

NBI Condition Ratings

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Concrete Deck Condition Rating (Item 58)

<u>Code</u>	<u>Condition of Deck Item</u>
N	Use for all culverts
9	Excellent condition – No noticeable or noteworthy deficiencies which affect the condition of the deck item. Usually new decks.
8	Very good condition – Minor transverse cracks with no deterioration, i.e. delamination, spalling, scaling or water saturation.
7	Good condition – Sealable deck cracks, light scaling (less than ¼” depth). No spalling or delamination of deck surface but visible tire wear. Substantial deterioration of curbs, sidewalks, parapets, railing or deck joints (need repair). Drains or scuppers need cleaning.
6	Satisfactory condition – Medium scaling (¼” to ½” in depth). Excessive number of open cracks in deck (5 ft intervals or less). Extensive deterioration of the curbs, sidewalks, parapets, railing or deck joints (requires replacing deteriorated elements).
5	Fair condition – Heavy scaling (½” to 1” in depth). Excessive cracking and up to 5% of the deck area is spalled; 20 – 40% is water saturated and/or deteriorated. Disintegrating of deck edges or around scuppers. Considerable leaching through deck. Some partial depth failures, i.e. rebar exposed (repairs needed).
4	Poor condition – More than 50 % of the deck area is water saturated and/or deteriorated. Leaching throughout deck. Substantial partial depth failures (replace deck soon).
3	Serious condition – More than 60% of the deck area is water saturated and/or deteriorated. Use this rating if severe or critical signs of structural distress are visible and the deck is integral with the superstructure. A full depth failure or extensive partial depth failures (repair or load post immediately).
2	Critical condition – Some full depth failures in the deck (close the bridge until the deck is repaired or holes covered).
1	“Imminent” failure condition – Substantial full depth failures in the deck (close the bridge until deck is repaired or replaced).
0	Failed condition – Extensive full depth failures in the deck (close bridge until the deck is replaced).

Steel Deck Condition Rating (Item 58)

<u>Code</u>	<u>Condition of Deck Item</u>
N	Use for all culverts.
9	Excellent condition – No noticeable or noteworthy deficiencies which affect the condition of the deck.
8	Very good condition – Tightly secured to floor system with no rust.
7	Good condition – Minor rusting with no section loss in decking (touch-up paint). Substantial deterioration of curbs, sidewalks, parapets or railing (needs repair). Connections between deck and stringers are broken (need rewelding).
6	Satisfactory condition – Moderate rusting with no loss of section (repaint). Extensive deterioration of curbs, sidewalks, parapets or railing (requires replacing deteriorated element(s)).
5	Fair condition – Heavy rusting with localized areas of section loss, some cracked welds in grids and/or broken grids in deck (repairs needed).
4	Poor condition – Heavy rusting resulting in considerable section loss, some cracked welds in grids and/or broken grids (replace deck soon).
3	Serious condition – This rating will apply if severe or critical signs of structural distress are visible. Welds in grids and/or broken grids (replace deck soon).
2	Critical condition – Some of the deck has failed (close the bridge until the deck is repaired or holes covered).
1	“Imminent” failure condition – Substantial failure of the deck (close bridge until the deck is repaired or replaced).
0	Failed condition – Substantial failure of the deck (close the bridge until the deck is replaced).

Timber Deck Condition Rating (Item 58)

<u>Code</u>	<u>Condition of Deck Item</u>
N	Use for all culverts.
9	Excellent condition – No noticeable or noteworthy deficiencies which affect the condition of the deck item.
8	Very good condition – No crushing, rotting or splitting. Tightly secured to stringers.
7	Good condition – Minor cracking or splitting with no loss of capacity. Loose deck planks (need nailing). Substantial deterioration of curbs, sidewalks, parapets or railing (needs repair).
6	Satisfactory condition – Some cracking or splitting with no loss of capacity. Some loose planks. Fire damage limited to surface scorching with no measurable section loss. Some wet areas noted. Extensive deterioration of the curbs, sidewalks, parapets or railing (requires replacing deteriorated element(s)).
5	Fair condition – Numerous (30 – 40%) planks checked, split, rotted or crushed. Many planks are loose. Fire damage limited to surface charring with minor, measurable section loss. Some planks (<10%) are in need of replacement.
4	Poor condition – Majority (over 40%) of the planks are rotted, crushed 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 or replacement.
3	Serious condition – This rating will apply if severe or critical signs of structural distress are visible. Substantial rotting, crushing, splitting and/or broken deck planks or holes in the deck (repair or load post immediately).
2	Critical condition – Some of the deck has failed (close the bridge until repaired or holes covered).
1	“Imminent” failure condition – Substantial failure of the deck (close the bridge until repaired or replaced).
0	Failed condition – Extensive failure of the deck (close bridge until the deck is replaced).

Concrete Superstructure Condition Rating (Item 59)

<u>Code</u>	<u>Condition of Superstructure</u>
N	Use for all culverts.
9	Excellent condition – No noticeable or noteworthy deficiencies which affect the condition of the superstructure item.
8	Very good condition – Minor collision damage without misalignment and no corrective action required.
7	Good condition – Hairline cracks without deterioration in girders, precast panels, slab etc. (seal concrete). Bearings have debris or corrosion problems (need cleaning and/or touch-up paint). Spalling without exposed rebar (patching required).
6	Satisfactory condition – Structural members show some minor deterioration or collision damage. Hairline structural cracks or spalls may be present with evidence or efflorescence. Minor water saturation marks. Generally reinforcing steel unaffected.
5	Fair condition – Significant, but not critical, collision damage to structural support elements (repairs needed). Bearing devices out of alignment and not functioning as designed (clean and paint). Some water saturation, or deterioration of slab ends, deck girder ends, precast ends, etc., or a portion of the top of deck girders (repairs needed). Spalls with exposed rebar but no loss of section in tension bars (patching required).
4	Poor condition – Extensive disintegration. Measurable structural cracks or large spalled areas. Corroded reinforcing steel evident with measurable section loss. Structural capacity of some structural members may be diminished. Critical collision damage to structural elements (precautionary measures may be needed). Bearing problems are damaging the structure; substantial deterioration, or damage of slab ends, girder ends, precast ends or substantial spalls with exposed rebar and loss of section in tension bars (replace structural elements soon).
3	Serious condition – Severe deterioration and/or disintegration of primary concrete members. Large structural cracks may be evident, such as diagonal shear cracks, and/or extensive spalls with exposed rebar and loss of section in tension bars. Reinforcing steel exposed with advanced stages of corrosion. Local failures or loss of bond possible (repair or load post immediately).
2	Critical condition – Advanced deterioration of primary structural elements. Concrete disintegration around reinforcing steel with loss of bond. Some reinforcing steel may be ineffective due to corrosion or loss of bond. Numerous large structural cracks may be present. Localized failures of bearing areas may exist. Unless closely monitored it may be necessary to close the bridge until corrective action is taken.
1	“Imminent” failure condition – Bridge closed to traffic. Major deterioration or section loss present on primary structural elements, obvious vertical or horizontal movement is affecting the structure’s stability. Corrective action may put back in light service.
0	Failed condition – Bridge is closed; out of service. Beyond corrective action; replacement necessary.

Prestressed Concrete Superstructure Condition Rating (Item 59)

<u>Code</u>	<u>Condition of Superstructure</u>
N	Use for all culverts.
9	Excellent condition – New condition.
8	Very good condition – No problems noted.
7	Good condition – Non-structural cracks less than 0.008” in width may be evident. No rust stains apparent.
6	Satisfactory condition – Minor concrete damage or deterioration. Non-structural cracks over 0.008”. Isolated and minor exposure of mild steel reinforcement may be present.
5	Fair condition – Isolated and minor exposure of prestressing strands may be present. Structural cracks with little or no rust staining. Primary members sound, but may be cracked or spalled.
4	Poor condition – Moderate damage or deterioration to concrete portions of the member exposing reinforcing bars or prestressing strands. Structural cracks with medium to heavy rust staining may be present. May be loss of camber.
3	Serious condition – Sever damage to concrete and reinforcing elements of the member. Severed prestressing strand(s), or strand(s) are visibly deformed. Major or total loss of concrete or section in bottom flange. Major loss of concrete section in the web, but not occurring at the same location as concrete section loss in the bottom flange. Unless closely monitored it may be necessary to restrict or close the bridge until corrective action is taken.
2	Critical condition – Critical damage to concrete and reinforcing elements of member. Cracks (that are not closed below the surface damage) extend across the bottom flange or in the web directly above the bottom flange damage. (This indicates that the prestressing strands have exceeded yield strength. An abrupt lateral offset as measured along the bottom flange or lateral distortion of exposed prestressing strands. (This also indicates that the prestressing strands have exceeded yield strength. Loss of prestress force to the extent that calculations show that repair cannot be made. Excessive vertical misalignment. Longitudinal cracks in the interface of the web and the top flange that are not substantially closed below the surface damage. (This indicates permanent deformations of stirrups.)
1	“Imminent” failure condition – Critical damage requiring the replacement of a member. Bridge is closed to traffic, and installation of temporary false work to safeguard the public and the bridge should be taken at the time of the inspection.
0	Failed condition – Bridge closed and out of service.

Steel Superstructure Condition Rating (Item 59)

<u>Code</u>	<u>Condition of Superstructure</u>
N	Use for all culverts.
9	Excellent condition – No noticeable or noteworthy deficiencies which affect the condition of the superstructure item.
8	Very good condition – Minor collision damage without misalignment and no corrective action required. No visible rust.
7	Good condition – Some rust with no section loss (touch-up paint). Bearings have debris or corrosion problems (need cleaning and/or touch-up paint).
6	Satisfactory condition – Substantial rust with no loss of section (requires repaint). Damaged or deteriorated cross bracing or wind bracing (needs replacing).
5	Fair condition – Minor section loss in critical areas. Significant, but not critical, collision damage to structural support elements (repairs needed). Bearing devices out of adjustment and not functioning as designed (clean and adjust). Loose bolted connections, some section loss, some fatigue or out-of-plane bending cracks present in redundant structures (repairs needed).
4	Poor condition – Critical collision damage to structural elements (precautionary measures needed). Fatigue or out-of-plane distortion cracks may be present in critical areas. Load carrying capacity or structural members affected. Bearing devices and/or hinges are frozen from corrosion and are causing structural damage; loose or deteriorated rivets; missing bolts; substantial section loss in structural elements (replace deficient elements soon).
3	Serious condition – Severe section loss in many areas with holes rusted through at numerous locations in critical stress areas or fracture in a major, but no fracture critical, structural element (repair or load post immediately).
2	Critical condition – Severe section loss in many areas with holes rusted through at numerous locations in critical areas. Extensive deterioration of superstructure resulting in minor deformation of a main member (close bridge until repaired).
1	“Imminent” failure condition – Extensive deterioration of superstructure resulting in significant deformation of a main member. Bridge closed. Corrective action may put back in light service.
0	Failed condition – Extensive deterioration of superstructure resulting in significant deformation of a main member (close bridge until replaced).

Timber Superstructure Condition Rating (Item 59)

<u>Code</u>	<u>Condition of Superstructure</u>
N	Use for all culverts.
9	Excellent condition – No noticeable or noteworthy deficiencies which affect the condition of the superstructure item.
8	Very good condition – Minor collision damage without misalignment and no corrective action required. Minor cracking or splitting of stringers at insignificant locations.
7	Good condition – Minor decay, loose connections or distribution beams of glue laminated slabs (tighten connections). Loose tie rods in field laminated slabs (tighten rods). Fire damage limited to surface scorching with no measurable section loss.
6	Satisfactory condition – Some decay, cracking or splitting, of beams or stringers. Fire damage limited to surface scorching with no measurable section loss. Damaged or deteriorated clip angles connecting laminated slabs to caps (replace deteriorated elements).
5	Fair condition – Moderate decay, collision damage, cracking, splitting or minor crushing of beams or stringers (place new helper stringers in interior or replace fascia stringer). Fire damage limited to surface charring with minor, measurable section loss. Missing or loose cross braces (repair bracing).
4	Poor condition – Substantial decay, cracking, splitting, significant fire damage or crushing of beams or stringers (replace deteriorated stringers soon). Diminished load carrying capacity of members is evident. Critical collision damage to structural elements (precautionary measures needed).
3	Serious condition – Extensive decay, major fire damage, cracking, splitting or crushing of stringers (repair or load post immediately). Load carrying capacity is substantially reduced. Local failure may be evident.
2	Critical condition – Extensive deterioration of superstructure resulting in minor deformation of a main member and significant local failures (close bridge until repaired).
1	“Imminent” failure condition – Extensive deterioration of superstructure in significant deformation of a main member (close bridge until repaired or replaced).
0	Failed condition – Extensive deterioration of superstructure resulting in significant deformation of a main member (close bridge until replaced).

Substructure Condition Rating (Item 60)

<u>Code</u>	<u>Condition of Substructure</u>
N	Use for all culverts.
9	Excellent condition – No noticeable or noteworthy deficiencies which affect the condition of the substructure item.
8	Very good condition – Shrinkage cracks, light scaling or insignificant spalling which does not expose reinforcing steel. Insignificant damage caused by drift or collision with no misalignment and no corrective action required.
7	Good condition – Minor cracking with possible leaching, or spalls on concrete or masonry units with no detriment effect on bearing area. Shrinkage cracks or light scaling (requires sealing). Spalling without exposed rebar (needs patching). Some rusting of steel substructure unit without measurable section loss. Insignificant decay, cracking or splitting of timber substructure unit. Leakage of expansion devices have initiated minor cracking. Debris on bearing seats (requires cleaning). Cracking, spalling or localized deterioration of slope protection (needs repair). Localized failure of rip-rap (needs repair). Minor scour may have occurred (needs rip-rap or slope protection).
6	Satisfactory condition – Minor deterioration or disintegration, spalls, cracking and leaching on concrete or masonry units with little or no loss of bearing area. Backwall is broken (replace backwall). Corrosion of steel section in a steel substructure unit, but no measurable section loss. Some initial decay, cracking or splitting of timber in a timber substructure unit. Fire damage limited to surface scorching of timber with no measurable section loss. Shallow, local scouring may have occurred near foundation and may have exposed footings. Extensive deterioration or failure of riprap or slope protection (requires new rip-rap or slope protection).
5	Fair condition – Concrete or masonry units may exhibit some spalling or scaling with exposed reinforcing steel possible but no significant loss of section on main rebars (needs patching). Measurable, but minor, section loss in steel members. Moderate decay, cracking or splitting of timber with minor, measurable section loss. Some exposure of timber piles as a result of erosion, reducing the embedment. Scour may be progressive and/or is becoming more prominent with a possibility of exposing top of footing and isolated undermining, but no misalignment or settlement noted (requires underpinning the footing). Some deterioration of bearing area with some loss of bearing (needs patching).
4	Poor condition – Structural cracks and advanced deterioration in concrete and masonry units. Substantial spalling with loss of section on main rebars. Extensive section loss in steel members. Substantial decay, cracking, splitting or crushing of primary timber members, requiring some replacement. Fire damage with significant section loss of timber which may reduce the load carrying capacity of the member. Extensive exposure of timber piles as a result of erosion, reducing the penetration and affecting the stability of the unit. Additional cross bracing or backfilling is required. Extensive scouring or undermining of footing affecting the stability of the unit and requiring corrective action; substantial deterioration of bearing area and loss of bearing capacity (replace structural elements soon).
3	Serious condition – Severe disintegration of concrete. Extensive section loss in steel members. Generally, main reinforcing steel exposed with advanced stages of corrosion. Severe section loss in critical stress areas. Major fire damage to timber which will substantially reduce the load carrying capacity of the member. Bearing areas seriously deteriorated with considerable loss of bearing. Severe scouring or undermining of footings affecting the stability of the unit. Settlement of the substructure may have occurred. Shoring considered necessary (not just precautionary) to maintain the safety and alignment of the substructure. Repair or load post immediately.
2	Critical condition – Concrete cap is soft and spalling with reinforcing steel exposed with no bond to the concrete. Top of concrete cap is split if concrete column has undergone shear failure. Structural steel members have critical section loss with holes in the web and/or knife edged flanges typical. Primary timber members crushed or split and ineffective. Scour has caused extensive undermining of footings such that the substructure is near state of collapse. Pier has settled. Close bridge until repaired.
1	“Imminent” failure condition – Bridge closed. Corrective action may put back in light service.
0	Failed condition – Bridge closed. Replacement necessary.

Culvert Condition Rating (Item 62)

<u>Code</u>	<u>Condition of Culvert</u>
N	Use if structure is not a culvert.
9	Excellent condition – No deficiencies.
8	Very good condition – No noticeable or noteworthy deficiencies which affect the condition of the culvert. Insignificant scrape marks caused by drift.
7	Good condition – Shrinkage cracks, light scaling and insignificant spalling which does not expose reinforcing steel. Insignificant damage caused by drift with no misalignment and not requiring corrective action. Some minor scour has occurred near toe walls, wingwalls or pipes. Metal culverts have a smooth symmetrical curvature with superficial corrosion and pitting.
6	Satisfactory condition – Deterioration or initial disintegration, minor chloride contamination, cracking with some leaching or spalls on concrete or masonry walls and slabs. Local minor scouring at toe walls, wingwalls or pipes. Metal culverts have a smooth curvature, nonsymmetrical shape, significant corrosion or deep pitting.
5	Fair condition – Moderate to major deterioration or disintegration, extensive cracking and leaching or spalls on concrete or masonry walls and slabs. Minor settlement or misalignment. Considerable scour or erosion causing significant undermining at toe walls, wingwalls or pipes. Metal culverts have significant distortion and deflection in one section, significant corrosion or deep pitting.
4	Poor condition – Large spalls, heavy scaling, wide cracks, considerable efflorescence or opened construction joint permitting loss of backfill. Considerable settlement or misalignment. Considerable scour or erosion causing significant undermining at toe walls, wingwalls or pipes. Metal culverts have significant distortion and deflection, or deep pitting with scattered perforations.
3	Serious condition – Any condition described in code 4 but which is excessive in scope. Severe movement or differential settlement of the segments, or loss of fill. Holes may exist in walls or slabs. Integral wingwalls nearly severed from culvert. Severe scour or erosion at toe walls, wingwalls or pipes causing extensive undermining. Metal culverts have extreme distortion and deflection in one section, extensive corrosion or deep pitting with scattered perforations.
2	Critical condition – Integral wingwalls collapsed, severe settlement of roadway due to loss of fill. Section of culvert may have failed and can no longer support embankment. Complete undermining at toe walls and pipes. Corrective action required to maintain traffic. Metal culverts have extreme distortion and deflection throughout with extensive perforations due to corrosion.
1	“Imminent” failure condition – Bridge closed. Corrective action may put back in light service.
0	Failed condition – Bridge closed. Replacement necessary.