COLORADO
Department of Transportation

Colorado Structure Element Level Coding Guide

Version 1.2: August 20, 2021

Colorado Structure
Element Level Coding Guide

Version 1.2

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Prepared for:

Colorado Department of Transportation

Bridge & Structure Asset Management Unit

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Section 1 Introduction

Section 1.1 Purpose

The Colorado Structure Element Level Coding Guide was prepared for the Colorado Department of Transportation (CDOT) to enhance consistency and data accuracy while performing bridge and culvert structure inventory and inspections. The specifications and procedures in this manual are intended to complement and further define the material presented in the American Association of State Highway and Transportation Officials (AASHTO) Manual for Bridge Element Inspection (MBEI), 2nd Edition and to incorporate CDOT specific policies and procedures related to bridge element level data collection and condition coding. This manual fully incorporates the AASHTO MBEI and includes additional information and modifications pertinent to CDOT policies.

This manual guides bridge inspectors on how to properly and consistently code the condition of individual elements of structure assets within Colorado for use by CDOT and other Colorado bridge and structure owners.

When performing work for CDOT, it is important to understand CDOT's vision statement, mission statement, and values, at the time of this manual publication, in order to provide the best possible product for the users of all of CDOT's assets.

CDOT VISION STATEMENT

To enhance the quality of life and the environment of the citizens of Colorado by creating an integrated transportation system that focuses on safely moving people and goods by offering convenient linkages among modal choices.

CDOT MISSION STATEMENT

To provide the best multi-modal transportation system for Colorado that most effectively and safely moves people, goods, and information.

CDOT VALUES

Safety – We work together to achieve a high-performing safety culture. We promote and apply consistent and sustainable safe work behaviors in everything we do.

People – We value our team. We acknowledge and recognize the skills and abilities of our co-workers and draw strength from our diversity and commitment to equal opportunity.

Integrity – We earn Colorado's trust! We are honest and responsible in all that we do and hold ourselves to the highest moral and ethical standards.

Customer Service – We strive to provide the highest level of customer satisfaction and experience. With a can-do attitude, we work together and with others to respond effectively to our customers' needs.

Excellence – We are committed to quality. We are leaders and problem solvers, continuously improving our products and services in support of our commitment to provide the best transportation systems for Colorado.

Respect – We treat everyone with respect. We are kind and civil with everyone, and we act with courage and humility.

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Section 1.2 History of Colorado Structure Element Level Coding Guide

In the 1990s, CDOT developed the Pontis Bridge Inspection Coding Guide to supplement the AASHTO Guide for Commonly Recognized Structural Elements. In 2013, AASHTO replaced the AASHTO Guide for Commonly Recognized Structural Elements with the AASHTO MBEI per the requirements as set forth in the Moving Ahead for Progress in the 21st Century Act (MAP-21) legislation. The Colorado Structure Element Level Coding Guide replaces the Pontis Bridge Inspection Coding Guide and supplements the AASHTO MBEI. See Appendix A Element Mapping for detailed documentation, translation, and mapping on individual structure elements that CDOT has used since the 1990s.

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Section 1.3 Units & Standards

All units within this specification are United States customary units.

Section 2 Structure Elements

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Section 2.1 Introduction to Elements

An element is defined as part of a structure that is needed for the respective structure to function as intended. This section defines all structure elements and groups elements into categories to facilitate ease of use by inspectors in the field. All elements have the following characteristics:

- The element number is the unique number assigned to represent that element.
- The element name is the unique name used to define that element.
- The unit of measure details the units to quantify that element. The unit of measure will be in feet (ft), square feet (ft^2), or each.
- Each element is classified as a National Bridge Element (NBE), Bridge Management Element (BME), or Agency Defined Element (ADE).
- Each element has four condition states: Good (Condition State 1), Fair (Condition State 2), Poor (Condition State 3), and Severe (Condition State 4).

Section 2.1.1 National Bridge Elements (NBEs)

The National Bridge Elements (NBEs) represent the main structural components of bridges as defined by AASHTO. The NBEs are designed to remain consistent from agency to agency across the United States in order to facilitate and standardize the capture of bridge element conditions at the national level.

Section 2.1.2 Bridge Management Elements (BMEs)

Bridge Management Elements (BMEs) include components of bridges such as joints, wearing surfaces, and protective coating systems. AASHTO separated these elements from the NBEs since these elements are not intended to be utilized for the purposes of national policy-making.

Section 2.1.3 Agency Defined Elements (ADEs)

The Agency Defined Elements (ADEs) in this manual have been developed by CDOT to track and document bridge components not included in the NBEs and BMEs.

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Section 2.2 Element List

Element #	Element Name	Unit of Measure	Classification
12	Reinforced Concrete Deck	Square Feet (ft^2)	NBE
13	Prestressed Concrete Deck	Square Feet (ft^2)	NBE
14	Partial Height Deck Panel	Square Feet (ft^2)	ADE
15	Prestressed Concrete Top Flange	Square Feet (ft^2)	NBE
16	Reinforced Concrete Top Flange	Square Feet (ft^2)	NBE
28	Steel Deck with Open Grid	Square Feet (ft^2)	NBE
29	Steel Deck with Concrete Filled Grid	Square Feet (ft^2)	NBE
30	Steel Deck Corrugated/Orthotropic/Etc.	Square Feet (ft^2)	NBE
31	Timber Deck	Square Feet (ft^2)	NBE
38	Reinforced Concrete Slab	Square Feet (ft^2)	NBE
54	Timber Slab	Square Feet (ft^2)	NBE
60	Other Deck	Square Feet (ft^2)	NBE
65	Other Slab	Square Feet (ft^2)	NBE
102	Steel Closed Web/Box Girder	Feet (ft)	NBE
104	Prestressed Concrete Closed Web/Box Girder	Feet (ft)	NBE
105	Reinforced Concrete Closed Web/Box Girder	Feet (ft)	NBE
106	Other Closed Web/Box Girder	Feet (ft)	NBE
107	Steel Open Girder/Beam	Feet (ft)	NBE
109	Prestressed Concrete Open Girder/Beam	Feet (ft)	NBE
110	Reinforced Concrete Open Girder/Beam	Feet (ft)	NBE
111	Timber Open Girder/Beam	Feet (ft)	NBE
112	Other Open Girder/Beam	Feet (ft)	NBE
113	Steel Stringer	Feet (ft)	NBE
115	Prestressed Concrete Stringer	Feet (ft)	NBE
116	Reinforced Concrete Stringer	Feet (ft)	NBE
117	Timber Stringer	Feet (ft)	NBE
118	Other Stringer	Feet (ft)	NBE
120	Steel Truss	Feet (ft)	NBE
135	Timber Truss	Feet (ft)	NBE
136	Other Truss	Feet (ft)	NBE
141	Steel Arch	Feet (ft)	NBE
142	Other Arch	Feet (ft)	NBE
143	Prestressed Concrete Arch	Feet (ft)	NBE
144	Reinforced Concrete Arch	Feet (ft)	NBE
145	Masonry Arch	Feet (ft)	NBE
146	Timber Arch	Feet (ft)	NBE
147	Steel Main Cable	Feet (ft)	NBE
148	Steel Secondary Cable	Each	NBE
149	Other Secondary Cable	Each	NBE
152	Steel Floor Beam	Feet (ft)	NBE
154	Prestressed Concrete Floor Beam	Feet (ft)	NBE
155	Reinforced Concrete Floor Beam	Feet (ft)	NBE

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Element #	Element Name	Unit of Measure	Classification
156	Timber Floor Beam	Feet (ft)	NBE
157	Other Floor Beam	Feet (ft)	NBE
161	Steel Pin, Pin and Hanger Assembly, or both	Each	NBE
162	Steel Gusset Plate	Each	NBE
202	Steel Column	Each	NBE
203	Other Column	Each	NBE
204	Prestressed Concrete Column	Each	NBE
205	Reinforced Concrete Column	Each	NBE
206	Timber Column	Each	NBE
207	Steel Tower	Feet (ft)	NBE
208	Timber Trestle	Feet (ft)	NBE
210	Reinforced Concrete Pier Wall	Feet (ft)	NBE
211	Other Pier Wall	Feet (ft)	NBE
212	Timber Pier Wall	Feet (ft)	NBE
213	Masonry Pier Wall	Feet (ft)	NBE
215	Reinforced Concrete Abutment	Feet (ft)	NBE
216	Timber Abutment	Feet (ft)	NBE
217	Masonry Abutment	Feet (ft)	NBE
218	Other Abutment	Feet (ft)	NBE
219	Steel Abutment	Feet (ft)	NBE
220	Reinforced Concrete Pile Cap/Footing	Feet (ft)	NBE
225	Steel Pile	Each	NBE
226	Prestressed Concrete Pile	Each	NBE
227	Reinforced Concrete Pile	Each	NBE
228	Timber Pile	Each	NBE
229	Other Pile	Each	NBE
231	Steel Pier Cap	Feet (ft)	NBE
233	Prestressed Concrete Pier Cap	Feet (ft)	NBE
234	Reinforced Concrete Pier Cap	Feet (ft)	NBE
235	Timber Pier Cap	Feet (ft)	NBE
236	Other Pier Cap	Feet (ft)	NBE
240	Steel Culvert	Feet (ft)	NBE
241	Reinforced Concrete Culvert	Feet (ft)	NBE
242	Timber Culvert	Feet (ft)	NBE
243	Other Culvert	Feet (ft)	NBE
244	Masonry Culvert	Feet (ft)	NBE
245	Prestressed Concrete Culvert	Feet (ft)	NBE
260	Slope, Slope Protection, Berm	Each	ADE
300	Strip Seal Expansion Joint	Feet (ft)	BME
301	Pourable Joint Seal	Feet (ft)	BME
302	Compression Joint Seal	Feet (ft)	BME
303	Assembly Joint with Seal	Feet (ft)	BME
304	Open Expansion Joint	Feet (ft)	BME
305	Assembly Joint without Seal	Feet (ft)	BME

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Element #	Element Name	Unit of Measure	Classification
306	Other Joint	Feet (ft)	BME
308	Construction/Non-Expansion Joint	Feet (ft)	ADE
310	Elastomeric Bearing	Each	NBE
311	Moveable Bearing	Each	NBE
312	Enclosed/Concealed Bearing	Each	NBE
313	Fixed Bearing	Each	NBE
314	Pot Bearing	Each	NBE
315	Disk Bearing	Each	NBE
316	Other Bearing	Each	NBE
320	Prestressed Concrete Approach Slab	Square Feet (ft^2)	BME
321	Reinforced Concrete Approach Slab	Square Feet (ft^2)	BME
322	Approach Roadway	Each	ADE
323	Approach Railing	Each	ADE
326	Wingwall	Each	ADE
329	Sidewalk/Median/Curb	Feet (ft)	ADE
330	Metal Bridge Railing	Feet (ft)	NBE
331	Reinforced Concrete Bridge Railing	Feet (ft)	NBE
332	Timber Bridge Railing	Feet (ft)	NBE
333	Other Bridge Railing	Feet (ft)	NBE
334	Masonry Bridge Railing	Feet (ft)	NBE
335	Headwall	Each	ADE
342	Sign Attachment	Each	ADE
343	Pole Attachment	Each	ADE
350	Approach Strip Seal Expansion Joint	Feet (ft)	ADE
351	Approach Pourable Joint Seal	Feet (ft)	ADE
352	Approach Compression Joint Seal	Feet (ft)	ADE
353	Approach Assembly Joint with Seal	Feet (ft)	ADE
354	Approach Open Expansion Joint	Feet (ft)	ADE
355	Approach Assembly Joint without Seal	Feet (ft)	ADE
356	Approach Other Joint	Feet (ft)	ADE
358	Approach Construction/Non-Expansion Joint	Feet (ft)	ADE
372	False Bent/Temporary Support	Each	ADE
501	Channel/Bank	Each	ADE
510	Wearing Surface	Square Feet (ft^2)	BME
515	Steel Protective Coating	Square Feet (ft^2)	BME
520	Concrete Reinforcing Steel Protective System	Square Feet (ft^2)	BME
521	Concrete Protective Coating	Square Feet (ft^2)	BME
600	General Notes	Each	ADE

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Section 2.3 Elements Grouped by Element Category

Element categories include:

- Decks and Slabs
- Railings
- Superstructure
- Bearings
- Substructure
- Culverts
- Joints
- Approach Slabs
- Channel/Embankment
- Protective Elements and Systems
- Miscellaneous

Section 2.3.1 Deck and Slab Elements

Element #	Element Name	Unit of Measure	Classification
12	Reinforced Concrete Deck	Square Feet (ft²)	NBE
13	Prestressed Concrete Deck	Square Feet (ft²)	NBE
14	Partial Height Deck Panel	Square Feet (ft²)	ADE
15	Prestressed Concrete Top Flange	Square Feet (ft²)	NBE
16	Reinforced Concrete Top Flange	Square Feet (ft²)	NBE
28	Steel Deck with Open Grid	Square Feet (ft²)	NBE
29	Steel Deck with Concrete Filled Grid	Square Feet (ft²)	NBE
30	Steel Deck Corrugated/Orthotropic/Etc.	Square Feet (ft²)	NBE
31	Timber Deck	Square Feet (ft²)	NBE
38	Reinforced Concrete Slab	Square Feet (ft²)	NBE
54	Timber Slab	Square Feet (ft²)	NBE
60	Other Deck	Square Feet (ft²)	NBE
65	Other Slab	Square Feet (ft²)	NBE

Section 2.3.2 Railing Elements

Element #	Element Name	Unit of Measure	Classification
323	Approach Railing	Each	ADE
330	Metal Bridge Railing	Feet (ft)	NBE
331	Reinforced Concrete Bridge Railing	Feet (ft)	NBE
332	Timber Bridge Railing	Feet (ft)	NBE
333	Other Bridge Railing	Feet (ft)	NBE
334	Masonry Bridge Railing	Feet (ft)	NBE

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Section 2.3.3 Superstructure Elements

Element #	Element Name	Unit of Measure	Classification
102	Steel Closed Web/Box Girder	Feet (ft)	NBE
104	Prestressed Concrete Closed Web/Box Girder	Feet (ft)	NBE
105	Reinforced Concrete Closed Web/Box Girder	Feet (ft)	NBE
106	Other Closed Web/Box Girder	Feet (ft)	NBE
107	Steel Open Girder/Beam	Feet (ft)	NBE
109	Prestressed Concrete Open Girder/Beam	Feet (ft)	NBE
110	Reinforced Concrete Open Girder/Beam	Feet (ft)	NBE
111	Timber Open Girder/Beam	Feet (ft)	NBE
112	Other Open Girder/Beam	Feet (ft)	NBE
113	Steel Stringer	Feet (ft)	NBE
115	Prestressed Concrete Stringer	Feet (ft)	NBE
116	Reinforced Concrete Stringer	Feet (ft)	NBE
117	Timber Stringer	Feet (ft)	NBE
118	Other Stringer	Feet (ft)	NBE
120	Steel Truss	Feet (ft)	NBE
135	Timber Truss	Feet (ft)	NBE
136	Other Truss	Feet (ft)	NBE
141	Steel Arch	Feet (ft)	NBE
142	Other Arch	Feet (ft)	NBE
143	Prestressed Concrete Arch	Feet (ft)	NBE
144	Reinforced Concrete Arch	Feet (ft)	NBE
145	Masonry Arch	Feet (ft)	NBE
146	Timber Arch	Feet (ft)	NBE
147	Steel Main Cable	Feet (ft)	NBE
148	Steel Secondary Cable	Each	NBE
149	Other Secondary Cable	Each	NBE
152	Steel Floor Beam	Feet (ft)	NBE
154	Prestressed Concrete Floor Beam	Feet (ft)	NBE
155	Reinforced Concrete Floor Beam	Feet (ft)	NBE
156	Timber Floor Beam	Feet (ft)	NBE
157	Other Floor Beam	Feet (ft)	NBE
161	Steel Pin, Pin and Hanger Assembly, or both	Each	NBE
162	Steel Gusset Plate	Each	NBE

Section 2.3.4 Bearing Elements

Element #	Element Name	Unit of Measure	Classification
310	Elastomeric Bearing	Each	NBE
311	Moveable Bearing	Each	NBE
312	Enclosed/Concealed Bearing	Each	NBE
313	Fixed Bearing	Each	NBE
314	Pot Bearing	Each	NBE
315	Disk Bearing	Each	NBE
316	Other Bearing	Each	NBE

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Section 2.3.5 Substructure Elements

Element #	Element Name	Unit of Measure	Classification
202	Steel Column	Each	NBE
203	Other Column	Each	NBE
204	Prestressed Concrete Column	Each	NBE
205	Reinforced Concrete Column	Each	NBE
206	Timber Column	Each	NBE
207	Steel Tower	Feet (ft)	NBE
208	Timber Trestle	Feet (ft)	NBE
210	Reinforced Concrete Pier Wall	Feet (ft)	NBE
211	Other Pier Wall	Feet (ft)	NBE
212	Timber Pier Wall	Feet (ft)	NBE
213	Masonry Pier Wall	Feet (ft)	NBE
215	Reinforced Concrete Abutment	Feet (ft)	NBE
216	Timber Abutment	Feet (ft)	NBE
217	Masonry Abutment	Feet (ft)	NBE
218	Other Abutment	Feet (ft)	NBE
219	Steel Abutment	Feet (ft)	NBE
220	Reinforced Concrete Pile Cap/Footing	Feet (ft)	NBE
225	Steel Pile	Each	NBE
226	Prestressed Concrete Pile	Each	NBE
227	Reinforced Concrete Pile	Each	NBE
228	Timber Pile	Each	NBE
229	Other Pile	Each	NBE
231	Steel Pier Cap	Feet (ft)	NBE
233	Prestressed Concrete Pier Cap	Feet (ft)	NBE
234	Reinforced Concrete Pier Cap	Feet (ft)	NBE
235	Timber Pier Cap	Feet (ft)	NBE
236	Other Pier Cap	Feet (ft)	NBE
372	False Bent/Temporary Support	Each	ADE

Section 2.3.6 Culvert Elements

Element #	Element Name	Unit of Measure	Classification
240	Steel Culvert	Feet (ft)	NBE
241	Reinforced Concrete Culvert	Feet (ft)	NBE
242	Timber Culvert	Feet (ft)	NBE
243	Other Culvert	Feet (ft)	NBE
244	Masonry Culvert	Feet (ft)	NBE
245	Prestressed Concrete Culvert	Feet (ft)	NBE

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Section 2.3.7 Joint Elements

Element #	Element Name	Unit of Measure	Classification
300	Strip Seal Expansion Joint	Feet (ft)	BME
301	Pourable Joint Seal	Feet (ft)	BME
302	Compression Joint Seal	Feet (ft)	BME
303	Assembly Joint with Seal	Feet (ft)	BME
304	Open Expansion Joint	Feet (ft)	BME
305	Assembly Joint without Seal	Feet (ft)	BME
306	Other Joint	Feet (ft)	BME
308	Construction/Non-Expansion Joint	Feet (ft)	ADE
350	Approach Strip Seal Expansion Joint	Feet (ft)	ADE
351	Approach Pourable Joint Seal	Feet (ft)	ADE
352	Approach Compression Joint Seal	Feet (ft)	ADE
353	Approach Assembly Joint with Seal	Feet (ft)	ADE
354	Approach Open Expansion Joint	Feet (ft)	ADE
355	Approach Assembly Joint without Seal	Feet (ft)	ADE
356	Approach Other Joint	Feet (ft)	ADE
358	Approach Construction/Non-Expansion Joint	Feet (ft)	ADE

Section 2.3.8 Approach Slab Elements

Element #	Element Name	Unit of Measure	Classification
320	Prestressed Concrete Approach Slab	Square Feet (ft^2)	BME
321	Reinforced Concrete Approach Slab	Square Feet (ft^2)	BME

Section 2.3.9 Channel/Embankment Elements

Element #	Element Name	Unit of Measure	Classification
260	Slope, Slope Protection, Berm	Each	ADE
501	Channel/Bank	Each	ADE

Section 2.3.10 Protective Elements and Systems

Element #	Element Name	Unit of Measure	Classification
510	Wearing Surface	Square Feet (ft^2)	BME
515	Steel Protective Coating	Square Feet (ft^2)	BME
520	Concrete Reinforcing Steel Protective System	Square Feet (ft^2)	BME
521	Concrete Protective Coating	Square Feet (ft^2)	BME

Section 2.3.11 Miscellaneous Elements

Element #	Element Name	Unit of Measure	Classification
322	Approach Roadway	Each	ADE
326	Wingwall	Each	ADE
329	Sidewalk/Median/Curb	Feet (ft)	ADE
335	Headwall	Each	ADE
342	Sign Attachment	Each	ADE
343	Pole Attachment	Each	ADE
600	General Notes	Each	ADE

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Section 3 Structure Defects

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Section 3.1 Introduction to Defects

All element deficiencies identified during field inspections shall be recorded within defects. This section defines all structure defects and groups them into defect categories based on element types and materials. All defects have the following characteristics:

- Each defect has a unique name.
- Each defect has a unique number.
- Each defect has four condition states: Good (Condition State 1), Fair (Condition State 2), Poor (Condition State 3), and Severe (Condition State 4).
- Each defect has unique language to define deficiencies within each condition state.
- Each defect was developed by either AASHTO or CDOT.

Section 3.1.1 AASHTO Defined Defects

The defects developed by AASHTO include all defects defined in the AASHTO MBEI.

Section 3.1.2 CDOT Defined Defects

CDOT developed "Defect 8000 – Other" to track and document deficiencies not covered by the AASHTO defined defects.

Section 3.1.3 Condition States

Each defect has four condition states:

- Good (Condition State 1)
  - Condition State 1 deficiencies are generally considered insignificant.
- Fair (Condition State 2)
  - Condition State 2 deficiencies are generally considered minor.
- Poor (Condition State 3)
  - Condition State 3 deficiencies are generally considered moderate.
- Severe (Condition State 4)
  - Condition State 4 deficiencies are generally considered major.

The limits of Condition States 1 through 3 are typically well defined for each defect. Condition State 4 is reserved for severe conditions which may have load capacity implications and typically warrant a structural or hydraulic review. A structural or hydraulic review must be completed by a qualified person to determine the condition's impact on the strength or serviceability of the element or structure. Structural or hydraulic reviews may consist of a review of field inspection notes and photos or it may require more detailed analysis and calculations to determine the impact on load capacity. When conditions require a structural or hydraulic review, a comment must be added to the element notes similar to the comments listed below:

- A structural review is recommended but has not been completed.
- The Condition State 4 defect has been reviewed by the [CDOT or Consultant Name] Program Engineer and does not have an effect on the strength and/or serviceability of the element or structure. The quantity was left in Condition State 4 as a flag to the next inspector to determine if the defect has deteriorated more and will require another review.

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- The Condition State 4 defect has been reviewed by the [CDOT or Consultant Name] Program Engineer and does have an effect on the strength and/or serviceability of the element or structure. The bridge owner was notified of the [Critical Inspection Finding or Essential Repair Finding] on [insert date of the notification].
- The Condition State 4 defect has been reviewed by the [CDOT or Consultant Name] Program Engineer and does have an effect on the strength and/or serviceability of the element or structure. The bridge has been [temporarily load posted, closed, or partially closed] until the necessary repairs have been completed.

Section 3.2 Defect List

Defect #	Defect Name	Agency
1000	Corrosion	AASHTO
1010	Cracking (Steel and Other)	AASHTO
1020	Connection	AASHTO
1080	Delamination/Spall/Patched Area	AASHTO
1090	Exposed Rebar	AASHTO
1100	Exposed Prestressing	AASHTO
1110	Cracking (PSC)	AASHTO
1120	Efflorescence/Rust Staining	AASHTO
1130	Cracking (RC and Other)	AASHTO
1140	Decay/Section Loss	AASHTO
1150	Check/Shake	AASHTO
1160	Crack (Timber)	AASHTO
1170	Split/Delamination (Timber)	AASHTO
1180	Abrasion/Wear (Timber)	AASHTO
1190	Abrasion/Wear (PSC/RC)	AASHTO
1220	Deterioration (Other)	AASHTO
1610	Mortar Breakdown (Masonry)	AASHTO
1620	Split/Spall (Masonry)	AASHTO
1630	Patched Area (Masonry)	AASHTO
1640	Masonry Displacement	AASHTO
1900	Distortion	AASHTO
2210	Movement	AASHTO
2220	Alignment	AASHTO
2230	Bulging, Splitting, or Tearing	AASHTO
2240	Loss of Bearing Area	AASHTO
2310	Leakage	AASHTO
2320	Seal Adhesion	AASHTO
2330	Seal Damage	AASHTO
2340	Seal Cracking	AASHTO
2350	Debris Impaction	AASHTO
2360	Adjacent Deck or Header	AASHTO
2370	Metal Deterioration or Damage	AASHTO
3210	Delamination/Spall/Patched Area/Pothole (Wearing Surfaces)	AASHTO
3220	Crack (Wearing Surfaces)	AASHTO
3230	Effectiveness (Wearing Surfaces)	AASHTO
3410	Chalking (Steel Protective Coatings)	AASHTO
3420	Peeling/Bubbling/Cracking (Steel Protective Coatings)	AASHTO
3430	Oxide Film Degradation Color/Texture Adherence (Steel Protective Coatings)	AASHTO
3440	Effectiveness (Steel Protective Coatings)	AASHTO
3510	Wear (Concrete Protective Coatings)	AASHTO
3540	Effectiveness (Concrete Protective Coatings)	AASHTO
3600	Effectiveness-Protective System (e.g. cathodic)	AASHTO

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Defect #	Defect Name	Agency
4000	Settlement	AASHTO
6000	Scour	AASHTO
7000	Damage	AASHTO
8000	Other	CDOT

Section 3.3 Defect Categories and Matrices

Defect categories include:

- Reinforced Concrete
- Prestressed Concrete
- Steel
- Timber
- Masonry
- Other Materials
- Bearings
- Joints
- Wearing Surfaces
- Steel Protective Coatings
- Concrete Protective Coatings
- Concrete Reinforcing Steel Protective Systems
- Agency Defined Elements with Specific Condition States
- Agency Defined Elements with No Defects or Condition States

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Section 3.3.1 Reinforced Concrete Elements and Defect Matrix

Element #	Element Name	Unit of Measure	Classification
12	Reinforced Concrete Deck	Square Feet (ft^2)	NBE
14	Partial Height Deck Panel	Square Feet (ft^2)	ADE
16	Reinforced Concrete Top Flange	Square Feet (ft^2)	NBE
38	Reinforced Concrete Slab	Square Feet (ft^2)	NBE
105	Reinforced Concrete Closed Web/Box Girder	Feet (ft)	NBE
110	Reinforced Concrete Open Girder/Beam	Feet (ft)	NBE
116	Reinforced Concrete Stringer	Feet (ft)	NBE
144	Reinforced Concrete Arch	Feet (ft)	NBE
155	Reinforced Concrete Floor Beam	Feet (ft)	NBE
205	Reinforced Concrete Column	Each	NBE
210	Reinforced Concrete Pier Wall	Feet (ft)	NBE
215	Reinforced Concrete Abutment	Feet (ft)	NBE
220	Reinforced Concrete Pile Cap/Footing	Feet (ft)	NBE
227	Reinforced Concrete Pile	Each	NBE
234	Reinforced Concrete Pier Cap	Feet (ft)	NBE
241	Reinforced Concrete Culvert	Feet (ft)	NBE
321	Reinforced Concrete Approach Slab	Square Feet (ft^2)	BME
329	Sidewalk/Median/Curb	Feet (ft)	ADE
331	Reinforced Concrete Bridge Railing	Feet (ft)	NBE

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Reinforced Concrete Defects and Condition States				
Defects	CS 1 - Good Insignificant Defects	CS 2 - Fair Minor Defects	CS 3 - Poor Moderate Defects	CS 4 - Severe Major Defects
Delamination/ Spall/ Patched Area (1080)	None.	Delaminated. Spall 1 inch or less deep or 6 inches or less in diameter. Patched area that is sound.	Spall greater than 1 inch deep or greater than 6 inches in diameter. Patched area that is unsound or showing distress. Does not warrant a structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the element or structure; OR a structural review has been completed and the defects impact strength or serviceability of the element or structure.
Exposed Rebar (1090)	None.	Present without measurable section loss.	Present with measurable section loss but does not warrant a structural review.	
Efflorescence/ Rust Staining (1120)	None.	Surface white without build-up or leaching without rust staining.	Heavy build-up and/or rust staining.	
Cracking (RC and Other) (1130)	Insignificant cracks (width less than 0.012 inch) or sealed medium width cracks. Crack spacing greater than 3 feet.	Unsealed medium width cracks (width 0.012-0.05 inch) or unsealed medium pattern/map cracking (spacing of 1-3 feet).	Wide cracks (width greater than 0.05 inch) or heavy pattern/map cracking (spacing less than 1 foot).	
Abrasion/Wear (PSC/RC) (1190)	Abrasion or wearing less than 0.25 inch deep with no exposed coarse aggregate.	Abrasion or wearing has exposed coarse aggregate but the aggregate remains secure in the concrete.	Coarse aggregate is loose or has popped out of the concrete matrix due to abrasion or wear.	
Settlement (4000)	None.	Exists within tolerable limits or arrested with no observed structural distress.	Exceeds tolerable limits but does not warrant a structural review.	
Scour (6000)	None.	Exists within tolerable limits or has been arrested with effective countermeasures.	Exceeds tolerable limits but is less than the critical limits determined by scour evaluation and does not warrant a structural review.	
Damage (7000)	None.	Minor impact damage.	Moderate impact damage.	
Other (8000)	None.	Minor deficiencies not covered by other defects.	Moderate deficiencies not covered by other defects.	

*Note: Concrete disintegration and scaling should be coded under Abrasion/Wear (PSC/RC) (1190).

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Reinforced Concrete Defects and Condition States			
Defects	CS 2 - Fair Minor Defects	CS 3 - Poor Moderate Defects	CS 4 - Severe Major Defects
Delamination/ Spall/ Patched Area (1080)	Delaminated. Spall 1 inch or less deep or 6 inches or less in diameter. Patched area that is sound.	Spall greater than 1 inch deep or greater than 6 inches in diameter. Patched area that is unsound or showing distress. Does not warrant a structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the element or structure; OR a structural review has been completed and the defects impact strength or serviceability of the element or structure.
			
Efflorescence/ Rust Staining (1120)	Surface white without build-up or leaching without rust staining.	Heavy build-up and/or rust staining.	The condition warrants a structural review to determine the effect on strength or serviceability of the element or structure; OR a structural review has been completed and the defects impact strength or serviceability of the element or structure.
			Requesting representative photo for this defect condition.

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Reinforced Concrete Defects and Condition States			
Defects	CS 2 - Fair Minor Defects	CS 3 - Poor Moderate Defects	CS 4 - Severe Major Defects
Cracking (RC and Other) (1130)	Unsealed medium width cracks (width 0.012-0.05 inch) or unsealed medium pattern/map cracking (spacing of 1-3 feet).	Wide cracks (width greater than 0.05 inch) or heavy pattern/map cracking (spacing less than 1 foot).	The condition warrants a structural review to determine the effect on strength or serviceability of the element or structure; OR a structural review has been completed and the defects impact strength or serviceability of the element or structure.
			
Abrasion/Wear (PSC/RC) (1190)	Abrasion or wearing has exposed coarse aggregate but the aggregate remains secure in the concrete.	Coarse aggregate is loose or has popped out of the concrete matrix due to abrasion or wear.	The condition warrants a structural review to determine the effect on strength or serviceability of the element or structure; OR a structural review has been completed and the defects impact strength or serviceability of the element or structure.
			

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Reinforced Concrete Defects and Condition States			
Defects	CS 2 - Fair Minor Defects	CS 3 - Poor Moderate Defects	CS 4 - Severe Major Defects
Settlement (4000)	Exists within tolerable limits or arrested with no observed structural distress.	Exceeds tolerable limits but does not warrant a structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the element or structure; OR a structural review has been completed and the defects impact strength or serviceability of the element or structure.
	Requesting representative photo for this defect condition.		Requesting representative photo for this defect condition.
Scour (6000)	Exists within tolerable limits or has been arrested with effective countermeasures.	Exceeds tolerable limits but is less than the critical limits determined by scour evaluation and does not warrant a structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the element or structure; OR a structural review has been completed and the defects impact strength or serviceability of the element or structure.
			

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Section 3.3.2 Prestressed Concrete Elements and Defect Matrix

Element #	Element Name	Unit of Measure	Classification
13	Prestressed Concrete Deck	Square Feet (ft^2)	NBE
14	Partial Height Deck Panel	Square Feet (ft^2)	ADE
15	Prestressed Concrete Top Flange	Square Feet (ft^2)	NBE
104	Prestressed Concrete Closed Web/Box Girder	Feet (ft)	NBE
109	Prestressed Concrete Open Girder/Beam	Feet (ft)	NBE
115	Prestressed Concrete Stringer	Feet (ft)	NBE
143	Prestressed Concrete Arch	Feet (ft)	NBE
154	Prestressed Concrete Floor Beam	Feet (ft)	NBE
204	Prestressed Concrete Column	Each	NBE
226	Prestressed Concrete Pile	Each	NBE
233	Prestressed Concrete Pier Cap	Feet (ft)	NBE
245	Prestressed Concrete Culvert	Feet (ft)	NBE
320	Prestressed Concrete Approach Slab	Square Feet (ft^2)	NBE
329	Sidewalk/Median/Curb	Feet (ft)	ADE

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Prestressed Concrete Defects and Condition States				
Defects	CS 1 - Good Insignificant Defects	CS 2 - Fair Minor Defects	CS 3 - Poor Moderate Defects	CS 4 - Severe Major Defects
Delamination/ Spall/ Patched Area (1080)	None.	Delaminated. Spall 1 inch or less deep or 6 inches or less in diameter. Patched area that is sound.	Spall greater than 1 inch deep or greater than 6 inches in diameter. Patched area that is unsound or showing distress. Does not warrant a structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the element or structure; OR a structural review has been completed and the defects impact strength or serviceability of the element or structure.
Exposed Rebar (1090)	None.	Present without measurable section loss.	Present with measurable section loss but does not warrant a structural review.	
Exposed Prestressing (1100)	None.	Present without section loss.	Present with section loss but does not warrant a structural review.	
Cracking (PSC) (1110)	Insignificant cracks (width less than 0.004 inch) or sealed medium width cracks. Crack spacing greater than 3 feet.	Unsealed medium width cracks (width 0.004-0.009 inch) or unsealed medium pattern/map cracking (spacing of 1-3 feet).	Wide cracks (width greater than 0.009 inch) or heavy pattern/map cracking (spacing less than 1 foot).	
Efflorescence/ Rust Staining (1120)	None.	Surface white without build-up or leaching without rust staining.	Heavy build-up and/or rust staining.	
Abrasion/Wear (PSC/RC) (1190)	Abrasion or wearing less than 0.25 inch deep with no exposed coarse aggregate.	Abrasion or wearing has exposed coarse aggregate but the aggregate remains secure in the concrete.	Coarse aggregate is loose or has popped out of the concrete matrix due to abrasion or wear.	
Distortion (1900)	None.	Distortion not requiring mitigation or mitigated distortion.	Distortion that requires mitigation that has not been addressed but does not warrant a structural review.	
Settlement (4000)	None.	Exists within tolerable limits or arrested with no observed structural distress.	Exceeds tolerable limits but does not warrant a structural review.	
Scour (6000)	None.	Exists within tolerable limits or has been arrested with effective countermeasures.	Exceeds tolerable limits but is less than the critical limits determined by scour evaluation and does not warrant a structural review.	
Damage (7000)	None.	Minor impact damage.	Moderate impact damage.	
Other (8000)	None.	Minor deficiencies not covered by other defects.	Moderate deficiencies not covered by other defects.	

*Note: Concrete disintegration and scaling should be coded under Abrasion/Wear (PSC/RC) (1190).

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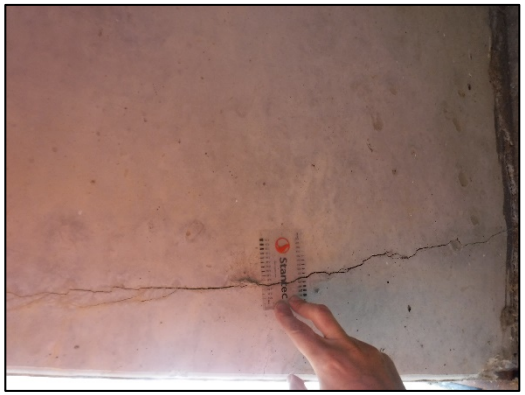
Prestressed Concrete Defects and Condition States			
Defects	CS 2 - Fair Minor Defects	CS 3 - Poor Moderate Defects	CS 4 - Severe Major Defects
Delamination/ Spall/ Patched Area (1080)	Delaminated. Spall 1 inch or less deep or 6 inches or less in diameter. Patched area that is sound.	Spall greater than 1 inch deep or greater than 6 inches in diameter. Patched area that is unsound or showing distress. Does not warrant a structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the element or structure; OR a structural review has been completed and the defects impact strength or serviceability of the element or structure.
			
Cracking (PSC) (1110)	Unsealed medium width cracks (width 0.004-0.009 inch) or unsealed medium pattern/map cracking (spacing of 1-3 feet).	Wide cracks (width greater than 0.009 inch) or heavy pattern/map cracking (spacing less than 1 foot).	The condition warrants a structural review to determine the effect on strength or serviceability of the element or structure; OR a structural review has been completed and the defects impact strength or serviceability of the element or structure.
			Requesting representative photo for this defect condition.

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Prestressed Concrete Defects and Condition States			
Defects	CS 2 - Fair Minor Defects	CS 3 - Poor Moderate Defects	CS 4 - Severe Major Defects
Damage (7000)	Minor impact damage.	Moderate impact damage.	The condition warrants a structural review to determine the effect on strength or serviceability of the element or structure; OR a structural review has been completed and the defects impact strength or serviceability of the element or structure.
	Requesting representative photo for this defect condition.	Requesting representative photo for this defect condition.	

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Section 3.3.3 Steel Elements and Defect Matrix

Element #	Element Name	Unit of Measure	Classification
28	Steel Deck with Open Grid	Square Feet (ft^2)	NBE
29	Steel Deck with Concrete Filled Grid	Square Feet (ft^2)	NBE
30	Steel Deck Corrugated/Orthotropic/Etc.	Square Feet (ft^2)	NBE
102	Steel Closed Web/Box Girder	Feet (ft)	NBE
107	Steel Open Girder/Beam	Feet (ft)	NBE
113	Steel Stringer	Feet (ft)	NBE
120	Steel Truss	Feet (ft)	NBE
141	Steel Arch	Feet (ft)	NBE
147	Steel Main Cable	Feet (ft)	NBE
148	Steel Secondary Cable	Each	NBE
152	Steel Floor Beam	Feet (ft)	NBE
161	Steel Pin, Pin and Hanger Assembly, or both	Each	NBE
162	Steel Gusset Plate	Each	NBE
202	Steel Column	Each	NBE
207	Steel Tower	Feet (ft)	NBE
219	Steel Abutment	Feet (ft)	NBE
225	Steel Pile	Each	NBE
231	Steel Pier Cap	Feet (ft)	NBE
240	Steel Culvert	Feet (ft)	NBE
329	Sidewalk/Median/Curb	Feet (ft)	ADE
330	Metal Bridge Railing	Feet (ft)	NBE

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Steel Defects and Condition States				
Defects	CS 1 - Good Insignificant Defects	CS 2 - Fair Minor Defects	CS 3 - Poor Moderate Defects	CS 4 - Severe Major Defects
Corrosion (1000)	None.	Freckled rust. Corrosion of the steel has initiated.	Section loss is evident, or pack rust is present but does not warrant a structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the element or structure; OR a structural review has been completed and the defects impact strength or serviceability of the element or structure.
Cracking (Steel and Other) (1010)	None.	Crack that has self-arrested or has been arrested with effective arrest holes, doubling plates, or similar.	Identified crack exists that is not arrested but does not warrant a structural review.	
Connection (1020)	Connection is in place and functioning as intended.	Loose fasteners or pack rust without distortion is present but the connection is in place and functioning as intended.	Missing bolts, rivets, broken welds, fasteners, or pack rust with distortion but does not warrant a structural review.	
Distortion (1900)	None.	Distortion not requiring mitigation or mitigated distortion.	Distortion that requires mitigation that has not been addressed but does not warrant a structural review.	
Settlement (4000)	None.	Exists within tolerable limits or arrested with no observed structural distress.	Exceeds tolerable limits but does not warrant a structural review.	
Scour (6000)	None.	Exists within tolerable limits or has been arrested with effective countermeasures.	Exceeds tolerable limits but is less than the critical limits determined by scour evaluation and does not warrant a structural review.	
Damage (7000)	None.	Minor impact damage.	Moderate impact damage.	
Other (8000)	None.	Minor deficiencies not covered by other defects.	Moderate deficiencies not covered by other defects.	

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Steel Defects and Condition States			
Defects	CS 2 - Fair Minor Defects	CS 3 - Poor Moderate Defects	CS 4 - Severe Major Defects
Corrosion (1000)	Freckled rust. Corrosion of the steel has initiated.	Section loss is evident, or pack rust is present but does not warrant a structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the element or structure; OR a structural review has been completed and the defects impact strength or serviceability of the element or structure.
			
Cracking (Steel and Other) (1010)	Crack that has self- arrested or has been arrested with effective arrest holes, doubling plates, or similar.	Identified crack exists that is not arrested but does not warrant a structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the element or structure; OR a structural review has been completed and the defects impact strength or serviceability of the element or structure.
			

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Steel Defects and Condition States			
Defects	CS 2 - Fair Minor Defects	CS 3 - Poor Moderate Defects	CS 4 - Severe Major Defects
Damage (7000)	Minor impact damage.	Moderate impact damage.	The condition warrants a structural review to determine the effect on strength or serviceability of the element or structure; OR a structural review has been completed and the defects impact strength or serviceability of the element or structure.
			

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Section 3.3.4 Timber Elements and Defect Matrix

Element #	Element Name	Unit of Measure	Classification
31	Timber Deck	Square Feet (ft^2)	NBE
54	Timber Slab	Square Feet (ft^2)	NBE
111	Timber Open Girder/Beam	Feet (ft)	NBE
117	Timber Stringer	Feet (ft)	NBE
135	Timber Truss	Feet (ft)	NBE
146	Timber Arch	Feet (ft)	NBE
156	Timber Floor Beam	Feet (ft)	NBE
206	Timber Column	Each	NBE
208	Timber Trestle	Feet (ft)	NBE
212	Timber Pier Wall	Feet (ft)	NBE
216	Timber Abutment	Feet (ft)	NBE
228	Timber Pile	Each	NBE
235	Timber Pier Cap	Feet (ft)	NBE
242	Timber Culvert	Feet (ft)	NBE
329	Sidewalk/Median/Curb	Feet (ft)	ADE
332	Timber Bridge Railing	Feet (ft)	NBE

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Timber Defects and Condition States				
Defects	CS 1 - Good Insignificant Defects	CS 2 - Fair Minor Defects	CS 3 - Poor Moderate Defects	CS 4 - Severe Major Defects
Connection (1020)	Connection is in place and functioning as intended.	Loose fasteners or pack rust without distortion is present but the connection is in place and functioning as intended.	Missing bolts, rivets, broken welds, fasteners, or pack rust with distortion but does not warrant a structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the element or structure; OR a structural review has been completed and the defects impact strength or serviceability of the element or structure.
Decay/Section Loss (1140)	None.	Affects less than 10% of the member section.	Affects 10% or more of the member but does not warrant a structural review.	
Check/Shake (1150)	Surface penetration less than 5% of the member thickness regardless of location.	Penetrates 5%-50% of the thickness of the member and not in a tension zone.	Penetrates more than 50% of the thickness of the member or more than 5% of the member thickness in a tension zone. Does not warrant a structural review.	
Crack (Timber) (1160)	None.	Crack that has been arrested through effective measures.	Identified crack exists that is not arrested but does not warrant a structural review.	
Split/Delamination (Timber) (1170)	None.	Length less than the member depth or arrested with effective actions taken to mitigate.	Length equal to or greater than the member depth but does not warrant a structural review.	
Abrasion/Wear (Timber) (1180)	None or no measurable section loss.	Section loss less than 10% of the member thickness.	Section loss 10% or more of the member thickness but does not warrant a structural review.	
Settlement (4000)	None.	Exists within tolerable limits or arrested with no observed structural distress.	Exceeds tolerable limits but does not warrant a structural review.	
Scour (6000)	None.	Exists within tolerable limits or has been arrested with effective countermeasures.	Exceeds tolerable limits but is less than the critical limits determined by scour evaluation and does not warrant a structural review.	
Damage (7000)	None.	Minor impact damage.	Moderate impact damage.	
Other (8000)	None.	Minor deficiencies not covered by other defects.	Moderate deficiencies not covered by other defects.	

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Timber Defects and Condition States			
Defects	CS 2 - Fair FAIR	CS 3 - Poor POOR	CS 4 - Severe SEVERE
Decay/Section Loss (1140)	Affects less than 10% of the member section.	Affects 10% or more of the member but does not warrant a structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the element or structure; OR a structural review has been completed and the defects impact strength or serviceability of the element or structure.
			
Check/Shake (1150)	Penetrates 5%-50% of the thickness of the member and not in a tension zone.	Penetrates more than 50% of the thickness of the member or more than 5% of the member thickness in a tension zone. Does not warrant a structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the element or structure; OR a structural review has been completed and the defects impact strength or serviceability of the element or structure.
			Requesting representative photo for this defect condition.

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Timber Defects and Condition States			
Defects	CS 2 - Fair Minor Defects	CS 3 - Poor Moderate Defects	CS 4 - Severe Major Defects
Crack (Timber) (1160)	Crack that has been arrested through effective measures.	Identified crack exists that is not arrested but does not warrant a structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the element or structure; OR a structural review has been completed and the defects impact strength or serviceability of the element or structure.
	Requesting representative photo for this defect condition.		
Split/Delamination (Timber) (1170)	Length less than the member depth or arrested with effective actions taken to mitigate.	Length equal to or greater than the member depth but does not warrant a structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the element or structure; OR a structural review has been completed and the defects impact strength or serviceability of the element or structure.
			

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Section 3.3.5 Masonry Elements and Defect Matrix

Element #	Element Name	Unit of Measure	Classification
145	Masonry Arch	Feet (ft)	NBE
213	Masonry Pier Wall	Feet (ft)	NBE
217	Masonry Abutment	Feet (ft)	NBE
244	Masonry Culvert	Feet (ft)	NBE
329	Sidewalk/Median/Curb	Feet (ft)	ADE
334	Masonry Bridge Railing	Feet (ft)	NBE

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Masonry Defects and Condition States				
Defects	CS 1 - Good Insignificant Defects	CS 2 - Fair Minor Defects	CS 3 - Poor Moderate Defects	CS 4 - Severe Major Defects
Delamination/Spall/ Patched Area (1080)	None.	Delaminated. Spall 1 inch or less deep or 6 inches or less in diameter. Patched area that is sound.	Spall greater than 1 inch deep or greater than 6 inches in diameter. Patched area that is unsound or showing distress. Does not warrant a structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the element or structure; OR a structural review has been completed and the defects impact strength or serviceability of the element or structure.
Efflorescence/Rust Staining (1120)	None.	Surface white without build-up or leaching without rust staining.	Heavy build-up with rust staining.	
Mortar Breakdown (Masonry) (1610)	None.	Cracking or voids in less than 10% of joints.	Cracking or voids in 10% or more of the joints.	
Split/Spall (Masonry) (1620)	None.	Block or stone has split or spalled with no shifting.	Block or stone has split or spalled with shifting but does not warrant a structural review.	
Patched Area (Masonry) (1630)	None.	Sound patch.	Unsound patch.	
Masonry Displacement (1640)	None.	Block or stone has shifted slightly out of alignment.	Block or stones has shifted significantly out of alignment or is missing but does not warrant a structural review.	
Distortion (1900)	None.	Distortion not requiring mitigation or mitigated distortion.	Distortion that requires mitigation that has not been addressed but does not warrant a structural review.	
Settlement (4000)	None.	Exists within tolerable limits or arrested with no observed structural distress.	Exceeds tolerable limits but does not warrant a structural review.	
Scour (6000)	None.	Exists within tolerable limits or has been arrested with effective countermeasures.	Exceeds tolerable limits but is less than the critical limits determined by scour evaluation and does not warrant a structural review.	
Damage (7000)	None.	Minor impact damage.	Moderate impact damage.	
Other (8000)	None.	Minor deficiencies not covered by other defects.	Moderate deficiencies not covered by other defects.	

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Masonry Defects and Condition States			
Defects	CS 2 - Fair Minor Defects	CS 3 - Poor Moderate Defects	CS 4 - Severe Major Defects
Mortar Breakdown (Masonry) (1610)	Cracking or voids in less than 10% of joints.	Cracking or voids in 10% or more of the joints.	The condition warrants a structural review to determine the effect on strength or serviceability of the element or structure; OR a structural review has been completed and the defects impact strength or serviceability of the element or structure.
			
Split/Spall (Masonry) (1620)	Block or stone has split or spalled with no shifting.	Block or stone has split or spalled with shifting but does not warrant a structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the element or structure; OR a structural review has been completed and the defects impact strength or serviceability of the element or structure.
			Requesting representative photo for this defect condition.

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Masonry Defects and Condition States			
Defects	CS 2 - Fair Minor Defects	CS 3 - Poor Moderate Defects	CS 4 - Severe Major Defects
Masonry Displacement (1640)	Block or stone has shifted slightly out of alignment.	Block or stones has shifted significantly out of alignment or is missing but does not warrant a structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the element or structure; OR a structural review has been completed and the defects impact strength or serviceability of the element or structure.
			

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Section 3.3.6 Other Material Elements and Defect Matrix

Element #	Element Name	Unit of Measure	Classification
60	Other Deck	Square Feet (ft^2)	NBE
65	Other Slab	Square Feet (ft^2)	NBE
106	Other Closed Web/Box Girder	Feet (ft)	NBE
112	Other Open Girder/Beam	Feet (ft)	NBE
118	Other Stringer	Feet (ft)	NBE
136	Other Truss	Feet (ft)	NBE
142	Other Arch	Feet (ft)	NBE
149	Other Secondary Cable	Each	NBE
157	Other Floor Beam	Feet (ft)	NBE
203	Other Column	Each	NBE
211	Other Pier Wall	Feet (ft)	NBE
218	Other Abutment	Feet (ft)	NBE
229	Other Pile	Each	NBE
236	Other Pier Cap	Feet (ft)	NBE
243	Other Culvert	Feet (ft)	NBE
329	Sidewalk/Median/Curb	Feet (ft)	ADE
333	Other Bridge Railing	Feet (ft)	NBE

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Other Material Defects and Condition States				
Defects	CS 1 - Good Insignificant Defects	CS 2 - Fair Minor Defects	CS 3 - Poor Moderate Defects	CS 4 - Severe Major Defects
Corrosion (1000)	None.	Freckled rust. Corrosion of the steel has initiated.	Section loss is evident, or pack rust is present but does not warrant a structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the element or structure; OR a structural review has been completed and the defects impact strength or serviceability of the element or structure.
Cracking (Steel and Other) (1010)	None.	Crack that has self-arrested or has been arrested with effective arrest holes, doubling plates, or similar.	Identified crack that is not arrested but does not warrant a structural review.	
Connection (1020)	Connection is in place and functioning as intended.	Loose fasteners or pack rust without distortion is present but the connection is in place and functioning as intended.	Missing bolts, rivets, broken welds, fasteners, or pack rust with distortion but does not warrant a structural review.	
Delamination/Spall/ Patched Area (1080)	None.	Delaminated. Spall 1 inch or less deep or 6 inches or less in diameter. Patched area that is sound.	Spall greater than 1 inch deep or greater than 6 inches in diameter. Patched area that is unsound or showing distress. Does not warrant a structural review.	
Efflorescence/ Rust Staining (1120)	None.	Surface white without build-up or leaching without rust staining.	Heavy build-up and/or rust staining.	
Cracking (RC and Other) (1130)	Insignificant cracks (width less than 0.012 inch) or sealed moderate width cracks. Crack spacing greater than 3 feet.	Unsealed moderate width cracks (width 0.012-0.05 inch) or unsealed moderate pattern/map cracking (spacing of 1-3 feet).	Wide cracks (width greater than 0.05 inch) or heavy pattern/map cracking (spacing less than 1 foot).	
Deterioration (Other) (1220)	None.	Initiated breakdown or deterioration.	Significant deterioration or breakdown but does not warrant a structural review.	
Distortion (1900)	None.	Distortion not requiring mitigation or mitigated distortion.	Distortion that requires mitigation that has not been addressed but does not warrant a structural review.	
Settlement (4000)	None.	Exists within tolerable limits or arrested with no observed structural distress.	Exceeds tolerable limits but does not warrant a structural review.	
Scour (6000)	None.	Exists within tolerable limits or has been arrested with effective countermeasures.	Exceeds tolerable limits but is less than the critical limits determined by scour evaluation and does not warrant a structural review.	
Damage (7000)	None.	Impact damage is in fair condition.	Impact damage is in poor condition.	
Other (8000)	None.	Fair condition deficiencies not covered by other defects.	Poor condition deficiencies not covered by other defects.	

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Section 3.3.7 Bearing Elements and Defect Matrix

Element #	Element Name	Unit of Measure	Classification
310	Elastomeric Bearing	Each	NBE
311	Moveable Bearing	Each	NBE
312	Enclosed/Concealed Bearing	Each	NBE
313	Fixed Bearing	Each	NBE
314	Pot Bearing	Each	NBE
315	Disk Bearing	Each	NBE
316	Other Bearing	Each	NBE

Bearing Defects and Condition States				
Defects	CS 1 - Good	CS 2 - Fair	CS 3 - Poor	CS 4 - Severe
	Insignificant Defects	Minor Defects	Moderate Defects	Major Defects
Corrosion (1000)	None.	Freckled rust. Corrosion of the steel has initiated.	Section loss is evident, or pack rust is present but does not warrant a structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the element or structure; OR a structural review has been completed and the defects impact strength or serviceability of the element or structure.
Connection (1020)	Connection is in place and functioning as intended.	Loose fasteners or pack rust without distortion is present but the connection is in place and functioning as intended.	Missing bolts, rivets, broken welds, fasteners, or pack rust with distortion but does not warrant a structural review.	
Movement (2210)	Free to move.	Minor restriction.	Restricted, but does not warrant a structural review.	
Alignment (2220)	Lateral and vertical alignment is as expected for the temperature conditions.	Tolerable lateral or vertical alignment that is inconsistent with the temperature conditions.	Approaching the limits of lateral or vertical alignment for the bearing but does not warrant a structural review.	
Bulging, Splitting, or Tearing (2230)	None.	Bulging less than 15% of the thickness.	Bulging 15% or more of the thickness. Splitting or tearing. Bearing's surfaces are not parallel. Does not warrant a structural review.	
Loss of Bearing Area (2240)	None.	Less than 10%.	10% or more but does not warrant a structural review.	
Damage (7000)	None.	Minor impact damage.	Moderate impact damage.	
Other (8000)	None.	Minor deficiencies not covered by other defects.	Moderate deficiencies not covered by other defects.	

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Bearing Defects and Condition States			
Defects	CS 2 - Fair Minor Defects	CS 3 - Poor Moderate Defects	CS 4 - Severe Major Defects
Alignment (2220)	Tolerable lateral or vertical alignment that is inconsistent with the temperature conditions.	Approaching the limits of lateral or vertical alignment for the bearing but does not warrant a structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the element or structure; OR a structural review has been completed and the defects impact strength or serviceability of the element or structure.
			
Bulging, Splitting, or Tearing (2230)	Bulging less than 15% of the thickness.	Bulging 15% or more of the thickness. Splitting or tearing. Bearing's surfaces are not parallel. Does not warrant a structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the element or structure; OR a structural review has been completed and the defects impact strength or serviceability of the element or structure.
			Requesting representative photo for this defect condition.

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Bearing Defects and Condition States			
Defects	CS 2 - Fair Minor Defects	CS 3 - Poor Moderate Defects	CS 4 - Severe Major Defects
Loss of Bearing Area (2240)	Less than 10%.	10% or more but does not warrant a structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the element or structure; OR a structural review has been completed and the defects impact strength or serviceability of the element or structure.
			

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Section 3.3.8 Joint Elements and Defect Matrix

Element #	Element Name	Unit of Measure	Classification
300	Strip Seal Expansion Joint	Feet (ft)	BME
301	Pourable Joint Seal	Feet (ft)	BME
302	Compression Joint Seal	Feet (ft)	BME
303	Assembly Joint with Seal	Feet (ft)	BME
304	Open Expansion Joint	Feet (ft)	BME
305	Assembly Joint without Seal	Feet (ft)	BME
306	Other Joint	Feet (ft)	BME
308	Construction/Non-Expansion Joint	Feet (ft)	ADE
350	Approach Strip Seal Expansion Joint	Feet (ft)	ADE
351	Approach Pourable Joint Seal	Feet (ft)	ADE
352	Approach Compression Joint Seal	Feet (ft)	ADE
353	Approach Assembly Joint with Seal	Feet (ft)	ADE
354	Approach Open Expansion Joint	Feet (ft)	ADE
355	Approach Assembly Joint without Seal	Feet (ft)	ADE
356	Approach Other Joint	Feet (ft)	ADE
358	Approach Construction/Non-Expansion Joint	Feet (ft)	ADE

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Joint Defects and Condition States				
Defects	CS 1 - Good Insignificant Defects	CS 2 - Fair Minor Defects	CS 3 - Poor Moderate Defects	CS 4 - Severe Major Defects
Leakage (2310)	None.	Minimal. Minor dripping through the joint.	Moderate. More than a drip and less than free flow of water.	Free flow of water through the joint.
Seal Adhesion (2320)	Fully adhered.	Adhered for more than 50% of the joint height.	Adhered 50% or less of joint height, but still some adhesion.	Complete loss of adhesion.
Seal Damage (2330)	None.	Seal abrasion without punctures.	Punctured or ripped or partially pulled out.	Punctured completely through, pulled out, or missing.
Seal Cracking (2340)	None.	Surface crack.	Crack that partially penetrates the seal.	Crack that fully penetrates the seal.
Debris Impaction (2350)	No debris to a shallow cover of loose debris may be evident but does not affect the performance of the joint.	Partially filled with hard-packed material but still allowing free movement.	Completely filled and impacts joint movement.	Completely filled and prevents joint movement.
Adjacent Deck or Header (2360)	Sound. No spall, delamination, or unsound patch.	Edge delamination or spall 1 inch or less deep or 6 inches or less in diameter. No exposed rebar. Patched area that is sound.	Spall greater than 1 inch deep or greater than 6 inches in diameter. Exposed rebar. Delamination or unsound patched area that makes the joint loose.	Spall, delamination, unsound patched area, or loose joint anchor that prevents the joint from functioning as intended.
Metal Deterioration or Damage (2370)	None.	Freckled rust. Metal has no cracks or impact damage. Connection may be loose but functioning as intended.	Section loss, missing or broken fasteners, cracking of the metal, or impact damage but joint still functioning.	Metal cracking, section loss, damage, or connection failure that prevents the joint from functioning as intended.
Damage (7000)	None.	Minor impact damage.	Moderate impact damage.	Major impact damage.
Other (8000)	None.	Minor deficiencies not covered by other defects.	Moderate deficiencies not covered by other defects.	Major deficiencies not covered by other defects.

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Joint Defects and Condition States			
Defects	CS 2 - Fair Minor Defects	CS 3 - Poor Moderate Defects	CS 4 - Severe Major Defects
Seal Damage (2330)	Seal abrasion without punctures.	Punctured or ripped or partially pulled out.	Punctured completely through, pulled out, or missing.
			
Adjacent Deck or Header (2360)	Edge delamination or spall 1 inch or less deep or 6 inches or less in diameter. No exposed rebar. Patched area that is sound.	Spall greater than 1 inch deep or greater than 6 inches in diameter. Exposed rebar. Delamination or unsound patched area that makes the joint loose.	Spall, delamination, unsound patched area, or loose joint anchor that prevents the joint from functioning as intended.
			

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Section 3.3.9 Wearing Surface Element and Defect Matrix

Element #	Element Name	Unit of Measure	Classification
510	Wearing Surface	Square Feet (ft^2)	BME

Wearing Surface Defects and Condition States				
Defects	CS 1 - Good	CS 2 - Fair	CS 3 - Poor	CS 4 - Severe
	Insignificant Defects	Minor Defects	Moderate Defects	Major Defects
Delamination/Spall/ Patched Area/Pothole (Wearing Surfaces) (3210)	None.	Delaminated. Spall less than 1 inch deep or less than 6 inches in diameter. Patched area that is sound. Partial-depth pothole.	Spall 1 inch deep or greater or 6 inches in diameter or greater. Patched area that is unsound or showing distress. Full-depth pothole.	The wearing surface is no longer effective.
Crack (Wearing Surfaces) (3220)	Insignificant cracks (width less than 0.012 inch) or sealed medium width cracks. Crack spacing greater than 3 feet.	Unsealed medium width cracks (width 0.012-0.05 inch) or unsealed medium pattern/map cracking (spacing of 1-3 feet).	Wide cracks (width greater than 0.05 inch) or heavy pattern/map cracking (spacing less than 1 foot).	
Effectiveness (Wearing Surfaces) (3230)	Fully effective. No evidence of leakage or further deterioration of the protected element.	Substantially effective. Deterioration of the protected element has slowed.	Limited effectiveness. Deterioration of the protected element has progressed.	
Damage (7000)	None.	Minor impact damage.	Moderate impact damage.	
Other (8000)	None.	Minor deficiencies not covered by other defects.	Moderate deficiencies not covered by other defects.	

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Wearing Surface Defects and Condition States			
Defects	CS 2 - Fair Minor Defects	CS 3 - Poor Moderate Defects	CS 4 - Severe Major Defects
Delamination/Spall/ Patched Area/Pothole (Wearing Surfaces) (3210)	Delaminated. Spall less than 1 inch deep or less than 6 inches in diameter. Patched area that is sound. Partial-depth pothole.	Spall 1 inch deep or greater or 6 inches in diameter or greater. Patched area that is unsound or showing distress. Full-depth pothole.	The wearing surface is no longer effective.
			
Crack (Wearing Surfaces) (3220)	Unsealed medium width cracks (width 0.012-0.05 inch) or unsealed medium pattern/map cracking (spacing of 1-3 feet).	Wide cracks (width greater than 0.05 inch) or heavy pattern/map cracking (spacing less than 1 foot).	The wearing surface is no longer effective.
	Requesting representative photo for this defect condition.		

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Section 3.3.10 Steel Protective Coating Element and Defect Matrix

Element #	Element Name	Unit of Measure	Classification
515	Steel Protective Coating	Square Feet (ft^2)	BME

Steel Protective Coating Defects and Condition States				
Defects	CS 1 - Good	CS 2 - Fair	CS 3 - Poor	CS 4 - Severe
	Insignificant Defects	Minor Defects	Moderate Defects	Major Defects
Chalking (Steel Protective Coatings) (3410)	None.	Surface dulling.	Loss of pigment.	Not applicable.
Peeling/Bubbling/Cracking (Steel Protective Coatings) (3420)	None.	Finish coats only.	Finish and primer coats.	Exposure of bare metal.
Oxide Film Degradation Color/Texture Adherence (Steel Protective Coatings) (3430)	Yellow-orange or light brown for early development. Chocolate-brown to purple-brown for fully developed. Tightly adhered, capable of withstanding hammering or vigorous wire brushing.	Granular texture.	Small flakes (less than 0.5 inch diameter).	Dark black color. Large flakes (0.5 inch diameter or greater) or laminar sheets or nodules.
Effectiveness (Steel Protective Coatings) (3440)	Fully effective.	Substantially effective.	Limited effectiveness.	Failed; no protection of the underlying metal.
Damage (7000)	None.	Minor impact damage.	Moderate impact damage.	Major impact damage.
Other (8000)	None.	Minor deficiencies not covered by other defects.	Moderate deficiencies not covered by other defects.	Major deficiencies not covered by other defects.

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Section 3.3.11 Concrete Protective Coating Element and Defect Matrix

Element #	Element Name	Unit of Measure	Classification
521	Concrete Protective Coating	Square Feet (ft^2)	BME

Concrete Protective Coating Defects and Condition States				
Defects	CS 1 - Good	CS 2 - Fair	CS 3 - Poor	CS 4 - Severe
	Insignificant Defects	Minor Defects	Moderate Defects	Major Defects
Wear (Concrete Protective Coatings) (3510)	None.	Underlying concrete not exposed; coating showing wear from UV exposure; friction course missing.	Underlying concrete is not exposed; thickness of the coating is reduced.	Underlying concrete exposed. Protective coating no longer effective.
Effectiveness (Concrete Protective Coatings) (3540)	Fully effective.	Substantially effective.	Limited effectiveness.	The protective system has failed or is no longer effective.
Damage (7000)	None.	Minor impact damage.	Moderate impact damage.	Major impact damage.
Other (8000)	None.	Minor deficiencies not covered by other defects.	Moderate deficiencies not covered by other defects.	Major deficiencies not covered by other defects.

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Section 3.3.12 Concrete Reinforcing Steel Protective System Element and Defect Matrix

Element #	Element Name	Unit of Measure	Classification
520	Concrete Reinforcing Steel Protective System	Square Feet (ft^2)	BME

Concrete Reinforcing Steel Protective System Defects and Condition States				
Defects	CS 1 - Good	CS 2 - Fair	CS 3 - Poor	CS 4 - Severe
	Insignificant Defects	Minor Defects	Moderate Defects	Major Defects
Effectiveness-Protective System (e.g. cathodic) (3600)	Fully effective.	Substantially effective.	Limited effectiveness.	The protective system has failed or is no longer effective.
Damage (7000)	None.	Minor impact damage.	Moderate impact damage.	Major impact damage.
Other (8000)	None.	Minor deficiencies not covered by other defects.	Moderate deficiencies not covered by other defects.	Major deficiencies not covered by other defects.

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Section 3.3.13 Agency Defined Elements with Specific Condition States

Element #	Element Name	Unit of Measure	Classification
260	Slope, Slope Protection, Berm	Each	ADE
326	Wingwall	Each	ADE
335	Headwall	Each	ADE
342	Sign Attachment	Each	ADE
343	Pole Attachment	Each	ADE
372	False Bent/Temporary Support	Each	ADE
501	Channel/Bank	Each	ADE

Slope, Slope Protection, Berm Defects and Condition States				
Defects	CS 1 - Good	CS 2 - Fair	CS 3 - Poor	CS 4 - Severe
	Insignificant Defects	Minor Defects	Moderate Defects	Major Defects
Other (8000)	Natural or unprotected slopes Isolated minor erosion or scour. Slope adequately protects substructure unit.	Natural or unprotected slopes Widespread minor or isolated moderate erosion or scour. Slope may be starting to wash away. Slope substantially protects substructure unit.	Natural or unprotected slopes Widespread moderate or isolated major erosion or scour. Large areas of slope may have washed away. Slope may be alluvial material which is highly vulnerable to erosion and scour. Slope has limited effectiveness.	Natural or unprotected slopes Failed or no longer functioning. Substructure unit unprotected.
	Protected slopes Isolated minor erosion, scour, settlement, damage, or deterioration. Slope and substructure unit are adequately protected.	Protected slopes Widespread minor or isolated moderate erosion, scour, settlement, damage, or deterioration. Some riprap may be displaced. Grouted riprap may have cracks, a few missing rocks, or minor undermining. Slope paving may have cracking, spalling, settlement, voids, or isolated broken sections. Slope protection is substantially effective.	Protected slopes Widespread moderate or isolated major erosion, scour, settlement, damage, or deterioration. Large areas of riprap may have washed away. Grouted riprap may be undermined, broken, and/or large areas washed away. Slope paving may have large voids, loss of backfill, and/or large broken sections. Slope protection has limited effectiveness.	Protected slopes Failed or no longer functioning. Substructure unit unprotected.

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Wingwall Defects and Condition States				
Defects	CS 1 - Good	CS 2 - Fair	CS 3 - Poor	CS 4 - Severe
	Insignificant Defects	Minor Defects	Moderate Defects	Major Defects
Other (8000)	Insignificant pushing/leaning or separation. Joint nearly tight with no fill spilling through. Insignificant defects or isolated minor defects.	Minor pushing/leaning or separation. Joint may be open with minor amount of fill spilling through. Widespread minor defects or isolated moderate defects.	Moderate pushing/leaning or separation. Joint misaligned allowing fill to freely spill through. Widespread moderate defects or isolated major defects.	Failed or no longer functioning.

Headwall Defects and Condition States				
Defects	CS 1 - Good	CS 2 - Fair	CS 3 - Poor	CS 4 - Severe
	Insignificant Defects	Minor Defects	Moderate Defects	Major Defects
Other (8000)	Insignificant defects or isolated minor defects.	Widespread minor defects or isolated moderate defects.	Widespread moderate defects or isolated major defects.	Failed or no longer functioning.

Sign Attachment Defects and Condition States				
Defects	CS 1 - Good	CS 2 - Fair	CS 3 - Poor	CS 4 - Severe
	Insignificant Defects	Minor Defects	Moderate Defects	Major Defects
Other (8000)	Insignificant defects or isolated minor defects.	Widespread minor defects or isolated moderate defects.	Widespread moderate defects or isolated major defects.	Failed or no longer functioning.

Pole Attachment Defects and Condition States				
Defects	CS 1 - Good	CS 2 - Fair	CS 3 - Poor	CS 4 - Severe
	Insignificant Defects	Minor Defects	Moderate Defects	Major Defects
Other (8000)	Insignificant defects or isolated minor defects.	Widespread minor defects or isolated moderate defects.	Widespread moderate defects or isolated major defects.	Failed or no longer functioning.

False Bent/Temporary Support Defects and Condition States				
Defects	CS 1 - Good	CS 2 - Fair	CS 3 - Poor	CS 4 - Severe
	Insignificant Defects	Minor Defects	Moderate Defects	Major Defects
Other (8000)	System is functioning as intended, has full bearing with the superstructure, and the foundation is sound. Insignificant defects or isolated minor defects.	System is substantially effective but may have minor bearing loss with the superstructure and/or the foundation may have minor signs of instability. Widespread minor defects or isolated moderate defects.	System has limited effectiveness and may have moderate bearing loss with the superstructure and/or the foundation may have moderate signs of instability. Widespread moderate defects or isolated major defects.	System is no longer functioning as intended, no longer in contact with the superstructure, or the foundation is unstable. Failed.

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Channel/Bank Defects and Condition States				
Defects	CS 1 - Good Insignificant Defects	CS 2 - Fair Minor Defects	CS 3 - Poor Moderate Defects	CS 4 - Severe Major Defects
Other (8000)	Alignment Flow angle of attack less than 15 degrees with respect to the bridge substructure. Migration Insignificant signs of migration. Degradation Insignificant degradation. Aggradation Insignificant aggradation. Debris Insignificant debris. Bank Erosion/Instability Insignificant erosion/instability.	Alignment Flow angle of attack 15 to 30 degrees with respect to the bridge substructure. Migration Thalweg has moved from its baseline location but does not threaten the structure or approach roadway. Degradation Exists within tolerable limits. Aggradation Exists within tolerable limits. Debris Restricts channel slightly or is prone to build-up. Bank Erosion/Instability Erosion/instability that does not threaten the structure or approach roadway.	Alignment Flow angle of attack greater than 30 degrees with respect to the bridge substructure. Migration Thalweg has moved from its baseline location and threatens the structure or approach roadway. Degradation Exceeds tolerable limits but is less than the critical limits established by scour evaluation. Aggradation Exceeds tolerable limits. Hydraulic opening no longer adequate. Debris Large deposits exist and restrict the channel. Bank Erosion/Instability Erosion/instability that threatens the structure or approach roadway.	The condition warrants a structural and/or hydraulic review to determine the effect on strength, stability, or serviceability of the structure; OR a structural and/or hydraulic review has been completed and the defects impact strength, stability, or serviceability of the structure.

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Section 3.3.14 Agency Defined Elements with no Defects or Condition States

Element #	Element Name	Unit of Measure	Classification
322	Approach Roadway	Each	ADE
323	Approach Railing	Each	ADE
600	General Notes	Each	ADE

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Section 4 Detailed Element Descriptions

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Section 4.1 Introduction

Section 4 provides detailed descriptions of each element. Each element description has the following sections:

- Description – Detailed description of the element.
- Quantity Calculation – Procedure on how to calculate the quantity of the element.
- Procedure – Description of recommended inspection procedures for the element.
- Commentary – Additional guidance in regards to CDOT policies for element coding, naming conventions, and best practices.
- Element Categories – Defines which element category applies to the element.
- Defect Categories and Condition States – Defines which defect categories may apply to the element.

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Element 12 – Reinforced Concrete Deck

Units: Square Feet (ft^2) NBE

DESCRIPTION

Reinforced concrete bridge decks.

QUANTITY CALCULATION

Area of the deck including medians, flares, and ramps. For simplicity, the quantity may also be calculated as the average deck out-to-out in each span times the span length. When using this simplified calculation, the back face of abutments and centerline of piers can be used to calculate span lengths.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Deck bays should be referenced alphabetically from left to right looking in the direction of inventory by respective span. For example, the leftmost bay in Span 2 should be referenced as Bay 2A.

Asphalt patches in a concrete deck should be coded as if the spall has not been patched.

The condition of an overlaid deck without documentation of any repair shall be coded the same as it was prior to the overlay unless the deterioration was limited only to the asphalt (i.e. rutting or wear).

ELEMENT CATEGORY

Deck and Slab Elements

DEFECT CATEGORIES AND CONDITION STATES

Reinforced Concrete Defects and Condition States

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Element 13 – Prestressed Concrete Deck

Units: Square Feet (ft^2) NBE

DESCRIPTION

Prestressed concrete bridge decks.

QUANTITY CALCULATION

Area of the deck including medians, flares, and ramps. For simplicity, the quantity may also be calculated as the average deck out-to-out in each span times the span length. When using this simplified calculation, the back face of abutments and centerline of piers can be used to calculate span lengths.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Deck bays should be referenced alphabetically from left to right looking in the direction of inventory by respective span. For example, the leftmost bay in Span 2 should be referenced as Bay 2A.

Asphalt patches in a concrete deck should be coded as if the spall has not been patched.

The condition of an overlaid deck without documentation of any repair shall be coded the same as it was prior to the overlay unless the deterioration was limited only to the asphalt (i.e. rutting or wear).

ELEMENT CATEGORY

Deck and Slab Elements

DEFECT CATEGORIES AND CONDITION STATES

Prestressed Concrete Defects and Condition States

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Element 14 – Partial Height Deck Panel	Units: Square Feet (ft^2)	ADE

DESCRIPTION

Decks constructed with precast concrete panels 3 or more inches thick with a cast-in-place concrete deck on top. The precast panels can be either prestressed or conventionally reinforced.

QUANTITY CALCULATION

Area of the deck including medians, flares, and ramps. For simplicity, the quantity may also be calculated as the average deck out-to-out in each span times the span length. When using this simplified calculation, the back face of abutments and centerline of piers can be used to calculate span lengths.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Deck bays should be referenced alphabetically from left to right looking in the direction of inventory by respective span. For example, the leftmost bay in Span 2 should be referenced as Bay 2A.

This element includes both the precast panels and cast-in-place concrete deck, therefore when this element is used, Element 12 – Reinforced Concrete Deck should not be coded.

Asphalt patches in a concrete deck should be coded as if the spall has not been patched.

The condition of an overlaid deck without documentation of any repair shall be coded the same as it was prior to the overlay unless the deterioration was limited only to the asphalt (i.e. rutting or wear).

ELEMENT CATEGORY

Deck and Slab Elements

DEFECT CATEGORIES AND CONDITION STATES

Reinforced Concrete Defects and Condition States

Prestressed Concrete Defects and Condition States

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Element 15 – Prestressed Concrete Top Flange

Units: Square Feet (ft^2) NBE

DESCRIPTION

Prestressed concrete girder top flanges where traffic rides directly on the structural element or wearing surface for the structural element.

QUANTITY CALCULATION

Area of the deck including medians, flares, and ramps. For simplicity, the quantity may also be calculated as the average deck out-to-out in each span times the span length. When using this simplified calculation, the back face of abutments and centerline of piers can be used to calculate span lengths.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Deck bays should be referenced alphabetically from left to right looking in the direction of inventory by respective span. For example, the leftmost bay in Span 2 should be referenced as Bay 2A.

Concrete topping slabs less than 4 inches thick shall be considered a wearing surface and not a deck. Concrete topping slabs with a thickness of 4 inches or more shall be considered a deck.

Asphalt patches in a concrete top flange should be coded as if the spall has not been patched.

The condition of an overlaid deck without documentation of any repair shall be coded the same as it was prior to the overlay unless the deterioration was limited only to the asphalt (i.e. rutting or wear).

ELEMENT CATEGORY

Deck and Slab Elements

DEFECT CATEGORIES AND CONDITION STATES

Prestressed Concrete Defects and Condition States

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Element 16 – Reinforced Concrete Top Flange

Units: Square Feet (ft^2) NBE

DESCRIPTION

Reinforced concrete girder top flanges where traffic rides directly on the structural element or wearing surface for the structural element.

QUANTITY CALCULATION

Area of the deck including medians, flares, and ramps. For simplicity, the quantity may also be calculated as the average deck out-to-out in each span times the span length. When using this simplified calculation, the back face of abutments and centerline of piers can be used to calculate span lengths.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Deck bays should be referenced alphabetically from left to right looking in the direction of inventory by respective span. For example, the leftmost bay in Span 2 should be referenced as Bay 2A.

Concrete topping slabs less than 4 inches thick shall be considered a wearing surface and not a deck. Concrete topping slabs with a thickness of 4 inches or more shall be considered a deck.

Asphalt patches in a concrete top flange should be coded as if the spall has not been patched.

The condition of an overlaid deck without documentation of any repair shall be coded the same as it was prior to the overlay unless the deterioration was limited only to the asphalt (i.e. rutting or wear).

ELEMENT CATEGORY

Deck and Slab Elements

DEFECT CATEGORIES AND CONDITION STATES

Reinforced Concrete Defects and Condition States

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Element 28 – Steel Deck with Open Grid	Units: Square Feet (ft^2)	NBE

DESCRIPTION

Steel open grid bridge decks with no fill.

QUANTITY CALCULATION

Area of the deck including medians, flares, and ramps. For simplicity, the quantity may also be calculated as the average deck out-to-out in each span times the span length. When using this simplified calculation, the back face of abutments and centerline of piers can be used to calculate span lengths.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing results for all elements.

COMMENTARY

Deck bays should be referenced alphabetically from left to right looking in the direction of inventory by respective span. For example, the leftmost bay in Span 2 should be referenced as Bay 2A.

When the steel grid deck has concrete fill in the wheel tracks only, use Element 29 – Steel Deck with Concrete Filled Grid for the concrete filled portion and Element 28 – Steel Deck with Open Grid for the unfilled portion of the deck.

ELEMENT CATEGORY

Deck and Slab Elements

DEFECT CATEGORIES AND CONDITION STATES

Steel Defects and Condition States

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Element 29 – Steel Deck with Concrete Filled Grid | Units: Square Feet (ft^2) | NBE

DESCRIPTION

Steel grid bridge decks with concrete fill either in all of the openings or within the wheel tracks.

QUANTITY CALCULATION

Area of the deck including medians, flares, and ramps. For simplicity, the quantity may also be calculated as the average deck out-to-out in each span times the span length. When using this simplified calculation, the back face of abutments and centerline of piers can be used to calculate span lengths.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing results for all elements.

COMMENTARY

Deck bays should be referenced alphabetically from left to right looking in the direction of inventory by respective span. For example, the leftmost bay in Span 2 should be referenced as Bay 2A.

When the steel grid deck has concrete fill in the wheel tracks only, use Element 29 – Steel Deck with Concrete Filled Grid for the concrete filled portion and Element 28 – Steel Deck with Open Grid for the unfilled portion of the deck.

The condition of an overlaid deck without documentation of any repair shall be coded the same as it was prior to the overlay unless the deterioration was limited only to the asphalt (i.e. rutting or wear).

ELEMENT CATEGORY

Deck and Slab Elements

DEFECT CATEGORIES AND CONDITION STATES

Steel Defects and Condition States

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Element 30 – Steel Deck Corrugated/Orthotropic/Etc.	Units: Square Feet (ft^2)	NBE

DESCRIPTION

Corrugated metal bridge decks filled with concrete, asphalt, or other riding surfaces. Orthotropic steel decks are also included.

QUANTITY CALCULATION

Area of the deck including medians, flares, and ramps. For simplicity, the quantity may also be calculated as the average deck out-to-out in each span times the span length. When using this simplified calculation, the back face of abutments and centerline of piers can be used to calculate span lengths.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing results for all elements.

COMMENTARY

Deck bays should be referenced alphabetically from left to right looking in the direction of inventory by respective span. For example, the leftmost bay in Span 2 should be referenced as Bay 2A.

The condition of an overlaid deck without documentation of any repair shall be coded the same as it was prior to the overlay unless the deterioration was limited only to the asphalt (i.e. rutting or wear).

ELEMENT CATEGORY

Deck and Slab Elements

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Steel Defects and Condition States

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Element 31 – Timber Deck

Units: Square Feet (ft^2) NBE

DESCRIPTION

Timber bridge decks.

QUANTITY CALCULATION

Area of the deck including medians, flares, and ramps. For simplicity, the quantity may also be calculated as the average deck out-to-out in each span times the span length. When using this simplified calculation, the back face of abutments and centerline of piers can be used to calculate span lengths.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Deck bays should be referenced alphabetically from left to right looking in the direction of inventory by respective span. For example, the leftmost bay in Span 2 should be referenced as Bay 2A.

The condition of an overlaid deck without documentation of any repair shall be coded the same as it was prior to the overlay unless the deterioration was limited only to the asphalt (i.e. rutting or wear).

ELEMENT CATEGORY

Deck and Slab Elements

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Timber Defects and Condition States

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Element 38 – Reinforced Concrete Slab

Units: Square Feet (ft^2) NBE

DESCRIPTION

Reinforced concrete bridge slabs.

QUANTITY CALCULATION

Area of the slab including medians, flares, and ramps. For simplicity, the quantity may also be calculated as the average deck out-to-out in each span times the span length. When using this simplified calculation, the back face of abutments and centerline of piers can be used to calculate span lengths.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Asphalt patches in a concrete slab should be coded as if the spall has not been patched.

The condition of an overlaid slab without documentation of any repair shall be coded the same as it was prior to the overlay unless the deterioration was limited only to the asphalt (i.e. rutting or wear).

ELEMENT CATEGORY

Deck and Slab Elements

DEFECT CATEGORIES AND CONDITION STATES

Reinforced Concrete Defects and Condition States

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Element 54 – Timber Slab	Units: Square Feet (ft^2)	NBE

DESCRIPTION

Timber bridge slabs.

QUANTITY CALCULATION

Area of the slab including medians, flares, and ramps. For simplicity, the quantity may also be calculated as the average deck out-to-out in each span times the span length. When using this simplified calculation, the back face of abutments and centerline of piers can be used to calculate span lengths.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

The condition of an overlaid slab without documentation of any repair shall be coded the same as it was prior to the overlay unless the deterioration was limited only to the asphalt (i.e. rutting or wear).

ELEMENT CATEGORY

Deck and Slab Elements

DEFECT CATEGORIES AND CONDITION STATES

Timber Defects and Condition States

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Element 60 – Other Deck

Units: Square Feet (ft^2) NBE

DESCRIPTION

Bridge decks constructed of materials not covered by other elements.

QUANTITY CALCULATION

Area of the deck including medians, flares, and ramps. For simplicity, the quantity may also be calculated as the average deck out-to-out in each span times the span length. When using this simplified calculation, the back face of abutments and centerline of piers can be used to calculate span lengths.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Deck bays should be referenced alphabetically from left to right looking in the direction of inventory by respective span. For example, the leftmost bay in Span 2 should be referenced as Bay 2A.

The condition of an overlaid deck without documentation of any repair shall be coded the same as it was prior to the overlay unless the deterioration was limited only to the asphalt (i.e. rutting or wear).

ELEMENT CATEGORY

Deck and Slab Elements

DEFECT CATEGORIES AND CONDITION STATES

Other Material Defects and Condition States

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Element 65 – Other Slab	Units: Square Feet (ft^2)	NBE

DESCRIPTION

Bridge slabs constructed of materials not covered by other elements.

QUANTITY CALCULATION

Area of the slab including medians, flares, and ramps. For simplicity, the quantity may also be calculated as the average deck out-to-out in each span times the span length. When using this simplified calculation, the back face of abutments and centerline of piers can be used to calculate span lengths.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

The condition of an overlaid slab without documentation of any repair shall be coded the same as it was prior to the overlay unless the deterioration was limited only to the asphalt (i.e. rutting or wear).

ELEMENT CATEGORY

Deck and Slab Elements

DEFECT CATEGORIES AND CONDITION STATES

Other Material Defects and Condition States

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Element 102 – Steel Closed Web/Box Girder	Units: Feet (ft)	NBE

DESCRIPTION

Steel closed web or box girders.

QUANTITY CALCULATION

Sum of the lengths of each girder. For simplicity, the quantity may also be calculated as the number of girders in each span times the span length. When using this simplified calculation, the back face of abutments and centerline of piers can be used to calculate span lengths.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing results for all elements. Any indication of cracking or fracture shall be evaluated and quantified by a qualified ASNT technician as defined by CDOT. The date of evaluation and summary of methods and findings shall be captured in the report.

COMMENTARY

Girders should be referenced alphabetically from left to right when looking in the direction of inventory by respective span. For example, the leftmost girder in Span 2 should be referenced as Girder 2A.

ELEMENT CATEGORY

Superstructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Steel Defects and Condition States

Click to return to: Table of Contents

Element 104 – Prestressed Concrete Closed Web/Box Girder	Units: Feet (ft)	NBE

DESCRIPTION

Pretensioned or post-tensioned concrete closed web or box girders.

QUANTITY CALCULATION

Sum of the lengths of each girder. For simplicity, the quantity may also be calculated as the number of girders in each span times the span length. When using this simplified calculation, the back face of abutments and centerline of piers can be used to calculate span lengths.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Girders should be referenced alphabetically from left to right when looking in the direction of inventory by respective span. For example, the leftmost girder in Span 2 should be referenced as Girder 2A.

For bridges with no deck above prestressed concrete girder top flanges, the girder top flanges above the fillet shall be evaluated as the deck using Element 15 – Prestressed Concrete Top Flange and excluded from this element. When Element 15 is used, the condition of the top flange shall not affect the condition states of the girder element.

ELEMENT CATEGORY

Superstructure Elements

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Prestressed Concrete Defects and Condition States

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Element 105 – Reinforced Concrete Closed Web/Box Girder	Units: Feet (ft)	NBE

DESCRIPTION

Reinforced concrete closed web or box girders.

QUANTITY CALCULATION

Sum of the lengths of each girder. For simplicity, the quantity may also be calculated as the number of girders in each span times the span length. When using this simplified calculation, the back face of abutments and centerline of piers can be used to calculate span lengths.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Girders should be referenced alphabetically from left to right when looking in the direction of inventory by respective span. For example, the leftmost girder in Span 2 should be referenced as Girder 2A.

For bridges with no deck above reinforced concrete girder top flanges, the girder top flanges above the fillet shall be evaluated as the deck using Element 16 – Reinforced Concrete Top Flange and excluded from this element. When Element 16 is used, the condition of the top flange shall not affect the condition states of the girder element.

ELEMENT CATEGORY

Superstructure Elements

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Reinforced Concrete Defects and Condition States

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Element 106 – Other Closed Web/Box Girder	Units: Feet (ft)	NBE

DESCRIPTION

Closed web or box girders constructed of materials not covered by other elements.

QUANTITY CALCULATION

Sum of the lengths of each girder. For simplicity, the quantity may also be calculated as the number of girders in each span times the span length. When using this simplified calculation, the back face of abutments and centerline of piers can be used to calculate span lengths.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Girders should be referenced alphabetically from left to right when looking in the direction of inventory by respective span. For example, the leftmost girder in Span 2 should be referenced as Girder 2A.

ELEMENT CATEGORY

Superstructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Other Material Defects and Condition States

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Element 107 – Steel Open Girder/Beam	Units: Feet (ft)	NBE

DESCRIPTION

Steel open web girders.

QUANTITY CALCULATION

Sum of the lengths of each girder. For simplicity, the quantity may also be calculated as the number of girders in each span times the span length. When using this simplified calculation, the back face of abutments and centerline of piers can be used to calculate span lengths.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing results for all elements. Any indication of cracking or fracture shall be evaluated and quantified by a qualified ASNT technician as defined by CDOT. The date of evaluation and summary of methods and findings shall be captured in the report.

COMMENTARY

Girders should be referenced alphabetically from left to right when looking in the direction of inventory by respective span. For example, the leftmost girder in Span 2 should be referenced as Girder 2A.

ELEMENT CATEGORY

Superstructure Elements

DEFECT CATEGORIES AND CONDITION STATES

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Element 109 – Prestressed Concrete Open Girder/Beam	Units: Feet (ft)	NBE

DESCRIPTION

Pretensioned or post-tensioned concrete open web girders.

QUANTITY CALCULATION

Sum of the lengths of each girder. For simplicity, the quantity may also be calculated as the number of girders in each span times the span length. When using this simplified calculation, the back face of abutments and centerline of piers can be used to calculate span lengths.

For prestressed open girders with multiple webs the reported girder length should be per web. For example, the element quantity of one prestressed concrete double-tee girder should be span length times two.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Girders should be referenced alphabetically from left to right when looking in the direction of inventory by respective span. For example, the leftmost girder in Span 2 should be referenced as Girder 2A.

For bridges with no deck above prestressed concrete girder top flanges, the girder top flanges above the fillet shall be evaluated as the deck using Element 15 – Prestressed Concrete Top Flange and excluded from this element. When Element 15 is used, the condition of the top flange shall not affect the condition states of the girder element.

ELEMENT CATEGORY

Superstructure Elements

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Prestressed Concrete Defects and Condition States

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Element 110 – Reinforced Concrete Open Girder/Beam	Units: Feet (ft)	NBE

DESCRIPTION

Reinforced concrete open web girders.

QUANTITY CALCULATION

Sum of the lengths of each girder. For simplicity, the quantity may also be calculated as the number of girders in each span times the span length. When using this simplified calculation, the back face of abutments and centerline of piers can be used to calculate span lengths.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Girders should be referenced alphabetically from left to right when looking in the direction of inventory by respective span. For example, the leftmost girder in Span 2 should be referenced as Girder 2A.

For bridges with no deck above reinforced concrete girder top flanges, the girder top flanges above the fillet shall be evaluated as the deck using Element 16 – Reinforced Concrete Top Flange and excluded from this element. When Element 16 is used, the condition of the top flange shall not affect the condition states of the girder element.

ELEMENT CATEGORY

Superstructure Elements

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Reinforced Concrete Defects and Condition States

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Element 111 – Timber Open Girder/Beam	Units: Feet (ft)	NBE

DESCRIPTION

Timber girders.

QUANTITY CALCULATION

Sum of the lengths of each girder. For simplicity, the quantity may also be calculated as the number of girders in each span times the span length. When using this simplified calculation, the back face of abutments and centerline of piers can be used to calculate span lengths.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Girders should be referenced alphabetically from left to right when looking in the direction of inventory by respective span. For example, the leftmost girder in Span 2 should be referenced as Girder 2A.

Timber girders which have been doubled for repair shall be designated with an apostrophe. For example, if Girder E has been repaired via doubling, the members should be referenced as Girders E and E'. The reported girder length shall not be doubled.

When reporting quantities in the various condition states, the entire timber girder length in the controlling condition state is to be reported per girder. For example, if the girder is 23' long, the reporting quantity is 23' in the controlling condition state contained within that girder.

When timber girders enter Condition State 3 or 4 and have been adequately repaired, they revert back to Condition State 2. However, when 25% of the total number of girders are split, cracked, OR repaired, then all of those girders shall be listed in Condition State 4 and remain there along with any new split, cracked, or repaired girders.

ELEMENT CATEGORY

Superstructure Elements

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Timber Defects and Condition States

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Element 112 – Other Open Girder/Beam	Units: Feet (ft)	NBE

DESCRIPTION

Open web girders constructed of materials not covered by other elements.

QUANTITY CALCULATION

Sum of the lengths of each girder. For simplicity, the quantity may also be calculated as the number of girders in each span times the span length. When using this simplified calculation, the back face of abutments and centerline of piers can be used to calculate span lengths.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Girders should be referenced alphabetically from left to right when looking in the direction of inventory by respective span. For example, the leftmost girder in Span 2 should be referenced as Girder 2A.

ELEMENT CATEGORY

Superstructure Elements

DEFECT CATEGORIES AND CONDITION STATES

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Element 113 – Steel Stringer	Units: Feet (ft)	NBE

DESCRIPTION

Steel members that support the deck in a stringer floor beam system.

QUANTITY CALCULATION

Sum of the lengths of each stringer. For simplicity, the quantity may also be calculated as the number of stringers in each span times the span length. When using this simplified calculation, the back face of abutments and centerline of piers can be used to calculate span lengths.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing results for all elements. Any indication of cracking or fracture shall be evaluated and quantified by a qualified ASNT technician as defined by CDOT. The date of evaluation and summary of methods and findings shall be captured in the report.

COMMENTARY

Stringers should be referenced alphabetically from left to right looking in the direction of inventory by respective span. For example, the leftmost stringer in Span 2 should be referenced as Stringer 2A.

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Superstructure Elements

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Steel Defects and Condition States

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Element 115 – Prestressed Concrete Stringer	Units: Feet (ft)	NBE

DESCRIPTION

Pretensioned or post-tensioned concrete members that support the deck in a stringer floor beam system.

QUANTITY CALCULATION

Sum of the lengths of each stringer. For simplicity, the quantity may also be calculated as the number of stringers in each span times the span length. When using this simplified calculation, the back face of abutments and centerline of piers can be used to calculate span lengths.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Stringers should be referenced alphabetically from left to right looking in the direction of inventory by respective span. For example, the leftmost stringer in Span 2 should be referenced as Stringer 2A.

ELEMENT CATEGORY

Superstructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Prestressed Concrete Defects and Condition States

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Element 116 – Reinforced Concrete Stringer	Units: Feet (ft)	NBE

DESCRIPTION

Reinforced concrete members that support the deck in a stringer floor beam system.

QUANTITY CALCULATION

Sum of the lengths of each stringer. For simplicity, the quantity may also be calculated as the number of stringers in each span times the span length. When using this simplified calculation, the back face of abutments and centerline of piers can be used to calculate span lengths.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Stringers should be referenced alphabetically from left to right looking in the direction of inventory by respective span. For example, the leftmost stringer in Span 2 should be referenced as Stringer 2A.

ELEMENT CATEGORY

Superstructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Reinforced Concrete Defects and Condition States

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Element 117 – Timber Stringer	Units: Feet (ft)	NBE

DESCRIPTION

Timber members that support the deck in a stringer floor beam system.

QUANTITY CALCULATION

Sum of the lengths of each stringer. For simplicity, the quantity may also be calculated as the number of stringers in each span times the span length. When using this simplified calculation, the back face of abutments and centerline of piers can be used to calculate span lengths.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Stringers should be referenced alphabetically from left to right looking in the direction of inventory by respective span. For example, the leftmost stringer in Span 2 should be referenced as Stringer 2A.

Timber stringers which have been doubled for repair shall be designated with an apostrophe. For example, if Stringer E has been repaired via doubling, the members should be referenced as Stringers E and E'. The reported stringer length shall not be doubled.

When reporting quantities in the various condition states, the entire timber stringer length in the controlling condition state is to be reported per stringer. For example, if the stringer is 23' long, the reporting quantity is 23' in the controlling condition state contained within that stringer.

When timber stringers enter Condition State 3 or 4 and have been adequately repaired, they revert back to Condition State 2. However, when 25% of the total number of stringers are split, cracked, OR repaired, then all of those stringers shall be listed in Condition State 4 and remain there along with any new split, cracked, or repaired stringers.

ELEMENT CATEGORY

Superstructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Timber Defects and Condition States

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Element 118 – Other Stringer	Units: Feet (ft)	NBE

DESCRIPTION

Members that support the deck in a stringer floor beam system constructed of materials not covered by other elements.

QUANTITY CALCULATION

Sum of the lengths of each stringer. For simplicity, the quantity may also be calculated as the number of stringers in each span times the span length. When using this simplified calculation, the back face of abutments and centerline of piers can be used to calculate span lengths.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Stringers should be referenced alphabetically from left to right looking in the direction of inventory by respective span. For example, the leftmost stringer in Span 2 should be referenced as Stringer 2A.

ELEMENT CATEGORY

Superstructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Other Material Defects and Condition States

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Element 120 – Steel Truss	Units: Feet (ft)	NBE

DESCRIPTION

Steel trusses, including all tension and compression members for through and deck trusses.

QUANTITY CALCULATION

Sum of the lengths of each truss. For simplicity, the quantity may also be calculated as the number of trusses in each span times the span length. When using this simplified calculation, the back face of abutments and centerline of piers can be used to calculate span lengths.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing results for all elements. Any indication of cracking or fracture shall be evaluated and quantified by a qualified ASNT technician as defined by CDOT. The date of evaluation and summary of methods and findings shall be captured in the report.

COMMENTARY

Trusses should be referenced alphabetically left to right looking in the direction of inventory by respective span. For example, the leftmost truss in Span 2 should be referenced as Truss 2A.

ELEMENT CATEGORY

Superstructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Steel Defects and Condition States

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Element 135 – Timber Truss	Units: Feet (ft)	NBE

DESCRIPTION

Timber trusses, including all tension and compression members for through and deck trusses.

QUANTITY CALCULATION

Sum of the lengths of each truss. For simplicity, the quantity may also be calculated as the number of trusses in each span times the span length. When using this simplified calculation, the back face of abutments and centerline of piers can be used to calculate span lengths.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Trusses should be referenced alphabetically left to right looking in the direction of inventory by respective span. For example, the leftmost truss in Span 2 should be referenced as Truss 2A.

ELEMENT CATEGORY

Superstructure Elements

DEFECT CATEGORIES AND CONDITION STATES

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Element 136 – Other Truss	Units: Feet (ft)	NBE

DESCRIPTION

Trusses constructed of materials not covered by other elements, including all tension and compression members for through and deck trusses.

QUANTITY CALCULATION

Sum of the lengths of each truss. For simplicity, the quantity may also be calculated as the number of trusses in each span times the span length. When using this simplified calculation, the back face of abutments and centerline of piers can be used to calculate span lengths.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Trusses should be referenced alphabetically left to right looking in the direction of inventory by respective span. For example, the leftmost truss in Span 2 should be referenced as Truss 2A.

ELEMENT CATEGORY

Superstructure Elements

DEFECT CATEGORIES AND CONDITION STATES

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Element 141 – Steel Arch	Units: Feet (ft)	NBE

DESCRIPTION

Steel arches.

QUANTITY CALCULATION

Sum of the lengths of each arch. For simplicity, the quantity may also be calculated as the number of arches in each span times the span length. When using this simplified calculation, the back face of abutments and centerline of piers can be used to calculate span lengths.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing results for all elements. Any indication of cracking or fracture shall be evaluated and quantified by a qualified ASNT technician as defined by CDOT. The date of evaluation and summary of methods and findings shall be captured in the report.

COMMENTARY

Arches should be referenced alphabetically left to right looking in the direction of inventory by respective span. For example, the leftmost arch in Span 2 should be referenced as Arch 2A.

ELEMENT CATEGORY

Superstructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Steel Defects and Condition States

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Element 142 – Other Arch	Units: Feet (ft)	NBE

DESCRIPTION

Arches constructed of materials not covered by other elements.

QUANTITY CALCULATION

Sum of the lengths of each arch. For simplicity, the quantity may also be calculated as the number of arches in each span times the span length. When using this simplified calculation, the back face of abutments and centerline of piers can be used to calculate span lengths.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Arches should be referenced alphabetically left to right looking in the direction of inventory by respective span. For example, the leftmost arch in Span 2 should be referenced as Arch 2A.

An example of an other material arch is an aluminum arch.

ELEMENT CATEGORY

Superstructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Other Material Defects and Condition States

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Element 143 – Prestressed Concrete Arch	Units: Feet (ft)	NBE

DESCRIPTION

Pretensioned or post-tensioned concrete arches.

QUANTITY CALCULATION

Sum of the lengths of each arch. For simplicity, the quantity may also be calculated as the number of arches in each span times the span length. When using this simplified calculation, the back face of abutments and centerline of piers can be used to calculate span lengths.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Arches should be referenced alphabetically left to right looking in the direction of inventory by respective span. For example, the leftmost arch in Span 2 should be referenced as Arch 2A.

ELEMENT CATEGORY

Superstructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Prestressed Concrete Defects and Condition States

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Element 144 – Reinforced Concrete Arch	Units: Feet (ft)	NBE

DESCRIPTION

Reinforced concrete arches.

QUANTITY CALCULATION

Sum of the lengths of each arch. For simplicity, the quantity may also be calculated as the number of arches in each span times the span length. When using this simplified calculation, the back face of abutments and centerline of piers can be used to calculate span lengths.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Arches should be referenced alphabetically left to right looking in the direction of inventory by respective span. For example, the leftmost arch in Span 2 should be referenced as Arch 2A.

ELEMENT CATEGORY

Superstructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Reinforced Concrete Defects and Condition States

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Element 145 – Masonry Arch	Units: Feet (ft)	NBE

DESCRIPTION

Masonry blocks or stacked stone arches.

QUANTITY CALCULATION

Sum of the lengths of each arch. For simplicity, the quantity may also be calculated as the number of arches in each span times the span length. When using this simplified calculation, the back face of abutments and centerline of piers can be used to calculate span lengths.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Arches should be referenced alphabetically left to right looking in the direction of inventory by respective span. For example, the leftmost arch in Span 2 should be referenced as Arch 2A.

ELEMENT CATEGORY

Superstructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Masonry Defects and Condition States

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Element 146 – Timber Arch	Units: Feet (ft)	NBE

DESCRIPTION

Timber arches.

QUANTITY CALCULATION

Sum of the lengths of each arch. For simplicity, the quantity may also be calculated as the number of arches in each span times the span length. When using this simplified calculation, the back face of abutments and centerline of piers can be used to calculate span lengths.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Arches should be referenced alphabetically left to right looking in the direction of inventory by respective span. For example, the leftmost arch in Span 2 should be referenced as Arch 2A.

ELEMENT CATEGORY

Superstructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Timber Defects and Condition States

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Element 147 – Steel Main Cable	Units: Feet (ft)	NBE

DESCRIPTION

Steel main suspension or cable stay cables not embedded in concrete.

QUANTITY CALCULATION

Sum of the lengths of each cable. For simplicity, the quantity may also be calculated as the number of cables in each span times the span length. When using this simplified calculation, the back face of abutments and centerline of piers can be used to calculate span lengths.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing results for all elements. Any indication of cracking or fracture shall be evaluated and quantified by a qualified ASNT technician as defined by CDOT. The date of evaluation and summary of methods and findings shall be captured in the report.

COMMENTARY

No additional commentary.

ELEMENT CATEGORY

Superstructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Steel Defects and Condition States

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Element 148 – Steel Secondary Cable	Units: Each	NBE

DESCRIPTION

Steel suspender cables not embedded in concrete.

QUANTITY CALCULATION

Sum of the individual cables or cable groups.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing results for all elements. Any indication of cracking or fracture shall be evaluated and quantified by a qualified ASNT technician as defined by CDOT. The date of evaluation and summary of methods and findings shall be captured in the report.

COMMENTARY

This element is intended for the use of suspender cables, other smaller cables, or groups of cables in one location acting as a system to carry loads from the superstructure to the main cables/arches. Suspension bridge main cables or cable stays shall be captured using Element 147 – Steel Main Cable.

ELEMENT CATEGORY

Superstructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Steel Defects and Condition States

Click to return to: Table of Contents

Element 149 – Other Secondary Cable	Units: Each	NBE

DESCRIPTION

Suspender cables constructed of materials not covered by other elements and not embedded in concrete.

QUANTITY CALCULATION

Sum of the individual cables or cable groups.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

This element is intended for use on suspender cables, other smaller cables, or groups of cables in one location acting as a system to carry loads from the deck/superstructure to the main cables/arches. Suspension bridge main cables or cable stays shall be captured using Element 147 – Steel Main Cable.

ELEMENT CATEGORY

Superstructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Other Material Defects and Condition States

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Element 152 – Steel Floor Beam	Units: Feet (ft)	NBE

DESCRIPTION

Steel floor beams.

QUANTITY CALCULATION

Sum of the lengths of each floor beam.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing results for all elements. Any indication of cracking or fracture shall be evaluated and quantified by a qualified ASNT technician as defined by CDOT. The date of evaluation and summary of methods and findings shall be captured in the report.

COMMENTARY

Floor beams should be referenced numerically looking in the direction of inventory. For floor beams located at an abutment or pier, numbering typically starts at 0. For example, the floor beam at Abutment 1 should be referenced as Floor Beam 0 in Span 1. Floor beam numbering typically restarts for each truss/arch or change in superstructure type.

ELEMENT CATEGORY

Superstructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Steel Defects and Condition States

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Element 154 – Prestressed Concrete Floor Beam	Units: Feet (ft)	NBE

DESCRIPTION

Pretensioned or post-tensioned concrete floor beams.

QUANTITY CALCULATION

Sum of the lengths of each floor beam.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Floor beams should be referenced numerically looking in the direction of inventory. For floor beams located at an abutment or pier, numbering typically starts at 0. For example, the floor beam at Abutment 1 should be referenced as Floor Beam 0 in Span 1. Floor beam numbering typically restarts for each truss/arch or change in superstructure type.

ELEMENT CATEGORY

Superstructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Prestressed Concrete Defects and Condition States

Click to return to: Table of Contents

Element 155 – Reinforced Concrete Floor Beam	Units: Feet (ft)	NBE

DESCRIPTION

Reinforced concrete floor beams.

QUANTITY CALCULATION

Sum of the lengths of each floor beam.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Floor beams should be referenced numerically looking in the direction of inventory. For floor beams located at an abutment or pier, numbering typically starts at 0. For example, the floor beam at Abutment 1 should be referenced as Floor Beam 0 in Span 1. Floor beam numbering typically restarts for each truss/arch or change in superstructure type.

ELEMENT CATEGORY

Superstructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Reinforced Concrete Defects and Condition States

Click to return to: Table of Contents

Element 156 – Timber Floor Beam	Units: Feet (ft)	NBE

DESCRIPTION

Timber floor beams.

QUANTITY CALCULATION

Sum of the lengths of each floor beam.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Floor beams should be referenced numerically looking in the direction of inventory. For floor beams located at an abutment or pier, numbering typically starts at 0. For example, the floor beam at Abutment 1 should be referenced as Floor Beam 0 in Span 1. Floor beam numbering typically restarts for each truss/arch or change in superstructure type.

ELEMENT CATEGORY

Superstructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Timber Defects and Condition States

Click to return to: Table of Contents

Element 157 – Other Floor Beam	Units: Feet (ft)	NBE

DESCRIPTION

Floor beams constructed of materials not covered by other elements.

QUANTITY CALCULATION

Sum of the lengths of each floor beam.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Floor beams should be referenced numerically looking in the direction of inventory. For floor beams located at an abutment or pier, numbering typically starts at 0. For example, the floor beam at Abutment 1 should be referenced as Floor Beam 0 in Span 1. Floor beam numbering typically restarts for each truss/arch or change in superstructure type.

ELEMENT CATEGORY

Superstructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Other Material Defects and Condition States

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Element 161 – Steel Pin, Pin and Hanger Assembly, or both	Units: Each	NBE

DESCRIPTION

Steel pins and pin and hanger assemblies.

QUANTITY CALCULATION

Sum of the individual pins or pin and hanger assemblies. The quantity for each pin and hanger assembly shall be one regardless of the number of individual pins within that assembly.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing results for all elements. Any indication of cracking or fracture shall be evaluated and quantified by a qualified ASNT technician as defined by CDOT. The date of evaluation and summary of methods and findings shall be captured in the report.

COMMENTARY

Pins and pin and hanger assemblies can be referenced by the panel point connection or connecting members. For example, a truss pin can be referenced as the Pin at Truss 2A, Panel Point 0. Also, a girder pin and hanger assembly can be referenced as the Girder 2A Pin and Hanger Assembly.

ELEMENT CATEGORY

Superstructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Steel Defects and Condition States

Click to return to: Table of Contents

Element 162 – Steel Gusset Plate	Units: Each	NBE

DESCRIPTION

Steel gusset plate assemblies that connect primary members at the main truss/arch panel points.

QUANTITY CALCULATION

Sum of the individual primary load path gusset plate assemblies. The quantity for each assembly shall be one regardless of the number of individual gusset plates at that assembly.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing results for all elements. Any indication of cracking or fracture shall be evaluated and quantified by a qualified ASNT technician as defined by CDOT. The date of evaluation and summary of methods and findings shall be captured in the report.

COMMENTARY

Gusset plates should be referenced by the panel point connection. For panel points with two gusset plates, the gusset plates can be differentiated as inboard and outboard gusset plates. For example, the leftmost (exterior) gusset plate at the first panel point for the lower chord of the leftmost truss in Span 2 should be referenced as Truss 2A, Panel Point L0, outboard Gusset Plate.

Gusset plates for secondary members such as truss lower lateral bracing are not included in this element.

ELEMENT CATEGORY

Superstructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Steel Defects and Condition States

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Element 202 – Steel Column	Units: Each	NBE

DESCRIPTION

Steel columns that are visible for inspection, including columns exposed from erosion or scour and columns visible during an underwater inspection.

QUANTITY CALCULATION

Sum of the individual columns.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing results for all elements.

COMMENTARY

Columns should be referenced alphabetically from left to right looking in the direction of inventory for each abutment, pier, or bent. For example, the leftmost column at Pier 2 should be referenced as Column 2A.

Vertical substructure units less than 6 feet wide shall be considered columns. Vertical substructure units equal to or greater than 6 feet wide shall be considered walls. This applies to both cylindrical and variable width shapes. Variable width walls shall be measured at the widest portion excluding the cap.

ELEMENT CATEGORY

Substructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Steel Defects and Condition States

Click to return to: Table of Contents

Element 203 – Other Column	Units: Each	NBE

DESCRIPTION

Columns constructed of materials not covered by other elements that are visible for inspection, including columns exposed from erosion or scour and columns visible during an underwater inspection.

QUANTITY CALCULATION

Sum of the individual columns.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Columns should be referenced alphabetically from left to right looking in the direction of inventory for each abutment, pier, or bent. For example, the leftmost column at Pier 2 should be referenced as Column 2A.

Vertical substructure units less than 6 feet wide shall be considered columns. Vertical substructure units equal to or greater than 6 feet wide shall be considered walls. This applies to both cylindrical and variable width shapes. Variable width walls shall be measured at the widest portion excluding the cap.

ELEMENT CATEGORY

Substructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Other Material Defects and Condition States

Click to return to: Table of Contents

Element 204 – Prestressed Concrete Column	Units: Each	NBE

DESCRIPTION

Prestressed concrete columns that are visible for inspection, including columns exposed from erosion or scour and columns visible during an underwater inspection.

QUANTITY CALCULATION

Sum of the individual columns.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Columns should be referenced alphabetically from left to right looking in the direction of inventory for each abutment, pier, or bent. For example, the leftmost column at Pier 2 should be referenced as Column 2A.

Vertical substructure units less than 6 feet wide shall be considered columns. Vertical substructure units equal to or greater than 6 feet wide shall be considered walls. This applies to both cylindrical and variable width shapes. Variable width walls shall be measured at the widest portion excluding the cap.

ELEMENT CATEGORY

Substructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Prestressed Concrete Defects and Condition States

Click to return to: Table of Contents

Element 205 – Reinforced Concrete Column	Units: Each	NBE

DESCRIPTION

Reinforced concrete columns that are visible for inspection, including columns exposed from erosion or scour and columns visible during an underwater inspection.

QUANTITY CALCULATION

Sum of the individual columns.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Columns should be referenced alphabetically from left to right looking in the direction of inventory for each abutment, pier, or bent. For example, the leftmost column at Pier 2 should be referenced as Column 2A.

Vertical substructure units less than 6 feet wide shall be considered columns. Vertical substructure units equal to or greater than 6 feet wide shall be considered walls. This applies to both cylindrical and variable width shapes. Variable width walls shall be measured at the widest portion excluding the cap.

ELEMENT CATEGORY

Substructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Reinforced Concrete Defects and Condition States

Click to return to: Table of Contents

Element 206 – Timber Column	Units: Each	NBE

DESCRIPTION

Timber columns that are visible for inspection, including columns exposed from erosion or scour and columns visible during an underwater inspection.

QUANTITY CALCULATION

Sum of the individual columns.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Columns should be referenced alphabetically from left to right looking in the direction of inventory for each abutment, pier, or bent. For example, the leftmost column at Pier 2 should be referenced as Column 2A.

Vertical substructure units less than 6 feet wide shall be considered columns. Vertical substructure units equal to or greater than 6 feet wide shall be considered walls. This applies to both cylindrical and variable width shapes. Variable width walls shall be measured at the widest portion excluding the cap.

When determining a condition state for the checks/shakes defect for timber columns, assume no tension zones are present within shorter length or braced piles. Judgment may be used to decide if a tension zone exists for eccentrically loaded columns, tall, unbraced columns, or other special cases. If a column is designated as having a tension zone, a note should be added in the checks/shakes defect notes to describe the condition.

ELEMENT CATEGORY

Substructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Timber Defects and Condition States

Click to return to: Table of Contents

Element 207 – Steel Tower	Units: Feet (ft)	NBE

DESCRIPTION

Steel built-up or framed towers.

QUANTITY CALCULATION

Sum of the heights of built-up or framed towers.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing results for all elements. Any indication of cracking or fracture shall be evaluated and quantified by a qualified ASNT technician as defined by CDOT. The date of evaluation and summary of methods and findings shall be captured in the report.

COMMENTARY

Towers should be referenced numerically by substructure unit looking in the direction of inventory. For example, substructure units for a structure with two intermediate substructure towers should be referenced as Abutment 1, Tower 2, Tower 3, Abutment 4, respectively.

This element is intended to be used for built-up or truss-framed tower supports. It is intended to capture large supports and towers associated with suspension bridges, cable stayed bridges, moveable bridges, trusses, or similar structural configurations.

ELEMENT CATEGORY

Substructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Steel Defects and Condition States

Click to return to: Table of Contents

Element 208 – Timber Trestle	Units: Feet (ft)	NBE

DESCRIPTION

Timber built-up or framed trestles or towers.

QUANTITY CALCULATION

Sum of the heights of built-up or framed trestles and towers.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Trestles should be referenced numerically by substructure unit looking in the direction of inventory. For example, substructure units for a structure with two intermediate substructure trestles should be referenced as Abutment 1, Trestle 2, Trestle 3, Abutment 4, respectively.

This element is intended to be used for truss-framed tower supports or built-up towers. It is intended to capture large supports and towers associated with suspension bridges, cable stayed bridges, moveable bridges, trusses, or similar structural configurations.

ELEMENT CATEGORY

Substructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Timber Defects and Condition States

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Element 210 – Reinforced Concrete Pier Wall	Units: Feet (ft)	NBE

DESCRIPTION

Reinforced concrete pier walls.

QUANTITY CALCULATION

Sum of the lengths of each pier wall.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Pier walls should be referenced numerically by substructure unit looking in the direction of inventory. For example, a structure with four substructure units should be referenced as Abutment 1, Pier 2, Pier 3, Abutment 4, respectively.

Vertical substructure units less than 6 feet wide shall be considered columns. Vertical substructure units equal to or greater than 6 feet wide shall be considered walls. This applies to both cylindrical and variable width shapes. Variable width walls shall be measured at the widest portion excluding the cap.

For concrete pier walls cast integral with concrete columns or caps, if the columns or caps are wider or longer than the wall, code the walls, columns, and caps as separate elements. For example, a solid concrete pier that has a wider section at the top should be separated into Element 210 – Reinforced Concrete Pier Wall and Element 234 – Reinforced Concrete Pier Cap.

ELEMENT CATEGORY

Substructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Reinforced Concrete Defects and Condition States

Click to return to: Table of Contents

Element 211 – Other Pier Wall	Units: Feet (ft)	NBE

DESCRIPTION

Pier walls constructed of materials not covered by other elements.

QUANTITY CALCULATION

Sum of the lengths of each pier wall.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Pier walls should be referenced numerically by substructure unit looking in the direction of inventory. For example, a structure with four substructure units should be referenced as Abutment 1, Pier 2, Pier 3, Abutment 4, respectively.

Vertical substructure units less than 6 feet wide shall be considered columns. Vertical substructure units equal to or greater than 6 feet wide shall be considered walls. This applies to both cylindrical and variable width shapes. Variable width walls shall be measured at the widest portion excluding the cap.

ELEMENT CATEGORY

Substructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Other Material Defects and Condition States

Click to return to: Table of Contents

Element 212 – Timber Pier Wall	Units: Feet (ft)	NBE

DESCRIPTION

Timber pier walls.

QUANTITY CALCULATION

Sum of the lengths of each pier wall.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Pier walls should be referenced numerically by substructure unit looking in the direction of inventory. For example, a structure with four substructure units should be referenced as Abutment 1, Pier 2, Pier 3, Abutment 4, respectively.

Vertical substructure units less than 6 feet wide shall be considered columns. Vertical substructure units equal to or greater than 6 feet wide shall be considered walls. This applies to both cylindrical and variable width shapes. Variable width walls shall be measured at the widest portion excluding the cap.

ELEMENT CATEGORY

Substructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Timber Defects and Condition States

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Element 213 – Masonry Pier Wall	Units: Feet (ft)	NBE

DESCRIPTION

Masonry blocks or stacked stone pier walls. The blocks or stones may be placed with or without mortar.

QUANTITY CALCULATION

Sum of the lengths of each pier wall.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Pier walls should be referenced numerically by substructure unit looking in the direction of inventory. For example, a structure with four substructure units should be referenced as Abutment 1, Pier 2, Pier 3, Abutment 4, respectively.

Vertical substructure units less than 6 feet wide shall be considered columns. Vertical substructure units equal to or greater than 6 feet wide shall be considered walls. This applies to both cylindrical and variable width shapes. Variable width walls shall be measured at the widest portion excluding the cap.

ELEMENT CATEGORY

Substructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Masonry Defects and Condition States

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Element 215 – Reinforced Concrete Abutment	Units: Feet (ft)	NBE

DESCRIPTION

Reinforced concrete abutments, including the material retaining the embankment.

QUANTITY CALCULATION

Sum of the lengths of each abutment. For simplicity, the quantity may also be calculated as the number of abutments times the deck or superstructure out-to-out along the skew.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Abutments should be referenced numerically by substructure unit looking in the direction of inventory. For example, a structure with four substructure units should be referenced as Abutment 1, Pier 2, Pier 3, Abutment 4, respectively.

For abutments that use lagging to retain the embankment between piles, code the lagging, piles, and caps as separate elements. For example, an abutment that consists of a steel cap on steel piles with concrete horizontal lagging retaining the embankment between piles should be separated into Element 225 – Steel Pile, Element 231 – Steel Pier Cap, and Element 215 – Reinforced Concrete Abutment.

Wingwalls are not included in this element, even if integral with the abutment. For abutments with integral wingwalls, it can be assumed the abutments end (and wingwalls start) at the out-to-out of the deck or superstructure.

Vertical substructure units less than 6 feet wide shall be considered columns. Vertical substructure units equal to or greater than 6 feet wide shall be considered walls or abutments. This applies to both cylindrical and variable width shapes. Variable width walls shall be measured at the widest portion excluding the cap.

For concrete abutment walls cast integral with concrete columns or caps, if the columns or caps are wider or longer than the wall, code the abutment, columns, and caps as separate elements. For example, a solid concrete abutment that has a wider section at the top should be separated into Element 215 – Reinforced Concrete Abutment and Element 234 – Reinforced Concrete Pier Cap.

ELEMENT CATEGORY

Substructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Reinforced Concrete Defects and Condition States

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Element 216 – Timber Abutment	Units: Feet (ft)	NBE

DESCRIPTION

Timber abutments, including the material retaining the embankment.

QUANTITY CALCULATION

Sum of the lengths of each abutment. For simplicity, the quantity may also be calculated as the number of abutments times the deck or superstructure out-to-out along the skew.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Abutments should be referenced numerically by substructure unit looking in the direction of inventory. For example, a structure with four substructure units should be referenced as Abutment 1, Pier 2, Pier 3, Abutment 4, respectively.

For abutments that use lagging to retain the embankment between piles, code the lagging, piles, and caps as separate elements. For example, an abutment that consists of a steel cap on steel piles with timber horizontal lagging retaining the embankment between piles should be separated into Element 225 – Steel Pile, Element 231 – Steel Pier Cap, and Element 216 – Timber Abutment.

Wingwalls are not included in this element, even if integral with the abutment. For abutments with integral wingwalls, it can be assumed the abutments end (and wingwalls start) at the out-to-out of the deck or superstructure.

ELEMENT CATEGORY

Substructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Timber Defects and Condition States

Click to return to: Table of Contents

Element 217 – Masonry Abutment	Units: Feet (ft)	NBE

DESCRIPTION

Masonry blocks or stacked stone abutments. The blocks or stones may be placed with or without mortar.

QUANTITY CALCULATION

Sum of the lengths of each abutment. For simplicity, the quantity may also be calculated as the number of abutments times the deck or superstructure out-to-out along the skew.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Abutments should be referenced numerically by substructure unit looking in the direction of inventory. For example, a structure with four substructure units should be referenced as Abutment 1, Pier 2, Pier 3, Abutment 4, respectively.

Wingwalls are not included in this element, even if integral with the abutment. For abutments with integral wingwalls, it can be assumed the abutments end (and wingwalls start) at the out-to-out of the deck or superstructure.

ELEMENT CATEGORY

Substructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Masonry Defects and Condition States

Click to return to: Table of Contents

Element 218 – Other Abutment	Units: Feet (ft)	NBE

DESCRIPTION

Abutments constructed of materials not covered by other elements, including the material retaining the embankment.

QUANTITY CALCULATION

Sum of the lengths of each abutment. For simplicity, the quantity may also be calculated as the number of abutments times the deck or superstructure out-to-out along the skew.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Abutments should be referenced numerically by substructure unit looking in the direction of inventory. For example, a structure with four substructure units should be referenced as Abutment 1, Pier 2, Pier 3, Abutment 4, respectively.

For abutments that use lagging to retain the embankment between piles, code the lagging, piles, and caps as separate elements. For example, an abutment that consists of a steel cap on steel piles with other material lagging retaining the embankment between piles should be separated into Element 225 – Steel Pile, Element 231 – Steel Pier Cap, and Element 218 – Other Abutment.

Wingwalls are not included in this element, even if integral with the abutment. For abutments with integral wingwalls, it can be assumed the abutments end (and wingwalls start) at the out-to-out of the deck or superstructure.

ELEMENT CATEGORY

Substructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Other Material Defects and Condition States

Click to return to: Table of Contents

Element 219 – Steel Abutment	Units: Feet (ft)	NBE

DESCRIPTION

Steel abutments, including the material retaining the embankment.

QUANTITY CALCULATION

Sum of the lengths of each abutment. For simplicity, the quantity may also be calculated as the number of abutments times the deck or superstructure out-to-out along the skew.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing results for all elements.

COMMENTARY

Abutments should be referenced numerically by substructure unit looking in the direction of inventory. For example, a structure with four substructure units should be referenced as Abutment 1, Pier 2, Pier 3, Abutment 4, respectively.

For abutments that use lagging to retain fill between piles, code the lagging, piles, and caps as separate elements. For example, an abutment that consists of a steel cap on steel piles with steel corrugated sheets retaining the embankment between piles should be separated into Element 225 – Steel Pile, Element 231 – Steel Pier Cap, and Element 219 – Steel Abutment.

Wingwalls are not included in this element, even if integral with the abutment. For abutments with integral wingwalls, it can be assumed the abutments end (and wingwalls start) at the out-to-out of the deck or superstructure.

ELEMENT CATEGORY

Substructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Steel Defects and Condition States

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Element 220 – Reinforced Concrete Pile Cap/Footing	Units: Feet (ft)	NBE

DESCRIPTION

Reinforced concrete pile caps/footings that are visible for inspection, including pile caps/footings exposed from erosion or scour or visible during an underwater inspection.

QUANTITY CALCULATION

Sum of the lengths of each pile cap/footing that are visible for inspection.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Pile caps/footings should be referenced according to their respective substructure unit. For example, the footing at Pier 2 should be referenced as Pier 2 footing.

ELEMENT CATEGORY

Substructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Reinforced Concrete Defects and Condition States

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Element 225 – Steel Pile	Units: Each	NBE

DESCRIPTION

Steel piles that are visible for inspection, including piles exposed from erosion or scour and piles visible during an underwater inspection.

QUANTITY CALCULATION

Sum of the individual piles visible for inspection.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing results for all elements.

COMMENTARY

Piles should be referenced alphabetically from left to right looking in the direction of inventory for each abutment, pier, or bent. For example, the leftmost pile at Pier 2 should be referenced as Pile 2A.

For substructure units with piles encased within a concrete wall, code the encased sections as either Element 210 – Reinforced Concrete Pier Wall or Element 215 – Reinforced Concrete Abutment.

ELEMENT CATEGORY

Substructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Steel Defects and Condition States

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Element 226 – Prestressed Concrete Pile	Units: Each	NBE

DESCRIPTION

Prestressed concrete piles that are visible for inspection, including piles exposed from erosion or scour and piles visible during an underwater inspection.

QUANTITY CALCULATION

Sum of the individual piles visible for inspection.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Piles should be referenced alphabetically from left to right looking in the direction of inventory for each abutment, pier, or bent. For example, the leftmost pile at Pier 2 should be referenced as Pile 2A.

For substructure units with piles encased within a concrete wall, code the encased sections as either Element 210 – Reinforced Concrete Pier Wall or Element 215 – Reinforced Concrete Abutment.

ELEMENT CATEGORY

Substructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Prestressed Concrete Defects and Condition States

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Element 227 – Reinforced Concrete Pile	Units: Each	NBE

DESCRIPTION

Reinforced concrete piles that are visible for inspection, including piles exposed from erosion or scour and piles visible during an underwater inspection.

QUANTITY CALCULATION

Sum of the individual piles visible for inspection.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Piles should be referenced alphabetically from left to right looking in the direction of inventory for each abutment, pier, or bent. For example, the leftmost pile at Pier 2 should be referenced as Pile 2A.

For substructure units with piles encased within a concrete wall, code the encased sections as either Element 210 – Reinforced Concrete Pier Wall or Element 215 – Reinforced Concrete Abutment.

ELEMENT CATEGORY

Substructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Reinforced Concrete Defects and Condition States

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Element 228 – Timber Pile	Units: Each	NBE

DESCRIPTION

Timber piles that are visible for inspection, including piles exposed from erosion or scour and piles visible during an underwater inspection.

QUANTITY CALCULATION

Sum of the individual piles visible for inspection.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Piles should be referenced alphabetically from left to right looking in the direction of inventory for each abutment, pier, or bent. For example, the leftmost pile at Pier 2 should be referenced as Pile 2A.

When determining a condition state for the checks/shakes defect for timber piles, assume no tension zones are present within shorter length or braced piles. Judgement may be used to decide if a tension zone exists for eccentrically loaded piles, tall, unbraced piles, or other special cases. If a pile is believed to have a tension zone, a note should be added in the checks/shakes defect notes to describe the condition.

For substructure units with piles encased within a concrete wall, code the encased sections as either Element 210 – Reinforced Concrete Pier Wall or Element 215 – Reinforced Concrete Abutment.

ELEMENT CATEGORY

Substructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Timber Defects and Condition States

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Element 229 – Other Pile	Units: Each	NBE

DESCRIPTION

Piles constructed of materials not covered by other elements that are visible for inspection, including piles exposed from erosion or scour and piles visible during an underwater inspection.

QUANTITY CALCULATION

Sum of the individual piles visible for inspection.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Piles should be referenced alphabetically from left to right looking in the direction of inventory for each abutment, pier, or bent. For example, the leftmost pile at Pier 2 should be referenced as Pile 2A.

For substructure units with piles encased within a concrete wall, code the encased sections as either Element 210 – Reinforced Concrete Pier Wall or Element 215 – Reinforced Concrete Abutment.

ELEMENT CATEGORY

Substructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Other Material Defects and Condition States

Click to return to: Table of Contents

Element 231 – Steel Pier Cap	Units: Feet (ft)	NBE

DESCRIPTION

Steel cap beams. This element includes caps on any type of substructure unit such as abutments, piers, or bents.

QUANTITY CALCULATION

Sum of the lengths of each cap. For simplicity, the quantity may also be calculated as the number of caps times the deck or superstructure out-to-out along the skew.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing results for all elements. Any indication of cracking or fracture shall be evaluated and quantified by a qualified ASNT technician as defined by CDOT. The date of evaluation and summary of methods and findings shall be captured in the report.

COMMENTARY

Pier caps should be referenced according to their respective substructure unit. For example, the cap at Pier 2 should be referenced as Pier 2 cap.

ELEMENT CATEGORY

Substructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Steel Defects and Condition States

Click to return to: Table of Contents

Element 233 – Prestressed Concrete Pier Cap	Units: Feet (ft)	NBE

DESCRIPTION

Prestressed concrete cap beams. This element includes caps on any type of substructure unit such as abutments, piers, or bents.

QUANTITY CALCULATION

Sum of the lengths of each cap. For simplicity, the quantity may also be calculated as the number of caps times the deck or superstructure out-to-out along the skew.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Pier caps should be referenced according to their respective substructure unit. For example, the cap at Pier 2 should be referenced as Pier 2 cap.

ELEMENT CATEGORY

Substructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Prestressed Concrete Defects and Condition States

Click to return to: Table of Contents

Element 234 – Reinforced Concrete Pier Cap	Units: Feet (ft)	NBE

DESCRIPTION

Reinforced concrete cap beams. This element includes caps on any type of substructure unit such as abutments, piers, or bents.

QUANTITY CALCULATION

Sum of the lengths of each cap. For simplicity, the quantity may also be calculated as the number of caps times the deck or superstructure out-to-out along the skew.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Pier caps should be referenced according to their respective substructure unit. For example, the cap at Pier 2 should be referenced as Pier 2 cap.

ELEMENT CATEGORY

Substructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Reinforced Concrete Defects and Condition States

Click to return to: Table of Contents

Element 235 – Timber Pier Cap	Units: Feet (ft)	NBE

DESCRIPTION

Timber cap beams. This element includes caps on any type of substructure unit such as abutments, piers, or bents.

QUANTITY CALCULATION

Sum of the lengths of each cap. For simplicity, the quantity may also be calculated as the number of caps times the deck or superstructure out-to-out along the skew.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Pier caps should be referenced according to their respective substructure unit. For example, the cap at Pier 2 should be referenced as Pier 2 cap.

ELEMENT CATEGORY

Substructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Timber Defects and Condition States

Click to return to: Table of Contents

Element 236 – Other Pier Cap	Units: Feet (ft)	NBE

DESCRIPTION

Cap beams constructed of materials not covered by other elements. This element includes caps on any type of substructure unit such as abutments, piers, or bents.

QUANTITY CALCULATION

Sum of the lengths of each cap. For simplicity, the quantity may also be calculated as the number of caps times the deck or superstructure out-to-out along the skew.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Pier caps should be referenced according to their respective substructure unit. For example, the cap at Pier 2 should be referenced as Pier 2 cap.

ELEMENT CATEGORY

Substructure Elements

DEFECT CATEGORIES AND CONDITION STATES

Other Material Defects and Condition States

Click to return to: Table of Contents

Element 240 – Steel Culvert	Units: Feet (ft)	NBE

DESCRIPTION

Steel closed bottom culverts, including all shapes.

QUANTITY CALCULATION

Sum of the lengths of each culvert barrel. Barrel lengths shall be measured along centerline of each barrel, not along centerline of roadway. The length of pipes shall include end sections.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Culverts cells and walls should be referenced numerically looking in the direction of inventory. Cells may also be referred to as spans or pipes depending on structure type. Culvert pipes and arches typically do not have walls referenced.

Aluminum culverts should be coded under Element 243 – Other Culvert.

Open bottom structures shall be coded as bridges, not as culverts. Structures with non-structural bottoms, such as concrete lined channels, shall be considered open bottom structures.

ELEMENT CATEGORY

Culvert Elements

DEFECT CATEGORIES AND CONDITION STATES

Steel Defects and Condition States

Click to return to: Table of Contents

Element 241 – Reinforced Concrete Culvert	Units: Feet (ft)	NBE

DESCRIPTION

Reinforced concrete closed bottom culverts, including all shapes.

QUANTITY CALCULATION

Sum of the lengths of each culvert barrel. Barrel lengths shall be measured along centerline of each barrel, not along centerline of roadway. The length of pipes shall include end sections.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Culverts cells and walls should be referenced numerically looking in the direction of inventory. Cells may also be referred to as spans or pipes depending on structure type. Culvert pipes and arches typically do not have walls referenced.

Open bottom structures shall be coded as bridges, not as culverts. Structures with non-structural bottoms, such as concrete lined channels, shall be considered open bottom structures.

ELEMENT CATEGORY

Culvert Elements

DEFECT CATEGORIES AND CONDITION STATES

Reinforced Concrete Defects and Condition States

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Element 242 – Timber Culvert	Units: Feet (ft)	NBE

DESCRIPTION

Timber closed bottom culverts.

QUANTITY CALCULATION

Sum of the lengths of each culvert barrel. Barrel lengths shall be measured along centerline of each barrel, not along centerline of roadway.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Culverts cells and walls should be referenced numerically looking in the direction of inventory. Cells may also be referred to as spans or pipes depending on structure type. Culvert pipes and arches typically do not have walls referenced.

Open bottom structures shall be coded as bridges, not as culverts. Structures with non-structural bottoms, such as concrete lined channels, shall be considered open bottom structures.

ELEMENT CATEGORY

Culvert Elements

DEFECT CATEGORIES AND CONDITION STATES

Timber Defects and Condition States

Click to return to: Table of Contents

Element 243 – Other Culvert	Units: Feet (ft)	NBE

DESCRIPTION

Closed bottom culverts constructed of materials not covered by other elements, including all shapes.

QUANTITY CALCULATION

Sum of the lengths of each culvert barrel. Barrel lengths shall be measured along centerline of each barrel, not along centerline of roadway. The length of pipes shall include end sections.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Culverts cells and walls should be referenced numerically looking in the direction of inventory. Cells may also be referred to as spans or pipes depending on structure type. Culvert pipes and arches typically do not have walls referenced.

This element includes aluminum culverts.

Open bottom structures shall be coded as bridges, not as culverts. Structures with non-structural bottoms, such as concrete lined channels, shall be considered open bottom structures.

ELEMENT CATEGORY

Culvert Elements

DEFECT CATEGORIES AND CONDITION STATES

Other Material Defects and Condition States

Click to return to: Table of Contents

Element 244 – Masonry Culvert	Units: Feet (ft)	NBE

DESCRIPTION

Closed bottom masonry blocks or stacked stone culverts.

QUANTITY CALCULATION

Sum of the lengths of each culvert barrel. Barrel lengths shall be measured along centerline of each barrel, not along centerline of roadway. The length of pipes shall include end sections.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Culverts cells and walls should be referenced numerically looking in the direction of inventory. Cells may also be referred to as spans or pipes depending on structure type. Culvert pipes and arches typically do not have walls referenced.

Open bottom structures shall be coded as bridges, not as culverts. Structures with non-structural bottoms, such as concrete lined channels, shall be considered open bottom structures.

ELEMENT CATEGORY

Culvert Elements

DEFECT CATEGORIES AND CONDITION STATES

Masonry Defects and Condition States

Click to return to: Table of Contents

Element 245 – Prestressed Concrete Culvert	Units: Feet (ft)	NBE

DESCRIPTION

Prestressed concrete closed bottom culverts, including all shapes of arches, pipes, and boxes.

QUANTITY CALCULATION

Sum of the lengths of each culvert barrel. Barrel lengths shall be measured along centerline of each barrel, not along centerline of roadway. The length of pipes shall include end sections.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Culverts cells and walls should be referenced numerically looking in the direction of inventory. Cells may also be referred to as spans or pipes depending on structure type. Culvert pipes and arches typically do not have walls referenced.

Open bottom structures shall be coded as bridges, not as culverts. Structures with non-structural bottoms, such as concrete lined channels, shall be considered open bottom structures.

ELEMENT CATEGORY

Culvert Elements

DEFECT CATEGORIES AND CONDITION STATES

Prestressed Concrete Defects and Condition States

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Element 260 – Slope, Slope Protection, Berm	Units: Each	ADE

DESCRIPTION

Slopes, slope protection, and berms within the bridge limits. Slopes outside of the bridge limits should be coded in Element 501 – Channel/Bank. This element includes all types of unprotected slopes, protected slopes, and slope protection such as soil, slope paving, riprap, gabions, rock filled baskets, sub-abutments, mechanically stabilized earth, etc.

QUANTITY CALCULATION

Sum of substructure units with slopes.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Slope locations should be referenced by the substructure unit they protect. For example, the slope adjacent to Abutment 1 should be referenced as the Abutment 1 slope.

This element is intended to be used to record the condition and effectiveness of the slope and/or slope protection. This element is not intended to be used to record the extent to which scour affects substructure units. Scour affecting structure units should be recorded under the appropriate defect and substructure element. The condition states of this slope element and the substructure unit it protects are intended to be independent, although they may be loosely correlated.

ELEMENT CATEGORY

Channel/Embankment Elements

DEFECT CATEGORIES AND CONDITION STATES

Slope, Slope Protection, Berm Defects and Condition States

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Slope, Slope Protection, Berm Defects and Condition States				
Defects	CS 1 - Good Insignificant Defects	CS 2 - Fair Minor Defects	CS 3 - Poor Moderate Defects	CS 4 - Severe Major Defects
Other (8000)	Natural or unprotected slopes Isolated minor erosion or scour. Slope adequately protects substructure unit.	Natural or unprotected slopes Widespread minor or isolated moderate erosion or scour. Slope may be starting to wash away. Slope substantially protects substructure unit.	Natural or unprotected slopes Widespread moderate or isolated major erosion or scour. Large areas of slope may have washed away. Slope may be alluvial material which is highly vulnerable to erosion and scour. Slope has limited effectiveness.	Natural or unprotected slopes Failed or no longer functioning. Substructure unit unprotected.
	Protected slopes Isolated minor erosion, scour, settlement, damage, or deterioration. Slope and substructure unit are adequately protected.	Protected slopes Widespread minor or isolated moderate erosion, scour, settlement, damage, or deterioration. Some riprap may be displaced. Grouted riprap may have cracks, a few missing rocks, or minor undermining. Slope paving may have cracking, spalling, settlement, voids, or isolated broken sections. Slope protection is substantially effective.	Protected slopes Widespread moderate or isolated major erosion, scour, settlement, damage, or deterioration. Large areas of riprap may have washed away. Grouted riprap may be undermined, broken, and/or large areas washed away. Slope paving may have large voids, loss of backfill, and/or large broken sections. Slope protection has limited effectiveness.	Protected slopes Failed or no longer functioning. Substructure unit unprotected.

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Element 300 – Strip Seal Expansion Joint	Units: Feet (ft)	BME

DESCRIPTION

Expansion joints within the bridge limits sealed with a neoprene type waterproof gland with a metal extrusion or other system to anchor the gland.

QUANTITY CALCULATION

Sum of the lengths of each joint. For simplicity, the quantity for transverse joints may also be calculated as the number of joints times the deck out-to-out along the skew.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Joints should be referenced according to their respective substructure unit. For example, the joint at Pier 2 should be referenced as the Pier 2 joint.

Joints that have been covered up by a wearing surface and are no longer visible for inspection should still have a joint element coded.

This element is to be used for strip seal expansion joints within the bridge limits. For strip seal expansion joints outside the bridge limits use Element 350 – Approach Strip Seal Expansion Joint.

ELEMENT CATEGORY

Joint Elements

DEFECT CATEGORIES AND CONDITION STATES

Joint Defects and Condition States

Click to return to: Table of Contents

Element 301 – Pourable Joint Seal	Units: Feet (ft)	BME

DESCRIPTION

Joints within the bridge limits filled with a pourable seal with or without a backer.

QUANTITY CALCULATION

Sum of the lengths of each joint. For simplicity, the quantity for transverse joints may also be calculated as the number of joints times the deck out-to-out along the skew.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Joints should be referenced according to their respective substructure unit. For example, the joint at Pier 2 should be referenced as the Pier 2 joint.

Joints that have been covered up by a wearing surface and are no longer visible for inspection should still have a joint element coded.

This element is to be used for pourable joint seals within the bridge limits. For pourable joint seals outside the bridge limits use Element 351 – Approach Pourable Joint Seal.

ELEMENT CATEGORY

Joint Elements

DEFECT CATEGORIES AND CONDITION STATES

Joint Defects and Condition States

Click to return to: Table of Contents

Element 302 – Compression Joint Seal	Units: Feet (ft)	BME

DESCRIPTION

Joints within the bridge limits filled with a preformed compression type seal. Includes joints with or without an anchor system to confine the seal.

QUANTITY CALCULATION

Sum of the lengths of each joint. For simplicity, the quantity for transverse joints may also be calculated as the number of joints times the deck out-to-out along the skew.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Joints should be referenced according to their respective substructure unit. For example, the joint at Pier 2 should be referenced as the Pier 2 joint.

Joints that have been covered up by a wearing surface and are no longer visible for inspection should still have a joint element coded.

This element is to be used for compression joint seals within the bridge limits. For compression joint seals outside the bridge limits use Element 352 – Approach Compression Joint Seal.

ELEMENT CATEGORY

Joint Elements

DEFECT CATEGORIES AND CONDITION STATES

Joint Defects and Condition States

Click to return to: Table of Contents

Element 303 – Assembly Joint with Seal	Units: Feet (ft)	BME

DESCRIPTION

Expansion joints within the bridge limits filled with an assembly mechanism that has a seal.

QUANTITY CALCULATION

Sum of the lengths of each joint. For simplicity, the quantity for transverse joints may also be calculated as the number of joints times the deck out-to-out along the skew.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Joints should be referenced according to their respective substructure unit. For example, the joint at Pier 2 should be referenced as the Pier 2 joint.

Joints that have been covered up by a wearing surface and are no longer visible for inspection should still have a joint element coded.

This element is to be used for assembly joints with a seal within the bridge limits. For assembly joints with a seal outside the bridge limits use Element 353 – Approach Assembly Joint with Seal.

ELEMENT CATEGORY

Joint Elements

DEFECT CATEGORIES AND CONDITION STATES

Joint Defects and Condition States

Click to return to: Table of Contents

Element 304 – Open Expansion Joint	Units: Feet (ft)	BME

DESCRIPTION

Expansion joints within the bridge limits that are designed to be open and have no seal. This element is intended for joints designed as open joints, not for joints that were designed to have a seal that is currently missing. Does not include assembly joints, for open assembly joints without a seal use Element 305 – Assembly Joint without Seal.

QUANTITY CALCULATION

Sum of the lengths of each joint. For simplicity, the quantity for transverse joints may also be calculated as the number of joints times the deck out-to-out along the skew.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Joints should be referenced according to their respective substructure unit. For example, the joint at Pier 2 should be referenced as the Pier 2 joint.

Joints that have been covered up by a wearing surface and are no longer visible for inspection should still have a joint element coded.

This element is to be used for open joints within the bridge limits. For open joints outside the bridge limits use Element 354 – Approach Open Expansion Joint.

ELEMENT CATEGORY

Joint Elements

DEFECT CATEGORIES AND CONDITION STATES

Joint Defects and Condition States

Click to return to: Table of Contents

Element 305 – Assembly Joint without Seal	Units: Feet (ft)	BME

DESCRIPTION

Expansion joints within the bridge limits filled with an assembly mechanism that is designed to be open and have no seal. Includes finger joints and sliding plate joints. Includes open joints with or without a drainage trough below the joint.

QUANTITY CALCULATION

Sum of the lengths of each joint. For simplicity, the quantity for transverse joints may also be calculated as the number of joints times the deck out-to-out along the skew.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Joints should be referenced according to their respective substructure unit. For example, the joint at Pier 2 should be referenced as the Pier 2 joint.

Joints that have been covered up by a wearing surface and are no longer visible for inspection should still have a joint element coded.

This element is to be used for assembly joints without a seal within the bridge limits. For assembly joints without a seal outside the bridge limits use Element 355 – Approach Assembly Joint without Seal.

ELEMENT CATEGORY

Joint Elements

DEFECT CATEGORIES AND CONDITION STATES

Joint Defects and Condition States

Click to return to: Table of Contents

Element 306 – Other Joint	Units: Feet (ft)	BME

DESCRIPTION

Joints within the bridge limits that are not defined by any other joint element.

QUANTITY CALCULATION

Sum of the lengths of each joint. For simplicity, the quantity for transverse joints may also be calculated as the number of joints times the deck out-to-out along the skew.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Joints should be referenced according to their respective substructure unit. For example, the joint at Pier 2 should be referenced as the Pier 2 joint.

Joints that have been covered up by a wearing surface and are no longer visible for inspection should still have a joint element coded.

This element is to be used for other joints within the bridge limits. For other joints outside the bridge limits use Element 356 – Approach Other Joint.

ELEMENT CATEGORY

Joint Elements

DEFECT CATEGORIES AND CONDITION STATES

Joint Defects and Condition States

Click to return to: Table of Contents

Element 308 – Construction/Non-Expansion Joint	Units: Feet (ft)	ADE

DESCRIPTION

Full-depth transverse and longitudinal non-expansion joints within the bridge limits. Includes both open and sealed non-expansion joints.

QUANTITY CALCULATION

Sum of the lengths of each joint. For simplicity, the quantity for transverse joints may also be calculated as the number of joints times the deck out-to-out along the skew and the quantity for longitudinal joints may also be calculated as the number of joints in each span times the span length. When using this simplified calculation, the back face of abutments and centerline of piers can be used to calculate span lengths.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Some examples of construction non-expansion joints are joints between concrete T-beams without a deck, joints between concrete slab beams without a deck, and joints between precast concrete rigid frame sections.

Joints between beams or sections that are not full-depth and are covered by a deck should not be included in this element.

Joints that have been covered up by a wearing surface and are no longer visible for inspection should still have a joint element coded.

This element is to be used for joints within the bridge limits. For construction non-expansion joints outside the bridge limits use Element 358 – Approach Construction/Non-Expansion Joint.

ELEMENT CATEGORY

Joint Elements

DEFECT CATEGORIES AND CONDITION STATES

Joint Defects and Condition States

Click to return to: Table of Contents

Element 310 – Elastomeric Bearing	Units: Each	NBE

DESCRIPTION

Bridge bearings that are constructed primarily of elastomers, with or without fabric or metal reinforcement. May include a masonry plate and/or sole plate with teflon sliding surface. Includes both moveable and fixed bearings.

QUANTITY CALCULATION

Sum of the individual bearings.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Bearings should be referenced alphabetically from left to right looking in the direction of inventory by respective substructure unit. For example, the leftmost bearing at Pier 2 should be referenced as Bearing 2A.

When pulpits or saddles have been added to restore the bearing area, the condition of the bearing may be restored to Condition State 1, however the damaged portion of the girder will continue to be reported. The pulpit or saddle should be coded as Element 313 – Fixed Bearing. Do not count the original bearing if a pulpit or saddle has been placed beneath the girder.

ELEMENT CATEGORY

Bearing Elements

DEFECT CATEGORIES AND CONDITION STATES

Bearing Defects and Condition States

Click to return to: Table of Contents

Element 311 – Moveable Bearing	Units: Each	NBE

DESCRIPTION

Bridge bearings that provide for both rotation and longitudinal movement by means of a roller, rocker, or sliding mechanisms.

QUANTITY CALCULATION

Sum of the individual bearings.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Bearings should be referenced alphabetically from left to right looking in the direction of inventory by respective substructure unit. For example, the leftmost bearing at Pier 2 should be referenced as Bearing 2A.

When pulpits or saddles have been added to restore the bearing area, the condition of the bearing may be restored to Condition State 1, however the damaged portion of the girder will continue to be reported. The pulpit or saddle should be coded as Element 313 – Fixed Bearing. Do not count the original bearing if a pulpit or saddle has been placed beneath the girder.

ELEMENT CATEGORY

Bearing Elements

DEFECT CATEGORIES AND CONDITION STATES

Bearing Defects and Condition States

Click to return to: Table of Contents

Element 312 – Enclosed/Concealed Bearing	Units: Each	NBE

DESCRIPTION

Bridge bearings that are enclosed so that they are not open for detailed inspection. Includes both moveable and fixed bearings.

QUANTITY CALCULATION

Sum of the individual bearings.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Bearings should be referenced alphabetically from left to right looking in the direction of inventory by respective substructure unit. For example, the leftmost bearing at Pier 2 should be referenced as Bearing 2A.

This element should be used for box girder hinges. In cases where the bearing material is not visible, the Inspector shall assess the condition based on alignment, grade across the joint, persistence of debris, or other indirect indicators of the condition.

When pulpits or saddles have been added to restore the bearing area, the condition of the bearing may be restored to Condition State 1, however the damaged portion of the girder will continue to be reported. The pulpit or saddle should be coded as Element 313 – Fixed Bearing. Do not count the original bearing if a pulpit or saddle has been placed beneath the girder.

ELEMENT CATEGORY

Bearing Elements

DEFECT CATEGORIES AND CONDITION STATES

Bearing Defects and Condition States

Click to return to: Table of Contents

Element 313 – Fixed Bearing	Units: Each	NBE

DESCRIPTION

Bridge bearings that provide for rotation only and are fixed against longitudinal movement.

QUANTITY CALCULATION

Sum of the individual bearings.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Bearings should be referenced alphabetically from left to right looking in the direction of inventory by respective substructure unit. For example, the leftmost bearing at Pier 2 should be referenced as Bearing 2A.

When pulpits or saddles have been added to restore the bearing area, the condition of the bearing may be restored to Condition State 1, however the damaged portion of the girder will continue to be reported. The pulpit or saddle should be coded as Element 313 – Fixed Bearing. Do not count the original bearing if a pulpit or saddle has been placed beneath the girder.

ELEMENT CATEGORY

Bearing Elements

DEFECT CATEGORIES AND CONDITION STATES

Bearing Defects and Condition States

Click to return to: Table of Contents

Element 314 – Pot Bearing	Units: Each	NBE

DESCRIPTION

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 movement in any direction.

QUANTITY CALCULATION

Sum of the individual bearings.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Bearings should be referenced alphabetically from left to right looking in the direction of inventory by respective substructure unit. For example, the leftmost bearing at Pier 2 should be referenced as Bearing 2A.

When pulpits or saddles have been added to restore the bearing area, the condition of the bearing may be restored to Condition State 1, however the damaged portion of the girder will continue to be reported. The pulpit or saddle should be coded as Element 313 – Fixed Bearing. Do not count the original bearing if a pulpit or saddle has been placed beneath the girder.

ELEMENT CATEGORY

Bearing Elements

DEFECT CATEGORIES AND CONDITION STATES

Bearing Defects and Condition States

Click to return to: Table of Contents

Element 315 – Disk Bearing	Units: Each	NBE

DESCRIPTION

High load bearings with hard plastic disks. The bearing may be fixed against horizontal movement, guided to allow movement in one direction, or floating to allow movement in any direction.

QUANTITY CALCULATION

Sum of the individual bearings.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Bearings should be referenced alphabetically from left to right looking in the direction of inventory by respective substructure unit. For example, the leftmost bearing at Pier 2 should be referenced as Bearing 2A.

When pulpits or saddles have been added to restore the bearing area, the condition of the bearing may be restored to Condition State 1, however the damaged portion of the girder will continue to be reported. The pulpit or saddle should be coded as Element 313 – Fixed Bearing. Do not count the original bearing if a pulpit or saddle has been placed beneath the girder.

ELEMENT CATEGORY

Bearing Elements

DEFECT CATEGORIES AND CONDITION STATES

Bearing Defects and Condition States

Click to return to: Table of Contents

Element 316 – Other Bearing	Units: Each	NBE

DESCRIPTION

Bridge bearings not covered by other elements, regardless of translation or rotation constraints.

QUANTITY CALCULATION

Sum of the individual bearings.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Bearings should be referenced alphabetically from left to right looking in the direction of inventory by respective substructure unit. For example, the leftmost bearing at Pier 2 should be referenced as Bearing 2A.

When pulpits or saddles have been added to restore the bearing area, the condition of the bearing may be restored to Condition State 1, however the damaged portion of the girder will continue to be reported. The pulpit or saddle should be coded as Element 313 – Fixed Bearing. Do not count the original bearing if a pulpit or saddle has been placed beneath the girder.

ELEMENT CATEGORY

Bearing Elements

DEFECT CATEGORIES AND CONDITION STATES

Bearing Defects and Condition States

Click to return to: Table of Contents

Element 320 – Prestressed Concrete Approach Slab

Units: Square Feet (ft^2) BME

DESCRIPTION

Pretensioned or post-tensioned concrete approach slabs between the abutment and the approach pavement.

QUANTITY CALCULATION

Sum of the areas of each approach slab.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Approach spans that cannot be inspected shall be coded as an approach slab. The total quantity is usually two, but not greater than four (for parallel bridges with a closed median with one structure number). When approach spans are accessible, the appropriate elements shall be coded and the quantities reported. When approach spans are coded as approach slabs they should not be included in the total number of spans for the bridge.

Railroad bridges with approach slabs which are covered with ballast that cannot be inspected should not have the approach slab element coded. Mention the existence of the approach slab in the abutment element comment field.

ELEMENT CATEGORY

Approach Slab Elements

DEFECT CATEGORIES AND CONDITION STATES

Prestressed Concrete Defects and Condition States

Click to return to: Table of Contents

Element 321 – Reinforced Concrete Approach Slab

Units: Square Feet (ft^2) BME

DESCRIPTION

Reinforced concrete approach slabs between the abutment and the approach pavement.

QUANTITY CALCULATION

Sum of the areas of each approach slab.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Approach spans that cannot be inspected shall be coded as an approach slab. The total quantity is usually two, but not greater than four (for parallel bridges with a closed median with one structure number). When approach spans are accessible, the appropriate elements shall be coded and the quantities reported. When approach spans are coded as approach slabs they should not be included in the total number of spans for the bridge.

Railroad bridges with approach slabs which are covered with ballast that cannot be inspected should not have the approach slab element coded. Mention the existence of the approach slab in the abutment element comment field.

ELEMENT CATEGORY

Approach Slab Elements

DEFECT CATEGORIES AND CONDITION STATES

Reinforced Concrete Defects and Condition States

Click to return to: Table of Contents

Element 322 – Approach Roadway	Units: Each	ADE

DESCRIPTION

This element is used to document the alignment and condition of the approach roadway, approach sidewalks, and approach medians regardless of material.

QUANTITY CALCULATION

Quantity for this element shall always be 1.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

This element includes documentation to justify the rating for NBI Item 72 Approach Roadway Alignment.

ELEMENT CATEGORY

Miscellaneous Elements

DEFECT CATEGORIES AND CONDITION STATES

Defects and condition states shall not be recorded for this element. Quantity of 1 shall be coded in Condition State 1.

Click to return to: Table of Contents

Element 323 – Approach Railing	Units: Each	ADE

DESCRIPTION

This element is used to document the condition of approach railings regardless of material.

QUANTITY CALCULATION

Sum of the individual approach railings at each corner of the structure.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

The quantity for this element should be between 0 and 4. Each corner of the structure should have a maximum quantity of 1 even if there are multiple rails or gaps within rails.

This element includes rails mounted in fill that extend over a structure under fill if they are not attached to the structure.

ELEMENT CATEGORY

Railing Elements

DEFECT CATEGORIES AND CONDITION STATES

Defects and condition states shall not be recorded for this element. The total quantity for this element shall be coded in Condition State 1.

Click to return to: Table of Contents

Element 326 – Wingwall	Units: Each	ADE

DESCRIPTION

This element defines all walls adjacent to abutments and culverts. Includes wingwalls of all materials.

QUANTITY CALCULATION

Sum of the individual wingwalls.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

This element shall be used for both bridge and culvert wingwalls.

This element includes wingwalls integral with abutments, it can be assumed the abutment ends (and the wingwall starts) at the out-to-out of the deck or superstructure. Any piling in the wingwall is included in the unit and not counted separately.

ELEMENT CATEGORY

Miscellaneous Elements

DEFECT CATEGORIES AND CONDITION STATES

Wingwall Defects and Condition States

Wingwall Defects and Condition States				
Defects	CS 1 - Good	CS 2 - Fair	CS 3 - Poor	CS 4 - Severe
	Insignificant Defects	Minor Defects	Moderate Defects	Major Defects
Other (8000)	Insignificant pushing/leaning or separation. Joint nearly tight with no fill spilling through. Insignificant defects or isolated minor defects.	Minor pushing/leaning or separation. Joint may be open with minor amount of fill spilling through. Widespread minor defects or isolated moderate defects.	Moderate pushing/leaning or separation. Joint misaligned allowing fill to freely spill through. Widespread moderate defects or isolated major defects.	Failed or no longer functioning.

Click to return to: Table of Contents

Element 329 – Sidewalk/Median/Curb	Units: Feet (ft)	ADE

DESCRIPTION

Sidewalks, medians, and curbs carried by the structure. Includes sidewalks, medians, and curbs of all materials.

QUANTITY CALCULATION

Sum of the lengths of each sidewalk, median, and curb. For simplicity, the quantity may also be calculated as the number of sidewalks, medians, and curbs times the bridge length.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Includes standalone curbs and curbs associated with sidewalks and medians. Curbs directly attached to bridge rails shall not be evaluated in this element and shall be evaluated in the bridge rail elements.

When a curb is associated with a sidewalk or median, a separate quantity is not needed for the curb length. Only includes lengths of sidewalks, medians, and curbs within the bridge limits.

This element only includes sidewalks, medians, and curbs rigidly attached to the structure and does not include sidewalks, medians, or curbs over fill.

ELEMENT CATEGORY

Miscellaneous Elements

DEFECT CATEGORIES AND CONDITION STATES

Reinforced Concrete Defects and Condition States

Prestressed Concrete Defects and Condition States

Steel Defects and Condition States

Timber Defects and Condition States

Masonry Defects and Condition States

Other Material Defects and Condition States

Click to return to: Table of Contents

Element 330 – Metal Bridge Railing	Units: Feet (ft)	NBE

DESCRIPTION

All types and shapes of metal bridge railing. Steel, aluminum, and other metals are included as a part of this element. This element includes posts, blocking, and curbs of any material.

QUANTITY CALCULATION

Sum of the lengths of each bridge railing. For simplicity, the quantity may also be calculated as the number of bridge railings times the bridge length.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

This element includes curbs directly attached to bridge railings or posts. For curbs that are not attached to bridge railings code as Element 329 – Sidewalk/Median/Curb.

This element includes both vehicle traffic railings and pedestrian railings.

This element only includes bridge railings rigidly attached to the structure and does not include railings mounted in fill. Code rails mounted in fill over a structure as Element 323 - Approach Railing.

ELEMENT CATEGORY

Railing Elements

DEFECT CATEGORIES AND CONDITION STATES

Reinforced Concrete Defects and Condition States

Prestressed Concrete Defects and Condition States

Steel Defects and Condition States

Timber Defects and Condition States

Masonry Defects and Condition States

Other Material Defects and Condition States

Click to return to: Table of Contents

Element 331 – Reinforced Concrete Bridge Railing	Units: Feet (ft)	NBE

DESCRIPTION

All types and shapes of reinforced concrete bridge railing. All elements of the railing must be concrete.

QUANTITY CALCULATION

Sum of the lengths of each bridge railing. For simplicity, the quantity may also be calculated as the number of bridge railings times the bridge length.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

This element includes curbs directly attached to bridge railings or posts. For curbs that are not attached to bridge railings code as Element 329 – Sidewalk/Median/Curb.

This element includes both vehicle traffic railings and pedestrian railings.

This element only includes bridge railings rigidly attached to the structure and does not include railings mounted in fill. Code rails mounted in fill over a structure as Element 323 - Approach Railing.

ELEMENT CATEGORY

Railing Elements

DEFECT CATEGORIES AND CONDITION STATES

Reinforced Concrete Defects and Condition States

Prestressed Concrete Defects and Condition States

Steel Defects and Condition States

Timber Defects and Condition States

Masonry Defects and Condition States

Other Material Defects and Condition States

Click to return to: Table of Contents

Element 332 – Timber Bridge Railing	Units: Feet (ft)	NBE

DESCRIPTION

All types and shapes of timber bridge railing. This element includes posts, blocking, and curbs of any material.

QUANTITY CALCULATION

Sum of the lengths of each bridge railing. For simplicity, the quantity may also be calculated as the number of bridge railings times the bridge length.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

This element includes curbs directly attached to bridge railings or posts. For curbs that are not attached to bridge railings code as Element 329 – Sidewalk/Median/Curb.

This element includes both vehicle traffic railings and pedestrian railings.

This element only includes bridge railings rigidly attached to the structure and does not include railings mounted in fill. Code rails mounted in fill over a structure as Element 323 - Approach Railing.

ELEMENT CATEGORY

Railing Elements

DEFECT CATEGORIES AND CONDITION STATES

Reinforced Concrete Defects and Condition States

Prestressed Concrete Defects and Condition States

Steel Defects and Condition States

Timber Defects and Condition States

Masonry Defects and Condition States

Other Material Defects and Condition States

Click to return to: Table of Contents

Element 333 – Other Bridge Railing	Units: Feet (ft)	NBE

DESCRIPTION

All types and shapes of bridge railing constructed of materials not covered by other elements.

QUANTITY CALCULATION

Sum of the lengths of each bridge railing. For simplicity, the quantity may also be calculated as the number of bridge railings times the bridge length.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

This element includes curbs directly attached to bridge railings or posts. For curbs that are not attached to bridge railings code as Element 329 – Sidewalk/Median/Curb.

This element includes both vehicle traffic railings and pedestrian railings.

This element only includes bridge railings rigidly attached to the structure and does not include railings mounted in fill. Code rails mounted in fill over a structure as Element 323 - Approach Railing.

ELEMENT CATEGORY

Railing Elements

DEFECT CATEGORIES AND CONDITION STATES

Reinforced Concrete Defects and Condition States

Prestressed Concrete Defects and Condition States

Steel Defects and Condition States

Timber Defects and Condition States

Masonry Defects and Condition States

Other Material Defects and Condition States

Click to return to: Table of Contents

Element 334 – Masonry Bridge Railing	Units: Feet (ft)	NBE

DESCRIPTION

Masonry blocks or stacked stone bridge railings. All elements of the railing must be masonry block or stone.

QUANTITY CALCULATION

Sum of the lengths of each bridge railing. For simplicity, the quantity may also be calculated as the number of bridge railings times the bridge length.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

This element includes curbs directly attached to bridge railings or posts. For curbs that are not attached to bridge railings code as Element 329 – Sidewalk/Median/Curb.

This element includes both vehicle traffic railings and pedestrian railings.

This element only includes bridge railings rigidly attached to the structure and does not include railings mounted in fill. Code rails mounted in fill over a structure as Element 323 - Approach Railing.

ELEMENT CATEGORY

Railing Elements

DEFECT CATEGORIES AND CONDITION STATES

Reinforced Concrete Defects and Condition States

Prestressed Concrete Defects and Condition States

Steel Defects and Condition States

Timber Defects and Condition States

Masonry Defects and Condition States

Other Material Defects and Condition States

Click to return to: Table of Contents

Element 335 – Headwall	Units: Each	ADE

DESCRIPTION

Headwalls at the ends of culverts to retain fill. Includes headwalls constructed of any material. This element includes saddle walls and slope protection used at the ends of pipes.

QUANTITY CALCULATION

Sum of the individual headwalls.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

If a noise barrier (or other items which have no defined element) extend the height of the headwall they shall be considered a part of the headwall.

ELEMENT CATEGORY

Miscellaneous Elements

DEFECT CATEGORIES AND CONDITION STATES

Headwall Defects and Condition States

Headwall Defects and Condition States				
Defects	CS 1 - Good	CS 2 - Fair	CS 3 - Poor	CS 4 - Severe
	Insignificant Defects	Minor Defects	Moderate Defects	Major Defects
Other (8000)	Insignificant defects or isolated minor defects.	Widespread minor defects or isolated moderate defects.	Widespread moderate defects or isolated major defects.	Failed or no longer functioning.

Click to return to: Table of Contents

Element 342 – Sign Attachment	Units: Each	ADE

DESCRIPTION

Overhead sign attachments mounted directly to the structure. This element does not include regulatory traffic signs.

QUANTITY CALCULATION

Sum of the individual sign attachments mounted to the structure.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Only evaluate the portions of the sign within 4 feet of the bridge.

Bridge components within the vicinity of the sign attachment are to be inspected for any signs of deterioration or distress and the conditions shall be reported in the applicable element.

ELEMENT CATEGORY

Miscellaneous Elements

DEFECT CATEGORIES AND CONDITION STATES

Sign Attachment Defects and Condition States

Sign Attachment Defects and Condition States				
Defects	CS 1 - Good	CS 2 - Fair	CS 3 - Poor	CS 4 - Severe
	Insignificant Defects	Minor Defects	Moderate Defects	Major Defects
Other (8000)	Insignificant defects or isolated minor defects.	Widespread minor defects or isolated moderate defects.	Widespread moderate defects or isolated major defects.	Failed or no longer functioning.

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Element 343 – Pole Attachment	Units: Each	ADE

DESCRIPTION

Poles mounted directly to the structure. This includes signal poles, light poles, camera poles, or any other item which utilizes a pole. This element does not include regulatory traffic signs or overhead signs.

QUANTITY CALCULATION

Sum of the individual poles attached to the structure.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Only evaluate the portions of the pole within 4 feet of the bridge.

Bridge components within the vicinity of the pole are to be inspected for any signs of deterioration or distress and the conditions should be reported in the applicable element.

ELEMENT CATEGORY

Miscellaneous Elements

DEFECT CATEGORIES AND CONDITION STATES

Pole Attachment Defects and Condition States

Pole Attachment Defects and Condition States				
Defects	CS 1 - Good	CS 2 - Fair	CS 3 - Poor	CS 4 - Severe
	Insignificant Defects	Minor Defects	Moderate Defects	Major Defects
Other (8000)	Insignificant defects or isolated minor defects.	Widespread minor defects or isolated moderate defects.	Widespread moderate defects or isolated major defects.	Failed or no longer functioning.

Click to return to: Table of Contents

Element 350 – Approach Strip Seal Expansion Joint	Units: Feet (ft)	ADE

DESCRIPTION

Expansion joints outside the bridge limits sealed with a neoprene type waterproof gland with a metal extrusion or other system to anchor the gland.

QUANTITY CALCULATION

Sum of the lengths of each joint.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Joints that have been covered up by a wearing surface and are no longer visible for inspection should still have a joint element coded.

This element is to be used for strip seal expansion joints outside the bridge limits. For strip seal expansion joints within the bridge limits use Element 300 – Strip Seal Expansion Joint.

ELEMENT CATEGORY

Joint Elements

DEFECT CATEGORIES AND CONDITION STATES

Joint Defects and Condition States

Click to return to: Table of Contents

Element 351 – Approach Pourable Joint Seal	Units: Feet (ft)	ADE

DESCRIPTION

Joints outside the bridge limits filled with a pourable seal with or without a backer.

QUANTITY CALCULATION

Sum of the lengths of each joint.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Joints that have been covered up by a wearing surface and are no longer visible for inspection should still have a joint element coded.

This element is to be used for pourable joint seals outside the bridge limits. For pourable joint seals within the bridge limits use Element 301 – Pourable Joint Seal.

ELEMENT CATEGORY

Joint Elements

DEFECT CATEGORIES AND CONDITION STATES

Joint Defects and Condition States

Click to return to: Table of Contents

Element 352 – Approach Compression Joint Seal	Units: Feet (ft)	ADE

DESCRIPTION

Joints outside the bridge limits filled with a preformed compression type seal. Includes joints with or without an anchor system to confine the seal.

QUANTITY CALCULATION

Sum of the lengths of each joint.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Joints that have been covered up by a wearing surface and are no longer visible for inspection should still have a joint element coded.

This element is to be used for compression joint seals outside the bridge limits. For compression joint seals within the bridge limits use Element 302 – Compression Joint Seal.

ELEMENT CATEGORY

Joint Elements

DEFECT CATEGORIES AND CONDITION STATES

Joint Defects and Condition States

Click to return to: Table of Contents

Element 353 – Approach Assembly Joint with Seal	Units: Feet (ft)	ADE

DESCRIPTION

Expansion joints outside the bridge limits filled with an assembly mechanism that has a seal.

QUANTITY CALCULATION

Sum of the lengths of each joint.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Joints that have been covered up by a wearing surface and are no longer visible for inspection should still have a joint element coded.

This element is to be used for assembly joints with a seal outside the bridge limits. For assembly joints with a seal within the bridge limits use Element 303 – Assembly Joint with Seal.

ELEMENT CATEGORY

Joint Elements

DEFECT CATEGORIES AND CONDITION STATES

Joint Defects and Condition States

Click to return to: Table of Contents

Element 354 – Approach Open Expansion Joint	Units: Feet (ft)	ADE

DESCRIPTION

Expansion joints outside the bridge limits that are designed to be open and have no seal. This element is intended for joints designed as open joints, not for joints that were designed to have a seal that is currently missing. Does not include assembly joints, for approach open assembly joints without a seal use Element 355 – Approach Assembly Joint without Seal.

QUANTITY CALCULATION

Sum of the lengths of each joint.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Joints that have been covered up by a wearing surface and are no longer visible for inspection should still have a joint element coded.

This element is to be used for open joints outside the bridge limits. For open joints within the bridge limits use Element 304 – Open Expansion Joint.

ELEMENT CATEGORY

Joint Elements

DEFECT CATEGORIES AND CONDITION STATES

Joint Defects and Condition States

Click to return to: Table of Contents

Element 355 – Approach Assembly Joint without Seal	Units: Feet (ft)	ADE

DESCRIPTION

Expansion joints outside the bridge limits filled with an assembly mechanism that is designed to be open and have no seal. Includes finger joints and sliding plate joints. Includes open joints with or without a drainage trough below the joint.

QUANTITY CALCULATION

Sum of the lengths of each joint.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Joints that have been covered up by a wearing surface and are no longer visible for inspection should still have a joint element coded.

This element is to be used for assembly joints without a seal outside the bridge limits. For assembly joints without a seal within the bridge limits use Element 305 – Assembly Joint without Seal.

ELEMENT CATEGORY

Joint Elements

DEFECT CATEGORIES AND CONDITION STATES

Joint Defects and Condition States

Click to return to: Table of Contents

Element 356 – Approach Other Joint	Units: Feet (ft)	ADE

DESCRIPTION

Joints outside the bridge limits that are not defined by any other joint element.

QUANTITY CALCULATION

Sum of the lengths of each joint.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Joints that have been covered up by a wearing surface and are no longer visible for inspection should still have a joint element coded.

This element is to be used for other joints outside the bridge limits. For other joints within the bridge limits use Element 306 – Other Joint.

ELEMENT CATEGORY

Joint Elements

DEFECT CATEGORIES AND CONDITION STATES

Joint Defects and Condition States

Click to return to: Table of Contents

Element 358 – Approach Construction/Non-Expansion Joint	Units: Feet (ft)	ADE

DESCRIPTION

Full-depth transverse and longitudinal non-expansion joints outside the bridge limits. Includes both open and sealed non-expansion joints.

QUANTITY CALCULATION

Sum of the lengths of each joint.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Joints that have been covered up by a wearing surface and are no longer visible for inspection should still have a joint element coded.

This element is to be used for construction non-expansion joints outside the bridge limits. For construction non-expansion joints within the bridge limits use Element 308 – Construction/Non-Expansion Joint.

ELEMENT CATEGORY

Joint Elements

DEFECT CATEGORIES AND CONDITION STATES

Joint Defects and Condition States

Click to return to: Table of Contents

Element 372 – False Bent/Temporary Support	Units: Each	ADE

DESCRIPTION

This element is used to document the condition of designated false bents or other temporary bridge supports.

QUANTITY CALCULATION

Sum of the individual false bents or temporary supports.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

No additional commentary.

ELEMENT CATEGORY

Substructure Elements

DEFECT CATEGORIES AND CONDITION STATES

False Bent/Temporary Support Defects and Condition States

False Bent/Temporary Support Defects and Condition States				
Defects	CS 1 - Good	CS 2 - Fair	CS 3 - Poor	CS 4 - Severe
	Insignificant Defects	Minor Defects	Moderate Defects	Major Defects
Other (8000)	System is functioning as intended, has full bearing with the superstructure, and the foundation is sound. Insignificant defects or isolated minor defects.	System is substantially effective but may have minor bearing loss with the superstructure and/or the foundation may have minor signs of instability. Widespread minor defects or isolated moderate defects.	System has limited effectiveness and may have moderate bearing loss with the superstructure and/or the foundation may have moderate signs of instability. Widespread moderate defects or isolated major defects.	System is no longer functioning as intended, no longer in contact with the superstructure, or the foundation is unstable. Failed.

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Element 501 – Channel/Bank	Units: Each	ADE

DESCRIPTION

This element is used to document the physical condition of the streambed, banks, and channel/bank protection. This element does not include the substructure slope protection which should be evaluated as a part of Element 260 – Slope, Slope Protection, Berm.

QUANTITY CALCULATION

Quantity for this element shall always be 1.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

This element includes documentation to justify the rating for NBI Item 61 Channel and Channel protection and NBI Item 71 Waterway Adequacy.

ELEMENT CATEGORY

Channel/Embankment Elements

DEFECT CATEGORIES AND CONDITION STATES

Channel/Bank Defects and Condition States

Click to return to: Table of Contents

Channel/Bank Defects and Condition States				
Defects	CS 1 - Good Insignificant Defects	CS 2 - Fair Minor Defects	CS 3 - Poor Moderate Defects	CS 4 - Severe Major Defects
Other (8000)	Alignment Flow angle of attack less than 15 degrees with respect to the bridge substructure. Migration Insignificant signs of migration. Degradation Insignificant degradation. Aggradation Insignificant aggradation. Debris Insignificant debris. Bank Erosion/Instability Insignificant erosion/instability.	Alignment Flow angle of attack 15 to 30 degrees with respect to the bridge substructure. Migration Thalweg has moved from its baseline location but does not threaten the structure or approach roadway. Degradation Exists within tolerable limits. Aggradation Exists within tolerable limits. Debris Restricts channel slightly or is prone to build-up. Bank Erosion/Instability Erosion/instability that does not threaten the structure or approach roadway.	Alignment Flow angle of attack greater than 30 degrees with respect to the bridge substructure. Migration Thalweg has moved from its baseline location and threatens the structure or approach roadway. Degradation Exceeds tolerable limits but is less than the critical limits established by scour evaluation. Aggradation Exceeds tolerable limits. Hydraulic opening no longer adequate. Debris Large deposits exist and restrict the channel. Bank Erosion/Instability Erosion/instability that threatens the structure or approach roadway.	The condition warrants a structural and/or hydraulic review to determine the effect on strength, stability, or serviceability of the structure; OR a structural and/or hydraulic review has been completed and the defects impact strength, stability, or serviceability of the structure.

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Element 510 – Wearing Surface

Units: Square Feet (ft^2) BME

DESCRIPTION

Wearing surfaces that protect decks, slabs, or girder top flanges. Includes wearing surfaces constructed from flexible (asphalt), semi-rigid (epoxy and polyester material), and rigid (concrete) materials; and timber running planks.

QUANTITY CALCULATION

Area of the deck or slab that is protected by the wearing surface. The quantity does not include areas of the deck or slab not protected by the wearing surface.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Timber running planks should be coded using timber defects and condition states.

ELEMENT CATEGORY

Protective Elements and Systems

DEFECT CATEGORIES AND CONDITION STATES

Wearing Surface Defects and Condition States

Timber Defects and Condition States

Click to return to: Table of Contents

Element 515 – Steel Protective Coating | Units: Square Feet (ft^2) | BME

DESCRIPTION

Coatings that protect steel elements. Includes coatings such as paint, galvanization, weathering steel patina, or other top coat steel corrosion inhibitors.

QUANTITY CALCULATION

Entire protected surface area of the steel element. For simplicity, in lieu of calculating the surface area of the protected element, the quantity may match the element quantity of the protected element, regardless of the unit of measure. For example, if Element 107 – Steel Open Girder/Beam is coded as 100 feet (ft) of painted steel girders, the steel protective coating quantity can be represented as 100 square feet (ft^2).

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

No additional commentary.

ELEMENT CATEGORY

Protective Elements and Systems

DEFECT CATEGORIES AND CONDITION STATES

Steel Protective Coating Defects and Condition States

Click to return to: Table of Contents

Element 520 – Concrete Reinforcing Steel Protective System	Units: Square Feet (ft^2)	BME

DESCRIPTION

All types of protective systems used to protect reinforcing steel in concrete elements from corrosion.

QUANTITY CALCULATION

Entire protected surface area of the protected element.

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

This protection system element is intended to capture instances where the concrete element may be expected to deteriorate at a rate that is slower than unprotected situations. Protection systems may include rebar coatings, cathodic protection, or other similar protection methods.

ELEMENT CATEGORY

Protective Elements and Systems

DEFECT CATEGORIES AND CONDITION STATES

Concrete Reinforcing Steel Protective System Defects and Condition States

Click to return to: Table of Contents

Element 521 – Concrete Protective Coating | Units: Square Feet (ft^2) | BME

DESCRIPTION

Coatings that protect concrete elements. Includes coatings and crack sealers such as silane/siloxane water proofers, High Molecular Weight Methacrylate (HMWM), or any topcoat barrier that protects concrete from deterioration and reinforcing steel from corrosion.

QUANTITY CALCULATION

Entire protected surface area of the concrete element. For simplicity, in lieu of calculating the surface area of the protected element, the quantity may match the element quantity of the protected element, regardless of the unit of measure. For example, if Element 215 – Reinforced Concrete Abutment is coded as 100 feet (ft) of painted abutment, the concrete protective coating quantity can be represented as 100 square feet (ft^2).

PROCEDURE

Visual assessments may be supplemented with non-destructive testing for all elements.

COMMENTARY

Wearing surfaces should be coded under Element 510 – Wearing Surface.

ELEMENT CATEGORY

Protective Elements and Systems

DEFECT CATEGORIES AND CONDITION STATES

Concrete Protective Coating Defects and Condition States

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Element 600 – General Notes	Units: Each	ADE

DESCRIPTION

This element is used to document special conditions, observations, or notes regarding the bridge or the bridge site not covered by any other element.

QUANTITY CALCULATION

Quantity for this element shall always be 1.

PROCEDURE

No procedure.

COMMENTARY

No additional commentary.

ELEMENT CATEGORY

Miscellaneous Elements

DEFECT CATEGORIES AND CONDITION STATES

Defects and condition states shall not be recorded for this element. Quantity of 1 shall be coded in Condition State 1.

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Appendix A Element Mapping

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Appendix A.1 Element Mapping Grouped by Element Category

Appendix A documents the history of structure elements CDOT has used since the 1990s. In the attached tables, the left column lists all elements that were defined in CDOT's Pontis Bridge Inspection Coding Guide, the center column lists all elements used in the interim after CDOT transitioned to AASHTO MBEI elements before this coding and reference manual was published, and the right column lists all elements defined in this Colorado Structure Element Level Coding Guide. The elements are grouped into separate tables for each element category. Within each table, the elements are organized to show which prior elements translated into the newest elements in the right column.

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Appendix A.1.1 Deck and Slab Elements

AASHTO CoRe Elements	AASHTO MBEI Elements	
Pontis Bridge Inspection Coding Guide	**Interim**	**Colorado Structure Element Level Coding Guide**
12 - Concrete Deck - Bare	12 - Reinforced Concrete Deck	12 - Reinforced Concrete Deck
13 - Concrete Deck - Unprotected w/AC Overlay		
14 - Concrete Deck - Protected w/AC Overlay		
26 - Concrete Deck - AC Overlay Protected w/Coated Bars		
18 - Concrete Deck - Protected w/Thin Overlay	9018 - Concrete Deck - Protected w/Thin Overlay	
22 - Concrete Deck - Protected w/Rigid Overlay	9022 - Concrete Deck - Protected w/Rigid Overlay	
23 - Concrete Deck - Bare Protected w/Coated Bars	9023 - Concrete Deck - Bare Protected w/Coated Bars	
24 - Concrete Deck - Thin Overlay Protected w/Coated Bars	9024 - Concrete Deck - Thin Overlay Protected w/Coated Bars	
25 - Concrete Deck - Rigid Overlay Protected w/Coated Bars	9025 - Concrete Deck - Rigid Overlay Protected w/Coated Bars	
27 - Concrete Deck - Protected w/Cathodic Protection	9027 - Concrete Deck - Protected w/Cathodic Protection	
Did not exist	13 - Prestressed Concrete Deck	13 - Prestressed Concrete Deck
35 - Precast Panel Concrete Deck - Bare	9035 - Precast Panel Concrete Deck - Bare	14 - Precast Prestressed Deck Panel
36 - Precast Panel Concrete Deck - Protected w/AC Overlay	9036 - Precast Panel Concrete Deck - Protected w/AC Overlay	
Did not exist	15 - Prestressed Concrete Top Flange	15 - Prestressed Concrete Top Flange
Did not exist	16 - Reinforced Concrete Top Flange	16 - Reinforced Concrete Top Flange
28 - Open Grid - Steel Deck	28 - Steel Deck with Open Grid	28 - Steel Deck with Open Grid
29 - Concrete Filled Grid - Steel Deck	29 - Steel Deck with Concrete Filled Grid	29 - Steel Deck with Concrete Filled Grid
30 - Corrugated/Orthotropic/Etc. Deck	30 - Steel Deck Corrugated/Orthotropic/Etc.	30 - Steel Deck Corrugated/Orthotropic/Etc.
31 - Timber Deck	31 - Timber Deck	31 - Timber Deck
32 - Timber Deck - w/AC Overlay		
38 - Concrete Slab - Bare	38 - Reinforced Concrete Slab	38 - Reinforced Concrete Slab
39 - Concrete Slab - Unprotected w/AC Overlay		
40 - Concrete Slab - Protected w/AC Overlay		
52 - Concrete Slab - Protected w/Coated Bars		
44 - Concrete Slab - Protected w/Thin Overlay	9044 - Concrete Slab - Protected w/Thin Overlay	
48 - Concrete Slab - Protected w/Rigid Overlay	9048 - Concrete Slab - Protected w/Rigid Overlay	
53 - Concrete Slab - Protected w/Cathodic Protection	9053 - Concrete Slab - Protected w/Cathodic Protection	
54 - Timber Slab	54 - Timber Slab	54 - Timber Slab
55 - Timber Slab - w/AC Overlay		
60 - Deck - Railroad	60 - Other Deck	60 - Other Deck
	9060 - Railroad Deck	
Did not exist	65 - Other Slab	65 - Other Slab

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Appendix A.1.2 Railing Elements

AASHTO CoRe Elements	AASHTO MBEI Elements	
Pontis Bridge Inspection Coding Guide	**Interim**	**Colorado Structure Element Level Coding Guide**
Did not exist	9530 - Approach Guardrail Adequacy	323 - Approach Railing
330 - Metal Bridge Railing (Uncoated)	330 - Metal Bridge Railing	330 - Metal Bridge Railing
334 - Metal Bridge Rail (Coated)		
331 - Concrete - Bridge Railing	331 - Reinforced Concrete Bridge Railing	331 - Reinforced Concrete Bridge Railing
332 - Timber - Bridge Railing	332 - Timber Bridge Railing	332 - Timber Bridge Railing
333 - Miscellaneous - Bridge Railing (Other)	333 - Other Bridge Railing	333 - Other Bridge Railing
	334 - Masonry Bridge Railing	334 - Masonry Bridge Railing

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Appendix A.1.3 Superstructure Elements

AASHTO CoRe Elements	AASHTO MBEI Elements	
Pontis Bridge Inspection Coding Guide	**Interim**	**Colorado Structure Element Level Coding Guide**
101 - Steel - Closed Web/Box Girder - Unpainted	102 - Steel Closed Web/Box Girder	102 - Steel Closed Web/Box Girder
102 - Steel - Closed Web/Box Girder - Painted		
104 - P/S Concrete - Closed Web/Box Girder	104 - Prestressed Concrete Closed Web/Box Girder	104 - Prestressed Concrete Closed Web/Box Girder
Did not exist	39 - Prestressed Concrete Slab	
105 - Concrete - Closed Webs/Box Girder	105 - Reinforced Concrete Closed Web/Box Girder	105 - Reinforced Concrete Closed Web/Box Girder
Did not exist	106 - Other Closed Web/Box Girder	106 - Other Closed Web/Box Girder
106 - Steel - Open Girder - Unpainted	107 - Steel Open Girder/Beam	107 - Steel Open Girder/Beam
107 - Steel - Open Girder - Painted		
109 - P/S Concrete - Open Girder	109 - Prestressed Concrete Open Girder/Beam	109 - Prestressed Concrete Open Girder/Beam
110 - Concrete - Open Girder	110 - Reinforced Concrete Open Girder/Beam	110 - Reinforced Concrete Open Girder/Beam
111 - Timber - Open Girder	111 - Timber Open Girder/Beam	111 - Timber Open Girder/Beam
Did not exist	112 - Other Open Girder/Beam	112 - Other Open Girder/Beam
112 - Steel - Stringer - Unpainted	113 - Steel Stringer	113 - Steel Stringer
113 - Steel - Stringer - Painted		
115 - P/S Concrete - Stringer	115 - Prestressed Concrete Stringer	115 - Prestressed Concrete Stringer
116 - Concrete - Stringer	116 - Reinforced Concrete Stringer	116 - Reinforced Concrete Stringer
117 - Timber - Stringer	117 - Timber Stringer	117 - Timber Stringer
Did not exist	118 - Other Stringer	118 - Other Stringer
130 - Steel - Deck Truss - Unpainted	120 - Steel Truss	120 - Steel Truss
131 - Steel - Deck Truss - Painted		
120 - Steel - Bottom chord Through Truss - Unpainted	9120 - Steel Bottom Chord Thru Truss - Unpainted	
121 - Steel - Bottom chord Through Truss - Painted	9121 - Steel Bottom Chord Thru Truss - Painted	
125 - Steel - Through Truss excluding Bottom Chord - Unpainted	9125 - Steel Thru Truss excluding Bottom Chord - Unpainted	
126 - Steel - Through Truss excluding Bottom Chord - Painted	9126 - Steel Thru Truss excluding Bottom Chord - Painted	
135 - Timber - Truss/Arch	135 - Timber Truss	135 - Timber Truss
	146 - Timber Arch	146 - Timber Arch
Did not exist	136 - Other Truss	136 - Other Truss
140 - Steel - Arch - Unpainted	141 - Steel Arch	141 - Steel Arch
141 - Steel - Arch - Painted		
143 - P/S Concrete - Arch	143 - Prestressed Concrete Arch	143 - Prestressed Concrete Arch
144 - Concrete - Arch	144 - Reinforced Concrete Arch	144 - Reinforced Concrete Arch
145 - Arch - Other/Stone Masonry	142 - Other Arch	142 - Other Arch
	145 - Masonry Arch	145 - Masonry Arch

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AASHTO CoRe Elements	AASHTO MBEI Elements	
Pontis Bridge Inspection Coding Guide	**Interim**	**Colorado Structure Element Level Coding Guide**
146 - Steel - Cable not embedded in concrete (Uncoated)	147 - Steel Main Cable	147 - Steel Main Cable
147 - Steel - Cable not embedded in concrete (Coated)		
Did not exist	148 - Secondary Steel Cable	148 - Steel Secondary Cable
Did not exist	149 - Other Secondary Cable	149 - Other Secondary Cable
151 - Steel - Floor Beam - Unpainted	152 - Steel Floor Beam	152 - Steel Floor Beam
152 - Steel - Floor Beam - Painted		
154 - P/S Concrete - Floor Beam	154 - Prestressed Concrete Floor Beam	154 - Prestressed Concrete Floor Beam
155 - Concrete - Floor Beam	155 - Reinforced Concrete Floor Beam	155 - Reinforced Concrete Floor Beam
156 - Timber - Floor Beam	156 - Timber Floor Beam	156 - Timber Floor Beam
Did not exist	157 - Other Floor Beam	157 - Other Floor Beam
160 - Steel - Pin and Hanger Assembly - Unpainted	161 - Steel Pin, Pin and Hanger Assembly, or both	161 - Steel Pin, Pin and Hanger Assembly, or both
161 - Steel - Pin and Hanger Assembly - Painted		
Did not exist	162 - Steel Gusset Plate	162 - Steel Gusset Plate

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Appendix A.1.4 Bearing Elements

AASHTO CoRe Elements	AASHTO MBEI Elements	
Pontis Bridge Inspection Coding Guide	**Interim**	**Colorado Structure Element Level Coding Guide**
309 - Elastomeric Bearing with Teflon	9309 - Elastomeric Bearing with Teflon	310 - Elastomeric Bearing
310 - Elastomeric Bearing	310 - Elastomeric Bearing	
311 - Moveable Bearing (Roller, Sliding, etc.)	311 - Moveable Bearing	311 - Moveable Bearing
Did not exist	312 - Enclosed/Concealed Bearing	312 - Enclosed/Concealed Bearing
313 - Fixed Bearing	313 - Fixed Bearing	313 - Fixed Bearing
314 - Pot Bearing	314 - Pot Bearing	314 - Pot Bearing
315 - Disk Bearing	315 - Disk Bearing	315 - Disk Bearing
Did not exist	316 - Other Bearing	316 - Other Bearing

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Appendix A.1.5 Substructure Elements

AASHTO CoRe Elements	AASHTO MBEI Elements	
Pontis Bridge Inspection Coding Guide	**Interim**	**Colorado Structure Element Level Coding Guide**
201 - Steel - Column or Pile Extension - Unpainted	202 - Steel Column	202 - Steel Column
202 - Steel - Column or Pile Extension - Painted		
Did not exist	203 - Other Column	203 - Other Column
204 - P/S Concrete - Column or Pile Extension	204 - Prestressed Concrete Column	204 - Prestressed Concrete Column
205 - Concrete - Column or Pile Extension	205 - Reinforced Concrete Column	205 - Reinforced Concrete Column
206 - Timber - Column or Pile Extension	206 - Timber Column	206 - Timber Column
Did not exist	207 - Steel Tower	207 - Steel Tower
Did not exist	208 - Timber Trestle	208 - Timber Trestle
210 - Concrete - Pier Wall	210 - Reinforced Concrete Pier Wall	210 - Reinforced Concrete Pier Wall
211 - Other - Pier Wall	211 - Other Pier Wall	211 - Other Pier Wall
	212 - Timber Pier Wall	212 - Timber Pier Wall
	213 - Masonry Pier Wall	213 - Masonry Pier Wall
215 - Concrete - Abutment	215 - Reinforced Concrete Abutment	215 - Reinforced Concrete Abutment
216 - Timber - Abutment	216 - Timber Abutment	216 - Timber Abutment
217 - Other - Abutment	217 - Masonry Abutment	217 - Masonry Abutment
	218 - Other Abutment	218 - Other Abutment
	219 - Steel Abutment	219 - Steel Abutment
220 - Concrete - Submerged Pile Cap/Footing	220 - Reinforced Concrete Pile Cap/Footing	220 - Reinforced Concrete Pile Cap/Footing
221 - Concrete - Pile Cap/Footing	9221 - Concrete Pile Cap/Footing	
225 - Steel - Submerged Pile - Unpainted	225 - Steel Pile	225 - Steel Pile
226 - P/S Concrete - Submerged Pile	226 - Prestressed Concrete Pile	226 - Prestressed Concrete Pile
227 - Concrete - Submerged Pile	227 - Reinforced Concrete Pile	227 - Reinforced Concrete Pile
228 - Timber - Submerged Pile	228 - Timber Pile	228 - Timber Pile
Did not exist	229 - Other Pile	229 - Other Pile
230 - Steel - Cap - Unpainted	231 - Steel Pier Cap	231 - Steel Pier Cap
231 - Steel - Cap - Painted		
233 - P/S Concrete - Cap	233 - Prestressed Concrete Pier Cap	233 - Prestressed Concrete Pier Cap
234 - Concrete - Cap	234 - Reinforced Concrete Pier Cap	234 - Reinforced Concrete Pier Cap
235 - Timber - Cap	235 - Timber Pier Cap	235 - Timber Pier Cap
Did not exist	236 - Other Pier Cap	236 - Other Pier Cap
372 - False Bent/Temporary Support	9372 - False Bent/Temporary Support	372 - False Bent/Temporary Support

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Appendix A.1.6 Culvert Elements

AASHTO CoRe Elements	AASHTO MBEI Elements	
Pontis Bridge Inspection Coding Guide	**Interim**	**Colorado Structure Element Level Coding Guide**
240 - Steel - Culvert	240 - Steel Culvert	240 - Steel Culvert
241 - Concrete - Culvert	241 - Reinforced Concrete Culvert	241 - Reinforced Concrete Culvert
	245 - Prestressed Concrete Culvert	245 - Prestressed Concrete Culvert
242 - Timber - Culvert	242 - Timber Culvert	242 - Timber Culvert
243 - Other - Culvert	243 - Other Culvert	243 - Other Culvert
	244 - Masonry Culvert	244 - Masonry Culvert

Appendix A.1.7 Joint Elements

AASHTO CoRe Elements	AASHTO MBEI Elements	
Pontis Bridge Inspection Coding Guide	**Interim**	**Colorado Structure Element Level Coding Guide**
300 - Strip Seal Expansion Joint	300 - Strip Seal Expansion Joint	300 - Strip Seal Expansion Joint
301 - Pourable Joint Seal	301 - Pourable Joint Seal	301 - Pourable Joint Seal
302 - Compression Joint Seal	302 - Compression Joint Seal	302 - Compression Joint Seal
Did not exist	303 - Assembly Joint with Seal	303 - Assembly Joint with Seal
307 - Modular Expansion Joint	9307 - Modular Expansion Joint	
304 - Open Expansion Joint	304 - Open Expansion Joint	304 - Open Expansion Joint
Did not exist	305 - Assembly Joint without Seal	305 - Assembly Joint without Seal
Did not exist	306 - Other Joint	306 - Other Joint
305 - Elastomeric Flex-type Joint	9305 - Elastomeric Flex Type Joint	
306 - Asphaltic Plug Expansion Device	9306 - Asphaltic Plug Expansion Joint	
308 - Construction/Non-Expansion Joint	308 - Construction/Non-Expansion Joint	308 - Construction/Non-Expansion Joint
Did not exist	Did not exist	350 - Approach Strip Seal Expansion Joint
Did not exist	Did not exist	351 - Approach Pourable Joint Seal
Did not exist	Did not exist	352 - Approach Compression Joint Seal
Did not exist	Did not exist	353 - Approach Assembly Joint with Seal
Did not exist	Did not exist	354 - Approach Open Expansion Joint
Did not exist	Did not exist	355 - Approach Assembly Joint without Seal
Did not exist	Did not exist	356 - Approach Other Joint
Did not exist	Did not exist	358 - Approach Construction/Non-Expansion Joint

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Appendix A.1.8 Approach Slab Elements

AASHTO CoRe Elements	AASHTO MBEI Elements	
Pontis Bridge Inspection Coding Guide	**Interim**	**Colorado Structure Element Level Coding Guide**
320 - P/S Concrete - Approach Slab	320 - Prestressed Concrete Approach Slab	320 - Prestressed Concrete Approach Slab
321 - Concrete - Approach Slab	321 - Reinforced Concrete Approach Slab	321 - Reinforced Concrete Approach Slab

Appendix A.1.9 Channel/Embankment Elements

AASHTO CoRe Elements	AASHTO MBEI Elements	
Pontis Bridge Inspection Coding Guide	**Interim**	**Colorado Structure Element Level Coding Guide**
325 - Slope, Slope Protection, Berms	9325 - Slope, Slope Protection, Berms	260 - Slope, Slope Protection, Berm
501 - Channel Condition	9501 - Channel Condition	501 - Channel/Bank
502 - Channel Protection Material and Condition	9502 - Channel Protection Material and Condition	
504 - Bank Condition	9504 - Bank Condition	
505 - Debris	9505 - Debris Smart Flag	
510 - Waterway Adequacy	9510 - Waterway Adequacy	

Appendix A.1.10 Protective Elements and Systems

AASHTO CoRe Elements	AASHTO MBEI Elements	
Pontis Bridge Inspection Coding Guide	**Interim**	**Colorado Structure Element Level Coding Guide**
Did not exist	510 - Wearing Surface	510 - Wearing Surface
Did not exist	515 - Steel Protective Coating	515 - Steel Protective Coating
Did not exist	520 - Concrete Reinforcing Steel Protective System	520 - Concrete Reinforcing Steel Protective System
Did not exist	521 - Concrete Protective Coating	521 - Concrete Protective Coating
340 - Concrete Coating (Superstructure)	9340 - Superstructure Concrete Coating	
341 - Concrete Coating (Substructure)	9341 - Substructure Concrete Coating	

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Appendix A.1.11 Miscellaneous Elements

AASHTO CoRe Elements	AASHTO MBEI Elements	
Pontis Bridge Inspection Coding Guide	**Interim**	**Colorado Structure Element Level Coding Guide**
520 - Approach Roadway Alignment	9520 - Approach Roadway Alignment	322 - Approach Roadway
326 - Bridge Wingwalls	9326 - Bridge Wingwalls	326 - Wingwall
327 - Culvert Wingwalls	9327 - Culvert Wingwalls	
336 - Metal - Curbs/Sidewalks - Painted	9336 - Metal - Curbs/Sidewalks - Coated	329 - Sidewalk/Median/Curb
337 - Metal - Curbs/Sidewalks - Unpainted	9337 - Metal - Curbs/Sidewalks - Uncoated	
338 - Curbs/Sidewalks (Concrete)	9338 - Concrete - Curbs/Sidewalks	
339 - Curbs/Sidewalks (Timber)	9339 - Timber - Curbs/Sidewalks	
335 - Culvert Headwalls	9335 - Culvert Headwalls	335 - Headwall
342 - Sign Attachment to Bridge	9342 - Sign Attachment	342 - Sign Attachment
343 - Pole Attachment to Bridge	9343 - Pole Attachment	343 - Pole Attachment
600 - General Remarks	9600 - General Remarks	600 - General Notes

Appendix A.1.12 Discontinued Smart Flag Elements

AASHTO CoRe Elements	AASHTO MBEI Elements	
Pontis Bridge Inspection Coding Guide	**Interim**	**Colorado Structure Element Level Coding Guide**
355 - Steel Diaphragms	Incorporated into girder elements	
356 - Steel – Fatigue	Incorporated into steel elements	
357 - Pack Rust (Superstructure)	incorporated into superstructure elements	
358 - Deck Surface Cracking	Incorporated into deck elements	
359 - Soffit of Concrete Decks and Slabs	Incorporated into deck elements	
360 – Settlement	Incorporated into substructure elements	
361 – Scour	Incorporated into substructure elements	
362 - Traffic Impact (Superstructure)	Incorporated into superstructure elements	
370 - Traffic Impact (Substructure)	Incorporated into substructure elements	
371 - Traffic Impact (Deck)	Incorporated into deck elements	
373 - Pack Rust (Substructure)	Incorporated into superstructure elements	
399 - Alkali-Silica Reactivity (ASR)	Incorporated into concrete elements	

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Appendix B Tracking Changes

Appendix B is to provide a location to track future changes to this coding guide. Any future policy changes that CDOT makes which affect this coding guide should be recorded in this section until they can be incorporated into the next updated version release of this coding guide.

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