

Chapter 8: Assigning Condition Ratings to the 1-4 Items

The Bridge Inspection Field Report is a document that may be used to complete either an element level inspection or a condition rating

inspection. The following report has the condition rating boxes highlighted blue. All ratings in orange are required, when the item exists on the bridge, for both an element level and condition rating inspection.

Condition Rating Materials

In order to expand upon the 9-0 “Condition Rating Guide” table and the “Advanced” definitions in Chapter 7 the following Material Specific guidance shall be followed when coding either the 1-4. The worst 1-4 bold box should correlate with the 9-0 Summary rating. Most deficiencies are material-based and these tables will be beneficial. Those components with non-material deficiencies or more

specific guidance are denoted with a “ded” on the field report. The charted guidance for these items follows the material guidance. The seven material types include: Reinforced Concrete, Wearing Surface, Structural Steel, Prestressed Concrete, Timber, Masonry & Mechanically Stabilized Earth.

STATE OF OHIO BRIDGE INSPECTION FIELD REPORT											
SFN DIST	Bridge Number	Feature Intersected	Year Built				Municipality				
			condition state				cr				
			Qty.	1	2	3	4	TR			
APPROACH ITEMS											
c1.	Wearing Surface (EA)							1-4			
c2.	Slab (SF)							1-4			
c3.	Relief Joint (LF)							1-4			
c4.	Embankment (EA) ^{ded}							1-4			
c5.	Guardrail (EA)							1-4			
N36.	Safety Features: Tr, Gr, Tm		B) 0,1,N	C) 0,1,N	D) 0,1,N						
c6.	Approach Summary							(9-0)	9-0		
DECK ITEMS											
c7.1.	Floor/Slab (SF)							1-4			
c7.2.	Edge of Floor/Slab (LF)							1-4			
c8.	Wearing Surface (SF)							1-4			
c9.	Curbs/Sidewalk (LF)							1-4			
c10.	Median (LF)							1-4			
c11.	Railing (LF)							1-4			
N36.	Safety Features: Rail				A) 0,1,N						
c12.	Drainage (EA) ^{ded}							1-4			
c13.	Expansion Joint (LF) ^{ded}							1-4			
N58.	Deck Summary							(9-0)	9-0		
SUPERSTRUCTURE ITEMS											
c14.	Alignment (EA) ^{ded}							1-4			
c15.1.	Beams/Girders (LF)							1-4			
c15.2.	Slab (SF)							1-4			
c16.	Diaphragm/X-Frames (EA)							1-4			
c17.	Stringers (LF)							1-4			
c18.	Floorbeams (LF)							1-4			
c19.	Truss Verticals (EA)							1-4			
c20.	Truss Diagonals (EA)							1-4			
c21.	Truss Upper Chord (EA)							1-4			
c22.	Truss Lower Chord (EA)							1-4			
c23.	Truss Gusset Plate (EA) ^{ded}							1-4			
c24.	Lateral Bracing (EA)							1-4			
c25.	Sway Bracing (EA)							1-4			
c26.	Bearing Devices (EA) ^{ded}							1-4			
c27.	Arch (LF)							1-4			
c28.	Arch Column/Hanger (EA)							1-4			
c29.	Arch Spandrel Walls (LF)							1-4			
c30.	Prot. Coating System (LF) ^{ded}							1-4			
c31.	Pins/Hangers/Hinges (EA) ^{ded}							1-4			
c32.	Fatigue (LF) ^{ded}							1-4			
N59.	Superstructure Summary							(9-0)	9-0		
SUBSTRUCTURE ITEMS											
c33.	Abutment Walls (LF)							1-4			
c34.	Abutment Caps (LF)							1-4			
c35.	Abut. Coloms/Bents (EA)							1-4			
c36.	Pier Walls (LF)							1-4			
c37.	Pier Caps (LF)							1-4			
c38.	Pier Columns/Bents (EA)							1-4			
c39.	Backwalls (LF)							1-4			
c40.	Wingwalls (EA)							1-4			
c42.	Scour (EA) ^{ded}							1-4			
c43.	Slope Protection (EA) ^{ded}							1-4			
N60.	Substructure Summary							(9-0)	9-0		
CULVERT ITEMS											
c44.	General (LF)							1-4			
c45.	Alignment (LF) ^{ded}							1-4			
c46.	Shape (LF) ^{ded}							1-4			
c47.	Seams (EA) ^{ded}							1-4			
c48.	Headwall/Endwall (EA)							1-4			
c49.	Scour (EA) ^{ded}							1-4			
c50.	Abutments (LF)							1-4			
N62.	Culvert Summary							(9-0)	9-0		
CHANNEL ITEMS											
c51.	Alignment (LF) ^{ded}							1-4			
c52.	Protection (LF) ^{ded}							1-4			
c53.	Hydraulic Opening (EA) ^{ded}							1-4			
c54.	Navigation Lights (EA) ^{ded}							1-4			
N61.	Channel Summary							(9-0)	9-0		
SIGN/UTILITY ITEMS											
c55.	Signs (EA) ^{ded}							1-4			
c56.	Sign Supports (EA) ^{ded}							1-4			
c57.	Utilities (LF) ^{ded}							1-4			
N59, 60 or 62	General Appraisal							(9-0)	9-0		
N41.	Operating Status							(Open, Restricted, or Closed)			
Inspector Name											
Inspector Date/Type											
Reviewer Name											
Review Date											
PE Number (Insp or Rev)											

Reinforced Concrete

Cracking: Knowing the extent of cracking gives an indication of how much water and chlorides are able to penetrate into the concrete. On tined concrete decks or overlays, it may be difficult to see cracks. The best time to see cracks on tined decks is soon after a rain (though this is not always practical). As a deck dries out, cracks will remain wet longer than the deck surface and thus appear as dark lines against the lighter colored, dry deck. Consideration may be used for raising a rating when a crack is retrofitted or dormant. Types of cracks commonly encountered include the following:

- Transverse flexural cracks (structural) due to negative bending will most likely appear over the piers of continuous superstructures or in the midspan of slabs.
- Shear Cracks (structural) will most likely be adjacent to supports.
- Longitudinal flexural cracks (structural). These are caused by negative bending of the deck over the girders or beams.
- Longitudinal reflective cracks (structural) may appear along the joints of adjacent prestressed box beams. This cracking is caused by differential beam deflection.
- Temperature and shrinkage cracks (non-structural). This map/pattern will be apparent on most concrete decks and overlays.
- Transverse reflective cracks (non-structural) may appear adjacent to an expansion joint. These cracks suggest that the joint anchorage hardware is beginning to fail.

Spalls and Delaminations: Delamination or spalling of the concrete is not necessarily an indication of poor concrete quality or of structural issues. It usually indicates that chlorides and moisture have migrated through the concrete and attacked the reinforcing steel. As the reinforcing steel corrodes, it increases in volume which tends to push the concrete away from the steel. When the corrosion forces caused by this steel expansion exceed the tensile strengths of the concrete, the concrete starts to delaminate or separate from the surface. A hollow sounding surface when tapped with a hammer or steel rod indicates a delamination which often results in a spall. The amount of time for this to occur depends on the porosity or permeability of the concrete, the depth of rebar and the prevalence of moisture and chlorides.

Reinforced Concrete – Condition Rating Definitions

1-4	9-0 Summary	% Spalling, % Pothole or % Asphalt Patch	% Saturation or % Delamination and Cracking
1-Good	9-Excellent	No signs of distress, no discoloration	
	8-Very Good	Isolate, Minor	Minor, no rust staining
	7-Good	Up to 1% *	Up to 5%, Minor, no rust staining Minor problems, hairline cracking with isolated leaking, isolated efflorescence.
2-Fair	6-Satisfactory	Up to 5% *, <u>Stub Abutments</u> : up to 4" deep spalling for less than 1/2 of the bridge width	Up to 10% Minor cracking with leaking, efflorescence and isolated rust staining. Map cracking combined with areas of saturation. Minor differential settlement
	5-Fair	Up to 10% with exposed steel, <u>Stub Abutments</u> : may have up to 4" deep spall for more than ½ of bridge width.	Up to 20%, <u>Stub Abutments</u> : may have 100% saturation with full width delaminations with a few exposed vertical bars Cracking with moderate leaking and buildup of efflorescence and widespread rust staining. Structural cracking with moderate, stable rotation or settlement
3-Poor	4-Poor	More than 10% Areas should include Advanced section loss to reinforcing	More than 20% Advanced cracking with heavy buildup, leaking, efflorescence and rust staining.
	3-Serious	4-Poor. . . And Local Failures Possible (ex. precursor to through-hole)	
4-Critical	2-Critical	3-Serious. . . And Unless closely monitored it may be necessary to close the bridge or lane(s) until corrective action is taken	
	1-Imm Failure	2-Critical. . . And Major deterioration is affecting stability. Bridge or lane(s) shall be closed to traffic but corrective action may put bridge back into light service	
	0-Failed	. . . And Out of service - beyond corrective action	

*Slab-Type Superstructures with one transverse section of more than 1/3 of the bridge width or primary bars exposed shall be coded no better than a "5-Fair".

Table 35 - Condition Rating Material: Concrete

Wearing Surface – Condition Rating Definitions

(Use steel material guidance for the Stay in place forms filled with asphalt)

1-4 Span.	Distress Potholes, Cracks, Ruts, Delaminations (Asphalt patches in Concrete overlay)	Rideability
1- Good	None	Smooth
	Isolated, Minor cracking Minor isolated rutting	Smooth
	1% distress, minor rutting	No bounce,
2-Fair	1-10% distress	isolated traffic bouncing
	10-15% distress (2-5% asphalt patches on rigid concrete overlay)	traffic bounce is not isolated but still subtle
3-Poor	Advanced deficiencies: <ul style="list-style-type: none"> • 6-10% asphalt patches on rigid concrete overlay • More than 15% potholes (special attention should be given to areas with exposed structural superstructure elements), OR • Widespread rutting deeper than 1", OR • Advanced cracking • Traffic bouncing, impact to vehicles and/or bridge 	
4- Critical	Serious. . . <u>And</u> Unless closely monitored it may be necessary to close the bridge or lane(s) until corrective action is taken	
	Critical. . . <u>And</u> Major deterioration is affecting stability. Bridge or lane(s) shall be closed to traffic but corrective action may put bridge back into light service	
	Imminent Failure. . . <u>And</u> Out of service - beyond corrective action	

Table 36 - Condition Rating Material: Wearing Surface

STEEL – Condition Rating Definitions

1-4	9-0 Summary	*Section Loss and Deterioration	**Cracks
1- Good	9-Excellent	None	
	8-V Good	No measurable section loss or very minor section loss	
	7-Good	Insignificant section loss, minor	
2- Fair	6-Satisfactory	Minor Section Loss (<i>ex. isolated pitting, corr. pin-hole in redundant fascia web or any interior beam stiffener or behind a bearing</i>)	
	5-Fair	Sound with some deterioration, moderate section loss (<i>ex. Some areas of heavy pitting, corrosion holes possible in fascia beams or outside of the load path, less than 1/4 loss in flanges in max bending regions</i>)	<u>Compression zone</u> : Minor cracking up to 2" long, stable cracks in base metal
3- Poor	4-Poor	Advanced (following page)	<u>Compression zone</u> : Any longer than 2", stable cracks in base metal. <u>Fracture Critical Member (FCM)</u> : any stable crack in the base metal of a FCM parallel to the primary stress. <u>Tension Zone</u> : small stable crack(s) all less than 2" long in redundant load path.
	3-Serious	Section loss is seriously affecting the load path, local failures are possible (<i>ex. Extensive perforations or loss through member, perforations through many members, buckle in compression zone</i>)	<u>Compression zone</u> : Any longer than 2" and unstable or working cracks. <u>Fracture Critical Member (FCM)</u> : any stable crack in the base metal of a FCM perpendicular to the primary stress. <u>Tension Zone</u> : Stable cracks, one may be 2" or longer in redundant load path.
4-Critical	2-Critical	Advanced deterioration (<i>ex. Active crushing or buckling</i>) lane should be closed or closely monitored. Distortion in a load path of a redundant member	Cracks have removed support or eliminated load path distribution. Working or unstable cracks in the tension zone perpendicular to the primary stress.
	1-Imminent Failure	Major section loss, deterioration or cracking that is worse than above (<i>ex. Beams are crushing, or buckling</i>) and closed to traffic. Distortion in a load path of a compression zone of a non-redundant member	
	0-Failed	Beyond corrective action	

Table 37 - Condition Rating Material: Steel

*Section loss is dependent on location, extent and severity.

**Cracking: Minor versus advanced cracking depends on the probability of propagation, location & length and may be given to the judgment of the Team Leader taking into consideration brittle fracture. For dormant cracks, consideration shall be given in improving the condition rating

Common “Advanced” Deficiencies

Settlement - Exceeds tolerable limits depending on component, activity and if it is measurable or unstable change

Scour - Exceeds tolerable limits, for example unprotected sides of spread footing, loss of bearing capacity, undermining, 1/3 or more of the front row of piling exposed piling.

Distortion - Exceeds tolerable limits, for example distortion or buckling that is localized and warranting a structural review.

Section Loss

Flexure or Bending Members

Steel Web –

- In the shear zone: Corrosion hole (in any interior beam OR fascia beam if the bridge is horizontally curved or if the fascia beam is one of 2 or 3 beams total). Corrosion holes behind a web stiffener or behind the bearing are not considered “advanced”
- In the shear zone: Deep section loss more than 50% of web depth for an area above the bearing 8” high and 18 X the web thickness wide (in any interior beam OR fascia beam if the superstructure is non-redundant or horizontally curved)

Steel Flange –

- Section loss of the flange cross section more than 1/4 of flange in the maximum negative or positive flexure zone (for “zone” longitudinal length use 1/3 of span length)

Steel Axial Members

Truss Members

- Corrosion holes OR section loss reducing any one cross section by more than 10% average *Steel Bents (including bents with steel columns without reinforcing cages)*
- Corrosion holes in 3 piles OR
- Missing steel sheath around ½ of one pile OR
- Overall thin metal in 3 consecutive piles

Corrugated Metal Pipe -Perforations or overall thin metal which allows for an easy puncture with chipping hammer throughout invert with roughly 20% of structure affected

Prestressed Concrete – Condition Rating Definitions

1-4 Span	9-0 Sum	General Deficiencies	Longitudinal Joints	Strand Exposure in worst transverse plane of a Non Composite Box Beam*
1-Good	9-Ex	No notable deficiencies		
	8-VGood	Minor deficiencies	Isolated leaking	Up to 1% of strands
	7-Good	Up to 1% , exposed strand in fascia or spalling along edge	Leaking up to 10% of span with light efflorescence	2- 10% with <i>neighboring beam</i> in similar condition or better.
2-Fair	6-Satis factory	Up to 5% , minor exposed strands, efflorescence, spalling	Leaking at joints with no efflorescence	11-15% with <i>neighboring beam</i> in good condition or in similar condition
	5-Fair	Up to 10% , no transverse cracks in bottom of beams	Leaking at joints with light efflorescence and isolated rust stains	16-25% with <i>neighboring beam</i> in satisfactory condition or in similar condition
3-Poor	4-Poor	More than 10%	Leaking at joints with heavy efflorescence and rust staining	26-40% with <i>neighboring beam</i> in fair condition or in similar condition. Fascia beam(s) are saturated
	3-Serious	Open flexure cracks, sagging or loss of camber	Broken or missing transverse tendons	41-50% with <i>neighboring beam</i> in poor condition or in similar condition
4-Critical	2-Critical	3-Serious. . . <i>And</i> Unless closely monitored it may be necessary to close the bridge or lane(s) until corrective action is taken		
	1-Imm F	2-Critical. . . <i>And</i> Major deterioration is affecting stability. Bridge or lane(s) shall be closed to traffic but corrective action may put bridge back into light service		
	0-Failed	. . . <i>And</i> Out of service - beyond corrective action		

Table 38 - Condition Rating Material: Prestressed Concrete

*This seems to be the most common deficiency for PSBB Noncomposite bridges. Beams carrying a sidewalk should not control the condition rating. Beam ratings shall consider beams immediately adjacent.

General Deficiencies – includes imperfection in the concrete (i.e. spalls, cracking, mottled area, efflorescence, honeycombing, water in beams, damaged concrete around railing connection) and general beam alignment (i.e. loss of upward camber, twists)

Longitudinal Joints –staining or wetted areas from runoff infiltration.

Strand Exposure – discount all strands visible and those strands not visible located:

- 1) Above a longitudinal cracks located in the bottom flange
- 2) Above a delamination
- 3) Above a spall with unsound or mottled concrete.
- 4) Consideration should also be given to those strands neighboring and above a corroded stirrup.

Only count the same strand exposed once per span. Divide those strands that are exposed over the total number of strands existing per beam (Plans will need to be reviewed for determining the number

of strands, should no plans be available the inspector should use design data sheets from the era of the bridge located on the ODOT website for an approximation).

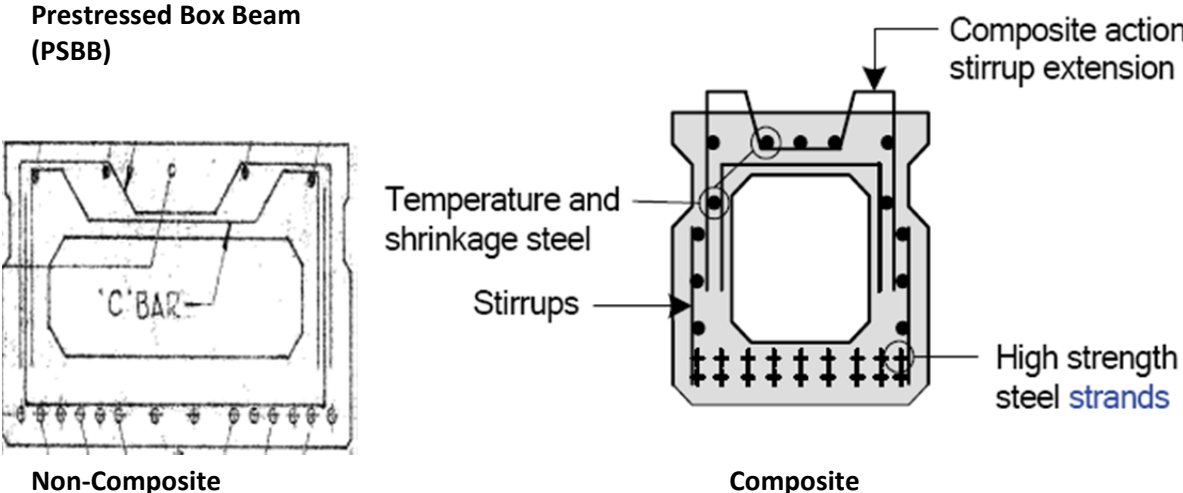


Figure 71 - Composite and Noncomposite PSBB

Structural Cracks in Prestressed Concrete – shear cracks are at a 45 degree angle sloping down near supports. Flexure cracks are transverse to the load path near high moment regions. Crack comparator cards and crack monitoring gauges are useful in quantifying and tracking crack widths especially for prestressed concrete. For structural cracks consider recording widths and locations in the comments and on the bridge. Note the crack width descriptions below from the BIRM 2002 for prestressed concrete:

Hairline (HL)	< 0.004"
Narrow (N)	0.004 to 0.009"
Medium (M)	0.010 to 0.030"
Wide (W)	> 0.030

TIMBER – Condition Rating Definitions

Timber should be examined for decay especially when bearing on sources of moisture, or between layers of planking or laminate pieces. Note loose connections and differential bending. The majority of timber members exists on local agency structures decks. Therefore the guidance primarily describes timber planks and deck components.

Abrasion due to stones on the top surface of floors will abrade into the timber floor in the wheel path. This is where moisture tends to pond and promotes accelerated rot. Where the timbers span the distance between abutments the floor rating must be the same as the Superstructure: beam/girder/slab rating.

Noticeable deflection, under traffic, of the timber floor between stringers may be a strong indicator of deficiency.

1-4 Indiv.	9-0 Summary	Description
1-Good	9-Excellent	No noticeable or noteworthy deficiencies which affect the condition of the deck.
	8-Very Good	No crushing, rotting, or splitting. Tightly secured to floor system. Very few minor deficiencies.
	7-Good	Minor checking or splitting with a few loose planks.
2-Fair	6-Satisfactory	Several planks are checked or split but sound. Some loose planks. Fire damage limited to surface scorching with no measurable section loss. Some wet areas noted. A few planks (under 5%) are in need of replacement.
	5-Fair	Numerous planks checked or split. Majority of planks are loose. Fire damage limited to surface charring with minor, measurable section loss. Some planks (5 - 10%) are in need of replacement.
3-Poor	4-Poor	Majority of the planks are checked or split. Fire damage with significant section loss which may reduce the load carrying capacity of the member. Over 10% of the planks are in need of replacement.
	3-Serious	Local failures possible. Severe signs of structural distress are visible. Major decay or fire damage is present which has substantially reduced the load carrying capacity of the deck.
4-Critical	2-Critical	Advanced deterioration with partial deck failure. May be necessary to close bridge until corrective action is taken.
	1-Imminent Failure	Bridge closed, corrective action will put it back in light service
	0-Failed	Bridge closed, replacement necessary

Table 39 - Condition Rating Material: Timber

MASONRY – Condition Rating Definitions

1-4 Individ.	9-0 Summary	General	Displacement
1-Good	9-Excellent	No signs of distress, Minor spalling of stone surface.	
	8-Very Good	Scaling on of stone surface less than 1/2 inch.	
	7-Good	Diagonal or vertical shear crack in isolated stones. Fracture of stone surface less than 2 inches.	
2-Fair	6-Satisfactory	Diagonal or vertical shear crack through several courses of stone. Removable stone face for less than 1/2 of bridge width less than ¼ stone depth.	Minor
	5-Fair	Diagonal or vertical shear crack through several courses of stone. Removable stone less than ¼ of stone depth for more than 1/2 of bridge	Displacement may be bulge or leaning stones. Total displacement is less than 1/4 of stone depth.
3-Poor	4-Poor	Settlement causing diagonal or vertical shear crack through several courses of stone with displacement. Large fractures or erosion of stone surfaces up to 1/3 stone depth on several adjacent stones.	Total displacement is less than 1/3 of stone depth.
	3-Serious	Large unsound areas. Misalignment of mortar joints. Large fractures or erosion of stone surfaces greater than 1/3 stone depth.	Several stones are displaced or missing.
4-Critical	2-Critical	Numerous missing or displaced stones. Displacements greater than 1/3 of stone depth. Keying (vertical separation between compression stones), or measurable displacement between adjacent stones, exists on at least 3 stones in one longitudinal load-line.	
	1-Imminent Failure	Partially collapsed abutment	
	0-Failed	Total failure of abutment	

Table 40 - Condition Rating Material: Masonry

Mechanically Stabilized Earth (MSE) – Condition Rating Definitions

1-4 Indiv.	9-0 Summary	Panels	Joints	Erosion	Bowed
1-Good	9-Excellent	No Cracking or Spalls	Uniform joint spacing		
	8-Very Good	No Cracking or Spalls, cracks may exist in coping	minor variation in joint spacing		None
	7-Good	Hairline cracking or spalls	Moderate variation in joint spacing, minor sand in joints		Minor
2-Fair	6-Satisfactory	Cracks <1/4" on a few panels	Moderate sand in joints but no exposed fabric nor sand piles below joints	Minor erosion along panels, max 1' deep	Moderate
	5-Fair	Cracks <1/4" many panels, global, minor spalling	Exposed fabric at a few isolated joints, small sand pile, moisture around a few joint(s)	Moderate erosion along panels, max 2' deep	Moderate change since as built
3-Poor	4-Poor	Cracks >1/4", global, moderate spalling	Exposed fabric at many joints, sand pile(s) below at least one joint, trees growing between joints. Moisture through joint(s)	Erosion >2' deep along panels	Major change since as built
	3-Serious	Spalling exposes backfill	Exposed fabric and active sand piles below many joints. Active moisture through joint(s)	Erosion exposing the top of the leveling pad and pad is not on rock, exposed straps or mesh	Major, changing, global
4-Critical	2-Critical	Any worse than above	Major leaking of sand from joints	erosion undermining leveling pads	Major, changing, systemic and global
	1-Imm Failure				
	0-Failed				

Table 41 - Condition Rating Material: MSE

Coding Condition ratings with dedicated Charts**Approach Embankment – “ded” CONDITION RATING**

Item - 4. Embankment

	Description
1-Good	Moderate rutting from drainage. Minor bare soil exposed.
2-Fair	Erosion caused by drainage or channel; Erosion to embankment impacting guardrail performance or encroaching on shoulder. Evidence of minor or stable foundation settlement.
3-Poor	Major erosion caused by drainage or channel; Erosion to embankment impacting guardrail performance or encroaching on shoulder. Evidence of foundation settlement.
4-Critical	Several guardrail posts are hanging due to major erosion. A lane of traffic is closed, tension cracks in asphalt due to embankment movement.

Table 42 - Condition Rating: Approach Embankment

Deck Drainage – “ded” CONDITION RATING

Item - 12. Drainage

Worst Span	Clogging	Ponding
1-Good	No clogging	No ponding
2-Fair	Up to a 25% of scuppers/grates continually clog.	Minor ponding may exist in the shoulder or outside of the traveling lanes.
3-Poor	More than 25% of the scuppers/grating continually clog.	Ponding is beginning to cross into the traveling lane.
4-Critical	Local flooding, hydroplaning or icing due to improper drainage system. Unless closely monitored it may be necessary to close the lane(s) until corrective action is taken.	

Table 43 - Condition Rating: Deck Drainage

Deck Expansion Joint – “ded” CONDITION RATING

Item 13. Expansion Joint

1-4	9-0 Summary	Leaking	Expansion and Contraction Opening	Armor and Anchorage
1- Good	9-Excellent	No leakage		
	8-Very Good	Minor isolated leakage, debris may be present		Minor surface delaminations in header
	7-Good	Localized leakage along the joint may be present, debris	Measurements exhibit normal expansion and contraction within ¼” on any one joint	A few delaminations or spalls or cracking in the header
2- Fair	6-Satisfactory	Leakage in several places. Gland is partially separated from the armor or has minor tears. Significant debris	Minor abnormalities in the longitudinal measurements may exist (1/4”-1/2” difference on any one joint)	Spalls or cracking in the deck and/or header may be present adjacent to the joint. Gouges in armor.
	5-Fair	Any Joint paved over, Leakage along the joint in many locations. Gland may be partially pulled out of the armor.	Abnormalities in measurements. Bent or misaligned fingers may be observed. Minor vertical offset. Closed in warmer temperatures.	'Clanking' under heavy truck traffic only with small spalls or cracking. Gouges in armor
3- Poor	4-Poor	Gland has been pulled completely out of the armor.	Significant abnormalities in the measurements. Missing or broken fingers. More than ½” difference in any one joint. Up to 1” vertical misalignment Closed in coldest temperatures.	Clanking in one lane under truck traffic. Major spalls or significant cracking.
	3-Serious		Major abnormalities in the measurements, up to 2” misalignment	Visible movement and clanking under all traffic loads in one lane, major spalls .
4- Critical	2-Critical	Major abnormalities in the longitudinal, vertical and/or horizontal measurements, greater than 2” misalignment. Tight on one side and open in the other. Visible movement and clanking under all traffic loads in all lanes, major spalls. Anchorage separation on multiple beams.		
	1-ImmFailure			
	0-Failed			

Table 44 - Condition Rating: Deck Expansion Joints

Superstructure Alignment – “ded” CONDITION RATING

Item - 14. Alignment (of members)

Worst Span: Condition Rating	Primary Members	Dimensions
1-Good	Minor misalignment or distortion due to construction	
2-Fair	Out of plane distortion of tension zones/members	
3-Poor	Vertical deflection (sag) due to deteriorations or excessive dead loads Major misalignment or distortion due to impact	Highly skewed bridges with Beam webs having less than 1/8” horizontal bow for every 1 vertical foot
4-Critical	Global racking, large distortion, vertical sag of the span due to distortion Any out of plane distortion of compression zones/ members.	More than 2-inch sag for a 100’ span Highly skewed bridges: More than 1/4” horizontal movement for every 1-foot vertical on a steel beam web

Table 45 - Condition Rating: Superstructure Alignment

Superstructure Truss Gusset Plates – “ded” CONDITION RATING

Item - 23. Truss Gusset Plates

Condition		Bowing	Section Loss (SL), Connectivity and General Deterioration
1-Good	9-Exclnt	Like new condition	<i>Isolated SL</i> up to 1/10 depth of plate thickness (ex. 1/16" loss for a 5/8" plate) not in primary line
	8-Vr Good	No problems noted	
	7-Good		
2-Fair	6-Satis factory	Bowing up to half the thickness of the plate due to inadequate fill plates, misalignment of truss members or pack rust (not free-edge bowing)	Minor deterioration <i>Widespread SL</i> up to 1/10 depth of plate thickness (ex. 1/16" for a 5/8" plate) along the primary load path, <i>Localized</i> pitting up to 1/10 depth of plate thickness up to 5% of plate area
	5-Fair	Bowing due to inadequate fill plates, misalignment of truss members or pack rust (no free edge bowing between compression members)	Minor section loss <i>Widespread SL</i> up to 1/4 depth of plate thickness (ex. 1/8" for a 1/2" plate) along the primary load path, <i>Localized</i> pitting up to 1/4 depth of plate thickness up to 25% of plate area, may have a corrosion hole up to 1/2" diameter NOT in the primary load path
3-Poor	4-Poor	Free edge bowing or distortion behind a compression member	Advanced section loss <i>Widespread SL</i> up to 1/3 depth of plate thickness (ex. 1/4" for a 3/4" plate) along the primary load path, <i>Localized</i> corrosion hole may exist up to 1/2" in length or diameter in the primary load path
	3-Serious	Any changed free edge bowing or distortion behind a compression member	Deficiencies that seriously affect the structural integrity of the bridge, large corrosion hole or pinholes interconnected with advanced section loss in the primary load path
4-Critical	2-Critical	<u>Unless closely monitored it may be necessary to close the bridge. Immediate action is required.</u> Any plastic deformation in primary load path	<u>Deficiencies that seriously affect the structural integrity of the bridge.</u> Stress cracks in the gusset plate in areas of advanced section loss, broken or missing bolt or rivets since as-built condition, fatigue cracks in gusset welded connection or gusset base metal
	1-Imm F	Bridge closed to vehicular traffic	
	0-Failed	Out of service, beyond corrective action	

Table 46 - Condition Rating: Superstructure Gusset Plates

- Special attention shall be placed on gusset plates with corrosion holes or widespread loss of section 1/3 the plate thickness in the primary load path & Special attention shall be placed on gusset plates with bowing at the free edge.
- Special attention shall be placed on gusset plates with loose, cracked or missing connections.
- The procedures for measuring bowing in gusset plates shall be clearly documented and quantitatively repeatable at future inspections by different inspectors in order to monitor bowing change within a tolerance of 1/16".

Superstructure Bearing Devices – “ded” CONDITION RATING

Item - 26. Bearing Devices
 Type - General

1-4	9-0 Summary	Function
1-Good	9-Excellent	Minor or aesthetic deficiencies. Bearings are free to move, slide, roll or rock back and forth longitudinally and rotate as designed. Bearings have not moved or shifted vertically or transversely from its intended position. Elastomeric pads: the horizontal bulge is less than 15% of the height
	8-Very Good	
	7-Good	
2-Fair	6-Satisfactory	Section loss, pack rust, bearings may have shifted vertically or horizontally but still within the design tolerance. Keeper bars or anchor bars are bent or showing signs of bending or loose when tapped with hammer. Elastomeric pads: the horizontal bulge is less than 25% of the height
	5-Fair	
3-Poor	4-Poor	Outside of design tolerance. Any two or more adjacent bearings are frozen, floating, excessively tilted or deficient that is directly impacting other elements (i.e. beam, deck, cross-frames). Advanced section loss, advanced pack rust, bearings are frozen and no longer free to move or tilted in excessively wrong directions for the temperature or shifted to expose the underside of the masonry plate**. Keeper bars or anchors are broken from transverse movement. Elastomeric pads: the horizontal bulge is MORE than 25% of the height
	3-Serious	
4-Critical	2-Critical	Multiple adjacent are rocked beyond recall* or walked out of position

Table 47 - Condition Rating: Superstructure Bearing Devices

***Beyond Recall** – Rocker(s) measured with a plumb-line whose horizontal distance is greater than 1/4 of H (Vertical height difference between the bottom face of the sole plate (top plate) and the top face of the masonry plate or bottom plate). Often the rocker will **pinch** and slide rather than rock.

****Masonry Plate Undermining:**

The bearings shall be downgraded for any undermining of a masonry plate when the Superstructure has shifted or moved the bearing. The substructure unit will be downgraded when the root cause is within the substructure, i.e. when settlement, deep spalling, crushing or delaminations occur.

Superstructure Protective Coating System – “ded” CONDITION RATING

Item - 30. Protective Coating System (PCS)

1-4 Rating	Degradation Problems			Workmanship Problems	Candidate for Recoating
	% Surface Area (SA) Failed	Issues	Surface Corrosion		
1-Good	0 to 5%		Light	Up to 10% failed SA, Multiple minor issues, Up to 10% finish coat failed	
2-Fair	6 to 15%	Not effective at Beam ends under joints	Prevalent	Up to 20%	Candidate for zone painting (fascias and under joints)
3-Poor	16-30%	Not effective	Prevalent	Large areas of old Paint Painted over	Candidate for total recoating
4-Failed	More than 30%				

Table 48 - Condition Rating: Superstructure Protective Coating System

Superstructure Pins/Hangers/Hinges – “ded” CONDITION RATING

Item -

31. Pins/Hangers/Hinges

Type -

Steel

1-4	9-0 Summary	Functional Movement	Corrosion & Cleanliness	Bearing Integrity/Hinge
1-Good	9-Excelent	Aesthetic deficiencies only		
	8-V Good			
	7-Good	All in proper contact		
2-Fair	6-Satisfact.	Movement not restricted; shallow wear grooves (up to 1/8")	Minor pack rust or debris, some dry spots in lubricated parts.	One pin/hanger/hinge slightly misaligned with others or missing not more than one anchor bolt per hanger line
	5-Fair	Movement restricted only at extreme operating limits. Minor misalignment. At least 1/8" deep wear grooves	Moderate pack rust or accumulated debris. Moderate abrasion up to 1/8" deep with no lubricant on parts.	One not in proper contact or somewhat misaligned with others. Missing not more than one anchor bolt per bearing.
3-Poor	4-Poor	Movement restricted within normal operating limits; seized. Up to 1" misalignment	Major pack rust or accumulated debris limiting normal operation. Lack of normal operation. Abrasion >1/8" deep of hanger sides with no lubrication.	Multiple not in proper contact or multiple adjacent pin/hanger/hinges misaligned on one unit or multiple not aligned
	3-Serious	Seized due to corrosion or debris, preventing movement. Up to 2" misalignment		Pin/hanger/hinges leaning beyond recall or jammed significantly
4-Critical	2-Critical	ANY SIZE fatigue crack in primary load path base metal in the hanger, hinge, pin or vicinity (within 4-feet of pin).		
	1-Imm Failure	Unless closely monitored it may be necessary to close bridge due to advanced deterioration. Crushing. More than 2" misalignment.		
	0-Failed			

Table 49 - Condition Rating: Superstructure Pins/Hangers/Hinges

Superstructure Fatigue – “ded” CONDITION RATING

Item -
Type -32. Fatigue
Steel

1-4	9-0 Summary	Cracks
1-Good	9-Excellent	
	8-V Good	
	7-Good	Any arrested or retrofitted crack
2-Fair	6-Satisfactory	<u>Compression zone</u> : Minor cracking up to 2" long, stable cracks in base metal
	5-Fair	
3-Poor	4-Poor	<u>Compression zone</u> : Any longer than 2", stable cracks in base metal. <u>Fracture Critical Member (FCM)</u> : any stable crack in the base metal of a FCM parallel to the primary stress. <u>Tension Zone</u> : small stable crack(s) all less than 2" long in redundant load path.
	3-Serious	<u>Compression zone</u> : Any longer than 2" and unstable or working cracks. <u>Fracture Critical Member (FCM)</u> : any stable crack in the base metal of a FCM perpendicular to the primary stress. <u>Tension Zone</u> : Stable cracks, one may be 2" or longer in redundant load path.
4-Critical	2-Critical	Any Crack in the base metal at or adjacent to a <u>pin and hanger or hinge assembly</u> shall be "Critical" or less. Cracks have removed support or eliminated load path distribution. Working or unstable cracks in the tension zone perpendicular to the primary stress.
	1-Imminent Failure	Major section loss, deterioration or cracking that is worse than above (<i>ex. Beams are crushing</i>) and closed to traffic. Distortion in a load path of a compression zone of a non-redundant member
	0-Failed	Beyond corrective action

Table 50 - Condition Rating: Superstructure Fatigue

- Cracks should be carefully measured and their location and length documented.
- Typically the first time a fatigue crack is identified it is CS 3 in the Compression zone and CS4 in the Tension zone.
- Truss: the quantity is the sum of all of the lengths of each truss panel measured longitudinal to the travel way and **the worst part in the vertical one-foot controls the rating** i.e. include all truss members by rating each vertical linear foot of truss as if it were an open-webbed beam or girder

Substructure Scour, Spread or Unknown foundations – “ded” CONDITION RATING

Item -

42. Scour

Type –

Spread Footing on Soil OR Unknown Foundations

1-4	9-0	Description*	Exposed <u>Spread</u> or <u>Unknown</u> Foundation*
1-Good	9-Excellent	No Problems noted.	
	8-Very Good	Minor scour holes developing, scour protection placed.	
	7-Good	Some minor problems. Minor scour holes exist; probing indicated soft material in scour hole.	top of footing exposed
2-Fair	6-Satisfactory	Damage to scour countermeasures, probing indicates soft material in scour hole.	Sides of footings exposed less than 6 inches.
	5-Fair	Minor scour, damage to scour countermeasures, probing indicates soft material in scour hole.	Unprotected footings along the vertical sides are exposed less than 12-inches high, corner of footing may have minor undermining.
3-Poor	4-Poor	Advanced scour.	Unprotected vertical side of footing exposed, full height, less than 1/3 the horizontal length of the footing.
	3-Serious	Scour has seriously affected the primary structural components Local failures are possible.	Undermining exposing the underside less than 1/3 the horizontal length of the footing.
4-Critical	2-Critical	Scour may have removed substructure support. Local failures are possible. Any substructure unit with more than 20% of bearing capacity removed.	Underside of footing exposed more than 1/3 the horizontal length of the footing.
	1-Imminent Failure	Obvious vertical or horizontal movement due to scour that is affecting the structure stability. Bridge is closed to traffic but corrective action may put bridge back in to light service.	
	0-Failed	Out of service - beyond corrective action.	

Table 51 - Condition Rating: Substructure Shallow Foundations Scour

*Condition shall be adjusted based on the **rate of change since the as-built condition**. This item may be rated higher, for example, if the as-built condition had the top face of the spread footing exposed and it has not changed. Also, due to the dynamic nature of the waterway the ratings may be coded lower if a dramatic change occurred since the previous inspection. Unknown foundations on soil shall be rated the same as a spread footing on soil. Those spread footings on rock shall be rated as deep foundations.

Substructure Scour, deep foundations – “ded” CONDITION RATING

Item - 42. Scour

Type – Deep Foundations: Piles, Drilled Shafts, including Spread Footing on Rock

1-4	9-0 Total Bridge	Description*	Exposed <u>Deep</u> Foundation*
1-Good	9-Excellent	No Problems noted.	
	8-Very Good	Minor scour holes developing, scour protection placed.	
	7-Good	Some minor problems. Minor scour holes exist; probing indicated soft material in scour hole.	top of footing and first 6-inches exposed
2-Fair	6-Satisfactory	Damage to scour countermeasures, probing indicates soft material in scour hole.	Full height side of footing exposed
	5-Fair	Minor scour, damage to scour countermeasures, probing indicates soft material in scour hole.	One or two pilings are visible less than 10% of piling height**
3-Poor	4-Poor	Advanced scour.	1/3 of the front row of piling exposed less 10% of piling height**
	3-Serious	Scour has seriously affected the primary structural components Local failures are possible.	Any one piling exposed above or below water more than 3-feet high, more than 1/3 of the front row of piling exposed less than 10% of piling height**
4-Critical	2-Critical	Scour may have removed substructure support. Local failures are possible	Any substructure unit with more than 20% of bearing capacity removed.
	1-Imminent Failure	Obvious vertical or horizontal movement due to scour that is affecting the structure stability. Bridge is closed to traffic but corrective action may put bridge back in to light service.	
	0-Failed	Out of service - beyond corrective action.	

Table 52 - Condition Rating: Substructure Deep Foundations Scour

*Condition shall be adjusted based on the **rate of change since the as-built condition**. This item may be rated higher, for example, if the as-built condition had the top face of the spread footing exposed and it has not changed. Also, due to the dynamic nature of the waterway the ratings may be coded lower if a dramatic change occurred since the previous inspection. Unknown foundations on soil shall be rated the same as a spread footing on soil. Those spread footings on rock shall be rated as deep foundations.

**Use 10-foot deep piling when the foundation plans do not exist.

- As a general guideline a bridge may warrant a scour analysis if any of the following occur:
 - Undermining for a spread footing
 - Water flowing beneath a culvert
- Monitoring scour related problems should include periodic stream profile measurements.

Substructure Slope Protection - "ded" CONDITION RATING

Item - 43. Slope Protection
 Type - Generic / Sloped

1-4	Erosion	Adequacy
1-Good	Minor Erosion not affecting substructure unit(s), beginning to slump.	Minor deficiencies, minor repairs recommended.
2-Fair	Small erosion channels/failure, up to 6" deep, erosion ruts exist.	Moderate deficiencies, sloughing or sliding of protection however still functioning as designed.
3-Poor	Significant erosion, up to 2' deep, erosion ruts.	Moderate and active slope protection failure. Slight Undermining, No longer stabilizing the slope, collapsing rip rap. Sand pile below at least one MSE wall joint
4-Critical	Major erosion, greater than 2' deep/wide ruts that are directly affecting substructure units, example 5' of one piling is exposed.	Serious undermining, evidence of obvious global movement, no longer stabilizing the slope.

Table 53 - Condition Rating: Substructure Slope Protection

Culvert Alignment – “ded” CONDITION RATING**Item -****45. Alignment**

1-4	9-0	Description
1-Good	9-Excellent	Straight line between sections.
	8-Very Good	Minor settlement or misalignment.
	7-Good	Minor misalignment at joints; off sets less than 1/2 inch no fill settlement. Minor settlement or misalignment, ponding less than 3 inches.
2-Fair	6-Satisfactory	Fair, minor misalignment and settlement at isolated locations. Moderate settlement or misalignment, ponding between 3 and 5 inches deep.
	5-Fair	Minor misalignment or settlement throughout culvert. Ponding (depths less than 5 inches) of water due to sagging or misalignment of pipe sections, end sections dislocated and about to drop off. Four or more sections with offset less than 3 inches.
3-Poor	4-Poor	Considerable settlement and misalignment of pipe. Significant ponding (depths less than 6 inches) of water due to sagging or misalignment of pipes sections, end sections dislocated about to drop off. Four or more sections with offset less than 4 inches. Rotation of foundation.
	3-Serious	Any condition described in “Poor” but is excessive in scope. Severe movement or differential settlement of the segments or loss of fill. Metal culverts have extreme distortion and deflection in one section. Significant ponding (depths greater than 6 inches) of water due to sagging or misalignment of pipes sections, end-section drop-off has occurred. Significant ponding of water due to sagging or misaligned masonry units; end section drop off has occurred. Four or more sections with off sets greater than 4 inches.
4-Critical	2-Critical	Culvert not functioning due to alignment problems throughout. Metal culverts have extreme distortion and deflection throughout.
	1-ImmFailure	Culvert partially collapsed or collapse is imminent.
	0-Failed	Culvert collapsed.

Table 54 - Condition Rating: Culvert Alignment

Culvert Shape – “ded” CONDITION RATING

Item -

46. Shape

Type -

Flexible Culverts Only

1-4	9-0 Summary	Description	% Change of Cross Section* under influence of traffic
1-Good	9-Excellent	New Condition. May exhibit minor damage along edge of inlet or outlet due to construction	
	8-Very Good	Smooth curvature in barrel	Span dimension within 1 percent of design.
	7-Good	Top half of pipe smooth but minor flattening of bottom	Span dimension within 3 percent of design. Very minor distortion
2-Fair	6-Satisfactory	Smooth curvature in top half, bottom flat	Span dimension within 5 percent of design. Very minor distortion
	5-Fair	Generally fair, significant distortion in top in one location; bottom has slight reverse curvature in one location but generally fair	Span dimension up to 7 percent greater than design. Non-symmetric shape.
3-Poor	4-Poor	Marginal significant distortion throughout length of pipe, lower third may be kinked	Span dimension more than 7 percent greater than design, noticeable dip in guardrail over pipe.
	3-Serious	Poor, extreme deflection at isolated locations, flattening at top of arch or crown; <i>bottom has reverse curvature throughout;</i>	Extreme non-symmetric shape.
4-Critical	2-Critical	Critical, extreme distortion and deflection throughout pipe	
	1-Imm Fail	Structure partially collapsed with crown in reverse curve.	
	0-Failed	Structure collapsed.	

Table 55 - Condition Rating: Culvert Shape

*This may include any straight measurement through the center of the cross section, i.e. perpendicular to the longitudinal axis. Refer to Appendix. for a chart for recording the shape changes/flattening in corrugated metal culverts.

Culvert Seams – “ded” CONDITION RATING

Item -

47. Seams

Type -

Corrugated Metal / Multi-Plate

1-4	9-0	Seam	Bolts	Backfill
1-Good	9-Excellent	Minor amounts of efflorescence or staining.		
	8-Very Good	Light surface rust on bolts due to loss of galvanizing, efflorescence staining, tight with no openings along seams.		
	7-Good	Metal has cracking on each side of the bolt hole less than 3 instances in a seam section. Minor seam openings less than 1/8 inch.	More than 2 consecutive missing bolts in a row. Rust scale around bolts.	Potential for backfill infiltration.
2-Fair	6-Satisfactory	Metal has cracking on each side of the bolt hole less than 6, more than 3 instances in a seam section. Minor seam openings less than 1/8 inch.	More than 3 consecutive missing bolts in a row. Rust scale around bolts.	Evidence of minor backfill infiltration through seams.
	5-Fair	Moderate cracking at bolt holes along a seam in one section.	More than 6 consecutive missing bolts in a row or 20% along the seam.	Backfill being lost through seam causing slight deflection.
3-Poor	4-Poor	Major cracking of seam near crown. Partial cocked and cusped seams.	Advanced section loss to bolt heads along seams. Missing several bolts in a row	Infiltration of backfill causing major deflection.
	3-Serious	Longitudinal cocked and cusped seams and/or metal has 3 inch crack on each side of the bolt hole run total length of culvert.	Numerous missing or tipping bolts.	Infiltration of backfill causing major deflection.
4-Critical	2-Critical	Seam cracked from bolt to bolt.	Missing or tipping bolts.	Significant amounts of backfill infiltration.
	1-Imminent Failure	Pipe partially collapsed or collapse is imminent.		
	0-Failed	Total failure of pipe.		

Table 56 - Condition Rating: Culvert Metal Seams

Culvert Seams – “ded” CONDITION RATING

Item -

47. Seams

Type -

Concrete

1-4	9-0 Summary	General	Alignment	Backfill
1-Good	9-Excellent	Straight line between sections.		
	8-Very Good	No settlement or misalignment; Tight with no defects apparent.		
	7-Good	Minor distress to pipe material adjacent to joint. Shallow mortar deterioration at isolated locations.	Minor misalignment at joints; off sets less than 1/2 inch.	Possible minor infiltration of fills no settlement.
2-Fair	6-Satisfactory	Extensive areas of shallow deterioration; missing mortar at isolated locations; possible infiltration or exfiltration; minor cracking.	Dislocated end section.	Minor backfill infiltration due to slight opening at joints; minor cracking or spalling at joints allowing exfiltration.
	5-Fair	Significant cracking, spalling, buckling of pipe material, loose or missing mortar at isolated locations.	Joint offset less than 3 inches. End sections dislocated about to drop off mortar generally deteriorated.	Joint open and allowing backfill to infiltrate, infiltration staining apparent.
3-Poor	4-Poor	Voids seen in fill through offset joints. End sections dropped off at inlet. Mortar severely deteriorated, significant loss of mortar.	Differential movement and separation of joints. Joint offset less than 4 inches.	Significant infiltration or exfiltration between masonry units.
	3-Serious	Large voids seen in fill through offset joints. Extensive areas of missing mortar.	Significant openings, dislocated joints in several locations exposing fill material with joint offsets greater than 4 inches.	Infiltration or exfiltration causing misalignment of pipe and settlement or depressions in roadway.
4-Critical	2-Critical	Culvert not functioning due to alignment problems throughout. Large voids seen in fill through offset joints.		
	1-Imminent Failure	Pipe partially collapsed or collapse is imminent.		

Table 57 - Condition Rating: Culvert Concrete Seams

Culvert Scour – “ded” CONDITION RATING

Item - 49. Scour

Type – Culvert

1-4	9-0	General*	Conduit-Type	Open Bottom-Type (no floor/invert)
1-Good	9-Excellent	No Problems noted.		
	8-Very Good	Minor scour holes developing, scour protection placed.		
	7-Good	Some minor problems. Minor scour holes exist; probing indicated soft material in scour hole.	Scour holes at inlet or outlet but are not affecting structure.	top of footing exposed
2-Fair	6-Satisfactory	Damage to scour countermeasures, probing indicates soft material in scour hole.	Minor scour holes developing at inlet or outlet.	Sides of footing exposed less than 6 inches.
	5-Fair	Minor scour, damage to scour countermeasures, probing indicates soft material in scour hole.	Scour holes at inlet or outlet.	Unprotected footing along the vertical sides are exposed less than 12-inches high, corner of footing may have minor undermining.
3-Poor	4-Poor	Advanced scour.	Significant scour holes developing at inlet or outlet. Major stream erosion behind headwall that threatens to undermine culvert.	Unprotected vertical side of footing exposed, full height, less than 1/3 the horizontal length of the footing.
	3-Serious	Scour has seriously affected the primary structural components. Local failures are possible.	Undermined cutoff walls or headwalls.	Undermining exposing the underside less than 1/3 the horizontal length of the footing.
4-Critical	2-Critical	Scour may have removed substructure support. Local failures are possible.	Streambed degradation causing severe settlement.	Underside of footing exposed more than 1/3 the horizontal length of the footing. Any substructure unit with more than 20% of bearing capacity removed.
	1-Imminent Failure	Obvious vertical or horizontal movement due to scour that is affecting the structure stability. Bridge is closed to traffic but corrective action may put bridge back in to light service.		
	0-Failed	Out of service - beyond corrective action.		

Table 58 - Condition Rating: Culvert Scour

Channel Alignment – “ded” CONDITION RATING

Item - 51. Alignment

Type – All

1-4	9-0	Channel Flow
1-Good	9-Excellent	Channel flow is causing no adverse conditions to channel protection bridge.
	8-Very Good	Channel has straight alignment for more than 100 feet upstream. Flow hits protective materials placed to protect structure.
	7-Good	Silt and gravel buildup restricts half of the channel; Tree or bush growing in the channel.
2-Fair	6-Satisfactory	Minor streambed movement evident. Not desirable: Flows through 1 out of 2 pipes; Flows along one abut. Doesn't flow under center of the structure; minor curve (20°-40° angle change from as-built); Deposits causing channel to split into 2 or more small channels.
	5-Fair	Flow hits outside wingwall/endwall into unprotected embankment. Stream has meandered or has deposited sediment diverting flow causing erosion to embankment (Flow angle between 40°-50° change from as-built) Trees and brush restrict the channel.
3-Poor	4-Poor	Flows into or along wall to expose footing. Stream has meandered or has deposited sediment diverting flow causing erosion to embankment (Flow angle between 50°-70° change from as-built) Flow enters pipe by other means than designed opening. Beginning to undercut substructure.
	3-Serious	Stream bed aggradation, degradation or lateral movement has changed the channel to now threaten the bridge and/or approach roadway. 80°-90° (change from as-built) turns at the bridge causing erosion behind wingwall. Loss of embankment material. Erosion to embankment encroaching on roadway.
4-Critical	2-Critical	Flow is piping around culvert. Erosion to embankment impacting roadway. The waterway has changed to the extent the bridge is near a state of collapse.
	1-Imminent Failure	No flow enters culvert. All of the flow pipes around culvert barrel. Bridge closed because of channel failure.
	0-Failed	Total failure of pipe.

Table 59 - Condition Rating: Channel Alignment

Channel Protection – “ded” CONDITION RATING

Item -

52. Protection

1-4	9-0	Channel Protection
1-Good	9-Excellent	Embankment protection is not required or is in a stable condition.
	8-Very Good	Banks are protected or well vegetated. River control devices such as spur dikes and embankment protection are not required or are in a stable condition. No noteworthy deficiencies, which affect the condition of the channel protection 100 feet upstream.
	7-Good	Bank protection is in need of minor repairs. River control devices and embankment protection have a little minor damage.
2-Fair	6-Satisfactory	Bank is beginning to slump. River control devices and embankment protection have widespread minor damage. Riprap starting to wash away. Minor erosion. Cracked concrete channel protection at inlet of a culvert.
	5-Fair	Bank protection is being eroded. River control devices and/or embankment have major damage. Broken up concrete channel protection.
3-Poor	4-Poor	Bank and embankment protection is severely undermined. River control devices have severe damage; stone is completely washed away; Major erosion; Failed concrete channel protection.
	3-Serious	Bank protection has failed and no threatens the structure. River control devices have been destroyed.
4-Critical	2-Critical	The channel has changed to the extent the bridge is near a state of collapse.
	1-Imminent Failure	Bridge closed because of channel failure. Corrective action may put back in light service.
	0-Failed	Bridge closed because of channel failure. Replacement necessary.

Table 60 - Condition Rating: Channel Protection

Channel Hydraulic Opening – “ded” CONDITION RATING

Item - 53. Hydraulic Opening

Type – All

1-4	9-0	% Debris Buildup/Blockage*		Blockage/Overtopping
		Scour Critical Bridge	Non-Scour Critical Bridge	
1-Good	9-Excellent	0	Up to 5%	No blockage or as designed condition.
	8-Very Good			Minor amounts of sediment build-up with no appreciable loss of opening.
	7-Good			Banks and/or channel have minor amounts of drift.
2-Fair	6-Satisfactory	0	Up to 10%	Debris is restricting the channel slightly. Fence placed at inlet or outlet;
	5-Fair	Up to 5%, none that may cause scour	Up to 20%	Trees and brush restrict the channel; Fence placed at inlet or outlet. Debris in cross frames from more than 10 years.
3-Poor	4-Poor	5-10%, none that may cause scour	Up to 30%	Large deposits of debris are in the waterway. Occasional (ex. every 3-10 years) overtopping of roadway. Minor inconvenience to traffic, passable in within a couple hours. Continual debris in crossframes, every 3-10 years
	3-Serious	ANY that MAY cause scour	ANY that IS causing scour	Overtopping of roadway (ex. every 3-10 years with long term traffic delays).
4-Critical	2-Critical	The channel has changed to the extent the bridge is near a state of collapse.		
	1-Imminent Failure	Bridge closed because of channel failure. Corrective action may put back in light service.		
	0-Failed	Bridge closed because of channel failure. Replacement necessary.		

*% blockage area below the ordinary high water elevation of any span **OR** of the span length

Table 61 - Condition Rating: Channel Hydraulic Opening

Channel Navigation Lights – “ded” CONDITION RATING

Item - 54. Navigation Lights

	Lighting
1-Good	All lights operating, no repairs necessary to system.
2-Fair	All lights operating, however, mounting brackets may need attention or wiring conduit may be partially disconnected.
3-Poor	All lights operating, however lenses may be broken, connections not secure.
4-Critical	Some lights burnt out or wiring circuitry non-functioning or both, connections not secure with imminent or permanent failure.

Table 62 - Condition Rating: Navigation Lights

Signs/Utilities – “ded” CONDITION RATING

Item - 55. Signs, 56. Sign Supports, 57. Utilities

Type – All

	Description
1-Good	All signs legible.
2-Fair	Minor damage.
3-Poor	At least one sign is ineffective. Signs barely legible due to vandalism or fading or partial obstructions.
4-Critical	Signs are ineffective

Table 63 - Condition Rating: Signs, Sign Supports and Utilities