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NBIS Final Rule	Metric Source
§ 650.301 Purpose.  This regulation sets the national standards for the proper safety inspection and evaluation of all highway bridges in accordance with 23 U.S.C. 151.	
§ 650.303 Applicability.  The National Bridge Inspection Standards (NBIS) in this part apply to all structures defined as highway bridges located on all public roads.	
§ 650.305 Definitions.  Terms used in this regulation are defined as follows:	
American Association of State Highway and Transportation Officials (AASHTO) Manual. "Manual for Condition Evaluation of Bridges," second edition, published by the American Association of State Highway and Transportation Officials (incorporated by reference, see § 650.317).	
Bridge. A structure including supports erected over a depression or an obstruction, such as water, highway, or railway, and having a track or passageway for carrying traffic or other moving loads, and having an opening measured along the center of the roadway of more than 20 feet between undercopings of abutments or spring lines of arches, or extreme ends of openings for multiple boxes; it may also include multiple pipes, where the clear distance between openings is less than half of the smaller contiguous opening.	
Bridge inspection experience. Active participation in bridge inspections in accordance with the NBIS, in either a field inspection, supervisory, or management role. A combination of bridge design, bridge	

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maintenance, bridge construction and bridge inspection experience, with the predominant amount in bridge inspection, is acceptable.	
Bridge inspection refresher training. The National Highway Institute "Bridge Inspection Refresher Training Course" or other State, local, or federally developed instruction aimed to improve quality of inspections, introduce new techniques, and maintain the consistency of the inspection program.	
Bridge Inspector's Reference Manual (BIRM). A comprehensive FHWA manual on programs, procedures and techniques for inspecting and evaluating a variety of in-service highway bridges. This manual may be purchased from the U.S. Government Printing Office, Washington, D.C. 20402 and from National Technical Information Service, Springfield, Virginia 22161, and is available at the following URL: <a href="https://www.fhwa.dot.gov/bridge/bripub.htm">www.fhwa.dot.gov/bridge/bripub.htm</a> .	
<u>Complex bridge</u> . Movable, suspension, cable stayed, and other bridges with unusual characteristics.	
Comprehensive bridge inspection training. Training that covers all aspects of bridge inspection and enables inspectors to relate conditions observed on a bridge to established criteria (see the Bridge Inspector's Reference Manual for the recommended material to be covered in a comprehensive training course).	
<u>Critical finding</u> . A structural or safety related deficiency that requires immediate follow-up inspection or action.	

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<u>Damage inspection</u> . This is an unscheduled inspection to assess structural damage resulting from environmental factors or human actions.	
<u>Fracture critical member (FCM)</u> . A steel member in tension, or with a tension element, whose failure would probably cause a portion of or the entire bridge to collapse.	
Fracture critical member inspection. A hands-on inspection of a fracture critical member or member components that may include other non-destructive evaluation.	
Hands-on. Inspection within arms length of the component. Inspection uses visual techniques that may be supplemented by nondestructive testing.	
Highway. The term "highway" is defined in 23 U.S.C. 101(a)(11).	
In-depth inspection. A close-up, inspection of one or more members above or below the water level to identify any deficiencies not readily detectable using routine inspection procedures; hands-on inspection may be necessary at some locations.	
<u>Initial inspection</u> . The first inspection of a bridge as it becomes a part of the bridge file to provide all Structure Inventory and Appraisal (SI&A) data and other relevant data and to determine baseline structural conditions.	
Legal load. The maximum legal load for each vehicle configuration permitted by law for the State in which the bridge is located.	

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<u>Load rating</u> . The determination of the live load carrying capacity of a bridge using bridge plans and supplemented by information gathered from a field inspection.	
National Institute for Certification in Engineering Technologies (NICET). The NICET provides nationally applicable voluntary certification programs covering several broad engineering technology fields and a number of specialized subfields. For information on the NICET program certification contact: National Institute for Certification in Engineering Technologies, 1420 King Street, Alexandria, VA 22314-2794.	
Operating rating. The maximum permissible live load to which the structure may be subjected for the load configuration used in the rating.	
Professional engineer (PE). An individual, who has fulfilled education and experience requirements and passed rigorous exams that, under State licensure laws, permits them to offer engineering services directly to the public. Engineering licensure laws vary from State to State, but, in general, to become a PE an individual must be a graduate of an engineering program accredited by the Accreditation Board for Engineering and Technology, pass the Fundamentals of Engineering exam, gain four years of experience working under a PE, and pass the Principles of Practice of Engineering exam.	
Program Manager. The individual in charge of the program, that has been assigned or delegated the duties and responsibilities for bridge inspection, reporting, or inventory. The program manager provides overall leadership and is available to inspection team leaders to provide guidance.	

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Public road. The term "public road" is defined in 23 U.S.C. 101(a)(27).	
Quality assurance (QA). The use of sampling and other measures to assure the adequacy of quality control procedures in order to verify or measure the quality level of the entire bridge inspection and load rating program.	
Quality control (QC). Procedures that are intended to maintain the quality of a bridge inspection and load rating at or above a specified level.	
Routine inspection. Regularly scheduled inspection consisting of observations and/or measurements needed to determine the physical and functional condition of the bridge, to identify any changes from initial or previously recorded conditions, and to ensure that the structure continues to satisfy present service requirements.	
Routine permit load. A live load, which has a gross weight, axle weight or distance between axles not conforming with State statutes for legally configured vehicles, authorized for unlimited trips over an extended period of time to move alongside other heavy vehicles on a regular basis.	
Scour. Erosion of streambed or bank material due to flowing water; often considered as being localized around piers and abutments of bridges.	
Scour critical bridge. A bridge with a foundation element that has been determined to be unstable for the observed or evaluated scour condition.	

#### National Bridge Inspection Standards 23 CFR 650 subpart C ( Metric Source Within Regulation) **NBIS Final Rule** Metric Source Special inspection. An inspection scheduled at the discretion of the bridge owner, used to monitor a particular known or suspected deficiency. State transportation department. The term "State transportation department" is defined in 23 U.S.C. 101(a)(34). Team leader. Individual in charge of an inspection team responsible for planning, preparing, and performing field inspection of the bridge. Underwater diver bridge inspection training. Training that covers all aspects of underwater bridge inspection and enables inspectors to relate the conditions of underwater bridge elements to established criteria (see the Bridge Inspector's Reference Manual section on underwater inspection for the recommended material to be covered in a underwater diver bridge inspection training course). Underwater inspection. Inspection of the underwater portion of a bridge substructure and the surrounding channel, which cannot be inspected visually at low water by wading or probing, generally requiring diving or other appropriate techniques. § 650.307 Bridge inspection organization. (a) Each State transportation department must inspect, or cause to be Metric #1: 23 CFR 650.307 Bridge inspection inspected, all highway bridges located on public roads that are fully or organization partially located within the State's boundaries, except for bridges that are 650.307 (a), (c), (d) & (e) – Bridge inspection organization Does the State transportation department have an organization that inspects or causes owned by Federal agencies. to be inspected, all highway bridges on public roads, except for bridges that are owned by Federal agencies? (b) Federal agencies must inspect, or cause to be inspected, all

highway bridges located on public roads that are fully or partially located

Metric Source	
Metric #2: 23 CFR 650.309 Qualifications of personnel – Program Manager  650.309 (a) - Program Manager: Does the Program Manager meet the requirements in paragraphs 650.309 (a) & 650.313 (g)?	

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## (b) There are five ways to qualify as a team leader. A team leader

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- (1) Have the qualifications specified in paragraph (a) of this section, or
- (2) Have five years bridge inspection experience and have successfully completed an FHWA approved comprehensive bridge inspection training course; or
- (3) Be certified as a Level III or IV Bridge Safety Inspector under the National Society of Professional Engineer's program for National Certification in Engineering Technologies (NICET) and have successfully completed an FHWA approved comprehensive bridge inspection training course, or
  - (4) Have all of the following:

must, at a minimum:

- (i) A bachelor's degree in engineering from a college or university accredited by or determined as substantially equivalent by the Accreditation Board for Engineering and Technology;
- (ii) Successfully passed the National Council of Examiners for Engineering and Surveying Fundamentals of Engineering examination;
  - (iii) Two years of bridge inspection experience; and
- (iv) Successfully completed an FHWA approved comprehensive bridge inspection training course, or.
  - (5) Have all of the following:
- (i) An associate's degree in engineering or engineering technology from a college or university accredited by or determined as substantially equivalent by the Accreditation Board for Engineering and Technology;

## Metric #3: 23 CFR 650.309 Qualifications of personnel – Team Leader(s)

Metric Source

650.309 (b) - Team leader(s)

Do the Team Leaders meet the requirements in paragraph 650.309 (b) & 650.313 (g)?

Metric #4: 23 CFR 650.309 Qualifications of personnel – Load Rating Engineer

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50.309 (c) - Individual Responsible for Load Ratings: oes the individual responsible for load ratings meet the requirement of paragraph 50.309 (c)?
letric #5: 23 CFR 650.309 Qualifications of personnel - W Bridge Inspection Diver
50.309 (d) - Underwater Bridge Inspection Diver: oes the underwater bridge inspection diver(s) reviewed meet the requirements of tragraph 650.309 (d)?
Metric #6: 23 CFR 650.311 Inspection frequency – outine  50.311 (a) (1) & (2) – Routine inspections are all bridges been inspected at regular intervals not exceeding 24 months? Have iteria to determine level and frequency for which bridges that require inspection at ass than 24 months been established?
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<ul> <li>(b) Underwater inspections.</li> <li>(1) Inspect underwater structural elements at regular intervals not to exceed sixty months.</li> <li>(2) Certain underwater structural elements require inspection at less than sixty-month intervals. Establish criteria to determine the level and frequency to which these members are inspected considering such factors as construction material, environment, age, scour characteristics, condition rating from past inspections and known deficiencies.</li> <li>(3) Certain underwater structural elements may be inspected at greater than sixty-month intervals, not to exceed seventy-two months, with written FHWA approval. This may be appropriate when past inspection findings and analysis justifies the increased inspection interval.</li> </ul>	Metric #8: 23 CFR 650.311 Inspection frequency – Underwater 650.311 (b) (1) & (2) – Underwater inspections Have all bridges requiring underwater inspections been inspected at regular intervals not exceeding 60 months? Have criteria to determine level and frequency for which bridges that require underwater inspections at less than 60 months been established?
<ul> <li>(c) Fracture critical member (FCM) inspections.</li> <li>(1) Inspect FCMs at intervals not to exceed twenty four months.</li> <li>(2) Certain FCMs require inspection at less than twenty-four month intervals. Establish criteria to determine the level and frequency to which these members are inspected considering such factors as age, traffic characteristics, and known deficiencies.</li> <li>(d) Damage, in-depth, and special inspections. Establish criteria to determine the level and frequency of these inspections.</li> </ul>	Metric #10: 23 CFR 650.311 Inspection frequency – Fracture Critical Member 650.311 (c) (1) & (2) – Fracture critical member (FCM) Have all FCMs been inspected at regular intervals not exceeding 24 months? Have criteria to determine level and frequency for which FCMs that require inspections at less than 24 months been established?  Metric #11: 23 CFR 650.311 Inspection frequency – Damage, In-depth or Special 650.311 (d) – Damage, in-depth and special inspections Have criteria to determine level and frequency for these inspections been established?
§ 650.313 Inspection procedures.	

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- (a) Inspect each bridge in accordance with the inspection procedures in the AASHTO Manual (incorporated by reference, see § 650.317).
- (b) Provide at least one team leader, who meets the minimum qualifications stated in § 650.309, at the bridge at all times during each initial, routine, in-depth, fracture critical member and underwater inspection.
- (c) Rate each bridge as to its safe load-carrying capacity in accordance with the AASHTO Manual (incorporated by reference, see §650.317). Post or restrict the bridge in accordance with the AASHTO Manual or in accordance with State law, when the maximum unrestricted legal loads or State routine permit loads exceed that allowed under the operating rating or equivalent rating factor.
- (d) Prepare bridge files as described in the AASHTO manual (incorporated by reference, see §650.317). Maintain reports on the results of bridge inspections together with notations of any action taken to address the findings of such inspections. Maintain relevant maintenance and inspection data to allow assessment of current bridge condition. Record the findings and results of bridge inspections on standard State or Federal agency forms.

### Metric #12: 23 CFR 650.313 Inspection procedures – Team Leader

650.313 (b) – Provide at least one team leader during inspections Is one team leader, who meets the minimum qualifications stated in § 650.309 (b) and 650.313 (g), at the bridge at all times during each initial, routine, in-depth, fracture critical member and underwater inspection?

## Metric #13: 23 CFR 650.313 Inspection procedures – Load Rating

650.313 (c) - Rate each bridge

Has each bridge been rated to its safe load carrying capacity in accordance with the AASHTO Manual

### Metric #14: 23 CFR 650.313 Inspection procedures – Post or Restrict

650.313 (c) – Post or restrict the bridge

Have all bridges been posted or restricted in accordance with the AASHTO Manual or in accordance with State law, when the maximum unrestricted legal loads or State routine permit loads exceed that allowed under the operating rating or equivalent rating factor?

## Metric #15: 23 CFR 650.313 Inspection procedures – Bridge Files

650.313 (d) – Prepare bridge files

Have bridge files been prepared as described in the AASHTO Manual i.e., maintain reports on the results of bridge inspections together with notations of any action taken to address the findings of such inspections, maintain relevant maintenance and

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#### inspection data to allow assessment of current bridge condition, and record the findings and results of bridge inspections on standard forms.

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- (e) Identify bridges with FCMs, bridges requiring underwater inspection, and bridges that are scour critical.
- (1) Bridges with fracture critical members. In the inspection records, identify the location of FCMs and describe the FCM inspection frequency and procedures. Inspect FCMs according to these procedures.
- (2) Bridges requiring underwater inspections. Identify the location of underwater elements and include a description of the underwater elements, the inspection frequency and the procedures in the inspection records for each bridge requiring underwater inspection. Inspect those elements requiring underwater inspections according to these procedures.
- (3) Bridges that are scour critical. Prepare a plan of action to monitor known and potential deficiencies and to address critical findings. Monitor bridges that are scour critical in accordance with the plan.
- (f) Complex bridges. Identify specialized inspection procedures, and additional inspector training and experience required to inspect complex bridges. Inspect complex bridges according to those procedures.
- (g) Quality control and quality assurance. Assure systematic quality control (QC) and quality assurance (QA) procedures are used to maintain a high degree of accuracy and consistency in the inspection program. Include periodic field review of inspection teams, periodic bridge inspection refresher training for program managers and team leaders, and

#### Metric #16: 23 CFR 650.313 Inspection procedures –

650.313 (e) (1) – Bridges with fracture critical members (FCMs)

Are the location of FCMs identified and the FCM inspection frequency and procedures described in the inspection records for each bridge requiring a fracture critical member inspection? Are FCMs inspected according to these procedures?

### Metric #17: 23 CFR 650.313 Inspection procedures - Underwater

650.313 (e) (2) - Bridges requiring underwater inspections
Are the location of underwater elements identified and the underwater elements, the inspection frequency, and the procedures described in the inspection records for each bridge requiring an underwater inspection? Are those elements requiring underwater inspections inspected according to these procedures?

# Metric #18: 23 CFR 650.313 Inspection procedures – Scour Critical Bridges

650.313 (e) (3) - Bridges that are scour critical Has a plan of action (POA) been prepared to monitor known and potential deficiencies and to address critical findings? Have bridges that are scour critical been monitored in accordance with the plan?

## Metric #19: 23 CFR 650.313 Inspection procedures – Complex Bridges

650.313 (f) – Complex bridges

**Fracture Critical Members** 

Have specialized inspection procedures, and additional inspector training and experience required to inspect complex bridges been identified? Are complex bridges inspected according to those procedures?

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independent review of inspection reports and computations.  (h) Follow-up on critical findings. Establish a statewide or Federal agency wide procedure to assure that critical findings are addressed in a timely manner. Periodically notify the FHWA of the actions taken to resolve or monitor critical findings.	Metric #20: 23 CFR 650.313 Inspection procedures – QC/QA 650.313 (g) – Quality control and quality assurance Are systematic quality control (QC) and quality assurance (QA) procedures used to maintain a high degree of accuracy and consistency in the inspection program? Are periodic field review of inspection teams, periodic bridge inspection refresher training for program managers and team leaders, and independent review of inspection reports and computations included in the procedures?  Metric #21: 23 CFR 650.313 Inspection procedures – Critical Findings 650.313 (h) – Follow-up on critical findings Has a statewide procedure been established to assure that critical findings are addressed in a timely manner? Is FHWA periodically notified of the actions taken to resolve or monitor critical findings?
	CONTINUED Metric #2: 23 CFR 650.309 Qualifications of personnel – Program Manager 650.309 (a) - Program Manager: Does the Program Manager meet the requirements in paragraphs 650.309 (a) & 650.313 (g)?  CONTINUED Metric #3: 23 CFR 650.309 Qualifications of personnel – Team Leader(s) 650.309 (b) - Team leader(s) Do the Team Leaders meet the requirements in paragraph 650.309 (b) & 650.313 (g)?
	<b>CONTINUED</b> Metric #12: 23 CFR 650.313 Inspection

National Bridge Inspection Standards 23 CFR 650 subpart C  ( Metric Source Within Regulation)	
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	<b>procedures – Team Leader</b> 650.313 (b) – Provide at least one team leader during inspections Is one team leader, who meets the minimum qualifications stated in § 650.309 (b) and 650.313 (g), at the bridge at all times during each initial, routine, in-depth, fracture critical member and underwater inspection?
§ 650.315 Inventory.  (a) Each State or Federal agency must prepare and maintain an inventory of all bridges subject to the NBIS. Certain Structure Inventory and Appraisal (SI&A) data must be collected and retained by the State or Federal agency for collection by the FHWA as requested. A tabulation of this data is contained in the SI&A sheet distributed by the FHWA as part of the "Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges," (December 1995) together with subsequent interim changes or the most recent version. Report the data using FHWA established procedures as outlined in the "Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges."	Metric #22: 23 CFR 650.315 Inventory – Prepare and Maintain 650.315 (a) – Prepare and maintain an inventory Does the State prepare and maintain an inventory of all bridges subject to the NBIS?
<ul> <li>(b) For routine, indepth, fracture critical, underwater, damage and special inspections, enter the SI&amp;A data into the State or Federal agency inventory within 90-days of the date of inspection for State or Federal agency bridges and within 180-days of the date of inspection for all other bridges.</li> <li>(c) For existing bridge modifications that alter previously recorded data and for new bridges, enter the SI&amp;A data into the State or Federal agency inventory within 90-days after the completion of the work for State or Federal agency bridges and within 180-days after the completion of the</li> </ul>	Metric #23: 23 CFR 650.315 Inventory – Update Data 650.315 (b), (c) & (d) – Updating data in the inventory Does the State enter the SI&A data in the inventory within 90 days of the date for State bridges and within 180 days of the date for all other bridges for inspections, bridge modifications and load restriction or closure status?

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work for all other bridges.  (d) For changes in load restriction or closure status, enter the SI&A data into the State or Federal agency inventory within 90-days after the change in status of the structure for State or Federal agency bridges and within 180-days after the change in status of the structure for all other bridges.	
[Note: The topic of inspection report covered in <b>Sect</b> 650.313(d) of final rule.]	
§ 650.317 Reference Manuals.  (a) The materials listed in this part are incorporated by reference in the corresponding sections noted. These incorporations by reference were	
approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. These materials are incorporated as	
they exist on the date of the approval, and notice of any change in these documents will be published in the Federal Register. The materials are	
available for purchase at the address listed below, and are available for inspection at the National Archives and Records Administration (NARA).	
These materials may also be reviewed at the Department of Transportation Library, 400 Seventh Street, SW., Washington, DC, in Room 2200. For information on the availability of these materials at NARA call (202) 741-	*****NOT APPLICABLE TO OHIO****
6030, or go to the following URL: <a href="http://www.archives.gov/federal_register/code">http://www.archives.gov/federal_register/code</a> of federal_regulations/ibr	Metric #7: 23 CFR 650.311 Inspection frequency – Routine Extended
<u>locations.html</u> . In the event there is a conflict between the standards in this part and any of these materials, the standards in this part will apply.	650.311 (a) (3) – Routine inspections – extended interval If FHWA approval has been granted for extended inspection interval, are bridges
(b) The following materials are available for purchase from the	being inspected in accordance with the approved criteria? Are controls in place to ensure sustained compliance with the approved criteria?

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#### American Association of State Highway and Transportation Officials, Suite 249, 444 N. Capitol Street, NW., Washington, D.C. 20001. The materials may also be ordered via the AASHTO bookstore located at the **Underwater Extended** following URL: http://www.aashto.org/aashto/home.nsf/FrontPage.

(1) The Manual for Condition Evaluation of Bridges, 1994, second edition, as amended by the 1995, 1996, 1998, and 2000 interim revisions, AASHTO, incorporation by reference approved for §§ 650.305 and 650.313.

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- (2) 2001 Interim Revision to the Manual for Condition Evaluation of Bridges, AASHTO, incorporation by reference approved for §§ 650.305 and 650.313.
- (3) 2003 Interim Revision to the Manual for Condition Evaluation of Bridges, AASHTO, incorporation by reference approved for §§ 650.305 and 650.313.

Dec 24, 2009 - Incorporate the recently issued AASHTO Manual for Bridge Evaluation (First Edition, 2008) in place of the AASHTO Manual for the Condition Evaluation of Bridges (Second Edition, 1994, with 2001 and 2003 interims).

### Metric #9: 23 CFR 650.311 Inspection frequency -

650.311 (b) (3) – Underwater Inspection – Extended Interval If FHWA approval has been granted for extended underwater inspection interval, are bridges being inspected in accordance with the approved criteria? Are controls in place to ensure sustained compliance with the approved criteria?

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