



## Jefferson County Department of Public Works

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*Monte Reinders, P.E.*  
*Public Works Director/County Engineer*

### MEMORANDUM

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**TO:** Board of County Commissioners

**FROM:** Monte Reinders, P.E., Public Works Director/County Engineer *MR*

**DATE:** September 11, 2018

**SUBJECT:** Bridge Condition Report 2018

#### INTRODUCTION

As required by WAC 136-20-060, each county engineer shall furnish the county legislative authority with a written report of the findings of the bridge inspection effort. This report shall be made available to said authority and shall be consulted during the preparation of the proposed six-year transportation program revision. The report shall include the county engineer's recommendations as to replacement, repair or load restriction for each deficient bridge. The resolution of adoption of the six-year transportation program shall include assurances to the effect that the county engineer's report with respect to deficient bridges was available to said authority during the preparation of the program.

#### BRIDGE INVENTORY

Jefferson County Public Works has 34 active bridges – see the attached Master Bridge List (Appendix A) for a listing of the county bridges. Of these, 32 bridges meet the federal definition of a bridge and are subject to the National Bridge Inspections Standards. Two of the bridges do not meet the federal bridge definition, one because it is a pedestrian bridge, and one because it has less than a twenty foot span; nevertheless, these two bridges are on Jefferson County's biannual bridge inspection program. Jefferson County also has two permanently closed bridges, which are not listed on the Master Bridge List.

## BRIDGE INSPECTIONS

The National Bridge Inspection Standards (NBIS) and WAC 136-20-030 mandate that public agencies inspect and report on all bridges at least once every two years (routine inspection). Jefferson County staff performs all routine inspections. Special inspections are required for bridges that cannot be inspected adequately from the ground. For these bridges an Under-Bridge Inspection Truck (UBIT) is required. Steel bridges with fracture critical members may also require special inspections with the UBIT and/or other special equipment. Jefferson County has two bridges which require the UBIT inspection and one bridge which requires both the UBIT and the fracture critical inspection (identified in the attached Master Bridge List). Jefferson County currently has a contract with the Washington State Department of Transportation (WSDOT) to perform these inspections.

Jefferson County Public Works has split up the bridge inspections so that East Jefferson County bridges are inspected in odd-numbered years and West Jefferson County bridges are inspected in even-numbered years. In conformance with that schedule, Jefferson County has completed the biennial inspections for all West Jefferson County bridges in 2018. WSDOT, under contract with Jefferson County, performed the required UBIT and Fracture Critical inspection of the Cassel Creek Bridge. The completed inspection reports were submitted to WSDOT, which verifies compliance with the NBIS and reports to the Federal Highway Administration (FHWA).

## DEFICIENT BRIDGES

All bridges are assigned a sufficiency rating (SR), which is a calculated score based on numbers assigned to all of the bridge elements reviewed by the bridge inspector. The SR is a number from 0 to 100, with 100 being an entirely sufficient bridge, and 0 being an entirely insufficient or deficient bridge. For additional explanation of the sufficiency rating and other ratings see the attached WSDOT publication, *Bridges and Structures – Ratings* (Appendix B). The sufficiency rating is used to determine if a bridge is eligible for federal rehabilitation or replacement funding. Under the current funding requirements, to be eligible for replacement a bridge must be structurally deficient and have a sufficiency rating of less than 40; to be eligible for rehabilitation a bridge must be structurally deficient and have a sufficiency rating of less than 80. Currently, none of the county's bridges meet these criteria, and therefore none are eligible for rehabilitation or replacement.

As described in previous Bridge Condition reports, the Tower Creek Bridge is being monitored for potential scour problems associated with down-cutting of the streambed. The Tower Creek streambed experienced significant down-cutting in 2007-2008 due to migration of the Hoh River and heavy flows in Tower Creek. However, based on regular monitoring, the streambed elevation has been relatively stable since 2008. Public Works will continue to monitor this situation. The Tower Creek Bridge is scheduled to be replaced in 2019-2020 by the Federal Highway Administration Western Federal Lands Division, and is being funded entirely by a Federal Lands Access Program grant.

## POSTED BRIDGES

All bridges are required to have a “Load Rating” calculation. The Load Rating establishes how much weight the bridge can carry for several standard configurations of vehicle axle loads. If the load rating calculation shows that a bridge cannot safely carry the legal traffic loads, as indicated by having an operating rating of less than one, then the bridge must be posted with the appropriate load limits. The operating rating values are listed on the attached Master Bridge List (Appendix A). Jefferson County currently does not have any bridges with load restrictions. The Yarr Bridge, which has an operating rating of 0.66, is being inspected on an annual basis, and shows no signs of distress. This plan of increased inspection frequency, which was recommended by the WSDOT Local Programs Bridge Engineer, is an acceptable alternative to load posting, provided that the bridge continues to show no signs of distress.

A 2013 FHWA mandate requires that all bridges be load rated for a relatively new class of vehicle, the Specialized Hauling Vehicle (SHV). SHV’s are closely-spaced multi-axle single unit trucks introduced by the trucking industry in the last decade. Examples include dump trucks, construction vehicles, solid waste trucks and other hauling trucks. The FHWA has divided bridges into two categories, with the first category requiring updated load ratings by December 31, 2017, and the second category requiring updated load ratings by December 31, 2022. Jefferson County has completed the new load ratings for three bridges for the 2017 deadline. An additional twenty-two bridges will need to be re-load rated prior to the 2022 deadline. It is possible that some Jefferson County bridges will need to be load posted for SHV’s after the load rating results are known.

## OBSOLETE BRIDGES

The Old Little Quilcene Bridge and the Maple Creek Bridge have been placed in obsolete status and removed from the Master Bridge List. Both are permanently closed to vehicular traffic. This action removes the requirement for biennial bridge inspection.

## EMERGENCY REPAIRS AND INSPECTIONS

No emergency repairs or inspections were performed in 2018 at the time of this report.

## MAINTENANCE ACTIVITIES

Routine maintenance of the county’s bridges is conducted by the road maintenance department. Typical routine maintenance consists of deck cleaning, brush clearing, and minor miscellaneous repairs.

## COMPLETED PROJECTS

No bridge projects were completed in 2018 at the time of this report.

## CURRENT PROJECTS

Current projects include the following:

- An 80 foot span concrete bridge at West Uncas Rd MP 0.804 is currently under construction. Construction is scheduled to be completed in December 2018. This project is being funded by a Salmon Recovery Funding Board grant (approx. 85%), a National Fish Passage Program grant (approx. 10%), and local funds (approx. 5%).

## PROGRAMMED PROJECTS

The Tower Creek Bridge on Upper Hoh Road is scheduled to be replaced during the 2019 – 2020 construction season. This project is being managed by the Federal Highway Administration Western Federal Lands Division, and is funded entirely by a Federal Lands Access Program grant. Jefferson County is currently applying for grant funding to design replacements for fish-barrier culverts at Thorndyke Road milepost 4.71 (Thorndyke Creek), West Valley Road milepost 2.59 (Naylor Creek), and Gibbs Lake Road milepost 1.82 (Naylor Creek). If funded, each of these culverts would most likely be replaced with new bridges.

## RECOMMENDED PROJECTS

There are no recommended bridge projects at this time.

## APPENDIX A

## Jefferson County Public Works

### Master Bridge List

LAST UPDATED: 6/14/18

Total number of bridges in inventory:	34
Total number of permanently closed bridges:	2
Total number of active bridges:	34
Total number of West Jefferson County bridges:	19 active bridges 1 short-span (non NBIS) bridge 1 permanently closed bridge
Total number of East Jefferson County Bridges	13 active bridges 1 pedestrian (non NBIS) bridge 1 permanently closed bridge

Jefferson County Public Works  
Master Bridge List  
East Jefferson County

Last Updated: 9/13/2018

FEDERAL STRUCTURE NUMBER	COUNTY NUMBER	NAME	ROAD NUMBER	ROAD NAME	MILEPOST	LENGTH (FEET)	BRIDGE TYPE		YEAR BUILT	FRACTURE CRITICAL	SPECIAL FEATURES	SCOUR CRITICAL	UNDERWATER INSPECTION	LOAD POSTED	INVENTORY RATING	OPERATING RATING	EQUIPMENT REQUIRED	LAST INSPECTION	SUFFICIENCY RATING FUNCTIONALLY OBSOLETE (FO) STRUCTURALLY DEFICIENT (SD)	REMARKS
							Superstructure	Substructure												
7996700	15E	Hunts	634509	Hunt Rd.	0.15	27	Reinforced Conc. Slab	Conc. Abutment w/ C.I.P. conc. piles	1971	NO	NO	NO	NO	NO	1.18 (42 TON)	1.97 (70 TON)	STD.	4/25/17	88.92	
8165100	16E	Little Quilcene River	931507	Center Rd.	14.6	64	Reinforced Conc. Slab, Conc. Girder	Conc. Pile cap, Prestress. Conc. piles	1955	NO	NO	NO	NO	NO	0.63 (22 TON)	1.05 (37 TON)	STD.	4/25/17	59.75 FO	
8464900	17E	Yarr	931507	Center Rd.	3.44	25	Conc. Multiple Web Girder	Conc. Abutment w/ Prestress. Conc. piles	1955	NO	NO	NO	NO	NO	0.39 (14 TON)	0.66 (23 TON)	STD.	4/25/17	64.61	12 MONTH INSPECTION FREQUENCY
8320300	23E	Linger Longer	301309	Linger Longer Rd.	0.42	81	Prestress. Conc. Bulb-T Girder	Conc. Abutment w/ Conc. column over C.I.P. conc. piles	1969	NO	NO	NO	NO	NO	0.89 (32 TON)	1.49 (53 TON)	STD.	4/19/17	70.03	
8381400	24E	Rocky Brook	250008	Dosewallips Rd.	3.01	47	Prestress. Conc. Bulb-T Girder	Conc. Abutment w/ Conc. Spread footing	1964	NO	NO	NO	NO	NO	0.72 (25 TON)	1.20 (43 TON)	STD.	4/19/17	76.99	
8229900	25E	Meyers	503409	Belfrage Rd.	0.12	30	Timber	Timber abutment, timber piles	1977	NO	NO	NO	NO	NO	0.81 (29 TON)	1.12 (40 TON)	STD.	6/29/17	63.58	
8488200	26E	West Uncas	500209	West Uncas Rd.	1.89	61	Reinf. Conc. Slab	Conc. Abutment, Conc. column over C.I.P. conc. pile	1964	NO	NO	NO	NO	NO	0.66 (23 TON)	1.10 (39 TON)	STD.	4/19/17	82.17	
8136900	28E	Leland Creek	344009	Rice Lake Rd.	0.33	32	Prestress. Conc. Slab	Conc. Abutment, Conc. spread footing	1987	NO	NO	NO	NO	NO	1.59 (57 TON)	2.66 (95 TON)	STD.	4/19/17	88.20 FO	
8660000	29E	Contractors Creek	501409	Old Gardiner Rd.	3.56	294	Timber Deck, Timber Girders	Conc. Pile cap, steel piles	2000	NO	NO	NO	NO	NO	0.78 (28 TON)	1.31 (47 TON)	UBIT	7/13/16	86.41	UBIT EVERY 4 YEARS -- LAST UBIT 7/13/2016

Jefferson County Public Works  
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							Superstructure	Substructure												
8754000	31E	Shine Creek	447608	South Point Rd.	0.25	70	Prestress. Conc. Slab	Conc. Abutment w/ Conc. Pile	2005	NO	NO	NO	NO	NO	1.45 (64 TON)	1.76 (108 TON)	STD.	4/25/17	97.58	
8753900	32E	Donovan Creek	327508	E Quilcene Rd.	0.77	70	Prestress. Conc. Slab	Conc. Abutment w/ Conc. Pile	2006	NO	NO	NO	NO	NO	1.25 (60 TON)	1.62 (101 TON)	STD.	4/19/17	89.28	
8753800	33E	Old Tarboo	357509	Old Tarboo Rd.	0.88	42	Prestress. Conc. Slab	Conc. Abutment w/ steel piles	2005	NO	NO	NO	NO	NO	1.84 (66 TON)	3.07 (111 TON)	STD.	4/25/17	89.98	
8753800	38E	Andrews Creek	352909	Snow Creek Rd.	3.78	24	Conc. 3-sided Box Culvert	Conc. Spread Footing	2014	NO	NO	NO	NO	NO	1.23 (44 TON)	1.60 (57 TON)	STD.	4/19/17	91.14	
8898600	41E	RTMT Pedestrian	352909	Rick Tollefson Mem. Trail	0.17	80	Steel Thru Truss	Conc. Spread Footing	2017	N/A	N/A	N/A	N/A	N/A	N/A	N/A	STD.	4/26/18	N/A	



Jefferson County Public Works  
Master Bridge List  
West Jefferson County

Last Updated: 9/13/2018

FEDERAL STRUCTURE NUMBER	COUNTY NUMBER	NAME	ROAD NUMBER	ROAD NAME	MILEPOST	LENGTH (FEET)	BRIDGE TYPE		YEAR BUILT	FRACTURE CRITICAL	SPECIAL FEATURES	SCOUR CRITICAL	UNDERWATER INSPECTION	LOAD POSTED	INVENTORY RATING	OPERATING RATING	EQUIPMENT REQUIRED	LAST INSPECTION	SUFFICIENCY RATING STRUCTURALLY DEFICIENT (SD) FUNCTIONALLY OBSOLETE (FO)	REMARKS
							Superstructure	Substructure												
8451600	01W	Fletcher Creek	911607	Quinault S. Shore Rd.	3.19	78	Prestress. Conc. Bulb-T Girder	Conc. Abutment w/ C.I.P. conc. pile	1974	NO	NO	NO	NO	NO	0.98 (35 TON)	1.64 (58 TON)	STD.	5/22/18	99.50	
8258500	02W	Barlow	134309	Oil City Rd.	9.75	64	Prestress. Conc. Slab	Conc. Abutment w/ C.I.P. Conc. Pile	2005	NO	NO	NO	NO	NO	1.53 (69 TON)	1.99 (115 TON)	STD.	5/22/18	83.53	
8145800	03W	Anderson Creek	134309	Oil City Rd.	4.44	87	Prestress. Conc. Bulb-T Girder	Conc. Abutment w/ C.I.P. conc. pile	1974	NO	NO	NO	NO	NO	0.91 (32 TON)	1.52 (54 TON)	STD.	5/22/18	90.43	
8280100	04W	Hell Roaring Creek	914207	Upper Hoh Rd.	0.16	120	Prestress. Conc. Girder	Conc. Abutment w/ steel H pile	1982	NO	NO	NO	NO	NO	1.31 (47 TON)	2.19 (78 TON)	STD.	5/23/18	91.88	
8298800	05W	Alder Creek	914207	Upper Hoh Rd.	2.07	67	Prestress. Conc. Bulb-T Girder	Conc. Abutment w/ C.I.P. conc. pile	1972	NO	NO	NO	NO	NO	1.11 (40 TON)	1.85 (66 TON)	STD.	5/23/18	99.59	
8383600	06W	Rock Creek	914207	Upper Hoh Rd.	6.49	83	Prestress. Conc. Bulb-T Girder	Conc. Abutment w/ C.I.P. conc. pile	1973	NO	NO	NO	NO	NO	1.13 (40 TON)	1.89 (67 TON)	STD.	5/23/18	92.80	
8384000	07W	Tower Creek	914207	Upper Hoh Rd.	7.5	71	Prestress. Conc. Bulb-T Girder	Conc. Abutment w/ C.I.P. conc. pile	1973	NO	NO	NO	NO	NO	1.10 (39 TON)	1.84 (66 TON)	STD.	5/23/18	92.80	
8391000	08W	Queets River	107509	Clearwater Rd.	0.6	844	Steel Plate Girder, C.I.P. conc. deck	Conc. Piers, Conc. Abutment w/ steel H pile	1988	NO	NO	NO	NO	NO	1.07 (38 TON)	1.79 (64 TON)	UBIT	7/11/16	98.71	UBIT EVERY 4 YEARS -- LAST UBIT 7/11/2016
8047800	09W	Hemphill Creek	146809	Dowans Creek Rd.	2.3	31	Timber Deck, Timber Girders	Timber abutment, timber piles	1977	NO	NO	NO	NO	NO	0.75 (27 TON)	1.06 (38 TON)	STD.	5/22/18	60.39	
7966600	10W	Dowans Creek	146809	Dowans Creek Rd.	0.52	81	Prestress. Conc. Bulb-T Girder	Conc. Abutment w/ C.I.P. conc. pile	1974	NO	NO	NO	NO	NO	1.10 (39 TON)	1.84 (66 TON)	STD.	5/22/18	93.79	

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							Superstructure	Substructure												
8475700	11W	Owl Creek	135109	Maple Creek Rd.	1.29	69	Prestress. Conc. Slab	Conc. Abutment w/ steel H piles	1989	NO	NO	NO	NO	NO	1.36 (49 TON)	2.27 (81 TON)	STD.	5/22/18	83.45 FO	
8253600	13W	Hurst Creek	107509	Clearwater Rd.	2.66	67	Prestress. Conc. Bulb-T Girder	Conc. Abutment, Conc. column, Conc. footing	1969	NO	NO	NO	NO	NO	1.03 (37 TON)	1.72 (61 TON)	STD.	5/22/18	98.86	
8339400	27W	Willoughby Creek	914207	Upper Hoh Rd.	3.52	60	Prestress. Conc. Bulb-T Girder	Conc. Pile cap w/ Prestress. Conc. piles	1962	NO	NO	NO	NO	NO	0.82 (29 TON)	1.37 (49 TON)	STD.	5/23/18	59.03	
8659900	30W	Cassel Creek	134309	Oil City Rd.	3.59	154	Steel Girder	Conc. Pile cap, steel piles	2000	YES	NO	NO	NO	NO	1.19 (43 TON)	2.00 (72 TON)	UBIT	7/11/16	72.52 FO	Fracture Critical Special Inspection -- WSDOT performs inspection with UBIT bi-annually
8829800	34W	Pole Creek	914207	Upper Hoh Rd.	8.3	37	Conc. 3-sided Box Culvert	Conc. Spread Footing	2010	NO	NO	NO	NO	NO	1.11 (50 TON)	1.44 (65 TON)	STD.	5/23/18	92.80	
8845600	35W	Dismal Creek	914207	Upper Hoh Rd.	9.19	22	Conc. 3-sided Box Culvert	Conc. Spread Footing	2011	NO	NO	NO	NO	NO	1 (36 TON)	1.3 (46 TON)	STD.	5/23/18	91.00	
8853500	36W	Spruce Creek	914207	Upper Hoh Rd.	9.7	22	Conc. 3-sided Box Culvert	Conc. Spread Footing	2012	NO	NO	NO	NO	NO	1.176 (42 TON)	1.465 (52 TON)	STD.	5/23/18	92.80	
8863300	37W	Alder Creek Tributary	914207	Upper Hoh Rd.	2.15	25	Conc. 3-sided Box Culvert	Conc. Spread Footing	2013	NO	NO	NO	NO	NO	1.00 (36 TON)	1.29 (46 TON)	STD.	5/23/18	91.11	
8886600	39W	Upper Hoh Rd. MP 6.95	914207	Upper Hoh Rd.	6.95	21	Conc. 3-sided Box Culvert	Conc. Spread Footing	2016	NO	NO	NO	NO	NO	1.65 (59 TON)	2.13 (76 TON)	STD.	5/23/18	82.69	
XG030700	41E	Donkey Creek	107509	Clearwater Rd.	1.29	17	Conc. 3-sided Box Culvert	Open-ended steel pipe piling	2015	NO	NO	NO	NO	NO	1.04 (37 TON)	1.34 (48 TON)	STD.	5/22/18		

## APPENDIX B



## Bridge Ratings

The safety of bridge structures in Washington State is ensured through a meticulous inspection system. All public bridge owners, such as WSDOT, Counties and Cities, follow the same bridge inspection procedures. The condition rating of all bridge decks, superstructures and substructures and other elements based on these inspections.

USDOT's Federal Highway Administration (FHWA) requires all public bridge owners (state, city, and county ) to inspect and their bridges and report information including bridge condition ratings as part of their requirements in the National Bridge Inventory Standards (NBIS).

Important aspects of the NBIS were:

1. All states must perform periodic inspections of bridges greater than 20 feet in span on at least a biennial basis.



SR6 Wiliapa River bridge



SR20 Deception Pass Bridge

2. Data collection was standardized and must be reported to FHWA.
3. Qualifications for inspection personnel were defined.
4. Training programs were developed and implemented.
5. The Bridge Replacement Program (BRP) was established to provide funding for bridge replacement on the system.

## Structurally Deficient

Structurally deficient means that a bridge requires repair or replacement of a certain component. This may include cracked or spalled concrete, the bridge deck, the support structure, or the entire bridge itself. If the condition is such that it no longer is able to carry its intended traffic loads it may be weight restricted. Being structurally deficient does not imply that the bridge is in danger of collapse or unsafe to the traveling public. If a bridge is open then it is considered safe.

A bridge is classified as "Structurally Deficient" when bridge inspectors give either the superstructure, deck, and/or substructure a rating of four or less on a scale of zero to nine. WSDOT's poor condition category uses the same data, criteria, and rating scale.

WSDOT has 137 state owned bridges that are classified as structurally deficient as of Jan. 2015. A list of these bridges is available in pdf and web page and map format.

### Functionally Obsolete

Functional obsolescence is assessed by comparing the existing design of each bridge to current standards.

A bridge can be categorized functionally obsolete a number of ways including: substandard bridge widths, low vertical clearance that can lead to repeated damage from over height trucks, load-carrying capacity, or flood potential.

There are 866 WSDOT bridges that are rated "Functionally Obsolete"



Interstate 82 Columbia River bridge near Umatilla

### Good, Fair, Poor Condition Rating

**Good:** A range from no problems to some minor deterioration of structural elements.

**Fair:** All primary structural elements are sound but may have deficiencies such as minor section loss, deterioration, cracking, spalling, or scour.

**Poor:** Advanced deficiencies such as section loss, deterioration, cracking, spalling, scour, or seriously affected primary structural components. Bridges rated in poor condition may be posted with truck weight restrictions.

A summary of the WSDOT bridge network conditions is available in the 2014 Bridge Annual Report in the Gray notebook.

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**What are “general condition ratings?”** According to the National Bridge Inspection Standards (NBIS), condition ratings are used to describe an existing bridge or culvert compared with its condition if it were new. The ratings are based on the materials, physical condition of the deck (riding surface), the superstructure (supports immediately beneath the driving surface) and the substructures (foundation and supporting posts and piers). General condition ratings range from 0 (failed condition) to 9 (excellent). For detailed definitions, click [here](#).

**Which bridges are included in the NBI system?** NBI structures are bridges or culverts that carry vehicular traffic and have an opening longer than 20 feet measured along the center of the roadway.

**What bridges are not considered part of the NBI system?** Non-NBI structures include bridges or culverts that carry vehicular traffic and are equal to or less than 20 feet measured along the center of the roadway.

VDOT exceeds the NBI standards by inspecting and documenting in our inventory all bridges regardless of their length and all culverts having an opening greater than 36 square feet.

**What is a “structurally deficient” bridge?** Bridges are considered structurally deficient if they have been restricted to light vehicles, closed to traffic or require rehabilitation. Structurally deficient means there are elements of the bridge that need to be monitored and/or repaired. The fact that a bridge is “structurally deficient” does not imply that it is likely to collapse or that it is unsafe. It means the bridge must be monitored, inspected and maintained.

**How is “structural deficiency” determined?** The condition of different parts of a bridge is rated on a scale of 0 to 9 (with 9 being “excellent” and zero being “failed”). A structurally deficient bridge is one for which the deck (riding surface), the superstructure (supports immediately beneath the driving surface) or the substructure (foundation and supporting posts and piers) are rated in condition 4 or less.

**What makes a bridge structurally deficient, and are structural deficient bridges unsafe?** The fact that a bridge is “structurally deficient” does not imply that it is likely to collapse or that it is unsafe. A “deficient” bridge is one with some maintenance concerns that do not pose a safety risk. A “deficient” bridge typically requires maintenance and repair and eventual rehabilitation or replacement to address deficiencies. To remain open to traffic, structurally deficient bridges are often posted with reduced weight limits that restrict the gross weight of vehicles using the bridges. If unsafe conditions are identified during a physical inspection, the structure must be closed.

**What is a “functionally obsolete” bridge?** A functionally obsolete bridge is one that was built to standards that are not used today. These bridges are not automatically rated as structurally deficient, nor are they inherently unsafe. Functionally obsolete bridges are those that do not have adequate lane widths, shoulder widths, or vertical clearances to serve current traffic demand, or those that may be occasionally flooded.

A functionally obsolete bridge is similar to an older house. A house built in 1950 might be perfectly acceptable to live in, but it does not meet all of today's building codes. Yet, when it comes time to consider upgrading that house or making improvements, the owner must look at ways to bring the structure up to current standards.

**What is a "fracture-critical" bridge?** A fracture-critical bridge is one that does not contain redundant supporting elements. This means that if those key supports fail, the bridge would be in danger of collapse. This does not mean the bridge is inherently unsafe, only that there is a lack of redundancy in its design.

**What is a bridge's "sufficiency rating?"** Sufficiency ratings were developed by the Federal Highway Administration to serve as a prioritization tool to allocate funds. The rating varies from 0 percent (poor) to 100 percent (very good). The formula considers structural adequacy, whether the bridge is functionally obsolete and level of service provided to the public.

**History of Federal Bridge Inspection Program** The federal bridge inspection program regulations were developed as a result of the Federal-Aid Highway Act of 1968 following the collapse of the Silver Bridge in Point Pleasant, West Virginia. The United States Secretary of Transportation established the National Bridge Inspection Standards (NBIS) to locate and evaluate existing bridge deficiencies to ensure the safety of the traveling public.

The 1968 Federal-Aid Highway Act directed the states to maintain an inventory of federal-aid highway system bridges. This was amended over time to establish criteria for NBIS bridges including:

- Defining the NBIS to bridges to those on the federal-aid highway system
- Requiring inspections of bridges longer than 20 feet on all public roads
- Expanding bridge inspection programs to include special inspection procedures for fracture-critical members and underwater inspection

<u>Code</u>	<u>Description</u>
N	NOT APPLICABLE
9	EXCELLENT CONDITION
8	VERY GOOD CONDITION No problems noted.
7	GOOD CONDITION Some minor problems.
6	SATISFACTORY CONDITION Structural elements show some minor deterioration.
5	FAIR CONDITION All primary structural elements are sound but may have some minor section loss (due to corrosion), cracking, spalling (deterioration of concrete surface) or scour (erosion of soil)
4	POOR CONDITION Advanced section loss, deterioration, spalling or scour.
3	SERIOUS CONDITION Loss of section, deterioration, spalling or scour have seriously affected primary structural components. Local failures are possible. Fatigue cracks in steel or shear cracks in concrete may be present.
2	CRITICAL CONDITION Advanced deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may have removed substructure support. Unless closely monitored it may be necessary to close the bridge until corrective action is taken.
1	"IMMINENT" FAILURE CONDITION Major deterioration or section loss present in critical structural components or obvious vertical or horizontal movement affecting structure stability. Bridge is closed to traffic but corrective action may put back in light service.
0	FAILED CONDITION Out of service - beyond corrective action.