitor
      - Use when admixtures are used to inhibit alkali-silica reactivity (ASR)
    - AX Admixture – other

Section 2.1 – Span Material & Type

- B.SP.11 Deck Protective System
  - Codes (cont.):
    - C01 Coating – paint
    - C02 Coating – silane/siloxane*
    - C03 Coating – methacrylate*
      - *Do not use codes C02 and C03 when the material is applied for localized crack repair
    - CX Coating – other
    - M01 Membrane – built up
      - Use when the membrane is built up using combined layers of liquid and preformed/sheet membranes
    - M02 Membrane – sheet
    - M03 Membrane – liquid applied
    - MU Membrane – unknown
      - Use when a membrane exists, but the type is unknown
    - MX Membrane – other
      - Use when a membrane type is known, but does not match the types specified for codes M01, M02, or M03

Section 2.1 – Span Material & Type

- B.SP.11 Deck Protective System
  - Code consistent with the predominant material reported in Item B.SP.09 (Deck Material and Type)
  - In cases where the deck may have a combination of protective systems, use the code for the predominant protective system based on protected area
  - In cases where multiple systems protect the same area, use the code for the outermost protective layer
  - Do not report this item when Item B.SP.09 (Deck Material and Type) is 0 (i.e., None)

Section 2.1 – Span Material & Type

- B.SP.12 Deck Reinforcing Protective System
  - Report the type of deck reinforcing protective system for the span configuration using one of the following codes for concrete decks and slabs:
    - 0 None
      - Use when steel reinforcement is unprotected, such as with black steel
    - C01 Coating – epoxy coated
    - C02 Coating – galvanized
    - C03 Coating – metalized
    - CX Coating – other
      - Use codes C01 to CX when any (e.g., top mat only) or all the reinforcing steel in the deck is protected by the selected steel type*

Section 2.1 – Span Material & Type

- B.SP.12 Deck Reinforcing Protective System
  - Codes (cont.):
    - R01 Reinforcing – stainless, clad
    - R02 Reinforcing – stainless, solid
    - R03 Reinforcing – high chromium
    - R04 Reinforcing – FRP, aramid fiber
    - R05 Reinforcing – FRP, carbon fiber
    - R06 Reinforcing – FRP, glass fiber
    - R07 Reinforcing – FRP, other
    - RX Reinforcing – other
      - *Use codes R01 to RX when any (e.g., top mat only) or all the reinforcing steel in the deck is protected by the selected steel type*

Section 2.1 – Span Material & Type

- B.SP.12 Deck Reinforcing Protective System
  - Codes (cont.):
    - S01 Sacrificial – cathodic, passive
    - S02 Sacrificial – cathodic, active
      - Use when impressed currents are used as the cathodic protection system
    - SX Sacrificial – other
    - X Other
    - In cases where the span(s) may have a combination of protective systems, use the code for the predominant protective system based on protected area
    - In cases where multiple systems protect the same area, use the code for the outermost protective layer
    - If the top and bottom mat have different protective systems, report the protective system for the top mat
    - Do not consider bar chairs or other reinforcing steel supports when coding this item
    - Report this item only if Item B.SP.09 (Deck Material and Type) is concrete (i.e., codes C01 to CX)

Section 2.1 – Span Material & Type

- B.SP.13 Deck Stay-In-Place Forms (new)
  - Do not report this item when Item B.SP.09 (Deck Material and Type) is 0
  - Report the type of deck stay-in-place form for the span configuration using one of the following codes:
    - 0 None
    - C01 Concrete – reinforced
      - Use when a precast reinforced concrete panel (partial depth) is used with a cast-in-place reinforced concrete placement on top
    - C02 Concrete – prestressed
      - Use when a precast prestressed concrete panel (partial depth) is used with a cast-in-place reinforced concrete placement on top
    - F01 FRP composite
    - M01 Metal
    - T01 Timber
    - X Other
    - When a span configuration has a combination of stay-in-place form types
      - Code the predominant type based on the deck area
    - Not intended to be used for materials installed only for debris shielding, or when Item B.SP.09 (Deck Material and Type) is S05 (i.e., Steel – corrugated)

Section 2.2 – Substructure Material & Type

- Data items in this subsection identify the substructure and foundation material(s) and type(s)for the bridge and are considered part of the Substructure Data Set
  - Items have a many-to-one relationship with the bridge when appliable
- Data items are reported for each substructure configuration present in the bridge
  - A substructure configuration characterizes all substructure units that have the same material, type and foundation type
  - Substructures of similar configuration do not need to be adjacent to be reported in the same data set
  - Data items are not reported when item B.SP.06 (Span Type) is a pipe
  - Deck and superstructure are not otherwise considered in the determination of a substructure set
  - Data typically remain static once a bridge has been inventoried

NextLevel INDIANA

Section 2.2 – Substructure Material & Type

- Data Relationships – Substructure Sets

Many Substructure Configuration Designations

to

One Bridge

- Code Description
- A## Abutment
- P## Pier or Bent
- W## Widening

4 - SUBSTRUCTURE SETS
State Code
Bridge Number
Substructure Configuration Designation
~~Number of Substructure Units~~
~~Substructure Material~~
Substructure Type
~~Substructure Protective System~~
Foundation Type
Foundation Protective System

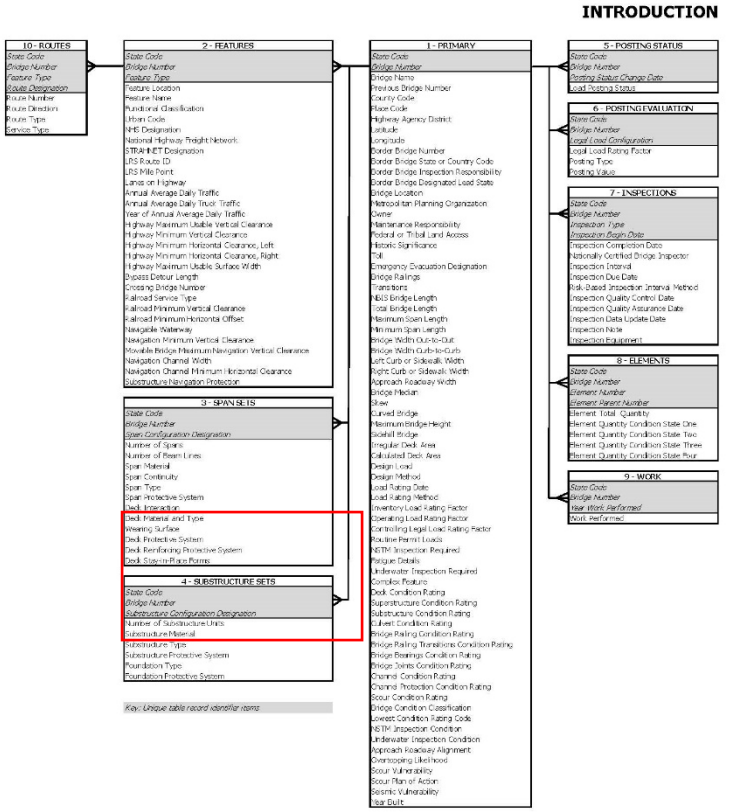


Figure 1. SNBI data relationships.

NextLevel INDIANA

Section 2.2 – Substructure Material & Type

- Items (All New)

From datacrosswalk.xlsx file at FHWA webpage

SNBI ID	Data Tag	SNBI Item Name	SNBI Format	1995 Coding Guide ID	1995 Coding Guide Item Name/Description	1995 Coding Guide	Clean Transition?
B.SB.01	BSB01	Substructure Configuration Designation	AN (3)	N/A	N/A	N/A	No
B.SB.02	BSB02	Number of Substructure Units	N (3,0)	N/A	N/A	N/A	No
B.SB.03	BSB03	Substructure Material	AN (3)	N/A	N/A	N/A	No
B.SB.04	BSB04	Substructure Type	AN (3)	N/A	N/A	N/A	No
B.SB.05	BSB05	Substructure Protective System	AN (3)	N/A	N/A	N/A	No
B.SB.06	BSB06	Foundation Type	AN (3)	N/A	N/A	N/A	No
B.SB.07	BSB07	Foundation Protective System	AN (3)	N/A	N/A	N/A	No

Item ID	Data Item	Value (1)	Value (2)	Value (3)	Value (4)	Value (5)
B.SB.01	Substructure Configuration Designation		A02	P01		
B.SB.02	Number of Substructure Units					
B.SB.03	Substructure Material					
B.SB.04	Substructure Type					
B.SB.05	Substructure Protective System					
B.SB.06	Foundation Type					
B.SB.07	Foundation Protective System					

NextLevel INDIANA

Section 2.2 – Substructure Material & Type

- B.SB.01 Substructure Configuration Designation (new)
  - Frequency I (initial)
  - Many-to-one
  - Report designation using the following:
    - A## Abutment: Located at end of bridge
    - P## Pier or Bent: Intermediate locations, Piers have 1 footing, Bents have no footing or have multiple footings
    - W## Widening: Used for widened portions of abutments or piers/bents with dissimilar substructure
    - The substructure is the portion of the bridge below the bearings or below the springline of an arch
  - Reported for each unique configuration based on Substructure Material, Substructure Type and Foundation Type

- B.SB.02 Number of Substructure Units (New)

Section 2.2 – Substructure Material & Type

- B.SB.03 Substructure Material (New)

Code	Code Description
0	None
A01	Aluminum
C01	Reinforced concrete – cast-in-place
C02	Reinforced concrete – precast
C03	Prestressed concrete – pre-tensioned
C04	Prestressed concrete – cast-in-place post-tensioned
C05	Prestressed concrete – precast post-tensioned
CX	Concrete – other

Code	Code Description
E01	Earth – reinforced soil
F01	FRP composite – aramid fiber
F02	FRP composite – carbon fiber
F03	FRP composite – glass fiber
FX	FRP composite – other
I01	Iron – cast
I02	Iron – wrought
M01	Masonry – block
M02	Masonry – stone
P01	Plastic – Polyethylene
PX	Plastic – other

Code	Code Description
S01	Steel – rolled shapes
S02	Steel – welded shapes
S03	Steel – bolted shapes
S04	Steel – riveted shapes
S05	Steel – bolted / riveted shapes
S06	Steel – pipe
SX	Steel – other
T01	Timber – glue laminated
T02	Timber – nail laminated
T03	Timber – solid sawn
T04	Timber – stress laminated
TX	Timber – other
X	Other

- Use 0 – None when superstructure rests directly on the foundation
- INDOT substructures typically C01 – Reinforced concrete cast-in-place

NextLevel INDIANA

Section 2.2 – Substructure Material & Type

- B.SB.04 Substructure Type (New)

Code	Code Description
0	None

Code	Code Description
A01	Abutment – cantilever/wall
A02	Abutment – stub
A03	Abutment – open/spill through
A04	Abutment – integral
A05	Abutment – semi-integral
A06	Abutment – gravity
A07	Abutment – counterfort
A08	Abutment – pile bent w/lagging
A09	Abutment – crib
A10	Abutment – cellular/vaulted
A11	Abutment – reinforced soil
A12	Abutment – footing only
AX	Abutment – other

Code	Code Description
B01	Bent – column or open
B02	Bent – column with web wall
B03	Bent – pile
B04	Bent – straddle or c-shaped
BX	Bent – other

Code	Code Description
P01	Pier – wall
P02	Pier – single column
P03	Pier – multiple column
P04	Pier – multiple column w/web wall
P05	Pier – straddle or c-shaped
P06	Pier – movable bridge
P07	Pier – tower
P08	Pier – footing only
PX	Pier – other

Code	Code Description
U	Unknown
X	Other

- In cases where the substructure may have a combination of designs due to retrofitting actions use the code for the predominant design (not to be confused with widening situations)
- Both piers and bents provide same function
  - Pier has only one footing which may serve as a pile cap, bents have no footing or multiple footings
- Use 0 – None when superstructure rests directly on the foundation

NextLevel INDIANA

Section 2.2 – Substructure Material & Type

- B.SB.05 Substructure Protective System (new)

Code	Code Description
0	None
A01	Admixture – internally sealed
A02	Admixture – low permeability
A03	Admixture – polymer impregnated
A04	Admixture – corrosion inhibitor
A05	Admixture – ASR inhibitor
AX	Admixture – other
C01	Coating – paint
C02	Coating – sealer
C03	Coating – galvanizing/metalizing
CX	Coating – other

Code	Code Description
E01	Encasement – concrete
EX	Encasement – other
P01	Patina – weathering steel
S01	Sacrificial – cathodic, passive
S02	Sacrificial – cathodic, active
SX	Sacrificial – other
T01	Treated – timber preservative
X	Other

- Code consistent with the predominant material
- Do not report this item when Item B.SB.04 (Substructure Type) is 0.

Section 2.2 – Substructure Material & Type

- B.SB.06 Foundation Type (new)

Code	Code Description
E01	Earth – reinforced soil

Code	Code Description
F01	Footing – not on rock
F02	Footing – on rock
F03	Footing – on reinforced soil

Code	Code Description
P01	Pile – steel H-shape
P02	Pile – steel pipe
P03	Pile – concrete, cast-in-place
P04	Pile – prestressed concrete
P05	Pile – timber
P06	Pile – auger cast
P07	Pile – micropile
P08	Pile – composite
P09	Pile – FRP composite
PX	Pile – other

Code	Code Description
S01	Drilled shaft – single
S02	Drilled shafts – multiple
S03	Caisson

Code	Code Description
U	Unknown
X	Other

- Do not consider localized repairs to original foundation types
- Every substructure type will have a foundation type
- E01 – Earth - When superstructure bears directly on reinforced soil mass
- S03 – Caisson – Use for footing sunk into position by excavation through or beneath caisson structure

NextLevel INDIANA

Section 2.2 – Substructure Material & Type

- B.SB.07 Foundation Protection System (new)

Code	Code Description
0	None
A01	Admixture – internally sealed
A02	Admixture – low permeability
A03	Admixture – polymer impregnated
A04	Admixture – corrosion inhibitor
A05	Admixture – ASR inhibitor
AX	Admixture – other
C01	Coating – paint
C02	Coating – sealer
C03	Coating – galvanizing/metalizing
CX	Coating – other

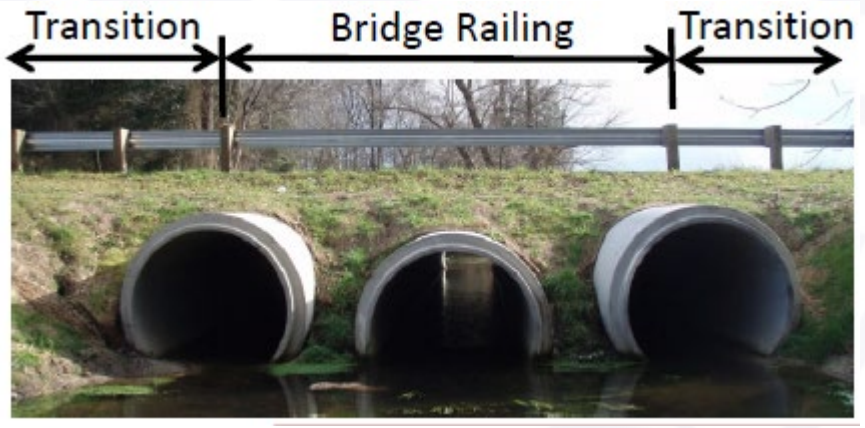
Code	Code Description
E01	Encasement – concrete
EX	Encasement – other
P01	Patina – weathering steel
S01	Sacrificial – cathodic, passive
S02	Sacrificial – cathodic, active
SX	Sacrificial – other
T01	Treated – timber preservative
U	Unknown
X	Other

- Code consistent with the predominant material reported in item B.SB.06 (foundation type)
- 0 – None – Use when foundation is unprotected
- Anti-graffiti coatings are not considered

NextLevel INDIANA

Section 2.3 – Roadside Hardware

- Data items in this subsection identify crash tested roadside hardware on the bridge
- Data items are considered part of the Primary Data Set and have a one-to-one relationship with a bridge
- Data typically remains static; Commonly associated with the bridge
- Inventoried to indicate if hardware at bridge is required, present, or has been crash tested. Does not consider condition



Section 2.3 – Roadside Hardware

- One Data Item – to – One Bridge

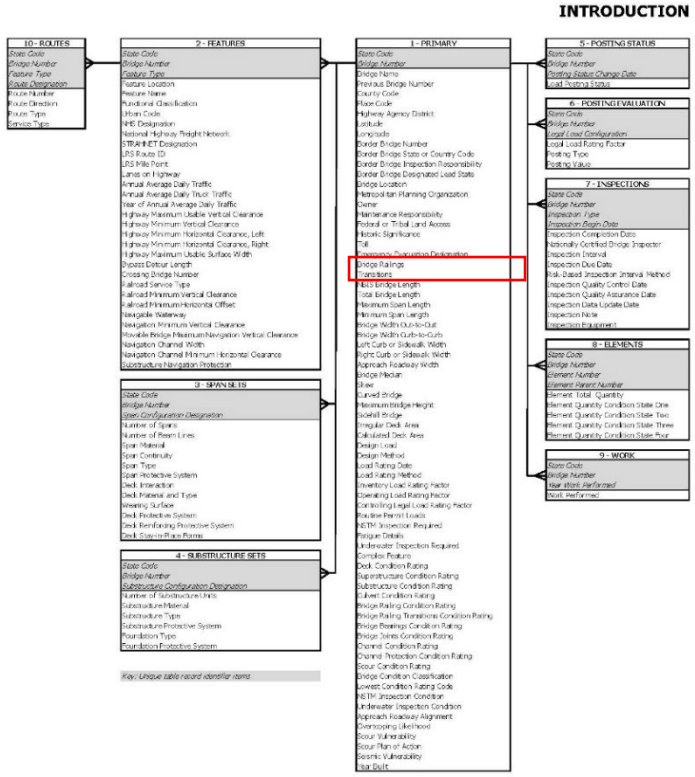


Figure 1. SNBI data relationships.

1 - PRIMARY
State Code
Bridge Number
Bridge Name
Previous Bridge Number
County Code
Place Code
Highway Agency District
Latitude
Longitude
…
…
Bridge Railings
Transitions
…

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Section 2.3 – Roadside Hardware

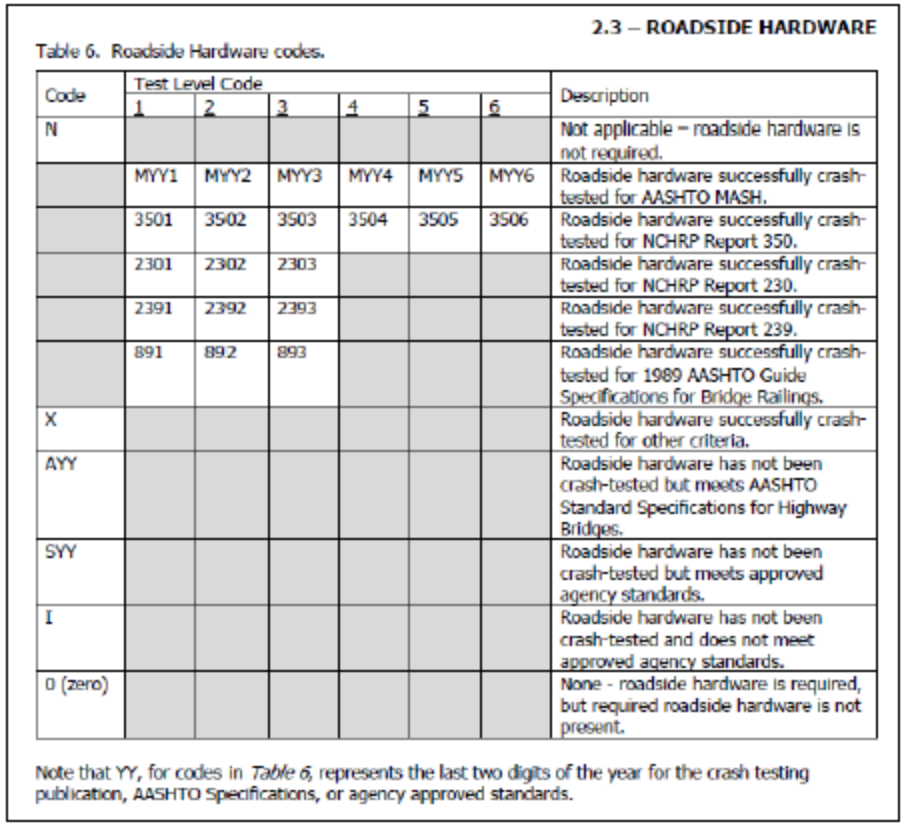
- One Data Item – to – One Bridge

From datacrosswalk.xlsx file at FHWA webpage

SNBI ID	Data Tag	SNBI Item Name	SNBI Format	1995 Coding Guide ID	1995 Coding Guide Item Name/Description	1995 Coding Guide Format	Clean Transition?
B.RH.01	BRH01	Bridge Railings	AN (4)	36A	Traffic Safety Features	1/AN	Partial
B.RH.02	BRH02	Transitions	AN (4)	36B	Traffic Safety Features	1/AN	Partial

Item ID	Data Item	Value
B.RH.01	Bridge Railings	
B.RH.02	Transitions	

- If more than one type of bridge railing or bridge railing transition use the code that first applies going from bottom (0-zero) of Table 6 to the top (MYY).



2.3 – ROADSIDE HARDWARE

Table 6. Roadside Hardware codes.

Code	Test Level Code 1	2	3	4	5	6	Description
N							Not applicable – roadside hardware is not required.
	MYY1	MYY2	MYY3	MYY4	MYY5	MYY6	Roadside hardware successfully crash-tested for AASHTO MASH.
	3501	3502	3503	3504	3505	3506	Roadside hardware successfully crash-tested for NCHRP Report 350.
	2301	2302	2303				Roadside hardware successfully crash-tested for NCHRP Report 230.
	2391	2392	2393				Roadside hardware successfully crash-tested for NCHRP Report 239.
	891	892	893				Roadside hardware successfully crash-tested for 1989 AASHTO Guide Specifications for Bridge Railings.
X							Roadside hardware successfully crash-tested for other criteria.
AYY							Roadside hardware has not been crash-tested but meets AASHTO Standard Specifications for Highway Bridges.
SYY							Roadside hardware has not been crash-tested but meets approved agency standards.
I							Roadside hardware has not been crash-tested and does not meet approved agency standards.
0 (zero)							None - roadside hardware is required, but required roadside hardware is not present.

Note that YY, for codes in *Table 6*, represents the last two digits of the year for the crash testing publication, AASHTO Specifications, or agency approved standards.

NextLevel INDIANA

Section 2.3 – Roadside Hardware

QUESTIONS?????