SMART FLAGS

RAIL

BEARINGS

JOINTS

CULVERTS

DECKS & SLABS

TIMBER

REINFORCED CONCRETE

PRESTRESSED CONCRETE

PAINTED STEEL

UNPAINTED STEEL

101
106
112
120
125
130
140
151
201
225
230

Unpainted Steel Elements

Element Number	Description
101	**Steel Closed Web/Box Girder, Unpainted (m)** This element defines only those steel closed web/box girder units that are not painted or are constructed of weathering steel or galvanized.
106	**Steel Open Girder, Unpainted (m)** This element defines only those steel open girder units that are not painted or are constructed of weathering steel.
112	**Steel Stringer, Unpainted (m)** This element defines all unpainted steel stringers which support the deck in a stringer-floor beam system.
120	**Steel Bottom Chord of Truss, Unpainted (m)** This element defines the bottom chord of unpainted steel trusses or those constructed of weathering steel. This element includes through trusses and Pony trusses.
125	**Steel Truss excluding bottom chord, Unpainted (m)** This element defines all truss elements except the bottom chord of unpainted steel trusses or those constructed of weathering steel. This element includes through trusses and Pony trusses.
130	**Steel Deck Truss excluding bottom chord, Unpainted (m)** This element defines all members of unpainted steel deck trusses or those constructed of weathering steel.
140	**Steel/Arch, Unpainted (m)** This element defines all members of only those steel arches that are not painted or are constructed of weathering steel.
151	**Steel Floor Beam, Unpainted (m)** This element defines only those steel floor beams that are not painted or are constructed of weathering steel.
201	**Steel Column or Pile Extension, Unpainted (EA)** This element defines only those columns or pile extensions that are unpainted or constructed of weathering steel.
225	**Steel Submerged Pile (EA)** This element defines only those unpainted steel foundation piles that are submerged in soil or water. Piles that are completely submerged, in soil or water, and not visible for inspection, should typically be recorded as quantity 1 EA in Condition State 1. If the foundation piles are partially visible for inspection, record the actual number of inspected piles and the corresponding condition states. The exposure may be intentional or caused by scour.
230	**Steel Pier Cap, Unpainted (m)** This element defines only those steel pier/bent caps that are not painted or are constructed of weathering steel.

Notes

- *See Appendix B for quantity conventions and Appendix C for Column and Pile guidelines.*

Unpainted Steel Elements

101
106
112
120
125
130
140
151
201
225
230

Condition	Description	Feasible Action
1	There is little or no corrosion of the unpainted steel. The weathering steel is coating uniformly and remains in excellent condition. Oxide film is tightly adhered.	Do Nothing
2	Surface rust, surface pitting, has formed or is forming on the unpainted steel. The weathering steel has not corroded beyond design limits. Weathering steel color is yellow-orange to light brown. Oxide film has a dusty to granular texture.	Do Nothing Clean and Paint
3	Steel has measurable section loss due to corrosion but does warrant structural analysis. Weathering steel is dark brown or black. Oxide film is flaking.	Do Nothing Clean and Paint
4	Corrosion is advanced. Oxide film has a laminar texture with thin sheets of rust. Section loss is sufficient to warrant structural analysis to ascertain the impact on the ultimate strength and/or serviceability of either the element or the bridge.	Clean and Paint Spot Blast Clean and Paint Rehab Element Replace Element

Notes

- *The Steel Section Loss Smart Flag 363 should be used for elements in Condition State 3 and 4.*
- *Downgrade elements significantly damaged by traffic impact (e.g., highload hit) and use a Traffic Impact Smart Flag 362 and a Steel Fatigue Smart Flag 356 if cracks are present.*

102 Painted Steel Elements

107

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121

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Element Number	Description
102	**Steel Closed Web/Box Girder, Painted (m)** This element defines only those steel closed web/box girder units that are painted.
107	**Steel Open Girder, Painted (m)** This element defines only those steel open girder units that are painted.
113	**Steel Stringer, Painted (m)** This element defines only those steel stringers that support the deck in a stringer-floor beam system that are painted.
121	**Steel Bottom Chord of Truss, Painted (m)** This element defines the bottom chord of steel trusses that are painted. This element includes through trusses and Pony trusses.-
126	**Steel Truss excluding bottom chord, Painted (m)** This element defines all truss elements except the bottom chord of steel trusses that are painted. This element includes through trusses and Pony trusses.-
131	**Steel Deck Truss excluding bottom chord, Painted (m)** This element defines all members of steel deck trusses that are painted.
141	**Steel/Arch, Painted (m)** This element defines all members of only those steel arches that are painted-
152	**Steel Floor Beam, Painted (m)** This element defines only those steel floor beams that are painted.
202	**Steel Column or Pile Extension, Painted (EA)** This element defines only those columns or pile extensions that are painted.
231	**Steel Pier Cap, Painted (m)** This element defines only those steel pier/bent caps that are painted.

Notes

- *See Appendix B for quantity conventions and Appendix C for Column and Pile guidelines.*

Painted Steel Elements

102
107
113
121
126
131
141
152
202
231

Condition	Description	Feasible Action
1	There is no evidence of corrosion and the paint system is sound and functioning as intended to protect the metal surface.	Do Nothing
2	There is little or corrosion. Surface or freckled rust has formed or is forming. The paint system may be chalking, peeling, curling or showing other early evidence of paint system distress but there is no exposure of metal.	Do Nothing Spot Blast, Clean, and Paint Replace Paint System
3	Surface or freckled rust is prevalent. There may be exposed metal but there is no active corrosion which is causing loss of section.	Do Nothing Spot Blast, Clean, and Paint Replace Paint System
4	Corrosion may be present but any section loss due to active corrosion does not yet warrant structural analysis of either the element or the bridge.	Do Nothing Spot Blast, Clean, and Paint Replace Paint System
5	Corrosion has caused section loss and is sufficient to warrant structural analysis to ascertain the impact on the ultimate strength and/or serviceability of either the element or the bridge.	Rehab Element Replace Element

Notes

- *The Steel Section Loss Smart Flag 363 should be used for Condition States 4 and 5. However, elements previously in Condition States 4 and 5, but were thoroughly cleaned and repainted, and the paint is holding up well, the Condition State can be improved with a Steel Section Loss Smart Flag 363 remaining.*
- *Poor condition paint on one portion of a girder (such as the bottom flange) means that the entire linear meters of beam in that area can be rated to the condition of the worst portion.*
- *Downgrade elements significantly damaged by traffic impact (e.g., highload hit) and use a Traffic Impact Smart Flag 362 and a Steel Fatigue Smart Flag 356 if cracks are present.*

104 109 115 143 154 204 226 233 Prestressed Concrete Elements

Element Number	Description
104	**Prestressed Concrete Closed Web/Box Girder (m)** This element defines only those closed web/box girder units constructed of prestressed concrete.
109	**Prestressed Concrete Open Girder (m)** This element defines only those prestressed concrete open girder units constructed of prestressed concrete.
115	**Prestressed Concrete Stringer (m)** Defines only those prestressed concrete stringers that support the deck in a stringer-floor beam system
143	**Prestressed Concrete Arch (m)** This element defines only those arches constructed of prestressed concrete.
154	**Prestressed Concrete Floor Beam (m)** This element defines only those floor beams constructed of prestressed concrete.
204	**Prestressed Concrete Column or Pile Extension (EA)** This element defines only those columns or pile extensions that are constructed of prestressed concrete. If the pile type is different than the extension type; record the extension type.
226	**Prestressed Concrete Submerged Pile (EA)** This element defines only those prestressed concrete piles that are continuously submerged and are visible for inspection. The exposure may be intentional or caused by scour.
233	**Prestressed Concrete Cap (m)** This element defines only those caps that are constructed of prestressed concrete and not integral with the superstructure (has a bearing surface).

Notes

- *For Box Girder with hinges add element number 312 Enclosed/Concealed Bearing System (EA) for each hinge location.*
- *See Appendix B for quantity conventions and Appendix C for Column and Pile guidelines.*

Prestressed Concrete Elements

104
109
115
143
154
204
226
233

Condition	Description	Feasible Action
1	The element shows no deterioration. There may be discoloration, efflorescence, and/or superficial cracking but without affect on strength and/or serviceability.	Do Nothing
2	Minor cracks and spalls may be present and there may be exposed reinforcing with no evidence of corrosion. There is no exposure of the prestress system.	Do Nothing Seal Cracks and Minor Patching
3	Some delamination and/or spalls may be present. There may be minor exposure but no deterioration of the prestress system. Corrosion of non-prestressed reinforcement may be present but loss of section is incidental and does not significantly affect the strength and/or serviceability of either the element or the bridge.	Do Nothing Clean Steel and Patch
4	Delamination, spalls and corrosion of non-prestressed reinforcement are prevalent. There may also be exposure and deterioration of the prestress system (manifested by loss of bond, broken strands or wire, failed anchorages, etc.). There is sufficient concern to warrant an analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge.	Rehab Element Replace Element

Notes

- *Downgrade elements significantly damaged by traffic impact (e.g., highload hit) and use a Traffic Impact Smart Flag 362.*

105 Reinforced Concrete Elements

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252

Element Number	Description
105	**Reinforced Concrete Closed Web/Box Girder (m)** This element defines only those closed web/box girder units constructed of reinforced concrete.
110	**Reinforced Concrete Open Girder (m)** This element defines only those reinforced concrete open girder units constructed of reinforced concrete. This can include deck girders, T- girders and through girders.
116	**Reinforced Concrete Stringer (m)** This element defines only those reinforced concrete stringers that support the deck in a stringer-floor beam system.
144	**Concrete Arch (m)** This element defines only those arches (open/closed spandrel, earth filled, bowstring, etc.) constructed of reinforced concrete.
155	**Reinforced Concrete Floor Beam (m)** This element defines only those floor beams constructed of reinforced concrete.
205	**Reinforced Concrete Column or Pile Extension (EA)** This element defines only those columns or pile extensions that are constructed of reinforced concrete. If the pile type is different than the extension type; record the extension type.
210	**Reinforced Concrete Pier Wall (m)** This element defines only those pier walls constructed of reinforced concrete. This element includes multi-column bents with full height in fill or debris walls. Partial height walls between columns should be neglected (record the columns only).
215	**Reinforced Concrete Abutment (m)** This element defines only those abutments constructed of reinforced concrete.
220	**Reinforced Concrete Submerged Pile Cap/Footing (EA)** This element defines only those reinforced concrete pile caps and/or footings that are continuously submerged and are visible for inspection. The exposure may be intentional or caused by scour.
227	**Reinforced Concrete Submerged Pile (EA)** This element defines only those reinforced concrete piles that are continuously submerged and are visible for inspection. The exposure may be intentional or caused by scour.
234	**Reinforced Concrete Pier/Bent Cap (m)** This element defines only those caps that are constructed of reinforced concrete.
252	**Cast-In-Drilled-Hole (CIDH) (EA)** This element defines only those reinforced concrete piles that are continuously submerged and are visible for inspection. The exposure may be intentional or caused by scour.

Notes

- *For Box Girder with hinges add element number 312 Enclosed/Concealed Bearing System (EA) for each hinge location.*
- *See Appendix B for quantity conventions and Appendix C for Column and Pile guidelines.*

Reinforced Concrete Elements

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220
227
234

Condition	Description	Feasible Action
1	The element shows little or no deterioration. There may be discoloration, efflorescence, and/or superficial cracking, but without affect on strength and/or serviceability.	Do Nothing
2	Minor cracks and spalls may be present but there is no exposed reinforcing or surface evidence of rebar corrosion.	Do Nothing Seal Cracks and Minor Patching
3	Some delamination and/or spalls may be present and some reinforcing may be exposed. Corrosion of rebar may be present but loss of section is incidental and does not significantly affect the strength and/or serviceability of either the element or the bridge.	Do Nothing Clean Steel and Patch
4	Advanced deterioration. Corrosion of reinforcement and/or loss of concrete section is sufficient to warrant analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge.	Rehab Element Replace Element

Notes

- *The Condition State 1 description for reinforced concrete allows for "superficial cracking". These cracks are the light/hairline cracks (< 0.5 mm wide) which often are evident even in new concrete.*
- *The Condition State 2 description for reinforced concrete mentions "minor cracking". These are 0.5 mm wide or wider.*
- *Condition State 4 description refers to "warrants analysis…". Guidelines for meeting this condition are when reinforcing bars are exposed and are measured to have equal to or more than 10% section loss of the steel.*
- *Downgrade elements significantly damaged by traffic impact (e.g., highload hit) and use a Traffic Impact Smart Flag 362.*

117 Timber Elements

135

156

206

216

228

235

Element Number	Description
117	**Timber Stringer/Girder (m)** This element defines only those stringers/girders constructed of timber.
135	**Timber Truss/Arch (m)** This element defines all members of trusses and arches that are constructed of timber.
156	**Timber Floor Beam (m)** This element defines only those floor beams constructed of timber.
206	**Timber Column or Pile Extension (EA)** This element defines only those columns or pile extensions that are constructed of timber. If the pile type is different than the extension type; record the extension type.
216	**Timber Abutment (m)** This element defines only those abutments constructed of timber.
228	**Timber Submerged Pile (EA)** This element defines only those timber piles that are continuously submerged and are visible for inspection. The exposure may be intentional or caused by scour.
235	**Timber Cap (m)** This element defines only those pier caps that are constructed of timber.

Notes

- *See Appendix B for quantity conventions and Appendix C for Column and Pile guidelines.*

Example: Use Elements 235 (cap), 206 (columns), and 216 (abutment) for the bridge abutment shown above.

Timber Elements

117
135
156
206
216
228
235

Condition	Description	Feasible Action
1	Investigation indicates no decay. There may be superficial cracks, splits and checks having no affect on strength or serviceability.	Do Nothing
2	Decay, insect infestation/marine bore infestation, abrasion, splitting, cracking, checking, or crushing may exist but none is sufficiently advanced to affect strength or serviceability of the element.	Do Nothing Rehab and/or Protect Element
3	Decay, insect/marine borer infestation, abrasion, splitting, cracking or crushing has produced loss of strength or deflection of the element but not of a sufficient magnitude to affect the serviceability of the bridge.	Do Nothing Rehab Element Replace Element
4	Advanced deterioration. Decay, insect/marine borer infestation, abrasion, splits, cracks or crushing has produced loss of strength or deflection that affects the serviceability of the bridge.	Rehab Element Replace Element

Notes

- *Downgrade elements significantly damaged by traffic impact (e.g., highload hit) and use a Traffic Impact Smart Flag 362*

145 211 217 "Other" Superstructure/Substructure Elements

Element Number	Description
145	**Arch (Other Material) (m)** This element defines only those arches (open/closed spandrel, earth filled, bowstring, etc.) constructed of "other material" types (i.e., stone masonry).
211	**Pier Wall (Other Material) (m)** This element defines only those pier walls (shafts) constructed of material other than reinforced concrete. This includes masonry pier walls.
217	**Abutment (Other Material) (m)** This element defines abutments made of masonry or any other material except concrete or timber.

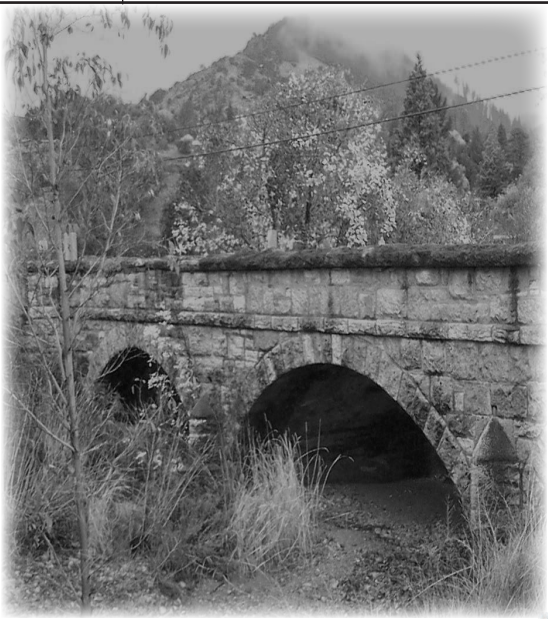
Notes

- *Other Material may consist of a combination of materials (i.e., concrete columns with timber lagging or H-piles with sheet pile backwall...etc) the columns and cap are to be coded separately.*
- *See Appendix B for quantity conventions and Appendix C for Column and Pile guidelines.*

“Other” Superstructure/Substructure Elements

145
211
217

Condition	Description	Feasible Action
1	There is little or no deterioration. Surface defects only are in evidence.	Do Nothing
2	There may be minor deterioration, cracking and weathering. Mortar in joints may show minor deterioration.	Do Nothing Rehab Element
3	Moderate to major deterioration and cracking. Major deterioration of joints.	Do Nothing Rehab Element
4	Major deterioration, splitting, or cracking of materials may be affecting the structural capacity of the element.	Rehab Element Replace Element



12 Concrete Deck – Bare (m^2)
38 Concrete Slab – Bare (m^2)

This element defines those concrete bridge decks/slabs with no surface protection of any type and constructed with uncoated reinforcement. Report the condition state that represents the condition of the entire deck.

Condition	Description	Feasible Action
1	The surface of the deck has no patched areas and there are no spalls/delamination in the deck surface.	Do Nothing
2	Patched areas and/or spalls/delamination exist in the deck surface. The combined distressed area is 2% or less of the total deck area.	Do Nothing Repair spalls and delamination
3	Patched areas and/or spalls/delamination exist in the deck surface. The combined area of distress is more than 2% but less than 10% of the total deck area.	Do Nothing Repair spalls and delamination Repair deck and place overlay
4	Patched areas and/or spalls/delamination exist in the deck surface. The combined area of distress is more than 10% but less than 25% of the total deck area.	Do Nothing Repair deck and place overlay Replace deck/slab
5	Patched areas and/or spalls/delamination exist. The combined area of distress is more than 25% of the total deck area.	Repair deck and place overlay Replace deck/slab

Notes

- *The entire quantity shall be placed in one condition state.*
- *Do not use this element for RC Culverts.*
- *The condition of the deck area within $^1/_2$ meter of all joints should be recorded as part of the joint element.*
- *Only rate the TOP or WEARING SURFACE for spalls and delaminating concrete.*
- *Deck cracking and soffit cracking and/or spalling are tracked as Smart Flag Elements 358 and 359, respectively.*
- *A patch is considered a repair of a concrete deck/slab with AC or other nonsuitable patching material. A sound concrete spall repair with suitable material should not downgrade the Condition State of the deck/slab.*
- *The condition state of the deck/slab should not be upgraded when a methacrylate treatment is applied with out spall and/or delamination repairs.*

Concrete Deck – Unprotected with AC Overlay (m^2) 13
Concrete Slab – Unprotected with AC Overlay (m^2) 39

This element defines those concrete bridge decks/slabs with no surface protection of any type. The deck is covered with an asphaltic concrete overlay.

Condition	Descriptions	Feasible Action
1	The surfacing on the deck has no patched areas and there are no potholes in this surfacing.	Do Nothing
2	Patched areas and/or potholes or impending potholes exist. Their combined area is less than 2% of the total deck area.	Do Nothing Repair potholes, spalls, and delam. Repair delam. and replace overlay
3	Patched areas and/or potholes or impending potholes exist. Their combined area is more than 2% but less than 10% of the total deck area.	Do Nothing Repair potholes, spalls, and delam. Repair delam. and replace overlay
4	Patched areas and/or potholes or impending potholes exist. Their combined area is more than 10% but less than 25% of the total deck area.	Do Nothing Repair potholes, spalls, and delam. Repair delam. and replace overlay
5	Patched areas and/or potholes or impending potholes exist. Their combined area is more than 25% of the total deck area.	Repair delam. and replace overlay Replace deck/slab

Notes

- *The entire quantity shall be placed in one condition state.*
- *Do not use this element for RC Culverts.*
- *The condition of the deck area within $^1/_2$ meter of all joints should be recorded as part of the joint element.*
- *Soffit cracking and/or spalling is tracked as Smart Flag Element 359.*
- *A Deck Cracking SMART Flag Element 358 that existed prior to an AC overlay or added following an AC remove and replace inspection, should remain.*
- *This element includes decks with a thin AC chip seal.*
- *Use this element when no plans are available to confirm surface protection.*

14 Concrete Deck – Protected with AC Overlay (m^2)
40 Concrete Slab – Protected with AC Overlay (m^2)

This element defines those concrete bridge decks/slabs protected with a membrane. The membrane is covered with an asphaltic concrete overlay.

Condition	Description	Feasible Action
1	The surfacing on the deck has no patched areas and there are no potholes in this surfacing.	Do Nothing
2	Patched areas and/or potholes or impending potholes exist. Their combined area is less than 2% of the total deck area.	Do Nothing Repair potholes, membrane, spalls & delam Repair substrate and place overlay
3	Patched areas and/or potholes or impending potholes exist. Their combined area is more than 2% but less than 10% of the total deck area.	Do Nothing Repair potholes, spalls, and delam. Repair delam. and replace overlay
4	Patched areas and/or potholes or impending potholes exist. Their combined area is more than 10% but less than 25% of the total deck area.	Do Nothing Repair potholes, spalls, and delam. Repair delam. and replace overlay
5	Patched areas and/or potholes or impending potholes exist. Their combined area is more than 25% of the total deck area.	Repair delam. and replace overlay Replace deck/slab

Notes

- *The entire quantity shall be placed in one condition state.*
- *Do not use this element for RC Culverts.*
- *The condition of the deck area within $^1/_2$ meter of all joints should be recorded as part of the joint element.*
- *Soffit cracking and/or spalling is tracked as Smart Flag Element 359.*
- *A Deck Cracking SMART Flag Element 358 that existed prior to an AC overlay or added following an AC remove and replace inspection, should remain.*
- *"Protected" indicates the presence of a waterproofing membrane or similar protection system.*
- *Use this element when plans or visual inspection confirm that surface protection is present.*

Concrete Deck – Protected with Thin Overlay (m^2) 18
Concrete Slab – Protected with Thin Overlay (m^2) 44

This element defines those concrete bridge decks/slabs protected with a thin (less than ŧ3/4") overlay (Portland cement, epoxy chip seal, polymer, etc.).

Condition	Description	Feasible Action
1	The surface of the deck has no patched areas and there are no spalls/delamination in the deck surface. No wear-out is visible.	Do Nothing
2	Patched areas and/or spalls/delamination exist in the deck surface. The combined distressed area is 2% or less of the deck area.	Do Nothing Repair spalls and delamination
3	Patched areas and/or spalls/delamination exist in the deck surface. The combined area of distress is more than 2% but less than 10% of the total deck area.	Do Nothing Repair spalls and delamination
4	Patched areas and/or spalls/delamination exist in the deck surface. The combined area of distress is more than 10% but less than 25% of the total deck area.	Do Nothing Repair spalls and delamination Replace overlay
5	Patched areas and/or spalls/delamination exist. The combined area of distress is more than 25% of the total deck/slab area.	Replace overlay Replace deck

Notes

- *The entire quantity shall be placed in one condition state.*
- *Do not use this element for RC Culverts.*
- *The condition of the deck area within $^1/_2$ meter of all joints should be recorded as part of the joint element.*
- *Only rate the TOP or WEARING SURFACE for spalls and delaminating concrete.*
- *Soffit cracking and/or spalling is tracked as Smart Flag Element 359.*
- *A Deck Cracking SMART Flag Element 358 that existed prior to a thin overlay (excluding AC) should be carried in Condition State 1 and revised accordingly during future inspections.*
- *A patch is considered a repair of a concrete deck/slab with AC or other nonsuitable patching material. A sound concrete spall repair with suitable material should not downgrade the Condition State of the deck/slab.*
- *This element is not intended for use on bridges with a polyester concrete overlay or methacrylate treatment (use Element 22/48).*

22 Concrete Deck – Protected with Rigid Overlay (m^2)
48 Concrete Slab – Protected with Rigid Overlay (m^2)

This element defines those concrete bridge decks/slabs protected with a rigid (3/4" or greater) overlay (low slump Portland cement, polyester concrete, polymer, etc.)

Condition	Description	Feasible Action
1	The surface of the deck has no patched areas and there are no spalls/delamination in the deck surface. No wear-out is visible.	Do Nothing
2	Patched areas and/or spalls/delamination exist in the deck surface. The combined distressed area is 2% or less of the deck area.	Do Nothing Repair spalls and delamination
3	Patched areas and/or spalls/delamination exist in the deck surface. The combined area of distress is more than 2% but less than 10% of the total deck area.	Do Nothing Repair spalls and delamination Repair deck and place overlay
4	Patched areas and/or spalls/delamination exist in the deck surface. The combined area of distress is more than 10% but less than 25% of the total deck area.	Do Nothing Repair deck and place overlay Replace deck
5	Patched areas and/or spalls/delamination exist. The combined area of distress is more than 25% of the total deck area.	Repair deck and place overlay Replace deck/slab

Notes

- *The entire quantity shall be placed in one condition state.*
- *Do not use this element for RC Culverts.*
- *The condition of the deck area within $^1/_2$ meter of all joints should be recorded as part of the joint element.*
- *Only rate the TOP or WEARING SURFACE for spalls and delaminating concrete.*
- *Soffit cracking and/or spalling is tracked as Smart Flag Element 359.*
- *A Deck Cracking SMART Flag Element 358 that existed prior to a rigid overlay (excluding AC) should be carried in Condition State 1 and revised accordingly during future inspections.*
- *A patch is considered a repair of a concrete deck/slab with AC or other nonsuitable patching material. A sound concrete patch repair should not downgrade the condition state of the deck/slab.*
- *The condition state of the deck/slab should not be upgraded when a methacrylate treatment is applied with out spall and/or delamination repairs.*

Concrete Deck – Protected with Coated Bars (m^2) 26
Concrete Slab – Protected with Coated Bars (m^2) 52

This element defines those concrete bridge decks/slabs constructed with coated (epoxy, galvanized, stainless steel, etc.) reinforcement bars.

Condition	Description	Feasible Action
1	The surface of the deck has no patched areas and there are no spalls/delamination in the deck surface.	Do Nothing
2	Patched areas and/or spalls/delamination exist in the deck surface. The combined distressed area is 2% or less of the deck area.	Do Nothing Repair spalls and delamination
3	Patched areas and/or spalls/delamination exist in the deck surface. The combined area of distress is more than 2% but less than 10% of the total deck area.	Do Nothing Repair spalls and delamination Repair deck and place overlay
4	Patched areas and/or spalls/delamination exist in the deck surface. The combined area of distress is more than 10% but less than 25% of the total deck area.	Do Nothing Repair deck and place overlay Replace deck
5	Patched areas and/or spalls/delamination exist. The combined area of distress is more than 25% of the total deck area.	Repair deck and place overlay Replace deck/slab

Notes

- *The entire quantity shall be placed in one condition state.*
- *Do not use this element for RC Culverts.*
- *The condition of the deck area within $^1/_2$ meter of all joints should be recorded as part of the joint element.*
- *Only rate the TOP or WEARING SURFACE for spalls and delaminating concrete.*
- *Deck cracking and soffit cracking and/or spalling are tracked as Smart Flag Elements 358 and 359, respectively.*
- *A patch is considered a repair of a concrete deck/slab with AC or other nonsuitable patching material. A sound concrete patch repair should not downgrade the condition state of the deck/slab..*
- *The condition state of the deck/slab should not be upgraded when a methacrylate treatment is applied with out spall and/or delamination repairs.*

27 Concrete Deck–Protected w/ Cathodic Protection (m^2)
53 Concrete Slab–Protected w/ Cathodic Protection (m^2)

This element defines those concrete bridge decks/slabs protected with a cathodic system.

Condition	Description	Feasible Action
1	The surface of the deck has no patched areas and there are no spalls/delamination in the deck surface.	Do Nothing
2	Patched areas and/or spalls/delamination exist in the deck surface. The combined distressed area is 2% or less of the deck area.	Do Nothing Repair spalls and delamination
3	Patched areas and/or spalls/delamination exist in the deck surface. The combined area of distress is more than 2% but less than 10% of the total deck area.	Do Nothing Repair spalls and delamination Repair deck/slab and place overlay
4	Patched areas and/or spalls/delamination exist in the deck surface. The combined area of distress is more than 10% but less than 25% of the total deck area.	Do Nothing Repair deck/slab and place overlay Replace deck/slab
5	Patched areas and/or spalls/delamination exist. The combined area of distress is more than 25% of the total deck area.	Repair deck/slab and place overlay Replace deck/slab

Notes

- *The entire quantity shall be placed in one condition state.*
- *Do not use this element for RC Culverts.*
- *The condition of the deck area within $^1/_2$ meter of all joints should be recorded as part of the joint element.*
- *Only rate the TOP or WEARING SURFACE for spalls and delaminating concrete.*
- *Deck cracking and soffit cracking and/or spalling are tracked as Smart Flag Elements 358 and 359, respectively.*
- *A patch is considered a repair of a concrete deck/slab with AC or other nonsuitable patching material. A sound concrete patch repair should not downgrade the Condition State of the deck/slab..*
- *The condition state of the deck/slab should not be upgraded when a methacrylate treatment is applied with out spall and/or delamination repairs.*

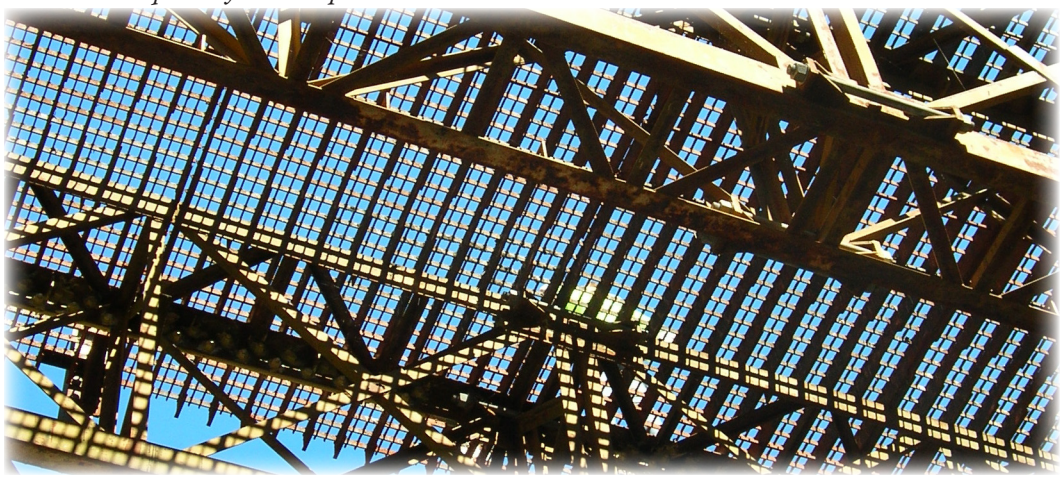
Open Grid Steel Deck (m^2) 28

This element defines those bridge decks that are constructed of steel grids that are open and unfilled.

Condition	Description	Feasible Action
1	There is no corrosion. The paint system, if any, is sound. The connectors (welds, rivets, etc.) are sound.	Do Nothing
2	There is little or no corrosion. The paint system, if any, may be showing early signs of distress. The connectors are still sound. The combined distressed area is 2% or less of the deck area.	Do Nothing
3	Surface or freckled rust has formed. The paint system is no longer fully effective. There is no loss of section. The connectors may be starting to show signs of distress—cracked welds or broken rivets. The combined area of distress is more than 2% but less than 10% of the total deck area.	Do Nothing Surface clean and restore top coat Rehab connectors
4	Corrosion is moderate. Surface pitting may be present but any section loss is incidental. Numerous connectors are failing at scattered locations. The strength or serviceability of the section is not yet affected. The combined area of distress is more than 10% but less than 25% of the total deck area.	Do Nothing Spot blast, clean and paint Rehab connectors
5	Corrosion is advanced. Numerous connectors have failed. Section loss and/or connectivity is sufficient to warrant analysis to ascertain the impact on the ultimate strength and/or serviceability of either the element or the bridge.	Rehab connectors and replace paint system Replace Element

Notes

- *The entire quantity shall be placed in one condition state.*



29 Concrete Filled Grid Steel Deck (m^2)

This element defines those bridge decks that are constructed of steel grids with either all of the openings or just those in the wheel tracks filled with concrete.

Condition	Description	Feasible Action
1	There is no corrosion. The paint system, if any, is sound. The connectors (welds, rivets, etc.) are sound. The concrete filler is sound.	Do Nothing
2	There is little or no corrosion. The paint system, if any, may be showing early signs of distress. The connectors are still sound. The concrete filler is sound. The combined distressed area is 2% or less of the deck area.	Do Nothing Surface clean
3	Surface or freckled rust has formed. The paint system is no longer fully effective. There is no loss of section. The connectors may be starting to show signs of distress cracked welds or broken rivets. The concrete filler may have broken out at scattered locations. The combined area of distress is more than 2% but less than 10% of the total deck area.	Do Nothing Surface clean and restore top coat Rehab connectors and concrete filler
4	Surface or freckled rust has formed. The paint system is no longer fully effective. There is no loss of section. Numerous connectors are failing at scattered locations. Small areas of concrete are missing. The combined area of distress is more than 10% but less than 25% of the total deck area.	Do Nothing Spot blast, clean and paint Rehab connectors and concrete filler
5	Corrosion is advanced. Numerous connectors have failed. Section loss and/or connectivity is sufficient to warrant analysis to ascertain the impact on the ultimate strength and/or serviceability of either the element or the bridge.	Rehab connectors and concrete filler Replace Element Much of the concrete filler is missing.

Notes

- *The entire quantity shall be placed in one condition state.*

Corrugated/Orthotropic Deck (m^2) 30

This element defines those bridge decks that are constructed of corrugated metal filled with Portland Cement Concrete, asphaltic concrete, or other material. This element includes orthotropic steel decks.

Condition	Description	Feasible Action
1	There is no evidence of corrosion and any protective systems are sound and functioning as intended to protect the metal surface. The surfacing, if any, on the deck has no repaired areas and there are no potholes.	Do Nothing
2	There is little or no active corrosion. Surface or freckle rust has formed or is forming. The protective system may be chalking, peeling, curling, or showing other early evidence of paint system distress, but there is no exposure of metal. Minor cracking or potholes may exist in the surfacing. The combined distressed area is 2% or less of the deck area.	Do Nothing Repair potholes
3	Surface or freckle rust is prevalent. There may be exposed metal but there is no active corrosion which is causing loss of section. Potholes exist in the surfacing and there may be significant cracking. The combined area of distress is more than 2% but less than 10% of the total deck area	Do Nothing Repair potholes
4	Corrosion may be present but any section loss due to active corrosion does not yet warrant structural analysis of either the element or the bridge. Potholes may be large and expose the metal decking. The combined area of distress is more than 10% but less than 25% of the total deck area.	Do Nothing Repair potholes Rehab deck
5	Corrosion has caused section loss and is sufficient to warrant structural analysis to ascertain the impact on the ultimate strength and/or serviceability of either the element or the bridge. The surfacing has failed.	Rehab deck Replace deck

Notes

- *The entire quantity shall be placed in one condition state.*
- *This element is intended for steel corrugated decks with an asphalt or concrete riding surface*
- *This element is not intended for steel corrugated stay-in-place deck forms.*
- *Protective systems may consist of paint, galvanizing, etc...*
- *Use this element for steel plates (bare or overlaid) and with railroad car frames (Element 170) consisting of a steel plate type deck.*

31 Timber Deck Bare (m^2)

This element defines those bridge decks that are constructed of timber and are not overlaid.

Condition	Description	Feasible Action
1	Investigation indicates no decay. There may be cracks, splits and checks having no effect on strength or serviceability.	Do Nothing
2	Decay, insect infestation, abrasion, splitting, cracking or crushing may exist but none is sufficiently advanced to affect serviceability or strength of the element.	Do Nothing Add wearing surface to protect deck
3	Decay, insect infestation, abrasion, splitting cracking or crushing has produced loss of strength or deflection of the element but not of sufficient magnitude to affect the serviceability of the bridge.	Do Nothing Add wearing surface to protect deck Replace deteriorated timbers
4	Advanced deterioration. Decay, insect infestation, abrasion, splits, cracks or crushing has produced loss of strength or deflection that affects the serviceability of the bridge.	Replace deteriorated timbers Replace deck

Notes

- *The entire quantity shall be placed in one condition state.*
- *For timber decks without wheel runners the wheel line wear should be recorded as follows:*
  State 1 – No wheel line wear.
  State 2 – Wheel line wear is present but not significant.
  State 3 – Wheel line wear has worn 12 mm or deeper but does not effect serviceability.
  State 4 – Wheel line wear warrants analysis for member strength for traffic safety..

Timber Deck with AC Overlay (m^2) 32

This element defines those bridge decks that are constructed of timber and are overlaid with asphaltic concrete.

Condition	Description	Feasible Action
1	Investigation indicates no decay. There may be cracks, splits and checks having no effect on strength or serviceability. There are no potholes in the surfacing.	Do Nothing
2	Decay, insect infestation, splitting, cracking or crushing may exist but none is sufficiently advanced to affect strength or serviceability of the element. There may be minor potholes deteriorated or impending potholes in the surfacing.	Do Nothing Repair potholes Remove AC overlay, repair timber, and repave
3	Decay, insect infestation, splitting cracking or crushing has produced loss of strength or deflection of the element but not deteriorated of sufficient magnitude to affect the serviceability of the bridge. There may be major potholes or impending potholes in the surfacing.	Do Nothing Remove AC overlay, repair timber, and repave Replace deck and AC overlay
4	Advanced deterioration. Decay, insect infestation, splits, deteriorated cracks or crushing has produced loss of strength or deflection that affects the serviceability of the bridge.	Remove AC overlay, repair timber, and repave Replace deck and surfacing

Notes

- *The entire quantity shall be placed in one condition state.*

54 Timber Slab Bare (m^2)

This element defines those slab span bridges that are constructed of timber and are not overlaid.

Condition	Description	Feasible Action
1	Investigation indicates no decay. There may be cracks, splits and checks having no effect on strength or serviceability.	Do Nothing
2	Decay, insect infestation, abrasion, splitting, cracking or crushing may exist but none is sufficiently advanced to affect serviceability or strength of the element.	Do Nothing Rehab and/or protect slab
3	Decay, insect infestation, abrasion, splitting cracking or crushing has produced loss of strength or deflection of the element but not of sufficient magnitude to affect the serviceability of the bridge.	Do Nothing Rehab slab Replace slab
4	Advanced deterioration. Decay, insect infestation, splits, cracks or crushing has produced loss of strength or deflection that affects the serviceability of the bridge.	Replace slab

Notes

- *The entire quantity shall be placed in one condition state.*
- *Use this element for manufactured glue-lam slabs.*

Timber Slab – with AC Overlay (m^2) 55

This element defines those slab span bridges that are constructed of timber and are overlaid with asphaltic concrete.

Condition	Description	Feasible Action
1	Investigation indicates no decay. There may be cracks, splits and checks having no effect on strength or serviceability. There are no potholes in the surfacing.	Do Nothing
2	Decay, insect infestation, splitting, cracking or crushing may exist but none is sufficiently advanced to affect strength or serviceability of the element. There may be minor potholes or impending potholes in the surfacing.	Do Nothing Repair potholes Rehab and/or protect Element
3	Decay, insect infestation, splitting cracking or crushing has produced loss of strength or deflection of the element but not of sufficient magnitude to affect the serviceability of the bridge. There may be major potholes or impending potholes in the surfacing.	Do Nothing Rehab slab and repair or replace surfacing Replace slab and surfacing
4	Advanced deterioration. Decay, insect infestation, splits, cracks or crushing has produced loss of strength that affects the serviceability of the bridge.	Replace slab and surfacing

Notes

- *The entire quantity shall be placed in one condition state.*
- *This element is intended for use with manufactured glue-lam slabs.*

60 Prestressed Concrete Slab Bare (m^2)

These elements define those prestressed concrete bridge decks/slabs with no surface protection of any type and constructed with uncoated reinforcement.

Condition	Description	Feasible Action
1	The surface of the slab has no patched areas and there are no spalls/delamination in the slab surface.	Do Nothing Add a protective system
2	Patched areas and/or spalls/delamination exist in the slab surface. The combined distressed area is 2% or less of the slab area.	Do Nothing Add a protective system Repair spalled/delaminated areas
3	Patched areas and/or spalls/delamination exist in the slab surface. The combined area of distress is more than 2% but less than 10% of the total slab area.	Do Nothing Repair spalls and delamination Repair slab and place overlay
4	Patched areas and/or spalls/delamination exist in the slab surface. The combined area of distress is more than 10% but less than 25% of the total slab area.	Do Nothing Repair slab and place overlay Replace slab
5	Patched areas and/or spalls/delamination exist. The combined area of distress is more than 25% of the total slab area.	Repair slab and place overlay Replace slab

Notes

- *The entire quantity shall be placed in one condition state.*
- *The condition of the slab area within $^1/_2$ meter of all joints should be recorded as part of the joint element.*
- *Only rate the TOP or WEARING SURFACE for spalls and delaminating concrete.*
- *Deck cracking and soffit cracking and/or spalling are tracked as Smart Flag Elements 358 and 359, respectively.*
- *A patch is considered a repair of a concrete deck/slab with AC or other nonsuitable patching material. A sound concrete patch repair should not downgrade the Condition State of the deck/slab..*
- *A methacrylate treatment should not improve the Condition States of this element.*

Prestressed Concrete Slab – Unprotected with AC Overlay (m^2) 61

These elements define those prestressed concrete bridge decks/slabs with no surface protection of any type. The slab is covered with an asphaltic concrete overlay.

Condition	Description	Feasible Action
1	The surfacing on the slab has no patched areas and there are no potholes in this surfacing.	Do Nothing
2	Patched areas and/or potholes or impending potholes exist. Their combined area is less than 2% the total slab area.	Do Nothing Repair potholes and substrate Repair substrate and replace overlay
3	Patched areas and/or potholes or impending potholes exist. Their combined area is more than 2% but less than 10% of the total slab area.	Do Nothing Repair potholes and substrate Repair substrate and replace overlay
4	Patched areas and/or potholes or impending potholes exist. Their combined area is more than 10% but less than 25% of the total slab area.	Do Nothing Repair potholes and substrate Repair substrate and replace overlay
5	Patched areas and/or potholes or impending potholes exist. Their combined area is more than 25% of the total slab area.	Repair substrate and replace overlay Replace slab

Notes

- *The entire quantity shall be placed in one condition state.*
- *The condition of the slab area within $^1/_2$ meter of all joints should be recorded as part of the joint element.*
- *Only rate the TOP or WEARING SURFACE for spalls and delaminating concrete.*
- *Soffit cracking and/or spalling is tracked as Smart Flag Element 359.*
- *A Deck Cracking SMART Flag Element 358 that existed prior to an AC overlay or added following an AC remove and replace inspection, should remain.*

146 Uncoated Cable (Not Embedded in Concrete) (EA)

This element defines only those uncoated steel cables not embedded in concrete.

Condition	Description	Feasible Action
1	There is little or no corrosion of uncoated steel. Strand and anchor sockets show no signs of distress.	Do Nothing
2	Surface or freckled rust has formed or is forming. Strand and anchor sockets show no signs of distress.	Do Nothing Clean and coat
3	Corrosion may be present but any section loss is incidental and does not affect the strength or serviceability of either the element or the bridge. Cable banding, if any, may show some loosening or slipping. Cable anchor devices may be loosening.	Do Nothing Clean and coat
4	Corrosion is advanced. Cable strands or wires may be broken or severely abraded. Anchors may show signs of slippage. Section loss or other deterioration is sufficient to warrant analysis for strength and/or serviceability of both the element and the bridge.	Rehab Element and coat Replace Element

Notes

- *Count each catenary cable and each main suspension cable or cable stay.*
- *This element **should not** be used for seismic restrainer cables (see Elements 180 -182).*
- *This element **should** be used for steel girder post-tensioning cables.*
- *For coated cables use Element 147.*

Coated Cable (Not Embedded in Concrete) (EA) 147

This element defines only those coated steel cables not embedded in concrete.

Condition	Description	Feasible Action
1	There is little or no evidence of active corrosion. Protective coating is sound and functioning as intended to protect the metal surface. Strand-and anchor sockets show no signs of distress.	Do Nothing
2	There is little or no evidence of active corrosion. Surface or freckled rust has formed or is forming. The protective coating may be peeling, chalking, curling or showing other early evidence of distress, but there is no exposure of metal. Strand and anchor sockets show no signs of distress.	Do Nothing Clean and restore coating
3	Surface or freckled rust is prevalent. There may be exposed metal, but there is no active corrosion which is causing loss of section. Protective system is no longer effective. Strand and anchor sockets show no signs of distress.	Do Nothing Clean and restore coating
4	Corrosion may be present, but any section loss is incidental and does not affect the strength or serviceability of either the element or the bridge. Cable banding, if any, may show some loosening or slippage. Cable anchor devices may be loosening.	Do Nothing Clean and coat
5	Corrosion is advanced. Cable strands or wires may be broken or or severely abraded. Anchors may show signs of slippage. Section loss or other deterioration is sufficient to warrant analysis for strength and/or serviceability of both the element and the bridge.	Rehab Element and replace coating system Replace Element

Notes

- *Count each catenary cable and each main suspension cable or cable stay.*
- *This element **should not** be used for seismic restrainer cables (see Elements 180 -182).*
- *This element **should** be used for steel girder post-tensioning cables.*

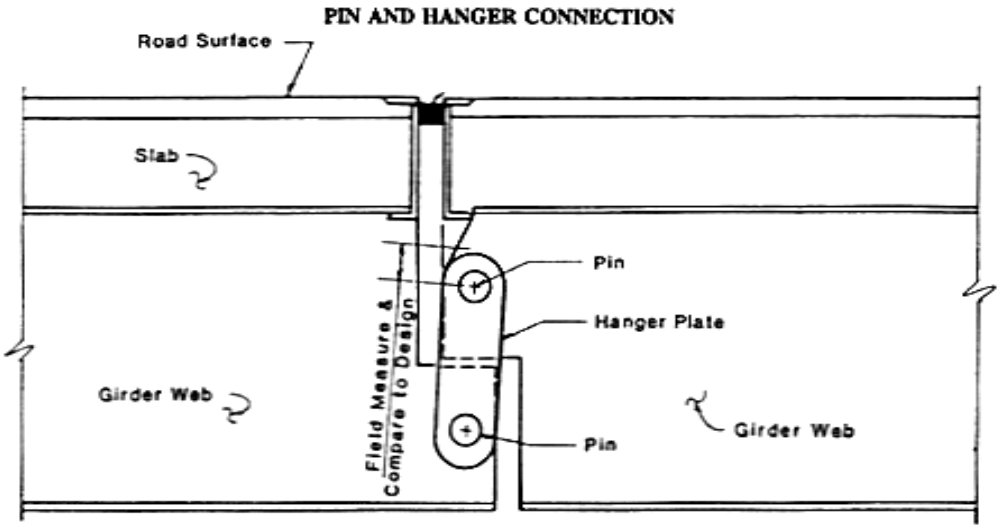
160 Unpainted Steel Pin and Hanger Assembly (EA)

This element defines only those steel pin and hanger assemblies that are either not painted or are constructed of weathering steel.

Condition	Description	Feasible Action
1	There is little or no corrosion of the unpainted steel. The weathering steel is coating uniformly and remains in excellent condition. Oxide film is tightly adhered.	Do Nothing
2	Surface rust; or surface pitting, has formed or is forming on the unpainted steel. The weathering steel has not corroded beyond design limits. Weathering steel color is yellow orange to light brown. Oxide film has a dusty to granular texture.	Do Nothing Clean and paint
3	Steel has measurable section loss due to corrosion but does not warrant structural analysis. Weathering steel is dark brown or black. Oxide film is flaking.	Do Nothing Clean and paint
4	Corrosion is advanced. Section loss is sufficient to warrant structural analysis to ascertain the impact on the ultimate strength and/or serviceability of either the element or the bridge.	Rehab element Replace Element

Notes

- *Indications of distress found using ultrasonic testing would typically place the assembly in Condition State 4.*
- *The ELI quantities should consist of each Pin and Hanger Connection/Assembly as shown below (i.e., a quantity of 1 per Girder for each hinge location).*
- *If painted use Element 161.*



Painted Steel Pin and Hanger Assembly (EA) 161

This element defines only those steel pin and hanger assemblies that are painted.

Condition	Description	Feasible Action
1	There is no evidence of active corrosion and the paint system is sound and functioning as intended to protect the metal surface.	Do Nothing
2	There is little or no active corrosion. Surface or freckled rust has formed or is forming. The paint system may be chalking, peeling, curling or showing other early evidence of paint system distress but there is no exposure of metal.	Do Nothing Spot blast, clean, and paint Repaint assembly
3	Surface or freckled rust is prevalent. There may be exposed metal but there is no active corrosion which is causing loss of section.	Do Nothing Spot blast, clean and paint
4	Corrosion may be present but any section loss due to active corrosion does not yet warrant structural analysis of either the element or the bridge.	Do Nothing Spot blast, clean, and paint Repaint assembly
5	Corrosion has caused section loss and is sufficient to warrant structural analysis to ascertain the impact on the ultimate strength and/or serviceability of either the element or the bridge.	Rehab Element Replace Element

Notes

- *Indications of distress found using ultrasonic testing would typically place the assembly in Condition State 5.*
- *The ELI quantities should consist of each Pin and Hanger Connection/Assembly as shown below (i.e., a quantity of 1 per Girder for each hinge location).*

170 Railroad Car Frame (EA)

This element is intended to be used for all superstructures composed of railroad car frames.

Condition	Description	Feasible Action
1	There is no evidence of corrosion and any paint systems are sound and functioning as intended to protect the metal surface.	Do Nothing
2	There is corrosion. Paint systems, if present, may be showing signs of distress. The total superstructure area in this state of distress is less than 10% of the total superstructure area.	Do Nothing Surface clean and restore top coat of paint
3	There is corrosion. Paint systems, if present, may be showing signs of distress. The total superstructure area in this state of distress is more than 10% but less than 25% of the total superstructure area.	Do Nothing Surface clean and restore top coat of paint
4	There is corrosion. Paint systems, if present, may be showing signs of distress. The total superstructure area in this state of distress is more than 25% of the total superstructure area.	Do Nothing Surface clean and restore top coat of paint
5	Corrosion is advanced. Section loss in any portion of the element is sufficient to warrant analysis to ascertain the impact on the ultimate strength and/or serviceability of either the element or the bridge.	Replace Element

Notes

- Railroad car frames shall be recorded as quantity 1 EA for bridges constructed with multiple railroad car frames (i.e., multiply spans, in parallel...etc).
- *A Steel Fatigue Smart Flag (Element 356) should be used when cracks are observed.*
- *A Steel Section Loss Smart Flag (Element 363) should be used when section loss is observed.*
- *Use an Orthotropic Deck (Element 30) for railroad cars with a steel plate type deck.*

Miscellaneous Steel Superstructures (EA) 171

This element is intended to be used for all other miscellaneous steel superstructure elements that were not previously defined. Example of such structures are army steel tread way, boat hatch cover, army steel pontoon, etc. The entire superstructure area (equivalent deck area) composed of these miscellaneous elements will be treated as an each regardless of the number of spans.

Condition	Description	Feasible Action
1	There is no evidence of corrosion and any paint systems are sound and functioning as intended to protect the metal surface.	Do Nothing
2	There is corrosion. Paint systems, if present, may be showing signs of distress. The total superstructure area in this state of distress is less than 10% of the total superstructure area.	Do Nothing Surface clean and restore top coat of paint
3	There is corrosion. Paint systems, if present, may be showing signs of distress. The total superstructure area in this state of distress is more than 10% but less than 25% of the total superstructure area.	Do Nothing Surface clean and restore top coat of paint
4	There is corrosion. Paint systems, if present, may be showing signs of distress. The total superstructure area in this state of distress is more than 25% of the total superstructure area.	Do Nothing Surface clean and restore top coat of paint
5	Corrosion is advanced. Section loss in any portion of the element is sufficient to warrant analysis to ascertain the impact on the ultimate strength and/or serviceability of either the element or the bridge.	Replace Element

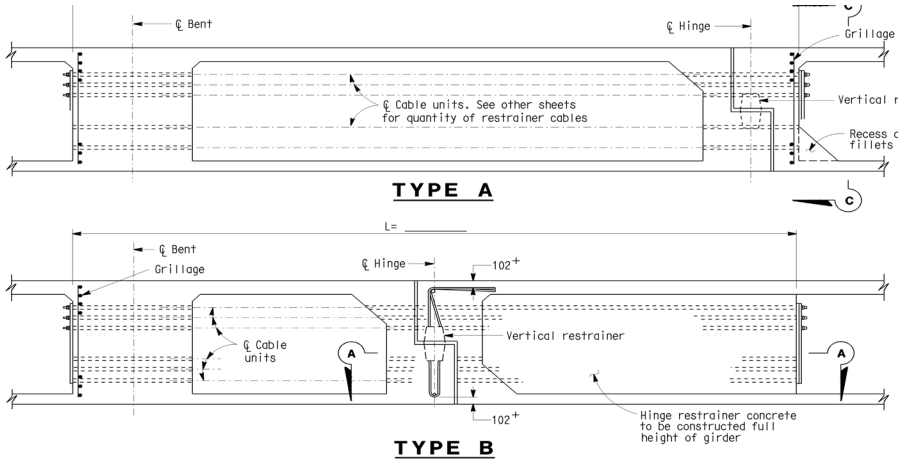
180 Seismic Restrainers (EA)

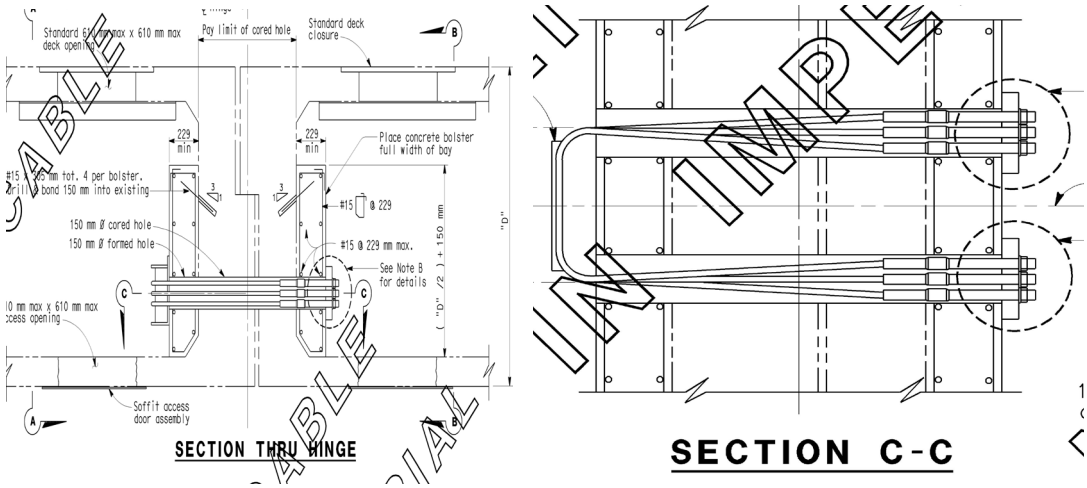
181

182

Element Number	Description
180	**Seismic Restrainer Type II (EA)** This element defines restrainer cables used for hinges with long hinge seats and occasionally in combination with pipe seat extenders. The standard length varies from fifteen to forty feet and the restrainer system at a hinge may consist of six to twelve cables.
181	**Seismic Restrainer C-1 (EA)** This element defines restrainer cables used for hinges with short hinge seats (< 9 inches). The current standard number of cables per drum is five. The original systems consisted of seven cables per drum.
182	**Seismic Restrainer Other (EA)** This element defines restrainer cable systems that are not Type II or C-1 restrainer cable systems.

Details of Type II Restrainer Cable System:





Details of C-1 Restrainer Cable System:

Seismic Restrainers (EA)

180

181

182

Condition	Description	Feasible Action
1	There is little or no corrosion of the metal and the galvanizing is sound and functional and installed as designed.	Do Nothing
2	Surface or freckled rust has formed or is forming. If a protective coating is present, the coating has minor areas of deterioration. Less than 20% of the restraint system is set improperly (excessive slack or tightness).	Do Nothing Clean and apply protective system Reset cables
3	Any protective coating has failed. Surface pitting may be present. Between 20% to 50% of the restraint system is set improperly (excessive slack or tightness).	Do Nothing Replace cables with corrosive resistance system Reset cables
4	Corrosion is advanced. Section loss is sufficient to warrant analysis to ascertain the impact on the ultimate strength and/or serviceability of the element. More than 50% of the restraint system is set improperly. Broken cables or excessive slack or tightness.	Replace cables with corrosive resistance system Reset cables

Notes

- *The element should be in Condition State 1 if not visible.*
- *Use a quantity of one per bent with restrainers.*
- *For box girders with a hinge, the as-built plans should be checked for type of restrainer and recorded accordingly.*

Examples of other Seismic Restrainer Cable System

240 Metal Culvert (m)

This element defines all metal (steel, aluminum, galvanized) culverts, including arches, round or elliptical pipes, etc.

Condition	Description	Feasible Action
1	The culvert shows little or no deterioration. Some discoloration or surface corrosion may exist but there is no metal pitting. There is little or no deterioration or separation of seams.	Do Nothing
2	There may be minor to moderate corrosion and pitting, especially at the barrel invert. Little or no distortion exists. There may be minor deterioration and/or separation of seams. Minor loss of fill material.	Do Nothing Rehab culvert
3	Significant corrosion, deep pitting or some holes in the invert, minor cracking or abrasion of the metal may exist. There may be considerable deterioration and/or separation of seams. Significant loss of fill material.	Do Nothing Rehab culvert
4	Major corrosion, extreme pitting or holes in the barrel may exist. Major distortion, deflection, or settlement may be evident. Major cracking or abrasion of the metal may exist. Major separation of seams may have occurred.	Replace culvert

Notes

- *This element includes galvanized metal culverts.*
- *Measurements are along the barrel length.*

Reinforced Concrete Culvert (m) 241

This element defines all precast and cast-in-place (conventional or prestressed) concrete arch, pipe and box culverts.

Condition	Description	Feasible Action
1	Superficial cracks and spalls may be present, but there is no exposed reinforcing or evidence of rebar corrosion. There is little or no deterioration or separation of joints.	Do Nothing
2	Deterioration, minor chloride contamination, minor abrasion, and minor cracking and/or leaching may have begun. There may be deterioration and separation of joints.	Do Nothing Seal cracks and/or patch
3	There may be moderate to major deterioration, abrasion, extensive cracking and/or leaching and large areas of spalls. Minor to moderate distortion, settlement, or misalignment may have occurred. There may be considerable deterioration and separation of joints.	Do Nothing Seal cracks and/or patch Rehab culvert
4	Major deterioration, abrasion, spalling, cracking, major distortion, deflection settlement, or misalignment of the barrel may be in evidence. Major separation of joints may have occurred. Holes may exist in floors and walls.	Rehab culvert Replace culvert

Notes

- *Measurements are along the barrel length.*
- *See Appendix B for culvert quantity conventions.*
- *A Deck Element, Deck and Soffit Cracking SMART Flags ares not used with this element.*

242 Timber Culvert (m)

This element defines all timber box culverts.

Condition	Description	Feasible Action
1	The timber and fasteners are in sound condition.	Do Nothing
2	There may be minor decay and weathering. Corrosion at fasteners and connections may have begun. There is little or no distortion and/or deflection.	Do Nothing Repair culvert
3	There may be significant decay, weathering and warped or broken timbers. Significant decay and corrosion at fasteners and connections may be evident. Minor to moderate distortion of the culvert may exist.	Do Nothing Rehab culvert
4	There may be major decay and many warped, broken or missing timbers. There is major decay and corrosion at fasteners and connections. Major distortion or deflection of the culvert may exist.	Rehab culvert Replace culvert

Notes

- *Measurements are along the barrel length.*
- *See Appendix B for culvert quantity conventions.*

Other Culvert (m) 243

This element defines all culverts not included under steel, concrete or timber culverts. It will include masonry and combinations of other materials.

Condition	Description	Feasible Action
1	There is little or no deterioration. Surface defects only are in evidence. There are no scour or misalignment problems.	Do Nothing
2	There may be minor deterioration, abrasion, cracking and misalignment.	Do Nothing Repair culvert
3	Moderate to major deterioration, abrasion, cracking and/or minor to moderate distortion or deflection has occurred.	Do Nothing Repair culvert
4	Major cracking, abrasion, distortion, deflection, settlement or misalignment and/or major deterioration affecting structural integrity may have occurred	Rehab culvert Replace culvert

Notes

- *This element includes masonry culverts.*
- *Measurements are along the barrel length.*
- *See Appendix B for culvert quantity conventions.*

250 Tunnel (m)

This element should be used to define bored tunnels not cut-and-cover type tunnels.

Condition	Description	Feasible Action
1	The element shows little or no signs of deterioration. There may be minor cracking, corrosion and/or other minor deterioration having no effect on strength or serviceability.	Do Nothing
2	Minor cracking, spalls, or corrosion may be present and should be repaired to prevent further deterioration that could jeopardize the structural integrity of the element.	Do Nothing Repair Element
3	Advanced deterioration. Corrosion or loss of section is sufficient to warrant analysis to ascertain the impact on the serviceability or strength of the element.	Rehab Element Replace Element

Notes

- *This element should be used for box culverts not designed to carry water.*
- *For a cut-and-cover type tunnel use appropriate superstructure and abutment elements.*
- *Measurements are along the tunnel length.*

Do not use Tunnel element for cut-and-cover type tunnels

Use this Tunnel element only for bored and lined type tunnels

Steel Shell Foundation Pile Filled with Concrete (EA) 251

This element is intended to be used for submerged piles and pile extensions filled with concrete.

Condition	Description	Feasible Action
1	There is no evidence of corrosion and the paint system is sound and functioning as intended to protect the metal surface.	Do Nothing Surface clean Element
2	There is little or no corrosion. The paint system may be chalking, peeling, curling or showing other early evidence of paint system distress but there is no exposure of metal.	Do Nothing Surface clean Surface clean and restore top coat
3	Surface or freckled rust has formed or is forming. The paint system is no longer effective. There may be exposed metal but there is no loss of section.	Do Nothing Spot blast, clean and paint
4	The paint system has failed. Surface pitting may be present but any section loss is incidental and does not yet affect the strength or serviceability of either the element or the bridge. bridge. Small seam weld cracks may be present but are less than 12 mm in length.	Do Nothing Spot blast, clean and paint Replace paint system
5	Corrosion is advanced. Section loss is sufficient to warrant analysis to ascertain the impact on the ultimate strength and/or serviceability of either the element or the bridge.	Rehab and replace paint system Replace Element

Notes

- This element should be used for Raymond step taper piles.
- For steel pile extensions use Elements 201 or 202. Use element 254 or 255 for seismic steel column jackets.
- *See Appendix C for Column and Pile Element Guidelines.*

254 Steel Seismic Column Shells (Full Height) (EA)

Condition	Description	Feasible Action
1	There is no evidence of active corrosion and the paint system is sound and functioning as intended to protect the metal surface.	Do Nothing Surface clean
2	There is little or no active corrosion. The paint system may be chalking, peeling, curling or showing other early evidence of paint system distress but there is no exposure of metal. All welds are intact.	Do Nothing Surface clean Surface clean and restore top coat
3	Surface or freckled rust has formed or is forming. The paint system is no longer effective. There may be exposed metal but there is no active corrosion which is causing loss of section. Seam welds are intact.	Do Nothing Spot blast, clean and paint
4	The paint system has failed. Surface pitting may be present but any section loss is due to active corrosion does not yet warrant structural analysis of either the element or the bridge. Small seam weld cracks may be present but are less than 12 mm in length.	Do Nothing Spot blast, clean and paint Replace paint system
5	Corrosion has caused section loss and is sufficient to warrant analysis to ascertain the impact on the ultimate strength and/or serviceability of either the element or the bridge. Seam weld cracks exceed 12 mm.	Major rehab Element Replace Element

Notes

- *Columns with full height shells* will not *use an associated column element 204, 205, 210 or 211.*

Steel Seismic Column Shells (Partial Height) (EA) 255

Condition	Description	Feasible Action
1	There is no evidence of active corrosion and the paint system is sound and functioning as intended to protect the metal surface.	Do Nothing Surface clean
2	There is little or no active corrosion. The paint system may be chalking, peeling, curling or showing other early evidence of paint system distress but there is no exposure of metal. All welds are intact.	Do Nothing Surface clean Surface clean and restore top coat
3	Surface or freckled rust has formed or is forming. The paint system is no longer effective. There may be exposed metal but there is no active corrosion which is causing loss of section. Seam welds are intact.	Do Nothing Spot blast, clean and paint
4	The paint system has failed. Surface pitting may be present but any section loss is due to active corrosion does not yet warrant structural analysis of either the element or the bridge. Small seam weld cracks may be present but are less than 12 mm in length.	Do Nothing Spot blast, clean and paint Replace paint system
5	Corrosion has caused section loss and is sufficient to warrant analysis to ascertain the impact on the ultimate strength and/or serviceability of either the element or the bridge. Seam weld cracks exceed 12 mm.	Major rehab Element Replace Element

Notes

- *Record the condition state of the visible portion of the column as the appropriate column element 204, 205, 210 or 211 in addition to the partial shell element.*

256 Slope Protection (EA)

This element identifies all types of slope protection under the bridge; including grouted or ungrouted riprap and concrete paving which provides erosion protection under the bridge.

Condition	Description	Feasible Action
1	Little or no deterioration of the concrete or breakdown of the asphalt aggregate surfacing. No undermining of slabs. The erosion control system is functioning properly.	Do Nothing
2	Some undermining or settlement of protection, some areas of concrete spalling or minor amounts of erosion and breakdown of aggregate and asphalt surfacing. The erosion control system is marginally effective.	Do Nothing Repair protection
3	Major undermining and/or settlement of protection, major erosion areas, concrete broken up or with major spalls. The effectiveness of the erosion control system is highly questionable.	Rehab Element Replace Element

Notes

- *Record the one each for each location protected.*
- *This element is not for use with continuously lined channels.*
- *This element accounts for scour of the slope protection. Only use a SMART Scour Flag if the substructure is affected by the scour.*

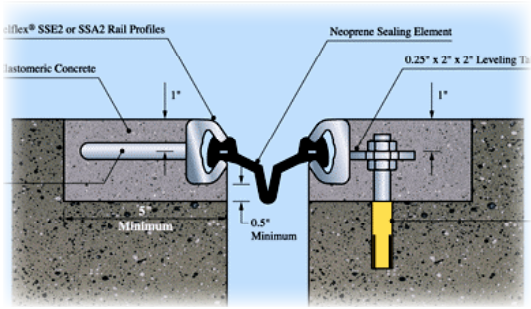
Strip Seal Expansion Joint (m) 300

This element defines only those expansion joint devices which utilize a neoprene type water-proof gland with steel extrusion to anchor the gland.

Condition	Description	Feasible Action
1	The element shows minimal deterioration. There is no leakage at any point along the joint. Gland is secure and has no defects. Debris in joint is not causing any problems. The adjacent deck and/or header is sound.	Do Nothing
2	Signs of seepage along the joint may be present. The seal may be punctured, ripped, or partially pulled out of the extrusion. Minor spalls in the deck and/or header may be present adjacent to the joint.	Do Nothing Replace gland and/or patch concrete
3	Signs of leakage along the joint is present. The gland may have failed from abrasion or tearing. The gland has pulled out of the extrusion. Major spalls may be present in the deck and/or header adjacent to the joint.	Replace gland and/or patch concrete Replace joint

Notes

- *Approach slab expansion joints are included in this element.*
- *See Appendix B to account for "skew".*
- *The condition of the deck area within $^1/_2$ meter of all joints should be included as part of the joint condition.*



JOINTS

301 Pourable Joint Seal (m)

This element defines only those joints filled with a pourable seal.

Condition	Description	Feasible Action
1	The element shows minimal deterioration. Adhesion is sound with no signs of leakage. There are no cohesion cracks. The adjacent deck and/or header is sound.	Do Nothing
2	Minor adhesion and/or cohesion failures may be present. Signs of seepage along the joint may be present. Joint may be slightly impacted with debris. Minor spalls in deck and/or headers may be present adjacent to joint.	Do Nothing Clean joint and replace seals
3	Major Adhesion and/or cohesion failures are present. Joint may be heavily impacted with debris and/or stones. Major spalls may be present in the deck and/or header adjacent to the joint.	Clean joint, patch spalls, and replace seals

Notes

- *Include approach slab expansion joints adjacent to the abutment.*
- *See Appendix B to account for "skew"*
- *The condition of the deck area within 1/2 meter of all joints should be included as part of the joint condition.*

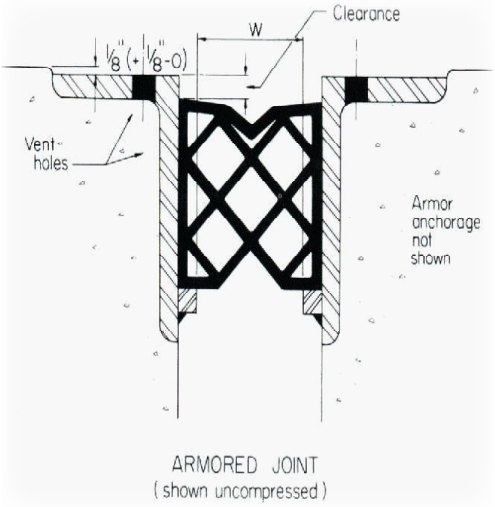
Compression Joint Seal (m) 302

This element defines only those joints filled with a pre-formed compression type seal.

Condition	Description	Feasible Action
1	The element shows minimal deterioration. Adhesion is sound with no signs of leakage. There are no cohesion cracks. The adjacent deck and/or header is sound. If joint is armored, there are no signs of anchorage looseness.	Do Nothing
2	Signs of seepage along the joint may be present. The seal may show signs of abrasion or minor tearing. Significant debris is in all or part of the joint. Minor spalls in the deck and/or headers may be present adjacent to the joint. If joint is armored, the anchorage may be loose.	Do Nothing Clean joint and replace seals
3	Major adhesion failures may be present. The gland may have failed from abrasion, tearing, or gaped. Signs or observance of leakage along the joint may be present. Major spalls may be present in the deck and/or header adjacent to the joint. If joint is armored, the anchorage has failed.	Clean joint, patch spalls, and replace seals

Notes

- *Include approach slab expansion joints adjacent to the abutment.*
- *See Appendix B to account for "skew".*
- *The condition of the deck area within 1/2 meter of all joints should be included as part of the joint condition.*
- *If a Type M seal is observed use this element.*



303 Assembly Joint Seal - Modular Type (m)

This element defines only those joints filled with an assembly mechanism that may or may not have a seal. The modular type assembly consists of beams and/or bars installed in the longitudinal direction designed to support the assembly joint.

Condition	Description	Feasible Action
1	The element shows minimal deterioration. The anchors are tight. The adjacent deck is sound. The paint system, if present, is sound and functioning as intended to protect the metal.	Do Nothing
2	The element shows minor deterioration or damage. The paint, system if present, may show some corrosion with slight pitting. There may be minor weld cracking. Minor spalls in the deck and/or header may be present adjacent to the joint. Signs of minor seepage along the joint may be present.	Do Nothing Patch spalls
3	The element shows major deterioration or damage. Corrosion is advanced. The joint anchorage system may be loose or has failed. Major spalls may be present in the deck and/or header adjacent to the joint. Signs of seepage along the joint are present.	Rehab assembly Replace assembly

Notes

- *This element should be used for a Delastiflex DL and Mauer.*
- *Evidences of mechanical failure such as loose or broken springs, bolts, or support bars shall be coded as Condition State 3.*
- *Delamination and fractures should be treated similar to spalling.*
- *Seal leakage should be recorded in Condition State 2 or 3 as appropriate.*
- *The condition of the deck area within 1/2 meter of all joints should be included as part of the joint condition.*

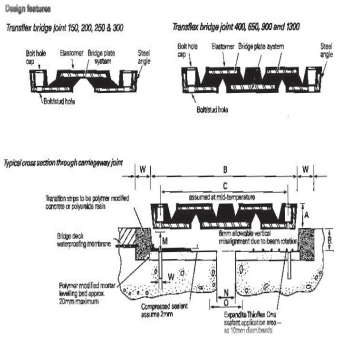
Assembly Joint Seal - Non Modular Type (m) 308

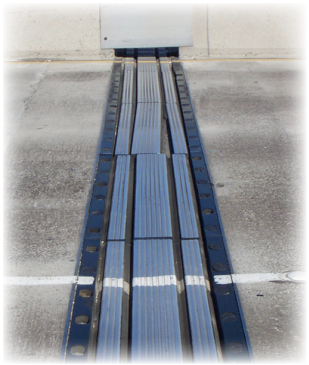
This element defines only those joints filled with an assembly mechanism that may or may not have a seal, for example a plank seal. Use this element for all joint assemblies that are not identified as modular (i.e., Waboflex, Wabo Aluminum Strip, Delastiflex RV (Delastiflex DL is modular type), Aluminum etc...).

Condition	Description	Feasible Action
1	The element shows minimal deterioration. The anchors are tight. There are no broken welds or fingers. The adjacent deck is sound. The paint system, if it is present, is sound and functioning as intended to protect the metal.	Do Nothing
2	The element shows minor deterioration or damage. The paint, system if present, may show some corrosion with slight pitting. There may be minor weld cracking. Minor spalls in the deck and/or header may be present adjacent to the joint. Signs of minor seepage along the joint may be present.	Do Nothing Patch spalls
3	The element shows major deterioration or damage. Corrosion is advanced. The joint anchorage system has failed. Major spalls may be present in the deck and/or header adjacent to the joint. Signs of seepage along the joint are present.	Rehab expansion joint Replace expansion joint

Notes

- *Use Element 349 and 350 for sliding plate joints (sealed or unsealed) and steel finger joints, respectively.*
- *Evidences of mechanical failure such as loose or broken springs, bolts, or support bars shall be coded as Condition State 3.*
- *Delamination and fractures should be treated similar to spalling.*
- *Seal leakage should be recorded in Condition State 2 or 3 as appropriate.*
- *The condition of the deck area within 1/2 meter of all joints should be included as part of the joint condition.*





304 Open Expansion Joints (m)

349

350

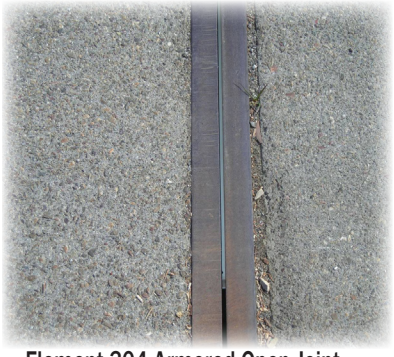
This element defines only those joints that are open and includes steel finger joints, sliding plate type joints that may have a seal, and joints filled with expansion paper or crack filler.

Condition	Description	Feasible Action
1	The element shows minimal deterioration. Joint armor, if present, is secure, and there are no bent, misaligned, or broken fingers. The adjacent deck and/or header is sound.	Do Nothing
2	There may be deck cracking indicating armor anchor loosening. Minor spalls in the deck and/or header may be present adjacent to the joint. There may be corrosion on joint armor steel plates. Bent or misaligned fingers are observed.	Do Nothing Clean joint and/or patch spalls Add a joint seal Rehab
3	There may be advanced corrosion of joint armor or steel plates. Major spalls may be present in the deck and/or header adjacent to the joint. Armor anchors have failed. There are missing or broken fingers.	Rehab Replace

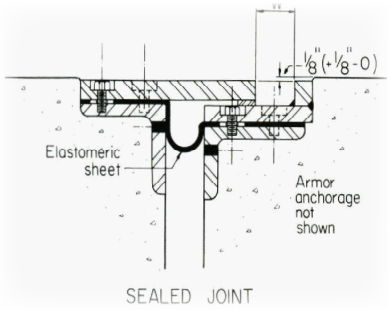
Notes

- *The condition of the deck area within 1/2 meter of all joints should be recorded as part of the joint element.*

Element 304 Open Joint



Element 304 Armored Open Joint



Element 349 - Steel Sliding Plates

Element 350 Steel Finger Joint

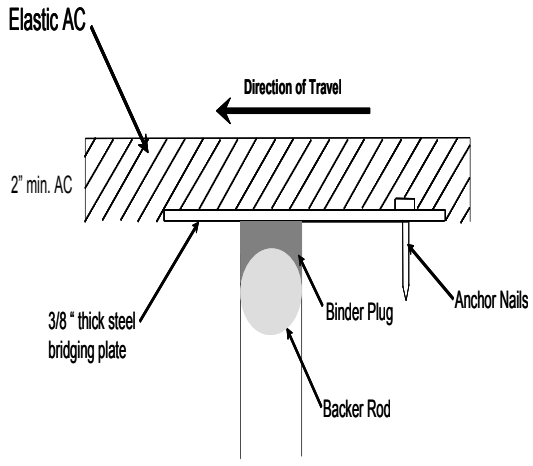
Asphaltic Plug Joint Seal (m) 309

This element defines only those joints with a standard asphaltic plug and shall not be used for joints paved over with a normal AC overlay.

Condition	Description	Feasible Action
1	The element shows minimal deterioration. There are no signs of cracking, spalling, delamination, or leakage. The adjacent deck and/or header is sound.	Do Nothing
2	The element may show minor cracking along the joint. Signs of seepage along the joint may be present. Minor potholes in deck may be present adjacent to joint.	Do Nothing Patch potholes
3	Major depression at joint and/or delamination failures may be present. Signs or observance of leakage along the joint is present. Major potholes may be present in the deck and/or header adjacent to the joint.	Replace asphaltic material Replace

Notes

- *Approach slab expansion joints are included in this element.*
- *See Appendix B to account for "skew"*
- *The condition of the deck area within 1/2 meter of all joints should be recorded as part of the joint element*



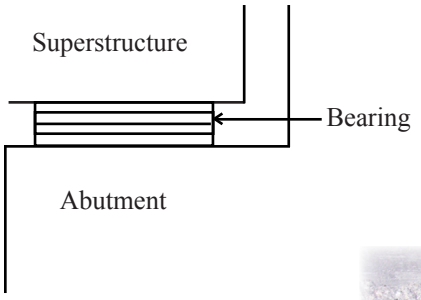
310 Elastomeric Bearing (EA)

This element defines only those bridge bearings that are constructed primarily of elastomers, with or without fabric or metal reinforcement.

Condition	Description	Feasible Action
1	The element shows little or no deterioration. Shear deformations are correct for existing temperatures. (The vertical slope is 0 – 30 degrees.)	Do Nothing
2	Both vertical and horizontal offsets are within the capability of the bearings and are not yet significant. Minor cracking, splitting or other deterioration may be present. Shear deformation may be slightly excessive. Strength and/or serviceability are not affected. (The vertical slope is 30 – 45 degrees.)	Do Nothing Reset bearings
3	Vertical and/or horizontal offsets are significant indicating bearing failures. Advanced deterioration. Shear deformations may be excessive. Top and bottom surfaces may no longer be parallel. Loss of bearing may be imminent. (The vertical slope is greater than 45 degrees.)	Reset bearings Replace bearings

Notes

- *Use Enclosed/Concealed Bearing or Bearing System (Element 312) for elastomeric pads at box girder hinges, abutments, and bents that can not be visually inspected.*



Typical elastomeric pad at an Abutment

Enclosed/Concealed Bearing or Bearing System (EA) 312

This element defines only those bridge bearings that are enclosed so that they are not open for detailed inspection.

Condition	Description	Feasible Action
1	The element shows little or no deterioration. There are no vertical or horizontal offsets. There is no cracking of support members. The supported member is stable under traffic.	Do Nothing
2	Both vertical and horizontal offsets are within the capability of the bearings and are not yet significant. The supported member may exhibit minimal vertical movement under traffic. Cracking of support members is not yet significant. There may be insignificant reduction of bearing due to superstructure shortening.	Do Nothing Rehab bearings
3	Vertical and/or horizontal offsets are significant indicating bearing failures. There may be significant vertical movement under traffic. Cracking of the support members may be significant. There may be significant reduction of bearing due to superstructure shortening.	Rehab bearings Replace bearings

Notes

- *This element should be used for the typical box girder hinge or for bearings at abutments that can not be inspected.*
- *Record each bearing system consisting of the entire bridge width (i.e., quantity would be two for a bridge with 2 hinges).*

311 Moveable Bearing (Roller, Sliding, etc.) (EA)

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

Condition	Description	Feasible Action
1	The element shows little or no deterioration. If a paint system is present, it is sound and functioning as intended to protect the metal. The bearing has minimal debris and corrosion. Vertical and horizontal alignment is within limits. Bearing support member is sound. Any lubrication system is functioning properly. Grout pad is sound.	Do Nothing
2	The paint system, if present, may show moderate to heavy corrosion with minor pitting but still functions as intended. The assemblies may have moved enough to cause minor cracking in the supporting concrete. Debris buildup is affecting bearing movement. Bearing alignment is still tolerable. Grout pad may have minor cracking and spalling	Do Nothing Clean and paint Rehab support and/or reset bearing
3	Corrosion is advanced. There may be loss of section of the supporting member sufficient to warrant supplemental supports or load restrictions. Bearing alignment may be beyond tolerable limits. Shear keys may have failed. The lubrication system, if any, may have failed. Grout pad may have significant deterioration.	Clean and paint Rehab support and/or reset bearing Replace

Fixed Bearing (EA) 313

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

Condition	Description	Feasible Action
1	The element shows little or no deterioration. If a paint system is present, it is sound and functioning as intended to protect the metal. Vertical and horizontal alignment is within limits. Bearing support member is sound. Any lubrication system is functioning properly. Grout pad is sound.	Do Nothing
2	The paint system, if present, may show moderate to heavy corrosion with pitting but still functions as intended. The assemblies may have moved enough to cause minor cracking in the supporting concrete. Grout pad may have minor cracking and spalling	Do Nothing Clean and paint Rehab support and/or reset bearing
3	Corrosion is advanced. There may be loss of section of the supporting member sufficient to warrant supplemental supports or load restrictions. Shear Keys may have failed. The lubrication system, if any, may have failed. Grout pad may have significant deterioration.	Clean and paint Rehab support and/or reset bearing Replace

314 Pot Bearing (EA)

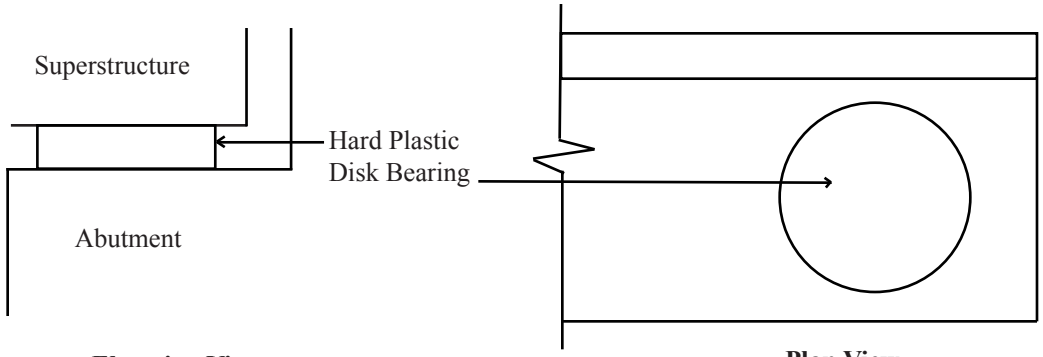
This element defines those high load bearings with confined elastomer. The bearing may be fixed against horizontal movement, guided to allow movement in one direction, or floating to allow sliding in any direction. This element should be used for Seismic Isolation Bearings.

Condition	Description	Feasible Action
1	The element shows minimal deterioration. The paint or other anti-corrosion system is sound and functioning as intended to protect the metal. The bearing has minimal debris and corrosion. Vertical and horizontal alignment is within limits. Bearing support member is sound. Any lubrication system is functioning properly.	Do Nothing
2	The anti-corrosion system may show some corrosion with minor pitting. Debris buildup is affecting bearing movement. Bearing alignment and load carrying capacity is still tolerable.	Do Nothing Rehab support or bearing
3	Corrosion is advanced. Bearing alignment and load carrying capacity may be beyond limits. Shear keys and the lubrication system, if any, may have failed. Elastomer may be actively extruding from the device.	Rehab bearing Replace bearing

Disk Bearing (EA) 315

This element defines those high load bearings with a hard plastic disk. The bearing may be fixed against horizontal movement, guided to allow movement in one direction, or floating to allow sliding in any direction. This element should be used for Spherical and Polytetrafluoro-ethylene (PTFE) Bearings.

Condition	Description	Feasible Action
1	The element shows minimal deterioration. The paint or other anti-corrosion system is sound and functioning as intended to protect the metal. The bearing has minimal debris and corrosion. Vertical and horizontal alignment is within limits. Bearing support member is sound. Any lubrication system is functioning properly.	Do Nothing
2	The anti-corrosion system may show some corrosion with minor pitting. Debris buildup is affecting bearing movement. Bearing alignment and load carrying capacity is still tolerable.	Do Nothing Rehab support or bearing
3	Corrosion is advanced. Bearing alignment and load carrying capacity may be beyond limits. Shear keys and the lubrication system, if any, may have failed.	Rehab bearing Replace bearing



Elevation View **Plan View**

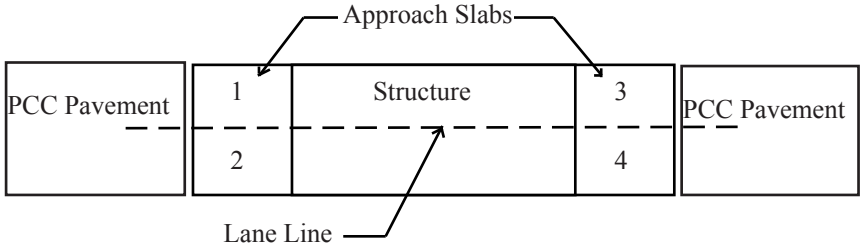
320 Prestressed Concrete Approach Slab (EA)

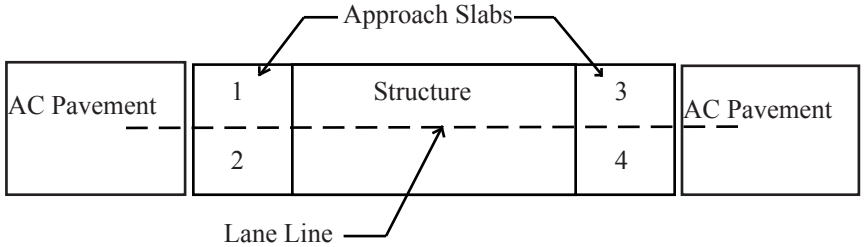
This element defines those structural sections with or without an asphalt or polyester concrete overlay, between the abutment and the approach pavement that are constructed of prestressed concrete.

Condition	Description	Feasible Action
1	The slab has not settled and shows no sign of deterioration other than superficial surface cracks.	Do Nothing
2	Minor cracking, spalls may be present but they do not affect the ability of the slab to carry traffic. Settlement may be occurring which increases the traffic impact on the bridge.	Do Nothing Perform mudjacking operations
3	Cracks may extend completely through the slab cross-section, but the slab does not act as if it is broken. Spalls may be heavy but they do not affect the structural integrity of the slab. Settlement may be occurring which increases the traffic impact on the bridge.	Do Nothing Place overlay Replace slab
4	The slab is broken or rocks under traffic loads. Settlement i excessive and cannot be corrected without increasing the size of the slab.	Replace slab

Notes

- *Each approach slab element should consist of the portion from the bridge to the 1st joint, not to exceed a distance of 30 feet.*
- *The examples below shows four approach slab units to be recorded.*
- *If overlays are placed w/out repairs maintain the prior condition state of an approach slab.*





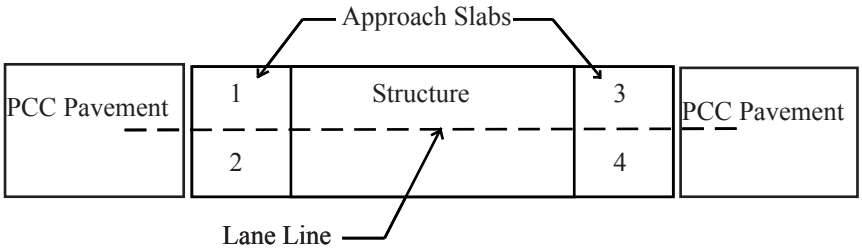
Reinforced Concrete Approach Slab (EA) 321

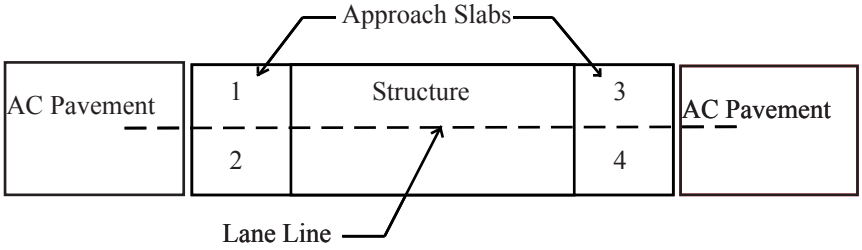
This element defines those structural sections, with or without an asphalt or polyester concrete overlay, between the abutment and the approach pavement that are constructed of reinforced concrete.

Condition	Description	Feasible Action
1	The slab has not settled and shows no sign of deterioration other than superficial surface cracks.	Do Nothing
2	Minor cracking, spalls may be present but they do not affect the ability of the slab to carry traffic. Settlement may be occurring which increases the traffic impact on the bridge.	Do Nothing Perform mud jacking operations
3	Cracks may extend completely through the slab cross-section, but the slab does not act as if it is broken. Spalls may be heavy but they do not affect the structural integrity of the slab. Settlement may be occurring which increases the traffic impact on the bridge.	Do Nothing Place overlay Replace slab
4	The slab is broken or rocks under traffic loads. Settlement is excessive and cannot be corrected without increasing the size of the slab.	Replace slab

Notes

- *Each approach slab element should consist of the portion from the bridge to the 1st joint, not to exceed a distance of 30 feet.*
- *The examples below shows four approach slab units to be recorded.*
- *If overlays are placed w/out repairs maintain the prior condition state of an approach slab.*





330 Metal Bridge Railing (m)

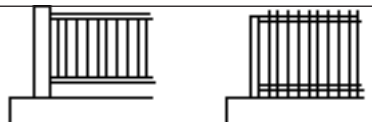
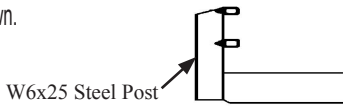
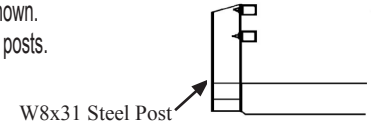
336

337 This element defines all types and shapes of metal bridge railing. Steel, aluminum, metal beam and rolled shapes, etc., are all considered part of this element. The element may be either painted,
338 galvanized, or protected with some other coating.

Condition	Description	Feasible Action
1	There is no evidence of active corrosion. The protective coating is sound and functioning as intended to protect the element.	Do Nothing
2	There is little or no active corrosion. Surface or freckled rust has formed or is forming. The protective coating may have minor areas of deterioration.	Do Nothing Clean and coat
3	Surface or freckled rust is prevalent. The protective coating is no longer effective. There may be exposed metal, but there is no active corrosion causing significant loss of section.	Do Nothing Clean and coat Replace rail
4	Corrosion is advanced. Section loss is sufficient to warrant analysis to ascertain the impact on the strength and/or serviceability of the element.	Rehab rail Replace rail

Notes

- *If the serviceability of the rail is affected by damaged posts or unsupported rail, code as Condition State 4. Record the lineal meters of rail affected by the defective or missing posts.*
- *Rails with any combination of metal and concrete should be recorded as element 333, 334 or 335.*
- *See Appendix B for length conventions.*

Element Number	Description
330	Includes all rails constructed of 100% steel (excluding sidewalk) and not depicted below
336	Steel Rail (pipe/picket) Includes all vertical pipe and picket rails constructed of *only* steel. 
337	Steel Rail (W6). Includes similar rails as shown. The rail must be steel with W6 posts. 
338	Steel Rail (W8). Includes similar rails as shown. The rail must be all steel with W8 or larger posts. 

Concrete Bridge Railing (m)

331

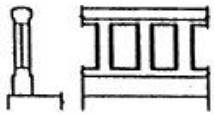
339

This element defines all types and shapes of reinforced concrete bridge railing. All elements of the railing must be concrete.

Condition	Description	Feasible Action
1	The element shows little or no deterioration. There may be discoloration, efflorescence, and/or superficial cracking but without effect on strength and/or serviceability.	Do Nothing
2	Minor cracks, surface scaling, or spalls may be present, but there is no exposed reinforcing or surface evidence of rebar corrosion.	Do Nothing Seal cracks and minor patching
3	Some delamination and/or spalls may be present, and some reinforcing may be exposed. Corrosion of rebar may be present, but loss of section is incidental and does not significantly affect the strength and/or serviceability of either the element.	Do Nothing Clean rebar and patch
4	Deterioration is advanced. Corrosion of reinforcement and/or loss of concrete section is sufficient to warrant analysis to ascertain the impact on the strength and/or serviceability of either the element.	Rehab rail Replace rail

Notes

- *If the serviceability of the rail is affected by damaged posts or unsupported rail, code as Condition State 3. Record the lineal meters of rail affected by the defective or missing posts). Rails with any combination of metal and concrete should be recorded as element 333, 334 or 335.*
- *Include median rail quantities, see Appendix B for conventions.*

Element Number	Description
331	Concrete Rail – Includes all rails constructed only of concrete and not shown below. All of our modern safety shape rails should be recorded as element 331.
339	Concrete Rail (Aesthetic) 

332 Timber Bridge Railing (m)

This element defines all types and shapes of timber bridge railing.

Condition	Description	Feasible Action
1	There is no decay. There may be minor cracks, splits and/or checks.	Do Nothing
2	There may be decay with or without splitting, cracking, checking or crushing but none is sufficiently advanced to affect serviceability.	Do Nothing Rehab rail
3	Advanced deterioration. Decay, splits, cracks, checking or crushing has produced loss of strength that may affect the serviceability of the element.	Rehab rail Replace rail

Notes

- *If the serviceability of the rail is affected by damaged posts or unsupported rail, code as Condition State 3. Record the lineal meters of rail affected by the defective or missing posts.*
- *Combination rails are coded as Element No. 333.*

Miscellaneous Bridge Railing (m)

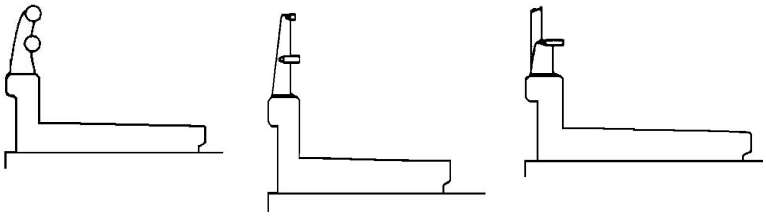
333
334
335

This element defines all types and shapes of bridge railing except those defined as metal, concrete or timber. This element includes combinations of materials.

Condition	Description	Feasible Action
1	The element shows no signs of deterioration. There may be minor cracking, corrosion and/or other minor deterioration having no affect on strength or serviceability.	Do Nothing
2	Minor cracking, spalls, decay of timber portions or corrosion of metal may be present.	Do Nothing Rehab rail
3	Advanced deterioration. Corrosion, decay or loss of section is sufficient to warrant analysis to ascertain the impact on the serviceability or strength of the element.	Rehab rail Replace rail

Notes

- *If the serviceability of the rail is affected by damaged posts or unsupported rail, code as Condition State 3. Record the lineal meters of rail affected by the defective or missing posts.*

Element Number	Description
333	Includes all rails constructed of a combination of materials and not depicted below.
334	Miscellaneous Rail (1 meter sidewalk) Includes all miscellaneous rails having a sidewalk 1 meter or less in width.
335	Miscellaneous Rail (sidewalk) includes all miscellaneous rails having a 1 meter or greater sidewalk width. 

356 Steel Fatigue Smart Flag (EA)

This condition state language addresses only those bridges with steel elements which are already showing fatigue damage. It should not be applied to steel bridges prior to fatigue damage becoming apparent.

Condition	Description
1	Fatigue damage to the bridge has been repaired or arrested. The bridge may still be fatigue prone.
2	Fatigue damage exists which is not arrested (normally, this condition state would be used the first time the element is identified and at any other time when additional fatigue damage occurs.)
3	Fatigue damage exists which warrants analysis of the element to ascertain the serviceability of the element or the bridge.

Notes

- *This Smart Flag represents all the steel on a bridge. The quantity will always be one (1). Do not count each fatigue crack individually.*
- *Use this Smart Flag when cracks are present due to impact damage (i.e., highload hit or drift).*

Pack Rust Smart Flag (EA) 357

This element defines only those connections (including shapes in contact in built-up members) of steel bridges which are already showing signs of rust packing between steel plates.

Condition	Description
1	The connection is showing signs of rusting between plates. Seams of the connections exhibit rust staining.
2	Rusting between plates is beginning to distress the connection. Minor swelling exists.
3	Rusting between plates has caused serious distress to the connection. The plates may be badly distorted, however all connectors (rivets/bolts) are still functioning.
4	Rusting between plates has caused serious distress to the connection which warrants analysis of the bridge to ascertain the impact on the serviceability of the bridge. Some rivets or other connectors may have popped or are no longer effective.

Notes

- *This Smart Flag represents all occurrences of pack rust on a bridge. The quantity will always be one (1). Do not count each occurrence of pack rust.*

358 Deck Cracking Smart Flag (EA)

This condition state language addresses cracking on the top surface of concrete decks.

Condition	Description
1	The surface of the deck is cracked, but the cracks are either **filled/sealed** or insignificant in size (**less than 0.5 mm** wide) and density (average **spacing greater than 1.0 meter**) to warrant repair activities.
2	**Unsealed** cracks which are **0.5 to 2.0 mm** in width **OR** have an average spacing range of **300 mm to 1.0 meter**.
3	**Unsealed** cracks which are **0.5 to 2.0 mm** in width **AND** with an average spacing range of **300 mm to 1.0 meter**.
4	**Unsealed** cracks in the deck which are greater than **2.0 mm** in width **AND/OR** an average crack spacing less than **300 mm.**

Notes

- *Condition State 1 should be used for bridge decks that have been treated with methacrylate.*
- *Bridge decks with a minimal number of cracks may not always warrant a Condition State of 3 or 4 and should be left to the discretion of the inspector.*
- *A Deck Cracking SMART Flag that existed prior to an AC overlay or added following an AC remove and replace inspection, should remain in the same Condition State.*
- *This element should not be used when evaluating the condition of RC culverts. Use RC Culvert (Element 241) to account for deck cracking.*

Soffit of Concrete Decks and Slabs Smart Flag (EA) 359

This condition state language addresses deck distresses through visual inspections of the deck soffit (under-surface). It is extremely valuable when the top surface of the deck is covered with an overlay.

Condition	Description
1	The under-surface of the deck or slab has little or no symptoms of distress. Any cracking that is present is only superficial.
2	There is no evidence that active corrosion or distress is occurring in the deck (There is no rust staining or spalling which could be attributed to active corrosion and/or distress). There are cracks with light density (**spacing greater than 1.0 meter**) and/or light to moderate efflorescence.
3	There is no evidence that active corrosion or distress is occurring in the deck (There is no rust staining or spalling which could be attributed to active corrosion and/or distress). There are cracks with a spacing range of **300 mm to 1.0 meter** and/or moderate to severe efflorescence. There may be some interconnecting cracking in only a few locations.
4	Light to moderate rust staining and/or spalling on the under-surface of the deck that indicates there is active corrosion and/or distress occurring in the deck. There are cracks with a crack spacing range of **300 mm to 1.0 meter**. There may be some interconnecting cracking in scattered locations.
5	Moderate to severe rust staining and/or spalling on the under-surface of the deck indicates there is active corrosion and distress is occurring in the deck. There are cracks with a crack spacing less than **300 mm.** There are interconnecting cracks throughout the soffit.

Notes

- *This Smart Flag represents the entire undersurface of a deck slab, not just the undersurface of the overhang. Do not record this smart flag until Condition State 2 is reached.*
- *Bridge deck soffits with a minimal number of cracks may not always warrant a Condition State of 3, 4, or 5 and should be left to the discretion of the inspector.*
- *This element should not be used when evaluating the condition of RC Culverts or Box Girders. For these elements account for soffit cracking using the appropriate element.*

360 Settlement Smart Flag (EA)

This condition state language addresses substructure settlement distresses which are evident during visual inspections. This element should be used primarily to identify bridges that are experiencing settlement and to provide some measure of the magnitude of that settlement.

Condition	Description
1	Some of the bridge supporting elements are showing signs of visible settlement or rotation but due to earlier repairs or other signs, the settlement appears to have stabilized.
2	Settlement or rotation of the bridge supporting elements show signs of continuing and if left unarrested could cause adverse impacts to the bridge.
3	Settlement or rotation of the bridge supporting elements is significant enough to warrant analysis of the bridge.

• *This Smart Flag should not be used for settlement of slope protection.*

Scour Smart Flag (EA) 361

This scour flag is used to record the current visual observation at the bridge site. Its primary purpose is to identify bridges that are experiencing scour and to provide some measure of the magnitude of scour. This scour flag is not revised based on revisions to NBI Item 113. NBI Item 113 coding that does not match observed conditions or any revisions to this SMART flag should be brought to the attention of SM&I Hydraulics.

Condition	Description
1	**Scour exists at the bridge site but is of little concern to the structural integrity of the bridge.** Scour holes are present but the channel bottom is not currently within the limits of the spread footings. Structure is close to as-built conditions with minor local scour holes present.
2	**Scour exists at the bridge site and if left unchecked could adversely impact the structural integrity of the bridge.** Channel bottom is currently within the footing limits of spread footings. **For steel and concrete piles and pile extensions:** Pile cap footings with scour that has exposed less than 0.9 meters (3 ft) of several piles. Scour has exposed less than 1.5 meters (5 ft) of additional pile, column, or pile extension from as-built conditions, at several locations. **For pier wall or column on footing with timber piles**: Any exposed timber piles warrants Condition State 3. **For timber pile bents:** Due to scour the unbraced length has increased since as-built conditions, however a structural analysis is not yet warranted.
3	**Scour is significant enough to warrant a structural analysis of the bridge.** Channel bottom is currently undermining a spread footing. **For steel and concrete piles:** Pile cap footings with scour that has exposed greater than 0.9 meters (3 ft) of the piles. Scour has exposed greater than 1.5 meters (5 ft) of additional pile, column or pile extension from as-built conditions. **For pier wall or column on footing with timber piles:** Any exposed timber piles. **For timber pile bents:** Due to scour the unbraced length is equal to or greater than 4.0 meters (13 ft) and 5.2 meters (17 ft) for a 12" diameter and 15" diameter pile in good condition, respectively. The condition warrants a structural analysis.

Notes

- *Substructure elements should not be assigned a lower condition state because of scour.*
- *The Scour Smart Flag is used for structure elements only, for scouring of slope protection use ELI No. 256.*
- *A Scour Flag should not be used for an exposed spread footing founded on non-erodible rock with no signs or history of undermining.*

362 Traffic Impact Damage Smart Flag (EA)

This condition state language addresses distress of any elements (mainly superstructure) due to traffic impact damage.

Condition	Description
1	Impact damage has occurred and has been repaired. Prestressing system is covered by patch concrete. Steel has been straightened or repaired.
2	Impact damage has occurred. Prestressing system is exposed, but is not impaired. Steel strength does not threaten the serviceability of the bridge.
3	Impact damage has occurred and strength of the member is impaired. Analysis is warranted to ascertain the serviceability of the bridge.

Notes

- *This Smart Flag should be used for structurally significant superstructure and substructure impact damage only.*
- *Impact damage sustained by the bridge rail elements, if not part of superstructure, should be handled with the appropriate condition state language for those elements.*
- *Record all structurally significant damage that has been repaired in Condition State 1 to keep a running total of hits on the bridge (e.g., a bridge hit 3 times would have a quantity of 3 Each).*

Steel Section Loss Smart Flag (EA) 363

This Smart Flag addresses section loss in areas of steel members that warrant analysis (e.g., beam/girder web in high-shear areas, beam/girder flanges in high-moment areas, bottom chords of through trusses, etc.).

Condition	Description
1	Section loss to the element has been repaired and/or cleaned and painted.
2	Section loss to the element exists and has not been repaired or painted over. Structural analysis is not yet warranted.
3	Measurable section loss to the element exists which warrants analysis to determine the serviceability of the element or the bridge. An analysis has been done, and it has been determined that serviceability has not been affected.
4	Section loss has affected the load carrying capacity or serviceability of the bridge. Use this condition state only after structural analysis.

Notes

- *This Smart Flag should be used for a steel element that is currently or previously in Condition State 3 (unpainted steel), Condition State 4 (painted steel), or has been repaired and/or cleaned and painted, as shown in photo below.*