List of WSDOT Elements by Number

4-1 Introduction

This chapter defines the Washington State Department of Transportation (WSDOT) approach for inspection, evaluation and recording of the structural condition state of the bridge structures within the WSDOT obligation to the National Bridge Inventory.

Local Agencies with inventory not on the National Highway System are encouraged, but not required, to use the WSDOT Bridge Element approach as defined in this chapter.

Doing so will enable the Local Agency to benefit from WSDOT Management strategies and lessons learned.

The intent of the element-level condition reporting is to supplement the National Bridge Inventory (NBI) structural condition state of the Bridge Deck, Superstructure, and Substructure. NBI information such as bridge location, traffic, and geometry is useful, however, element-level condition reporting provides a greater degree of information from which to draw upon to more effectively apply solutions to emergent bridge preservation and management needs.

Though the NBIS provides a consistent standard for the collection of bridge data, it is not comprehensive enough to provide performance-based decision support that includes economic considerations.

Limitations within the NBI system include:

- Each bridge is divided into only three major components for condition assessment: deck, superstructure, and substructure. This level of detail is not sufficient to identify appropriate repair strategies, or to accurately estimate repair/rehabilitation/replacement costs.
- Each of the three major components are rated on a 0-9 scale by severity of deterioration, without identifying the deterioration process at work or the extent of deterioration.
- NBI condition ratings vary based on the broad language of the condition definitions. Because the bridges include multiple distress symptoms and ratings to describe the overall or “average” condition of the bridge, it is often difficult to decide what the “average” condition is when a bridge has mainly localized problems.
- NBI does not provide a method to inspect or track the performance of items such as paint, overlays, and expansion joints.

WSDOT recognized a different strategy towards future bridge preservation was needed in the early 1980’s. A comprehensive deck testing program existed at the time and the Bridge Inspection Program needed to have a connection to the NBI bridge condition rating convention.

WSDOT elements have been in use since 1992 and are designed to be practical for the inspector, useful to a bridge manager, and accurately capture bridge conditions.

WSDOT elements have matured since 1992 and so have the national element philosophies:

- 1985 – NCHRP Project 12-28: Bridgit and Pontis Management software
- 1987 – NCHRP Report 300: Element based Bridge Management System (BMS)
- 1993 – FHWA CoRe Element Report recommendations
- 1996 – AASHTO CoRe Element Guidelines adopted
- 2011 – AASHTO Guidelines for Bridge Element Inspection

- 2014 – FHWA requirement to collect element level bridge inspection data for NHS bridges.
- 2015 – As a supplement to the National Bridge Inventory (NBI) data submission due April 1, 2015, and every year thereafter, each State and Federal agency will also provide element level bridge inspection data for bridges on the NHS to the FHWA for inclusion in the NBI.

Today, a successful Bridge Management System must use supplemental bridge condition data to ensure the effective use of available funds. WSDOT element data has supported WSDOT Bridge needs with minor changes since the year 2008 in the following ways:

- Element data is used to identify current bridge condition, need, and cost.
- Provides a logical and realistic method to prioritize bridge projects.
- Provides realistic and reliable forecasts of future preservation needs and costs.
- Adapts to changes in management philosophies without changing an element definition or category.
- Tracks the performance of desired bridge needs.

4-1.1 *Element Description*

A bridge is divided into three major components which includes the:

- Bridge deck
- Bridge superstructure
- Bridge substructure

Bridge *elements* are individual members comprised of basic shapes and materials connected together to form bridge components. (Ref BIRM Sec. 3.3). The WSDOT Inspection program is based upon documenting the condition state of these elements. This is accomplished through documenting the results of the visual and physical examination of these elements.

4-1.2 *Smart Flag*

The “Smart Flag” provides supplemental information gathered by the Inspector concerning an observed condition or defect that may or may not be included in the National Bridge Inventory element condition state language – and is judged to be necessary in order to accurately document the element commentary.

4-1.3 *Identifying Elements Prior to Inspection*

Details about the design of the bridge are important when identifying the elements. As-built plans should be used to determine the correct elements, and then field verified during the inspection. If as-built plans are not available, then the elements will have to be defined or assumed at the bridge site. Many of the element dimensions for the element total quantity are difficult to determine in the field and it is highly recommended the total quantities be calculated based on contract plan dimensions.

For example, looking at the contract Plans is the only practical way to determine if a bridge deck has plain reinforced steel which is element 12A, or epoxy coated steel which is element 12B because this information is not visible to the inspector. Likewise, field measuring the deck length and width in traffic would not be necessary and usually less accurate than if plan dimensions are available.

An average bridge made of the same material will have six to ten elements. A large or complex bridge may have up to 20 elements. A typical bridge will have a bridge deck, possibly a deck overlay, bridge rails, a primary load carrying member like a prestressed concrete girder, primary substructure support like concrete columns, other elements like abutments, expansion joints and/or bearings.

In order to maintain quality element data, the Inspector is responsible for updating the elements and quantities as they change with time by maintenance or by contract. Many bridges will have construction work that changes the joints, asphalt depth, rail, concrete overlay, or widens the structure, etc. These activities can change elements that apply to the bridge and must be updated accordingly. WSDOT uses a Contract History database to log contract work and for reference. See Section 2-2 for more information on the Contract History database.

4-1.4 *Application of Element Units*

Each element is assigned a unit of measure which quantifies the extent of an observed defect. Unit descriptions are:

- **Square Feet (SF):** Where the surface area is used to document the element condition state, such as deck surface and paint surface elements.
- **Lineal Feet (LF):** Represents the total length of an element and is based on the way it was constructed. For example: A bridge may have been built using five “Prestressed Concrete Girders.” Each girder was individually precast and then put into place at the bridge site. If each girder were 100 feet in length, then the total element quantity would be “500 LF.” If the same bridge was a “Concrete Box Girder” then the total quantity would be “100 LF” since the box girder was constructed as one unit.
- **Each (EA):** Applies to the number of members in a condition state. For example: A bridge may include 5 piles at 3 pier locations for a total pile element quantity of 15. Then, each pile is inspected, evaluated, and recorded in the appropriate condition state. Elements with units of “EA” are coded to reflect the entire member in one condition state, such as pile, where the entire pile is in one of the defined condition states.
- **“Cell”:** Applies to floating bridge concrete pontoon segments.

4-1.5 *Quantifying Element Defects*

To quantify the condition of an element, the first step is to review the element condition state language. A complete list of the condition state descriptions is provided in this chapter.

Similar to the NBI system of evaluation, element condition requires the inspector to evaluate defects and also quantify the defect’s impact to the element or possibly the bridge. A defect evaluation may result in element quantities in CS1, CS2, CS3, or CS4 depending on the location, size, structural importance, or element units.

Element condition state (CS) language is typically based on four condition state levels as noted above. However, it is important to note that only three condition states (CS1, CS2 & CS3) apply to Expansion Joint and Overlay elements. Additionally, certain Smart Flag defects may include only one or two condition states or use all four.

4-1.5.A Affected Quantity

Prior to 2025 the concept of the "Affected quantity" was applied in two ways. Previously beam type and structural slab elements coded in Condition State 4 used a load path consideration, thereby coding the entire span length of the member as being affected. Going forward, with the exception of trusses and joints, "Affected Quantity" is the actual length of the defect, defects, or repairs to the member.

In the case of joints, the percentage of the joint element in any given condition state will determine the recorded length for the purposes of asset management. Trusses are the most difficult because the linear feet quantities represent a 3-dimensional member with chords, verticals, horizontals, sway bracing, etc. Trusses should quantify all defects CS2 through 4 by panel the length of truss. For specific information, see condition state coding instruction for each of the joint and truss elements.

4-1.5.B WSDOT Condition States for Structural Members

The following discusses and summarizes the WSDOT element condition state philosophy for primary structural members. Different condition philosophies apply to some of the non-primary structural elements such as deck/overlays, joints, paint, and smart flags which are specified for each element in Chapter 4, but not discussed in this section.

For additional information and suggestions for superficial, minor, moderate, and major defects in concrete, wood, steel and prestressed concrete, see Exhibits 4-1 through 4-4 located in Appendix 4-A. Inspector judgement should be used for all cases.

Condition State 1: Good Condition – This condition state describes elements with either no defects or elements with insignificant or superficial defects. These defects do not require repair recommendations and are not typically indicative of progressing deterioration. The defects may be inherent to the material or construction methods. Inherent defects may include checks or shakes in timber elements, or patches in concrete elements.

Permanent, in-kind repairs may be considered in Good Condition.

Condition State 2: Fair Condition – This condition state describes elements with minor defects, including completed and effective repairs or patches. Repairs for these defects may be recommended but are not required for serviceability or strength of the element. Minor defects may be indicative of an active deterioration mode; however, this deterioration has been remediated, either with a repair or naturally, or the deterioration is occurring at a slow pace (little change between subsequent inspections).

Any repairs or patches are considered in Fair Condition if they are functioning as intended.

Condition State 3: Poor Condition – This condition state describes elements with moderate defects. Moderate defects may be indicative of an active deterioration mode that will continue if left unchecked. Structural capacity is not significantly affected, and a structural analysis is not recommended, or has already been done to determine capacity is not significantly affected. Repairs may be recommended and necessary to prevent further deterioration.

Existing repairs and patches that are ineffective or failed may be in Poor Condition, with consideration of the original defect.

Condition State 4: Severe Condition – This condition state documents elements with defects that have impacted the structural capacity of the element. Severe defects are typically the product of active deterioration or damage caused by an event (high-load impact, earthquake, etc.). A structural analysis is warranted to determine the safe load carrying capacity of the bridge, or an analysis has been completed and confirmed the capacity is significantly affected. Repairs or other actions may be required to preserve or restore the capacity of the member.

4-1.6 *Reporting Structural History*

There are times when structural information may be known but not visible, or visible and then, at a later time, not visible to the inspector. This can happen to piles/footings that are buried or submerged one inspection and exposed the next. This also applies to asphalt overlays where the deck patching is not visible to the inspector. This type of element information should remain in the element notes until the element condition is known to have changed. An example of an element change would be deck delaminations recorded in CS4 which are not visible to the inspector and are removed by hydro milling during construction of a concrete overlay. The CS4 data does not apply after the concrete overlay is completed and WSDOT element 376 should be deleted from the report and the concrete deck CS4 quantity should be zero.

4-1.7 *Concrete Element Cracking*

The following table is provided for use to distinguish between different sizes of concrete cracks.

Exhibit 4-1 WSDOT Element Concrete Crack Width Guidelines

	Reinforced Concrete		Prestressed Concrete	
	English	Metric	English	Metric
Hairline (HL)	< 0.0625"	< 1.6 mm	< 0.004"	< 0.1 mm
	< 1/16"			
Narrow (N)	0.0625" to 0.125"	1.6 to 3.2 mm	0.004" to 0.009"	0.1 to 0.23 mm
	1/16" to 1/8"			
Medium (M)	0.125" to 0.1875"	3.2 to 4.8 mm	0.010" to 0.030"	0.25 to 0.75 mm
	1/8" to 3/16"			
Wide (W)	> 0.1875"	> 4.8 mm	> 0.030"	> 0.76 mm
	> 3/16"			

Concrete Structural Cracking – For the purpose of evaluating element condition, concrete structural cracks are narrow (or wider) in regions of high shear or moment (see BIRM).

Crack width is significant to the extent that it indicates exposure of rebar to water and/or a structural problem in a concrete element. Generally, most concrete elements will exhibit some level of hairline cracking which is not considered significant from a structural standpoint.

4-1.8 *WSDOT Deck Element to SNBI Deck Overall Rating*

Overall Rating of SNBI Decks was originally addressed here but is now addressed for both SNBI and WSDOT Specific within Chapter 2 Coding Guide.

4-2 Bridge Decks

The intent of the bridge deck elements is to record the top surface deterioration. The Concrete Deck Soffit, slab, or deck-girder elements record the edge and soffit deterioration. Condition States should be supported in the notes for each element. Do not count filling in of the rut as a patch. These locations have filled in a rut with Liquid Concrete or urethane-based repair materials and are not considered a deck structural repair.

All asphaltic patching material on a concrete bridge deck shall be considered a spalled area, or CS3, and is an unacceptable patching material. These materials can be picked out of the spall and will smell like tar.

All bridges will have at least one deck element, even though some may be only a deck surface element. The one exception is an earth filled arch structure with an asphalt pavement surface only.

Traditional concrete bridge decks use elements 12A, 12B, 12C or 12D to record the top surface deterioration; and have the WSDOT Soffit Element (35) to record the structural deterioration. It should be noted for element 12B that epoxy coated rebar in bridge decks became an industry standard in Washington State in the early 1980s.

Non-Traditional concrete decks use elements 12E, 16, or 17 to record the top surface deterioration and the slab or deck-girder elements record the structural deterioration.

Steel and Timber decks use elements 28, 29, 30A, 30B, 31 to record structural deterioration of the top and bottom surface.

Inspectors are encouraged to take the time to locate and describe the patches and spalls on larger structures using photos and descriptions. The preferred documentation format for patching is the number and SF per span. This format is easiest for the next inspector to identify quantity changes.

Quantity estimates must be based on the sum of the estimated length and width of the patched or spalled areas. Approximations based on the percent of area are not useful.

Note: The total quantity for deck elements is the actual bridge deck area. Do not use the reported curb-to-curb when deck curb-to-curb dimensions vary.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
12A	12	**Concrete Deck**	**Units - SF**	12	--	N

This element defines a concrete bridge deck constructed with uncoated steel reinforcement. The total quantity for this element is the actual bridge deck area from curb line to curb line.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
12B	26	**Concrete Deck w/Coated Bars**	**Units - SF**	12	--	Y

This WSDOT element defines a concrete bridge deck constructed with coated (epoxy, galvanizing, stainless steel, fiber reinforced polymer (FRP), etc.) reinforcement. The total quantity for this element is the actual bridge deck area from curb line to curb line.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
12C	20	**Concrete Deck – Lightweight Aggregate**	**Units - SF**	12	--	Y

This WSDOT element defines a lightweight concrete bridge deck constructed with lightweight aggregate and steel reinforcement. The total design weight of the deck is approximately 120 lbs./C.Y. The total quantity for this element is the actual bridge deck area from curb line to curb line.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
12D	16	**Thin Concrete Deck < 6” Thick**	**Units - SF**	12	--	Y

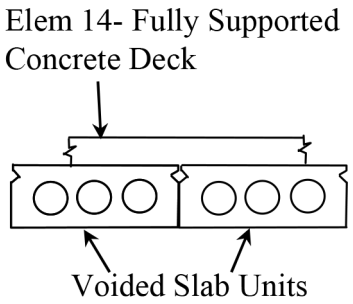
This element defines a concrete bridge deck constructed with a deck that is less than 6” in thickness. The total quantity for this element is the actual bridge deck area from curb line to curb line.

WSDOT BMSE 12E	Prior BMS 14	Fully Supported Concrete Deck	Units - SF	NBE 12	BME --	ADE Y

This WSDOT element defines a fully supported concrete bridge deck constructed with one layer of coated reinforcement (epoxy, galvanizing, stainless steel, etc.). The bridge support surface consists of precast or prestressed girders with no span between the flanges. This WSDOT element may apply to superstructure WSDOT elements 39A, 39C, 109E, 109F, or 110B. The total quantity for this element is the actual bridge deck area from curb line to curb line.

Condition States for WSDOT Elements 12A, 12B, 12C, 12D, and 12E

1. Deck surface defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Deck surface area with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Deck surface area with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Deck surface area with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Abrasion or wear is causing significant section loss and may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.



WSDOT BMSE	Prior BMS	Post-Tensioned Concrete Deck	Units - SF	NBE	BME	ADE
13	15			13	--	N

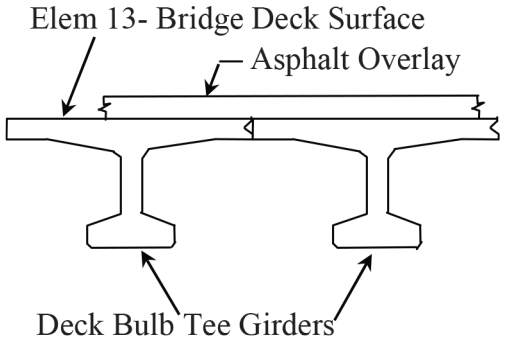
This element is defined by a concrete bridge deck that has transverse or longitudinal post tensioning; and includes the deck on elements 104B Post Tensioned Segmental and 104C Post Tensioned Concrete Box. These decks require a higher level of care for maintenance, special attention by management, and have a higher replacement cost. This element does not include the deck of elements 105 Concrete Box Girder and 104A Prestressed Concrete Tub Girder. The total quantity for this element is the actual bridge deck area from curb line to curb line.

Condition States for WSDOT Element 13 if the top of the deck is visible

1. Deck surface defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.004”)
2. Deck surface area with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.004” - 0.009”) or sealed medium/ wide cracks.
3. Deck surface area with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.010” - 0.030”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Deck surface area with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Abrasion or wear is causing significant section loss and may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar or tensioning strands exhibit corrosion with measurable section loss (Note remaining diameter or cross section). Tensioning strands may be stretched or severed. Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.030”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

WSDOT BMSE	Prior BMS	Bridge Deck Surface - Top Flange	Units - SF	NBE	BME	ADE
16	13			16	--	N

This WSDOT element defines a surface of a bridge deck that consists of a slab or girder without a traditional deck. Usually there is a deck protection system (overlay) present, but in some cases, traffic may be driving directly on the girder or slab. The Bridge Deck Surface consists of precast or prestressed girders with no span between the flanges. This WSDOT element is generally used with superstructure elements 38B, 38D, 39B, 39D, 54, 109E, 109F, or 110B. The total quantity for this element is the actual bridge deck area from curb line to curb line.



WSDOT BMSE	Prior BMS	Bridge Deck Surface - Solid Slab	Units - SF	NBE	BME	ADE
17	--			--	--	Y

This WSDOT element defines a surface of a bridge deck that consists of a solid slab without a traditional deck. Usually there is a deck protection system (overlay) present, but in some cases, traffic may be driving directly on the slab. This WSDOT element is used with superstructure elements 38A, 38C, 39A or 39C, corresponding to SNBI Item BSP06 coded S01 for solid slab. The total quantity for this element is the actual bridge deck area from curb line to curb line.

Condition States for WSDOT Elements 16 and 17 if the top of the slabs or girders are visible

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Deck surface area with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Deck surface area with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Deck surface area with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Abrasion or wear is causing significant section loss and may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
28	28	**Steel Deck – Open Grid**	**Units - SF**	28	--	N

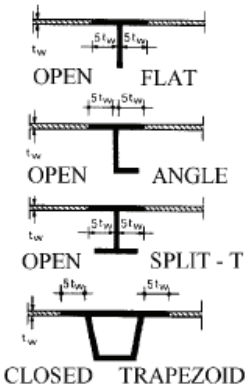
This WSDOT element defines a bridge deck constructed of steel grids that are open and unfilled. The total quantity for this deck WSDOT element is the actual bridge deck area from curb line to curb line.

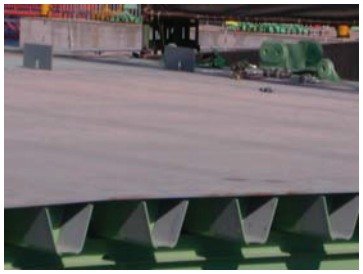
WSDOT BMSE	Prior BMS			NBE	BME	ADE
29	29	**Steel Deck – Concrete Filled Grid**	**Units - SF**	29	--	N

This WSDOT element defines a bridge deck constructed of steel grids with either all of the openings or just those in the wheel lines filled with concrete. The total quantity for this element is the actual bridge deck area from curb line to curb line.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
30A	27	**Steel Orthotropic Deck**	**Units - SF**	30	--	Y

This WSDOT element defines a bridge deck constructed of a flat, deck plate stiffened either longitudinally or transversely, or in both directions. See BIRM, Volume 1, Figure P.1.2.7. The total quantity for this element is the actual bridge deck area curb-to-curb.





WSDOT BMSE	Prior BMS	Deck – Corrugated or Other Steel System	Units - SF	NBE	BME	ADE
30B	30			30	--	N

This WSDOT element generally defines a bridge deck constructed of corrugated metal filled with Portland cement concrete or asphaltic concrete. This element may also be used to identify other non-standard steel decks. The total quantity for this element is the actual bridge deck area from curb line to curb line.

Condition States for WSDOT Elements 28, 29, 30A, and 30B (Structural Decks)

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed.
2. Deck area with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended but may have loose or damaged fasteners. Bolts/rivets may have been replaced.
3. Deck area with moderate defects, failed repairs, or any identified distortion, damaged wires or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Deck area with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

WSDOT BMSE	Prior BMS	Timber Deck	Units - SF	NBE	BME	ADE
31	31			31	--	N

This WSDOT element defines a bridge deck constructed of timber. The deck may be longitudinally or transversely laminated or of planks. The deck may have an overlay or may be constructed with runners of metal or timber. The total quantity for this element is the actual bridge deck area from curb line to curb line.

Condition States for WSDOT Element 31

1. Defects if any are superficial and have no effect on the structural capacity. Decay, insect infestation, cracks, splits, or checks may exist.
2. Deck area with minor distortion or defects not requiring repair or monitoring, and any existing repairs are in place and functioning as intended. Any evidence or presence of rot or insect infestation still has greater than 90% section remaining. Significant checks are not located within tension zones and do not penetrate more than ½ the member thickness. Any splitting does not penetrate the full thickness of the member or is fully arrested within a repair. Connections may have loose fasteners, or superficial corrosion or pack rust but are functioning as intended.
3. Deck area with moderate distortion or defects that may require repair or monitoring, or any existing repairs that have failed or are not functioning as intended. Rot pockets or insect infestation result in less than 90% section remaining. For a remaining shell thickness >= 1-½" location is YELLOW TAGGED. Checks penetrate more than ½ the member thickness at any location or more than 5% of the thickness within a tension zone. Splitting penetrates the full thickness of the member but does not affect capacity. Connections have missing fasteners, broken welds or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity, do not warrant analysis but may require repairs.
4. Deck area with major defects or failed repairs that may require immediate action. Rot pockets or insect infestation have resulted in significant section loss affecting capacity. For a remaining shell thickness < 1-½" location is RED TAGGED. Checks, splits or distortion are significant and are affecting structural capacity. Connections are no longer functioning as intended with missing fasteners, broken welds, distortion, or due to other local timber defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects are affecting structural capacity. Structural analysis is warranted or repairs are essential to restore capacity.

WSDOT BMSE	Prior BMS	Fiber Reinforced Polymer (FRP) Deck	Units - SF	NBE	BME	ADE
32	32			60	--	Y

This WSDOT element defines a bridge deck constructed of fiber reinforced polymer. The total quantity for this element is the actual bridge deck area from curb line to curb line.

Condition States for WSDOT Element 32

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Deck surface area with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Deck surface area with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Deck surface area with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Abrasion or wear is causing significant section loss and may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

WSDOT BMSE	Prior BMS	Concrete Deck Soffit	Units - SF	NBE	BME	ADE
35	35			12	--	Y

This WSDOT element defines the bottom (or undersurface) and edge of a concrete deck and is to be included with concrete WSDOT deck elements 12A, 12B, 12C, and 12D. It is extremely valuable when an asphalt overlay exists on the top surface of the deck. The purpose of the element is to identify decks that may have a reduced structural capacity through visual inspections of the deck soffit. Element 35 does not apply if steel stay-in-place forms are present since the soffit is not visible. To be consistent with the deck quantity, the total quantity for this element is the actual bridge deck area from curb line to curb line. Delaminations on concrete soffits over roadways may pose a danger to traffic below the bridge. In this situation, a repair should be recommended to correct the condition.

Condition States for WSDOT Element 35

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Soffit area with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Soffit area with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended..
4. Soffit area with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

WSDOT BMSE	Prior BMS	Deck Rebar Cover - Smart Flag	Units - EA	NBE	BME	ADE
36	36			--	--	Y

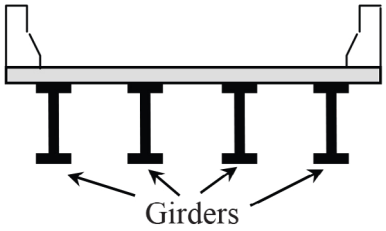
This does not apply to deck spalling with exposed rebar. This element is used to identify the top surface of bridge decks with concrete cover less than 1 inch and having rebar exposed. This condition results from either lack of cover during construction or general rutting that has exposed rebar. Deck patching is often difficult at these locations. This flag will determine method of deck rehabilitation. Report existence of exposed reinforcement in CS1 or CS2 as appropriate.

1. Deck top surface has exposed reinforcement due to lack of cover.
2. Deck top surface has exposed reinforcement within rutted wheel.

4-3 Superstructure

4-3.1 *Girders*

A girder is defined as any longitudinal structural member (single web or box section) that directly supports the bridge deck. A girder type bridge will typically have two or more girders. Girders may be constructed of the following typical materials: Rolled, welded or bolted (riveted) steel sections; Post tensioned, prestressed or reinforced concrete sections; or Timber sections.



4-3.2 *Diaphragms*

Diaphragms are structural members used to tie adjoining girders together to improve the strength and rigidity of the girder and to distribute forces in the lateral direction.

Diaphragms do not have an element but if a diaphragm has advanced deterioration, it should be noted in the element comments of the associated girder.

4-3.3 *Pedestrian Bridges*

The same WSDOT elements used for bridges that carry vehicular traffic can be used for pedestrian bridges. Do not use the WSDOT sidewalk elements (#260 through #267) for pedestrian bridges.

4-3.4 *Slab Bridges*

Slab bridges can have precast segments or cast in place concrete. The bridge in the picture is a cast in place concrete slab and will have a deck element for the deterioration of the top surface. Structural deficiencies of the slab bottom and edge are documented in WSDOT element 38A Reinforced Concrete Solid Slab.

Note: The total quantity for slab elements is the actual bridge deck area. Do not use the reported curb-to-curb value when a deck curb-to-curb dimensions vary.

WSDOT BMSE	Prior BMS	**Reinforced Concrete Solid Slab**	**Units - SF**	NBE	BME	ADE
38A	38			38	--	N

This element defines a concrete slab bridge and edge that has been constructed with uncoated reinforcement. Structural deficiencies of the edge and bottom surface are addressed in the condition states. The total quantity for this slab element is the actual bridge slab area from curb line to curb line.

WSDOT BMSE	Prior BMS	**Reinforced Concrete Hollow Slab**	**Units - SF**	NBE	BME	ADE
38B	49			38	--	Y

This element defines a concrete slab bridge and edge that has been constructed with sono-tubes and uncoated reinforcement. Structural deficiencies of the edge and bottom surface are addressed in the condition states. This type of bridge was typically built in the 50's and 60's on the state highway system. The total quantity for this slab element is the actual bridge slab area from curb line to curb line.

WSDOT BMSE	Prior BMS	Reinforced Concrete Solid Slab w/Coated Bars	Units - SF	NBE	BME	ADE
38C	52			38	--	Y

This element defines a concrete slab bridge and edge that has been constructed with coated (epoxy, etc.) reinforcement. Structural deficiencies of the edge and bottom surface are addressed in the condition states. The total quantity for this slab element is the actual bridge slab area from curb line to curb line.

WSDOT BMSE	Prior BMS	Reinforced Concrete Hollow Slab w/Coated Bars	Units - SF	NBE	BME	ADE
38D	--			38	--	Y

This element defines a concrete slab bridge and edge that has been constructed with sono-tubes and coated (epoxy, galvanizing, stainless steel, fiber reinforced polymer (FRP), etc.) reinforcement Structural deficiencies of the edge and bottom surface are addressed in the condition states. This type of bridge was typically built in the 50's and 60's on the state highway system. The total quantity for this slab element is the actual bridge slab area from curb line to curb line.

Condition States for WSDOT Elements 38A, 38B, 38C, and 38D

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625")
2. Slab area with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1" deep and 6" in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½" deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625" - 0.125") or sealed medium/wide cracks.
3. Slab area with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½"-1" deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125" - 0.1875") that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Slab area with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875") that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
39A	50	**Prestressed Concrete Solid Slab**	**Units - SF**	39	--	Y

This element defines a concrete slab bridge that has been constructed with prestressed concrete and uncoated steel reinforcement. Structural deficiencies of the edge and bottom surface are addressed in the condition states. The total quantity for this slab element is the actual bridge slab area from curb line to curb line.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
39B	--	**Prestressed Concrete Hollow Slab**	**Units - SF**	39	--	Y

This element defines a concrete slab bridge and edge that has been constructed with sono-tubes using prestressed concrete and uncoated reinforcement. Structural deficiencies of the edge and bottom surface are addressed in the condition states. The total quantity for this slab element is the actual bridge slab area from curb line to curb line.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
39C	51	**Prestressed Concrete Solid Slab w/Coated Strands**	**Units - SF**	39	--	Y

This element defines a concrete slab bridge that has been constructed with prestressed concrete and coated steel reinforcement (epoxy, etc.). This element may be solid or have built in voids. Structural deficiencies of the edge and bottom surface are addressed in the condition states. The total quantity for this slab element is the actual bridge slab area from curb line to curb line.

WSDOT BMSE	Prior BMS	Prestressed Concrete Hollow Slab w/Coated Strands	Units - SF	NBE	BME	ADE
39D	--			39	--	Y

This element defines a concrete slab bridge and edge that has been constructed with sono-tubes using prestressed concrete and coated (epoxy, galvanizing, stainless steel, fiber reinforced polymer (FRP), etc.) reinforcement. Structural deficiencies of the edge and bottom surface are addressed in the condition states. The total quantity for this slab element is the actual bridge slab area from curb line to curb line

Condition States for WSDOT Elements 39A, 39B, 39C, and 39D

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.004”)
2. Slab area with minor defects or effective functioning repairs/patches present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar or prestressing may be exposed with no signs of corrosion or section loss and surface efflorescence may be present without rust staining. May have open narrow cracks (0.004” - 0.009”) or sealed medium/wide cracks.
3. Slab area with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar or prestressing has corrosion with insignificant section loss, but all strands are intact. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.010” - 0.030”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Slab area with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar or prestressing strands exhibit corrosion with measurable section loss (Note remaining diameter or cross section). Prestressing strands may be stretched or severed. Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.030”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

WSDOT BMSE	Prior BMS	Timber Slab	Units - SF	NBE	BME	ADE
54	54			54	--	N

This element defines a slab that is constructed of timber. Structural deficiencies of the edge and bottom surface are addressed in the condition states. The total quantity for this slab element is the actual bridge slab area from curb line to curb line.

Condition States for WSDOT Element 54

1. Defects if any are superficial and have no effect on the structural capacity. Decay, insect infestation, cracks, splits, or checks may exist.
2. Slab area with minor distortion or defects not requiring repair or monitoring, and any existing repairs are in place and functioning as intended. Any evidence or presence of rot or insect infestation still has greater than 90% section remaining. Significant checks are not located within tension zones and do not penetrate more than ½ the member thickness. Any splitting does not penetrate the full thickness of the member or is fully arrested within a repair. Connections may have loose fasteners, or superficial corrosion or pack rust but are functioning as intended.
3. Slab area with moderate distortion or defects that may require repair or monitoring, or any existing repairs that have failed or are not functioning as intended. Rot pockets or insect infestation result in less than 90% section remaining. For a remaining shell thickness >= 1-½" location is YELLOW TAGGED. Checks penetrate more than ½ the member thickness at any location or more than 5% of the thickness within a tension zone. Splitting penetrates the full thickness of the member but does not affect capacity. Connections have missing fasteners, broken welds or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity, do not warrant analysis but may require repairs.
4. Slab area with major defects or failed repairs that may require immediate action. Rot pockets or insect infestation have resulted in significant section loss affecting capacity. For a remaining shell thickness < 1-½" location is RED TAGGED. Checks, splits or distortion are significant and are affecting structural capacity. Connections are no longer functioning as intended with missing fasteners, broken welds, distortion, or due to other local timber defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects are affecting structural capacity. Structural analysis is warranted or repairs are essential to restore capacity.

WSDOT BMSE	Prior BMS	Steel Box Girder	Units - LF	NBE	BME	ADE
102	102			102	--	N

This element defines a box girder unit constructed with structural steel. This element directly supports the bridge deck. The total quantity for this element is the sum of each girder length.

Condition States for WSDOT element 102

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed.
2. Length of box girder with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners. Bolts/rivets may have been replaced.
3. Length of box girder with moderate defects, failed repairs, or any identified distortion, or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Length of box girder with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
104A	97	**Prestressed Concrete Tub Girder**	**Units - LF**	104	--	Y

This element defines a prestressed concrete box girder or Tub Girder as defined in the *Bridge Design Manual* M 23-50. Post-tensioning and span field splices may or may not be present The total quantity for this element is the sum of each girder length.

Condition States for WSDOT Element 104A

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.004")
2. Length of girder with minor defects or effective functioning repairs/patches present. May have delaminations and spalling typically up to 1" deep and 6" in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½" deep. Rebar or prestressing may be exposed with no signs of corrosion or section loss and surface efflorescence may be present without rust staining. May have open narrow cracks (0.004" - 0.009") or sealed medium/wide cracks.
3. Length of girder with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½"-1" deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar or prestressing has corrosion with insignificant section loss, but all strands are intact. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.010" - 0.030") that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of girder with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar or prestressing strands exhibit corrosion with measurable section loss (Note remaining diameter or cross section). Prestressing strands may be stretched or severed. Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.030") that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

WSDOT BMSE	Prior BMS	Post-Tensioned Concrete Segmental Box Girder	Units - LF	NBE	BME	ADE
104B	100			104	--	Y

This element defines a post-tensioned concrete box girder constructed using the segmental precast process. The total quantity for this element is the length of segmental box girders.

WSDOT BMSE	Prior BMS	Post-Tensioned Concrete Box Girder	Units - LF	NBE	BME	ADE
104C	104			104	--	N

This element defines a box girder unit constructed of post-tensioned, cast in place concrete. The total quantity for this element is the sum of each girder length.

Condition States for WSDOT Elements 104B and 104C

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.004”)
2. Length of girder with minor defects or effective functioning repairs/patches present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar or prestressing may be exposed with no signs of corrosion or section loss and surface efflorescence may be present without rust staining. May have open narrow cracks (0.004” - 0.009”) or sealed medium/wide cracks.
3. Length of girder with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar or prestressing has corrosion with insignificant section loss, but all strands are intact. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.010” - 0.030”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of girder with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar or prestressing strands exhibit corrosion with measurable section loss (Note remaining diameter or cross section). Prestressing strands may be stretched or severed. Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.030”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
105	105	**Concrete Box Girder**	**Units - LF**	105	--	N

This element defines a box girder superstructure unit constructed with cast in place reinforced concrete. The total quantity for this element is the sum of each girder length.

Condition States for WSDOT Element 105

1. Concrete box girder defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625")
2. Length of concrete box girder with minor defects or effective functioning repairs/ patches are present. May have delaminations and spalling typically up to 1" deep and 6" in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½" deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625" - 0.125") or sealed medium/wide cracks.
3. Length of concrete box girder with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½"-1" deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125" - 0.1875") that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of concrete box girder with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss and may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875") that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
107A	90	**Steel Rolled Girder**	**Units - LF**	107	--	Y

This element defines a girder unit of structural steel that has an integral web and flanges and was fabricated in a steel mill by the rolling process. This element may have bolted, riveted or welded cover plates. This element directly supports the bridge deck and is part of a two or more longitudinal girder system. The total quantity for this element is the sum of each girder length.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
107B	91	**Steel Riveted Girder**	**Units - LF**	107	--	Y

This element defines a girder unit of structural steel that directly supports the bridge deck. This element has a web and flanges that are connected with rivets. This element is part of a two or more longitudinal girder system. The total quantity for this element is the sum of each girder length.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
107C	92	**Steel Welded Girder**	**Units - LF**	107	--	Y

This element defines a girder unit of structural steel that directly supports the bridge deck. This element has a web and flanges that are connected with welds. This element is part of a two or more longitudinal girder system. The total quantity for this element is the sum of each girder length.

Condition States for WSDOT Elements 107A, 107B, and 107C

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed.
2. Length of girder with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners. Bolts/rivets may have been replaced.
3. Length of girder with moderate defects, failed repairs, or any identified distortion, damaged wires or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Length of girder with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

WSDOT BMSE	Prior BMS	Concrete Encased Steel Girder	Units - LF	NBE	BME	ADE
107D	96			107	--	Y

This element defines a steel girder that is encased in concrete. The total quantity for this element is the sum of each girder length.

Condition States for WSDOT Element 107D

1. Defects in the concrete encasing the girders, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Length of the concrete encasing with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Length of the concrete encasing with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of the concrete encasing with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

WSDOT BMSE	Prior BMS	Steel Open Girder (Through Girder)	Units - LF	NBE	BME	ADE
107E	107			107	--	N

This element defines an open girder unit that is constructed of structural steel. An open or "through" girder is part of a two-girder system with stringer and floor beam elements that support a bridge deck. Open girders are located on the outside of the bridge. The bridge deck and any sidewalks are contained between the open girders. Bridges with open girders were generally built prior to 1950 and usually have built up riveted steel members. The total quantity for this element is the sum of each girder length.

Condition States for WSDOT Element 107E.

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed.
2. Length of girder with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners. Bolts/rivets may have been replaced.
3. Length of girder with moderate defects, failed repairs, or any identified distortion, damaged wires or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Length of girder with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
109A	115	**Prestressed Concrete Girder**	**Units - LF**	109	--	Y

This element defines a girder constructed of precast prestressed concrete that may or may not be post-tensioned and supports the bridge deck. The total quantity for this element is the sum of each girder length.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
109B	89	**Prestressed Concrete Girder w/ Coated Strands**	**Units - LF**	109	--	Y

This element defines a girder constructed of precast prestressed concrete and epoxy coated strand that supports the bridge deck. The element quantity should equal the sum of each girder length. The element total quantity for this element is the sum of each girder length.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
109C	98	**Thin Flange Girder**	**Units - LF**	109	--	Y

This element defines a precast prestressed concrete girder unit where the top flange is not designed to carry live load and must have a concrete deck. There may be asphalt or a concrete overlay on the concrete slab. This element represents the WSDOT - WFxxTDG girder sections: WF36TDG, WF42TDG, WF50TDG, WF58TDG, WF66TDG, WF74TDG, WF83TDG, WF95TDG, and WF100TDG. Structural deficiencies of the edge and bottom surface are addressed in the condition states. The total quantity for this element is the sum of each girder length.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
109D	103	**Prestressed Concrete Super Girder**	**Units - LF**	109	--	Y

This element defines a prestressed WSDOT girder WF83G, WF95G, WF100G, WF83PTG, WF95PTG, WF100PTG. Girders may or may not be post-tensioned. The total quantity for this element is the sum of each girder length.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
109E	108	**Prestressed Concrete Bulb-T Girder**	**Units - LF**	109	--	Y

This element defines a precast prestressed concrete Bulb-Tee girder unit which has little or no span between the top flanges. There may be asphalt, a concrete slab, a concrete overlay, or nothing on the top flange. This element represents the following WSDOT girder sections: W35DG, W41DG, W53DG, W65DG, WF39DG, WF45DG, WF53DG, WF61DG, WF69DG, WF77DG, WF86DG, WF98DG, WF103DG. Structural deficiencies of the edge and bottom surface are addressed in the condition states. The total quantity for this element is the sum of each girder length.

WSDOT BMSE	Prior BMS	Prestressed Concrete Multiple Web Girder Units	Units - LF	NBE	BME	ADE
109F	109			109	--	N

This element defines a precast prestressed concrete girder that has more than one web. Structural deficiencies of the edge and bottom surface are addressed in the condition states. The total quantity for this element is the sum of each girder length.

Condition States for WSDOT Elements 109A, 109B, 109C, 109D, 109E, and 109F

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.004").
2. Length of girder with minor defects or effective functioning repairs/patches present. May have delaminations and spalling typically up to 1" deep and 6" in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½" deep. Rebar or prestressing may be exposed with no signs of corrosion or section loss and surface efflorescence may be present without rust staining. May have open narrow cracks (0.004" - 0.009") or sealed medium/wide cracks.
3. Length of girder with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½"-1" deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar or prestressing has corrosion with insignificant section loss, but all strands are intact. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.010" - 0.030") that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of girder with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar or prestressing strands exhibit corrosion with measurable section loss (Note remaining diameter or cross section). Prestressing strands may be stretched or severed. Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.030") that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
110A	110	**Concrete Girder**	**Units - LF**	110	--	N

This element defines a girder (including T-Beams) constructed of non-prestressed reinforced concrete. The total quantity for this element is the sum of each girder length.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
110B	114	**Concrete Multiple Web Girder Unit**	**Units - LF**	110	--	Y

This element defines a girder constructed of non-prestressed reinforced precast concrete. Structural deficiencies of the edge and bottom surface are addressed in the condition states. The total quantity for this element is the sum of each girder length. Check the NBIS main span type.

Condition States for WSDOT Elements 110A and 110B

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Length of concrete girder with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Length of concrete girder with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of concrete girder with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
111A	111	**Timber Glulam Girder**	**Units - LF**	111	--	N

This element defines a girder unit constructed of glulam timber. This element directly supports the bridge deck. The total quantity for this element is the sum of each girder length.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
111B	117	**Timber Sawn Girder**	**Units - LF**	111	--	Y

This element defines a girder constructed of sawn timber that supports the bridge deck. The total quantity for this element is the sum of each girder length.

Condition States for WSDOT Elements 111A and 111B

1. Defects if any are superficial and have no effect on the structural capacity. Decay, insect infestation, cracks, splits, or checks may exist.
2. Length of timber girder with minor distortion or defects not requiring repair or monitoring, and any existing repairs are in place and functioning as intended. Any evidence or presence of rot or insect infestation still has greater than 90% section remaining. Significant checks are not located within tension zones and do not penetrate more than ½ the member thickness. Any splitting does not penetrate the full thickness of the member or is fully arrested within a repair. Connections may have loose fasteners, or superficial corrosion or pack rust but are functioning as intended.
3. Length of timber girder with moderate distortion or defects that may require repair or monitoring, or any existing repairs that have failed or are not functioning as intended. Rot pockets or insect infestation result in less than 90% section remaining. For a remaining shell thickness >= 1-½" location is YELLOW TAGGED. Checks penetrate more than ½ the member thickness at any location or more than 5% of the thickness within a tension zone. Splitting penetrates the full thickness of the member but does not affect capacity. Connections have missing fasteners, broken welds or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity, do not warrant analysis but may require repairs.
4. Length of timber girder with major defects or failed repairs that may require immediate action. Rot pockets or insect infestation have resulted in significant section loss affecting capacity. For a remaining shell thickness < 1-½" location is RED TAGGED. Checks, splits or distortion are significant and are affecting structural capacity. Connections are no longer functioning as intended with missing fasteners, broken welds, distortion, or due to other local timber defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects are affecting structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity.

WSDOT BMSE	Prior BMS	Steel Stringer	Units - LF	NBE	BME	ADE
113	113			113	--	N

This element defines a stringer constructed of structural steel that supports the deck in a stringer-floor beam system. A stringer is connected to a floor beam and directly supports a bridge deck. A steel stringer and floor beam combination is commonly used in steel truss and steel open girder bridges. The total quantity for this element is the sum of each girder length.

Condition States for WSDOT Element 113

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed.
2. Length of stringer with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners. Bolts/rivets may have been replaced.
3. Length of stringer with moderate defects, failed repairs, or any identified distortion, or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Length of stringer with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

WSDOT BMSE	Prior BMS	Concrete Stringer	Units - LF	NBE	BME	ADE
116	116			116	--	N

This element defines a stringer constructed of reinforced concrete that supports the bridge deck in a stringer-floor beam system. The total quantity for this element is the sum of each stringer length. See Steel Stringers and Floor Beams for a more general description.

Condition States for WSDOT Element 116

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Length of stringer with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Length of stringer with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of stringer with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
117	118	**Timber Stringer**	**Units - LF**	117	--	N

This element defines a stringer constructed of timber that supports the bridge deck. The element total quantity is the sum of each stringer length. See Steel Stringers, WSDOT Element 113, for a more general description.

Condition States for WSDOT Element 117

1. Defects if any are superficial and have no effect on the structural capacity. Decay, insect infestation, cracks, splits, or checks may exist.
2. Length of timber stringer with minor distortion or defects not requiring repair or monitoring, and any existing repairs are in place and functioning as intended. Any evidence or presence of rot or insect infestation still has greater than 90% section remaining. Significant checks are not located within tension zones and do not penetrate more than ½ the member thickness. Any splitting does not penetrate the full thickness of the member or is fully arrested within a repair. Connections may have loose fasteners, or superficial corrosion or pack rust but are functioning as intended.
3. Length of timber stringer with moderate distortion or defects that may require repair or monitoring, or any existing repairs that have failed or are not functioning as intended. Rot pockets or insect infestation result in less than 90% section remaining. For a remaining shell thickness >= 1-½" location is YELLOW TAGGED. Checks penetrate more than ½ the member thickness at any location or more than 5% of the thickness within a tension zone. Splitting penetrates the full thickness of the member but does not affect capacity. Connections have missing fasteners, broken welds or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity, do not warrant analysis but may require repairs.
4. Length of timber stringer with major defects or failed repairs that may require immediate action. Rot pockets or insect infestation have resulted in significant section loss affecting capacity. For a remaining shell thickness < 1-½" location is RED TAGGED. Checks, splits or distortion are significant and are affecting structural capacity. Connections are no longer functioning as intended with missing fasteners, broken welds, distortion, or due to other local timber defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects are affecting structural capacity. Structural analysis is warranted or repairs are essential to restore capacity.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
120A	126	**Steel Thru Truss**	**Units - LF**	120	--	N

This element includes all structural steel truss members. Code this element for through and pony trusses only. The total quantity for this element is the sum of each truss length, which is two times the truss span length.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
120B	131	**Steel Deck Truss**	**Units - LF**	120	--	Y

This element includes all truss members of a structural steel deck truss. The top and bottom chords are included in this element. The total quantity for this element is the sum of each truss length, which is two times the truss span length.

Condition States for WSDOT Elements 120A and 120B

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed.
2. Steel Deck Truss panel length with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners. Bolts/rivets may have been replaced.
3. Steel Deck Truss panel length with moderate defects, failed repairs, or any identified distortion, damaged wires or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Steel Deck Truss panel length with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

WSDOT BMSE	Prior BMS	Timber Truss	Units - LF	NBE	BME	ADE
135	135			135	--	N

This element defines a truss constructed of timber members. The total quantity for this element is the sum of each truss length, which is two times the truss span length.

Condition States for WSDOT Element 135

1. Defects if any are superficial and have no effect on the structural capacity. Decay, insect infestation, cracks, splits, or checks may exist.
2. Truss panel length with minor distortion or defects not requiring repair or monitoring, and any existing repairs are in place and functioning as intended. Any evidence or presence of rot or insect infestation still has greater than 90% section remaining. Significant checks are not located within tension zones and do not penetrate more than ½ the member thickness. Any splitting does not penetrate the full thickness of the member or is fully arrested within a repair. Connections may have loose fasteners, or superficial corrosion or pack rust but are functioning as intended.
3. Truss panel length with moderate distortion or defects that may require repair or monitoring, or any existing repairs that have failed or are not functioning as intended. Rot pockets or insect infestation result in less than 90% section remaining. For a remaining shell thickness >= 1-½" location is YELLOW TAGGED. Checks penetrate more than ½ the member thickness at any location or more than 5% of the thickness within a tension zone. Splitting penetrates the full thickness of the member but does not affect capacity. Connections have missing fasteners, broken welds or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity, do not warrant analysis but may require repairs.
4. Truss panel length with major defects or failed repairs that may require immediate action. Rot pockets or insect infestation have resulted in significant section loss affecting capacity. For a remaining shell thickness < 1-½" location is RED TAGGED. Checks, splits or distortion are significant and are affecting structural capacity. Connections are no longer functioning as intended with missing fasteners, broken welds, distortion, or due to other local timber defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects are affecting structural capacity. Structural analysis is warranted or repairs are essential to restore capacity.

WSDOT BMSE	Prior BMS	Concrete Truss	Units - LF	NBE	BME	ADE
136	119			136	--	N

This element defines all members in a truss that is constructed of concrete. There is only one concrete truss on the state highway system. The total quantity for this element is the sum of each concrete truss length, which is two times the truss span length.

Condition States for WSDOT Element 136

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Truss panel length with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Truss panel length with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Truss panel length with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss and may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) **that** appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
141A	142	**Steel Tied Arch**	**Units - LF**	141	--	Y

This element includes all members of a tied arch constructed of structural steel. The bottom chord, top chord, and steel hangers are included in this element. The total quantity for this element is the length measured from one arch support to the other. If steel hangers are cable elements, report them in element 148B.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
141B	141	**Steel Arch**	**Units - LF**	141	--	N

This element includes only the arch constructed of structural steel. When coding NBI, pier caps, cross beams, and any other coded substructure elements within the arch span are considered superstructure elements. The total quantity for this element is the length measured from one arch support to the other.

Condition States for WSDOT Elements 141A and 141B

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed.
2. Arch panel length with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member or damage to wires within a cable does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners. Bolts/rivets may have been replaced.
3. Arch panel length with moderate defects, failed repairs, or any identified distortion, damaged wires or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Arch panel length with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

WSDOT BMSE	Prior BMS	Composite Arch	Units - LF	NBE	BME	ADE
142	140			142	--	N

This element includes all members of an arch constructed of Composite material. The total quantity for this element is the length measured from one arch support to the other.

Condition States for WSDOT Element 142

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”). Noted defects have no effect on the structural capacity of the element.
2. Arch panel length with minor defects or effective repairs that are in place and functioning as intended. There is no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended.
3. Arch panel length with moderate defects that may be surrounded by other minor deterioration such as cracking delamination. Any section loss is measurable and there may be open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Arch span length affected by major defects or damage Significant section loss may be associated with other signs of deterioration. (Note remaining diameter or cross section). Any repairs or patching is ineffective. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
144A	145	**Earth Filled Concrete Arch**	**Units - LF**	144	--	Y

This element defines an earth filled arch constructed of reinforced concrete. The total quantity for this element is the length measured from one arch foundation to the other. If there is a concrete deck constructed on the fill, WSDOT element 12E applies. If there is an ACP wearing surface, WSDOT element 510A or 510B applies.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
144B	144	**Concrete Arch**	**Units - LF**	144	--	N

This element only defines the arch (open/closed spandrel, bowstring, etc.) and is constructed of non-prestressed reinforced concrete. When coding SNBI, pier caps, cross beams, and any other coded substructure elements within the arch span are considered superstructure elements. The total quantity for this element is the length measured from one arch foundation to the other.

Condition States for WSDOT Element 144A and 144B

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Arch panel length with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Arch panel length with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Arch panel length with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

WSDOT BMSE	Prior BMS	Timber Arch	Units - LF	NBE	BME	ADE
146	139			146	--	N

This element includes all members of an arch constructed of Timber. The total quantity for this element is the length measured from one arch support to the other.

Condition States for WSDOT Element 146

1. Defects if any are superficial and have no effect on the structural capacity. Decay, insect infestation, cracks, splits, or checks may exist.
2. Arch panel length with minor distortion or defects not requiring repair or monitoring, and any existing repairs are in place and functioning as intended. Any evidence or presence of rot or insect infestation still has greater than 90% section remaining. Significant checks are not located within tension zones and do not penetrate more than ½ the member thickness. Any splitting does not penetrate the full thickness of the member or is fully arrested within a repair. Connections may have loose fasteners, or superficial corrosion or pack rust but are functioning as intended.
3. Arch panel length with moderate distortion or defects that may require repair or monitoring, or any existing repairs that have failed or are not functioning as intended. Rot pockets or insect infestation result in less than 90% section remaining. For a remaining shell thickness >= 1-½" location is YELLOW TAGGED. Checks penetrate more than ½ the member thickness at any location or more than 5% of the thickness within a tension zone. Splitting penetrates the full thickness of the member but does not affect capacity. Connections have missing fasteners, broken welds or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity, do not warrant analysis but may require repairs.
4. Arch panel length with major defects or failed repairs that may require immediate action. Rot pockets or insect infestation have resulted in significant section loss affecting capacity. For a remaining shell thickness < 1-½" location is RED TAGGED. Checks, splits or distortion are significant and are affecting structural capacity. Connections are no longer functioning as intended with missing fasteners, broken welds, distortion, or due to other local timber defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects are affecting structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
147A	146	**Suspension – Main Cable**	**Units - EA**	147	--	N

This element defines a main steel cable used to support the superstructure in a suspension bridge. The total quantity for this element is the number of cables.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
147B	149	**Cable Stayed Bridge – Cable**	**Units - EA**	147	--	Y

This element defines a steel cable used to support the superstructure in a cable stayed bridge. The cable stays include the anchor device at the ends. The total quantity for this element is the number of steel cables.

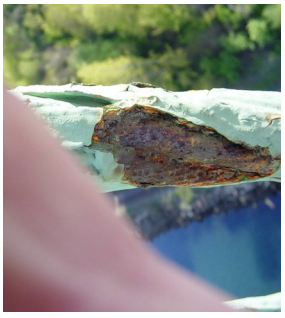
WSDOT BMSE	Prior BMS			NBE	BME	ADE
148A	147	**Suspension – Suspender Cable**	**Units - EA**	148	--	N

This element defines a suspender steel cable that connects the bridge superstructure to the main suspension cable. Suspender cables include the anchor device at the ends and the zinc protection on the wires. The outer protection system is usually a form of a paint element. The total quantity for this element is the number of steel cables.

Condition States for WSDOT Elements 147A, 147B, and 148A

1. Number of cables with no defects. Zinc coating may be dull gray showing early signs/stages of zinc oxidation. No breaks in cable stay protective polyethylene pipe. New replacement cables are coded in this condition state.
2. Number of cables with defects that are insignificant and do not affect the capacity of the cable. Zinc coating has white spots or areas of the surface which indicate corrosion of the zinc protection. Cable stay protective polyethylene pipe may have cracks but not separation exposing underlying grout or cable wires/strands.
3. Number of cables or anchors with defects that are beginning to affect the capacity of the cable but are within acceptable design limits. Localized areas of zinc depletion and showing rust spots, but there is no visible section loss. Cable stay protective polyethylene pipe has cracked and separated, exposing grout or cable wires/strands. No corrosion present in exposed wires/strands.

4. Number of cables or anchors with defects that have clearly affected the capacity. This includes broken wires or localized section loss due to other defects. The zinc protective coating is largely depleted with ferrous rust prevalent in many locations along the cable length.



WSDOT BMSE	Prior BMS	Tied Arch – Suspender Cable	Units - EA	NBE	BME	ADE
148B	143			148	--	Y

This element defines a steel cable used to suspend a bridge deck from an arch or truss. The total quantity for this element is the total number of suspenders.

Condition States for WSDOT Element 148B

1. Number of suspenders with defects that are superficial and have no effect on the structural capacity of the element.
2. Number of suspenders with repairs such as: bolts or rivets have been replaced; cracks that have been drilled or plated.
3. Number of suspenders with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth).
4. Number of suspenders with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Structural deficiencies are not limited to impact damage, corrosion, a crack in primary load path member or in the attachment welded to primary member. Retain the quantity of the element reported in CS4 if the element is repainted but not repaired.

WSDOT BMSE	Prior BMS	Concrete Column on Spandrel Arch	Units - EA	NBE	BME	ADE
151	150			--	--	Y

This element defines the column supports on a spandrel arch bridge. The total quantity for this element is the number of columns supported by the arch.

Condition States for WSDOT Element 151

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Number of columns with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Number of columns with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Number of columns with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

WSDOT BMSE	Prior BMS	Steel Floor Beam	Units - LF	NBE	BME	ADE
152	152			152	--	N

This element defines a floor beam constructed of structural steel that supports stringers in a stringer-floor beam system. Floor beams are load carrying elements located transversely to the general bridge alignment. Floor beams transmit the loads from the deck and/or stringers to the outside open girders or to the bottom chord of a truss bridge. The total quantity for this element is the sum of each floor beam length.

Condition States for WSDOT Element 152

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed.
2. Steel Floor Beam length with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners. Bolts/rivets may have been replaced.
3. Steel Floor Beam length with moderate defects, failed repairs, or any identified distortion, damaged wires or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Steel Floor Beam length with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

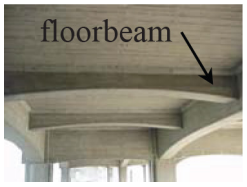
WSDOT BMSE	Prior BMS	Prestressed Concrete Floor Beam	Units - LF	NBE	BME	ADE
154	154			154	--	N

This element defines a floor beam constructed of prestressed concrete that supports the bridge deck in a stringer-floor beam system. The total quantity for this element is the sum of each floor beam length.

Condition States for WSDOT Element 154

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.004”).
2. Length of floor beam with minor defects or effective functioning repairs/patches present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar or prestressing may be exposed with no signs of corrosion or section loss and surface efflorescence may be present without rust staining. May have open narrow cracks (0.004” - 0.009”) or sealed medium/wide cracks.
3. Length of floor beam with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar or prestressing has corrosion with insignificant section loss, but all strands are intact. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.010” - 0.030”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of floor beam with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar or prestressing strands exhibit corrosion with measurable section loss (Note remaining diameter or cross section). Prestressing strands may be stretched or severed. Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.030”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

WSDOT BMSE	Prior BMS	Concrete Floor Beam	Units - LF	NBE	BME	ADE
155	155			155	--	N



This element defines a floor beam constructed of reinforced concrete that supports the bridge deck in a stringer-floor beam system. Floor beams are load carry elements located transversely to the general bridge alignment. Floor beams transmit the loads from the deck and/or stringers to the outside open girders. The total quantity for this element is the sum of each floor beam length.

Condition States for WSDOT Element 155

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625")
2. Length of floor beam with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1" deep and 6" in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½" deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625" - 0.125") or sealed medium/wide cracks.
3. Length of floor beam with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½"-1" deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125" - 0.1875") that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of floor beam with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875") that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

WSDOT BMSE	Prior BMS	Timber Floor Beam	Units - LF	NBE	BME	ADE
156	156			156	--	N

This element defines a stringer constructed of timber that supports the bridge deck. The total quantity for this element is the sum of each floor beam length. See Steel Floor beam, WSDOT Element 152, for a more general description.

Condition States for WSDOT Element 156

1. Defects if any are superficial and have no effect on the structural capacity. Decay, insect infestation, cracks, splits, or checks may exist.
2. Length of floor beam with minor distortion or defects not requiring repair or monitoring, and any existing repairs are in place and functioning as intended. Any evidence or presence of rot or insect infestation still has greater than 90% section remaining. Significant checks are not located within tension zones and do not penetrate more than ½ the member thickness. Any splitting does not penetrate the full thickness of the member or is fully arrested within a repair. Connections may have loose fasteners, or superficial corrosion or pack rust but are functioning as intended.
3. Length of floor beam with moderate distortion or defects that may require repair or monitoring, or any existing repairs that have failed or are not functioning as intended. Rot pockets or insect infestation result in less than 90% section remaining. For a remaining shell thickness >= 1-½" location is YELLOW TAGGED. Checks penetrate more than ½ the member thickness at any location or more than 5% of the thickness within a tension zone. Splitting penetrates the full thickness of the member but does not affect capacity. Connections have missing fasteners, broken welds or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity, do not warrant analysis but may require repairs.
4. Length of floor beam with major defects or failed repairs that may require immediate action. Rot pockets or insect infestation have resulted in significant section loss affecting capacity. For a remaining shell thickness < 1-½" location is RED TAGGED. Checks, splits or distortion are significant and are affecting structural capacity. Connections are no longer functioning as intended with missing fasteners, broken welds, distortion, or due to other local timber defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects are affecting structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
160	160	**Steel Column on Spandrel Arch**	**Units - EA**	--	--	Y

This element defines the column supports on a spandrel arch bridge. The total quantity for this element is the number of columns supported by the arch.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
161A	161	**Steel Hanger**	**Units - EA**	161	--	N

This element defines the hanger portion of a pin and hanger usually on a steel girder. Truss "hanger" members are not included in this element. The total quantity for this element is the number of steel hangers on the bridge. Generally, there will be two hangers at each location.

Condition States for WSDOT Elements 160 and 161A

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed.
2. Number of steel columns or hangers with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member or damage to wires within a cable does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners. Bolts/rivets may have been replaced.
3. Number of steel columns or hangers with moderate defects, failed repairs, or any identified distortion, damaged wires or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Number of steel columns or hangers with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

WSDOT BMSE	Prior BMS	Steel Pin	Units - EA	NBE	BME	ADE
161B	162			161	--	Y

This element defines a structural pin used in any connection joint in a girder or truss.

The total quantity for this element is the number of pins on the bridge. Zero force and construction pins are not included in the quantity. Pins in bearing elements are not included unless they have uplift loadings.

Condition States for WSDOT Element 161B

1. Number of pins and associated connection plates are in good condition. Visual Inspection: There may be minor rust or shallow surface deformations on the exposed pin surfaces. Minor amounts of rust powder or paint damage may be present suggesting minor pin rotation in place. No pack rust is present between associated connection plates. There is no noise associated with the pin connection. Ultrasonic Testing (UT): Transducer can be applied to both ends of pin allowing a complete scan of pin grip surfaces, there are strong shoulder and end reflections, and there are no UT indications. UT indications are defined as pips in the grip area that are three times larger (3:1) than the background noise when the GAIN is adjusted to produce a 90 to 100 percent reflection height for the far shoulder.
2. Number of pins and associated connection plates have defects that do not affect the strength or serviceability of the bridge. Visual Inspection: Corrosion with pitting or laminar rust may be present. Minor abnormalities may be observed in alignment, pin wear, or deck joint movement. Pack rust may be present between connection plates but is not judged to put a jacking force between the pin nuts. The connection may have some rust powder and/or make noise under loading. Ultrasonic Testing (UT): For pins UT inspected from both ends, there may be non-coincident indications between 10 and 20 percent of the far shoulder reflection height. There may be loss in shoulder or back reflections which can be explained by pin end conditions (dents, holes, corrosion). Pins that can be UT inspected from one end only are considered CS2, even if they have no indications or have indications less than 10 percent of the far shoulder reflection height.
3. Number of pins and associated connection plates have defects that may affect the strength or serviceability of the bridge. Visual Inspection: Significant corrosion may be present, suggesting that pin is “frozen” in place. Measurable abnormalities may be observed in alignment, pin wear, or deck joint movement. Pack rust may be present between connection plates that place a jacking force between the pin nuts. The connection may have significant amounts of rust powder and/or make noise under loading. Ultrasonic Testing (UT): For pins UT inspected from both ends, there may be coincident indications (of any size) or non-coincident indications greater than 20 percent of the far shoulder reflection height. There may be loss in shoulder or back reflections that cannot be explained by pin end conditions (dents, holes, corrosion). Pins that can be UT inspected from one end only are considered CS3 if there are indications greater than 10 percent of the far shoulder reflection height.
4. Number of pins and associated connection plates have defects that are judged to affect the strength or serviceability of the bridge. Visual Inspection: There may be “frozen” pins designed for free rotation as part of normal bridge movement. Pack rust may be present between connection plates that are causing distortion/displacement of plates or pins.

WSDOT BMSE	Prior BMS	Truss Gusset Plates	Units - EA	NBE	BME	ADE
162	133			162	--	N

This element documents structural defects on gusset plates at the panel points of a truss element. Gusset plates are defined as any plate attached to primary members that transfer primary or secondary load at the panel joint. Significant defects should be considered when they are within the stress zones of the gusset. Stress zones are approximately illustrated as the shaded portion in Figure at right. The total quantity for a truss is the total number of all node points of all trusses.

Condition States for WSDOT Element 162

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed.
2. Number of Truss Gusset Plates with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners. Bolts/rivets may have been replaced.
3. Number of Truss Gusset Plates with moderate defects, failed repairs, or any identified distortion, damaged wires or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Number of Truss Gusset Plates with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

WSDOT BMSE	Prior BMS	Tension Hold Down Anchor Assembly	Units - EA	NBE	BME	ADE
164	163			--	--	Y

This is a NSTM of the bridge that carries uplift loads from the superstructure to the substructure. The anchorage may consist of several parts with built-up steel members. Each location has anchor bolts in tension that must be evaluated and included in the NSTM Report. The element is defined as all parts in tension between the lower tip of the anchor bolts to the first pin or truss member. A pin is usually present and included in element 161B because it carries uplift loads. The total quantity for this element is the number of Tension Hold-Down Anchor Assemblies on the bridge.

WSDOT bridges known to have Tension Hold Down Anchor Assemblies are: 2/35, 20/204, 25/130, 169/8, 261/125, 305/10 and 395/545.

Condition States for WSDOT Element 164

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed.
2. Number of Tension Hold-Down Anchor Assemblies with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any noted distortion in the member does not require repair or monitoring. Concrete anchorage may have minor scale, spalling or rust staining but connections are functioning as intended.
3. Number of Tension Hold-Down Anchor Assemblies with moderate defects, failed repairs, or any identified distortion, damaged wires or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Number of Tension Hold-Down Anchor Assemblies with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

4-4 Substructure

The evaluation of the substructure elements is based on those portions of the member that are exposed for visual inspection and included in the element quantity. If an element is added to a bridge or quantities are changed due to exposure or discovery by other means, do not delete the historical information in subsequent inspections. Simply note the prior exposure or those members not visible and document the current condition.

4-4.1 *Abutments*

An abutment is a substructure unit located at the end of a bridge that is designed to retain the fill supporting the roadway and support the bridge superstructure. Bridges that terminate in mid-span or at a pier that is not at grade do not have an abutment substructure unit and do not have abutment elements. These cases will use other appropriate structural elements to evaluate condition.

All abutments shall be evaluated for the capacity to transfer design loads to a foundation thru structural elements. The roadway embankment with non-monolithic concrete wingwalls, timber planking, or other abutment retaining systems are included in the evaluation of the WSDOT Abutment Fill element 200 (EA) where the evaluation is limited to no more than 25 feet from the abutment. Timber Abutment element 216 (LF) is equivalent to element 200.

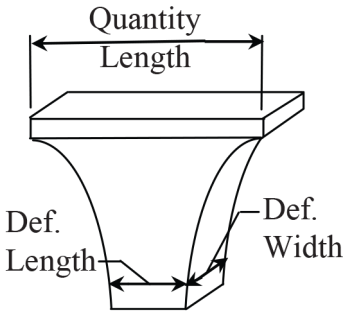
4-4.2 *Pier Cap/Cross Beam*

A pier cap is an element that is attached to the top of a pier and is used to support the superstructure of a bridge. A pier cross beam is generally attached to the girders and is used to distribute the loads from the girders to the pier.

One WSDOT element is used to define either a cap or cross beam constructed of the same material.

4-4.3 *Pier Wall Definition*

A pier wall is a substructure pier element. For WSDOT elements, a pier wall is defined using two criteria: if the length (transverse direction) is 3 times greater than the width (longitudinal direction) at the bottom; and the wall extends full height from the foundation to the superstructure. If the pier does not meet these two criteria, then the element would be coded as a column or other pier.



4-4.4 *Pile/Column Elements*

These long slender members transfer load normally as a part of the bridge substructure. The bottom of a column element may be visible or supported on unknown foundations. For element and inspection purposes, a pile is inspected as a designed column for the visible portion above ground or if visible in the past. Single columns supported on a single shaft are to be considered the same as one column or column length even though a part of the shaft is visible.

4-4.5 *Foundation Elements*

WSDOT Timber Foundation and Concrete Foundation elements document that a foundation is visible, and the structural condition may or may not be related to scour. The foundation may be a spread footing, or a footing supported by piles or drilled shafts. The foundation element is based on the footing material and the piles may be of any material. The condition of the foundation is the focus of these elements, not the pile design or material.

If the supporting piles are visible, then the pile element should be added to the bridge. Do not delete the pile element in subsequent inspections. The total quantity is the quantity of piles supporting the exposed foundation, not just the number of exposed piles. When scour threatens or reduces the condition, the scour documentation and condition is recorded separately in WSDOT element 361 and not recorded in the foundation element.

WSDOT BMSE	Prior BMS	**Abutment Fill**	**Units - EA**	NBE	BME	ADE
200	200			--	--	Y

This element is defined as the soil retained behind a concrete or steel abutment and includes the materials retaining the embankment such as non-monolithic concrete wing walls or other retaining wall system. The evaluation of the fill or retaining systems should not extend beyond 25 feet or the approach slab, whichever is greater. This element also includes abutment ends of cantilevered spans (formerly element 219).

Normally structures have two abutments at grade. When bridges terminate at intermediate piers or in mid-span (not on the ground), then this element does not apply. In addition, WSDOT Element 200 is equivalent to and does not apply to structures with WSDOT Timber Abutment 216 (LF).

Erosion outside of the abutment/wingwalls can be documented in the notes but is not included in the evaluation or condition of the element.

Condition States for WSDOT Element 200

1. Defects are superficial and have no effect on the structural capacity or performance of the fill.
2. Number of abutments that have been repaired for problems with retaining fill.
3. Number of abutments with a fill problem which does not significantly affect the support of the traveled lanes. Deficiencies do not warrant analysis but may require repairs.
4. Number of abutments with a fill problem in locations or quantity and has reduced the structural capacity of the soil to support the approach or roadway. It is a threat to traffic. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

WSDOT BMSE	Prior BMS	Steel Column	Units - EA	NBE	BME	ADE
202	202			202	--	N

This element defines a column or portion of a column constructed of structural steel visible for inspection.

Condition States for WSDOT Element 202

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed.
2. Number of steel columns with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners. Bolts/rivets may have been replaced
3. Number of steel columns with moderate defects, failed repairs, or any identified distortion, damaged wires or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Number of steel columns with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

WSDOT BMSE	Prior BMS	Prestressed Concrete Column	Units - EA	NBE	BME	ADE
204A	204			204	--	N

This element defines a column or portion of a column constructed of prestressed concrete visible for inspection.

WSDOT BMSE	Prior BMS	Prestressed Hollow Concrete Column	Units - EA	NBE	BME	ADE
204B	203			204	--	Y

This element defines a column or portion of a column constructed of prestressed concrete and hollow. Inspection includes the visible portion above ground line.

Condition States for WSDOT Element 204A and 204B

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.004”)
2. Number of columns with minor defects or effective functioning repairs/patches present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar or prestressing may be exposed with no signs of corrosion or section loss and surface efflorescence may be present without rust staining. May have open narrow cracks (0.004” - 0.009”) or sealed medium/wide cracks.
3. Number of columns with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar or prestressing has corrosion with insignificant section loss, but all strands are intact. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.010” - 0.030”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Number of columns with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar or prestressing strands exhibit corrosion with measurable section loss (Note remaining diameter or cross section). Prestressing strands may be stretched or severed. Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.030”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

WSDOT BMSE	Prior BMS	Concrete Column	Units - EA	NBE	BME	ADE
205A	205			205	--	N

This element defines a column or portion of a column constructed of reinforced concrete visible for inspection.

Condition States for WSDOT Element 205A

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Number of columns with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Number of columns with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Number of columns with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
206	206	**Timber Column**	**Units - EA**	206	--	N

This element defines a column or portion of a column constructed of timber visible for inspection.

Condition States for WSDOT Element 206

1. Defects if any are superficial with no effect on the structural capacity. Checks, mold or staining may be present, and all connections are in place and functioning as intended.
2. Number of timber column with minor distortion or defects not requiring repair or monitoring, and any existing repairs are in place and functioning as intended. Any evidence or presence of rot or insect infestation still has greater than 90% section remaining. Significant checks are not located within tension zones and do not penetrate more than ½ the member thickness. Any splitting does not penetrate the full thickness of the member or is fully arrested within a repair. Connections may have loose fasteners, or superficial corrosion or pack rust but are functioning as intended.
3. Number of timber columns with moderate distortion or defects that may require repair or monitoring, or any existing repairs that have failed or are not functioning as intended. Rot pockets or insect infestation result in less than 90% section remaining. For a remaining shell thickness >= 1-½" location is YELLOW TAGGED. Checks penetrate more than ½ the member thickness at any location or more than 5% of the thickness within a tension zone. Splitting penetrates the full thickness of the member but does not affect capacity. Connections have missing fasteners, broken welds or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity, do not warrant analysis but may require repairs.
4. Number of timber columns with major defects or failed repairs that may require immediate action. Rot pockets or insect infestation have resulted in significant section loss affecting capacity. For a remaining shell thickness < 1-½" location is RED TAGGED. Checks, splits or distortion are significant and are affecting structural capacity. Connections are no longer functioning as intended with missing fasteners, broken welds, distortion, or due to other local timber defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects are affecting structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
207A	--	**Steel Tower**	**Units - LF**	207	--	N

This element defines a truss framed tower support or built-up steel tower. Quantity is calculated as the sum of the heights of built up or framed tower supports.

Condition States for WSDOT Element 207A

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed.
2. Tower panel length (height) with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners. Bolts/rivets may have been replaced.
3. Tower panel length (height) with moderate defects, failed repairs, or any identified distortion, damaged wires or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Tower panel length (height) with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
208	--	**Timber Trestle**	**Units - LF**	208	--	N

This element defines a truss framed timber trestle or tower support or built up timber tower. Quantity is calculated as the sum of the heights of built up or framed tower supports.

Condition States for WSDOT Element 208

1. Defects if any are superficial and have no effect on the structural capacity. Decay, insect infestation, cracks, splits, or checks may exist.
2. Length of trestle with minor distortion or defects not requiring repair or monitoring, and any existing repairs are in place and functioning as intended. Any evidence or presence of rot or insect infestation still has greater than 90% section remaining. Significant checks are not located within tension zones and do not penetrate more than ½ the member thickness. Any splitting does not penetrate the full thickness of the member or is fully arrested within a repair. Connections may have loose fasteners, or superficial corrosion or pack rust but are functioning as intended.
3. Length of trestle with moderate distortion or defects that may require repair or monitoring, or any existing repairs that have failed or are not functioning as intended. Rot pockets or insect infestation result in less than 90% section remaining. For a remaining shell thickness >= 1-½" location is YELLOW TAGGED. Checks penetrate more than ½ the member thickness at any location or more than 5% of the thickness within a tension zone. Splitting penetrates the full thickness of the member but does not affect capacity. Connections have missing fasteners, broken welds or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity, do not warrant analysis but may require repairs.
4. Length of trestle with major defects or failed repairs that may require immediate action. Rot pockets or insect infestation have resulted in significant section loss affecting capacity. For a remaining shell thickness < 1-½" location is RED TAGGED. Checks, splits or distortion are significant and are affecting structural capacity. Connections are no longer functioning as intended with missing fasteners, broken welds, distortion, or due to other local timber defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects are affecting structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
210	210	**Concrete Pier Wall**	**Units - LF**	210	--	N

This element defines a pier wall, including submerged pier walls (formerly under Element 212), constructed of reinforced concrete. The total quantity for this element is the length at the top of the wall.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
211	211	**Other Pier Wall**	**Units - LF**	211	--	N

This element defines a pier wall including submerged non-standard material (rock and mortar) or non-standard construction type walls (formerly element 213), that is constructed of a non-standard material (rock and mortar) or non-standard construction. The total quantity for this element is the length at the top of the wall.

Condition States for WSDOT Elements 210 and 211

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”).
2. Length of pier wall with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear exfoliation will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Length of pier wall with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of pier wall with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

WSDOT BMSE	Prior BMS	Concrete Abutment	Units - LF	NBE	BME	ADE
215	215			215	--	N

This element is defined as a concrete abutment or a concrete cap at the abutment which are designed to carry design loads to a foundation. A concrete abutment is a short or tall wall supporting the superstructure. An abutment cap is generally a rectangular beam supporting the superstructure. An abutment cap is included in this element and excluded from the quantity of element 234, Concrete Caps, elsewhere in the bridge. An abutment cap may be supported with concrete, steel, or timber columns or piles and the columns are coded separately and not included in this element but are included with the quantity and evaluation of the other the similar columns in the bridge. The columns are only coded if they are visible or have been visible in the past.

The element quantity is measured along the skew and includes concrete monolithic wingwalls up to the first open joint or expansion joint when oriented parallel to the abutment or skewed towards the approaching roadway. Wingwalls extending inboard towards the bridge are not included in the quantity (Fig. 1). Skewed wingwalls are measured from either the back of the pavement (when parallel to roadway, Fig. 2) or from the abutment wall angle point. Wingwalls monolithic with the abutment shall be included in the evaluation of the abutment. The length of monolithic wingwall shall not exceed 20 feet per corner.

The embankment and retaining system, or retaining system beyond a monolithic wingwall, are documented in WSDOT element 200.

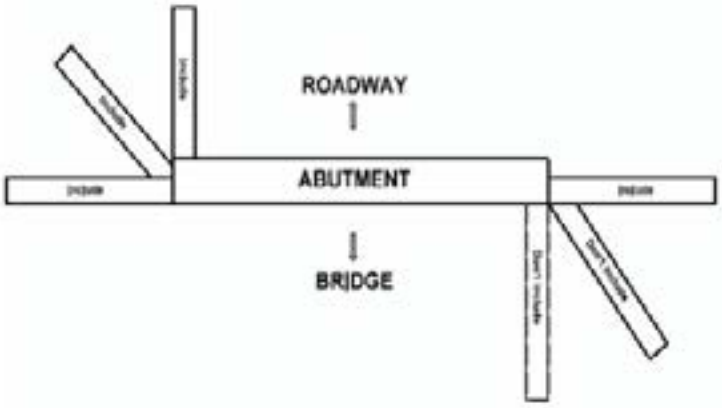


Fig. 1

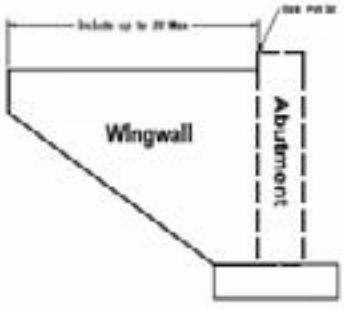


Fig. 2

Condition States for WSDOT Element 215

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Length of abutment with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.Length of abutment.
3. Length of abutment with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of abutment with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

WSDOT BMSE	Prior BMS	Timber Abutment	Units - LF	NBE	BME	ADE
216	216			216	--	N

This element defines the roadway embankment fill behind a timber cap and includes the sheet materials retaining the embankment. The total quantity is the length of the timber cap. Timber caps at the abutment and the piles supporting the caps are not included in this element. The caps are included in the element 235 with other timber caps and the piles are included with the other pile elements in the bridge.

Erosion outside of the abutment/wingwalls can be documented in the notes but is not included in the evaluation of the element condition states.

Condition States for WSDOT Element 216

1. Defects if any are superficial with no effect on the structural capacity. Checks, mold or staining may be present, and all connections are in place and functioning as intended.
2. Length of abutment with minor distortion or defects not requiring repair or monitoring, and any existing repairs are in place and functioning as intended. Any evidence or presence of rot or insect infestation still has greater than 90% section remaining. Significant checks are not located within tension zones and do not penetrate more than ½ the member thickness. Any splitting does not penetrate the full thickness of the member or is fully arrested within a repair. Connections may have loose fasteners, or superficial corrosion or pack rust but are functioning as intended.
3. Timber Length of abutment with moderate distortion or defects that may require repair or monitoring, or any existing repairs that have failed or are not functioning as intended. Rot pockets or insect infestation result in less than 90% section remaining. For a remaining shell thickness >= 1-½" location is YELLOW TAGGED. Checks penetrate more than ½ the member thickness at any location or more than 5% of the thickness within a tension zone. Splitting penetrates the full thickness of the member but does not affect capacity. Connections have missing fasteners, broken welds or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity, do not warrant analysis but may require repairs.
4. Length of abutment with major defects or failed repairs that may require immediate action. Rot pockets or insect infestation have resulted in significant section loss affecting capacity. For a remaining shell thickness < 1-½" location is RED TAGGED. Checks, splits or distortion are significant and are affecting structural capacity. Connections are no longer functioning as intended with missing fasteners, broken welds, distortion, or due to other local timber defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects are affecting structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity.

WSDOT BMSE	Prior BMS	Other Abutment	Units - LF	NBE	BME	ADE
218	217			218	--	N

This element defines an abutment not constructed of steel, timber, or concrete such as rock/mortar. The element quantity is the length of abutment measured along the skew. The element quantity includes monolithic wing walls but not to exceed 20 feet per corner.

Document the condition of the embankment and the embankment retaining system conditions in WSDOT element 200.

Condition States for WSDOT Element 218

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Length of abutment with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear exfoliation will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Length of abutment with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of abutment with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

WSDOT BMSE	Prior BMS	Steel Abutment	Units - LF	NBE	BME	ADE
219	218			219	--	N

This element defines an abutment constructed of structural steel which is usually a steel cap at the abutment. Similar to concrete abutment caps, steel abutment caps are included in this element and are not included in the quantity of element 233, steel cap/crossbeam. The columns supporting the steel cap are coded separately or included with other similar columns in the bridge. The element quantity is the length of steel abutment cap measured along the skew.

Document the embankment conditions and the embankment retaining system conditions in WSDOT element 200.

Condition States for WSDOT Element 219

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed
2. Length of abutment with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners. Bolts/rivets may have been replaced.
3. Length of abutment with moderate defects, failed repairs, or any identified distortion, damaged wires or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Length of abutment with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

WSDOT BMSE	Prior BMS	Concrete Pile Cap/Footing	Units - LF	NBE	BME	ADE
220	220			220	--	N

This element defines a reinforced concrete pile cap/footing supported by shafts, piles, or soil (spread footing) that is visible for inspection and may be always, or seasonably covered by water. (Formerly covered by Elements 220 and 221). Scour deficiencies at a concrete pile cap/footing are included in WSDOT element 361 and are not included in this element.

Plinths are a form of spread footing and included in this element which are a small concrete base that supports a column. Quantity is sum of the length of footings or pile caps along the skew angle.

The supporting piles may be timber, concrete, or steel. If the supporting piles become visible, then the pile element should be added to the bridge.

WSDOT BMSE	Prior BMS	Concrete Web Wall between Columns	Units - LF	NBE	BME	ADE
221	214			--	--	Y

This element defines a secondary concrete wall constructed between pier columns. This element includes railroad crash barriers. The total quantity for this element is the length at the top of the wall.

Condition States for WSDOT Elements 220 and 221

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Length of pile cap, footing or web wall with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Length of pile cap, footing or web wall with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of pile cap, footing or web wall with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

WSDOT BMSE	Prior BMS	Timber Foundation	Units - LF	NBE	BME	ADE
222	222			--	--	Y

This element defines a timber foundation element that includes a mud sill which is a spread footing, and the rare case of a pile supported footing. A timber pile supported footing is where a timber horizontal footing member provides support for the columns and the timber member is supported by piles. The total quantity for this element is the length of timber foundation.

Condition States for WSDOT Element 222

1. Defects if any are superficial with no effect on the structural capacity. Checks, mold or staining may be present, and all connections are in place and functioning as intended.
2. Timber foundation length with minor distortion or defects not requiring repair or monitoring, and any existing repairs are in place and functioning as intended. Any evidence or presence of rot or insect infestation still has greater than 90% section remaining. Significant checks are not located within tension zones and do not penetrate more than ½ the member thickness. Any splitting does not penetrate the full thickness of the member or is fully arrested within a repair. Connections may have loose fasteners, or superficial corrosion or pack rust but are functioning as intended.
3. Timber foundation length with moderate distortion or defects that may require repair or monitoring, or any existing repairs that have failed or are not functioning as intended. Rot pockets or insect infestation result in less than 90% section remaining. For a remaining shell thickness >= 1-½" location is YELLOW TAGGED. Checks penetrate more than ½ the member thickness at any location or more than 5% of the thickness within a tension zone. Splitting penetrates the full thickness of the member but does not affect capacity. Connections have missing fasteners, broken welds or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity, do not warrant analysis but may require repairs.
4. Timber foundation length with major defects or failed repairs that may require immediate action. Rot pockets or insect infestation have resulted in significant section loss affecting capacity. For a remaining shell thickness < 1-½" location is RED TAGGED. Checks, splits or distortion are significant and are affecting structural capacity. Connections are no longer functioning as intended with missing fasteners, broken welds, distortion, or due to other local timber defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects are affecting structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity.

WSDOT BMSE	Prior BMS	Steel Pile	Units - EA	NBE	BME	ADE
225	225			225	--	N

This element defines a pile or pile portion of a pile constructed of structural steel visible for inspection. Do not delete the element from the bridge because the element is no longer visible. The exposure may be intentional or caused by scour.

Condition States for WSDOT Element 225

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed.
2. Number of Steel Piles with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners. Bolts/rivets may have been replaced.
3. Number of Steel Piles with moderate defects, failed repairs, or any identified distortion, damaged wires or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Number of Steel Piles with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
226A	226	**Prestressed Concrete Pile**	**Units - EA**	226	--	N

This element defines a pile or portion of a pile constructed of prestressed concrete and is visible for inspection. This includes all prestressed concrete piles, submerged or not. Do not delete the element from the bridge because the element is no longer visible. The exposure may be intentional or caused by scour.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
226B	232	**Prestressed Hollow Concrete Pile**	**Units - EA**	226	--	Y

This element defines a pile or portion of a pile constructed of prestressed concrete pile that has an interior void or is hollow. This includes all hollow prestressed concrete piles, submerged or not.

Condition States for WSDOT Elements 226A and 226B

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.004”)
2. Number of piles with minor defects or effective functioning repairs/patches present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar or prestressing may be exposed with no signs of corrosion or section loss and surface efflorescence may be present without rust staining. May have open narrow cracks (0.004” - 0.009”) or sealed medium/wide cracks.
3. Number of piles with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar or prestressing has corrosion with insignificant section loss, but all strands are intact. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.010” - 0.030”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Number of piles with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar or prestressing strands exhibit corrosion with measurable section loss (Note remaining diameter or cross section). Prestressing strands may be stretched or severed. Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.030”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
227	227	**Concrete Pile**	**Units - EA**	227	--	N

This element defines a pile or portion of a pile constructed of reinforced concrete and is visible for inspection. This includes all concrete piles, submerged or not. Usually, WSDOT concrete piles are designed and constructed inside a sacrificial steel pipe casing. Do not delete the element from the bridge because the element is no longer visible. The exposure may be intentional or caused by scour.

Condition States for WSDOT Element 227

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Number of piles with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Number of piles with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Number of piles with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

WSDOT BMSE	Prior BMS	Timber Pile	Units - EA	NBE	BME	ADE
228	228			228	--	N

This element defines a pile or portion of a pile constructed of timber and is visible for inspection. This includes all timber piles, submerged or not. Do not delete the element from the bridge because the element is no longer visible. The exposure may be intentional or caused by scour.

Condition States for WSDOT Element 228

1. Defects if any are superficial with no effect on the structural capacity. Checks, mold or staining may be present, and all connections are in place and functioning as intended.
2. Number of timber piles with minor distortion or defects not requiring repair or monitoring, and any existing repairs are in place and functioning as intended. Any evidence or presence of rot or insect infestation still has greater than 90% section remaining. Significant checks are not located within tension zones and do not penetrate more than ½ the member thickness. Any splitting does not penetrate the full thickness of the member or is fully arrested within a repair. Connections may have loose fasteners, or superficial corrosion or pack rust but are functioning as intended.
3. Number of timber piles with moderate distortion or defects that may require repair or monitoring, or any existing repairs that have failed or are not functioning as intended. Rot pockets or insect infestation result in less than 90% section remaining. For a remaining shell thickness >= 1-½" location is YELLOW TAGGED. Checks penetrate more than ½ the member thickness at any location or more than 5% of the thickness within a tension zone. Splitting penetrates the full thickness of the member but does not affect capacity. Connections have missing fasteners, broken welds or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity, do not warrant analysis but may require repairs.
4. Number of timber piles with major defects or failed repairs that may require immediate action. Rot pockets or insect infestation have resulted in significant section loss affecting capacity. For a remaining shell thickness < 1-½" location is RED TAGGED. Checks, splits or distortion are significant and are affecting structural capacity. Connections are no longer functioning as intended with missing fasteners, broken welds, distortion, or due to other local timber defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects are affecting structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
231A	231	**Steel Pier Cap/Crossbeam**	**Units - LF**	231	--	N

This element defines a steel pier cap or crossbeam. The total quantity for this element is the length at the top of the crossbeam.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
231B	229	**Timber Cap Rehab with Steel**	**Units - LF**	231	--	Y

This element consists of a timber cap rehabilitation where alternate load paths to piling are provided by steel members on the exterior of the cap and the timber cap remains in place. The timber conditions are excluded from the condition evaluation. The total quantity for this element is the length of the existing timber pier cap, where this quantity is deducted from the total quantity of Element 234.

Condition States for WSDOT Elements 231A and 231B

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed.
2. Length of pier cap, crossbeam or rehabilitation with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners. Bolts/rivets may have been replaced.
3. Length of pier cap, crossbeam or rehabilitation with moderate defects, failed repairs, or any identified distortion, damaged wires or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Length of pier cap, crossbeam or rehabilitation with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

WSDOT BMSE	Prior BMS	Prestressed Concrete Pier Cap/ Crossbeam	Units - LF	NBE	BME	ADE
233	233			233	--	N

This element defines a prestressed concrete pier cap or crossbeam. The total quantity for this element is the length at the top of the crossbeam.

Condition States for WSDOT Element 233

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.004”).
2. Length of pier cap or crossbeam with minor defects or effective functioning repairs/ patches present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar or prestressing may be exposed with no signs of corrosion or section loss and surface efflorescence may be present without rust staining. May have open narrow cracks (0.004” - 0.009”) or sealed medium/wide cracks.
3. Length of pier cap or crossbeam with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar or prestressing has corrosion with insignificant section loss, but all strands are intact. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.010” - 0.030”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of pier cap or crossbeam with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar or prestressing strands exhibit corrosion with measurable section loss (Note remaining diameter or cross section). Prestressing strands may be stretched or severed. Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.030”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

WSDOT BMSE	Prior BMS	**Concrete Pier Cap/Crossbeam**	**Units - LF**	NBE	BME	ADE
234	234			234	--	N

This element defines a reinforced concrete pier cap or crossbeam. Integral pier caps with girders framed directly into the crossbeam are also included in this element. The total quantity for this element is the length at the top of the crossbeam.

Condition States for WSDOT Element 234

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.004”)
2. Length of pier cap or crossbeam with minor defects or effective functioning repairs/ patches present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar or prestressing may be exposed with no signs of corrosion or section loss and surface efflorescence may be present without rust staining. May have open narrow cracks (0.004” - 0.009”) or sealed medium/wide cracks.
3. Length of pier cap or crossbeam with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar or prestressing has corrosion with insignificant section loss, but all strands are intact. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.010” - 0.030”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of pier cap or crossbeam with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar or prestressing strands exhibit corrosion with measurable section loss (Note remaining diameter or cross section). Prestressing strands may be stretched or severed. Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.030”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

WSDOT BMSE	Prior BMS	Timber Pier Cap	Units - EA	NBE	BME	ADE
235	235			235	--	N

This element defines a timber pier cap that directly supports the superstructure. The total quantity for this element is the length at the top of the crossbeam.

Condition States for WSDOT Element 235

1. Defects if any are superficial with no effect on the structural capacity. Checks, mold or staining may be present, and all connections are in place and functioning as intended.
2. Length of timber pier cap with minor distortion or defects not requiring repair or monitoring, and any existing repairs are in place and functioning as intended. Any evidence or presence of rot or insect infestation still has greater than 90% section remaining. Significant checks are not located within tension zones and do not penetrate more than ½ the member thickness. Any splitting does not penetrate the full thickness of the member or is fully arrested within a repair. Connections may have loose fasteners, or superficial corrosion or pack rust but are functioning as intended.
3. Length of timber pier cap with moderate distortion or defects that may require repair or monitoring, or any existing repairs that have failed or are not functioning as intended. Rot pockets or insect infestation result in less than 90% section remaining. For a remaining shell thickness >= 1-½" location is YELLOW TAGGED. Checks penetrate more than ½ the member thickness at any location or more than 5% of the thickness within a tension zone. Splitting penetrates the full thickness of the member but does not affect capacity. Connections have missing fasteners, broken welds or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity, do not warrant analysis but may require repairs.
4. Length of timber pier cap with major defects or failed repairs that may require immediate action. Rot pockets or insect infestation have resulted in significant section loss affecting capacity. For a remaining shell thickness < 1-½" location is RED TAGGED. Checks, splits or distortion are significant and are affecting structural capacity. Connections are no longer functioning as intended with missing fasteners, broken welds, distortion, or due to other local timber defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects are affecting structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
237	237	**Pontoon Hatch/Bulkhead**	**Units - EA**	--	--	Y

This element defines a deck or bulkhead access hatch made of steel or aluminum. Deck hatches are accessed from the exterior of a pontoon and bulkhead hatches provide access between cells. The condition evaluation of a pontoon hatch is based on the condition of the hatch and the ability of a hatch to provide a watertight structural seal. The performance of the hatches is critical to the design buoyancy of the pontoon structure during extreme events. The total element quantity is the total number of hatches on a bridge.

Condition States for WSDOT Element 237

1. Defects are superficial and are insignificant to the performance of the hatch to moderate surface corrosion with no appreciable pitting or section loss. Insignificant amounts of water enter a cell when a deck hatch is closed.
2. Number of hatches with temporary repairs such as: partially replaced seals, repaired hold-down dogs or locks. Light to moderate surface corrosion with some pitting resulting in section loss of up to 5% of the surface area of the hatch.
3. Number of hatches with structural defects. The defects do not threaten performance of the hatch. Moderate to heavy surface corrosion with more frequent section loss due to pitting. Section loss estimated between 5% and 25% of the surface area of the hatch. Heavy pitting and section loss along seal edges which compromises the watertight integrity of the hatch. Superficial chipping noted in hatch components. Number of hatches which allow water accumulation into a cell of less than 1” per year.
4. Number of hatches with damage that threatens performance during an extreme event. Heavy surface corrosion with more uniform pitting. Visually corresponds to approximately 25% or more section loss of the surface area of the hatch. Cracking present in hatch components. Chips or broken hatch components that compromise the strength of the hatch or the watertight seal. Number of hatches which allow water accumulation into a cell of 1” or more per year. All pontoon cells in WSDOT element 239 shall be coded CS4 that have a deck hatch or bulkhead hatch coded CS4.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
238	238	**Floating Bridge – Anchor Cable**	**Units - EA**	149	--	Y

This element defines a steel anchor cable or structural strand used to stabilize the position of a floating bridge. The condition of a floating pontoon anchor cable is evaluated during underwater inspections performed by divers and remotely operated vehicles. Condition evaluation is based on the cable protection system, breakage of wires within the cable and the condition of the cable anchor. The total element quantity should equal the number of floating pontoon anchor cables attached to the bridge.

Floating bridge anchor cables Condition Definitions: The amount of corrosion noted corresponds to the following criteria.

LIGHT (CS2) – Light surface corrosion (freckle rust, not white oxidation) and rusting of the outer layers of wires, no appreciable rust nodules or section loss detected.

LIGHT TO MODERATE – More significant corrosion with scattered rust nodules 1/16 inch thick, very early stages of section loss due to occasional pitting less than 1/32 inch deep.

MODERATE (CS3) – Rust nodules more uniform and typically 1/16 to ¼ inch thick with more frequent section loss due to pitting, typically still less than 1/32 inch deep, but with occasional pitting up to 1/32 inch deep. Visually corresponds to approximately 5% section loss in outer wires.

MODERATE TO HEAVY – Uniform rust nodules typically ¼ inch thick with uniform section loss due to pitting typically 1/32 inch deep. Outer wire section loss estimated between 5% and 25%.

HEAVY (CS4) – Uniform rust nodules typically ¼ inch to 3/8 inch thick with uniform section loss due to pitting typically 1/32 to 1/16 inch deep. Visually corresponds to approximately 25% section loss to the outer wires (obvious flattening of the wires, with grooves between the wires still visible).

1. Number of cables or anchors with no defects in the cable or anchor and the galvanized protection system is functioning properly, which includes white zinc oxidation. New replacement cables are coded in this condition state. (Corresponds to SNBI Substructure Condition (SNBI Item B.C.03) and SNBI Underwater Inspection Condition (SNBI Item B.C.15) rating of 7 or 8.)
2. Number of cables or anchors with defects that are insignificant and do not affect the capacity of the cable. The galvanized protection system is showing signs of failure, and surface or freckled rust may exist with no measurable loss of section. Any individual wire up to 75% out of lay and no closer than 30 LF apart is CS2. If any portion of the cable or anchor is CS2, then the NBI Substructure Condition rating (SNBI Item B.C.03) and SNBI Underwater Inspection Condition (SNBI Item B.C.15) shall be a maximum of 6.
3. Number of cables or anchors with defects that are beginning to affect the capacity of the cable but are within acceptable design limits. Corrosion section loss is not more than 25% of the outer wire layer. Single wire failures of the cable may exist due to corrosion or hydrogen embrittlement, but no closer than 30 feet apart. Gaps in the outer wires exposing the inner layer with no ferrous corrosion to inner layer. Multiple adjacent wires up to 100% out of lay. Wires more than 100% out of lay with second layer exposed are considered broken wires. If any portion of the cable or anchor is CS3, then the SNBI Substructure Condition rating (SNBI Item B.C.03) and SNBI Underwater Inspection Condition (SNBI Item B.C.15) shall be a maximum of 5.
4. Number of cables or anchors with defects that have significantly affected the capacity. Two or more broken wires, or equivalent section loss due to other defects, are within 30 feet. Outer wire section loss greater than 25%. Exposed inner wires with measurable section loss. Any cable which exhibits permanent deformation. If any portion of the cable or anchor is CS4, then the SNBI Substructure Condition rating (SNBI Item B.C.03) shall be a maximum of 4. If two or more adjacent cables (on the same side or opposite sides of the pontoon) or more than four cables on the structure are CS4, then the SNBI Substructure Condition rating (SNBI Item B.C.03) and SNBI Underwater Inspection Condition (SNBI Item B.C.15) shall be 3.

WSDOT BMSE	Prior BMS	Concrete Floating Pontoon	Units - Cell	NBE	BME	ADE
239	236			--	--	Y

A concrete floating bridge is a series of post-tensioned floating pontoons which are subdivided into internal compartments called cells. Traffic may ride directly on the top of the pontoon, or the roadway may be elevated above the pontoon and supported by columns.

This element includes all pontoons regardless of size or configuration and all cells shall be evaluated at the same risk to the bridge condition. Deck elements will apply for the entire length of the pontoon structure. Pontoon condition will include the top slab where the deck/soffit elements exist on the pontoon. The deck/soffit elements are not included where the deck is elevated above the pontoon. The total quantity for the Concrete Floating Pontoon element is the total number of pontoon cells for the bridge.

Concrete pontoons are specially designed to be watertight and dry while in service. The concrete is specifically designed to be visually crack free and have low permeability with watertight construction joints. Watertight design is the basis for condition evaluation of the pontoon below water line and is to include but is not limited to the assessment of post-tensioned concrete, connections between pontoons, WSDOT element 237-Pontoon Hatch/Bulkheads, and the risk to buoyancy. Watertight criteria shall not apply to the evaluations of conventionally designed concrete conditions above the waterline.

Concrete cracking shall be assessed on the location:

- Above or below the waterline.
- Whether it is in an exterior or interior wall.
- Whether it is active or in-active.
- And based on the design criteria that visible cracking should not exist on submerged surfaces.

An active crack is defined for this element as a crack that allows water to pass into or through a concrete section which is a risk for transporting fine materials out of the section or a source of contaminates into the section. Active cracks may be visible under normal bridge loading or only visible under storm conditions.

The presence of water in a cell is evaluated based on the time required to obtain a measured depth of water. Stated another way, the evaluation is based on the rate of accumulation, not the total depth of water. For example, seepage in a cell is defined as, less than 1” of water accumulated over a period of one year. Ballasted cells shall establish a void ratio of the ballast to calculate a volume of water in a cell, and also the actual infiltration rate of water assuming no ballast was present.

This Concrete Floating Pontoon element also defines the relationship between the bridge element condition and the corresponding SNBI Substructure Condition rating, Item BC03. For cases where defects are observed in pontoons underwater and defects are independent of those seen on the interior of pontoons, Underwater Inspection Condition (SNBI Item B.C.15) coding will follow the same coding correlations as defined below for NBI Substructure Condition rating.

1. Number of pontoon cells with defects that are superficial and are insignificant to structural capacity or buoyancy of the cell, pontoon or bridge. The cell concrete surfaces may have structurally insignificant hairline cracks, possibly sealed with Crystalline during construction, with no history of seepage. The cell is dry. A cell may have water

present due to condensation or from water accumulating at a rate slower than would be considered a CS3 “trace’ amount of water.

- If the total quantity is in CS1, then Item BC03 shall be an 8.

2. Number of pontoon cells with a repair such as, but not limited to a concrete patch or an epoxy injected sealed crack.
   - If repairs are above water level, or on interior walls between cells, then Item BC03 shall be a 7.
   - If repairs are below water level, then Item BC03 shall be a 6.
3. Number of pontoon cells with significant defects. Conventional concrete defects which do not affect structural capacity of the bridge. Watertight defects below the waterline which may affect buoyancy of the cell, pontoon or the bridge. Typical CS3 submerged defects include but are not limited to seepage of less than 1” of water accumulation in a year (trace). Trace is further defined as the amount of water required to manifest as puddled water over more than 50% of the pontoon floor. Below this amount of water, the pontoon cell is considered dry. Pontoon cells which have water present but does not increase in amount for 3 consecutive years are considered CS1 cells.

   Pontoon cells will be monitored annually for water when there is more than 1” accumulation in a year, but do not meet the leaking requirements of CS4.
   - If cells are in CS3 due to seepage, then Item BC03 shall be a 6.
   - If eight or more adjacent or contiguous cells in a single pontoon are in CS3, then Item BC03 shall be a 5.
   - If 20 percent of the cells in one pontoon, or a total of 10 percent of the cells in adjoining pontoons or 5 percent of the total element quantity are in CS3, then Item BC03 shall be a 4.
4. Number of pontoon cells with damage in locations or quantity, which has reduced the structural capacity of the pontoon or threatens the buoyancy of a cell, the pontoon, or the bridge. Wet conditions that indicate a threat to a cell’s buoyancy include, but not limited to: Water leaks 1 inch or more per year in three consecutive years; Water leaks 2 inches or more in a year; Any cell visually leaking water at a rate greater than what would be classified as seepage for a CS3 cell. Any cell with a pontoon hatch or bulkhead in CS4, see WSDOT element 237.
   - If cells are in CS4, then Item BC03 shall be a 4.
   - If eight or more non-adjacent cells in a single pontoon are in CS4 or one cell leaks ½ inch per month, then Item BC03 shall be a 3.
   - If eight or more adjacent cells in a single pontoon are in CS4, or one cell leaks 1 inch of water per month, then Item BC03 shall be a 2.
   - If 20 percent of the cells in one pontoon, or a total of 10 percent of the cells in adjoining pontoons or 5 percent of the total element quantity are in CS4, then Item BC03 shall be a 2.
   - If one cell leaks 1 inch of water per month, for three consecutive months, then the Item BC03 shall be a 1 and the bridge shall be closed to traffic.
   - If there is a measurable or visual change in the alignment or the free board distance at any location on the pontoon, then the Item BC03 shall be a 1 and the bridge shall be closed to traffic.

4-5 Culverts

WSDOT BMSE	Prior BMS			NBE	BME	ADE
240	240	**Metal Culvert**	**Units - LF**	240	--	N

This element defines a metal (steel, aluminum, etc.) culvert including arches, round or elliptical pipes, etc. The total quantity is the length of culvert from inlet to outlet along the bottom of the culvert and does not include the apron.

Condition States for WSDOT Element 240

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed.
2. Length of culvert with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners. Bolts/rivets may have been replaced.
3. Length of culvert with moderate defects, failed repairs, or any identified distortion, damaged wires or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Length of culvert with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
241	241	**Concrete Culvert**	**Units - LF**	241	--	N

This element defines all precast and cast-in-place (conventional or prestressed) concrete arch, pipe and box culverts. The total quantity is the length of culvert from inlet to outlet along the bottom of the culvert and does not include the apron.

Condition States for WSDOT Element 241

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Length of culvert with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Length of culvert with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of culvert with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

WSDOT BMSE	Prior BMS	Timber Culvert	Units - LF	NBE	BME	ADE
242	242			242	--	N

This element defines all timber box culverts. The total quantity is the length of culvert from inlet to outlet along the bottom of the culvert and does not include the apron.

Condition States for WSDOT Element 242

1. Defects if any are superficial and have no effect on the structural capacity. Decay, insect infestation, cracks, splits, or checks may exist.
2. Length of culvert with minor distortion or defects not requiring repair or monitoring, and any existing repairs are in place and functioning as intended. Any evidence or presence of rot or insect infestation still has greater than 90% section remaining. Significant checks are not located within tension zones and do not penetrate more than ½ the member thickness. Any splitting does not penetrate the full thickness of the member or is fully arrested within a repair. Connections may have loose fasteners, or superficial corrosion or pack rust but are functioning as intended.
3. Length of culvert with moderate distortion or defects that may require repair or monitoring, or any existing repairs that have failed or are not functioning as intended. Rot pockets or insect infestation result in less than 90% section remaining. For a remaining shell thickness >= 1-½" location is YELLOW TAGGED. Checks penetrate more than ½ the member thickness at any location or more than 5% of the thickness within a tension zone. Splitting penetrates the full thickness of the member but does not affect capacity. Connections have missing fasteners, broken welds or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity, do not warrant analysis but may require repairs.
4. Length of culvert with major defects or failed repairs that may require immediate action. Rot pockets or insect infestation have resulted in significant section loss affecting capacity. For a remaining shell thickness < 1-½" location is RED TAGGED. Checks, splits or distortion are significant and are affecting structural capacity. Connections are no longer functioning as intended with missing fasteners, broken welds, distortion, or due to other local timber defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects are affecting structural capacity. Structural analysis is warranted or repairs are essential to restore capacity.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
243	243	**Other Culvert**	**Units - LF**	243	--	N

This element defines all culverts not included under steel, concrete, or timber culvert elements. It may include masonry or combinations of other materials. The total quantity is the length of culvert from inlet to outlet along the bottom of the culvert and does not include the apron.

Condition States for WSDOT Element 243

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Length of culvert with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear exfoliation will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Length of culvert with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of culvert with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Signs of significant deficiencies may include distortion, deflection, misalignment or roadway settlement. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

4-6 Sidewalk and Supports

A sidewalk is an element that provides pedestrian access across a bridge. A sidewalk is supported by a bridge deck and/or by sidewalk brackets that consist of several types of materials. The purpose of the sidewalk BMS is to record the structural integrity of the support system and sidewalk. Identify these elements in BMS if the sidewalk width is greater than or equal to 3 feet.

However, there are exceptions that must be accommodated. When there is a true sidewalk on a bridge as determined by the design, approach sidewalks, and location, it is appropriate to enter a sidewalk element in the BMS. Timber sidewalks, for example, may be narrow and have a support system. These exceptions should include a sidewalk WSDOT element. A specific note explaining the reasoning for including the sidewalk element should be provided.

If a rail retrofit or a wide curb has been determined to NOT be a sidewalk, then Bridge Rail elements will be used to document defects.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
260	260	**Steel Open Grid Sidewalk and Supports**	**Units - SF**	--	--	Y

This element defines a sidewalk constructed of steel grids that are open and unfilled. This element also includes the members used to provide support like stringers and braces. The total quantity should equal the width of the sidewalk times its length which includes sidewalk supported by structural bridge members such as a wing wall or approach slab.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
261	261	**Steel Concrete Filled Grid Sidewalk and Supports**	**Units - SF**	--	--	Y

This element defines a sidewalk constructed of steel grids that have been filled with concrete. This element also includes the members used to provide support like stringers and braces.

The total quantity should equal the width of the sidewalk times its length which includes sidewalk supported by structural bridge members such as a wing wall or approach slab.

WSDOT BMSE	Prior BMS	Corrugated/Orthotropic Sidewalk and Supports	Units - SF	NBE	BME	ADE
262	262			--	--	Y

This element defines a sidewalk constructed of corrugated metal filled with Portland cement concrete or asphaltic concrete or an orthotropic steel deck. This element also includes the members used to provide support like stringers and braces. The total quantity should equal the width of the sidewalk times its length which includes sidewalk supported by structural bridge members such as a wing wall or approach slab.

Condition States for WSDOT Elements 260, 261, and 262

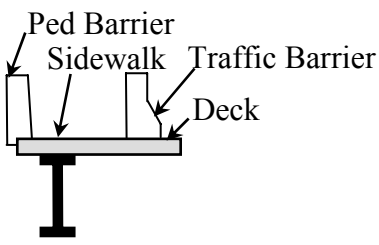
1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed.
2. Sidewalk area with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners. Bolts/rivets may have been replaced.
3. Sidewalk area with moderate defects, failed repairs, or any identified distortion, damaged wires or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Sidewalk area with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

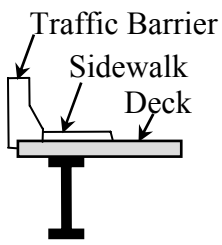
WSDOT BMSE	Prior BMS	Timber Sidewalk and Supports	Units - SF	NBE	BME	ADE
264	264			--	--	Y

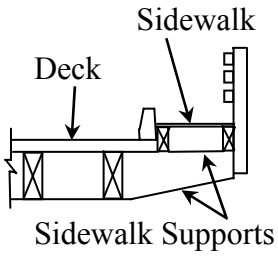
This element defines a sidewalk constructed of timber. This element also includes the members used to provide support like stringers and braces. The total quantity should equal the width of the sidewalk times its length which includes sidewalk supported by structural bridge members such as a wing wall or approach slab.

Condition States for WSDOT Element 264

1. Defects if any are superficial and have no effect on the structural capacity. Decay, insect infestation, cracks, splits, or checks may exist.
2. Sidewalk area with minor distortion or defects not requiring repair or monitoring, and any existing repairs are in place and functioning as intended. Any evidence or presence of rot or insect infestation still has greater than 90% section remaining. Significant checks are not located within tension zones and do not penetrate more than ½ the member thickness. Any splitting does not penetrate the full thickness of the member or is fully arrested within a repair. Connections may have loose fasteners, or superficial corrosion or pack rust but are functioning as intended.
3. Sidewalk area with moderate distortion or defects that may require repair or monitoring, or any existing repairs that have failed or are not functioning as intended. Rot pockets or insect infestation result in less than 90% section remaining. For a remaining shell thickness >= 1-½" location is YELLOW TAGGED. Checks penetrate more than ½ the member thickness at any location or more than 5% of the thickness within a tension zone. Splitting penetrates the full thickness of the member but does not affect capacity. Connections have missing fasteners, broken welds or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity, do not warrant analysis but may require repairs.
4. Sidewalk area with major defects or failed repairs that may require immediate action. Rot pockets or insect infestation have resulted in significant section loss affecting capacity. For a remaining shell thickness < 1-½" location is RED TAGGED. Checks, splits or distortion are significant and are affecting structural capacity. Connections are no longer functioning as intended with missing fasteners, broken welds, distortion, or due to other local timber defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects are affecting structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity.







WSDOT BMSE	Prior BMS			NBE	BME	ADE
266	266	**Concrete Sidewalk and Supports**	**Units - SF**	--	--	Y

This element defines a sidewalk constructed of reinforced concrete. The concrete sidewalk may be supported by the roadway deck, bracing, diaphragms, or sidewalk stringers. The total quantity should equal the width of the sidewalk times its length which includes sidewalk supported by structural bridge members such as a wing wall or approach slab.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
267	267	**Fiber Reinforced Polymer (FRP) Sidewalk and Supports**	**Units - SF**	--	--	Y

This element defines a sidewalk constructed of fiber-reinforced polymer. This element also includes the members used to provide support like stringers and braces. The total quantity should equal the width of the sidewalk times its length which includes sidewalk supported by structural bridge members such as a wing wall or approach slab.

Condition States for WSDOT Elements 266 and 267

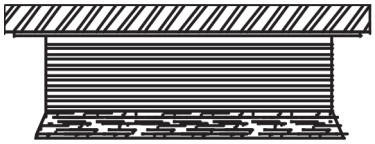
1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Sidewalk area with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks
3. Sidewalk area with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Sidewalk area with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

4-7 Bearings

When an in-span hinge separates two structures, the joint, bearing, and seismic restrainers at the hinge will be documented in the dependent (or supported) structure only.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
310	310	**Elastomeric Bearing**	**Units - EA**	310	--	N

This element defines a bridge bearing that is constructed primarily of elastomers, with or without fabric or metal reinforcement.



WSDOT BMSE	Prior BMS			NBE	BME	ADE
311	311	**Moveable Bearing (Roller, Sliding, etc.)**	**Units - EA**	311	--	N

This element defines those bridge bearings that provide for both deflection and longitudinal movement by means of roller, rocker or sliding mechanisms.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
312	312	**Concealed Bearing or Bearing System**	**Units - EA**	312	--	N

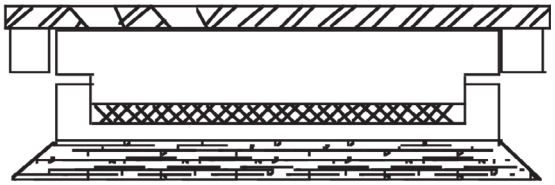
This element defines those bridge bearings and/or bearing seats that are not accessible with tools or equipment and therefore are not open for detailed inspection.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
313	313	**Fixed Bearing**	**Units - EA**	313	--	N

This element defines those bridge bearings that provide for rotation only.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
314	314	**Pot Bearing**	**Units - EA**	314	--	N

This element defines those high load bearings with a confined elastomer. The bearing may be fixed against horizontal movement, guided to allow sliding in one direction, or floating to allow sliding in any direction.



WSDOT BMSE	Prior BMS			NBE	BME	ADE
315	315	**Disk Bearing**	**Units - EA**	315	--	N

This element defines a high load bearing with a hard plastic disc. The bearing may be fixed against horizontal movement, guided to allow sliding in one direction, or floating to allow sliding in any direction.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
316	316	**Isolation Bearing**	**Units - EA**	316	--	N

This element defines a bearing that is laminated and is a sandwich of neoprene and steel plates. The bearing contains a lead core that is primarily used for seismic loads. The isolation bearing is used to protect structures against earthquake damage.

Condition States for WSDOT Elements 310, 311, 312, 313, 314, 315, and 316

1. Defects are superficial and have no effect on the superstructure movements or safe transfer of load to the substructure. Shear deformation, displacement, or cracking of grout pad may be present. Top and bottom surfaces may not be parallel.
2. Number of bearings with a repair.
3. Number of bearings with structural defects. The defects are not detrimental to the superstructure or the safe transfer of load to the substructure. Deficiencies do not warrant analysis but may require repairs.
4. Number of bearings with defects that are detrimental to the superstructure or the safe transfer of load to the substructure. Loss of minimum bearing area may be imminent. Structural analysis is warranted or has determined bearing repairs are essential to restore the safe movement or transfer of load to the substructure.

4-8 Bridge Approach

WSDOT BMSE	Prior BMS	Concrete Roadway Approach Slab	Units - SF	NBE	BME	ADE
321	321			--	321	N

This element defines a structural concrete slab supported at the bridge abutment and the roadway pavement. This element is essentially a concrete deck element that documents the surface conditions of the approach slab. The element quantity is the total area of both concrete approach slabs attached to the bridge. Do not include asphalt shoulder if present. Whether surface of approach slab is visible or covered by an asphalt overlay, a WSDOT element shall exist.

Condition States for WSDOT Element 321

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Slab surface area with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Slab surface area with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended..
4. Slab surface area with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Abrasion or wear is causing significant section loss and may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies may be due to shifting or movement off of the bridge seat and will require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

4-9 Bridge Rail

WSDOT element for bridge railing are to be entered for each type of rail. For example, if there is W-beam or Thrie-beam guardrail mounted on the concrete bridge rail, then the length of each metal and concrete element should be entered. If the original concrete bridge rail has aluminum rail installed on top (with or without a rail retrofit), enter that quantity into the appropriate WSDOT element as well. In the element notes, describe what type of metal bridge or pedestrian rail has been entered.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
330	330	**Metal Bridge Rail**	**Units - LF**	330	--	N

This element defines all types and shapes of metal bridge railing aluminum, metal beam, rolled shapes, etc. The quantity should equal the total length measured along each bridge rail within the limits of the bridge which includes rail permanently attached to structural bridge members such as the deck, a wing wall or approach slab.

Condition States for WSDOT Element 330

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed.
2. Bridge rail length with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners. Bolts/rivets may have been replaced.
3. Bridge rail length with moderate defects, failed repairs, or any identified distortion, damaged wires or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Bridge rail length with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

WSDOT BMSE	Prior BMS	Concrete Bridge Rail	Units - LF	NBE	BME	ADE
331	331			331	--	N

This element defines all types and shapes of reinforced concrete bridge railing. The quantity should equal the total length measured along each bridge rail within the limits of the bridge which includes rail permanently attached to structural bridge members such as the deck, a wing wall or approach slab.

Condition States for WSDOT Element 331

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Length of rail with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Length of rail with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of rail with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
332	332	**Timber Bridge Rail**	**Units - LF**	332	--	N

This element defines all types and shapes of timber railing. All elements of this rail (except connectors) must be timber. The quantity should equal the total length measured along each bridge rail within the limits of the bridge which includes rail permanently attached to structural bridge members such as the deck, a wing wall or approach slab.

Condition States for WSDOT Element 332

1. Defects if any are superficial and have no effect on the structural capacity. Decay, insect infestation, cracks, splits, or checks may exist.
2. Bridge rail length with minor distortion or defects not requiring repair or monitoring, and any existing repairs are in place and functioning as intended. Any evidence or presence of rot or insect infestation still has greater than 90% section remaining. Significant checks are not located within tension zones and do not penetrate more than ½ the member thickness. Any splitting does not penetrate the full thickness of the member or is fully arrested within a repair. Connections may have loose fasteners, or superficial corrosion or pack rust but are functioning as intended.
3. Bridge rail length with moderate distortion or defects that may require repair or monitoring, or any existing repairs that have failed or are not functioning as intended. Rot pockets or insect infestation result in less than 90% section remaining. For a remaining shell thickness >= 1-½" location is YELLOW TAGGED. Checks penetrate more than ½ the member thickness at any location or more than 5% of the thickness within a tension zone. Splitting penetrates the full thickness of the member but does not affect capacity. Connections have missing fasteners, broken welds or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity, do not warrant analysis but may require repairs.
4. Bridge rail length with major defects or failed repairs that may require immediate action. Rot pockets or insect infestation have resulted in significant section loss affecting capacity. For a remaining shell thickness < 1-½" location is RED TAGGED. Checks, splits or distortion are significant and are affecting structural capacity. Connections are no longer functioning as intended with missing fasteners, broken welds, distortion, or due to other local timber defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects are affecting structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity.

WSDOT BMSE	Prior BMS	Other Bridge Rail	Units - LF	NBE	BME	ADE
333	333			333	--	N

This element defines all types and shapes of bridge railing except those defined as METAL, CONCRETE or TIMBER. This element will include cable rails, and combinations of materials. The quantity should equal the total length measured along each bridge rail within the limits of the bridge which includes rail permanently attached to structural bridge members such as the deck, a wing wall or approach slab.

Condition States for WSDOT Element 333

1. Defects are superficial and have no effect on the structural capacity of the element.
2. Length of rail with minor defects or effective repairs that are in place and functioning as intended. There is no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners.
3. Length of rail with moderate defects. Defects may include traffic impact damage, cracks, decay, broken or missing fasteners, or measurable section loss. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of rail with major defects or damage. Defects may include severe traffic impact damage, cracks, decay, broken or missing fasteners, or significant section loss. (Note remaining diameter or cross section). Any previous repairs are ineffective. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

4-10 Pedestrian Rail

A pedestrian rail will typically be on the outside of a sidewalk and protected from traffic by a Bridge Rail.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
340	340	**Metal Pedestrian Rail**	**Units - LF**	--	--	Y

This element defines all types and shapes of metal pedestrian bridge railing including steel (excluding weathering steel), aluminum, metal beam, rolled shapes, etc. The quantity should equal the total length measured along each pedestrian rail within the limits of the bridge which includes rail permanently attached to structural bridge members such as the deck, a wing wall or approach slab.

Condition States for WSDOT Element 340

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed.
2. Length of pedestrian rail with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners. Bolts/rivets may have been replaced
3. Length of pedestrian rail with moderate defects, failed repairs, or any identified distortion, damaged wires or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Length of pedestrian rail with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
341	341	**Concrete Pedestrian Rail**	**Units - LF**	--	--	Y

This element defines all types and shapes of reinforced concrete pedestrian bridge railing. The quantity should equal the total length measured along each pedestrian rail within the limits of the bridge which includes rail permanently attached to structural bridge members such as the deck, a wing wall or approach slab.

Condition States for WSDOT Element 341

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625")
2. Length of rail with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1" deep and 6" in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½" deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625" - 0.125") or sealed medium/wide cracks.
3. Length of rail with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½"-1" deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125" - 0.1875") that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of rail with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875") that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
342	342	**Timber Pedestrian Rail**	**Units - LF**	--	--	Y

This element defines all types and shapes of timber pedestrian bridge railing. All elements of this rail (except connectors) must be timber. The quantity should equal the total length measured along each pedestrian rail within the limits of the bridge which includes rail permanently attached to structural bridge members such as the deck, a wing wall or approach slab.

Condition States for WSDOT Element 342

1. Defects if any are superficial and have no effect on the structural capacity. Decay, insect infestation, cracks, splits, or checks may exist.
2. Length of pedestrian rail with minor distortion or defects not requiring repair or monitoring, and any existing repairs are in place and functioning as intended. Any evidence or presence of rot or insect infestation still has greater than 90% section remaining. Significant checks are not located within tension zones and do not penetrate more than ½ the member thickness. Any splitting does not penetrate the full thickness of the member or is fully arrested within a repair. Connections may have loose fasteners, or superficial corrosion or pack rust but are functioning as intended.
3. Length of pedestrian rail with moderate distortion or defects that may require repair or monitoring, or any existing repairs that have failed or are not functioning as intended. Rot pockets or insect infestation result in less than 90% section remaining. For a remaining shell thickness >= 1-½" location is YELLOW TAGGED. Checks penetrate more than ½ the member thickness at any location or more than 5% of the thickness within a tension zone. Splitting penetrates the full thickness of the member but does not affect capacity. Connections have missing fasteners, broken welds or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity, do not warrant analysis but may require repairs.
4. Length of pedestrian rail with major defects or failed repairs that may require immediate action. Rot pockets or insect infestation have resulted in significant section loss affecting capacity. For a remaining shell thickness < 1-½" location is RED TAGGED. Checks, splits or distortion are significant and are affecting structural capacity. Connections are no longer functioning as intended with missing fasteners, broken welds, distortion, or due to other local timber defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects are affecting structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
343	343	**Other Pedestrian Rail**	**Units - LF**	--	--	Y

This element defines all types and shapes of pedestrian bridge railing except those defined as METAL, CONCRETE or TIMBER. This element will include cable rails, and combinations of materials. The quantity should equal the total length measured along each pedestrian rail within the limits of the bridge which includes rail permanently attached to structural bridge members such as the deck, a wing wall or approach slab.

Condition States for WSDOT Element 343

1. Defects are superficial and have no effect on the structural capacity of the element.
2. Length of rail with minor defects or effective repairs that are in place and functioning as intended. There is no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners.
3. Length of rail with moderate defects. Defects may include traffic impact damage, cracks, decay, broken or missing fasteners, or measurable section loss. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended..
4. Length of rail with major defects or damage. Defects may include severe traffic impact damage, cracks, decay, broken or missing fasteners, or significant section loss. (Note remaining diameter or cross section). Any previous repairs are ineffective. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

4-11 Smart Flags

WSDOT BMSE	Prior BMS	Approach Roadway Impact – Smart Flag	Units - EA	NBE	BME	ADE
322	322	**Smart Flag**		--	--	Y

Assigned to document the increase to the bridge live load, or impact, due to hammering or dynamic response of the bridge from traffic (specifically trucks) coming onto the bridge. Traffic speed may be considered when slower speeds reduce the impact. Total quantity is based on the direction of traffic coming onto the bridge. Bridges with two-way traffic will have two approaches and bridges with one way traffic such as ramps or divided main line structures will have only one approach. Code the approach roadway lanes in the condition state that best indicates the severity of the problem. For the roadway lanes where traffic is leaving the structure, deficiencies will be described and repairs may be called out; however, the trailing roadway will not be quantified in the condition states.

1. The number of approach roadways that are smooth. Hammer or dynamic response to the structure is not significant. There may be small bumps or minor raveling of the pavement in the approach roadway.
2. The number of approach roadways (not approach slab) that have been repaired or feather patched to correct an approach problem. If a paving project has removed the repairs, maintain the CS2 condition and note the year of the new asphalt.
3. The number of approach roadways that are rough, but the increase in live load to the structure is minor. Hammering impact is minor due to the wheels passing over surface discontinuities such as joints, cracks, or potholes. Dynamic response is minor due to a dip or rise in the approach roadway alignment.
4. The number of approach roadways that are causing significant increase in live load to the structure. Hammering impact is significant due to the wheels passing over surface discontinuities such as joints, cracks, or potholes. Dynamic response is significant due to a dip or rise in the approach roadway alignment.

WSDOT BMSE	Prior BMS	Chloride Impact – Smart Flag	Units - EA	NBE	BME	ADE
351	351			--	--	Y

Assigned when chloride contamination of a structure is identified through testing or field evaluation. Contamination may be in any of the Deck, Superstructure or Substructure elements. Condition state coding represents levels of impact, deterioration and degree of mitigation or rehabilitation expected to be necessary to extend structure life or restore it.

1. Structure has been identified to have chloride contamination through testing and or field evaluation by the Bridge Preservation Repair section. Best practices are required to extend the life of the structure to include:
   - Maintain the seal of all deck expansion joints to protect superstructure and substructure elements below.
   - Seal all cracking in deck surface or overlay and restore membranes prior to new overlay.
   - Seal barrier expansion joints within 6” above the deck surface and all leaking deck to barrier construction joints.
   - Direct all bridge and roadway drainage away from the structure to include extending any bridge drains away from pier caps and columns.
   - Initiate practices to minimize or eliminate use of chlorides on or in vicinity of the bridge.
2. Chloride contamination is actively contributing to deterioration of bridge elements with areas of concrete cracking, discoloration and delamination primarily concentrated in locations exposed to chloride use. Corrosion of reinforcement may not be openly evident but is occurring. These include the deck surface or soffit and areas of the superstructure and substructure exposed to water spray or uncontrolled drainage. Mitigation is required to reduce further impact, protect damaged elements, and slow the progression of ongoing damage. By the nature of chloride impacts, deterioration will continue, but without mitigation and extensive repair, damage will spread in extent and severity at increasing rates.
   - Once contamination reaches reinforcing steel. patching with cementitious products can result in a “Halo Effect” pattern of deterioration, accelerating corrosion of the steel. All chloride contaminated concrete and steel must be removed and replaced as part of a proper repair. (See ACI 364.6T-02, July 2002)
3. Chloride contamination has caused damage and decay of bridge Deck, Superstructure, or Substructure elements. Damage is widespread with areas of delamination, possible spalling, and open cracking progressing into and throughout structural elements. Corrosion of reinforcement has resulted in section loss that is directly impacting the overall serviceability and integrity of elements. Loss of capacity may or may not be indicated. Current condition risks necessity for restrictions or closure. Additional invasive evaluation may be necessary to fully determine the extent of damage. Extensive rehabilitation is indicated to extend useable life of the structure.
4. Chloride contamination has caused extensive damage and decay of bridge Deck, Superstructure, or Substructure elements and continues at increased rates. Damage is widespread with areas of delamination, spalling and open cracking progressing throughout structural elements. Corrosion of reinforcement has resulted in heavy section loss that is directly impacting the serviceability, integrity, and capacity of elements. Overall damage is extensive and expected to expand at increased rates reducing or eliminating options for rehabilitation. Remaining structure life is limited with high risk of near-term restrictions or closure that precipitate replacement.

WSDOT BMSE	Prior BMS	Encampment Impact – Smart Flag	Units - EA	NBE	BME	ADE
353	353			--	--	Y

Assigned when encampment activity is impacting inspection, maintenance, and condition of a bridge. Activity indicates the presence of encampments and/or encampment related activity or debris that prevents full access for adequate inspection or maintenance of a structure.

Activity may be causing or has previously caused damage to the structure. Condition state coding represents levels of impact, or damage. Write any repairs for removal or clean up under the “0” Note”.

1. Encampment activity is evident with accumulations of debris under and/or in the immediate vicinity of the structure. Activity may be hindering inspection and maintenance activities in one or more areas making access and thorough examination of bridge elements difficult.
2. Heavy encampment activity and accumulations of related debris under and around the immediate vicinity of the bridge is creating a hazardous situation and prevents full and adequate inspection of the structure.
3. Encampment is causing or has caused physical damage to the structure through vandalism, break-in, theft or excavation of footings or slope protection. Damage may or may not require repairs. Graffiti is not considered.
4. Encampment is causing or has caused physical damage as a result of fire. Damage may or may not require repairs but may affect longevity of bride element conditions. Resulting access conditions may be hazardous.

WSDOT BMSE	Prior BMS	Damaged Bolts or Rivets – Smart Flag	Units - EA	NBE	BME	ADE
355	355			--	--	Y

Assigned to identify superstructure steel elements that have broken or missing bolts and/or rivets.

Report a quantity of one unit in the appropriate condition states identified, but no more than one unit per condition state total.

1. Bolts or rivets missing, damaged or replaced in the superstructure due to fatigue.
2. Bolts or rivets missing, having more than 10% section loss in the superstructure due to corrosion.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
356	356	**Steel Cracking – Smart Flag**	**Units - EA**	--	--	Y

Assigned to identify superstructure steel elements with cracks. Report a quantity of one unit in the appropriate condition states identified, but no more than one unit per condition state total. If fatigue damage exists, which may warrant analysis of the element or the serviceability of the element is uncertain, contact a supervisor immediately. Any cracks (typically cope cracks) on WSDOT bridges must be repaired accordance with WSDOT Bridge Preservation Office procedures.

1. Steel cracks, of any length, are present in a secondary member(s).
2. Steel cracks within a load path that have been repaired or arrested are present.
3. Steel cracks within a load path that are not arrested and less than 1 inch.
4. Steel cracks within a load path that are not arrested and 1 inch or greater in length are present.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
357	357	**Pack Rust – Smart Flag**	**Units - EA**	--	--	Y

Assigned to identify the presence of pack rust within steel connections. Steel connections where pack rust is significant or rust expansion is visually deflecting steel plates and should be addressed when the bridge is painted. Structural impacts to pack rust overstressing are recorded within the steel elements. Report a quantity of one unit in the appropriate condition states identified, but no more than one unit per condition state total.

1. Pack rust exists and is less than ¼ inch thick.
2. Pack rust exists where rust is more than ¼ inch thick and/or the deformation of connection steel members is evident.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
360	360	**Bridge Movement – Smart Flag**	**Units - EA**	--	--	Y

Assigned to identify structural movement that is causing significant distress to the bridge. Movements may be horizontal, vertical, or rotational. Evidence of movement should be documented (photo) in such a way that future measurements can determine if the structure is still moving or has stabilized.

1. The entire bridge appears to have stabilized due to repairs or recent history of measurements. Tilt meters, piezometer tubes, or monitoring system show no movement in the past two years.
2. Bridge elements are moving but do not cause a significant problem for the bridge. Bearings may be approaching design limits. Substructure elements may be moving.
3. Bridge movement is at or beyond design limits. Investigation and repair analysis of the bridge is warranted.

WSDOT BMSE	Prior BMS	Scour – Smart Flag	Units - EA	NBE	BME	ADE
361	361			--	--	Y

Assigned to identify foundation scour for bridge crossing waterways as observed during inspections. Its primary purpose is to identify bridge piers or abutments that are subject to scour and to provide some measure of the magnitude of that scour. Piers in normal high water are typically considered for this element but there are instances where piers above high water may be subject to scour. Maintain historical information related to scour documented in previous inspections such as measurements and/or comments of exposed footings.

1. Number of pier/abutment foundations where no Scour exists, or where scour is superficial and has no effect on the foundation's structural capacity.
2. Number of pier/abutment foundations where scour has been mitigated and the repair is functioning and in place as designed. Evaluate and comment on any riprap or other scour countermeasures that are in place.
3. Number of pier/abutment foundations where scour exists. The scour does not significantly affect the foundations structural capacity. Scour does not warrant analysis but may require repairs. If left unchecked, could adversely impact the foundations structural capacity.

   Scour at this level should not impact the NBI Substructure Overall rating code, item BC03).

   Examples:

   - Top of spread footings are exposed due to scour.
   - Bottom of pile caps are exposed due to scour.
   - Minimum known pile embedment is between 5' and 10' or the column unbraced length has increased, but does not threaten pile capacity.
4. Number of pier/abutment foundations with scour damage in significant locations or quantity and has reduced the foundations structural capacity. Structural analysis is warranted. Repair and or action are required to protect exposed foundation and to restore capacity to the pier.

   Scour at this level may impact the SNBI Substructure Overall rating code, item BC03. A comment is necessary if the SNBI Substructure Overall rating code is lowered.

   Examples:

   - Undermining of spread footings or foundation material is occurring.
   - Minimum known pile embedment is less than 5' or the column unbraced length has increased and threatens pile/column capacity. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

WSDOT BMSE	Prior BMS	Concrete Deck Delamination Testing – Smart Flag	Units - SF	NBE	BME	ADE
376	376			--	--	Y

Assigned to document deck delamination testing or condition to include repairs at the time of a contract. Documented condition must be included in the evaluation of a concrete deck and overlay. ASTM 4580, Chain Drag Testing will locate and quantify the patches, spalls, delaminations and other defects on the entire top surface of the bridge deck that are not visible to the inspector This information is supplemental to the deck/overlay elements and the quantities do not change unless new testing information is provided. For Washington State bridges, the BMS engineer will provide the condition state quantities and notes for this element based on a Chain Drag Report produced by Design or Construction.

For decks covered with an Asphalt Overlay, the 376 data will be updated each time the asphalt is removed from the concrete surface and must be used to evaluate the deck element even though defects are not visible to the inspector. This information does not expire, and the element must not be deleted from the report unless the deck is replaced, or new information is provided.

If a Chain Drag was completed before a concrete overlay was constructed, then element 376 should be deleted from the report since patching and delaminations are addressed during the construction.

1. Deck area with no delaminations.
2. For decks covered with asphalt, this quantity of patching must be recorded in the deck CS2 and used to evaluate the deck. Do not include this quantity in the evaluation of a bare deck.
3. For decks covered with asphalt or a concrete overlay, this quantity of spalling and delamination must be recorded in the deck CS3 and used to evaluate the deck. Do not include this quantity in the evaluation of a bare deck.

WSDOT BMSE	Prior BMS	WSDOT Undercrossing Safety – Smart Flag	Units - EA	NBE	BME	ADE
378	378			--	--	Y

Assigned to cover the WSDOT Safety Inspection report type, to be used when the structure is not owned by WSDOT but interacts with a route that is. WSDOT Safety Inspections only address significant safety issues on those parts of the structure that affect the route that is owned by WSDOT.

This smart flag is intended to hold all notes associated with the primary safety inspection, and the inspector should not create or edit any other inspection notes except for repair recommendations, if warranted.

Examples include:

- railroad owned structures over state or local agency routes.
- locally owned structures over state routes.
- state owned structures over locally owned routes.

1. Report the entire bridge in condition state 1 (EA).

WSDOT BMSE	Prior BMS	Local Agency Undercrossing Safety – Smart Flag	Units - EA	NBE	BME	ADE
379	379			--	--	Y

Assigned to cover the Local Agency Safety Inspection report type, to be used when the structure is not owned by the local agency performing the inspection but interacts with a route that is. Local Agency Safety Inspections only address significant safety issues on those parts of the structure that affect the route that is owned by the local agency performing the inspection.

This smart flag is intended to hold all notes associated with the secondary safety inspection, and the inspector should not create or edit any other inspection notes except for repair recommendations, if warranted.

Examples include:

- railroad owned structures over local agency routes.
- a state route crosses over a city street and a county road.

1. Report the entire bridge in condition state 1 (EA).

WSDOT BMSE	Prior BMS	Joint Seal/Gland Leaking – Smart Flag	Units - EA	NBE	BME	ADE
381	381			--	--	Y

Assigned when inspection identifies that the joint seal or gland is no longer effective in providing a watertight seal within the joint gap, or the joint design does not include a seal, allowing water to pass through on to bridge elements below. Active corrosion or damage may or may not already be present in the elements below. Identify the joints in the notes for the flag and describe any joint defects and impacts under the joint BMS Element. Code a quantity for each joint identified as leaking.

In cases where a leaking joint only affects roadway or embankment fill (joints at integral abutments and approach slabs, for example) do not use this smart flag.

1. Seal/Gland is separated or missing, whole or in part, allowing water to pass through the joint gap onto structural bridge elements below.

4-12 Seismic Retrofit

Earthquake restrainers have been installed on WSDOT bridges since the 1980s. The typical longitudinal restrainer uses epoxy coated DYWIDAG bars with a designed gap maintained by double nuts. An earlier system using springs to maintain the required restrainer gap was used until the early 1990s when it was discontinued. Gap measurements are required during an inspection if visual inspection or loose double nuts indicate the gaps are not uniform.

WSDOT BMSE	Prior BMS	Concrete Column w/Steel Jacket (Seismic)	Units - EA	NBE	BME	ADE
205B	207			205	--	Y

This element defines a column, including a submerged column or portion of a concrete column where the exposed surface has been retrofitted top to bottom with a steel jacket visible for inspection. This changes the deterioration and management of the pile. Element 205B replaces existing column elements 204A and 205A where the existing column quantities decrease, and Element 205B quantities increase by the number of steel jacketed columns. Construction of the steel jacket also rehabilitates any pre-existing defects, and the quantities are initially coded in condition state one.

Columns that are not jacketed top to bottom are considered a repair and Element 205B does not apply, such as a timber element with a steel splice. Code these repairs in the applicable condition state with the original element 204A or 205A.

Condition States for WSDOT Element 205B

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element
2. Number of columns with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring.
3. Number of columns with moderate defects, failed repairs, or any identified distortion, damaged wires or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.

4. Number of columns with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

WSDOT BMSE 205C	Prior BMS 208	Concrete Pile/Column w/ Composite Wrap (Seismic)	Units - EA	NBE 205	BME --	ADE Y

This element defines a concrete pile/column or portion of a pile/column where the exposed surface has been retrofitted top to bottom with a composite wrap. Examples of composite material are carbon fiber and fiberglass. This changes the deterioration and management of the pile/column. Element 205C replaces existing pile/column elements 204A, 205A, 226, or 227 where the existing pile/column quantities decrease, and Element 205C quantities increase by the number of composite wrapped piles/columns. Composite wrapping also rehabilitates any pre-existing defects and the quantities are initially condition state one.

Pile/columns that are not wrapped top to bottom are considered a repair and Element 205C does not apply, such as a fiberglass repair to a timber pile at the ground line. Code these repairs in the applicable condition state with the existing pile/column element.

The structural condition should be based on the quantity and location of visible defects. Defects should be documented well enough to determine a change in condition. Defects include cracked or damaged composite reinforcement, abrasions, or seepage of moisture. Sounding with a rock hammer should use caution and not damage the resin materials.

Condition States for WSDOT Element 205C

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Number of composite wrapped pile/columns with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Number of composite wrapped pile/columns with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Number of composite wrapped pile/columns with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

WSDOT BMSE 368	Prior BMS 368	Seismic Pier Crossbeam Bolster	Units - LF	NBE --	BME --	ADE Y

This element identifies those piers that have been seismically retrofit with crossbeam bolsters. The quantity for this element is the length along the top of each crossbeam face (typically two lengths) that has been retrofitted with a bolster.

WSDOT BMSE 369	Prior BMS 369	Seismic Pier Infill Wall	Units - EA	NBE --	BME --	ADE Y

This element identifies concrete piers with seismic structural improvements.

Number of piers with a seismic pier infill wall.

Condition States for WSDOT Elements 368 and 369

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Length of bolster or pier wall with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Length of bolster or pier wall with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of bolster or pier wall with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
370	370	**Seismic – Longitudinal Restrainer**	**Units - EA**	--	--	Y

This element is used to identify longitudinal seismic restrainers. When an in-span hinge separates two structures, the joint, bearing, and seismic restrainers at the hinge will be documented in the dependent (or supported) structure only. The quantity should equal the total number of longitudinal restrainers on the bridge.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
371	371	**Seismic – Transverse Restrainer**	**Units - EA**	--	--	Y

This element identifies existing bridges that have been retrofitted or newer structures that have been equipped with transverse restrainers designed to restrain transverse movement during a seismic event. The quantity should equal the total number of transverse restrainers on the bridge. When an in-span hinge separates two structures, the joint, bearing, and seismic restrainers at the hinge will be documented in the dependent (or supported) structure only.

Concrete girder stops located at the ends of girders attached to the abutment or intermediate pier caps/crossbeams provide lateral restraint however it is not the intention to include these in with this element.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
372	372	**Seismic – Link/Pin Restrainer**	**Units - EA**	--	--	Y

This element is used to identify link/pin seismic restrainers. When an in-span hinge separates two structures, the joint, bearing, and seismic restrainers at the hinge will be documented in the dependent (or supported) structure only. The quantity should equal the total number of link/pin restrainers on the bridge.

Condition States for WSDOT Elements 370, 371, and 372

1. Restrainer is in good condition and will function as designed. Anchor plate nuts have been checked and are in good condition.
2. Number of restrainers with misaligned seismic-longitudinal restrainer rods. Anchor plate nuts that are tight, but that have epoxy running down their bolts or are of varying lengths. The gap between adjacent longitudinal restrainers varies between ¼ inch and ¾ inch. Short transverse pipe restrainer length. Measure the depth of the diaphragm hole to the restrainer. Take a picture of the hole and tape measure.
3. Number of restrainers with improper anchor plate installation. Loose or inadequately bonded anchor nuts. A repair is warranted if over 25 percent of the anchor nuts have more than 2 inches of bolt thread exposed below the nut. Restrainer gap variation in a series of longitudinal seismic restrainers is greater than ¾ inches (measure and add the two gap distances on both sides of each restrainer in making your comparisons). Loose double nuts. Specify the replacement of the double nuts with (new) nuts having (with) setscrews and the resetting of the restrainer gaps according to the design tables. The inspector shall specify the required gaps, according to the bridge plans, in the repair.

WSDOT BMSE	Prior BMS	Seismic – Catcher Block	Units - EA	NBE	BME	ADE
373	373			--	--	Y

This element is used to identify a catcher block attached to a pier or abutment installed as part of a seismic retrofit. The quantity should equal the total number of catcher blocks on the bridge.

1. Number of catcher blocks in good condition.
2. Number of catcher blocks with deficiencies that need correction.

WSDOT BMSE	Prior BMS	Seismic – Column Silo	Units - EA	NBE	BME	ADE
374	374			--	--	Y

I-5 N-N RAMP OVER I-5 - 5/628N-N - 0016991A

This element is used to identify when a column has been designed to be isolated from the surrounding soil during a seismic event. This will usually consist of a corrugated metal pipe buried in the ground with a cap at the base of a column. The inspection note needs to identify the individual columns that are siloed along with the planned depth (relative to an identifiable elevation) at each one. In cases with small numbers of siloed columns, that could be done in the note. In other situations, a spreadsheet attached as a file or something similar may be useful. In-depth inspections are required upon the occurrence of a seismic event that is judged to have potentially affected the structure. Due to the dimensional variation of the column isolation feature at each structure, the In-depth inspection may require means (equipment and manpower) to open and then reclose/reseal the capping system along with tools to measure the silo depth and to roughly assess column and silo condition below the capping system. Each bridge with siloed columns may require an individual in-depth inspection procedure.

1. Silo capping system is intact as designed and is accessible with no visible deterioration.
2. Minor deterioration of silo capping system elements such as hardware corrosion, visible seal deterioration, access hardware broken/missing.
3. Capping system has been buried and is not visible for inspection. (Write repair – priority 2 or higher)
4. Capping system has failed allowing solid foreign material to enter the intended gap and potentially restrict column movement. (Write repair – priority 1)

4-13 Expansion Joint Elements

The expansion joint evaluation considers the overall function of the joint assembly including any observed structural defects such as spalling, cracking, patches, raveling, or defects connected with the joint seal, filler or gland component.

If any portion of a joint falls into a lower condition state, code the entire length of the joint in the lower condition state. Joints with structural defects are coded in CS2. Joints that require replacement are tracked in CS3. In general, joints in Condition State 3 will be programmed for rehabilitation or replacement. Note that condition state CS4 is not used within this section.

When a joint is entirely reconstructed or replaced with a new joint type, then revise the WSDOT element to reflect the new joint type. These new joint types may include the use of a header assembly to form the new joint configuration. These headers may consist of cementitious or polymer types of concrete material and are to be included within the joint element, not the deck surface element.

Deck surface spalling, cracking, or raveling within 1′-0″ of a joint or joint header assembly is considered a joint defect, not a deck surface defect.

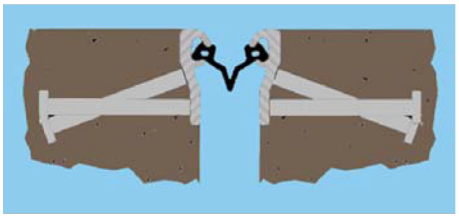
Assign Smart Flag 381 when inspection identifies that the joint seal or gland is no longer effective in providing a watertight seal within the joint gap, or the joint design does not include a seal, allowing water to pass through on to bridge elements below. Certain joint types are designed to allow the passage of water through the joint gap, and in such cases, Smart Flag 381 still applies. Active corrosion or damage may or may not already be present in the elements below. Identify the joints in the notes for the flag and describe any joint defects and impacts under the joint BMS Element.

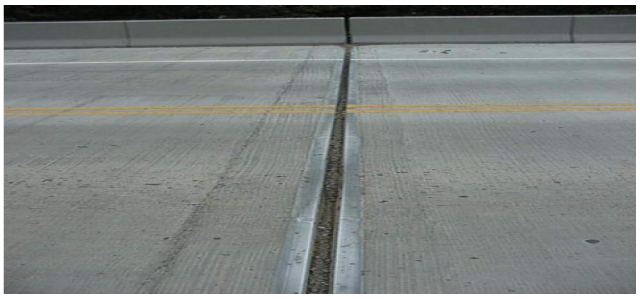
Do not use more than one WSDOT element for a joint location, unless the structure has been widened and there are two joint systems present. Joint notes should reference specific joints by pier or span number. If multiple joint types exist within a joint location where the deck has not been widened, then record the joint type that represents the larger quantity of the skewed length. Make a note of the other (lesser quantity) joint type.

When an in-span hinge separates two structures, the joint, bearing, and seismic restrainers at the hinge will be documented in the dependent (or supported) structure only.

WSDOT BMSE	Prior BMS	Strip Seal - Anchored	Units - LF	NBE	BME	ADE
300A	412			--	300	Y

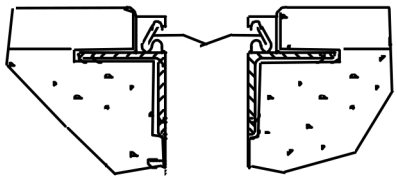
This element defines an expansion joint that uses a neoprene type waterproof gland with steel extrusion or other system to anchor the gland. The steel extrusion is anchored into the concrete deck or header. The quantity should equal the length measured along the expansion joint.





WSDOT BMSE	Prior BMS	Strip Seal – Welded	Units - LF	NBE	BME	ADE
300B	413			--	300	Y

This element defines an expansion joint that uses a neoprene type waterproof gland with steel extrusion or other system to anchor the gland. The steel extrusion is welded to a preexisting steel expansion joint. The quantity should equal the length measured along the expansion joint.



Condition States for WSDOT Elements 300A and 300B

1. The expansion joint is functioning as designed. Defects are superficial and have no effect on the structural capacity of the joint. The adjacent deck or header is sound.
2. Skewed joint length at each location with “D” spalls or patches present in the header or in the deck within one foot either side of the joint.
3. Skewed joint length at each location where the deck or headers must be rebuilt to maintain a reliable roadway surface or to maintain seal placement. As a guideline, more than 25 percent of the joint length has spalls or patches in the deck or headers adjacent to the seal.

   Steel Materials: Steel components are banging, cracked, loose, broken, or missing. Steel sections that have been removed and/or replaced with something else (usually concrete patching) should be CS3.

WSDOT BMSE	Prior BMS	Asphalt Butt Joint – Paving Joint Seal	Units - LF	NBE	BME	ADE
301A	400			--	301	Y

This element defines a butt joint between concrete and asphalt pavement that is an asphalt sawcut filled with hot poured rubber. This joint is shown in WSDOT Standard Plan A-40.20, Bridge Paving Joint Seals, Detail 3 or 4.

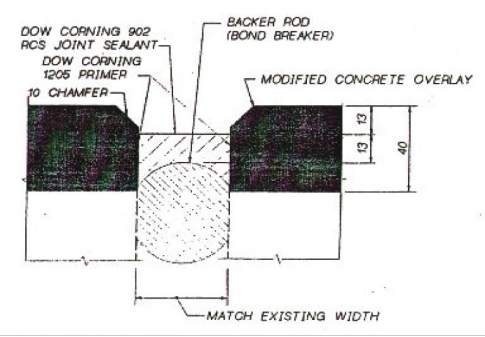
This element applies to the asphalt butt joint located at the back of the abutment pavement seat. It does not apply to the asphalt butt joint located at the roadway end of an approach slab. The quantity should equal the length measured along the joint.

WSDOT BMSE	Prior BMS	Silicone Rubber Joint	Units - LF	NBE	BME	ADE
301B	417			--	301	Y

This element defines an expansion joint that has been repaired with a single or two component rubber joint filler. The quantity should equal the length measured along the expansion joint.

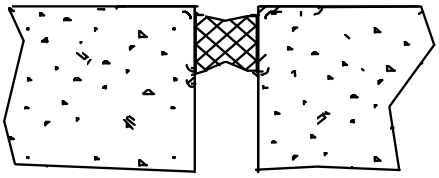
Condition States for WSDOT Elements 301A and 301B

1. The joint is functioning as designed. Defects are superficial and have no effect on the performance of the joint. The adjacent deck or header is sound.
2. Skewed joint length at each location. “D” spalls, patches, cracking or raveling is present in the concrete or asphalt within one foot of either side of the joint but no more than 10 percent of the length.
3. Skewed joint length at each location with the following typical criteria: When the concrete or asphalt must be rebuilt to maintain a reliable roadway surface; More than 10 percent of the joint length has potholes or patches adjacent to the seal; Asphalt was placed without a sawcut or the sawcut was not in the proper location.



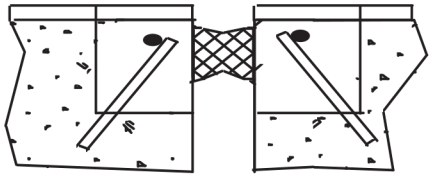
WSDOT BMSE	Prior BMS	Compression Seal/Concrete Header	Units - LF	NBE	BME	ADE
302A	404			--	302	Y

This element defines a joint with concrete headers formed during the original construction of the bridge. The joint is filled with a pre-formed compression type seal. The quantity should equal the length measured along the expansion joint.



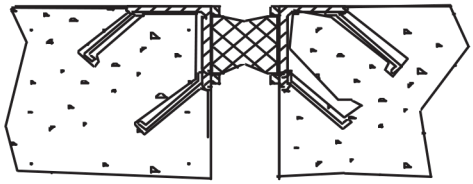
WSDOT BMSE	Prior BMS	Compression Seal/Polymer Header	Units - LF	NBE	BME	ADE
302B	405			--	302	Y

This element defines those joints that have been rehabilitated with a polymer header and filled with a pre-formed compression type seal. The quantity should equal the length measured along the expansion joint.



WSDOT BMSE	Prior BMS	Compression Seal/Steel Header	Units - LF	NBE	BME	ADE
302C	406			--	302	Y

This element defines a joint with steel angle plate headers that have a pre-formed compression type seal. The quantity should equal the length measured along the expansion joint.



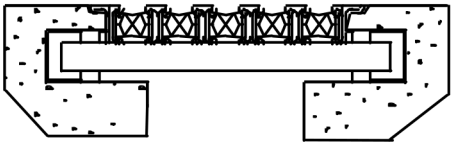
Condition States for WSDOT Elements 302A, 302B, and 302C

1. The expansion joint is functioning as designed. Defects are superficial and have no effect on the structural capacity of the joint. The adjacent deck or header is sound.
2. Skewed joint length at each location with “D” spalls or patches present in the header or in the deck within one foot either side of the joint.
3. Skewed joint length at each location where the deck or headers must be rebuilt to maintain a reliable roadway surface or to maintain seal placement. As a guideline, more than 25 percent of the joint length has spalls or patches in the deck or headers adjacent to the seal.

   Steel Materials: Steel components are banging, cracked, loose, broken, or missing. Steel sections that have been removed and/or replaced with something else (usually concrete patching) should be CS3.

WSDOT BMSE	Prior BMS	Assembly Joint Seal (Modular)	Units - LF	NBE	BME	ADE
303	416			--	303	Y

This element defines a large movement joint that has an assembly mechanism with multiple neoprene type waterproof glands. The quantity should equal the length measured along the expansion joint.



Condition States for WSDOT Elements 303

1. The expansion joint is functioning as designed. Defects are superficial and have no effect on the structural capacity of the joint. The adjacent deck or header is sound.
2. Skewed joint length at each location with “D” spalls or patches present in the header or in the deck within one foot either side of the joint.
3. Skewed joint length at each location where the deck or headers must be rebuilt to maintain a reliable roadway surface or to maintain seal placement. As a guideline, more than 25 percent of the joint length has spalls or patches in the deck or headers adjacent to the seal.

   Steel Materials: Steel components are banging, cracked, loose, broken, or missing. Steel sections that have been removed and/or replaced with something else (usually concrete patching) should be CS3.

WSDOT BMSE	Prior BMS	Asphalt Open Joint – Paving Joint Seal	Units - LF	NBE	BME	ADE
304A	401			--	304	Y

This element represents a sealed and sawcut contraction joint or an asphalt joint in bridge paving over an open concrete joint in a bridge deck or truss panel joint, as shown in WSDOT Standard Plan A-40.20, Bridge Paving Joint Seals, Detail 1, 2, 5, or 6. The joint consists of hot poured rubber placed in an open concrete joint and a membrane may or may not exist. After the asphalt is placed, a sawcut is placed over the concrete joint and the gap filled with hot poured rubber. WSDOT Elements 304B - Open Concrete Joint and 308 - Joint Paved Over - Smart Flag do not apply at these locations. The quantity should equal the length measured along the joint. It does not apply to the asphalt open joint located at the roadway end of an approach slab.

WSDOT Element 308 - the Joint Paved Over – Smart Flag does apply for all locations of a buried steel joint due to the risk of planing equipment damaging the bridge deck.

Condition States for WSDOT Element 304A

1. The joint is functioning as designed. Defects are superficial and have no effect on the performance of the joint. The adjacent deck or header is sound.
2. Skewed joint length at each location. “D” spalls, patches, cracking or raveling is present in the concrete or asphalt within one foot of either side of the joint but no more than 10 percent of the length.
3. Skewed joint length at each location with the following typical criteria: When the concrete or asphalt must be rebuilt to maintain a reliable roadway surface; More than 10 percent of the joint length has potholes or patches adjacent to the seal; Asphalt was placed without a sawcut or the sawcut was not in the proper location.

WSDOT BMSE	Prior BMS	Open Concrete Joint – Paving Joint Seal	Units - LF	NBE	BME	ADE
304B	402			--	304	Y

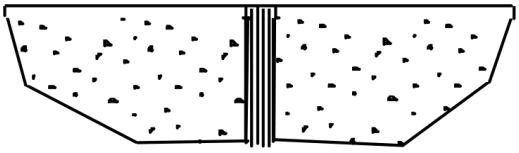
This element defines a joint designed to have concrete edges at the joint opening in a concrete wearing surface. The original design is usually filled with hot poured rubber or pre molded joint filler and the design materials may or may not be present. This joint is typical for panel joints at a truss floor beam, interior joints on older bridges, and at the concrete roadway/approach slab joint. At the back-of-pavement seat, if a compression seal has been removed and replaced with Hot Poured Rubber (crack sealant), then quantities for the 402 element apply and the quantities for the compression seal must be reduced. The quantity should equal the length measured along the expansion joint. It does not apply to the open concrete joint located at the roadway end of an approach slab.

This joint type does not apply to: WSDOT Element 306A - Concrete Bulb-T -Paving Joint Seal joint, WSDOT Elements 302B or 302C Compression Seals with the seal missing, or WSDOT Element 301B - Silicone Rubber Joint.

Condition States for WSDOT Element 304B

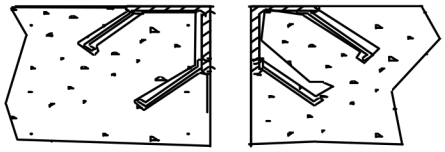
1. The expansion joint is functioning as designed. Defects are superficial and have no effect on the performance of the joint. The adjacent deck or header is sound.
2. Skewed joint length at each location with “D” spalls or patches present in the header or in the deck within one foot of either side of the joint and is less than 25 percent of the joint length.
3. Skewed joint length at each location where the deck or headers must be rebuilt to maintain a reliable roadway surface. As a guideline, more than 25 percent of the joint length has spalls or patches in the deck or headers adjacent to the seal.

   A repair to reseal the joints is required for bridges at each steel floor beam where water is corroding the top flange and/or connections.



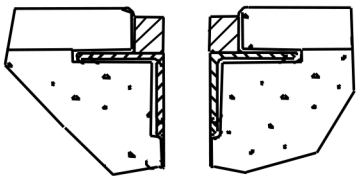
WSDOT BMSE	Prior BMS	Steel Angle Header	Units - LF	NBE	BME	ADE
304C	407			--	304	Y

This element defines an open joint with steel angle plate headers. The quantity should equal the length measured along the expansion joint.



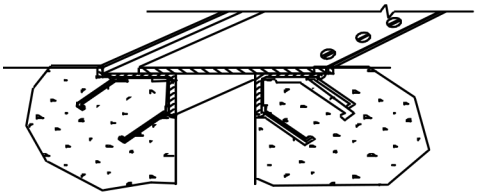
WSDOT BMSE	Prior BMS	Steel Angle w/Raised Bars	Units - LF	NBE	BME	ADE
304D	419			--	304	Y

This element defines a joint with steel angles and steel raised bars welded to the angles to accommodate an overlay. The quantity should equal the length measured along the expansion joint.



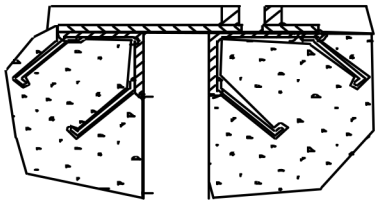
WSDOT BMSE	Prior BMS	Steel Sliding Plate	Units - LF	NBE	BME	ADE
305A	408			--	305	Y

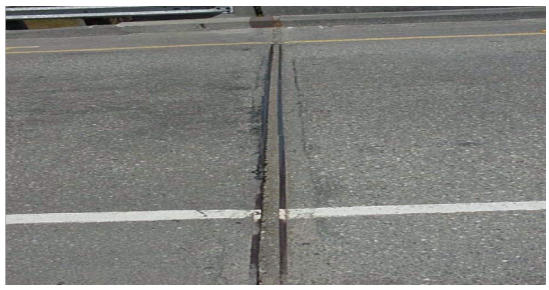
This element defines a joint with steel sliding plates. The quantity should equal the length measured along the expansion joint.



WSDOT BMSE	Prior BMS			NBE	BME	ADE
305B	409	**Steel Sliding Plate w/Raised Bars**	**Units - LF**	--	305	Y

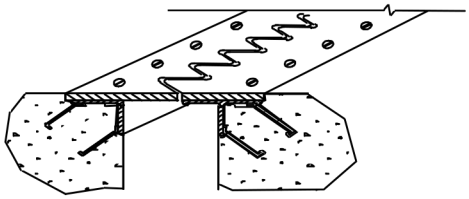
This element defines a joint with steel sliding plates and steel raised bars welded to the plates to accommodate an overlay. The quantity should equal the length measured along the expansion joint.





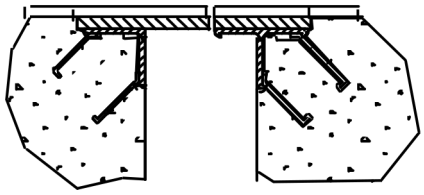
WSDOT BMSE	Prior BMS			NBE	BME	ADE
305C	410	**Steel Fingers**	**Units - LF**	--	305	Y

This element defines a joint with open steel fingers. The quantity should equal the length measured along the expansion joint.



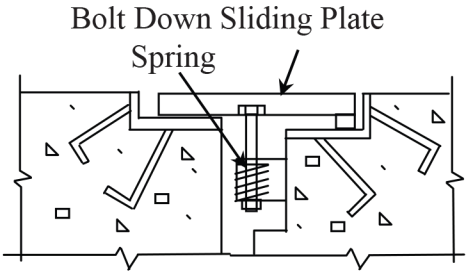
WSDOT BMSE	Prior BMS			NBE	BME	ADE
305D	411	**Steel Fingers w/Raised Bars**	**Units - LF**	--	305	Y

This element defines a joint with bars or plates welded to the steel finger plates to accommodate an overlay. The quantity should equal the length measured along the expansion joint.



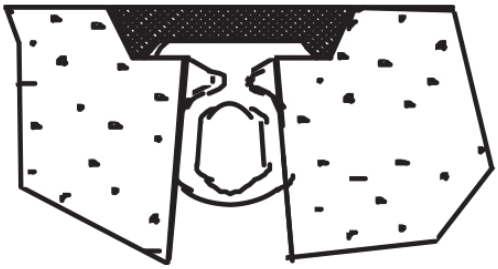
WSDOT BMSE	Prior BMS	Bolt Down – Sliding Plate w/ springs	Units - LF	NBE	BME	ADE
305E	414			--	305	Y

This element defines a bolted sliding plate expansion joint that uses steel springs. The quantity should equal the length measured along the expansion joint.



WSDOT BMSE	Prior BMS	Concrete Bulb-T	Units - LF	NBE	BME	ADE
306A	403			--	306	Y

This element defines a joint formed to accept a Bulb-T preformed seal. The seal may be missing, or other materials present to provide a seal. The quantity should equal the length measured along the expansion joint.



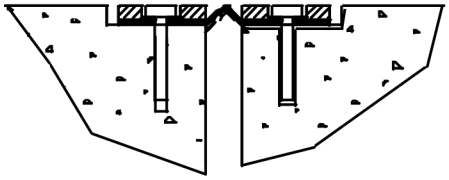
Condition States for WSDOT Elements 304C, 304D, 305A, 305B, 305C, 305D, 305E, and 306A

1. The expansion joint is functioning as designed. Defects are superficial and have no effect on the structural capacity of the joint. The adjacent deck or header is sound.
2. Skewed joint length at each location with “D” spalls or patches present in the header or in the deck within one foot either side of the joint.
3. Skewed joint length at each location where the deck or headers must be rebuilt to maintain a reliable roadway surface or to maintain seal placement. As a guideline, more than 25 percent of the joint length has spalls or patches in the deck or headers adjacent to the seal.

   Steel Materials: Steel components are banging, cracked, loose, broken, or missing. Steel sections that have been removed and/or replaced with something else (usually concrete patching) should be CS3.

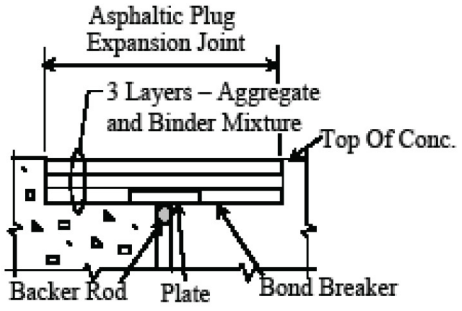
WSDOT BMSE	Prior BMS			NBE	BME	ADE
306B	415	**Bolt Down Panel – Molded Rubber**	**Units - LF**	--	306	Y

This element defines an expansion joint that uses a waterproof gland that is held in place by molded rubber panels that are attached with bolts. The quantity should equal the length measured along the expansion joint.



WSDOT BMSE	Prior BMS			NBE	BME	ADE
306C	418	**Asphalt Plug**	**Units - LF**	--	306	Y

This element defines an expansion joint that has been replaced with an asphalt plug system. The quantity should equal the length measured along the expansion joint.



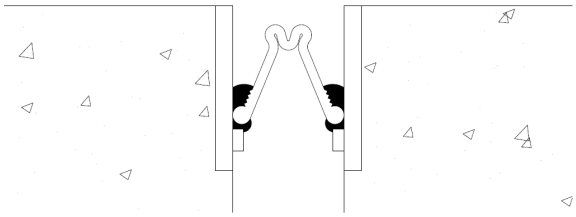
WSDOT BMSE	Prior BMS	Flexible Joint Seal	Units - LF	NBE	BME	ADE
306D	422			--	306	Y

This element defines a joint with a flat extruded gland that is flexible. The gland is folded, held in place with adhesive, and may be supported by steel or concrete materials. This element supersedes other joint elements where maintenance has replaced the existing gland with a flexible joint seal. The quantity should equal the length measured along the expansion joint.

Condition States for WSDOT Elements 306B, 306C, and 306D

1. The expansion joint is functioning as designed. Defects are superficial and have no effect on the structural capacity of the joint. The adjacent deck or header is sound.
2. Skewed joint length at each location with “D” spalls or patches present in the header or in the deck within one foot either side of the joint.
3. Skewed joint length at each location where the deck or headers must be rebuilt to maintain a reliable roadway surface or to maintain seal placement. As a guideline, more than 25 percent of the joint length has spalls or patches in the deck or headers adjacent to the seal.

   Steel Materials: Steel components are banging, cracked, loose, broken, or missing. Steel sections that have been removed and/or replaced with something else (usually concrete patching) should be CS3.



WSDOT BMSE	Prior BMS	Joint Paved Over - Smart Flag	Units - EA	NBE	BME	ADE
308	420			--	--	Y

This element identifies when a steel joint system that has been paved over with asphalt. This is a high risk to damaging the steel joint or bridge deck by the paving operations. When this flag is used, a cost for joint work will be included in the next paving contract to correct the problem. Since the joint cannot be inspected, the joint element condition states should remain unchanged (and so noted). Some steel joints may have more than 2.5” of asphalt may not require rehabilitation. The Total quantity will be the sum total length of all joint systems on the bridge.

1. Skewed joint length at each location that is paved over, but rehabilitation is not required.
2. Skewed joint length at each location that requires rehabilitation. A photo is helpful to determine the type of rehabilitation.

4-14 Movable Bridges

WSDOT BMSE	Prior BMS			NBE	BME	ADE
207B	501	**Movable Bridge Steel Tower**	**Units - LF**	207	--	Y

This element defines the structural steel columns and members used to support a counterweight of a vertical lift span. The total quantity is the total of the supporting column lengths.

1. Defects are superficial and have no effect on the structural capacity of the element.
2. Tower column length with repairs such as: bolts or rivets have been replaced; cracks that have been drilled or plated.
3. Tower column length with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis but may require repairs.
4. Tower column length affected by damage in locations or quantity and has reduced the structural capacity of the column or the tower. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Structural deficiencies are not limited to impact damage, corrosion, a crack in primary load path member or in the attachment welded to primary member. Retain the quantity of the element reported in CS4 if the element is repainted but not repaired.

4-15 Other Bridge Elements

WSDOT BMSE	Prior BMS			NBE	BME	ADE
705	705	**Bridge Luminaire Pole and Base**	**Units - EA**	--	--	Y

This element is defined by a light pole and anchor system attached to a bridge. It does not include the mast arm or other types of lights that may be attached to the bridge. The condition states describe the structural condition of the pole, anchor bolts, and support.

WSDOT Region maintenance may need to be contacted prior to inspection in to remove bolt covers or otherwise provide access for inspection. The total element quantity should equal the number of luminaire poles attached to the bridge.

1. There are no significant structural defects in the pole or support, and the grout pad is solid. Poles or supports that have been replaced are coded in this condition state.
2. Number of poles where structural inspection requires special equipment to access.
3. Number of poles with structural defects. The defects do not significantly affect the structural capacity.
4. Number of poles affected by damage in locations or quantity and has reduced structural capacity. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Visual inspection indicates a base plate that is not supported by leveling nuts.

WSDOT BMSE	Prior BMS	Fender System/Pier Protection	Units - EA	NBE	BME	ADE
707	707			--	--	Y

Piers in the water can be vulnerable to rot, corrosion, and collision damage from ships or ice flows. This element is limited to external pier collision systems such as dolphins and fenders designed to resist vessels in the water. Dolphins are placed in front of a pier to re-direct an impact such as a large mass structure or pile clusters tied together. Fenders are protective fences or bumpers that surround a pier to absorb impacts from marine traffic. This element is coded separately from the pier elements and does not include extended concrete footings or cofferdams that are designed and constructed to primarily support vertical pier loads.

This element defines a protection system made of wood, steel, or concrete that is designed to protect the pier from vessel damage. The total element quantity should equal the number of piers with protection. In the case of a log boom, count the one pier connected to the boom.

1. There are no significant structural defects in the pier protection system. A protection system that has been replaced is coded in this condition state.
2. Number of pier protection systems that have been repaired.
3. Number of pier protection systems with structural defects. The defects do not significantly affect the structural capacity or function of the system.
4. Number of pier protection systems affected by damage in locations or quantity and has reduced structural capacity. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

WSDOT BMSE	Prior BMS	Bridge Mounted Sign Structures	Units - EA	NBE	BME	ADE
710	710			--	--	Y

This element defines bridge mounted sign structures anchored to the bridge. This includes signs mounted to the outside face of the bridge or over the deck using a beam, truss, or cantilevered support. The condition states address any physical damage defects with the sign or its anchorage and the inventory status of the sign. The inventory status may be determined by the presence of a "Bridge Preservation Sign Structure Identification Tag". The quantity should equal the number of signs mounted to the bridge.

1. The sign has been inventoried and has the appropriate identification tag. The sign, support, and anchorage are in good condition with no significant structural defects.
2. The sign has not been inventoried. The sign, support, and anchorage are in good condition with no apparent defects.
3. The sign may or may not have been inventoried and has defects to the structure or anchorage but is safe and the structural capacity has not been significantly reduced.

   This may include loose, missing or damaged bolts, or hardware within the sign structure where redundant framework or hardware prevents the identified defects from creating an immediate hazard. Anchorage defects may include corrosion or cracks; grout may be loose or missing. A repair should be written, and the sign bridge engineer notified.
4. The sign may or may not have been inventoried. Defects to the structure or anchorage threaten or have reduced the structural capacity. This may include loose, missing or damaged bolts, or hardware in multiple locations, and cracks within structural sections. Anchorage defects may include loose, missing, or broken hardware, broken or delaminating anchor locations, or loss of embedment due to creep or pull out. An emergent repair should be specified with written notification to region maintenance and the sign bridge engineer.

4-16 WSDOT Bridge Deck Overlay Elements

WSDOT categorizes overlays into two different types. The first type consists of Asphalt Concrete Pavements (ACP) and Thin Overlays. These are deck protection systems intended to prolong the life of the deck by removing the traffic wear from the surface of the concrete deck. The second type is a Concrete Overlay which is intended to rehabilitate the deck and provide a new concrete wearing surface.

ACP Overlays represented by the WSDOT element 510A can generally be identified in the field where as WSDOT element 510B represents asphalt with a membrane below it that is not visible. Thin overlays may be identified in the field if the system has failed, and areas of the thin layers are missing.

Deterioration of the ACP and thin overlays is not generally associated with the deterioration of the deck. The ACP may be replaced several times without exposing the concrete deck and the condition states for the deck and overlay elements are independent and DIFFERENT. Paving contracts attempt to repair all concrete spalls and delaminations on WSDOT bridges before placing the overlay. If the area of patching/spalls/delams is known, then the quantity should be noted and recorded in the WSDOT concrete deck element as CS2, CS3 or CS4 respectively, while the overlay quantities of CS2 and CS3 are based on the visible inspection of the surface. In a similar fashion, if a new Bituminous Surface Treatment (BST) has been applied to an asphalt surface, then the overlay element CS2 and CS3 are equal to zero.

WSDOT BMSE	Prior BMS	**BST on Concrete (Chip Seal)**	**Units – SF**	NBE	BME	ADE
506	806			--	--	Y

This defines a Bituminous Surface Treatment (BST), or commonly known as a chip seal, mistakenly applied directly on a concrete deck and is to be removed. This severely limits the inspection of the deck. Code the area of BST covering the concrete deck in CS1.

Note: Element 510A or 510B is used when a chip seal is intentionally applied to a structure. WSDOT discontinued use of this element in the year 2012.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
510A	800	**Asphalt Concrete Overlay**	**Units - SF**	--	510	Y

This element defines an Asphalt Concrete (AC) bridge deck overlay, with or without a Bituminous Surface Treatment (BST). The quantity should equal the overlay's width times the length.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
510B	801	**Asphalt Concrete Overlay w/ Waterproofing Membrane**	**Units - SF**	--	510	Y

This element defines an Asphalt Concrete (AC) with waterproofing membrane bridge deck overlay. The quantity should equal the overlay's width times the length.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
510C	802	**Thin Polymer Overlay**	**Units - SF**	--	510	Y

This defines a thin polymer bridge deck overlay that is less than or equal to 0.5 inches in thickness (i.e., epoxy, methyl-methacrylate). The quantity should equal the overlay's width times the length.

Condition States for WSDOT Elements 510A, 510B, and 510C

1. Defects are superficial. The deck surfaces have no spalls/delaminations or previous repairs. The deck surfaces may have cracking.
2. Total area of overlay patches.
3. Total area of overlay spalls or potholes. Thin Polymer Overlays (510C) may have visible delaminations and should be considered as spalls and coded in CS3.

Concrete Overlay elements are difficult to discern in the field and are identified in special provisions or Plans. When constructing modified concrete overlays, the material removed by the deck preparation (spalls and delams) is replaced with the overlay material. WSDOT considers this construction deck rehabilitation; or in other words, the concrete overlay and deck are monolithic. Therefore, CS2 and CS3 for the deck and concrete overlay will be the SAME. All defects noted in the concrete overlay (SF) apply to the deck. It is not uncommon to have the overlay break up when there is a problem in the deck below it.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
510D	803	**Modified Concrete Overlay**	**Units - SF**	--	510	Y

This defines a rigid modified concrete bridge deck overlay that is normally 1.5 inches or greater in thickness (i.e., Latex (LMC), Microsilica (MMC), Fly Ash (FMC), Fiber Reinforced (FRC)). The quantity should equal the overlay's width times the length.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
510E	804	**Polyester Concrete Overlay**	**Units - SF**	--	510	Y

This defines a rigid polyester concrete bridge deck overlay that is normally 0.75 inches in thickness. The quantity should equal the overlay's width times the length.

Condition States for WSDOT Elements 510D and 510E

1. Defects are superficial. The deck surfaces have no spalls/delaminations or previous repairs. The deck surfaces may have hairline cracks or rock pockets.
2. Concrete overlay area with repairs or patches. Do not include the rare cases of rutting that has been filled with patching material.
3. Concrete overlay area with spalling.
4. Record the delaminated area (CS4) from WSDOT element 376 in the overlay CS4. If new delaminations are found, do not add delaminations found in the field unless approved by Bridge Management. Chain Drag testing by the Bridge Inspector must chain the entire deck, record the results in a Chain Drag Report available on the Bridge Website under Bridge Overlays, and send the file to Bridge Management.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
510F	805	**AC Over a Polymer Overlay**	**Units - SF**	--	510	Y

This defines an asphaltic concrete applied over a thin polymer bridge deck overlay (i.e., epoxy, methyl-methacrylate). The quantity should equal the overlay's width times the length.

1. Defects are superficial. The deck surfaces have no spalls/delaminations or previous repairs. The deck surfaces may have cracking.
2. ACP overlay area with patches.
3. ACP overlay area with spalls or potholes.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
510G	807	**Asphalt Concrete Overlay w/ High Performance Membrane**	**Units - SF**	--	510	Y

This element is defined as asphaltic concrete overlay with a higher quality waterproof membrane on a bridge deck. These membranes are spray-on polymers that cover rough surfaces or bridge decks that are considered significant. The condition states are based on the overlay, not the membrane. The quantity should equal the overlay width times the length.

There are three WSDOT bridges with this element: 16/110W, 5/504W, and 5/814.

1. Defects are superficial. The deck surfaces have no spalls/delaminations or previous repairs. The deck surfaces may have cracking.
2. Total area of overlay patches.
3. Total area of overlay spalls or potholes.

4-17 Protective Coatings

The steel paint area is equal to the surface area of the steel members in the bridge. An estimate of the steel paint area may be made if bridge plans are not available but the steel tonnage is known. The following table provides an approximate conversion factor:

Bridge Type	Square Feet Per Ton
Rolled or Plate Girder	110
Truss	160

WSDOT BMSE	Prior BMS			NBE	BME	ADE
515A	901	**Red Lead Alkyd Paint System**	**Units - SF**	--	515	Y

This paint protection system is a 3-coat alkyd system incorporating lead-based paint. Use this paint element as a default if the paint was installed prior to 1991.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
515B	902	**Inorganic Zinc/Vinyl Paint System**	**Units - SF**	--	515	Y

This paint protection system consists of an inorganic zinc silicate shop applied primer system and a vinyl is paint applied after erection, cleaning, and spot priming.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
515C	903	**Inorganic Zinc/Urethane Paint System**	**Units - SF**	--	515	Y

This paint protection system consists of an inorganic zinc silicate shop applied primer system and an epoxy, aliphatic urethane paint system applied after erection, cleaning, and spot priming. **This paint system is used on new WSDOT steel bridges.**

WSDOT BMSE	Prior BMS			NBE	BME	ADE
515D	904	**Organic Zinc/Urethane Paint System**	**Units - SF**	--	515	Y

This paint protection system is a 3-coat system incorporating an organic zinc primer, an epoxy second coat and a moisture cured urethane topcoat and is typically used on existing WSDOT steel bridges.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
515E	905	**Coal Tar Epoxy Paint System**	**Units - SF**	--	515	Y

This paint protection system incorporates a coal tar epoxy-based product.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
515F	906	**Metalizing**	**Units - SF**	--	515	Y

This protection system consists of a sprayed coating of zinc or zinc/aluminum.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
515G	907	**Galvanizing**	**Units - SF**	--	515	Y

This protection system consists of zinc applied to steel in a variety of spray-on methods.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
515H	908	**Epoxy Paint for Weathering Steel**	**Units - SF**	--	515	Y

This protection system consists of a clear epoxy coating applied to weathering steel to prevent excessive corrosion.

WSDOT BMSE	Prior BMS			NBE	BME	ADE
515J	909	**Zinc Primer**	**Units - SF**	--	515	Y

This paint protection system consists of a zinc silicate shop applied primer system.

Condition States for WSDOT Elements 515A thru 515J

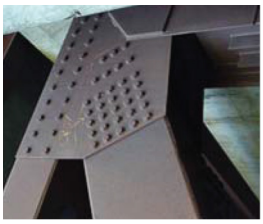
1. The protection system is sound and functioning as intended to protect the metal surface.
2. Protection system area that has been painted by maintenance.
3. Protection system area with chalking, peeling, curling or showing other early evidence of paint system distress, but there is no exposure of metal.
4. Protection system area that is no longer effective. The metal substrate is exposed.

WSDOT BMSE 515K	Prior BMS 910	Weathering Steel Patina	Units - SF	NBE --	BME 515	ADE Y

This protection system consists of a chemical compound formed on the surface of weathering steel elements and is called the patina. When exposed to the atmosphere, weathering steel develops a patina, which seals and protects the steel from further corrosion. This oxide film is an intended layer of surface rust, which protects the member from further corrosion and loss of material thickness. The patina acts like a paint system to protect the steel. The color is an indicator of the condition of the patina may vary from orange to dark brown or purple-brown.

Condition States for WSDOT Element 515K

1. Weathering steel area that is chocolate brown or purple, brown in color (boldly exposed) and in good condition. The patina is tightly adhered, capable of withstanding hammering or vigorous wire brushing. The patina system is sound and functioning to protect the metal surface.
2. Weather steel area that has been painted by maintenance.
3. Weathering steel color is yellow orange to light brown. Some areas may not have rust. Patina has a dusty to granular texture.
4. Weathering steel area that is black in color indicating non-protective patina. Area that remains damp for long periods of time due to rain, condensation, leaky joints, traffic spray or other source of moisture. Area where debris has accumulated on a horizontal surface and the steel is continuously wet. Area with a texture of large granules (greater than ⅛″ diameter); flaking (greater than ¼″ diameter) or laminar rusting in thin sheets.



WSDOT BMSE 515L	Prior BMS 911	Paint System - Other	Units - SF	NBE --	BME 515	ADE Y

This element applies to any protective structural steel coating system not included in the previously listed protective coating elements.

Examples may include:

- High Ratio Calcium Sulfonate Alkyd (HRCSA) which is typically a single-coat system and behaves as a flexible elastomeric film once applied to steel surfaces.
- Two-coat Polyurethane based (Polyaspartic) coatings applied to steel surfaces.
- Polysiloxane based coatings applied to steel surfaces.

Condition States for WSDOT Element 515L

1. Defects are superficial. The protection system is sound and functioning as intended to protect the metal surfaces.
2. Protection system area that has been painted by maintenance.
3. Protection system area with chalking, peeling, curling, or showing other early evidence of paint system distress, but there is no exposure of metal.
4. Protection system area that is no longer effective. The metal substrate is exposed.

4-18 Appendices

Appendix 4-A Common Material Defects

Exhibit 4-A-1 Prestressed Concrete Common Defects

The table below is intended to be general guidance only. Inspector judgement should be used when coding and quantifying defects. If engineering judgement is required, consult with a licensed engineer with inspection experience.

Defect	CS1 Good - Superficial	CS2 Fair - Minor	CS3 Poor - Moderate	CS4 Severe - Major
Delamination/Spall	None or superficial spalls, including small rock pockets or popouts.	Delaminated or spalls without other signs of deterioration. Spalls typically less than 1” deep or 6” diameter.	Spalls with exposed rebar and/or combined with other signs of minor deterioration in the area surrounding the spall (efflorescence, cracking, delamination).	Spalls with exposed and corroded rebar and/or combined with signs of ongoing moderate or major deterioration in the area surrounding the spall (efflorescence, cracking, delamination).
Repairs/patches	None.	Repair or patch is in-place and effective or functioning as intended.	Patches may be partially cracked, delaminated or losing adhesion.	Patches are ineffective, they may be broken or otherwise failed.
Exposed Rebar	None or superficial.	Rebar is exposed without signs of corrosion or section loss.	Exposed rebar has signs of corrosion and insignificant section loss.	Exposed rebar has signs of corrosion and measurable section loss. Remaining diameter or cross-section of rebar should be noted.
Exposed Prestressing	None.	Prestressing is exposed without signs of corrosion or section loss.	Exposed prestressing has signs of corrosion. All strands/wires are intact.	Exposed prestressing has signs of corrosion and measurable section loss. Strands/wires may be stretched or severed.
Efflorescence/Rust Staining	None.	Surface white without build-up or leaching without rust staining.	Heavy build-up with rust staining.	Heavy build-up with rust staining combined with other signs of deterioration (cracking, delaminations, spalls).
Cracking	None or hairline cracks (< 0.004”).	Narrow cracks (0.004” to 0.009”) or sealed medium/wide cracks.	Medium cracks (0.010” to 0.030”). Cracks do not appear active under live load and have not increased since the previous inspection.	Wide cracks (> 0.030”). Cracks appear active under live load or have increased since the previous inspection.

Exhibit 4-A-2 Reinforced Concrete Common Defects

The table below is intended to be general guidance only. Inspector judgement should be used when coding and quantifying defects. If engineering judgement is required, consult with a licensed engineer with inspection experience.

Defect	CS1 Good - Superficial	CS2 Fair - Minor	CS3 Poor - Moderate	CS4 Severe - Major
Delamination/Spall	None or superficial spalls, including small rock pockets or popouts.	Delaminated or spalls without other signs of deterioration. Spalls typically less than 1” deep or 6” diameter.	Spalls with exposed rebar and/or combined with other signs of minor deterioration in the area surrounding the spall (efflorescence, cracking, delamination).	Spalls with exposed and corroded rebar and/or combined with signs of ongoing moderate or major deterioration in the area surrounding the spall (efflorescence, cracking, delamination).
Repairs/patches	None.	Repair or patch is in-place and effective or functioning as intended.	Patches may be partially cracked, delaminated or losing adhesion.	Patches are ineffective, they may be broken or otherwise failed.
Exposed Rebar	None or superficial.	Rebar is exposed without signs of corrosion or section loss.	Exposed rebar has signs of corrosion and insignificant section loss.	Exposed rebar has signs of corrosion and measurable section loss. Remaining diameter or cross-section of rebar should be noted.
Efflorescence/Rust Staining	None.	Surface white without build=up or leaching without rust staining.	Heavy build-up with rust staining.	Heavy build-up with rust staining combined with other signs of deterioration (cracking, delaminations, spalls).
Cracking	None or hairline cracks (< 0.0625”).	Narrow cracks (0.0625” to 0.125”) or sealed medium/ wide cracks.	Medium cracks (0.125” to 0.1875”). Cracks do not appear active under live load and have not increased since the previous inspection.	Wide cracks (> 0.1875”). Cracks appear active under live load or have increased since the previous inspection.
Abrasion/Wear	None or superficial.	Exposed aggregrate; concrete matrix intact. Typically < 1/2” wear.	Exposed aggregate, may be loose or popped out; concrete matrix is breaking down. Typically 1/2” to 1” wear.	Abrasion/wear has caused significant section loss of the member. Other signs of deterioration, such as exposed rebar, cracking, and spalling may be present.

Exhibit 4-A-3 Structural Steel Common Defects

The table below is intended to be general guidance only. Inspector judgement should be used when coding and quantifying defects. If engineering judgement is required, consult with a licensed engineer with inspection experience.

Defect	CS1 Good - Superficial	CS2 Fair - Minor	CS3 Poor - Moderate	CS4 Severe - Major
Corrosion	None or superficial rust staining.	Freckled rust. Corrosion of the steel has initiated. No measurable section loss.	Rust is widespread. Section loss is insignificant. More significant corrosion may be present in areas not contributing to element capacity.	Steel has signs of significant corrosion and measurable section loss. Remaining cross-section should be noted. Section loss affects the load capacity of the element.
Repairs	None.	Repair is in-place and effective or functioning as intended. Includes bolt/ rivet replacement, and arrested or plated cracks.	Ineffective or failed repairs should be coded based on the original defect.	Ineffective or failed repairs should be coded based on the original defect. May require immediate action.
Pack Rust	None.	Superficial.	Pack rust < 1/4” thick and/or causing no distress to a load carrying member.	Pack rust > 1/4” thick and/or causing deformation to a load carrying member.
Distortion	None.	Distortion is insignificant and does not require monitoring or repair.	Distortion requires monitoring or repair.	Distortion is significant and affects load carrying capacity of the member. May require immediate action.
Cracking	None.	Crack has self arrested or has been effectively arrested or otherwise repaired.	Crack has been identified and requires monitoring and may require repair.	Crack is significant and affects load carrying capacity of the member. May require immediate action.
Connection	In place and functioning as intended.	Loose fasteners or superficial pack-rust, connection functioning as intended.	Missing fasteners, broken welds, or distortion.	Connection is not functioning as intended due to missing fasteners, broken welds, distortion, or other defects.

Exhibit 4-A-4 Timber Common Defects

The table below is intended to be general guidance only. Inspector judgement should be used when coding and quantifying defects. If engineering judgement is required, consult with a licensed engineer with inspection experience.

Defect	CS1 Good - Superficial	CS2 Fair - Minor	CS3 Poor - Moderate	CS4 Severe - Major
Decay/Section Loss	None. Superficial mold or staining may be present.	Evidence of rot is present. Section loss is insignificant (> 90% section remaining).	Rot or rot pockets evident with section loss (< 90% section remaining). Shell thickness >= 1-1/2". YELLOW TAG.	Rot or rot pockets evident with significant section loss affecting structural capacity. Shell thickness < 1-1/2". RED TAG.
Repairs	None.	Repair is in-place and effective or functioning as intended.	Ineffective or failed repairs should be coded based on the original defect.	Ineffective or failed repairs should be coded based on the original defect. May require immediate action.
Check/Shake	None or superficial.	Not in a tension zone and penetrates less than half the thickness of the member.	Penetrates more than half the thickness of the member at any location or more than 5% of the member thickness in a tension zone.	Check/shake is significant and affects load carrying capacity of the member. May require immediate action.
Split	None.	Length less than the member depth or arrested with effective repair.	Length equal to or greater than the member depth but does not significantly affect load carrying capacity.	Split is significant and affects load carrying capacity of the member. May require immediate action.
Distortion	None.	Distortion is insignificant and does not require monitoring or repair.	Distortion requires monitoring or repair.	Distortion is significant and affects load carrying capacity of the member. May require immediate action.
Connection	In place and functioning as intended.	Loose fasteners or superficial pack-rust on steel connection elements, connection functioning as intended.	Missing fasteners, broken welds, or distortion.	Connection is not functioning as intended due to missing fasteners, broken welds, or distortion in steel elements or other local defects in the timber member.
Insect Infestation	None	Evidence of insect infestation. May have insignificant section loss (> 90% section remaining).	Evidence of insect infestation. < 90% section remaining. Mitigation of infestation may be required. YELLOW TAG.	Insect infestation has resulted in significant section loss affecting structural capacity. RED TAG.

Appendix 4-B National Bridge Element Translation Guide

Appendix 4-B-1 Bridge Element Translation Table

WSDOT Bridge Management System Elements (BMSE)				National Bridge Elements (NBE) and Bridge Management Elements (BME)			
2025 BMSE #	2024 BMSE #	BMS Element Name	BMSE Unit	NBE #	BME #	NBE or BME Name	Translation Notes
12A	12	Concrete Deck	SF	12	--	Reinforced Concrete Deck	Note 1
12B	26	Concrete Deck w/Coated Bars					
12C	20	Conc. Deck - Lightweight					
12D	16	Thin Concrete Deck <6" Thick					
12E	14	Fully Supported Concrete Deck					
35	35	Concrete Deck Soffit					
13	15	Post-Tensioned Concrete Deck	SF	13	--	Prestressed Concrete Deck	
--	--	Intentionally Blank	--	15	--	Prestressed Concrete Top Flange	
16	13	Bridge Deck Surface - Top Flange	SF	16	--	Reinforced Concrete Deck Top Flange	
17	--	Bridge Deck Surface - Solid Slab	SF	38 or 39	--	Intentionally Blank	Note 2 or 3
28	28	Steel Deck - Open Grid	SF	28	--	Steel Deck with Open Grid	
29	29	Steel Deck - Concrete Filled Grid	SF	29	--	Steel Deck with Concrete Filled Grid	
30A	27	Steel Orthotropic Deck	SF	30	--	Steel Deck Corrugated/ Orthotropic/Etc.	
30B	30	Deck - Corrugated or Other Steel System					
31	31	Timber Deck	SF	31	--	Timber Deck	
32	32	Fiber Reinforced Polymer (FRP) Deck	SF	60	--	Other Deck	
36	36	Deck Rebar Cover - Smart Flag	EA	--	--	Intentionally Blank	
38A	38	Reinforced Concrete Solid Slab	SF	38	--	Reinforced Concrete Slab	Note 2
38B	49	Reinforced Concrete Hollow Slab					
38C	52	RC Solid Slab w/Coated Bars					
38D	--	RC Hollow Slab w/Coated Bars					

Appendix 4-B-1 Bridge Element Translation Table

WSDOT Bridge Management System Elements (BMSE)				National Bridge Elements (NBE) and Bridge Management Elements (BME)			
2025 BMSE #	2024 BMSE #	BMS Element Name	BMSE Unit	NBE #	BME #	NBE or BME Name	Translation Notes
39A	50	Prestressed Concrete Solid Slab	SF	39	--	Prestressed Concrete Slab	Note 3
39B	--	Prestressed Concrete Hollow Slab					
39C	51	PS Solid Slab w/Coated Strands					
39D	--	PS Hollow Slab w/Coated Strands					
54	54	Timber Slab	SF	54	--	Timber Slab	
--	--	Intentionally Blank	--	60	--	Other Deck	
--	--	Intentionally Blank	--	65	--	Other Slab	
102	102	Steel Box Girder	LF	102	--	Steel Closed Web/Box Girder	
104A	97	Prestressed Concrete Tub Girder	LF	104	--	Prestressed Concrete Closed Web/Box Girder	
104B	100	Post-Tensioned Conc. Segmental Box Girder					
104C	104	Post-Tensioned Concrete Box Girder					
105	105	Concrete Box Girder	LF	105	--	Reinforced Concrete Closed Web/Box Girder	
--	--	Intentionally Blank	--	106	--	Other Closed Web/Box Girder	
107A	90	Steel Rolled Girder	LF	107	--	Steel Open Girder/Beam	
107B	91	Steel Riveted Girder					
107C	92	Steel Welded Girder					
107D	96	Concrete Encased Steel Girder					
107E	107	Steel Open Girder (Through Girder)					
109A	115	Prestressed Concrete Girder	LF	109	--	Prestressed Concrete Open Girder/Beam	
109B	89	Prestressed Concrete Girder w/Coated Strands					
109C	98	Thin Flange Girder					
109D	103	Prestressed Concrete Super Girder					
109E	108	Prestressed Concrete Bulb-T Girder					
109F	109	PS Conc. Multiple Web Girder Units					
110A	110	Concrete Girder	LF	110	--	Reinforced Concrete Open Girder/Beam	
110B	114	Concrete Multiple Web Girder Unit					
111A	111	Timber Glulam Girder	LF	111	--	Timber Open Girder/ Beam	
111B	117	Timber Sawn Girder					
--	--	Intentionally Blank	--	112	--	Other Open Girder/Beam	

Appendix 4-B-1 Bridge Element Translation Table

WSDOT Bridge Management System Elements (BMSE)				National Bridge Elements (NBE) and Bridge Management Elements (BME)			
2025 BMSE #	2024 BMSE #	BMS Element Name	BMSE Unit	NBE #	BME #	NBE or BME Name	Translation Notes
113	113	Steel Stringer	LF	113	--	Steel Stringer	
--	--	Intentionally Blank	--	115	--	Prestressed Concrete Stringer	
116	116	Concrete Stringer	LF	116	--	Reinforced Concrete Stringer	
117	118	Timber Stringer	LF	117	--	Timber Stringer	
--	--	Intentionally Blank	--	118	--	Other Stringer	
120A	126	Steel Thru Truss	LF	120	--	Steel Truss	
120B	131	Steel Deck Truss					
135	135	Timber Truss	LF	135	--	Timber Truss	
136	119	Concrete Truss	LF	136	--	Other Truss	
141A	142	Steel Tied Arch	LF	141	--	Steel Arch	
141B	141	Steel Arch					
142	140	Composite Arch	LF	142	--	Other Arch	
--	--	Intentionally Blank	--	143	--	Prestressed Concrete Arch	
144A	145	Earth Filled Concrete Arch	LF	144	--	Reinforced Concrete Arch	
144B	144	Concrete Arch					
--	--	Intentionally Blank	--	145	--	Masonry Arch	
146	139	Timber Arch	LF	146	--	Timber Arch	
147A	146	Suspension - Main Cable	EA	147	--	Steel Main Cables	Note 4
147B	149	Cable Stayed Bridge - Cable					
148A	147	Suspension - Suspender Cable	EA	148	--	Secondary Steel Cable	
148B	143	Tied Arch - Suspender Cable	EA				
--	--	Intentionally Blank	--	149	--	Other Secondary Cable	
151	150	Concrete Column on Spandrel Arch	EA	--	--	Intentionally Blank	
152	152	Steel Floor Beam	LF	152	--	Steel Floor Beam	
154	154	Prestressed Concrete Floor Beam	LF	154	--	Prestressed Concrete Floor Beam	
155	155	Concrete Floor Beam	LF	155	--	Reinforced Concrete Floor Beam	
156	156	Timber Floor Beam	LF	156	--	Timber Floor Beam	
--	--	Intentionally Blank	--	157	--	Other Floor Beam	
160	160	Steel Column on Spandrel Arch	EA	--	--	Intentionally Blank	
161A	161	Steel Hanger	EA	161	--	Steel Pin and Pin & Hanger Assembly or both	Note 5
161B	162	Steel Pin					
162	133	Truss Gusset Plates	EA	162	--	Steel Gusset Plate	
164	163	Tension Hold Down Anchor Assembly	EA	--	--	Intentionally Blank	

Appendix 4-B-1 Bridge Element Translation Table

WSDOT Bridge Management System Elements (BMSE)				National Bridge Elements (NBE) and Bridge Management Elements (BME)			
2025 BMSE #	2024 BMSE #	BMS Element Name	BMSE Unit	NBE #	BME #	NBE or BME Name	Translation Notes
200	200	Abutment Fill	EA	--	--	Intentionally Blank	
202	202	Steel Column	EA	202	--	Steel Column	
--	--	Intentionally Blank	--	203	--	Other Column	
204A	204	Prestressed Concrete Column	EA	204	--	Prestressed Concrete Column	
204B	203	Prestressed Hollow Concrete Column					
205A	205	Concrete Column	EA	205	--	Reinforced Concrete Column	
205B	207	Concrete Column w/Steel Jacket					
205C	208	Conc. Column w/ Composite Wrap					
206	206	Timber Column	EA	206	--	Timber Column	
207A	--	Steel Tower	LF	207	--	Steel Tower	
207B	501	Moveable Bridge Steel Tower					
208	--	Timber Tower	LF	208	--	Timber Trestle	
210	210	Concrete Pier Wall	LF	210	--	Reinforced Concrete Pier Wall	
211	211	Other Pier Wall	LF	211	--	Other Pier Wall	
--	--	Intentionally Blank	--	212	--	Timber Pier Wall	
--	--	Intentionally Blank	--	213	--	Masonry Pier Wall	
215	215	Concrete Abutment	LF	215	--	Reinforced Concrete Abutment	
216	216	Timber Abutment	LF	216	--	Timber Abutment	
--	--	Intentionally Blank	--	217	--	Masonry Abutment	
218	217	Other Abutment	LF	218	--	Other Abutments	
219	218	Steel Abutment	LF	219	--	Steel Abutment	
220	220	Concrete Pile Cap/ Footing	LF	220	--	Reinforced Concrete Pile Cap/Footing	
221	214	Concrete Web Wall between Columns	LF	--	--	Intentionally Blank	
222	222	Timber Foundation	LF	--	--	Intentionally Blank	
225	225	Steel Pile	EA	225	--	Steel Pile	
226A	226	Prestressed Concrete Pile	EA	226	--	Prestressed Concrete Pile	
226B	232	Prestressed Hollow Concrete Pile					
227	227	Concrete Pile	EA	227	--	Reinforced Concrete Pile	
228	228	Timber Pile	EA	228	--	Timber Pile	
--	--	Intentionally Blank	--	229	--	Other Pile	
231A	231	Steel Pier Cap/Crossbeam	LF	231	--	Steel Pier Cap	
231B	229	Timber Cap Rehab with Steel					
233	233	Prestressed Concrete Pier Cap/Crossbeam	LF	233	--	Prestressed Concrete Pier Cap	

Appendix 4-B-1 Bridge Element Translation Table

WSDOT Bridge Management System Elements (BMSE)				National Bridge Elements (NBE) and Bridge Management Elements (BME)			
2025 BMSE #	2024 BMSE #	BMS Element Name	BMSE Unit	NBE #	BME #	NBE or BME Name	Translation Notes
234	234	Concrete Pier Cap/ Crossbeam	LF	234	--	Reinforced Concrete Pier Cap	
235	235	Timber Pier Cap	LF	235	--	Timber Pier Cap	
--	--	Intentionally Blank	--	236	--	Other Pier Cap	
237	237	Pontoon Hatch/Bulkhead	EA	--	--	Intentionally Blank	
238	238	Floating Bridge - Anchor Cable	EA	149	--	Other Secondary Cable	
239	236	Concrete Floating Pontoon	Cell	--	--	Intentionally Blank	
240	240	Metal Culvert	LF	240	--	Steel Culvert	
241	241	Concrete Culvert	LF	241	--	Reinforced Concrete Culvert	
242	242	Timber Culvert	LF	242	--	Timber Culvert	
243	243	Other Culvert	LF	243	--	Other Culvert	
--	--	Intentionally Blank	--	244	--	Masonry Culvert	
--	--	Intentionally Blank	--	245	--	Prestressed Concrete Culvert	
260	260	Steel Open Grid Sidewalk and Supports	SF	--	--	Intentionally Blank	
261	261	Steel Conc. Filled Grid Sidewalk and Supports					
262	262	Corrugated/Orthotropic Sidewalk and Supports					
264	264	Timber Sidewalk and Supports					
266	266	Concrete Sidewalk and Supports					
267	267	FRP Sidewalk and Supports					
300A	412	Strip Seal - Anchored	LF	--	300	Strip Seal Expansion Joint	Note 6
300B	413	Strip Seal - Welded					
301A	400	Asphalt Butt Joint - Paving Joint Seal	LF	--	301	Pourable Joint Seal	Note 6
301B	417	Silicone Rubber Joint					
302A	404	Compression Seal/ Concrete Header	LF	--	302	Compression Joint Seal	Note 6
302B	405	Compression Seal/ Polymer Header					
302C	406	Compression Seal/Steel Header					
303	416	Assembly Joint Seal (Modular)	LF	--	303	Assembly Joint with Seal	Note 6

Appendix 4-B-1 Bridge Element Translation Table

WSDOT Bridge Management System Elements (BMSE)				National Bridge Elements (NBE) and Bridge Management Elements (BME)			
2025 BMSE #	2024 BMSE #	BMS Element Name	BMSE Unit	NBE #	BME #	NBE or BME Name	Translation Notes
304A	401	Asphalt Open Joint - Paving Joint Seal	LF	--	304	Open Expansion Joint	Note 6
304B	402	Open Concrete Joint - Paving Joint Seal					
304C	407	Steel Angle Header					
304D	419	Steel Angle W/Raised Bars					
305A	408	Steel Sliding Plate	LF	--	305	Assembly Joint without Seal	Note 6
305B	409	Steel Sliding Plate w/ Raised Bars					
305C	410	Steel Fingers					
305D	411	Steel Fingers w/Raised Bars					
305E	414	Bolt Down - Sliding Plate w/Springs					
306A	403	Concrete Bulb-T	LF	--	306	Other Expansion Joint	Note 6
306B	415	Bolt Down Panel - Molded Rubber					
306C	418	Asphalt Plug					
306D	422	Flexible Joint Seal					
308	420	Joint Paved Over - Smart Flag	EA	--	--	Intentionally Blank	
--	--	Intentionally Blank	--	--	301A	Poured-In-Place Plug Joint System	Note 7
--	--	Intentionally Blank	--	--	302A	Bonded Preformed Joint Seal	Note 7
--	--	Intentionally Blank	--	--	302B	Bonded Preformed Joint Seal	Note 7
--	--	Intentionally Blank	--	--	303A	Segmental Joint System	Note 7
--	--	Intentionally Blank	--	--	303B	Modular Joint Assembly	Note 7
--	--	Intentionally Blank	--	--	305A	Sliding Plate Joint Assembly	Note 7
--	--	Intentionally Blank	--	--	305B	Finger (tooth) Joint Assembly	Note 7
310	310	Elastomeric Bearing	EA	310	--	Elastomeric Bearing	
311	311	Moveable Bearing (Roller, Sliding, etc.)	EA	311	--	Movable Bearing	
312	312	Concealed Bearing or Bearing System	EA	312	--	Enclosed/Concealed Bearing	
313	313	Fixed Bearing	EA	313	--	Fixed Bearing	
314	314	Pot Bearing	EA	314	--	Pot Bearing	
315	315	Disc Bearing	EA	315	--	Disk Bearing	
316	316	Isolation Bearing	EA	316	--	Other Bearing	
--	--	Intentionally Blank	--	--	320	Prestressed Concrete Approach Slab	
321	321	Concrete Roadway Approach Slab	SF	--	321	Concrete Roadway Approach Slab	

Appendix 4-B-1 Bridge Element Translation Table

WSDOT Bridge Management System Elements (BMSE)				National Bridge Elements (NBE) and Bridge Management Elements (BME)			
2025 BMSE #	2024 BMSE #	BMS Element Name	BMSE Unit	NBE #	BME #	NBE or BME Name	Translation Notes
322	322	Approach Roadway Impact - Smart Flag	EA	--	--	Intentionally Blank	
330	330	Metal Bridge Rail	LF	330	--	Metal Bridge Railing	
331	331	Concrete Bridge Rail	LF	331	--	Reinforced Concrete Railing	
332	332	Timber Bridge Rail	LF	332	--	Timber Bridge Railing	
333	333	Other Bridge Rail	LF	333	--	Other Bridge Railing	
--	--	Intentionally Blank	--	334	--	Masonry Bridge Railing	
340	340	Metal Pedestrian Rail	LF	--	--	Intentionally Blank	
341	341	Concrete Pedestrian Rail	LF	--	--	Intentionally Blank	
342	342	Timber Pedestrian Rail	LF	--	--	Intentionally Blank	
343	343	Other Pedestrian Rail	LF	--	--	Intentionally Blank	
351	351	Chloride Impact - Smart Flag	EA	--	--	Intentionally Blank	
353	353	Encampment Impact - Smart Flag	EA	--	--	Intentionally Blank	
355	355	Damaged Bolts or Rivets - Smart Flag	EA	--	--	Intentionally Blank	
356	356	Steel Cracking - Smart Flag	EA	--	--	Intentionally Blank	
357	357	Pack Rust - Smart Flag	EA	--	--	Intentionally Blank	
360	360	Bridge Movement - Smart Flag	EA	--	--	Intentionally Blank	
361	361	Scour - Smart Flag	EA	--	--	Intentionally Blank	
368	368	Seismic Pier Crossbeam Bolster	LF	--	--	Intentionally Blank	
369	369	Seismic Pier Infill Wall	EA	--	--	Intentionally Blank	
370	370	Seismic - Longitudinal Restrainer	EA	--	--	Intentionally Blank	
371	371	Seismic - Transverse Restrainer	EA	--	--	Intentionally Blank	
372	372	Seismic - Link/Pin Restrainer	EA	--	--	Intentionally Blank	
373	373	Seismic - Catcher Block	EA	--	--	Intentionally Blank	
374	374	Seismic - Column Silo	EA	--	--	Intentionally Blank	
376	376	Conc. Deck Delam Testing - Smart Flag	SF	--	--	Intentionally Blank	
378	378	WSDOT Undercrossing Safety - Smart Flag	EA	--	--	Intentionally Blank	
379	379	LA Undercrossing Safety - Smart Flag	EA	--	--	Intentionally Blank	
381	381	Joint Seal/Gland Leaking - Smart Flag	EA	--	--	Intentionally Blank	
506	806	BST on Concrete (Chip Seal)	SF	--	--	Intentionally Blank	

Appendix 4-B-1 Bridge Element Translation Table

WSDOT Bridge Management System Elements (BMSE)				National Bridge Elements (NBE) and Bridge Management Elements (BME)			
2025 BMSE #	2024 BMSE #	BMS Element Name	BMSE Unit	NBE #	BME #	NBE or BME Name	Translation Notes
510A	800	Asphalt Concrete Overlay	SF	--	510	Wearing Surfaces	Note 8
510B	801	AC Overlay w/ Waterproofing Mem.					
510C	802	Thin Polymer Overlay					
510D	803	Modified Concrete Overlay					
510E	804	Polyester Concrete Overlay					
510F	805	AC Over a Polymer Overlay					
510G	807	AC Overlay w/High Performance Membrane					
515A	901	Red Lead Alkyd Paint System	SF	--	515	Steel Protective Coating	
515B	902	Inorganic Zinc/Vinyl Paint System					
515C	903	Inorganic Zinc/Urethane Paint System					
515D	904	Organic Zinc/Urethane Paint System					
515E	905	Coal Tar Epoxy Paint System					
515F	906	Metalizing					
515G	907	Galvanizing					
515H	908	Epoxy Paint for Weathering Steel					
515J	909	Zinc Primer					
515K	910	Weathering Steel Patina					
515L	911	Paint System - Other					
--	--	Intentionally Blank	--	--	520	Concrete Reinforcing Steel Protective System	
--	--	Intentionally Blank	--	--	521	Concrete Protective Coating	
705	705	Bridge Luminaire Pole and Base	EA	--	--	Intentionally Blank	
707	707	Fender System/Pier Protection	EA	--	--	Intentionally Blank	
710	710	Bridge Mounted Sign Structures	EA	--	--	Intentionally Blank	

Translation Notes for Appendix 4-B-1

1. Concrete Deck BMSE 12A through 12E will be combined with the deck soffit BMSE 35 and submitted as NBE 12. See 4-B-1 Step Sequencing 1 for details.
2. Bridge Deck Surface - Solid Slab BMSE 17 will be combined with a reinforced concrete solid slab element, either BMSE 38A or 38C, and submitted as NBE 38. See 4-B-1 Step Sequencing 2 for details.
3. Bridge Deck Surface - Solid Slab BMSE 17 will be combined with a prestressed solid slab element, either BMSE 39A or 39C, and submitted as NBE 39. See 4-B-1 Step Sequencing 3 for details.
4. Main Cable BMSE 147A and 147B have units of EA. Quantities in each condition state and total will be summed and reported in NBE 147 as LF without alteration.
5. Steel pin and hanger BMSE 161A and 161B will be combined and submitted as NBE 161. See Note 4-B-1 Step Sequencing 5 for details.
6. Bridge joint BMSE 300A through 306E will be combined and translated to four condition states and submitted to the appropriate NBE. See Note 4-B-1 Step Sequencing 6 for details.
7. Bridge joint BME 301A through 305B are in the 2024 Manual for Bridge Element Inspection but have not been adopted by FHWA into the NBI.
8. Wearing surface BMSE 510A through 510G will be combined and translated to four condition states and submitted to the appropriate NBE. See Note Step Sequencing 6 for details.

4-B-1 Step Sequencing 1

Step	Description
1	Sum total quantities and all quantities in each condition state from WSDOT BMSE 12A - 12E into an NBE Temp 12.
2	Add WSDOT BMSE 35 quantities in CS2, CS3, and CS4 to NBE Temp 12.
3	If NBE Temp total quantity = NBE Temp CS1 + CS2 + CS3 + CS4, go to Step 8.
4	If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, deduct difference from NBE Temp CS1 to zero limit, then go to Step 3.
5	If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, deduct difference from NBE Temp CS2 to zero limit, then go to Step 3.
6	If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, deduct difference from NBE Temp CS3 to zero limit, then go to Step 3.
7	If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, set NBE Temp CS4 = NBE Temp total quantity, then go to Step 8.
8	Move NBE Temp total quantity and all Temp CS1 through CS4 quantities to final NBE 12.

4-B-1 Step Sequencing 2

Step	Description
1	Sum total quantities and all quantities in each condition state from WSDOT BMSE 38A or 38C with BMSE 17 into an NBE Temp 38.
2	If NBE Temp total quantity = NBE Temp CS1 + CS2 + CS3 + CS4, go to Step 7.
3	If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, deduct difference from NBE Temp CS1 to zero limit, then go to Step 2.
4	If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, deduct difference from NBE Temp CS2 to zero limit, then go to Step 2.
5	If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, deduct difference from NBE Temp CS3 to zero limit, then go to Step 2.
6	If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, set NBE Temp CS4 = NBE Temp total quantity, then go to Step 7.
7	Move NBE Temp total quantity and all Temp CS1 through CS4 quantities to final NBE 38.

4-B-1 Step Sequencing 3

Step	Description
1	Sum total quantities and all quantities in each condition state from WSDOT BMSE 39A or 39C with BMSE 17 into an NBE Temp 39.
3	If NBE Temp total quantity = NBE Temp CS1 + CS2 + CS3 + CS4, go to Step 7.
4	If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, deduct difference from NBE Temp CS1 to zero limit, then go to Step 2.
5	If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, deduct difference from NBE Temp CS2 to zero limit, then go to Step 2.
6	If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, deduct difference from NBE Temp CS3 to zero limit, then go to Step 2.
7	If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, set NBE Temp CS4 = NBE Temp total quantity, then go to Step 7.
8	Move NBE Temp total quantity and all Temp CS1 through CS4 quantities to final NBE 38.

4-B-1 Step Sequencing 5

Step	Description
1	Sum total quantities and all quantities in each condition state from WSDOT BMSE 161A and 161B into an NBE Temp 161.
2	If NBE Temp total quantity = NBE Temp CS1 + CS2 + CS3 + CS4, go to Step 7.
3	If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, deduct difference from NBE Temp CS1 to zero limit, then go to Step 2.
4	If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, deduct difference from NBE Temp CS2 to zero limit, then go to Step 2.
5	If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, deduct difference from NBE Temp CS3 to zero limit, then go to Step 2.
6	If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, set NBE Temp CS4 = NBE Temp total quantity, then go to Step 7.
7	Move NBE Temp total quantity and all Temp CS1 through CS4 quantities to final NBE 161.

4-B-1 Step Sequencing 6

Step	Description
1	Sum the WSDOT element total quantities into NBE element total quantity. Note that multiple WSDOT elements will be combined into a single NBE element.
2	Sum the WSDOT element CS1 quantities into NBE element CS2 quantity. Note that NBE will have zero quantity in CS1.
3	Sum the WSDOT element CS2 quantities into NBE element CS3 quantity.
4	Sum the WSDOT element CS3 quantities into NBE element CS4 quantity.

Appendix 4-B-2 Washington State Ferries - Bridge Element Translation Table

WSDOT Bridge Management System Elements (BMSE)				National Bridge Elements (NBE) and Bridge Management Elements (BME)			
2025 BMSE #	2024 BMSE #	BMS Element Name	BMSE Unit	NBE #	BME #	NBE or BME Name	Translation Notes
8216	8216	Concrete Deck Soffit	SF	12	--	Reinforced Concrete Deck	Note 1
8217	8217	Concrete Deck	SF				
8213	8213	Bridge Deck Surface	SF	16	--	Reinforced Concrete Deck Top Flange	
8218	8218	Steel Deck - Open Grid	SF	28	--	Steel Deck with Open Grid	
8219	8219	Steel Deck - Concrete Filled Grid	SF	29	--	Steel Deck with Concrete Filled Grid	
8222	8222	Deck - Corrugated or Other Steel System	SF	30	--	Steel Deck Corrugated/ Orthotropic/Etc.	
8221	8221	Timber Deck	SF	31	--	Timber Deck	
8150	8150	Prestressed Concrete Slab	SF	39	--	Prestressed Concrete Slab	
8151	8151	Prestressed Concrete Slab w/ Coated Strands	SF				
8200	8200	Steel Box Girder	LF	102	--	Steel Closed Web/Box Girder	
8090	8090	Steel Rolled Girder	LF	107	--	Steel Open Girder/Beam	
8201	8201	Steel Open Girder	LF				
8108	8108	Prestressed Concrete Bulb-T Girder	LF	109	--	Prestressed Concrete Open Girder/Beam	
8109	8109	Prestressed Concrete Multiple Web Girder Units	LF				
8111	8111	Prestressed Concrete Girder	LF				
8110	8110	Concrete Girder	LF	110	--	Reinforced Concrete Open Girder/Beam	
8112	8112	Timber Sawn Girder	LF	111	--	Timber Open Girder/Beam	
8114	8114	Timber Laminated Girder	LF				
8209	8209	Steel Stringer	LF	113	--	Steel Stringer	
8204	8204	Steel Thru Truss	LF	120	--	Steel Truss	
8206	8206	Steel Floor Beam	LF	152	--	Steel Floor Beam	
8341	8341	Lift Beam (NSTM)	LF				
8342	8342	Live Load Hanger Bars (NSTM)	LF	161	--	Steel Pin and Pin & Hanger Assembly or both	
8343	8343	Apron Two Hinge Pin System/ LL Hanger Pins (NSTM)	EA				
8210	8210	Truss Gusset Plates	EA	162	--	Steel Gusset Plate	
8127	--	Steel Column	EA	202	--	Steel Column	
8125	8125	Concrete Column	EA	205	--	Reinforced Concrete Column	
8129	8129	Transfer Span/OHL Supercolumn	EA				
8123	--	Timber Column	EA	206	--	Timber Column	
8102	8102	Concrete Abutment	LF	215	--	Reinforced Concrete Abutment	
8103	8103	Timber Abutment	LF	216	--	Timber Abutment	
8101	8101	Steel Abutment	LF	219	--	Steel Abutment	
8136	8136	Concrete Pile Cap/Footing	LF	220	--	Reinforced Concrete Pile Cap/ Footing	
8128	8128	Steel Pile	EA	225	--	Steel Pile	
8126	8127	Prestress Concrete Pile	EA	226	--	Prestressed Concrete Pile	
8124	8124	Timber Pile	EA	228	--	Timber Pile	
8130	8130	Steel Pier Cap/Crossbeam	LF	231	--	Steel Pier Cap	

Appendix 4-B-2 Washington State Ferries - Bridge Element Translation Table

WSDOT Bridge Management System Elements (BMSE)				National Bridge Elements (NBE) and Bridge Management Elements (BME)			
2025 BMSE #	2024 BMSE #	BMS Element Name	BMSE Unit	NBE #	BME #	NBE or BME Name	Translation Notes
8132	8132	Concrete Pier Cap/Crossbeam	LF	234	--	Reinforced Concrete Pier Cap	
8131	8131	Timber Pier Cap	LF	235	--	Timber Pier Cap	
8391	8391	Moveable Bearing (Roller, Sliding, etc.)	EA	311	--	Movable Bearing	
8390	8390	Fixed Bearing	EA	313	--	Fixed Bearing	
8810	8810	Metal Bridge Railing	LF	330	--	Metal Bridge Railing	
8811	8811	Concrete Bridge Railing	LF	331	--	Reinforced Concrete Railing	
8812	8812	Timber Bridge Railing	LF	332	--	Timber Bridge Railing	
8813	8813	Other Bridge Railing	LF	333	--	Other Bridge Railing	
8404	8404	Compression Seal/Concrete Header	LF	--	302	Compression Joint Seal	Note 2
8406	8406	Compression Seal/Steel Header	LF				
8407	8407	Steel Angle Header	LF	--	304	Open Expansion Joint	Note 2
8408	8408	Steel Sliding Plate	LF	--	305	Assembly Joint without Seal	Note 2
8223	8223	Asphalt Concrete Overlay	SF	--	510	Wearing Surfaces	Note 2
8224	8224	Thin Polymer Overlay	SF				
8901	8901	Protective Coating - Bridge	SF	--	515	Steel Protective Coating	
8902	8902	Protective Coating - Piling	SF				
8907	8907	Galvanizing	SF				
8225	8225	Non-skid Metal Surfacing	SF	--	--	Intentionally Blank	
8261	8261	Steel Filled Grid Sidewalk and Supports	SF	--	--	Intentionally Blank	
8262	8262	Corrugated/Orthotropic Sidewalk and Supports	SF	--	--	Intentionally Blank	
8263	8263	Steel Open Grid Sidewalk w/ Cover Plate & Suppt.	SF	--	--	Intentionally Blank	
8264	8264	Timber Sidewalk and Supports	SF	--	--	Intentionally Blank	
8265	8265	Fiber Reinforced Polymer (FRP) Sidewalk and Supports	SF	--	--	Intentionally Blank	
8266	8266	Concrete Sidewalk and Supports	SF	--	--	Intentionally Blank	
8301	8301	Apron Steel Orthotropic Deck	SF	--	--	Intentionally Blank	
8305	8305	Apron Hinge Multi-Pin & Plate	EA	--	--	Intentionally Blank	
8307	8307	Apron Lips & Pins	EA	--	--	Intentionally Blank	
8310	8310	Apron Hoist/Cables/Spool/ Platform/Supports/Rigging	EA	--	--	Intentionally Blank	
8312	8312	Span Apron/Cab Gangplank Pivot/Raise/Rams/Fittings	EA	--	--	Intentionally Blank	
8348	8348	Span Hoist/Cables/Spool/ Platform/Supports/Rigging	EA	--	--	Intentionally Blank	
8355	8355	Damaged Bolts or Rivets - Smart Flag	EA	--	--	Intentionally Blank	
8356	8356	Steel Cracking - Smart Flag	EA	--	--	Intentionally Blank	
8357	8357	Pack Rust - Smart Flag	EA	--	--	Intentionally Blank	
8359	8359	Bridge Impact	EA	--	--	Intentionally Blank	
8360	8360	Bridge Movement - Smart Flag	EA	--	--	Intentionally Blank	
8361	8361	Scour - Smart Flag	EA	--	--	Intentionally Blank	

Appendix 4-B-2 Washington State Ferries - Bridge Element Translation Table

WSDOT Bridge Management System Elements (BMSE)				National Bridge Elements (NBE) and Bridge Management Elements (BME)			
2025 BMSE #	2024 BMSE #	BMS Element Name	BMSE Unit	NBE #	BME #	NBE or BME Name	Translation Notes
8362	8362	Impact Damage	EA	--	--	Intentionally Blank	
8370	8370	Seismic - Longitudinal Restrainer	EA	--	--	Intentionally Blank	
8371	8371	Seismic - Transverse Restrainer	EA	--	--	Intentionally Blank	
8375	8375	Cathodic Protection	EA	--	--	Intentionally Blank	
8376	8376	Concrete Deck Delamination Testing - Smart Flag	SF	--	--	Intentionally Blank	
8413	8413	Steel Tower	EA	--	--	Intentionally Blank	
8414	8414	Timber Tower	EA	--	--	Intentionally Blank	
8415	8415	Steel Headframe	LF	--	--	Intentionally Blank	
8416	8416	Timber Headframe	LF	--	--	Intentionally Blank	
8417	8417	Tower Base Platform	SF	--	--	Intentionally Blank	
8418	8418	Counterweight Guides	EA	--	--	Intentionally Blank	
8419	8419	Concrete Counterweights	EA	--	--	Intentionally Blank	
8420	8420	CTWT Sheaves/Shafts(NSTM)/ Bearings/Anchor Blts.	EA	--	--	Intentionally Blank	
8421	8421	Counterweight Cable Protective Systems	LF	--	--	Intentionally Blank	
8423	8423	Steel Counterweights	EA	--	--	Intentionally Blank	
8450	8450	Timber Wingwalls	LF	--	--	Intentionally Blank	
8451	8451	Steel Pile Frame Wingwalls	LF	--	--	Intentionally Blank	
8460	8460	Timber Pile Dolphins	EA	--	--	Intentionally Blank	
8462	8462	Steel Pile Frame Dolphins	EA	--	--	Intentionally Blank	
8463	8463	Timber Floating Dolphin	LF	--	--	Intentionally Blank	
8464	8464	Concrete Pontoon Floating Dolphin	LF	--	--	Intentionally Blank	
8640	8640	Moveable Pedestrian Gangplank	LF	--	--	Intentionally Blank	
8650	8650	Overhead Passenger Loading Cab	SF	--	--	Intentionally Blank	
8653	8653	Passenger Cab Floor System and Lift Beam(NSTM)	LF	--	--	Intentionally Blank	
8701	8701	Ferry Concrete Floating Pontoon	Cell	--	--	Intentionally Blank	
8702	8702	Ferry Steel Floating Pontoon	Cell	--	--	Intentionally Blank	
8703	8703	Spud Piling & Wells	EA	--	--	Intentionally Blank	
8704	8704	Pontoon Anchors, Anchor Chain/Cables/Clamps	EA	--	--	Intentionally Blank	
8705	8705	Bridge Luminaire Pole and Base	EA	--	--	Intentionally Blank	
8815	8815	Metal Pedestrian Rail	LF	--	--	Intentionally Blank	
8816	8816	Concrete Pedestrian Rail	LF	--	--	Intentionally Blank	
8817	8817	Timber Pedestrian Rail	LF	--	--	Intentionally Blank	
8818	8818	Other Pedestrian Rail	LF	--	--	Intentionally Blank	
8910	8910	Safety Access Ladders	EA	--	--	Intentionally Blank	
8911	8911	Safety Railing & Catwalks	LF	--	--	Intentionally Blank	
--	8909	Zinc Primer	SF	--	--	Intentionally Blank	

Appendix 4-B-2 Washington State Ferries - Bridge Element Translation Table

WSDOT Bridge Management System Elements (BMSE)				National Bridge Elements (NBE) and Bridge Management Elements (BME)			
2025 BMSE #	2024 BMSE #	BMS Element Name	BMSE Unit	NBE #	BME #	NBE or BME Name	Translation Notes
--	8903	Inorganic Zinc/Urethane Paint System	SF	--	--	Intentionally Blank	
--	8904	Organic Zinc/Urethane Paint System	SF	--	--	Intentionally Blank	
--	8905	Coal Tar Epoxy Paint System	SF	--	--	Intentionally Blank	
--	8906	Epoxy Paint System	SF	--	--	Intentionally Blank	

Translation Notes for Appendix 4-B-2

1. Concrete Deck BMSE 8217 will be combined with the deck soffit BMSE 8216 and submitted as NBE 12. See 4-B-2 Step Sequencing 1 for details.
2. Bridge joint BMSE 8404 through 8408 will be translated to four condition states and submitted to the appropriate NBE. See Note 4-B-2 Step Sequencing 2 for details.
3. Wearing surface BMSE 8223 through 8224 will be translated to four condition states and submitted to the appropriate NBE. See 4-B-2 Step Sequencing 2 for details.

4-B-2 Step Sequencing 1

Step	Description
1	Sum total quantities and all quantities in each condition state from WSDOT BMSE 8216 and 8217 into an NBE Temp 12.
2	If NBE Temp total quantity = NBE Temp CS1 + CS2 + CS3 + CS4, go to Step 7.
3	If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, deduct difference from NBE Temp CS1 to zero limit, then go to Step 2.
4	If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, deduct difference from NBE Temp CS2 to zero limit, then go to Step 2.
5	If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, deduct difference from NBE Temp CS3 to zero limit, then go to Step 2.
6	If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, set NBE Temp CS4 = NBE Temp total quantity, then go to Step 7.
7	Move NBE Temp total quantity and all Temp CS1 through CS4 quantities to final NBE 12.

4-B-2 Step Sequencing 2

Step	Description
1	Sum the WSDOT element total quantities and into NBE element total quantities.
2	Sum the WSDOT element CS1 quantities into NBE element CS2 quantities. Note that NBE will have zero quantities in CS1.
3	Sum the WSDOT element CS2 quantities into NBE element CS3 quantities.
4	Sum the WSDOT element CS3 quantities into NBE element CS4 quantities.