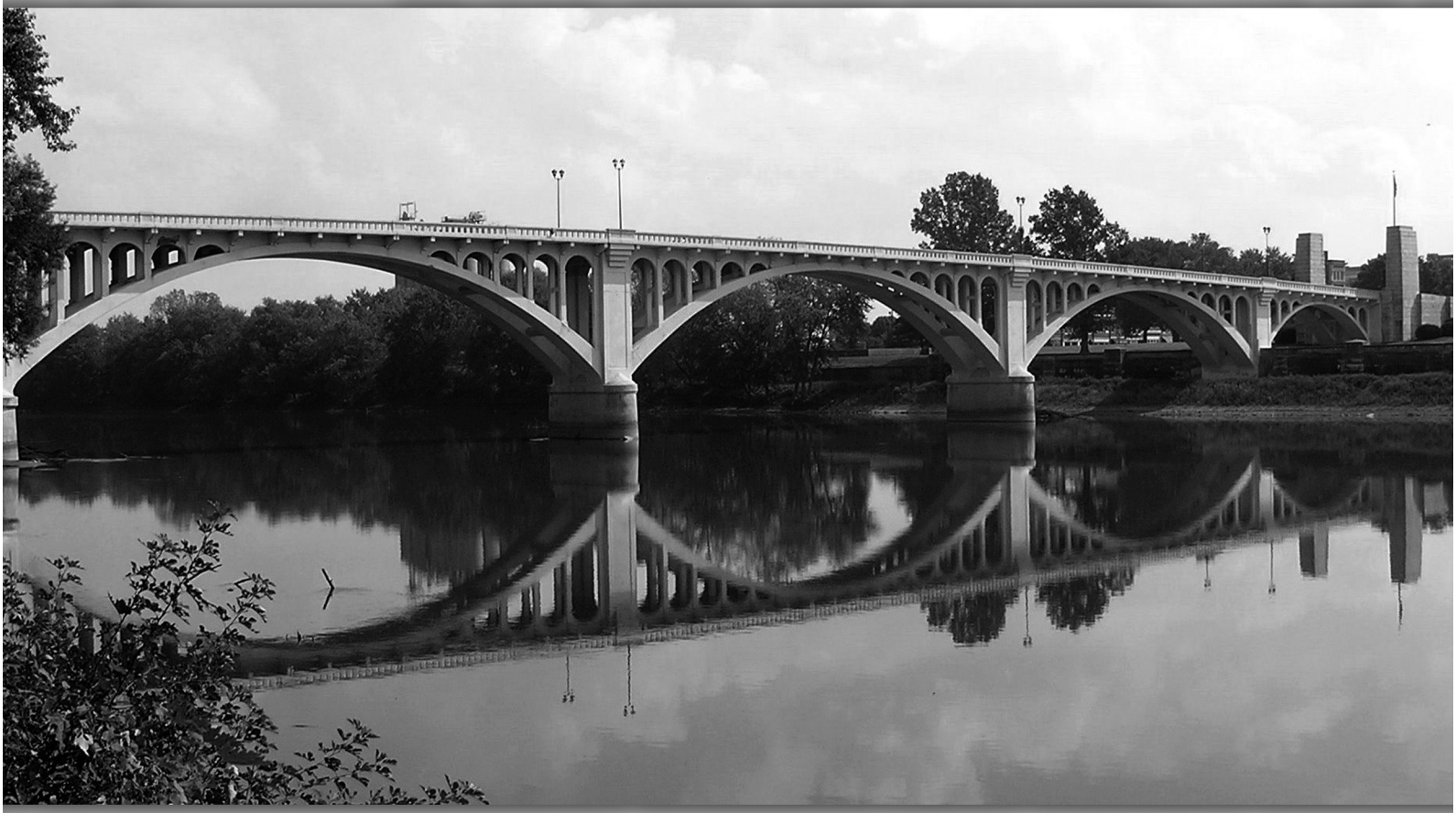
**State of Illinois**
Illinois Department of Transportation



# Bridge Element Inspection Manual

Illinois Department of Transportation

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# Bridge Element Inspection Manual

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## CONCRETE DECK/SLAB BARE

11/12/2013

These elements include: Unprotected bare concrete, which receives direct traffic loads. Precast and precast prestressed beams top surfaces are included in element 8034. The top flange of cast in place reinforced concrete T-beams, as well as, reinforced concrete slabs are included in element 8038. The evaluated portions of the bridge deck include all traffic lanes and shoulders. Deck portions not to be evaluated include sidewalks, parapets, medians and other areas, which are not expected to receive direct traffic loads.

| Elem # | Description |
|---|---|
| 12 | Concrete Deck Bare (**SF**) |
| 8034 | Precast Concrete Deck Bare (**SF**) |
| 8038 | Concrete Slab Bare (**SF**) |
| **8056** | **Precast Concrete Deck w/Rigid 5" Overlay (SF)** |

**Condition State 1** The deck surface and soffit have no deficiencies. There are no spalled/delaminated, or map cracked areas in the deck surface. There are no map cracked, spalled/delaminated areas, or stalactitic leaching cracks in the deck soffit. Sound previously repaired areas may exist in the deck surface or soffit. Asphalt repairs are not considered sound repairs.

Feasible actions:
1) DN
2) *Wash
3) *Add a protective system and wearing surface

**Condition State 2** Map cracked areas, intersecting longitudinal and transverse cracks, parallel cracks at 2' centers or less, spalls/delaminations not associated with corroding reinforcement or stalactitic leaching cracks exist in the deck surface and/or soffit.

Feasible actions:
1) DN
2) Seal or inject cracks
3) *Add a protective system and wearing surface

**Condition State 3** Spalls/delaminations exposing reinforcement exist in the deck surface or soffit.

Feasible actions:
1) DN
2) Partial depth repair
3) *Replace deck

**Condition State 4** Spalled/delaminated, map cracked, or intersecting longitudinal and transverse cracked areas in the deck surface are positioned directly above spalls/delaminations, map cracked, intersecting crack or stalactitic leaching crack areas in the soffit. Condition state 2 or 3 areas in the deck surface are positioned directly above condition state 2 or 3 areas in the soffit. Specifically excluded from this condition state are areas which contain parallel cracks extending through the top to the bottom of the deck, these areas remain in condition state 2, unless accompanied by additional deficiencies.

Feasible actions:
1) DN
2) Full depth repair
3) *Replace deck

## CONCRETE DECK/SLAB UNPROTECTED W/HMA OVERLAY

11/12/2013

These elements include: HMA overlaid and bituminous sealed concrete decks/slabs without a waterproof membrane system, which receive direct traffic loads. Precast and precast prestressed beams top surfaces are included in element 8035. The top flange of cast in place reinforced concrete T-beams, as well as, reinforced concrete slabs are included in element 8039. The evaluated portions of the bridge deck include all traffic lanes and shoulders. Deck portions not to be evaluated include sidewalks, parapets, medians and other areas, which are not expected to receive direct traffic loads.

| Elem # | Description |
|---|---|
| 8013 | Concrete Deck Unprotected w/ HMA Overlay (**SF**) |
| 8035 | Precast Concrete Deck Unprotected w/ HMA Overlay (**SF**) |
| 8039 | Concrete Slab Unprotected w/ HMA Overlay (**SF**) |

**Condition State 1** The deck surface and soffit have no deficiencies. There are no potholes, spalled/delaminated or map cracked areas in the deck surface. There are no map cracked, spalled/delaminated areas, or stalactitic leaching cracks in the deck soffit. Sound previously repaired areas may exist in the deck surface or soffit. Cold patch repairs are not considered sound repairs. Square cut hot mix and concrete repairs are sound repairs.

Feasible actions:
1) DN
2) *Wash

**Condition State 2** Potholes, map cracked areas, parallel cracks at 2' centers or less, intersecting cracks, spalls/delaminations not associated with corroding reinforcement or stalactitic leaching cracks exist in the deck surface and/or soffit.

Feasible actions:
1) DN
2) Patch holes, seal or inject cracks
3) *Remove overlay, add protection system and wearing surface

**Condition State 3** Large potholes, large ruts or washboards, in the deck surface or spalls/delaminations exposing reinforcement in the concrete deck or soffit exist.

Feasible actions:
1) DN
2) Partial depth repair
3) *Replace Deck

**Condition State 4** Large potholes, large ruts, washboard, repairs, spalled/delaminated, map cracked or intersecting longitudinal and transverse cracked areas in the deck surface and/or subsurface are positioned directly above spalls/delaminations, map cracked, intersecting cracks or stalactitic leaching crack areas in the soffit. Condition state 2 or 3 areas in the deck surface are positioned directly above condition state 2 or 3 areas in the soffit. Specifically excluded from this condition state are areas which contain parallel cracks extending through the top to the bottom of the deck, these areas remain in condition state 2, unless accompanied by additional deficiencies.

Feasible actions:
1) DN
2) Full depth repair
3) *Replace deck

## CONCRETE DECK/SLAB PROTECTED W/ HMA OVERLAY

11/12/2013

These elements include: HMA overlaid concrete decks/slabs with a waterproof membrane system, which receive direct traffic loads. Precast and precast prestressed beams top surfaces are included in element 8036. The top flange of cast in place reinforced concrete T-beams, as well as, reinforced concrete slabs are included in element 8040. The evaluated portions of the bridge deck include all traffic lanes and shoulders. Deck portions not to be evaluated include sidewalks, parapets, medians and other areas, which are not expected to receive direct traffic loads.

| Elem # | Description |
|---|---|
| 8014 | Concrete Deck Protected w/ HMA Overlay (**SF**) |
| 8036 | Precast Concrete Deck Protected w/HMA Overlay (**SF***)* |
| 8040 | Concrete Slab Protected w/ HMA Overlay (**SF**) |

**Condition State 1** The deck surface and soffit have no deficiencies. There are no potholes, spalled/delaminated or map cracked areas in the deck surface. There are no map cracked, spalled/delaminated areas, or stalactitic leaching cracks in the deck soffit. Sound previously repaired areas may exist in the deck surface or soffit. Cold patch repairs are not considered sound repairs. Square cut hot mix and concrete repairs are sound repairs.

Feasible actions:
1) DN
2) *Wash

**Condition State 2** Potholes, map cracked areas, intersecting cracks, parallel cracks at 2' centers or less, stalactitic leaching cracks or surface spalls/delamination without reinforcement corrosion exist in the deck surface and/or soffit.

Feasible actions:
1) DN
2) Patch holes, seal or inject cracks
3) *Remove overlay, add protection system and wearing surface

**Condition State 3** Large potholes, large ruts or washboards, in the deck surface or spalls/delaminations exposing reinforcement in the concrete deck or soffit exist.

Feasible actions:
1) DN
2) Partial depth repair
3) *Replace deck

**Condition State 4** Large potholes, large ruts, washboard, repairs, spalled/delaminated, map cracked or intersecting longitudinal and transverse cracked areas in the deck surface and/or subsurface are positioned directly above spalls/delaminations, map cracked, intersecting cracks or stalactitic leaching crack areas in the soffit. Condition state 2 or 3 areas in the deck surface are positioned directly above condition state 2 or 3 areas in the soffit. Specifically excluded from this condition state are areas which contain parallel cracks extending through the top to the bottom of the deck, these areas remain in condition state 2, unless accompanied by additional deficiencies.

Feasible actions:
1) DN
2) Full depth repair
3) *Replace deck

## CONCRETE DECK/SLAB PROTECTED W/ THIN (<1") OVERLAY

09/30/2013

These elements include: Concrete decks/slabs that have a less than 1 inch thick cementitious overlay which receive direct traffic loads. The top flange of cast in place reinforced concrete T-beams, as well as, reinforced concrete slabs are included in element 8044. All other decks protected with thin overlays, including precast beams, are included in element 8018. The evaluated portions of the bridge deck include all traffic lanes and shoulders. Deck portions not to be evaluated include sidewalks, parapets, medians and other areas, which are not expected to receive direct traffic loads.

| Elem # | Description |
|---|---|
| 8018 | Concrete Deck Protected w/ Thin Overlay (**SF**) |
| 8044 | Concrete Slab Protected w/ Thin Overlay (**SF**) |

**Condition State 1** The deck surface and soffit have no deficiencies. There are no spalled/delaminated, map cracked areas in the deck surface. There are no map cracked, spalled/delaminated areas, or stalactitic leaching cracks in the deck soffit. Sound previously repaired areas may exist in the deck surface or soffit. Asphalt repairs are not considered sound repairs.

Feasible actions:
1) DN
2) *Wash
3) *Add overlay

**Condition State 2** Map cracked areas, intersecting longitudinal and transverse cracks, parallel cracks at 2' centers or less, or stalactitic leaching cracks, spalls/delaminations are not associated with corroding reinforcement exist in the deck surface and/or soffit.

Feasible actions:
1) DN
2) Seal or inject cracks
3) *Add overlay

**Condition State 3** Spalls/delaminations exposing reinforcement exist in the deck surface or soffit.

Feasible actions:
1) DN
2) Partial depth repair
3) *Replace deck

**Condition State 4** Spalled/delaminated, map cracked, or intersecting longitudinal and transverse cracked areas in the deck surface are positioned directly above spalls/delaminations, map cracked, intersecting cracks or stalactitic leaching crack areas in the soffit. Conditions state 2 or 3 areas in the deck surface are positioned directly above condition state 2 or 3 areas in the soffit. Specifically excluded from this condition state are areas which contain parallel cracks extending through the top to the bottom of the deck, these areas remain in condition state 2, unless accompanied by additional deficiencies.

Feasible actions:
1) DN
2) Full depth repair
3) *Replace deck

## CONCRETE DECK/SLAB PROTECTED W/ RIGID (>1") OVERLAY

09/30/2013

These elements include: Concrete decks/slabs that have a rigid overlay 1 inch thick or greater which receive direct traffic loads. The top flange of cast in place reinforced concrete T-beams, as well as, reinforced concrete slabs are included in element 8048. All other decks protected with overlays, including precast beams, are included in element 8022. The evaluated portions of the bridge deck include all traffic lanes and shoulders. Deck portions not to be evaluated include sidewalks, parapets, medians and other areas, which are not expected to receive direct traffic loads.

| Elem # | Description |
|---|---|
| 8022 | Concrete Deck Protected w/ Rigid Overlay (**SF**) |
| 8048 | Concrete Slab Protected w/ Rigid Overlay (**SF**) |

**Condition State 1** The deck surface and soffit have no deficiencies. There are no spalled/delaminated, or map cracked areas in the deck surface. There are no map cracked, spalled/delaminated areas, or stalactitic leaching cracks in the deck soffit. Sound previously repaired areas may exist in the deck surface or soffit. Asphalt repairs are not considered sound repairs.

Feasible actions:
1) DN
2) *Wash

**Condition State 2** Map cracked areas, intersecting longitudinal and transverse cracks, parallel cracks at 2' centers or less, spalls/delaminations not associated with corroding reinforcement, or stalactitic leaching cracks exist in the deck surface and/or soffit.

Feasible actions:
1) DN
2) Seal or inject cracks

**Condition State 3** Spalls/delaminations exposing reinforcement exist in the deck surface or soffit.

Feasible actions:
1) DN
2) Partial depth repair
3) *Replace deck

**Condition State 4** Spalled/delaminated, map cracked, or intersecting longitudinal and transverse cracked areas in the deck surface are positioned directly above spalls/delaminations, map cracked, intersecting cracks or stalactitic leaching crack areas in the soffit. Condition state 2 or 3 areas in the deck surface are positioned directly above condition state 2 or 3 areas in the soffit. Specifically excluded from this condition state are areas which contain parallel cracks extending through the top to the bottom of the deck, these areas remain in condition state 2, unless accompanied by additional deficiencies.

Feasible actions:
1) DN
2) Full depth repair
3) *Replace deck

## CONCRETE DECK/SLAB COATED BARS

09/30/2013

These elements include: Bare concrete decks/slabs that are protected with epoxy coated bars, which receive direct traffic loads. The evaluated portions of the bridge deck include all traffic lanes and shoulders. Deck portions not to be evaluated include sidewalks, parapets, medians and other areas, which are not expected to receive direct traffic loads.

| Elem # | Description |
|---|---|
| 8026 | Concrete Deck Protected w/ Coated Bars (**SF**) |
| 8033 | Concrete Deck Protected w/ Coated Bars w/ PPC Panels (**SF**) |
| 8052 | Concrete Slab Protected w/ Coated Bars (**SF**) |

**Condition State 1** The deck surface and soffit have no deficiencies. There are no spalled/delaminated, or map cracked areas in the deck surface. There are no map cracked, spalled/delaminated areas or stalactitic leaching cracks in the deck soffit. Sound previously repaired areas may exist in the deck surface or soffit. Asphalt repairs are not considered sound repairs.

Feasible actions:
1) DN
2) *Wash
3) *Add concrete overlay

**Condition State 2** Map cracked areas, intersecting longitudinal and transverse cracks, parallel cracks at 2' centers or less, stalactitic leaching cracks or surface spalls/delaminations without reinforcement corrosion exist in the deck surface and/or soffit.

Feasible actions:
1) DN
2) Seal or inject cracks
3) *Add concrete overlay

**Condition State 3** Spalls/delaminations exposing reinforcement exist in the deck surface or soffit.

Feasible actions:
1) DN
2) Partial depth repair
3) *Replace deck

**Condition State 4** Spalled/delaminated, map cracked, or intersecting longitudinal and transverse cracked areas in the deck surface are positioned directly above spalls/delaminations, map cracked, intersecting cracks or stalactitic leaching crack areas in the soffit. Condition state 2 or 3 areas in the deck surface are positioned directly above condition state 2 or 3 areas in the soffit. Specifically excluded from this condition state are areas which contain parallel cracks extending through the top to the bottom of the deck, these areas remain in condition state 2, unless accompanied by additional deficiencies.

Feasible actions:
1) DN
2) Full depth repair
3) *Replace deck

## CONCRETE DECK/SLAB CATHODIC PROTECTION

09/30/2013

These elements include: Concrete decks/slabs that are protected with cathodic protection which receive direct traffic loads. The evaluated portions of the bridge deck include all traffic lanes and shoulders. Deck portions not to be evaluated include sidewalks, parapets, medians and other areas, which are not expected to receive direct traffic loads.

| Elem # | Description |
|---|---|
| 8027 | Concrete Deck Protected w/Cathodic Protection (**SF**) |
| 8053 | Concrete Slab Protected w/Cathodic Protection (**SF**) |

**Condition State 1** The deck surface and soffit have no deficiencies. There are no spalled/delaminated, or map cracked areas in the deck surface. There are no map cracked, or spalled/delaminated areas, or stalactitic leaching cracks in the deck soffit. Sound previously repaired areas may exist in the deck surface or soffit. Asphalt repairs are not considered sound repairs.

Feasible actions:
1) DN
2) *Wash
3) Replace anode

**Condition State 2** Map cracked areas, intersecting longitudinal and transverse cracks, parallel cracks at 2' centers or less, spalls/delaminations not associated with corroding reinforcement or stalactitic leaching cracks exist in the deck surface and/or soffit.

Feasible actions:
1) DN
2) Seal or inject cracks
3) Repair cathodic protection

**Condition State 3** Spalls/delaminations exposing reinforcement exist in the deck surface or soffit.

Feasible actions:
1) DN
2) Repair cathodic protection
3) *Replace deck

**Condition State 4** Spalled/delaminated, map cracked, or intersecting longitudinal and transverse cracked areas in the deck surface are positioned directly above spalls/delaminations, map cracked, intersecting cracks or stalactitic leaching crack areas in the soffit. Condition state 2 or 3 areas in the deck surface are positioned directly above condition state 3 or 4 areas in the soffit. Specifically excluded from this condition state are areas which contain parallel cracks extending through the top to the bottom of the deck, these areas remain in condition state 2, unless accompanied by additional deficiencies.

Feasible actions:
1) DN
2) *Replace cathodic protection
3) *Replace deck

## OPEN GRID DECK

11/12/2013

This element includes: Steel open grid decks, which receive direct traffic loads. The evaluated portions of the bridge deck include all traffic lanes and shoulders. Deck portions not to be evaluated include sidewalks, parapets, medians and other areas, which are not expected to receive direct traffic loads.

| Elem # | Description |
|---|---|
| 28 | Steel Deck Open Grid (**SF**) |

**Condition State 1** The deck has no deficiencies. There is no corrosion. The paint system is sound. All connections are sound.

Feasible actions:
1) DN
2) *Wash

**Condition State 2** The paint system has failed, and corrosion has formed or secondary connectors show cracked welds or broken rivets or bolts.

Feasible actions:
1) DN
2) *Wash
3) *Wash and paint or reconnect

**Condition State 3** Measurable corrosion or connections have failed on secondary grid or primary connections show cracks.

Feasible actions:
1) DN
2) *Wash
3) *Wash and paint or reconnect

**Condition State 4** Measurable corrosion or connections to the floor system have failed on the primary grid.

Feasible actions:
1) DN
2) Spot blast, clean and paint or reconnect
3) *Replace deck

## FILLED GRID DECK

11/12/2013

This element includes: Steel grid decks filled with concrete, which receive direct traffic loads. The evaluated portions of the bridge deck include all traffic lanes and shoulders. Deck portions not to be evaluated include sidewalks, parapets, medians and other areas, which are not expected to receive direct traffic loads.

| Elem # | Description |
|---|---|
| 29 | Steel Deck Concrete Filled Grid (**SF**) |

**Condition State 1** The deck has no deficiencies. There is no corrosion. The paint system is sound. The deck has no delaminations. Connections are sound.

Feasible actions:
1) DN
2) *Wash

**Condition State 2** The paint system has failed and corrosion has formed or secondary connectors show cracked welds or broken rivets or bolts. If present, wearing surface has map cracked areas, intersecting longitudinal and transverse cracks.

Feasible actions:
1) DN
2) *Wash
3) *Wash and paint or reconnect

**Condition State 3** Grid fill is spalling, secondary grid connections have failed or have measurable corrosion, or primary connections show cracks.

Feasible actions:
1) DN
2) Repair deficient areas
3) *Replace deck

**Condition State 4** Grid fill has large spalls, measurable corrosion or connections to the floor system have failed on the primary grid.

Feasible actions:
1) DN
2) Repair deficient areas
3) *Replace deck

## FILLED GRID DECK w/HMA OVERLAY

11/12/2013

This element includes: Steel grid decks filled with concrete, which receive direct traffic loads. The evaluated portions of the bridge deck include all traffic lanes and shoulders. Deck portions not to be evaluated include sidewalks, parapets, medians and other areas, which are not expected to receive direct traffic loads.

| Elem # | Description |
|---|---|
| **8057** | **Steel Deck Concrete Filled Grid w/HMA Overlay (SF)** |

**Condition State 1** The deck surface and soffit have no deficiencies. There are no potholes, spalled/delaminated, or map cracked areas in the deck surface. The protection system of the deck soffit is sound. Previously repaired/repainted areas may exist in the deck surface or soffit. There is no corrosion. The paint system is sound. Connections are sound.

Feasible actions:
1) DN
2) *Wash

**Condition State 2** Potholes, map cracked areas, parallel cracks at 2' centers or less, or intersecting cracks exist in the deck surface or the underside protection system is being affected. The paint system has failed and corrosion has formed or secondary connectors show cracked welds or broken rivets or bolts.

Feasible actions:
1) DN
2) *Wash
3) *Wash and paint or reconnect

**Condition State 3** Large potholes, large ruts or washboard areas in the deck surface or the soffit is corroding. Secondary grid connections have failed or have measurable corrosion, or primary connections show cracks.

Feasible actions:
1) DN
2) Repair deficient areas
3) *Replace deck

**Condition State 4** The surfacing has failed, grid fill has large spalls, measurable corrosion or connections to the floor system have failed on the primary grid.

Feasible actions:
1) DN
2) Repair deficient areas
3) *Replace deck

## CORRUGATED/ORTHOTROPIC DECK

08/19/2013

This element includes: Steel decks, which support traffic loads. Included are the tops of steel box superstructures and asphalt filled corrugated decks. Orthotropic deck paint condition and corrosion should be reported with the superstructure element. This element does not include: Stay in place corrugated steel forms used to temporarily support concrete decks during placement. Steel stay in place forms should be evaluated as the soffit of the concrete deck element.

| Elem # | Description |
|---|---|
| 30 | Corrugated/Orthotropic/Etc. Deck (**SF**) |

**Condition State 1** The deck surface and soffit have no deficiencies. There are no potholes, spalled/delaminated, or map cracked areas in the deck surface. The protection system of the deck soffit is sound. Previously repaired/repainted areas may exist in the deck surface or soffit.

Feasible actions:
1) DN
2) *Wash

**Condition State 2** Potholes, map cracked areas, parallel cracks at 2' centers or less, or intersecting cracks exist in the deck surface or the underside protection system is being affected.

Feasible actions:
1) DN
2) Patch holes, seal cracks
3) *Remove overlay, add protection system and wearing surface

**Condition State 3** Large potholes, large ruts or washboard areas in the deck surface or the soffit is corroding but no measurable section loss.

Feasible actions:
1) DN
2) Patch holes and seal cracks
3) *Remove overlay, add protection system and wearing surface

**Condition State 4** Corrosion is advanced. Measurable section loss warrants analysis to ascertain the impact on the ultimate strength and/or serviceability of either the element or the bridge. The surfacing has failed.

Feasible actions:
1) DN
2) *Rehabilitate, replace paint system, replace surfacing
3) *Replace deck

## TIMBER DECK/SLAB BARE

10/18/1995

These elements include: Bare timber decks/slabs, which receive direct traffic loads. The evaluated portions of the bridge deck include all traffic lanes and shoulders. Deck portions not to be evaluated include sidewalks, parapets, medians and other areas, which are not expected to receive direct traffic loads.

| Elem # | Description |
|---|---|
| 31 | Timber Deck Bare (**SF**) |
| 54 | Timber Slab Bare (**SF**) |

**Condition State 1** The deck has no deficiencies. There may be small cracks, splits and checks having no effect on strength or serviceability. There is no decay, wet areas, and insect infestation.

Feasible actions:
1) DN
2) *Clean
3) *Clean and seal

**Condition State 2** Decay, insect infestation, splitting, cracking or crushing may exist but none is sufficiently advanced to affect serviceability or strength. The deck may be covered with debris or rocks but no serious wearing. Fire damage limited to surface scorching with no measurable section loss. Areas, which collect and hold water intermittently are included.

Feasible actions:
1) DN
2) *Clean
3) *Clean and seal

**Condition State 3** Decay, insect infestation, splitting cracking or crushing has produced loss of strength of the element but not of sufficient magnitude to affect the serviceability of the bridge. Debris or rocks may have caused minor section loss. Fire damage limited to surface charring with minor, measurable section loss. Wet areas with sufficient water present to support fungus growth.

Feasible actions:
1) DN
2) *Clean and seal
3) Replace deficient members

**Condition State 4** Advanced deterioration. Decay, insect infestation, splits, cracks or crushing has produced loss of strength that affects the serviceability of the bridge. Debris or rock may have caused greater than 1/2" deep ruts or wear. Major fire damage which substantially reduces the load-carrying capacity of the deck. Wet areas with possibly green leafy growth growing from the deck.

Feasible actions:
1) DN
2) Replace deficient members
3) *Replace deck

## TIMBER DECK/SLAB OVERLAY

11/12/2013

These elements include: Overlaid timber decks/slabs, which receive direct traffic loads. The evaluated portions of the bridge deck include all traffic lanes and shoulders. Deck portions not to be evaluated include sidewalks, parapets, medians and other areas, which are not expected to receive direct traffic loads.

| Elem # | Description |
|---|---|
| 8032 | Timber Deck with HMA Overlay (**SF**) |
| 8055 | Timber Slab with HMA Overlay (**SF**) |

**Condition State 1** Investigation indicates no decay. There may be cracks, splits and checks having no effect on strength or serviceability. There are no potholes in the surfacing.

Feasible actions:
1) DN
2) *Clean

**Condition State 2** Decay, insect infestation, splitting, cracking or crushing may exist but none is sufficiently advanced to affect serviceability. Potholes, map cracked areas, intersecting cracks exist in the deck surface. Fire damage limited to surface scorching without measurable section loss. Areas, which collect and hold water intermittently are included.

Feasible actions:
1) DN
2) *Clean
3) *Remove/replace overlay

**Condition State 3** Decay, insect infestation, splitting cracking or crushing has produced loss of strength of the element but not of sufficient magnitude to affect the serviceability of the bridge. Large potholes, large ruts or washboards in the deck surface. Fire damage limited to surface charring with minor, measurable section loss. Wet areas with sufficient water present to support fungus growth.

Feasible actions:
1) DN
2) *Rehabilitate deck and repair or replace surfacing
3) *Replace deck and surfacing

**Condition State 4** Advanced deterioration. Decay, insect infestation, splits, cracks or crushing has produced loss of strength that affects the serviceability of the bridge. Large potholes, large ruts, washboards, map cracked areas are positioned above areas of the soffit which show advanced section loss. Major fire damage which substantially reduces the load-carrying capacity of the deck. Wet areas with green leafy growth growing from the deck.

Feasible actions:
1) DN
2) *Rehabilitate deck and repair or replace surfacing
3) *Replace deck and surfacing

# SIDEWALK

11/12/2013

These elements include: Optional element for sidewalks which are not expected to receive direct traffic loads.

| Elem # | Description |
|---|---|
| **8058** | **Sidewalk (SF)** |

**Condition State 1** The sidewalk surface and soffit have no deficiencies. There are no spalled/delaminated, or map cracked areas in the sidewalk surface. There are no map cracked, spalled/delaminated areas, or stalactitic leaching cracks in the sidewalk soffit. Sound previously repaired areas may exist in the sidewalk surface or soffit. Asphalt repairs are not considered sound repairs.

Feasible actions:
1) DN
2) *Wash
3) *Add a protective coating system

**Condition State 2** Map cracked areas, intersecting longitudinal and transverse cracks, parallel cracks at 2' centers or less, spalls/delaminations not associated with corroding reinforcement or stalactitic leaching cracks exist in the sidewalk surface and/or soffit.

Feasible actions:
1) DN
2) Seal or inject cracks
3) *Add a protective coating system

**Condition State 3** Spalls/delaminations exposing reinforcement exist in the sidewalk surface or soffit.

Feasible actions:
1) DN
2) Partial depth repair / Curb Face Concrete Repair
3) *Replace sidewalk

**Condition State 4** Spalled/delaminated, map cracked, or intersecting longitudinal and transverse cracked areas in the sidewalk surface are positioned directly above spalls/delaminations, map cracked, intersecting crack or stalactitic leaching crack areas in the soffit. Condition state 2 or 3 areas in the sidewalk surface are positioned directly above condition state 2 or 3 areas in the soffit. Specifically excluded from this condition state are areas which contain parallel cracks extending through the top to the bottom of the sidewalk, these areas remain in condition state 2, unless accompanied by additional deficiencies.

Feasible actions:
1) DN
2) Full depth repair
3) *Replace sidewalk

## PROTECTION SYSTEM
## UNPAINTED STEEL ELEMENTS

11/12/2013

These elements include: The protection system of unpainted ASTM 588 or ASHTTO M222 steel substructure and superstructure elements that were designed to achieve corrosion protection by a uniform collection of corrosion products on the steel surface. Other Steel chemistries that were installed unpainted or have lost their original paint system will be included with Protection System Non-Lead Painted Steel Elements (p. 17).

| Elem # | Description |
|---|---|
| 8101 | Unpainted Steel Closed Web/Box Girder (**SF**) |
| 8106 | Unpainted Steel Open Girder (**SF**) |
| 8112 | Unpainted Steel Stringer (**SF**) |
| 120 | Unpainted Steel Bottom Chord Through Truss (**SF**) |
| 8125 | Unpainted Steel Through Truss Excluding Bottom Chord (**SF**) |
| 8130 | Unpainted Steel Deck Truss (**SF**) |
| 8140 | Unpainted Steel Arch/Arch Tie (**SF**) |
| 8151 | Unpainted Steel Floor Beam (**SF**) |
| 8160 | Unpainted Steel Pin and/or Hanger (**EA**) |
| 8171 | Unpainted Steel Closed Web/Box Girder and Open Girder/Stringer Ends Including Diaphragms Below Deck Joints (**EA**) |
| 8180 | Unpainted Steel Deck Truss Below Deck Joints (**SF**) |
| 8190 | Unpainted Steel Floor Beam Below Deck Joints (**SF**) |
| 8201 | **Unpainted Steel Column (SF)** |
| 8222 | Unpainted Steel Abutment and Wingwall (**SF**) |
| 8224 | **Unpainted Steel Pile Extension (SF)** |
| 8230 | Unpainted Steel Pier or Abutment Cap (**SF**) |
| 8270 | Unpainted Steel Pier or Abutment Cap Below Deck Joint (**SF**) |

**Condition State 1** The weathering steel is corroded uniformly and remains in excellent condition. Surfaces covered by mill scale are included.

Feasible actions:
1) DN
2) *Wash

**Condition State 2** Surface pitting has formed or is forming on the unpainted steel.

Feasible actions:
1) DN
2) *Wash
3) *Clean and paint

**Condition State 3** Steel has measurable section loss due to corrosion up to 1/16” per face.

Feasible actions:
1) DN
2) *Wash
3) *Clean and paint, minor repair

**Condition State 4** Corrosion is advanced. Section loss is greater than 1/16” per face.

Feasible actions:
1) DN
2)*Rehabilitate entire unit
3)*Replace entire unit

## PROTECTION SYSTEM
## LEAD PAINTED STEEL ELEMENTS

11/12/2013

These elements include: The protection system of lead painted steel substructure and superstructure elements. Lead paint use was discontinued in 1988; therefore any bridge built in 1989 or later should not have a lead paint system. Structures built prior to 1989 that were over-coated with non-lead paint are included because the lead paint system was not removed.

| Elem # | Description |
|---|---|
| 102 | Lead Painted Steel Closed Web/Box Girder (**SF**) |
| 107 | Lead Painted Steel Open Girder (**SF**) |
| 113 | Lead Painted Steel Stringer (**SF**) |
| 8121 | Lead Painted Steel Bottom Chord Through Truss (**SF**) |
| 8126 | Lead Painted Steel Through Truss Excluding Bottom Chord (**SF**) |
| 8131 | Lead Painted Steel Deck Truss (**SF**) |
| 141 | Lead Painted Steel Arch/Arch Tie (**SF**) |
| 152 | Lead Painted Steel Floor Beam (**SF**) |
| 161 | Lead Painted Steel Pin and/or Hanger (**EA**) |
| 162 | **Lead Painted Steel Gusset Plate (EA)** |
| 8172 | Lead Painted Steel Closed Web/Box Girder and Open Girder /Stringer Ends Incl Diaphragms Below Deck Joints (**EA**) |
| 8181 | Lead Painted Steel Deck Truss Below Deck Joints (**SF**) |
| 8191 | Lead Painted Steel Floor Beam Below Deck Joints (**SF**) |
| 202 | **Lead Painted Steel Column** (**SF**) |
| 8221 | Lead Painted Steel Abutment and Wingwall (**SF**) |
| 225 | **Lead Painted Steel Pile Extension (SF)** |
| 231 | Lead Painted Steel Pier or Abutment Cap (**SF**) |
| 8271 | Lead Painted Steel Pier or Abut Cap Below Deck Joints (**SF**) |

**Condition State 1** There is no evidence of active corrosion and the paint system is sound and functioning as intended to protect the metal surface. The top coat may be discolored and\or chalking.

Feasible actions:
1) DN
2) *Wash

**Condition State 2** This condition state includes a wide range of visible paint conditions. It includes conditions from little active corrosion through surface or freckled rust to complete paint system failure. The paint system is no longer effective. There may be exposed metal with very slight rust scaling but little pitting or metal losses have occurred.

Feasible actions:
1) DN
2) *Wash
3) * Zone clean and paint entire surface

**Condition State 3** The paint system has failed and measurable section loss has occurred. Metal loss is less than or equal to 1/16” per face.

Feasible actions:
1) DN
2) *Blast and paint entire surface
3) *Replace paint system

**Condition State 4** Corrosion has caused section loss and substantial metal loss is evident (greater than 1/16" per face) and some perforation may have occurred.

Feasible actions:
1) DN
2) *Blast and paint entire surface
3) *Replace entire unit

## PROTECTION SYSTEM
## NON-LEAD PAINTED STEEL ELEMENTS

11/12/2013

These elements include: The protection system of non-lead painted steel substructure and superstructure elements Includes elements protected with galvanizing / metalizing.

| Elem # | Description |
|---|---|
| 8103 | Non-Lead Painted Steel Closed Web/Box Girder (**SF**) |
| 8118 | Non-Lead Painted Steel Open Girder (**SF**) |
| 8119 | Non-Lead Painted Steel Stringer (**SF**) |
| 8122 | Non-Lead Painted Steel Bottom Chord Through Truss (**SF**) |
| 8123 | Non-Lead Painted Steel Through Truss Excluding Bottom Chord (**SF**) |
| 8124 | Non-Lead Painted Steel Deck Truss (**SF**) |
| 8128 | Non-Lead Painted Steel Arch/Arch Tie (**SF**) |
| 8129 | Non-Lead Painted Steel Floor Beam (**SF**) |
| 8162 | Non-Lead Painted Steel Pin and/or Hanger (**EA**) |
| 8163 | **Non-Lead Painted Steel Gusset Plate (EA)** |
| 8173 | Non-Lead Painted Steel Closed Web/Box Girder and Open Girder/Stringer Ends Incl Diaphragms Bel Deck Joints (**EA**) |
| 8182 | Non-Lead Painted Steel Deck Truss Below Deck Joints (**SF**) |
| 8192 | Non-Lead Painted Steel Floor Beam Below Deck Joints (**SF**) |
| 8200 | **Non-Lead Painted Steel Column (SF)** |
| 8220 | Non-Lead Painted Steel Abutment and Wingwall (**SF**) |
| 8236 | Non-Lead Painted Steel Pier or Abutment Cap (**SF**) |
| 8246 | **Non-Lead Painted Steel Pile Extension (SF)** |
| 8272 | Non-Lead Painted Stl Pier or Abut Cap Bel Deck Joints (**SF**) |

**Condition State 1** There is no evidence of active corrosion and the paint system is sound and functioning as intended to protect the metal surface. The top coat may be discolored and\or chalking.

Feasible actions:
1) DN
2) *Wash

**Condition State 2** This condition state covers a wide range of visible paint conditions. It includes conditions from little active corrosion through surface or freckled rust to complete paint system failure. Exposed metal may have very slight rust scaling but no pitting or measurable section loss occurred.

Feasible actions:
1) DN
2) *Wash
3) Zone clean and paint entire surface

**Condition State 3** The paint system has failed and measurable corrosion has occurred. Section loss is less than or equal to 1/16” per face.

Feasible actions:
1) DN
2) *Blast and paint entire surface
3) *Replace paint system

**Condition State 4** Corrosion has caused section loss and substantial metal loss is evident (greater than 1/16" per face) and some perforation may have occurred.

Feasible actions:
1) DN
2) *Blast and paint entire surface
3) *Replace entire unit

## STEEL DAMAGED ELEMENTS

11/12/2013

These elements include: Damage caused to steel substructure and superstructure elements not associated with active corrosion; which are identified and added as necessary by the inspector in the field during the inspection.

| Elem# | Description |
|---|---|
| 8401 | Steel Closed Web/Box Girder (**LF**) |
| 8402 | Steel Bottom Chord Through Truss (**LF**) |
| 8403 | Steel Through Truss Excluding Bottom Chord (**LF**) |
| 8404 | Steel Deck Truss (**LF**) |
| 8406 | Steel Open Girder (**LF**) |
| 8407 | Steel Arch/Arch Tie **(LF**) |
| 8408 | Steel Floor Beam (**LF**) |
| 8409 | **Steel Column (LF)** |
| 8410 | Steel Pier or Abutment Cap (**LF**) |
| 8411 | Steel Pin and/or Hanger (**EA**) |
| 8412 | Steel Stringer (**LF**) |
| 8413 | **Steel Gusset Plate (EA)** |
| 8414 | **Steel Pile Extension (LF)** |

**Condition State 1** Suspected locations where minor fatigue, out-of-plane bending cracks, tears or perforation could develop in structural elements that should be monitored during future inspections.

Feasible actions: 1) DN

**Condition State 2** Minor fatigue, out-of-plane bending cracks, tears, or perforation may be present in structural elements. Minor impact damage may have occurred. Excessive live load deflection occurs. Minor pitting has been cleaned and painted that does not require immediate action.

Feasible actions:
1) DN
2) Grind cracks or plate, lubricate hinges
3) Straighten or install new section

**Condition State 3** Moderate fatigue, out-of-plane bending cracks, tears, or perforation in structural elements parallel to the direction of stress. Hinges may be frozen from corrosion. Impact damage has occurred and\or permanent deformations may be evident. Section loss up to 1/16” per face has been cleaned and painted.

Feasible actions:
1) DN
2) Grind cracks or plate; lubricate hinges
3) Straighten or install new section

**Condition State 4** Severe fatigue, out-of-plane bending cracks, impact damage, tears or perforations have occurred that requires repairs. Hinges demonstrate uneven alignment horizontally from below or vertically from the deck above. Temporary supports may have been installed following structural analysis to allow continued utilization of the structure. Section loss greater than 1/16” per face has been cleaned and painted.

Feasible action:
1) DN
2) Install new sections
3) *Replace entire unit

## P/S CONCRETE ELEMENTS

11/12/2013

These elements include: Precast and precast prestressed substructure and superstructure elements.

| Elem # | Description |
|---|---|
| 104 | P/S Concrete Closed Web/Box Girder (**LF**) |
| 109 | P/S Concrete Open Girder (**LF**) |
| 8142 | P/S Concrete Segmental Box Girders (**LF**) |
| 143 | P/S Concrete Arch/Arch Tie (**LF**) |
| 154 | P/S Concrete Floor Beam (**LF**) |
| 204 | **P/S Concrete Column (SF)** |
| 226 | **P/S Concrete Pile Extension (SF)** |
| 233 | P/S Concrete Pier or Abutment Cap (**LF**) |
| 8237 | P/S Concrete Beam Ends Including Diaphragms Under Deck Joints (**EA**) |

**Condition State 1** The element shows no deterioration. There may be discoloration, efflorescence, and/or superficial cracking but without affect on strength and/or serviceability. No rust stains visible.

Feasible actions: 1) DN

**Condition State 2** Minor cracks & spalls may be present and there may be exposed reinforcing with no evidence of corrosion. There is no exposure of the prestress system. Minor rust stains visible.

Feasible actions:
1) DN
2) Seal cracks and minor patch

**Condition State 3** Delaminations and/or spalls may be present. There may be minor exposure but no deterioration of the prestress system. Corrosion of non-prestressed main reinforcement may be present but loss of section is incidental. Minor impact damage may have occurred. Working flexural cracks and other miscellaneous cracks with medium rust staining.

Feasible actions:
1) DN
2) Clean steel and patch (and/or seal cracks)
3) *Rehabilitate unit

**Condition State 4** Delaminations, spalls and corrosion of non-prestressed main reinforcement are prevalent. There may also be exposure and deterioration of the prestress system (manifested by loss of bond, broken strands or wire, failed anchorages, etc). Damages due to vehicular collision that may have caused wires to be severed and/or large concrete section loss. Longitudinal joints may have failed. Rocking of members may be visible with the passage of live load. Temporary supports may have been installed following structural analysis to allow continual utilization of the structure.

Feasible actions:
1) DN
2) *Rehabilitate unit
3) *Replace unit

*Note: For condition state 4, the quantity reported is to equal the entire beam length.*

## REINFORCED CONCRETE ELEMENTS

11/12/2013

These elements include: Reinforced concrete substructure and superstructure elements.

| Elem # | Description |
|---|---|
| 105 | Concrete Closed Webs/Box Girder (**LF**) |
| 110 | Concrete Open Girder (**LF**) |
| 144 | Concrete Arch/Arch Tie (**LF**) |
| 155 | Concrete Floor Beam (**LF**) |
| 205 | **Concrete Column (SF)** |
| 210 | Concrete Pier Wall (**SF**) |
| 215 | Concrete Abutment and Wingwall (**SF**) |
| 227 | **Concrete Pile Extension (SF)** |
| 234 | Concrete Pier or Abutment Cap (**LF**) |
| 8238 | Concrete Beam Ends Including Diaphragms Under Deck Joints (**EA**) |

**Condition State 1** The element shows no deterioration. There may be discoloration, efflorescence, and/or superficial cracking but without affect on strength and/or serviceability. No rust stains visible.

Feasible actions: 1) DN

**Condition State 2** Minor cracks & spalls may be present but there is no exposed main reinforcing or surface evidence of reinforcement corrosion. Minor rust stains visible.

Feasible actions: 1) DN
2) Seal cracks and minor patch

**Condition State 3** Delaminations and/or spalls in the cover concrete may be present and main reinforcing may be exposed. Corrosion of main reinforcement may be present but loss of section is incidental. Working flexural cracks, map cracked areas or leaching cracks, and other miscellaneous cracks with medium rust staining. Minor impact damage may have occurred.

Feasible actions: 1) DN
2) Clean reinforcement and patch, (and/or seal cracks)
3) Rehabilitate unit

**Condition State 4** Advanced deterioration. Measurable section loss of main reinforcement and/or loss of core concrete section. Internal failures have caused excessive movement. Damages due to vehicular collision that have caused reinforcement to be severed and/or large concrete section loss. Temporary supports may have been installed following structural analysis to allow continued utilization of the structure.

Feasible actions: 1) DN
2) Repair and seal unit
3) *Replace unit

*Note: For condition state 4, the quantity reported is to equal the entire beam length.*

## KEYWAY

08/19/2013

This element includes: Grout in longitudinal joints between precast beams and the outside 2" of the precast beam above the keyway.

| Elem # | Description |
|---|---|
| 8108 | Keyway (**LF**) |

**Condition State 1** This element shows no deterioration. There are no cracks in the joint grout or in the overlay above the longitudinal joints and no visible leakage between the beams.

Feasible actions: 1) DN

**Condition State 2** There may be tight cracks in the joint grout or in the overlay, or visible leakage between the beams is evident.

Feasible actions:
1) DN
2) Seal cracks in the surface
3) Clean and seal keyway

**Condition State 3** Portions of the keyway have failed indicated by long wide or working longitudinal cracks and small portions (less than 12" along the length of the beam) of the joint may be fractured loose, but the beams are still acting as a single unit. Considerable leakage between the joints is evident.

Feasible actions:
1) DN
2) Clean and epoxy grout keyway
3) Remove and replace *grout in effected* keyways *and bearings*

**Condition State 4** The entire keyway has failed and the beams are acting independently indicated by wide or working longitudinal cracks the whole span length in the grout, wide or working cracks in the beam concrete above the keyway, large portions of the joint grout fractured loose or visible movement of the beam under live load. This condition requires that a load limit evaluation be conducted on the bridge.

Feasible actions:
1) DN
2) *Remove and replace *grout in* all keyways *and grout bearings*

## TIMBER ELEMENTS

09/30/2013

These elements include: Timber substructure and superstructure elements. Timber closed abutments will normally include timber column or pile extension elements, as well as abutment (retaining timber elements).

| Elem # | Description |
|---|---|
| 111 | Timber Open Girder (**LF**) |
| 117 | Timber Stringer (**LF**) |
| 135 | Timber Truss (**LF**) |
| 146 | **Timber Arch (LF)** |
| 156 | Timber Floor Beam (**LF**) |
| 206 | **Timber Column** (**EA**) |
| 216 | Timber Abutment and Wingwall (**SF**) |
| 228 | **Timber Pile Extension (EA)** |
| 235 | Timber Pier or Abutment Cap (**LF**) |
| 8239 | Timber Deck Runners (**LF**) |

**Condition State 1** Investigation indicates no decay. There may be superficial cracks, splits and checks having no affect on strength or serviceability. Preservative is in place and functioning or untreated timber is sheltered from moisture and not in contact with the earth.

Feasible actions: 1) DN

**Condition State 2** Decay, insect infestation, splitting, cracking, checking or minor crushing may exist but none is sufficiently advanced to affect serviceability of the element. Preservative is in place but demonstrates thinning beyond surface discoloration. Minor leaking is occurring on untreated sheltered timbers. Fire damage limited to surface scorching with no measurable section loss.

Feasible actions:
1) DN
2) *Apply preservative

**Condition State 3** Decay, insect infestation, splitting, cracking or crushing has produced loss of strength of the element but not of a sufficient magnitude to affect the serviceability of the bridge. Preservative is ineffective or nonexistent and timber is exposed to the weather or in contact with the earth. Fire damage limited to surface charring with minor, measurable section loss.

Feasible actions:
1) DN
2) *Apply preservative
3) Replace affected members

**Condition State 4** Advanced deterioration. Decay, insect infestation, splits, cracks or crushing has produced loss of strength that affects the serviceability of the bridge. Major fire damage which will substantially reduce the load carrying capacity of the member.

Feasible actions:
1) DN
2) Replace affected members
3) *Replace unit

## CABLES

11/12/2013

This element includes: The cable, cable protection system, if present, and cable anchorage system. Primary Cables include main cables in suspension bridges or main cable stays in cable stayed bridges. Secondary Cables include suspender cables in suspension or arch bridges. Excluded are all cables used as temporary supports to the structure or replacement truss members. Two suspension cables will be counted per suspension bridge. Cable hangers will be counted as 1 (one) each per hanger location, regardless of the number of cables at the hanger location.

| Elem # | Description |
|---|---|
| 147 | **Primary Cable (LF)** |
| 148 | **Secondary Cable (EA)** |

**Condition State 1** There is little or no corrosion of the steel. Paint system, if present, is sound and functioning as intended to protect the metal surface. Strand and anchor sockets show no signs of distress.

Feasible actions: 1) DN

**Condition State 2** Surface rust efflorescence or other stains may have formed on the exterior protection system. Paint system, if present, is peeling and is no longer effective. Strand and anchor sockets show no signs of distress. *Cable banding or protective sheathing, if any, may show some loosening or slipping*.

Feasible actions:
1) DN
2) Clean and paint affected cable
3) Patch affected protective sheathing

**Condition State 3** The paint system, if present, has failed. Surface pitting may be present but any section loss is incidental. Cable anchor devices may be loosening. One or two cable strands or wires may be broken or severely abraded.

Feasible actions:
1) DN
2) *Clean and paint
3) *Rehabilitate cable and replace paint system

**Condition State 4** Corrosion is advanced with measurable section loss. More than two cable strands or wires may be broken or severely abraded. Anchors may show signs of slippage.

Feasible actions:
1) DN
2) *Rehabilitate unit and replace paint system
3) *Replace unit

## "OTHER" SUBSTRUCTURE MATERIALS

11/12/2013

These elements include: Stone, masonry, etc. substructure elements.

| Elem # | Description |
|---|---|
| 211 | Other Pier Wall (**SF**) |
| 218 | Other Abutment and Wingwall (**SF**) |

**Condition State 1** There is little or no deterioration. Only surface defects are in evidence.

Feasible actions: 1) DN

**Condition State 2** There may be minor deterioration, cracking and weathering. Mortar in joints may show minor deterioration.

Feasible actions:
1) DN
2) Rehabilitate affected area
3) Minor repair, i.e. tuck point

**Condition State 3** Moderate to major deterioration and cracking. Major deterioration of joints.

Feasible actions:
1) DN
2) Rehabilitate affected areas
3) Minor repair, i.e. tuck point

**Condition State 4** Major deterioration, splitting, or cracking.

Feasible actions:
1) DN
2) Rehabilitate unit
3) *Replace unit

## STEEL CULVERT

10/18/95

This element includes: Steel culverts having at least 5 feet barrel width and end sections, if present.

| Elem # | Description |
|---|---|
| 240 | Steel Culvert (**LF**) |

**Condition State 1** The element shows little or no deterioration. Some discoloration or surface corrosion may exist but there is no metal pitting.

Feasible actions: 1) DN

**Condition State 2** There may be minor to moderate corrosion with pitting, especially at the barrel invert. Little or no distortion exists.

Feasible actions: 1) DN

**Condition State 3** Significant corrosion, deep pitting or some holes in the invert may exist. Significant scour or erosion may be affecting structural integrity. Minor to moderate distortion and deflection may exist. There is little or no roadway settlement.

Feasible actions:
1) DN
2) Rehabilitate affected lengths (i.e. line/pave invert)
3) *Replace unit

**Condition State 4** Major corrosion, extreme pitting or holes in the barrel may exist. Major distortion, deflection or settlement may be evident.

Feasible actions:
1) DN
2) Rehabilitate affected lengths (i.e. line/pave invert)
3) *Replace unit

## CONCRETE CULVERT

10/18/95

This element includes: Concrete culverts having at least 5 feet barrel width. When traffic loads are applied directly to the top slab, the slab condition will be reflected in the appropriate slab element.

| Elem # | Description |
|---|---|
| 241 | Concrete Culvert (**LF**) |

**Condition State 1** Superficial cracks and spalls may be present, but there is no exposed reinforcing or evidence of rebar corrosion. There is little or no deterioration or separation of joints.

Feasible actions: 1) DN

**Condition State 2** Deterioration, minor chloride contamination, minor cracking and/or leaching may have occurred. There may be deterioration and separation of joints. Rebars may be exposed with little or no section loss.

Feasible actions:
1) DN
2) Seal cracks, coat rebars, and minor patch

**Condition State 3** There may be moderate to major deterioration, extensive cracking and/or leaching and large areas of spalls. Minor to moderate distortion, settlement, or misalignment may have occurred. There may be considerable deterioration and separation of joints.

Feasible actions:
1) DN
2) Seal cracks, coat rebars, and minor patch
3) Rehabilitate affected lengths and roadway

**Condition State 4** Major deterioration, spalling, cracking, major distortion, deflection settlement, or misalignment of the barrel may be in evidence. Major separation of joints may have occurred. Holes may exist in floors and walls.

Feasible actions:
1) DN
2) Rehabilitate affected lengths and roadway
3) *Replace unit and roadway

## OTHER CULVERT

10/18/95

This element includes: Stone, masonry, etc. culverts including end sections/wingwalls.

| Elem # | Description |
|---|---|
| 243 | Other Culvert (**LF**) |

**Condition State 1** There is little or no deterioration. Surface defects only are in evidence. There are no misalignment problems.

Feasible actions: 1) DN

**Condition State 2** There may be minor deterioration, cracking and misalignment.

Feasible actions: 1) DN
2) Tuck point, patch and seal

**Condition State 3** Moderate to major deterioration and cracking and/or minor to moderate distortion or deflection has occurred.

Feasible actions: 1) DN
2) Tuck point, patch and seal
3) Rehabilitate affected lengths

**Condition State 4** Major distortion, deflection, settlement or misalignment and/or major deterioration affecting structural integrity may have occurred.

Feasible actions: 1) DN
2) Rehabilitate affected lengths
3) *Replace unit

## STRIP SEAL JOINT

11/12/2013

This element includes: Longitudinal and transverse expansion joint devices which utilize a neoprene type waterproof gland with some type of steel extrusion or other system to anchor the gland.

| Elem # | Description |
|---|---|
| 300 | Strip Seal Expansion Joint (**LF**) |

**Condition State 1** There is no leakage at any point along the joint. Gland is secure and has no defects.

Feasible actions: 1) DN

**Condition State 2** Minor leakage may be occurring along the joint. Gland is secure and has minimal defects. Debris in joint is not causing any problems.

Feasible actions: 1) DN

**Condition State 3** Leakage due to punctured or ripped joint, gland pulled out of extrusion or loss of bond between concrete and the extrusion. Minor corrosion or debris on elements below. Minor concrete spalling or loosening of extruded steel.

Feasible actions:
1) DN
2) Patch, reset, clean joint
3) *Replace gland, reset extruded steel and patch concrete

**Condition State 4** Major deterioration of gland, concrete spalled at joint, major leakage along joint causing significant damage to elements below.

Feasible actions:
1) DN
2) *Replace gland, reset extruded steel and patch concrete
3) *Replace joint

## POURABLE JOINT

11/12/2013

This element includes: Longitudinal and transverse *approved pourable joints including* the XJS Joint System.

| Elem # | Description |
|---|---|
| 301 | Pourable Joint Seal (**LF**) |

**Condition State 1** There is no leakage at any point along the joint. Sealant is secure and has no defects.

Feasible actions: 1) DN

**Condition State 2** The element shows minimal deterioration. Minor leakage may be occurring along the joint. There are no cohesion cracks. The adjacent deck armor and/or header is sound.

Feasible actions: 1) DN

**Condition State 3** Minor adhesion and/or cohesion failures may be present. Leakage is occurring, and seal may show minor sagging, bulging, stretching and/or embedded with debris. Minor spalls and/or cracks in deck and/or headers may be present adjacent to joint. Minor corrosion or debris on elements below. Armor may be loose.

Feasible actions:
1) DN
2) Clean and repair seal, seal cracks, patch concrete and/or epoxy inject anchors

**Condition State 4** Significant adhesion and/or cohesion failures are present. Seal may show excessive sagging, bulging, stretching and/or embedded with debris. Adjacent deck may be spalled and/or heavily cracked. Armor may be loose or anchors exposed or broken. Major leakage along joint causing significant damage to elements below.

Feasible actions:
1) DN
2) Clean and repair seal; patch spalls, seal cracks and/or epoxy inject anchors
3) *Reconstruct joint

## PREFORMED JOINT

11/12/2013

This element includes: Longitudinal and transverse 1 3/4 inch through 4 inch preformed joint seals, armor angles, retainer bars and the concrete in the block out details. Jeene joints are included in this element.

| Elem # | Description |
|---|---|
| 302 | Preformed Joint Seal (**LF**) |

**Condition State 1** There is no leakage at any point along the joint. PJS is secure and has no defects.

Feasible actions: 1) DN

**Condition State 2** The element shows minimal deterioration. Minor leakage may be occurring along the joint. There are no cracks in the PJS. The adjacent deck armor and/or header is sound. The membrane is not over compressed.

Feasible actions: 1) DN

**Condition State 3** There may be small contact failures. The PJS may be over compressed. There may be leakage extending to the bearing surface. Minor corrosion or debris on elements below. The seal may show signs of abrasion or tearing. Minor spalls in the deck and/or headers may be present. Armors may be loose. Retainer bars may be loose or missing but seal remains in place.

Feasible actions:
1) DN
2) Seal cracks, patch concrete, seal and/or epoxy inject anchors

**Condition State 4** Wide contact failures may be present. The seal is possibly showing signs of failure from abrasion or tearing. The PJS may be excessively compressed forcing the rubber to protrude above the deck. There may be heavy leakage causing significant corrosion to elements below. Significant spalls may be present in the deck and/or headers adjacent to the seal. Armor anchorage may be exposed. Armors may be loose or missing.

Feasible actions:
1) DN
2) Seal cracks, patch concrete, reposition and seal and/or epoxy inject anchors
3) *Rebuild joint

## MODULAR JOINT

10/18/95

This element includes: Deck joints filled with an assembly mechanism.

| Elem # | Description |
|---|---|
| 303 | Modular Joints (**LF**) |

**Condition State 1** The element shows minimal deterioration. The anchors are tight. There are no broken welds. The adjacent deck is sound. The paint system, if present, is sound and functioning as intended to protect the metal.

Feasible actions: 1) DN

**Condition State 2** The paint system, if originally applied is substantially functioning. The steel may show some corrosion with slight pitting and edge or localized plate rusting. There may be minor weld cracking. There may be minor cracking and/or spalling of the anchorage concrete. Minor leaking through the joint causing minimal damage to elements below.

Feasible actions:
1) DN
2) Minor repairs including: spot paint, patch concrete, seal cracks, inject epoxy

**Condition State 3** The paint system, if originally applied, is failing. The steel is corroding with moderate pitting and minor section loss. There may be moderate weld cracking (greater that 10% of the welds cracked). One or two components may be loose or rattling. The adjacent deck may be cracked, spalled or otherwise disbonded. Anchors may be loose. There may be moderate leaking resulting in minor corrosion to elements below.

Feasible actions:
1) DN
2) Minor repairs including: spot paint, patch concrete, seal cracks, inject epoxy
3) Rehabilitate unit replacing damaged sections

**Condition State 4** Corrosion is advanced. The assembly may be loose because of anchorage failure. There may be deck spalling adjacent to the assembly. Broken or missing components or broken welds may be prevalent. There may be heavy leaking causing significant corrosion to elements below.

Feasible actions:
1) DN
2) Rehabilitate unit replacing damaged sections
3) *Replace unit

## OPEN JOINT

11/12/2013

This element includes: Longitudinal and transverse simple deck joints where no water seal is provided, with or without steel armor. Open joints filled with joint filler are also included in this element.

| Elem # | Description |
|---|---|
| 304 | Open Expansion Joint (**LF**) |

**Condition State 1** The element shows no deterioration. Joint armor, if present, is secure. There are no joint spalls.

Feasible actions: 1) DN

**Condition State 2** The element shows minimal deterioration. Joint armor, if present, is secure. There are no significant joint spalls.

Feasible actions:
1) DN
2) *Seal joint

**Condition State 3** There may be deck cracking indicating armor anchor loosening. Spalling at joint edges or adjacent to armor may have begun. There may be corrosion on joint armor. Minor corrosion or debris on elements below.

Feasible actions:
1) DN
2) Minor repairs including: concrete patching, epoxy injection and/or seal cracks
3) *Seal joint

**Condition State 4** Advanced corrosion of joint armor. There may be large spalls at the joint edges or adjacent to armor. Armor anchors are loose. Significant damage to elements below.

Feasible actions:
1) DN
2) Rehabilitate affected sections
3) *Reconstruct joint and seal

## FINGER JOINT

11/01/96

This element includes: Those deck joints filled with an assembly mechanism designed to bridge the joint gap without protecting elements below.

| Elem # | Description |
|---|---|
| 305 | Finger Joints without Trough (**LF**) |

**Condition State 1** The element shows minimal deterioration. The anchors are tight. There are no broken welds or fingers. The adjacent deck is sound. The paint system, if it is present, is sound and functioning as intended to protect the metal.

Feasible actions: 1) DN

**Condition State 2** The steel may show some corrosion with slight pitting and edge or localized plate rusting. There may be minor weld or finger cracking. There may be minor cracking and/or spalling of the anchorage concrete.

Feasible actions:
1) DN
2) Minor repairs including: spot paint, patch concrete, seal cracks, inject epoxy and/or cut or weld fingers

**Condition State 3** The paint system on the underside of the joint has failed. The steel is corroding with moderate pitting and minor section loss. There may be moderate weld or finger cracking (greater than 10% of the welds are cracked). Components may be loose or rattling. The adjacent deck may be cracked, spalled or otherwise disbonded. Fingers are raised toward opposing traffic. Anchors may be loose.

Feasible actions:
1) DN
2) Minor repair including spot paint, patch concrete, seal cracks, inject epoxy and/or cut or weld fingers
3) Rehabilitate unit by replacing damaged sections

**Condition State 4** Corrosion is advanced. The assembly may be loose because of anchorage failure. There may be deck spalling adjacent to the assembly. Broken fingers may be present.

Feasible actions:
1) DN
2) Rehabilitate unit by replacing damaged sections
3) *Replace unit

## TROUGH FINGER JOINT

09/30/2013

This element includes: Those deck joints filled with an assembly mechanism designed to bridge the gap and protect elements below.

| Elem # | Description |
|---|---|
| 8306 | Finger Joints with Trough (**LF)** |

**Condition State 1** The element shows minimal deterioration. The anchors are tight. There are no broken welds or fingers. The adjacent deck is sound. The paint system, if present, is sound and functioning as intended to protect the metal. The trough is not leaking.

Feasible actions: 1) DN

**Condition State 2** The steel may show some corrosion with slight pitting and edge or localized plate rusting. There may be minor weld or finger cracking. There may be minor cracking and/or spalling of the anchorage concrete. Minor leaking of the trough resulting in little or no damage to elements below.

Feasible actions:
1) DN
2) Minor repairs including: spot paint, patch concrete, seal cracks and/or trough, inject epoxy and/or cut or weld fingers

**Condition State 3** The paint system on the underside of the joint has failed. The steel is corroding with moderate pitting and minor section loss. There may be moderate weld or finger cracking (greater than 10% of the welds are cracked). Components may be loose or rattling. Fingers are raised towards opposing traffic. There is moderate leaking resulting in damage to elements below. The adjacent deck may be cracked, spalled or otherwise disbonded. Anchors may be loose.

Feasible actions:
1) DN
2) Minor repair including spot paint, patch concrete, seal cracks and/or trough, inject epoxy and/or cut or weld fingers.
3) Rehabilitate unit by replacing damaged sections

**Condition State 4** Corrosion is advanced. The assembly may be loose because of anchorage failure. There may be deck spalling adjacent to the assembly. Broken fingers may be prevalent. There may be heavy leaking causing significant damage to elements below.

Feasible actions:
1) DN
2) Rehabilitate unit by replacing damaged sections
3) *Replace joint

## NEOPRENE JOINT

11/12/2013

This element includes: Longitudinal and transverse expansion joint devices, which utilize individual block segments to form a discontinuous seal. This joint type has not been used since 1984; therefore any structure built in 1985 or later should not contain this element.

| Elem # | Description |
|---|---|
| 8307 | Neoprene Expansion Joint (**LF**) |

**Condition State 1** The element shows minimal deterioration. There is little or no leakage. The blocks are secure and have no defects. Debris in joint is not causing any problems. The adjacent deck is sound. The joint is properly seated and aligned.

Feasible actions: 1) DN

**Condition State 2** The seal may be punctured or ripped but still anchored. Anchors may be loose. The adjacent deck may show some signs of anchors loosening. There may be minor cracking and/or spalling of the block out concrete. There may be minor leaking resulting in little or no damage to elements below.

Feasible actions:
1) DN
2) Minor repairs including: patch concrete, seal cracks and inject epoxy

**Condition State 3** The seal may be heavily damaged. Blocks may be loose but still connected. Anchors may be loose or exposed. The adjacent deck is heavily spalled and/or has wide cracks. The joint may be banging against the shelf with passage of trucks. The shelves may be beginning to break away from the deck or showing horizontal/vertical displacement. Minor corrosion or debris on elements below.

Feasible actions:
1) DN
2) Minor repairs including: patch concrete seal, cracks, retighten anchor bolts and inject epoxy
3) Replace segments, patch and seal deck concrete and rebuild shelves

**Condition State 4** Major deterioration of the joint, concrete spalled at joint, major leakage. Some anchors may have completely failed. Significant damage to the elements below.

Feasible actions:
1) DN
2) Replace segments, patch and seal deck and rebuild shelves
3) *Replace joint

*Note: All measurements for this element are to be recorded in increments of individual panel lengths.*

## CONTINUOUS SEAL NEOPRENE JOINT

09/30/2013

This element includes: Longitudinal and transverse expansion joint devices, which utilize neoprene blocks to hold down a continuous waterproof gland.

| Elem # | Description |
|---|---|
| 8308 | Continuous Seal Neoprene Expansion Joint (**LF**) |

**Condition State 1** The element shows minimal deterioration. There is little or no leakage. The blocks are secure and have no defects. Debris in joint is not causing any problems. The adjacent deck is sound. The joint is properly seated and aligned.

Feasible actions: 1) DN

**Condition State 2** The seal may be punctured or ripped but still anchored. Anchors may be loose. The adjacent deck may show some signs of anchors loosening. There may be minor cracking and/or spalling of the block out concrete. There may be minor leaking resulting in little or no damage to elements below.

Feasible actions:
1) DN
2) Minor repairs including: patch concrete, seal cracks and inject epoxy

**Condition State 3** The seal may be heavily damaged. Blocks may be loose but still connected. Anchors may be loose or exposed. The adjacent deck is heavily spalled and/or has wide cracks. The joint may be banging against the shelf with passage of trucks. The shelves may be beginning to break away from the deck or showing horizontal/vertical displacement. Minor corrosion or debris on elements below.

Feasible actions:
1) DN
2) Minor repairs including: patch concrete, seal cracks, retighten anchor bolts and inject epoxy
3) Replace affected segments, patch and seal deck concrete and rebuild shelves

**Condition State 4** Major deterioration of the joint, concrete spalled at joint, major leakage. Some anchors may have completely failed. Significant damage to the elements below.

Feasible actions:
1) DN
2) Replace affected segments, patch and seal deck and rebuild shelves
3) *Replace joint

## ELASTOMERIC BEARING

11/12/2013

This element includes: Type I, II, and III elastomeric bearings, top and bottom plates, retainer angles and shear studs. This element also includes seismic isolation bearings made of elastomeric materials and their appurtenant components.

| Elem # | Description |
|---|---|
| 310 | Elastomeric Bearing (**EA**) |

**Condition State 1** The element shows no deterioration.

Feasible actions: 1) DN

**Condition State 2** The element shows little deterioration. Shear deformations are correct for existing temperatures.

Feasible actions: 1) DN

**Condition State 3** Minor cracking, splitting or other deterioration of the elastomer may be present. Steel components may have measureable section loss. Shear deformation may be slightly excessive or in the wrong direction. Strength and/or serviceability of the bearing components are not affected.

Feasible actions: 1) DN
2) Reset bearings

**Condition State 4** Advanced deterioration of the elastomer and/or steel components. Shear deformations may be excessive. Top and bottom surfaces may no longer be parallel. Loss of bearing may be imminent.

Feasible actions: 1) DN
2) Reset bearings
3) *Replace bearings and reset girders

## STEEL BEARINGS

11/12/2013

This element includes: Steel rocker and roller, gear pin and ratchet, rocker pin, and sliding plate assemblies consisting of bottom and top plates, pintels, leveling plates, retainers and bolts not subject to deck drainage through joints.

| Elem # | Description |
|---|---|
| 8316 | Moveable Steel Bearings Below Continuous Decks (**EA**) |

**Condition State 1** The element shows no deterioration.

Feasible actions: 1) DN

**Condition State 2** The element shows little deterioration. If a paint system is present, it may have surface rust with minor pitting. The bearing has minimal debris and does not affect movement. Vertical and horizontal alignment are within design limits. Any lubrication system is functioning properly.

Feasible actions:
1) DN
2) *Wash

**Condition State 3** The steel may show advanced corrosion with measureable section loss. The assemblies may have moved enough to cause minor cracking in the supporting concrete. Debris buildup is affecting bearing movement. Bearing alignment is tolerable.

Feasible actions:
1) DN
2) Minor repairs including cleaning debris and/or spot painting
3) Rehabilitate, sandblast and recoat and/or reset bearing devices

**Condition State 4** Corrosion is advanced. There may be loss of section of the supporting member sufficient to warrant supplemental supports or load restrictions. Bearing alignment may be beyond tolerable limits. Shear keys may have failed. The lubrication system, if any, may have failed. There may be significant movement or pounding under traffic.

Feasible actions:
1) DN
2) Rehabilitate and/or reset bearing device
3) *Replace bearing

## STEEL BEARINGS BELOW JOINTS

11/12/2013

This element includes: Standard steel rocker and roller, gear pin and ratchet, rocker pin and sliding plate assemblies consisting of bottom and top plates, pintels, leveling plates, retainers and bolts.

| Elem # | Description |
|---|---|
| 311 | Moveable Steel Bearings Below Discontinuous Deck Joints (**EA**) |

**Condition State 1** The element shows no deterioration.

Feasible actions: 1) DN

**Condition State 2** The element shows little deterioration. If a paint system is present, it may have surface rust with minor pitting. The bearing has minimal debris and does not affect movement. Vertical and horizontal alignment are within design limits. Any lubrication system is functioning properly.

Feasible actions: 1) DN
2) *Wash

**Condition State 3** The steel may show localized advanced corrosion with measurable section loss (Bearing could be cleaned up and reused). The assemblies may have moved enough to cause minor cracking in the supporting concrete. Debris buildup is affecting bearing movement. Bearing alignment is tolerable.

Feasible actions: 1) DN
2) Minor repairs including cleaning debris and/or spot painting
3) Rehabilitate, sandblast and recoat and/or reset bearing devices

**Condition State 4** Corrosion is advanced, sections have been lost. There may be significant horizontal or vertical misalignment to warrant supplemental supports or load restrictions. Bearing alignment may be beyond tolerable limits. Shear keys may have failed. The lubrication system, if any, may have failed. There may be significant movement or pounding under traffic.

Feasible actions: 1) DN
2) Rehabilitate, sandblast and recoat and/or reset bearing device
3) *Replace bearing

## CLUSTER BEARINGS

08/19/2013

This element includes: Steel cluster bearings. Also included are top and bottom plates, retainers and anchor bolts.

| Elem # | Description |
|---|---|
| 312 | Enclosed/Concealed Bearing or Bearing System (**EA**) |

**Condition State 1** The element shows no deterioration.

Feasible actions: 1) DN

**Condition State 2** The element shows little deterioration. There are no vertical or horizontal offsets. The supported member is stable under traffic. Internal corrosion is minimal. Any lubrication system is functioning properly.

Feasible actions: 1) DN

**Condition State 3** Both vertical and horizontal offsets are within the capability of the bearings and are not yet significant. The bearing may exhibit minimal vertical movement under traffic. There may be insignificant reduction of bearing. Debris and/or corrosion is affecting bearing movement.

Feasible actions:
1) DN
2) Minor repairs, replace covers, wash/lubricate and shim
3) Rehabilitate unit

**Condition State 4** Vertical and/or horizontal offsets are significant indicating bearing failures. There may be significant vertical movement under traffic. There may be significant reduction of bearing. The lubrication system, if any, may have failed.

Feasible actions:
1) DN
2) Rehabilitate unit
3) *Replace unit

## FIXED BEARING

11/12/2013

This element includes: Fixed bearing plates flat or rounded, and fixed pin plate girder bearings. Pintels, anchor bolts, top and bottom plates and shim plates are also included.

| Elem # | Description |
|---|---|
| 313 | Fixed Bearing (**EA**) |

**Condition State 1** The element shows no deterioration.

Feasible actions: 1) DN

**Condition State 2** The element shows little deterioration. If a paint system is present, it may have surface rust with minor pitting. Vertical and horizontal alignments are within design limits. Any lubrication system is functioning properly.

Feasible actions:
1) DN
2) *Wash

**Condition State 3** Steel may show advanced corrosion with measurable section loss. The assemblies may have moved enough to cause minor cracking in the supporting concrete. Debris build up is affecting bearing rotation. Bearing alignment is tolerable.

Feasible actions:
1) DN
2) Minor repairs including cleaning debris and spot paint
3) Rehabilitate sandblast and recoat, and/or reset bearings

**Condition State 4** Corrosion is advanced. There may be significant horizontal or vertical misalignment to warrant supplemental supports or load restrictions. Shear keys may have failed. The lubrication system, if any, may have failed. There may be significant movement or pounding under traffic.

Feasible actions:
1) DN
2) Rehabilitate, sandblast and recoat, and/or reset bearings
3) *Replace bearing

## POT BEARING

11/12/2013

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

| Elem # | Description |
|---|---|
| 314 | Pot Bearing (**EA**) |

**Condition State 1** The element shows no deterioration.

Feasible actions: 1) DN

**Condition State 2** The element shows minimal deterioration. The paint or other anti-corrosion system may have surface rust with minor pitting. The bearing has minimal debris and does not affect movement. Vertical and horizontal alignment are within design limits. Any lubrication system is functioning properly.

Feasible actions:
1) DN
2) *Wash and/or spot paint

**Condition State 3** The anti-corrosion system may show some corrosion with measurable section loss. Debris buildup is affecting bearing movement. Bearing alignment and load carrying capacity is tolerable. Minor amounts of elastomer may be extruding from the device.

Feasible actions:
1) DN
2) *Wash and/or spot paint
3) Rehabilitate bearing devices

**Condition State 4** Corrosion is advanced. Bearing alignment and load carrying capacity may be beyond limits. Shear keys and the lubrication system, if any, may have failed. Elastomer may be actively extruding from the device.

Feasible actions:
1) DN
2) Rehabilitate bearing devices
3) *Replace bearings

## APPROACH SPANS

09/30/2013

These elements include: Those structural (non-pavement) sections behind the bridge abutment which do not derive support by continuous contact with soil *and no provision for access was provided for in the original construction.* They may span a vaulted abutment or span alongside an approach pavement at a widened cross-section. They may be multiple elements separated by longitudinal joints.

| Elem # | Description |
|---|---|
| 320 | P/S Concrete Approach Span (**SF**) |
| 321 | Concrete Approach Slab (**SF**) |
| 8322 | Concrete Approach Beam (**SF**) |

**Condition State 1** The span shows no sign of deterioration other than superficial surface cracks.

Feasible actions: 1) DN

**Condition State 2** Minor cracking, spalls may be present but they do not affect the ability of the span to carry traffic. Edge joints may be unsealed allowing water flow through the embankment.

Feasible actions:
1) DN
2) Seal cracks, and/or edges
3) Rehabilitate affected sections

**Condition State 3** Cracks may extend completely through the span cross-section, but the span does not act as if it is broken. Spalls may be heavy and/or reinforcement may be exposed but they do not affect the structural integrity of the span.

Feasible actions:
1) DN
2) Seal cracks and/or edges
3) *Replace approach

**Condition State 4** The span is broken or rocks under traffic loads. Settlement is excessive and cannot be corrected without increasing the size of the span. Large spalls in the top surface and/or exposed main reinforcement are present, which affect the structural integrity of the span.

Feasible actions:
1) DN
2) *Place overlay
3) *Replace approach

## APPROACH PAVEMENT

09/30/2013

This element includes: Concrete or bituminous pavement sections behind the bridge abutment, which derive support by continuous contact with soil.

| Elem # | Description |
|---|---|
| 8323 | Approach Pavement (**EA**) |

**Condition State 1** The concrete or bituminous pavement has not settled and shows no sign of deterioration other than superficial surface cracks.

Feasible actions: 1) DN

**Condition State 2** Minor cracking, spalls may be present but they do not affect the ability of the concrete or bituminous pavement to carry traffic. Settlement may be occurring, which increases the traffic impact on the bridge.

Feasible actions:
1) DN
2) Seal cracks
3) Place overlay

**Condition State 3** Cracks may extend completely through the pavement cross-section, but the concrete or bituminous pavement does not act as if it is broken. Spalls may be heavy but they do not affect the structural integrity of the concrete or bituminous pavement. Settlement may be occurring, which increases the traffic impact on the bridge.

Feasible actions:
1) DN
2) Place overlay
3) Replace approach

**Condition State 4** The concrete or bituminous pavement is broken. Settlement is excessive and cannot be corrected without increasing the size of the slab.

Feasible actions:
1) DN
2) Place overlay
3) Replace approach

Note: Always will have an approach pavement except for rock and dirt approaches.

## METAL BRIDGE RAILING

11/12/2013

This element includes: All types of railings primarily constructed of metal.

| Elem # | Description |
|---|---|
| 330 | Metal Bridge Railing (**LF**) |

**Condition State 1** The element shows no deterioration.

Feasible actions: 1) DN

**Condition State 2** The element shows minimal deterioration. The paint or anticorrosive system may have edge corrosion up to system failure with surface rust and minor pitting. Minor impact damage.

Feasible actions: 1) DN
2) *Clean and paint

**Condition State 3** This element shows moderate deterioration. The paint or anticorrosive system has failed with measurable section loss up to 1/16” per face. Moderate impact damage.

Feasible actions: 1) DN
2) *Clean and paint
3) Rehabilitate railing

**Condition State 4** This element shows advanced deterioration. Corrosion and/or loss of section is greater than 1/16” per face. Severe impact damage.

Feasible actions: 1) DN
2) Rehabilitate railing
3) *Replace railing

## CONCRETE BRIDGE RAILING

11/12/2013

This element includes: All types of railings primarily constructed of concrete. This includes metal handrails or bicycle rails if attached to concrete barriers.

| Elem # | Description |
|---|---|
| 331 | Concrete Bridge Railing (**LF**) |

**Condition State 1** The element shows no deterioration.

Feasible actions: 1) DN

**Condition State 2** The element shows minimal deterioration. There may be discoloration, efflorescence and/or minor cracking but without effect on strength and/or serviceability. Minor impact damage.

Feasible actions: 1) DN
2) *Apply protective coat

**Condition State 3** Cracks & spalls may be present but there is no loss of core concrete section. Reinforcing may be exposed with some corrosion. Moderate impact damage.

Feasible actions: 1) DN
2) *Apply protective coat
3) Seal cracks, paint reinforcement and/or patch concrete or repair metal handrail

**Condition State 4** Advanced deterioration. Measurable section loss of main reinforcement and loss of core concrete section. Severe impact damage.

Feasible actions: 1) DN
2) Rehabilitate railing
3) *Replace railing

## TIMBER BRIDGE RAILING

11/12/2013

This element includes: All rails primarily constructed of timber.

| Elem # | Description |
|---|---|
| 332 | Timber Bridge Railing (**LF)** |

**Condition State 1** The element shows no deterioration.

Feasible actions: 1) DN

**Condition State 2** There is minimal decay. There may be minor cracks, splits and/or checks. Minor impact damage.

Feasible actions: 1) DN

**Condition State 3** There may be decay with or without splitting, cracking, checking or crushing but none is sufficiently advanced to affect serviceability. Moderate impact damage.

Feasible actions: 1) DN
2) Replace affected members and/or apply surface treatment

**Condition State 4** Advanced deterioration. Decay, splits, cracks or crushing has produced loss of strength that may affect the serviceability of the element. Severe impact damage.

Feasible actions: 1) DN
2) Replace affected members
3) *Replace railing

## OTHER BRIDGE RAILING

11/12/2013

This element includes: All rails primarily constructed of stone, masonry, etc..

| Elem # | Description |
|---|---|
| 333 | Other Bridge Railing (**LF**) |

**Condition State 1** The element shows no deterioration.

Feasible actions: 1) DN

**Condition State 2** The element shows minimal signs of deterioration. There may be minor cracking, corrosion and/or other minor deterioration having no affect on strength or serviceability. Minor impact damage.

Feasible actions: 1) DN

**Condition State 3** Minor cracking, spalls, decay of timber portions or corrosion of metal may be present. Moderate impact damage.

Feasible actions:
1) DN
2) Patch and repair rail
3) Replace affected members

**Condition State 4** Advanced deterioration. Corrosion, decay or loss of section is sufficient to warrant analysis to ascertain the impact on the serviceability or strength of the element. Severe impact damage.

Feasible actions:
1) DN
2) Replace affected members
3) *Replace rail

## SCOUR/EROSION

11/12/2013

These elements include: Those occurrences when scour could cause damage to the bridge or culvert; which are identified and added as necessary by the inspector in the field during the inspection. A one each quantity should be added for every location at the bridge where scour is a problem.

| Elem # | Description |
|---|---|
| 8361 | Pier and Abutment Scour (**EA**) |
| 8461 | Culvert Scour (**EA**) |

**Condition State 1**: Scour exists but is little concern to the structural integrity of the bridge or unit. Insignificant damage caused by drift or collision with no misalignment of flow with substructure units and not requiring corrective action. Scour countermeasures may be in place with no significant problems.

Feasible actions:
1) DN
2) Monitor
3) Rip rap and/or *remove debris*

**Condition State 2**: Minor scour may have occurred. Scour countermeasures may need some repairs. Drift accumulation may be causing a change in flow.

Feasible actions:
1) DN
2) Monitor
3) Rip rap and/or *remove debris*

**Condition State 3**: Scour has exposed the top of footing at pile supported footings or the pile is exposed below the encasement, if present or greater than 6 feet below the natural ground line at bents. No structure misalignment or settlement noted. New countermeasures or the repair of existing countermeasures are needed.

Feasible actions:
1) DN
2) Rip rap
3) Extensive scour countermeasures including large rip rap, paved sections or channel modifications

**Condition State 4**: Severe scour or undermining of the footings possibly affecting the stability of the unit. An analysis of the integrity and the hydraulics of the structure are necessary.

Feasible actions:
1) DN
2) Extensive scour countermeasures
3) Provide larger opening or relief structure

## SETTLEMENT

11/12/2013

These elements include: Those occurrences when settlement could cause damage to the bridge or culvert; which are identified and added as necessary by the inspector in the field during the inspection. A one each quantity should be added for each location at the bridge where settlement is a problem.

| Elem # | Description |
|---|---|
| 8360 | Pier and Abutment Settlement (**EA**) |
| 8460 | Culvert Settlement (**EA**) |

**Condition State 1** Settlement exists but is little concern to the structural integrity of the bridge or unit.

Feasible actions: 1) DN

**Condition State 2** Signs of visible settlement or rotation are apparent but due to earlier repairs or other factors, the settlement appears to have stabilized.

Feasible actions:
1) DN
2) Minor stabilization retrofits (cables, bearing shims, etc.)

**Condition State 3** Settlement or rotation show signs of continuing and if left unarrested, could cause adverse impacts to the bridge.

Feasible actions:
1) DN
2) Minor stabilization retrofits
3) Construct cripple bents

**Condition State 4** Settlement or rotation is significant enough to require repairs.

Feasible actions:
1) DN
2) Construct cripple bents
3) Replace substructure unit

## ENVIRONMENT DESCRIPTIONS

Deck

| Environment | Description |
|---|---|
| 1 | ADT ≤ 1700 |
| 2 | 1700 < ADT ≤ 4100 |
| 3 | 4100 < ADT≤ 9950 |
| 4 | 9950 < ADT |

Superstructure

| Environment | Description |
|---|---|
| 1 | ADTT ≤ 165 or ADT Under ≤ 6200 |
| 2 | 165 < ADTT ≤ 385 or 6200 < ADT Under ≤ 14,800 |
| 3 | 385 < ADTT ≤ 1170 or 14,800 < ADT Under ≤ 27,300 |
| 4 | 1170 < ADTT or 27,300 < ADT Under |

Substructure

| Environment | Description |
|---|---|
| 1 | ADT Under ≤ 6,200 or Light Industry |
| 2 | 6,200 < ADT Under ≤ 14,800 or Moderate Industry |
| 3 | 14,800 < ADT Under ≤ 27,300 or Heavy Industry |
| 4 | 27,300 < ADT Under |

1) Deck

A) Deck
B) Steel superstructure elements below discontinuous deck joints including, beam ends, end diaphragms, bearings and face girders
C) Steel substructure elements below discontinuous deck joints including, pier and abutment caps, and abutment backwalls

2) Superstructure

Includes all superstructure elements not included in the first group

3) Substructure

Includes all substructure elements not included in the first group

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09/30/2013


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| 12 | Concrete Deck Bare (**SF**) | 1 |
| 8026 | Concrete Deck Protected w/ Coated Bars (**SF**) | 6 |
| 8033 | Concrete Deck Protected w/ Coated Bars w/ PPC Panels (**SF**) | 6 |
| 8014 | Concrete Deck Protected w/ HMA Overlay (**SF**) | 3 |
| 8022 | Concrete Deck Protected w/ Rigid Overlay (**SF**) | 5 |
| 8018 | Concrete Deck Protected w/ Thin Overlay (**SF**) | 4 |
| 8027 | Concrete Deck Protected w/ Cathodic Protection (**SF**) | 7 |
| 8013 | Concrete Deck Unprotected w/ HMA Overlay (**SF**) | 2 |
| 155 | Concrete Floor Beam (**LF**) | 20 |
| 110 | Concrete Open Girder (**LF**) | 20 |
| 234 | Concrete Pier or Abutment Cap (**LF**) | 20 |
| 210 | Concrete Pier Wall (**SF**) | 20 |
| 8038 | Concrete Slab Bare (**SF**) | 1 |
| 8052 | Concrete Slab Protected w/ Coated Bars (**SF**) | 6 |
| 8040 | Concrete Slab Protected w/ HMA Overlay (**SF**) | 3 |
| 8048 | Concrete Slab Protected w/ Rigid Overlay (**SF**) | 5 |
| 8044 | Concrete Slab Protected w/ Thin Overlay (**SF**) | 4 |
| 8053 | Concrete Slab Protected w/ Cathodic Protection (**SF**) | 7 |
| 8039 | Concrete Slab Unprotected w/ HMA Overlay (**SF**) | 2 |
| 8308 | Continuous Seal Neoprene Expansion Joint (**LF**) | 36 |
| 30 | Corrugated/Orthotropic/Etc. Deck (**SF**) | 11 |
| 8461 | Culvert Scour (**EA**) | 49 |
| 8460 | Culvert Settlement (**EA**) | 50 |
| 310 | Elastomeric Bearing (**EA**) | 37 |
| 312 | Enclosed/Concealed Bearing or Bearing System (**EA**) | 40 |
| 8306 | Finger Joints with Trough (**LF**) | 34 |
| 305 | Finger Joints without Trough (**LF**) | 33 |
| 313 | Fixed Bearing (**EA**) | 41 |
| 8108 | Keyway (**LF**) | 21 |
| 8221 | Lead Painted Steel Abutment and Wingwall (**SF**) | 16 |
| 141 | Lead Painted Steel Arch/Arch Tie (**SF**) | 16 |
| 8121 | Lead Painted Steel Bottom Chord Through Truss (**SF**) | 16 |
| 102 | Lead Painted Steel Closed Web/Box Girder (**SF**) | 16 |
| 8172 | Lead Painted Steel Closed Web/Box Girder and Open Girder/Stringer Ends Including Diaphragms Below Deck Joints (**EA**) ` | 16 |
| 202 | **Lead Painted Steel Column (SF)** | 16 |
| 8181 | Lead Painted Steel Deck Truss Below Deck Joints (**SF**) | 16 |
| 8131 | Lead Painted Steel Deck Truss (**SF**) | 16 |
| 152 | Lead Painted Steel Floor Beam (**SF**) | 16 |
| 8191 | Lead Painted Steel Floor Beam Below Deck Joints (**SF**) | 16 |
| 162 | **Lead Painted Steel Gusset Plate (EA)** | 16 |
| 107 | Lead Painted Steel Open Girder (**SF**) | 16 |

| Elem # | Description | Page # |
|---|---|---|
| 231 | Lead Painted Steel Pier or Abutment Cap (**SF**) | 16 |
| 8271 | Lead Painted Steel Pier or Abutment Cap Below Deck Joint (**SF**) | 16 |
| 225 | **Lead Painted Steel Pile (SF)** | 16 |
| 161 | Lead Painted Steel Pin and/or Hanger (**EA**) | 16 |
| 113 | Lead Painted Steel Stringer (**SF**) | 16 |
| 8126 | Lead Painted Steel Through Truss Excluding Bottom Chord (**SF**) | 16 |
| 330 | Metal Bridge Railing (**LF**) | 45 |
| 303 | Modular Joints (**LF**) | 31 |
| 8316 | Moveable Steel Bearings Below Continuous Decks (**EA**) | 38 |
| 311 | Moveable Steel Bearings Below Discontinuous Deck Joints (**EA**) | 39 |
| 8307 | Neoprene Expansion Joint (**LF**) | 35 |
| 8220 | Non-Lead Painted Steel Abutment and Wingwall (**SF**) | 17 |
| 8128 | Non-Lead Painted Steel Arch/Arch Tie (**SF**) | 17 |
| 8122 | Non-Lead Painted Steel Bottom Chord Through Truss (**SF**) | 17 |
| 8103 | Non-Lead Painted Steel Closed Web/Box Girder (**SF**) | 17 |
| 8173 | Non-Lead Painted Steel Closed Web/Box Girder and Open Girder/Stringer Ends Including Diaphragms Below Deck Joints (**EA**) | 17 |
| 8200 | **Non-Lead Painted Steel Column** (**SF**) | 17 |
| 8182 | Non-Lead Painted Steel Deck Truss Below Deck Joints (**SF**) | 17 |
| 8124 | Non-Lead Painted Steel Deck Truss (**SF**) | 17 |
| 8129 | Non-Lead Painted Steel Floor Beam (**SF**) | 17 |
| 8192 | Non-Lead Painted Steel Floor Beam Below Deck Joints (**SF**) | 17 |
| 8163 | **Non-Lead Painted Steel Gusset Plate (EA)** | 17 |
| 8118 | Non-Lead Painted Steel Open Girder (**SF**) | 17 |
| 8236 | Non-Lead Painted Steel Pier or Abutment Cap (**SF**) | 17 |
| 8272 | Non-Lead Painted Steel Pier or Abutment Cap Below Deck Joints (**SF**) | 17 |
| 8162 | Non-Lead Painted Steel Pin and/or Hanger (**EA**) | 17 |
| 8119 | Non-Lead Painted Steel Stringer (**SF**) | 17 |
| 8123 | Non-Lead Painted Steel Through Truss Excluding Bottom Chord (**SF**) | 17 |
| 304 | Open Expansion Joint (**LF**) | 32 |
| 218 | **Other Abutment and Wingwall (SF)** | 24 |
| 333 | Other Bridge Railing (**LF**) | 48 |
| 243 | Other Culvert (**LF**) | 27 |
| 211 | Other Pier Wall (**SF**) | 24 |
| 147 | **Primary Cable (LF)** | 23 |
| 320 | P/S Concrete Approach Span (**SF**) | 43 |
| 143 | P/S Concrete Arch/Arch Tie (**LF**) | 19 |
| 8237 | P/S Concrete Beam Ends Including Diaphragms Under Deck Joints (**EA**) | 19 |
| 104 | P/S Concrete Closed Web/Box Girder (**LF**) | 19 |
| 204 | **P/S Concrete Column (SF)** | 19 |
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| 109 | P/S Concrete Open Girder (**LF**) | 19 |
| 233 | P/S Concrete Pier or Abutment Cap (**LF**) | 19 |
| 236 | **P/S Concrete Pile Extension (SF)** | 19 |
| 8142 | P/S Concrete Segmental Box Girders (**LF**) | 19 |
| 8361 | Pier and Abutment Scour (**EA**) | 49 |
| 8360 | Pier and Abutment Settlement (**EA**) | 50 |
| 314 | Pot Bearing (**EA**) | 42 |
| 301 | Pourable Joint Seal (**LF**) | 29 |
| 8034 | Precast Concrete Deck Bare (**SF**) | 1 |
| 8036 | Precast Concrete Deck Protected w/ HMA Overlay (**SF**) | 3 |
| 8035 | Precast Concrete Deck Unprotected w/ HMA Overlay (**SF**) | 2 |
| 8056 | Precast Concrete Deck w/Rigid 5” Overlay (**SF**) | 1 |
| 302 | Preformed Joint Seal (**LF**) | 30 |

| Elem # | Description | Page # |
|---|---|---|
| 227 | **Reinforced Concrete Pile Extension (SF)** | 20 |
| 148 | **Secondary Cable (EA)** | 23 |
| 8058 | **Sidewalk** (**SF**) | 14 |
| 8407 | Steel Arch/Arch Tie (**LF**) | 18 |
| 8402 | Steel Bottom Chord Through Truss (**LF**) | 18 |
| 8401 | Steel Closed Web/Box Girder (**LF**) | 18 |
| 8409 | Steel Column or Pile Extension (**LF**) | 18 |
| 240 | Steel Culvert (**LF**) | 25 |
| 29 | Steel Deck Concrete Filled Grid (**SF**) | 9 |
| 8057 | **Steel Deck Concrete Filled Grid w/HMA Overlay** (**SF**) | 10 |
| 28 | Steel Deck Open Grid (**SF**) | 8 |
| 8404 | Steel Deck Truss (**LF**) | 18 |
| 8408 | Steel Floor Beam (**LF**) | 18 |
| 8413 | **Steel Gusset Plate (EA)** | 18 |
| 8406 | Steel Open Girder (**LF**) | 18 |
| 8410 | Steel Pier or Abutment Cap (**LF**) | 18 |
| 8414 | **Steel Pile Extension (LF)** | 18 |
| 8411 | Steel Pin and/or Hanger (**EA**) | 18 |
| 8412 | Steel Stringer (**LF**) | 18 |
| 8403 | Steel Through Truss Excluding Bottom Chord (**LF**) | 18 |
| 300 | Strip Seal Expansion Joint (**LF**) | 28 |
| 216 | Timber Abutment and Wingwall (**SF**) | 22 |
| 146 | **Timber Arch** (**LF**) | 22 |
| 332 | Timber Bridge Railing (**LF**) | 47 |
| 206 | **Timber Column (EA)** | 22 |
| 31 | Timber Deck Bare (**SF**) | 12 |
| 8239 | Timber Deck Runners (**LF**) | 22 |
| 8032 | Timber Deck with HMA Overlay (**SF**) | 13 |
| 156 | Timber Floor Beam (**LF**) | 22 |
| 111 | Timber Open Girder (**LF**) | 22 |
| 235 | Timber Pier or Abutment Cap (**LF**) | 22 |
| 228 | **Timber Pile Extension (EA)** | 22 |
| 54 | Timber Slab Bare (**SF**) | 12 |
| 8055 | Timber Slab with HMA Overlay (**SF**) | 13 |
| 117 | Timber Stringer (**LF**) | 22 |
| 135 | Timber Truss (**LF**) | 22 |
| 8222 | Unpainted Steel Abutment and Wingwall (**SF**) | 15 |
| 8140 | Unpainted Steel Arch/Arch Tie (**SF**) | 15 |
| 120 | Unpainted Steel Bottom Chord Through Truss (**SF**) | 15 |
| 8101 | Unpainted Steel Closed Web/Box Girder (**SF**) | 15 |
| 8171 | Unpainted Steel Closed Web/Box Girder and Open Girder/Stringer Ends Including Diaphragms Below Deck Joints (**EA**) | 15 |
| 201 | **Unpainted Steel Column (SF)** | 15 |
| 8180 | Unpainted Steel Deck Truss Below Deck Joints (**SF**) | 15 |
| 8130 | Unpainted Steel Deck Truss (**SF**) | 15 |
| 8151 | Unpainted Steel Floor Beam (**SF**) | 15 |
| 8190 | Unpainted Steel Floor Beam Below Deck Joints (**SF**) | 15 |
| 8106 | Unpainted Steel Open Girder (**SF**) | 15 |
| 8270 | Unpainted Steel Pier or Abutment Cap Below Deck Joints (**SF**) | 15 |
| 8230 | Unpainted Steel Pier or Abutment Cap (**SF**) | 15 |
| 8224 | **Unpainted Steel Pile Extension (SF)** | 15 |
| 8160 | Unpainted Steel Pin and/or Hanger (**EA**) | 15 |
| 8112 | Unpainted Steel Stringer (**SF**) | 15 |
| 8125 | Unpainted Steel Through Truss Excluding Bottom Chord (**SF**) | 15 |

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| 12 | Concrete Deck Bare (**SF**) | 1 |
| 8013 | Concrete Deck Unprotected w/ HMA Overlay (**SF**) | 2 |
| 8014 | Concrete Deck Protected w/HMA Overlay (**SF**) | 3 |
| 8018 | Concrete Deck Protected w/ Thin Overlay (**SF**) | 4 |
| 8022 | Concrete Deck Protected w/ Rigid Overlay (**SF**) | 5 |
| 8026 | Concrete Deck Protected w/ Coated Bars (**SF**) | 6 |
| 8027 | Concrete Deck Protected w/Cathodic Protection (**SF**) | 7 |
| 28 | Steel Deck Open Grid (**SF**) | 8 |
| 29 | Steel Deck Concrete Filled Grid (**SF**) | 9 |
| 30 | Corrugated/Orthotropic/Etc. Deck (**SF**) | 11 |
| 31 | Timber Deck Bare (**SF**) | 12 |
| 8032 | Timber Deck with HMA Overlay (**SF**) | 13 |
| 8033 | Concrete Deck Protected w/ Coated Bars w/ PPC Panels (**SF**) | 6 |
| 8034 | Precast Concrete Deck Bare (**SF**) | 1 |
| 8035 | Precast Concrete Deck Unprotected w/ HMA Overlay (**SF**) | 2 |
| 8036 | Precast Concrete Deck Protected w/ HMA Overlay (**SF**) | 3 |
| 8038 | Concrete Slab Bare (**SF**) | 1 |
| 8039 | Concrete Slab Unprotected w/ HMA Overlay (**SF**) | 2 |
| 8040 | Concrete Slab Protected w/HMA Overlay (**SF**) | 3 |
| 8044 | Concrete Slab Protected w/ Thin Overlay (**SF**) | 4 |
| 8048 | Concrete Slab Protected w/ Rigid Overlay (**SF**) | 5 |
| 8052 | Concrete Slab Protected w/ Coated Bars (**SF**) | 6 |
| 8053 | Concrete Slab Protected w/Cathodic Protection (**SF**) | 7 |
| 54 | Timber Slab Bare (**SF**) | 12 |
| 8055 | Timber Slab with HMA Overlay (**SF**) | 13 |
| 8056 | **Precast Concrete Deck w/Rigid 5" Overlay** (**SF**) | 1 |
| 8057 | **Steel Deck Concrete Filled Grid w/HMA Overlay** (**SF**) | 10 |
| 8058 | **Sidewalk** (**SF**) | 14 |
| 8101 | Unpainted Steel Closed Web/Box Girder (**SF**) | 15 |
| 102 | Lead Painted Steel Closed Web/Box Girder (**SF**) | 16 |
| 8103 | Non-Lead Painted Steel Closed Web/Box Girder (**SF**) | 17 |
| 104 | P/S Concrete Closed Web/Box Girder (**LF**) | 19 |
| 105 | Concrete Closed Web/Box Girder (**LF**) | 20 |
| 8106 | Unpainted Steel Open Girder (**SF**) | 15 |
| 107 | Lead Painted Steel Open Girder (**SF**) | 16 |
| 8108 | Keyway (**LF**) | 21 |
| 109 | P/S Concrete Open Girder (**LF**) | 19 |
| 110 | Concrete Open Girder (**LF**) | 20 |
| 111 | Timber Open Girder (**LF**) | 22 |
| 8112 | Unpainted Steel Stringer (**SF**) | 15 |
| 113 | Lead Painted Steel Stringer (**SF**) | 16 |
| 117 | Timber Stringer (**LF**) | 22 |
| 8118 | Non-Lead Painted Steel Open Girder (**SF**) | 17 |
| 8119 | Non-Lead Painted Steel Stringer (**SF**) | 17 |
| 120 | Unpainted Steel Bottom Chord Through Truss (**SF**) | 15 |
| 8121 | Lead Painted Steel Bottom Chord Through Truss (**SF**) | 16 |
| 8122 | Non-Lead Painted Steel Bottom Chord Through Truss (**SF**) | 17 |
| 8123 | Non-Lead Painted Steel Through Truss Excluding Bottom Chord (**SF**) | 17 |
| 8124 | Non-Lead Painted Steel Deck Truss (**SF**) | 17 |
| 8125 | Unpainted Steel Through Truss Excluding Bottom Chord (**SF**) | 15 |
| 8126 | Lead Painted Steel Through Truss Excluding Bottom Chord (**SF**) | 16 |
| 8128 | Non-Lead Painted Steel Arch/Arch Tie (**SF**) | 17 |

| Elem # | Description | Page # |
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| 8129 | Non-Lead Painted Steel Floor Beam (**SF**) | 17 |
| 8130 | Unpainted Steel Deck Truss (**SF**) | 15 |
| 8131 | Lead Painted Steel Deck Truss (**SF**) | 16 |
| 135 | Timber Truss (**LF**) | 22 |
| 8140 | Unpainted Steel Arch/Arch Tie (**SF**) | 15 |
| 141 | Lead Painted Steel Arch/Arch Tie (**SF**) | 16 |
| 8142 | P/S Concrete Segmental Box Girder (**LF**) | 19 |
| 143 | P/S Concrete Arch/Arch Tie (**LF**) | 19 |
| 144 | Concrete Arch/Arch Tie (**LF**) | 20 |
| 146 | **Timber Arch (LF)** | 22 |
| 147 | **Primary Cable (LF)** | 23 |
| 148 | **Secondary Cable (EA)** | 23 |
| 8151 | Unpainted Steel Floor Beam (**SF**) | 15 |
| 152 | Lead Painted Steel Floor Beam (**SF**) | 16 |
| 154 | P/S Concrete Floor Beam (**LF**) | 19 |
| 155 | Concrete Floor Beam (**LF**) | 20 |
| 156 | Timber Floor Beam (**LF**) | 22 |
| 8160 | Unpainted Steel Pin and/or Hanger (**EA**) | 15 |
| 161 | Lead Painted Steel Pin and/or Hanger (**EA**) | 16 |
| 162 | **Lead Painted Steel Gusset Plate (EA)** | 16 |
| 8162 | **Non-Lead Painted Steel Pin and/or Hanger (EA)** | 17 |
| 8163 | **Non-Lead Painted Steel Gusset Plate (EA)** | 17 |
| 8171 | Unpainted Steel Closed Web/Box Girder and Open Girder/Stringer Ends Including Diaphragms Below Deck Joints (**EA**) | 15 |
| 8172 | Lead Painted Steel Closed Web/Box Girder and Open Girder/Stringer Ends Including Diaphragms Below Deck Joints (**EA**) | 16 |
| 8173 | Non-Lead Painted Steel Closed Web/Box Girder and Open Girder/Stringer Ends Including Diaphragms Below Deck Joints **(EA**) | 17 |
| 8180 | Unpainted Steel Deck Truss Below Deck Joints (**SF**) | 15 |
| 8181 | Lead Painted Steel Deck Truss Below Deck Joints (**SF**) | 16 |
| 8182 | Non-Lead Painted Steel Deck Truss Below Deck Joints (**SF**) | 17 |
| 8190 | Unpainted Steel Floor Beam Below Deck Joints (**SF**) | 15 |
| 8191 | Lead Painted Steel Floor Beam Below Deck Joints (**SF**) | 16 |
| 8192 | Non-Lead Painted Steel Floor Beam Below Deck Joints (**SF**) | 17 |
| 8200 | **Non-Lead Painted Steel Column (SF)** | 17 |
| 8201 | **Unpainted Steel Column (SF)** | 15 |
| 202 | **Lead Painted Steel Column (SF)** | 16 |
| 204 | **P/S Concrete Column (SF)** | 19 |
| 205 | **Concrete Column (SF)** | 20 |
| 206 | **Timber Column** (**EA**) | 22 |
| 210 | Concrete Pier Wall (**SF**) | 20 |
| 211 | Other Pier Wall (**SF**) | 24 |
| 215 | Concrete Abutment and Wingwall (**SF**) | 20 |
| 216 | Timber Abutment and Wingwall (**SF**) | 22 |
| 218 | **Other Abutment and Wingwall (SF)** | 24 |
| 8220 | Non-Lead Painted Steel Abutment and Wingwall (**SF**) | 17 |
| 8221 | Lead Painted Steel Abutment and Wingwall (**SF**) | 16 |
| 8222 | Unpainted Steel Abutment and Wingwall (**SF**) | 15 |
| 8224 | **Unpainted Steel Pile (SF)** | 15 |
| 225 | **Lead Painted Steel Pile Extension (SF)** | 16 |
| 226 | **Prestressed Concrete Pile Extension (SF)** | 19 |
| 227 | **Reinforced Concrete Pile Extension (SF)** | 20 |
| 228 | **Timber Pile Extension (LF)** | 22 |
| 8230 | Unpainted Steel Pier or Abutment Cap (**SF**) | 15 |

| Elem # | Description | Page # |
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| 231 | Lead Painted Steel Pier or Abutment Cap (**SF**) | 16 |
| 233 | P/S Concrete Pier or Abutment Cap (**LF**) | 19 |
| 234 | Concrete Pier or Abutment Cap (**LF**) | 20 |
| 235 | Timber Pier or Abutment Cap (**LF**) | 22 |
| 8236 | Non-Lead Painted Steel Pier or Abutment Cap (**SF**) | 17 |
| 8237 | P/S Concrete Beam Ends Including Diaphragms Under Deck Joints (**EA**) | 19 |
| 8238 | Concrete Beam Ends Including Diaphragms Under Deck Joints (**EA**) | 20 |
| 8239 | Timber Deck Runners (**LF**) | 22 |
| 240 | Steel Culvert (**LF**) | 25 |
| 241 | Concrete Culvert (**LF**) | 26 |
| 243 | Other Culvert (**LF**) | 27 |
| 8246 | Non-Lead Painted Steel Pile Extension | 17 |
| 8270 | Unpainted Steel Pier or Abutment Cap Below Deck Joints (**SF**) | 15 |
| 8271 | Lead Painted Steel Pier or Abutment Cap Below Deck Joints (**SF**) | 16 |
| 8272 | Non-Lead Painted Steel Pier or Abutment Cap Below Deck Joints (**SF**) | 17 |
| 300 | Strip Seal Expansion Joint (**LF**) | 28 |
| 301 | Pourable Joint Seal (**LF**) | 29 |
| 302 | Preformed Joint Seal (**LF**) | 30 |
| 303 | Modular Joints (**LF**) | 31 |
| 304 | Open Expansion Joint (**LF**) | 32 |
| 305 | Finger Joints without Trough (**LF**) | 33 |
| 8306 | Finger Joints with Trough (**LF**) | 34 |
| 8307 | Neoprene Expansion Joint (**LF**) | 35 |
| 8308 | Continuous Seal Neoprene Expansion Joint (**LF**) | 36 |
| 310 | Elastomeric Bearing (**EA**) | 37 |
| 311 | Moveable Steel Bearings Below Discontinuous Deck Joints (**EA**) | 39 |
| 312 | Enclosed/Concealed Bearing or Bearing System (**EA**) | 40 |
| 313 | Fixed Bearing (**EA**) | 41 |
| 314 | Pot Bearing (**EA**) | 42 |
| 8316 | Moveable Steel Bearings Below Continuous Decks (**EA**) | 38 |
| 320 | P/S Concrete Approach Span (**SF**) | 43 |
| 321 | Concrete Approach Slab (**SF**) | 43 |
| 8322 | Concrete Approach Beam (**SF**) | 43 |
| 8323 | Approach Pavement (**EA**) | 44 |
| 330 | Metal Bridge Railing (**LF**) | 45 |
| 331 | Concrete Bridge Railing (**LF**) | 46 |
| 332 | Timber Bridge Railing (**LF**) | 47 |
| 333 | Other Bridge Railing (**LF**) | 48 |
| 8360 | Pier and Abutment Settlement (**EA**) | 50 |
| 8361 | Pier and Abutment Scour (**EA**) | 49 |
| 8401 | Steel Closed Web/Box Girder (**LF**) | 18 |
| 8402 | Steel Bottom Chord Through Truss (**LF**) | 18 |
| 8403 | Steel Through Truss Excluding Bottom Chord (**LF**) | 18 |
| 8404 | Steel Deck Truss (**LF**) | 18 |
| 8406 | Steel Open Girder (**LF**) | 18 |
| 8407 | Steel Arch/Arch Tie (**LF**) | 18 |
| 8408 | Steel Floor Beam (**LF**) | 18 |
| 8409 | Steel Column or Pile Extension (**LF**) | 18 |
| 8410 | Steel Pier or Abutment Cap (**LF**) | 18 |
| 8411 | Steel Pin and/or Hanger (**EA**) | 18 |
| 8412 | Steel Stringer (**LF**) | 18 |
| 8413 | **Steel Gusset Plate (EA)** | 18 |
| 8414 | **Steel Pile (LF)** | 18 |
| 8460 | Culvert Settlement (**EA**) | 50 |

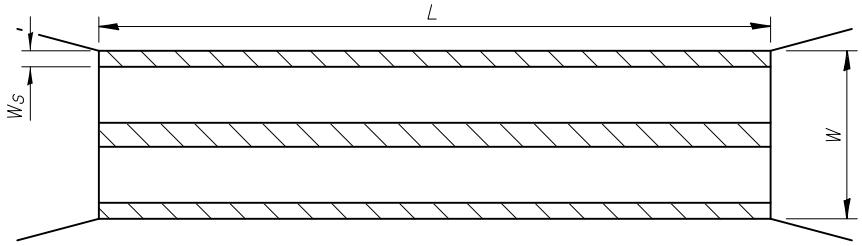
| **Elem #** | **Description** | **Page #** |
|---|---|---|
| 8461 | Culvert Scour (**EA**) | 49 |

# Appendix

## Deck/Slab

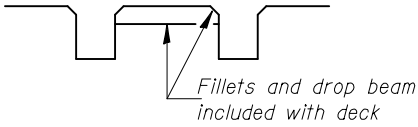
Quantity=L xW=SF

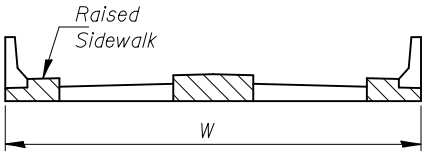
Deteriorated areas will be measured only in the riding surface.

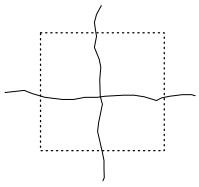



Areas not rated:

Note:
If optional sidewalk element is used, the sidewalk quantity will be length x Ws (width of sidewalk). The deck quantity is unchanged.

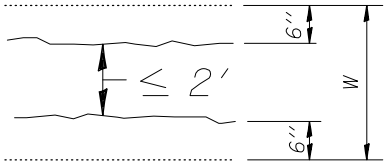


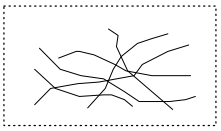
CS3 area = 1 s.f.

### INTERSECTING CRACKS




CS3 area = W x length of crack

### PARALLEL CRACKS



CS3 area = rectangular shape

### MAP CRACKS, SPALLS OR DELAMINATIONS

## Protection System Unpainted/Painted Steel Elements

Quantity= Total SF of structural steel from CAPPS

Steel beam ends are not subtracted from the total structural quatity.

Diaphragms may be assumed to increase total quantity by 10% but interior diaphragms remain in Condition State 1. End diaphragms can only effect the condition state of the beam ends. Judgement should be used to determine to what degree the effect is on the condition state of the beam ends to which they are attached.

Condition State 2 quantities should be recorded including the entire flange face and the portions of web face which contain this level of deficiency.

Condition State 3 and 4 quantities should be recorded including the entire flange face and/or the entire web face which contain this level of deficiency, except for those isolated corrosion cells in Condition State 3, which are recorded as one square foot.

## Concrete Elements

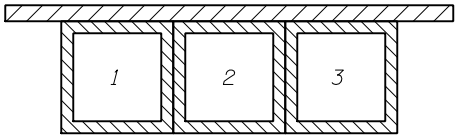
Girder Quantity = (L - X) (# of Girders) =LF

X = (# of Deck Joints/Span) (5) = LF

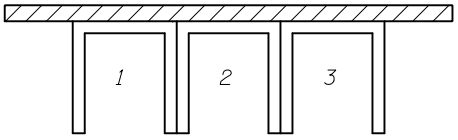
Abutment/Pier Quantity = L x W = SF

Length and width will be taken from as built plans. No field correction is necessary unless a gross error is apparent.

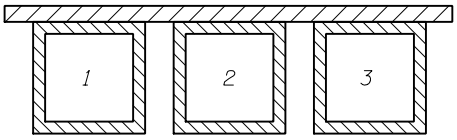
Girder Measurements Cont'd.



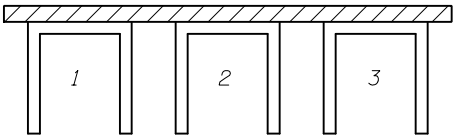

3 Girders



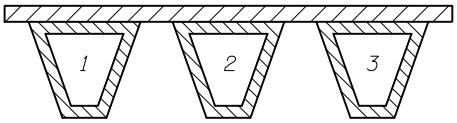

3 Girders



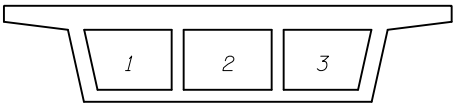

3 Girders



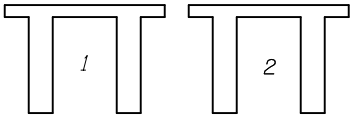

3 Girders



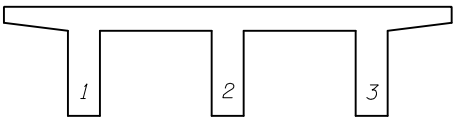

3 Girders




3 Girders

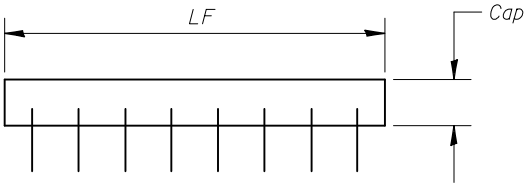



2 Girders




3 Girders

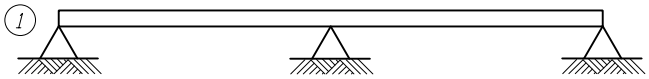
## Pile Bent Cap



## Bearings

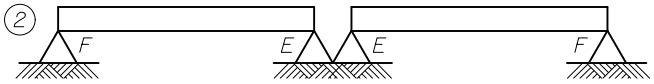
Quantity = EA

Integral Abutment/Two span Continuous




| Beam | Element # | Quantity |
|---|---|---|
| 1 | 316 | 1 |
| 2 | 311 | 2 |
| | 313 | 2 |

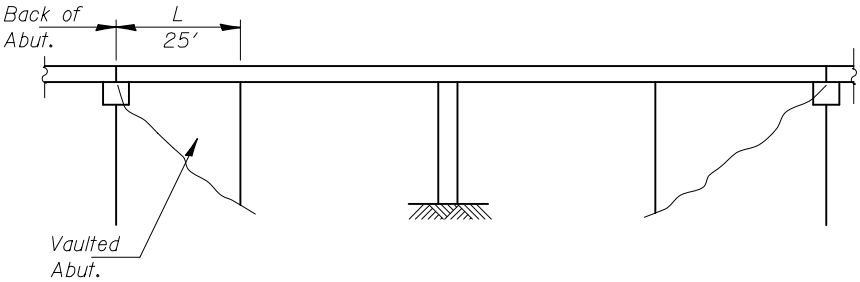
Two span Discontinuous

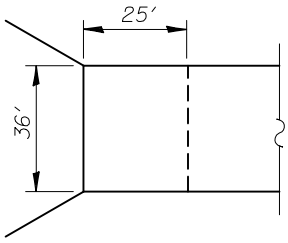



Bearings that cannot be seen are not included in Pontis.

## Approach Span is rigidly supported on both ends

Quantity= L x W= SF



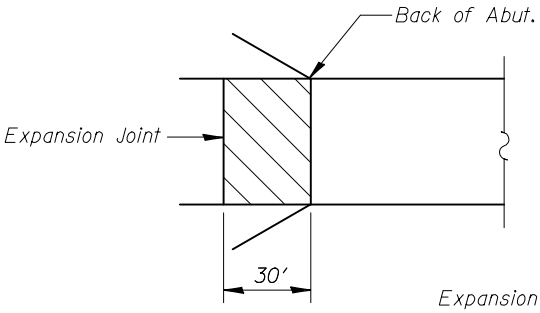



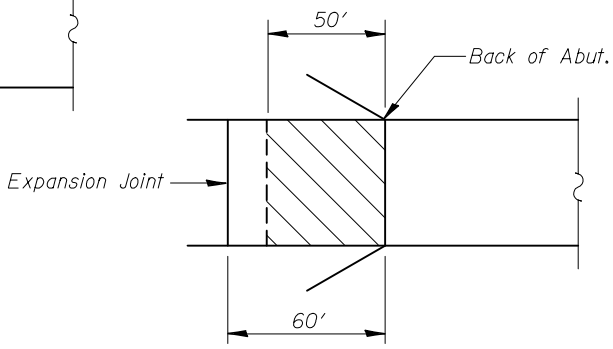

Q= (2)(25)(36)= 1800 SF.

## Approach Pavement is ground supported

Quantity= EA

Maximum area of consideration 50 Ft. from back of abutment.

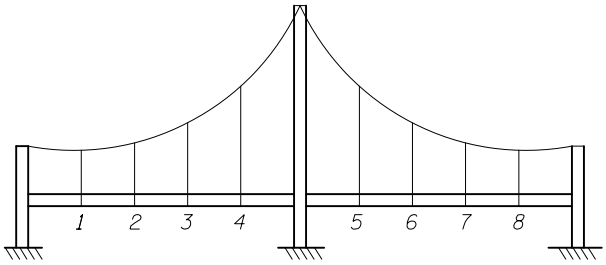



Approach Pavement

## Cables

Quantity = EA



Top View

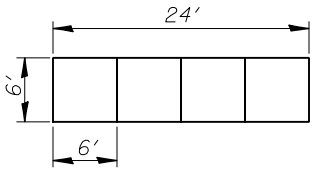
Total quantity= 18

## Culverts

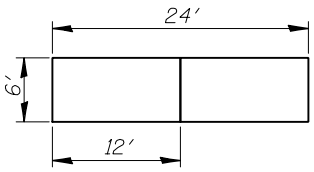
Quantity = L x (# of Barrels) = LF

One Barrel = 5 Ft - 7.5 Ft

Two Barrels => 7.51 Ft




Four Barrels



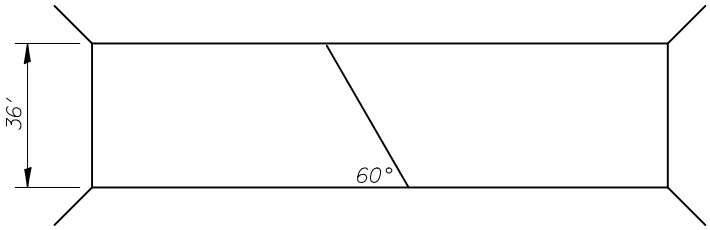

Four Barrels

Culvert environments are determined using subtructures criteria except when the top slab receives direct traffic loads (no fill). When direct traffic loads are received the environment is determined from the worst of the three categories on page 49.

## Joints

Quantity = LF

Measurements taken along joint.

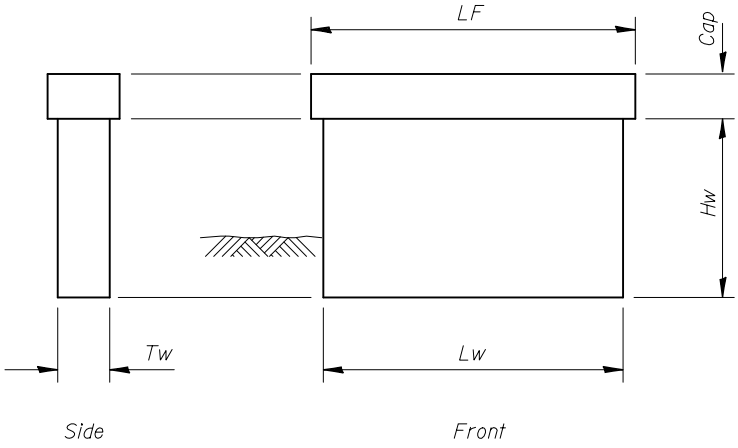



Q = (36)/Sin 60° = 41.6'

## Timber Elements

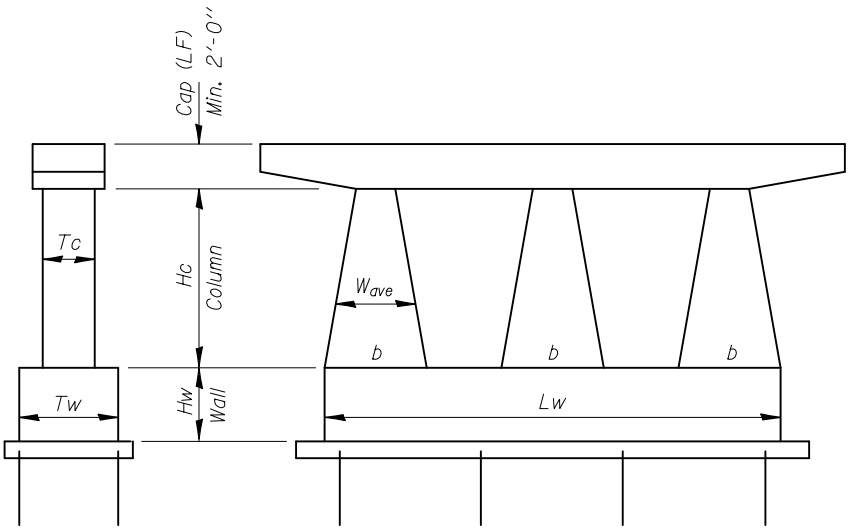
Quantity = L x (# of Girders) = LF

## Encased Pile Bent




Area Pier Wall = Hw (Lw +Tw) 2

## Column




One column area = Hc x 2 ($W_{ave}$ + Tc)
Pier wall area = Hw x 2 (Lw + Tw) + (Tw x Lw - 3b x Tc)

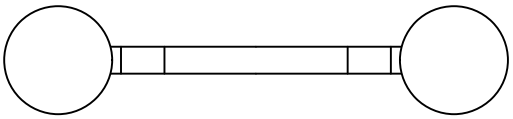
Notes:

Pier and Column (SF) : When "Condition State" of front and back areas coincide. Each area is recorded in the total for each condition state.

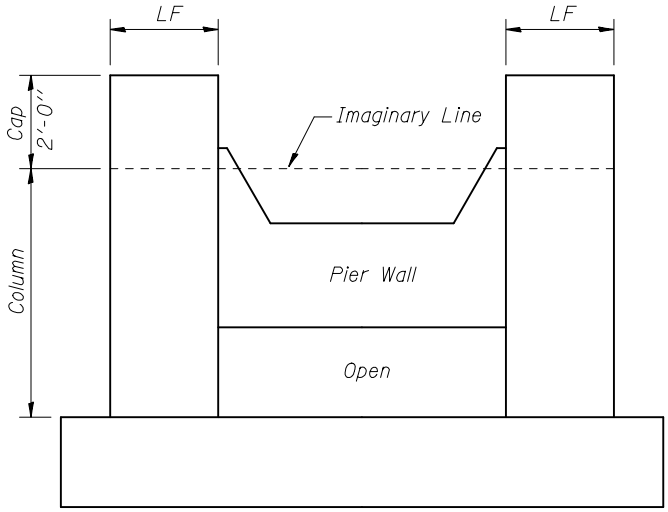
Cap (LF) : When "Condition State" of Front and Back areas coincide. The rated lineal length is the longest length and not the sum. Worst "Condition State" governs for the coincident length.

# Pier Cap

Case 1

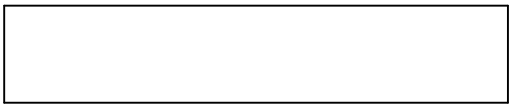


Plan

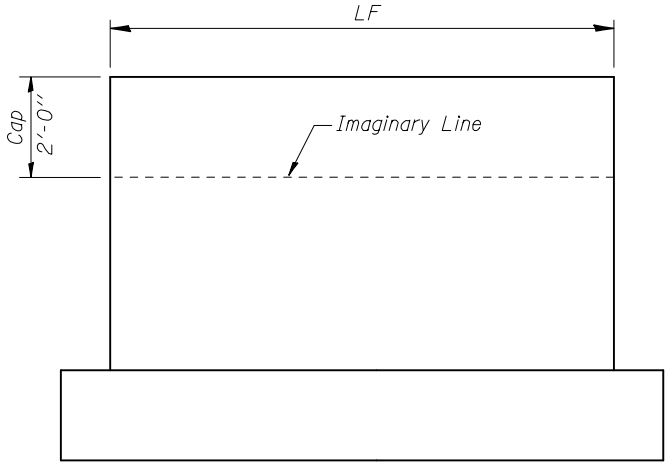



Elevation

Case 2



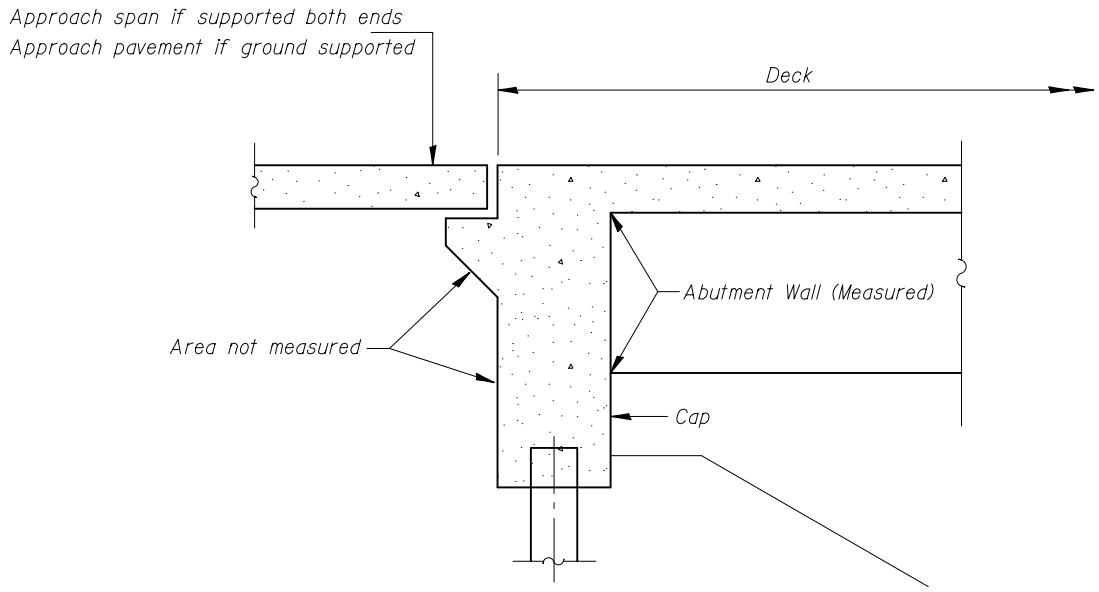
Plan




Elevation

Notes: If there is no visible division between the pier wall and the cap, 2 feet below top of wall must be considered pier cap.

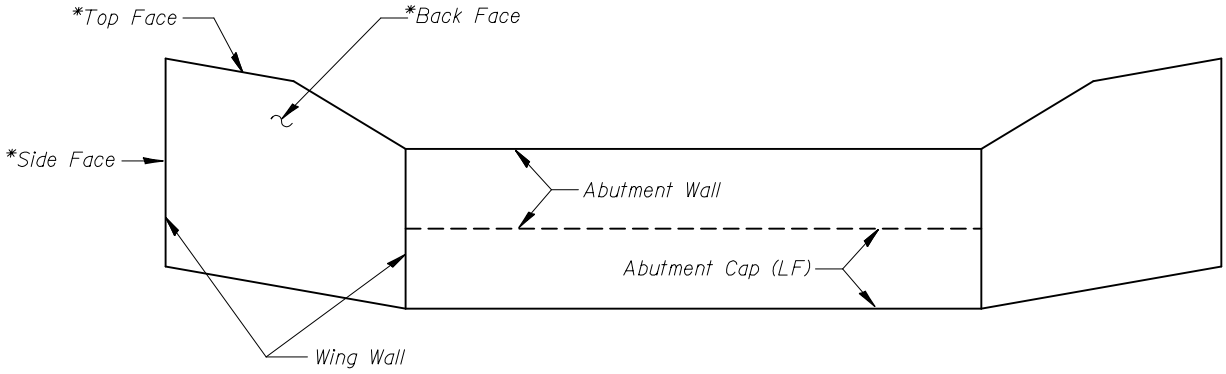
## Integral Abutment




Integral abutment must be separated into 3 elements as follows:

1.) Abutment wall
2.) Deck
3.) Cap

Concrete Abutment Wall and Wing Wall: measure only the front faces

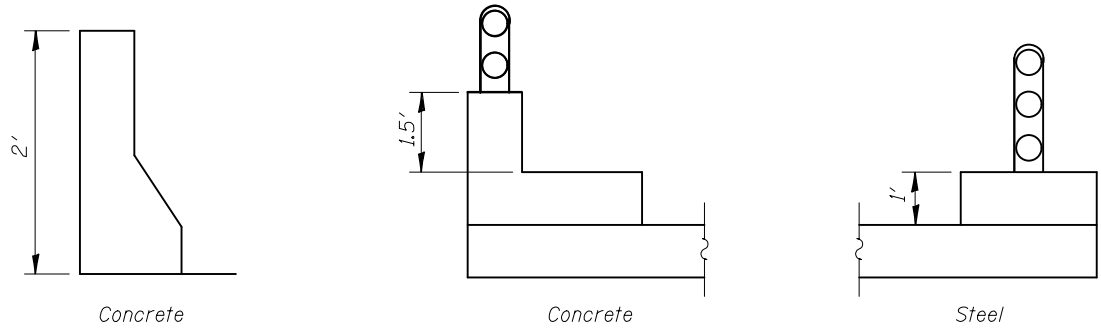



* Not Measured

## Railing

Quantity = LF

Type of railing is determined by what material will primarily resist impact loads.




The following elements have to be field determined and recorded only when deficiencies exist elements are not found in the plans.

## 1. Scour/Erosion

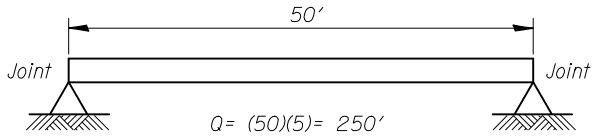
Quantity = EA

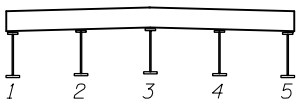
## 2. Settlement

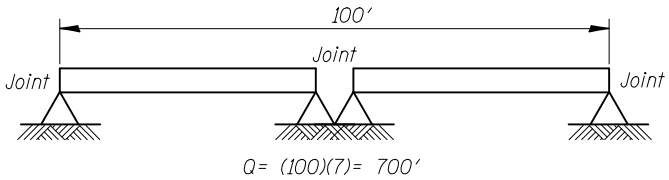
Quantity = EA

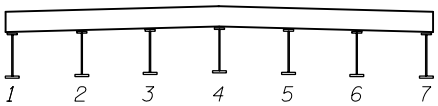
## 3. Steel Damaged Elements

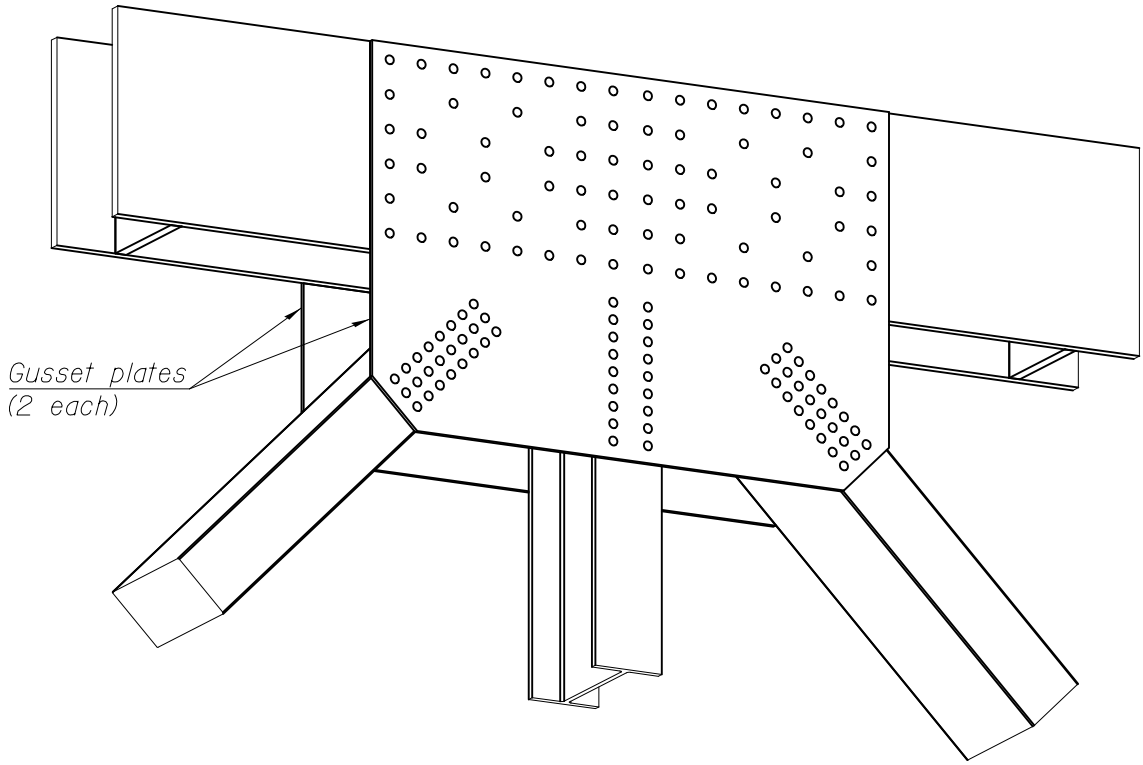
Quantity= L x (# of Girders)= LF






GUSSET PLATES