



**DEPARTMENT OF TRANSPORTATION**

**[4910-22-P]**

**Federal Highway Administration**

**23 CFR Part 650**

**[FHWA Docket No. FHWA–2017-0047]**

**RIN 2125-AF55**

**National Bridge Inspection Standards**

**AGENCY:** Federal Highway Administration (FHWA), U.S. Department of Transportation (DOT).

**ACTION:** Notice of proposed rulemaking (NPRM).

**SUMMARY:** The Moving Ahead for Progress in the 21st Century Act (MAP-21) required the Secretary to update the National Bridge Inspection Standards (NBIS). Through this NPRM, FHWA proposes to update the NBIS to address MAP-21 requirements, incorporate technological advancements including the use of unmanned aerial systems, and address ambiguities identified since the last update to the regulation in 2009. The FHWA also proposes to repeal two outdated regulations: the Highway Bridge Replacement and Rehabilitation Program and the Discretionary Bridge Candidate Rating Factor.

**DATES:** Comments must be received on or before [INSERT DATE 60 DAYS AFTER PUBLICATION IN FEDERAL REGISTER]. Late-filed comments will be considered to the extent practicable.

**ADDRESSES:** To ensure that you do not duplicate your docket submissions, please submit them by only one of the following means:

- Federal eRulemaking Portal: Go to <http://www.regulations.gov> and follow the online instructions for submitting comments.
- Mail: Docket Management Facility, U.S. Department of Transportation, 1200 New Jersey Ave., SE., West Building Ground Floor Room W12-140, Washington, DC 20590-0001;
- Hand Delivery: West Building Ground Floor, Room W12-140, 1200 New Jersey Ave., SE., between 9 a.m. 5 p.m., e.t., Monday through Friday, except Federal holidays. The telephone number is (202) 366-9329;
- Instructions: You must include the agency name and docket number or the Regulatory Identification Number (RIN) for the rulemaking at the beginning of your comments. All comments received will be posted without change to <http://www.regulations.gov>, including any personal information provided.

**FOR FURTHER INFORMATION CONTACT:** Mr. John Thiel, P.E., Office of Bridges and Structures, HIBS-30, (202) 366-8795, or Mr. William Winne, Office of the Chief Counsel, HCC-30, (202) 366-1397, Federal Highway Administration, 1200 New Jersey Avenue, SE., Washington, DC 20590.

**SUPPLEMENTARY INFORMATION:**

**Electronic Access and Filing**

This document and all comments received may be viewed online through the Federal eRulemaking portal at <http://www.regulations.gov>. The Web site is available 24 hours each day, 365 days each year. An electronic copy of this document may also be

downloaded by accessing the Office of the Federal Register's home page at:

*<https://www.federalregister.gov>*.

## **Executive Summary**

### **I. Purpose of the Regulatory Action**

This regulatory action seeks to update the national standards for bridge inspections consistent with the provisions of the MAP-21 (Pub. L. 112-141, 126 Stat. 405) legislation, which includes new requirements for a highway bridge inspection program, maintaining a bridge inventory, and reporting to FHWA the inspection results and, in particular, critical findings, meaning any structural or safety-related deficiencies that require immediate follow-up inspection or action. The updated NBIS proposed in this NPRM apply to all structures defined as highway bridges on all public roads, on and off Federal-aid highways, including tribally and federally owned bridges. In addition, FHWA proposes to apply these standards to privately owned bridges that are connected to a public road on each end.

Periodic and thorough inspections of our Nation's bridges are necessary to maintain safe bridge operation and prevent structural and functional failures. In addition, data on the condition and operation of our Nation's bridges is necessary for bridge owners to make informed investment decisions as part of an asset management program for their bridges. Congress declared in MAP-21 that it is in the vital interest of the United States to inventory, inspect, and improve the condition of the Nation's highway bridges. As a result of this declaration and the authority established by MAP-21 in 23 U.S.C. 144, FHWA is proposing to update the NBIS.

This regulatory action also proposes to eliminate two outdated regulations: the Highway Bridge Replacement and Rehabilitation Program (23 CFR part 650, subpart D) and the Discretionary Bridge Candidate Rating Factor (23 CFR part 650, subpart G).

## **II. Summary of the Major Provisions of the Regulatory Action in Question**

The FHWA proposes revisions to the existing NBIS relative to the National Bridge Inventory, including the requirement to collect element level data for National Highway System (NHS) bridges. The proposed regulations require inspections of bridges on all public roads, on and off Federal-aid highways, including tribally and federally owned bridges, and private bridges connected on each end by a public road. The regulations propose several new terms to provide consistency and clarity in the implementation of the regulations. This includes renaming some terms in a more descriptive way, such as fracture critical member being renamed nonredundant steel tension member.

The proposed regulations would require the bridge inspection organizations to maintain a registry of nationally certified bridge inspectors to align with a similar provision in the National Tunnel Inspection Standards (NTIS) in 23 CFR part 650, subpart E. The proposed regulations modify the training requirements for program managers and team leaders by defining a required amount of refresher training for both roles and defining training needed to be a team leader on a nonredundant steel tension member inspection.

The regulations propose the permissible inspection intervals for bridges, including options for more rigorous, risk-based intervals based on the consideration of certain

factors. They propose options for establishing inspection intervals for each inspection type. An inspection interval tolerance of 3 months beyond the inspection date is proposed. Specific criteria would be established to allow for extended routine inspection intervals up to 48 months, and 72 months for underwater inspections. Similarly, proposed requirements are described to enable the establishment of more rigorous, risk-based intervals in consideration of certain factors associated with bridges for routine, underwater, and nonredundent steel tension member inspections that would allow some inspection intervals to be up to 72 months.

The proposed regulations require written reports to FHWA of critical findings identified during inspections and they provide minimum criteria for what a critical finding is, for national consistency. The regulations also propose that a bridge inspection organization is to provide information to FHWA for annual compliance reviews.

The regulations propose new time frames for updating inventory data, and a process for tracking the updates of inventory data. In addition, they propose a new document to identify data items for the National Bridge Inventory. This document, “Specifications for the National Bridge Inventory,” is proposed to replace the “Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation’s Bridges.”

### **III. Costs and Benefits**

The FHWA estimated the incremental costs associated with the requirements proposed in this regulatory action that represent a change to current practices for State departments of transportation (State DOT), Federal agencies, and Tribal governments. The FHWA derived the costs of components by assessing the expected increase in level

of effort from labor and additional capital needed to standardize and update NBIS practices.

The FHWA multiplied the level of effort, expressed in labor hours, with a corresponding loaded wage rate that varied by the type of laborer needed to perform the activity to estimate costs.<sup>1</sup> Where necessary, capital costs were included, as well. Following this approach, the annualized cost of this rule, discounted to 2018 using a 7 percent discount rate, is \$1.65 million expressed in 2016 dollars over the 10-year analysis period. The vast majority of the costs associated with this rulemaking are necessary to implement 23 U.S.C. 144, as amended by MAP-21.

The FHWA expects that, upon implementation, the proposed rule would result in significant benefits, although they are not easily quantifiable. Specifically, FHWA expects this proposed rule to result in improved bridge condition-related project, program, and policy choices due to improved data. In addition, the proposed rule would help focus the Federal-aid highway program on achieving improved bridge performance outcomes.

## **Background**

The FHWA bridge inspection program regulations were developed as a result of the Federal-Aid Highway Act of 1968 (Pub. L. 90–495, 82 Stat. 815), which required the Secretary of Transportation to establish the NBIS to ensure the safety of the traveling public on highway bridges, and directed the States to maintain an inventory of Federal-aid highway system bridges. The Federal-Aid Highway Act of 1970 (Pub. L. 91–605, 84

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<sup>1</sup> Bureau of Labor Statistics Employee Cost Index, 2016

Stat. 1713) limited the NBIS to bridges on the Federal-aid highway system. The Surface Transportation Assistance Act of 1978 (Pub. L. 95–599, 92 Stat. 2689) extended the NBIS requirements to bridges on all public roads. The Surface Transportation and Uniform Relocation Assistance Act of 1987 (Pub. L. 100–17, 101 Stat. 132) expanded the scope of highway bridge inspection programs to include special inspection procedures for fracture critical members and underwater inspection. Section 1111 of MAP-21 modified 23 U.S.C. 144 by revising the NBIS and adding requirements for a parallel NTIS framework. The FHWA adopted procedures for the NTIS via rulemaking on July 14, 2015, at 80 FR 41350. In order to update the NBIS regulations for MAP-21, and to align them with the successful procedures in place for NTIS, FHWA proposes a number of changes to 23 CFR part 650.

The framework of this proposed regulation is aligned with the current NBIS framework. Both start with sections discussing the purpose, applicability, and definitions. These are followed by sections on organization responsibilities, qualifications of select personnel, inspection interval, and inspection procedures. The current and proposed regulation end with sections on inventorying bridges, submitting data, and incorporated references. Specific discussions on each section are detailed later.

The FHWA is required by 23 U.S.C. 144(h), as amended by MAP-21, to update the NBIS to address the methodology, training, and qualifications for inspectors, as well as the frequency of bridge inspections. In carrying out the MAP-21 provisions, the Secretary is required to consider a risk-based approach to determining the frequency of bridge inspections.

The NBIS is required by 23 U.S.C. 144(h)(2), as amended by MAP-21, to specify the method by which the inspections shall be carried out by the States, Federal agencies, and Tribal governments, or their agents. The NBIS is also required to establish the maximum time period between inspections and the qualifications for those charged with carrying out the inspections. The NBIS requires each State, Federal agency, and Tribal government to maintain and make available to the Secretary, on request, written reports on the results of highway bridge inspections and notations of any action taken pursuant to the findings of the inspections and current inventory data for all highway bridges reflecting the findings of the most recent inspections conducted. The NBIS is to establish a procedure for national certification of highway bridge inspectors.

A requirement was introduced in 23 U.S.C. 144(d)(2), as amended by MAP-21, for each State and Federal Agency to report element level bridge inspection data to the Secretary, as each bridge is inspected, for all highway bridges on the NHS.

The Secretary is required by 23 U.S.C. 144(h)(3)(B), as amended by MAP-21, to establish procedures for States in reporting critical findings relating to structural or safety-related deficiencies of highway bridges and reports on subsequent monitoring activities and corrective actions taken in response to a critical finding.

## **Section-by-section Discussion of the Proposal**

### **Section 650.301 Purpose**

The FHWA proposes to amend § 650.301 and be consistent with the amendments made by Section 1111(a) of MAP-21. The purpose of the NBIS is to set the national minimum standards for the proper inspection and evaluation of all highway bridges for

safety and serviceability and to prepare and maintain an inventory of all bridges. The phrase “preparing and maintaining an inventory” of all bridges is proposed to be added to this section to align with 23 U.S.C. 144(h)(2)(D).

### **Section 650.303 Applicability**

The FHWA proposes to amend § 650.303 to clarify the application of the NBIS to privately owned bridges. This will also align the NBIS with the NTIS. The NBIS applies to all highway bridges located on all public roads, on and off Federal-aid highways, including tribally owned, federally owned, and privately owned bridges connected to a public road on each end. The term “public road” is defined in 23 U.S.C. 101 as “any road or street under the jurisdiction of and maintained by a public authority and open to public travel.” A “public authority” is defined in 23 U.S.C. 101 as a Federal, State, county, town, or township, Indian Tribe, municipal or other local government with authority to finance, build, operate, or maintain toll or toll-free facilities.

Because of the seamless nature of the transportation infrastructure across the Nation, the motoring public generally is unaware of the difference between a privately owned and publicly owned highway bridge while traveling within a State, Federal land, or Tribal land. Therefore, State DOTs, Federal Agencies, and Tribal governments are responsible for ensuring the safety of the traveling public at all times by requiring all bridges on public roads within their boundaries to be inspected in accordance with the NBIS. State DOTs, Federal agencies, and Tribal governments are also responsible for ensuring all privately owned bridges that are connected to a public road on each end of such bridges, receive a proper inspection and evaluation.

The inspection of privately owned bridges connected to privately owned roads that are open to the public are not typically the responsibility of the public authority. State DOTs, Federal agencies, and Tribal governments are strongly encouraged to inspect or cause the inspection of these bridges in accordance with the NBIS.

### **Section 650.305 Definitions**

The FHWA proposes to modify § 650.305 to clarify existing definitions, introduce definitions for new terms, and delete definitions that are no longer needed. In several cases, the changes in definitions are aligned with the NTIS.

The FHWA is proposing seven new definitions associated with the concept of the more rigorous assessment of risk in establishing inspection intervals. *Attribute* is used to describe characteristics that affect the reliability of a bridge. *Consequence* is used to describe the impacts if the bridge is allowed to deteriorate to a point a critical finding needs to be addressed. *Damage mode* is used to identify ways a bridge can deteriorate or be damaged by external events. *Probability* is used to identify the likelihood a damage mode may occur before the bridge's next inspection. *Risk* is proposed as a combination of the probability of an event occurring and its consequence. *Risk assessment panel* is proposed to describe the type of expertise needed for the more rigorous assessment of risk to establish inspection intervals. And, *Service inspection* is proposed as a new inspection type when there is a considerable amount of time between routine inspections. See the discussion of the Method 2 risk assessment process under § 650.311 for further explanation of these terms.

The definition of the term *Bridge* is proposed to be modified to clarify that a multiple pipe structure meeting the geometric requirements in the definition is a bridge.

The proposed modifications to the *Bridge inspection experience* definition clarify that some of the required experience may come from relevant bridge design, bridge construction, and bridge maintenance experience provided it develops the skills necessary to properly perform a NBIS bridge inspection.

The definition for *Complex bridge* is proposed to be deleted and replaced by a new definition for *Complex feature*. The proposed *Complex feature* definition strategically focuses an inspection on those parts of bridges that warrant additional attention due to their inherent complexity rather than an entire bridge that may have many other noncomplex elements.

Element level data for bridges on the NHS is required to be reported to FHWA by 23 U.S.C. 144(d)(2). A definition for *Element level bridge inspection data* is proposed to establish a uniform understanding of the data to be reported in order to satisfy the legislative requirement. *Element level bridge inspection data* would be defined as quantitative condition assessment data, collected during bridge inspections, that indicates the severity and extent of defects in bridge elements. The proposed definition is consistent with the common understanding of element level bridge inspection data that has existed in the highway bridge community for many years.

The term *End-of-course assessment* is proposed in the revisions to § 650.309. A definition is proposed to establish a uniform understanding that students who complete

the various types of inspection training will be evaluated through the use of comprehensive examinations.

The definitions for *Fracture critical member* and *Fracture critical member inspection* are proposed to be deleted and replaced with new definitions for the new terms *Nonredundant member* and *Nonredundant steel tension member (NSTM) inspection*. See the proposed definitions below.

The definition of *Initial inspection* is proposed to be revised to clarify the data that is to be provided as part of the first inspection of a highway bridge and is to include a full inspection of all members of the bridge, including the nonredundant steel tension and underwater members. The definitions for *In-depth inspection* and *Routine inspection* are proposed to be revised to provide more clarity and to align with the definitions in the NTIS.

A new definition is proposed to clarify that the *Inspection date* is the date on which an inspection begins. In addition, a new definition is proposed for *Inspection due date* to identify when the next inspection must begin.

A new definition is proposed to clarify that an *Inspection report* is the document which summarizes inspection findings, results, and recommendations of the inspection for a bridge. The proposed definition also makes it clear that the report must be signed by a team leader.

A new definition is proposed for *Inventory data* to clarify that these terms include all data reported to the National Bridge Inventory in accordance with the “Specifications for the National Bridge Inventory.” A new *Load posting* definition is proposed to expand

upon the definition of posting that exists in the American Association of State Highway and Transportation Officials “Manual for Bridge Evaluation” (AASHTO MBE). The proposed definition clearly states that the signing must be in accordance with the FHWA “Manual for Uniform Traffic Control Devices.”<sup>2</sup> All of these standards are proposed to be incorporated by reference.

Pursuant to 23 U.S.C. 144(h)(2)(E), procedures are required to be established within the NBIS for the national certification of bridge inspectors. Accordingly, the proposed definition for the new term *Nationally certified bridge inspector* is a team leader meeting the requirements of § 650.309(b). The team leader position has existed for many years and is ingrained in the National Bridge Inspection Program. The team leader is the on-site individual in charge of an inspection team and responsible for planning, preparing, performing, and reporting on bridge field inspection. It is logical and efficient to align the national certification expectations with the national qualification requirements that are proposed for team leaders. Each State DOT, Federal agency, and Tribal government may require higher requirements for their team leaders than in the NBIS which could require additional training, education or experience of a *Nationally certified bridge inspector* to practice as team leader within the respective State DOT, Federal agency, and Tribal government.

The FHWA proposes to delete the definition of *National Institute for Certification in Engineering Technologies (NICET)* to be consistent with the proposed changes to § 650.309. The material used in the current NICET certification for bridge inspectors is out

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<sup>2</sup> 23 CFR 655.601, <https://mutcd.fhwa.dot.gov/>

of date. The FHWA does not control the NICET certification process and is not authorized to require that it be updated and maintained.

The FHWA proposes a definition of *Nonredundant member* for this regulation that more accurately reflects the engineering basis for identifying bridge members in this category.

A definition for the proposed term *Nonredundant steel tension member inspection training* is included in order to align with the proposed requirements in § 650.309(c) for training of team leaders who inspect NSTMs on bridges.

A new definition of *Plan of action (POA)* is proposed in order to establish uniformity and a level of consistency in the procedures bridge inspectors and engineers adhere to in managing bridges in their inventory that are determined to be scour critical or have unknown foundations.

A new definition of *Procedures* is proposed to be added to the rule in order to clarify what FHWA means by this term which is used extensively throughout this rule.

The FHWA proposes to modify the definition of *Professional engineer* to better align with the definition of the same term used in the NTIS.

The FHWA proposes to revise the definition of *Program manager* to reflect the possibility that there may be multiple individuals who serve in this role within an organization. The proposed § 650.307(g) requires that when there is more than one program manager, there must be one lead program manager who is responsible for coordinating the NBIS policies and procedures throughout the State, Federal agency, or Tribal government land. In addition, the proposed definition clarifies that program

managers have an overall responsibility for ensuring that load ratings and load postings are completed since they are ultimately responsible for everything associated with the bridge inspection program.

A new definition of *Safe load capacity* is proposed in order to convey the term as used in § 650.311(a)(3). The wording of the definition comes directly from section 1.5 of the AASHTO MBE.

A new definition of *Scour appraisal* is proposed to define that either observed or evaluated scour will control the scour critical determination.

The current *Special inspection* definition is proposed to be revised to clarify that a bridge that does not have defects may need a special inspection when the bridge has details or characteristics that have been known to result in defects.

A new definition of *Special permit load* is proposed in order to define the term used in § 650.313(c)(3). The definition is intended to capture live loads crossing a bridge that do not conform with legal vehicles nor routine permit vehicles.

The current *Team leader* definition is proposed to be revised to clarify that the team leader is the individual on site during inspections. Team leaders would have some field inspection experience and meet the requirements of a team leader in § 650.309(b).

Inspection requirements for temporary bridges are proposed in § 650.313(a)(3). Accordingly, a definition of the new term *Temporary bridge* is proposed to identify the population of bridges to which the § 650.313(a)(3) requirements would apply.

The term *Underwater diver bridge inspection training* is proposed to be renamed *Underwater bridge inspection training* to align with the proposed language changes in the § 650.309.

### **Section 650.307 Bridge inspection organization responsibilities**

The FHWA proposes to amend § 650.307 to clarify the responsibilities of the State DOT's, Federal agency's, and Tribal government's bridge inspection organization. The documented policies and procedures referenced in § 650.307 would further support compliance with the inspection procedure provisions of § 650.313. Documented processes serve as the foundation for any successful business practice and have many benefits. They are key characteristics to ensuring continuity and uniformity in the bridge inspection operation. Other benefits of documented processes include ensuring that staff have a clear understanding of their responsibilities and authority in performing their day to day functions, describing the accountability of staff within the organization, ensuring program compliance with regulations and policies, serving as a resource for new staff, and providing a method for managing risk.

The FHWA proposes to amend the title of § 650.307 Bridge inspection organization by adding the term *responsibilities*. The reason for this modification is to make the title consistent with the requirements of this section, which are focused on the responsibilities of a bridge inspection organization. This is consistent with the NTIS.

The FHWA proposes to amend § 650.307(a) and (b) to clarify the responsibilities of the State DOTs and Federal agencies. The phrase "must inspect, or cause to be inspected, all highway bridges" is proposed to be replaced with "perform, or cause to be

performed, the proper inspection and evaluation of all highway bridges” to be consistent with the language of 23 U.S.C. 144(h)(1)(A). Also, FHWA proposes to remove the term “public roads” from § 650.307(a) and (b) for consistency with the proposed changes to § 650.303.

The FHWA proposes to amend § 650.307(c) through (e) to accommodate new additions and to clarify current requirements. In accordance with 23 U.S.C. 144(h)(2), FHWA proposes a new § 650.307(c) that establishes the bridge inspection responsibilities of Tribal governments.

The FHWA proposes a new § 650.307(d) to address the bridge inspection responsibilities of jointly owned bridges that involve bordering States or combinations of State DOTs, Federal agencies, or Tribal governments ownership, or different entities within a State, or Federal, or Tribal jurisdiction. The FHWA’s experience is that in some instances there has not been a clear delineation of the inspection responsibilities of border bridges between the affected agencies. The lack of a clear delineation of inspection responsibilities can lead to undue delays in conducting and completing the required inspections, and in the overall management of the bridge. To align the NBIS process with that of the existing requirements in the NTIS, this proposed language would require the affected agencies to have a written agreement in place to clarify the NBIS-related responsibilities for each agency for that particular bridge and help ensure that timely bridge inspections and follow-up actions are accomplished in accordance with these standards.

The FHWA proposes to replace current § 650.307(c)(1) and (2) with § 650.307(e)(1) through (11) to clarify the responsibilities of the bridge inspection organization for each State DOT, Federal agency, and Tribal government. In accordance with 23 U.S.C. 144(h)(2), FHWA proposes adding “Tribal government” to the proposed § 650.307(e), which would require each Tribal government with highway bridges open to the public on its land to provide for a bridge inspection organization responsible for addressing the various requirements in these standards. A Tribal government may delegate its responsibilities under this subpart to the Bureau of Indian Affairs (BIA) if the BIA agrees. A Tribal government that does not delegate its responsibilities to BIA would need to provide a bridge inspection organization.

The FHWA proposes to replace § 650.307(c)(1) with the new § 650.307(e)(1). The phrase “Developing and implementing written” is proposed to be added to the existing section to clarify the intent that bridge inspection organizations are to have documented policies and procedures.

The FHWA proposes a new § 650.307(e)(2), which would require each bridge inspection organization to have documented policies and procedures for setting inspection intervals as required under § 650.311.

The FHWA proposes a new § 650.307(e)(3), which would require each bridge inspection organization to document the roles and responsibilities of personnel involved in carrying out the requirements of the respective bridge inspection programs of the State DOTs, Federal agencies, and Tribal governments.

The FHWA proposes a new § 650.307(e)(4), which would require each bridge inspection organization to maintain a central registry of nationally certified bridge inspectors that are performing bridge inspections in their respective State, Federal, or Tribal government jurisdiction. This proposal is aligned with the requirements in the NTIS. This proposed requirement further clarifies the roles and responsibilities within the bridge inspection organization.

The FHWA proposes a new § 650.307(e)(5), which clarifies the intent of the current § 650.307(c)(2) that each bridge inspection organization is to have documented policies and procedures for managing bridge inspection reports and files.

The FHWA proposes a new § 650.307(e)(6), which clarifies the intent of the current § 650.307(c)(1) that each bridge inspection organization is to perform quality control and quality assurance.

The FHWA proposes a new § 650.307(e)(7), which clarifies the intent of the current § 650.307(c)(1) that each bridge inspection organization is to prepare and maintain bridge inventory data.

The FHWA proposes a new § 650.307(e)(8), which clarifies the intent of the current § 650.307(c)(2) that each bridge inspection organization is to have documented policies and procedures for load rating, load posting, and determining other restrictions. The current § 650.307(c)(2) does not include the phrase "...load posting, and determining other restrictions;" however, these are typically associated with load ratings, and thus would be added for clarity.

In accordance with 23 U.S.C. 144(h)(3)(B), FHWA proposes a new § 650.307(e)(9), which would require each bridge inspection organization to have documented policies and procedures for managing critical finding activities.

The FHWA proposes a new § 650.307(e)(10), which would require each bridge inspection organization to have documented policies and procedures for managing scour appraisals and associated plans of action that may result from such appraisals.

The FHWA proposes a new § 650.307(e)(11), which would require each bridge inspection organization to perform all other requirements of the NBIS that otherwise were not listed in this section.

The FHWA proposes to redesignate § 650.307(d) to § 650.307(f) and amend the content to clarify the functions that may be delegated as well as the documentation required for such delegation to occur. The FHWA's observation and experience is that the lack of clear and documented delegation of functions leads to situations of misunderstanding and disagreement among organizations. For example, there have been instances in which the lack of clearly documented delegations has led to delinquent inspections, neglected load postings, and delayed repairs. The States in these instances did not have a clear understanding as to what authority it had over the owners of these bridges, which led to inaction to correct these issues. A documented and agreed upon delegation of responsibilities could have prevented these situations. This proposal is aligned with the NTIS.

The FHWA proposes to redesignate § 650.307(e) to § 650.307(g) and amend the content to clarify that the intent is not to limit an agency to a single program manager. Rather an agency may organize itself so that it may have more than one program manager. In the event of an agency having more than one program manager fulfilling the responsibilities described in these standards, the agency would be required to identify a lead program manager to serve as the main point of contact. If any Tribal governments delegate their responsibilities under this subpart to BIA, a qualified employee of BIA may serve as the program manager for all such Tribal governments.

### **Section 650.309 Qualifications of personnel**

In § 650.309(a), FHWA proposes to clarify what is intended by successful completion of the comprehensive bridge inspection training by adding language defining a minimum passing score on an end-of-course assessment that is part of the comprehensive bridge inspection training, which is consistent with the NTIS. The 70 percent minimum passing score is proposed to align with the National Highway Institute's (NHI) threshold for issuance of continuing education units for students of its training courses. This is not intended to require current program managers who have successfully completed prior versions of the comprehensive bridge inspection training course to retake the course and achieve a minimum score on an end-of-course assessment. Completion of this training under prior regulations will satisfy the intent of this requirement. The FHWA proposes a new § 650.309(a)(3) that moves bridge inspection refresher training from current § 650.313(g). The FHWA proposes that program managers must complete 18 hours of FHWA-approved bridge inspection

refresher training every 60 months, which is consistent with the NTIS. This is proposed to address concerns from stakeholders that the current regulation is not specific enough and results in a lack of national uniformity in the duration and content of the training. The NHI has a Bridge Inspection Refresher training course that offers 18 hours of training, and FHWA believes taking this course once every 60 months is reasonable. The FHWA also recognizes that some stakeholders have their own bridge inspection refresher programs that may comply with the NBIS training requirements.

The 18 hours of training would not have to be continuous and may be accumulated through multiple training events over a 60-month period. However, the program manager would be required to have the 18 hours of training during any 60-month time period that is reviewed by FHWA. For example, a program manager could not take the training at the beginning of one 60-month period and then again at the end of the next 60-month period as in between those trainings there would be a period of 60 months that no training was taken.

The FHWA proposes a new § 650.309(a)(4), which would require program managers to maintain the documentation needed to ensure that the qualifications of this section are met. The FHWA proposes to amend § 650.309(a) to allow current program managers who do not meet the proposed program manager qualifications to fulfill all requirements of this section within 24 months of the effective date of the final rule. During this time period, program managers may maintain their current role.

In § 350.309(b), FHWA proposes to reorganize the section by clearly defining two requirements that apply to all team leaders and then listing four ways to meet the

remaining requirements for team leaders. The FHWA proposes to clarify what constitutes successful completion of the comprehensive bridge inspection training by adding language defining a minimum passing score on an end-of-course assessment. The 70 percent minimum passing score is proposed to align with NHI's threshold for issuance of continuing education units for students of its training courses, which is consistent with the NTIS. This is not intended to require current team leaders who have successfully completed prior versions of the comprehensive bridge inspection training course to retake the course and achieve a minimum score on an end-of-course assessment. Completion of this training under prior regulations would satisfy the intent of this requirement.

The FHWA proposes a new § 650.309(b)(2) for team leaders that moves required bridge inspection refresher training to this section from current § 650.313(g).

The FHWA proposes that team leaders must complete 18 hours of FHWA-approved bridge inspection refresher training every 60 months, which is consistent with the NTIS. This proposed requirement addresses concerns from stakeholders that the current regulation is not specific enough and results in a lack of national uniformity in the duration and content of the training. The NHI has a Bridge Inspection Refresher training course that offers 18 hours of training and FHWA believes that taking this course once every 60 months is reasonable. The FHWA also recognizes that some stakeholders have their own bridge inspection refresher programs which meet NBIS training requirements and may be a viable option to team leaders.

The 18 hours of training would not have to be continuous and may be accumulated through multiple training events over a 60-month period. However, the

team leader must have the 18 hours of training during any 60-month time period that is reviewed. For example, a team leader could not take the training at the beginning of one 60-month period and then again at the end of the next 60-month period as in between those trainings there would be a period of 60 months that no training was taken.

The FHWA proposes a new option in § 650.309(b)(3)(i) that allows a Professional Engineer with 6 months of bridge inspection experience to be a qualified team leader, assuming other requirements of § 650.309(b) are met. The bridge inspection experience requirement is proposed to ensure that all team leaders have some experience and are familiar with the collection and recording of bridge inspection information as well as the process and procedures associated with bridge inspection activities. The FHWA proposes to delete the team leader qualification option of using the NICET certification. The FHWA does not control the NICET certification process and is not authorized to require that it be updated and maintained. The FHWA proposes to add engineering technology as an eligible degree to § 650.309(b)(3)(iii)(A), which is consistent with the language used in § 650.309(b)(3)(iv)(A).

The FHWA proposes a new § 650.309(b)(4) to ensure that the program manager receives the documentation from team leaders to verify that they meet the qualifications of this section. Part of this verification involves the program manager's review and approval of the team leader's bridge inspection experience as defined in § 650.305. The FHWA proposes to amend § 650.309(b) to allow current team leaders who do not meet the proposed team leader qualifications 24 months from the effective date of the final rule

to fulfill all requirements of this section. During this time period, team leaders may maintain their current role.

The FHWA proposes a new § 650.309(c) that establishes additional requirements for team leaders of NSTM inspections. The FHWA proposes that team leaders on these inspection types must complete additional training on NSTM inspections and achieve a minimum passing score on an end-of-course assessment. The proposed § 650.309(c)(2) is to ensure that team leaders of NSTM inspections possess the higher level of training commensurate with the importance of these members within a bridge system. The 70 percent minimum passing score for this training is proposed to align with NHI's threshold for issuance of continuing education units for students of its training courses. The FHWA proposes to allow current team leaders who no longer meet these proposed team leader qualifications to fulfill all requirements of this section within 24 months of the effective date of the final rule. During this time period, team leaders may maintain their current role.

The FHWA proposes to eliminate current § 650.309(c), which required each State DOT and Federal agency to have one person with the overall responsibility for load rating because the requirement does not align with the structure and function of some organizations. Due to this proposed deletion, FHWA proposes to modify the definition for program manager in § 650.305 to include responsibilities for load rating and load posting because this individual(s) is ultimately responsible for everything associated with the bridge inspection program.

The FHWA proposes a new § 650.309(d), requiring that load ratings be performed by, or under the direct supervision of, a registered professional engineer (PE). The FHWA acknowledges that bridge inspection organizations can be structured differently, which may result in one or more individuals performing these functions. The intent of this proposal is not to require everyone involved in the load rating and load posting processes to be a PE, but rather to ensure that the individuals performing the load rating, or those supervising the individuals performing the load rating, are PEs. The FHWA believes the PE requirement is necessary because load ratings require engineering calculations, evaluations, and judgments and are vitally important to the safety of the travelling public. This proposal is aligned with the NTIS.

The FHWA proposes in § 650.309(e) (current § 650.309(d)), to remove the comprehensive bridge inspection training as an option for an underwater bridge inspection diver to satisfy the training requirement. Robust underwater bridge inspection training was not readily available when this regulation was updated in 2004 and the comprehensive bridge inspection training was an acceptable alternate. Today, underwater bridge inspection training is readily available and the level of detail in this training to prepare underwater bridge inspection divers is much greater than the comprehensive bridge inspection training. In addition, FHWA proposes to add language defining a minimum passing score on an end-of-course assessment that is part of the underwater bridge inspection training. The proposed 70 percent minimum passing score aligns with NHI's threshold for issuance of continuing education units for students of its training courses. The proposed requirement of § 650.309(e) for underwater inspection

diver applies to personnel performing the physical inspection of the underwater portion of the bridge. Non-inspection personnel supporting the underwater bridge inspection diver, such as the tender or safety diver, are not required to meet the proposed requirement of § 650.309(e).

The FHWA proposes a new § 650.309(f), requiring State DOTs, Federal agencies, and Tribal governments to determine the qualifications for the inspection personnel used on damage, service, and special inspections. This proposal provides flexibility to bridge inspection organizations for determining the personnel to be used on damage, service, and special inspections as these inspection protocols can vary widely. The FHWA proposes this section to clarify that State DOTs, Federal agencies, and Tribal governments are to define the qualifications for personnel involved in these inspections.

The FHWA proposes two options for acceptable bridge inspection training that fulfills the requirements for comprehensive bridge inspection training, bridge inspection refresher training, underwater bridge inspection training, and NSTM inspection training. These options are to provide flexibility to bridge inspection organizations. One proposed option is the NHI's training courses, and the second proposed option allows for State, federally, and tribally developed training courses. The FHWA proposes to describe what training elements are needed in each of the NHI courses. For the second option, FHWA proposed the alternate training materials and end-of-courses assessments must include all the topics from the NHI courses and be submitted to FHWA for approval to ensure national consistency in course content and certification. It is the intent of FHWA that any program manager, team leader, or underwater bridge inspection diver who successfully

completes an alternate course developed by a State, Federal agency, or Tribal government will meet the basic training necessary in this regulation to perform these roles for any State, Federal agency, or Tribal government.

The FHWA proposes that the program manager must review the approved alternate training courses at least once every 5 years to ensure that the material being delivered to bridge inspection personnel is still current and relevant. The FHWA proposes that any modifications and updates to the training material approved under the current regulation are to be resubmitted to FHWA for review and approval to ensure national consistency. Finally, FHWA proposes to amend this section by allowing State DOTs and Federal agencies with currently approved alternate training courses 24 months from the effective date of the final rule to review and modify, as necessary, course material (and end-of-courses assessments) to meet the proposed requirements. When a stakeholder determines a previously approved training course needs to be modified to maintain compliance, the course material and end-of-courses assessments must be resubmitted to FHWA for approval within 24 months of the effective date of the final rule before it can be offered.

The FHWA would make NHI bridge inspection course materials available to State DOTs, Federal agencies, and Tribal governments through a formal written agreement. The written agreement would establish controls on use of the material and the qualifications of those who deliver the training. The listing of the bridge inspection courses available would be: FHWA-NHI-130053 Bridge Inspection Refresher Training, FHWA-NHI-130054 Engineering Concepts for Bridge Inspectors, FHWA-NHI-130055

Safety Inspection of In-Service Bridges, FHWA-NHI-130056 Safety Inspection of In-Service Bridges for Professional Engineers, FHWA-NHI-130078 Fracture Critical Inspection Techniques for Steel Bridges, and FHWA-NHI-130091 Underwater Bridge Inspection.

### **Section 650.311 Inspection interval**

The FHWA proposes that the current section title “Inspection frequency” be changed to “Inspection interval.” The term interval is more accurate than frequency when referring to the time period for occurrence of inspections and is aligned with the language in the NTIS.

Existing regulations require highway bridges to be inspected at regular intervals not to exceed 24 months. The regulations also state that certain bridges require inspection at less than 24-month intervals, and require the establishment of criteria to determine the level and frequency to which these bridges are inspected. The regulations also allow bridges to be inspected at intervals greater than 24 months but not to exceed 48 months with written FHWA approval. The 2018 National Bridge Inventory shows that more than 39,000 bridges are currently inspected at intervals greater than 24 months based on FHWA approval of State developed extended interval policies.

In accordance with 23 U.S.C. 144(h)(7), FHWA proposes to amend the section to establish risk-based processes to establish intervals for routine, underwater, and NSTM inspections. The proposal includes two different options for State DOTs, Federal agencies, and Tribal governments to determine the proper inspection interval. The

Method 1 option presents a simplified assessment approach while the Method 2 option presents a more rigorous assessment methodology.

The FHWA proposes to redesignate the current § 650.311(a)(1) to proposed § 650.311(a)(1)(i).

The FHWA proposes to redesignate and amend the current § 650.311(a)(2), to proposed § 650.311(a)(1)(ii), to require that the criteria by which bridges are to be inspected at less than a 24-month interval must be documented. The amendment also adds more items to the list of criteria to be considered for a routine inspection interval less than 24 months. Lastly, the paragraph proposes minimum criteria at which routine inspections must be performed at intervals not to exceed 12 months.

The FHWA proposes to redesignate and amend § 650.311(a)(3), to proposed § 650.311(a)(1)(iii), by removing the FHWA approval process, which used FHWA Technical Advisory 5140.21 for guidance, and replacing it with a set of required criteria for when a bridge can be inspected at an extended interval of up to 48 months. The proposal is intended to provide a straightforward process for the State DOTs, Federal agencies, and Tribal governments to establish a policy for extended inspection intervals. State DOTs, Federal agencies, and Tribal governments may use their intimate knowledge of their bridge inventory and any other relevant factors to supplement these minimum criteria. The FHWA also proposes to provide State DOTs, Federal agencies, and Tribal governments that currently have approved extended interval policies 24 months from the effective date of the final rule to revise their current policies to meet these proposed criteria.

The FHWA proposes new § 650.311(a)(1)(iii)(A) through (I) to provide the minimum criteria for extended intervals for required bridge inspections. The proposed § 650.311(a)(1)(iii)(A) would require that a bridge must have a National Bridge Inspection (NBI) condition rating for the deck, superstructure, substructure, and culvert of a seven or higher to be eligible for extended intervals for inspection. This criterion is slightly more restrictive than the current FHWA Technical Advisory 5140.21 (see <http://www.fhwa.dot.gov/bridge/nbis/t514021.cfm>).

The proposed § 650.311(a)(1)(iii)(B) would require that the channel and channel protection NBI condition rating value for a bridge to be six or higher for the bridge to be eligible for an extended interval for inspection. The FHWA subject matter experts (SMEs) believe a condition rating value of six is the lowest acceptable value for a bridge to be on an extended interval without additional risk assessment. The description of a condition rating value of four (poor) states the channel has widespread moderate or isolated major defects and the bridge is at risk. The SMEs believe that without additional risk assessment, allowing a bridge with a channel or channel protection condition rating value of a five to be on extended intervals for up to four years would be too long to potentially capture when the condition of this item would become poor. This criterion is consistent with the current FHWA Technical Advisory 5140.21.

The proposed § 650.311(a)(1)(iii)(C) would require that a bridge must have an operating rating factor or legal load rating factor of at least 1.1 for all vehicles legally permitted to cross the bridge to be eligible for an extended interval for inspection. The FHWA SMEs believe a factor of 1.1 is the lowest acceptable value for a bridge to be on

an extended interval without additional risk assessment. A factor of 1.0 means the bridge has the same load carrying capacity as the legal vehicles that are allowed to use the bridge. The SMEs believe that without additional risk assessment, allowing a bridge with a factor less than 1.1 to be on extended intervals for up to four years would be too long to potentially capture deterioration of critical elements that are necessary for the safe load carrying capacity of the bridge. This criterion replaces the inventory level load rating criteria included in FHWA Technical Advisory 5140.21.

The proposed § 650.311(a)(1)(iii)(D) would make steel bridges with existing fatigue cracks, details with AASHTO “LRFD Bridge Design Specifications” fatigue categories E and E’, details with a history of fatigue cracking, and fracture-prone details ineligible for extended intervals for inspection. This is a criterion that does not exist in FHWA Technical Advisory 5140.21. It is FHWA’s position that bridges with these types of details are prone to rapid deterioration, similar to what the Daniel Webster Hoan Memorial Bridge in Milwaukee, Wisconsin experienced in December 2000, when two of the bridge's three support girders fractured and the bridge roadway sagged approximately four feet. The fractures in the steel girders occurred suddenly and propagated through the girders at an explosive rate. Due to the concern that sudden fractures could occur, FHWA SMEs believe bridges with these types of details are not suitable for an extended interval without the more extensive review process required in § 650.311(a)(2).

The proposed § 650.311(a)(1)(iii)(E) would require a bridge to have a vertical over or underclearance greater than or equal to 16’-0” for Interstates, freeways, and other arterials or 14’-0” for local roads and collectors and with no history of vehicular damage

to be eligible for an extended interval for inspection. This criterion has been modified from the current FHWA Technical Advisory 5140.21 to account for different clearances based on the functional classification of the highway and is aligned with the vertical clearance standards in the AASHTO's "A Policy of Geometric Designs of Highways and Streets, 7<sup>th</sup> Edition."

The proposed § 650.311(a)(1)(iii)(F) and (G) would require that a bridge be of specific design, material, and environments to be eligible for an extended inspection interval. The FHWA SMEs believe more complex designs and aggressive environments should not be on an extended interval without additional risk assessment that is allowed in § 650.311(a)(2). This criterion is similar to the current FHWA Technical Advisory 5140.21 used to approve extended inspection policies but provides specificity to ensure consistent application.

The proposed § 650.311(a)(1)(iii)(H) makes certain bridges ineligible for extended inspection intervals. These ineligible bridges would consist of scour critical bridges, bridges that have not been evaluated for scour (including tidal bridges and bridges with unknown foundations), or bridges where scour condition rating is below six. The FHWA SMEs believe a condition rating value of six is the lowest acceptable value for a bridge to be on an extended interval without additional risk assessment. The description of a scour condition rating of four (poor) states there is widespread moderate or isolated major scour and the bridge is at risk. The SMEs believe that without additional risk assessment, allowing a bridge with a scour condition rating value of a five

to be on extended intervals for up to four years would be too long to potentially capture when the condition of this item would become poor.

The original FHWA Technical Advisory 5140.21 did not include these criteria. The intent of FHWA is to remove structures that are vulnerable to scour from consideration for extended inspection intervals without the more extensive review process required in § 650.311(a)(2).

Finally, the proposed § 650.311(a)(1)(iii)(I) provides a list of additional criteria that would be considered to know the performance of the bridge is not a concern within the next 48 months.

The FHWA proposes a new § 650.311(a)(2), which would provide bridge inspection organizations with an optional, more rigorous, risk-based process for the determination of routine inspection intervals. This proposed paragraph is based largely on the recommendations of NCHRP Report 782 “Proposed Guideline for Reliability Based Bridge Inspection Practices.” Although the report makes mention of routine inspection intervals up to 96 months, the research recommends that routine inspection intervals up to 72 months should be pursued. Seventy-two months is the maximum inspection interval being proposed in this regulation in alignment with the research recommendation. Bridges typically exhibit structural deterioration in a controlled and stable manner over time; therefore, risk is considered to be an effective measure upon which to base the interval of inspections. When risk grows, bridges should be inspected more often, and when risk is reduced, bridges may be inspected less often.

In the development of § 650.311(a)(2), a SME, Dr. Glenn Washer, was contracted to review this one section and present comments to FHWA.

The risk considered herein refers to the development and significance of a scenario where structural safety or serviceability is lost to the point of requiring immediate action. If a bridge owner is aware of special features that may be problematic, the risk for the feature would need to be included in the assessment. This includes both loss of safe load carrying capacity, which is determined by load rating analysis and other damages involving serviceability, such as under-deck spalling or bearing support loss. Risk by basic mathematical definition is the product of the probability and consequence of an event.<sup>3</sup> Consequence herein focuses on the implications to the structure's safety and serviceability, and not necessarily the importance of the bridge or impacts to the users. Risk may be based on the frequency of events, such as in the quantitative probability of an event occurring, or on degree of belief or expectation from a panel of experienced professionals. Degrees of belief about probability can be chosen using qualitative scales, ranks or categories, such as remote/low/moderate/high or remote/unlikely/moderate/likely/almost certain.

Bridges all have features and attributes that will define the risk. Bridges all have a set of damage modes that may occur, which also define the risk. The risk of each potential damage mode must be evaluated and the one that is most critical is used to

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<sup>3</sup> National Cooperative Highway Research Program Report 782, "Proposed Guideline for Reliability-Based Bridge Inspection Practices."

select the appropriate inspection interval. Additional information can be found in the following two documents which are available on the docket: NCHRP Report 782 “Proposed Guideline for Reliability-Based Bridge Inspection Practices” and a report for FHWA “A Method for Determining the Interval for Hands-On Inspection of Steel Bridges with Fracture Critical Members” by: Robert J. Connor and Michael J. Parr, November, 2008.

The proposed process in § 650.311(a)(2) for identifying risk-based intervals involves the identification and use of an interval that is commensurate with the risk of safety or service loss in a given bridge. It provides additional flexibility to bridge inspection organizations by applying their experience and engineering judgment to determining the use of limited resources in a more optimal way across their inventory.

The proposed § 650.311(a)(2)(i) through (vi) would establish a general framework and process for assessment of risk, and provides bridge inspection organizations the latitude for exercising their interpretations in determination of probability, consequence, and risk for bridges in their inventory.

The proposed process in § 650.311(a)(2) would require that bridges be classified into one of four general risk levels for consistency and uniformity with routine inspection intervals not to exceed 12, 24, 48, and 72 months. This process allows for risk assessment by quantified statistical analysis, when possible, or by qualitative expert judgment. The expectation is that this classification would result in an appropriate distribution of bridges in the four risk categories. These risk assessment criteria would be submitted to FHWA for approval.

As part of the proposed process in § 650.311(a)(2)(i), the criteria to be used by the bridge inspection organization to determine risk would be developed and documented by consensus of at least three experts and a program manager with collective experience in bridge design, materials, including ultra-high performance concrete or similar highly durable materials, construction, inspection, and evaluation. It is recognized that there may be too few quantified measures to make mathematical risk calculations; therefore, the experience of engineers to make judgments about expected performance and outcomes would be acceptable.

Another part of the proposed process allows for applying the risk-based interval in § 650.311(a)(2) to individual bridges and a group of bridges. A bridge may have unique features or attributes that require customized risk assessment. The intent of the proposal is not to mandate the application of the rigorous risk-based approach to an entire inventory, although it is an option.

The FHWA proposes a new § 650.311(a)(3), which would require that any new, rehabilitated, or structurally modified bridge must have an initial inspection completed, be in service for 24 months, receive its next routine inspection, and have any other required NBIS inspection completed before it can be considered for a routine inspection interval greater than 24 months. It is FHWA's position that the initial inspection is needed to capture unforeseen problems in a new, rehabilitated, or modified bridge before it is allowed to be inspected at an interval longer than 24 months. This is similar to the current FHWA Technical Advisory 5140.21 used to approve extended inspection policies. The regulation differs in that the 12- to 24-month in-service period specified in

Technical Advisory 5140.21 is proposed to change in the regulation to 24 months and the in-depth inspection criterion is omitted in the regulation.

The FHWA proposes to redesignate and amend § 650.311(b)(2) to proposed § 650.311(b)(1)(ii), and to require that the criteria used to determine the interval by which underwater members are inspected at less than 60 months be documented. The proposal also adds more items to the list of criteria to be considered for an underwater inspection interval less than 60 months. Lastly, the paragraph proposes minimum criteria at which underwater inspections must be performed at intervals not to exceed 36 months.

The FHWA proposes to redesignate and amend current § 650.311(b)(3) to proposed § 650.311(b)(1)(iii) by removing the FHWA approval process and replacing it with a set of requirements for the underwater portions of a bridge to be inspected at an extended interval of up to 72 months. These criteria were developed using the current guidance from FHWA Technical Advisory 5140.21, American Society of Civil Engineers Manuals and Reports on Engineering Practice No. 101, Underwater Investigations, Standard Practice Manual and the Waterfront Facilities Inspection & Assessment Standard Practice Manual, American Society of Civil Engineers Coasts, Oceans Ports & Rivers Institute Ports and Harbors Committee Waterfront Inspection Task Committee, October 28, 2013.

The FHWA proposes a new § 650.311(b)(2), which allows the use of the more rigorous, risk-based process as described in the new § 650.311(a)(2) in determining appropriate underwater inspection intervals. For underwater inspections in this process,

bridges are to be classified into one of three general risk levels with inspection intervals not to exceed 36, 60, and 72 months.

The FHWA proposes to amend § 650.311(c) by changing the name of the section to “Nonredundant steel tension member inspections.”

The FHWA proposes to redesignate and amend § 650.311(c)(2) to proposed § 650.311(c)(1)(ii) to require that the State, Federal agency, or Tribal government must document the criteria used to determine the interval by which NSTMs are inspected at less than 24 months. The proposal also adds more items to the list of criteria to be considered for a NSTM inspection interval less than 24 months. Lastly, the paragraph proposes minimum criteria at which NSTM inspections must be performed at intervals not to exceed 12 months.

The FHWA proposes a new § 650.311(c)(1)(iii), which allows the use of the more rigorous, risk-based process as described in the new § 650.311(a)(2) in determining appropriate NSTM inspection intervals. For NSTM inspections in this process, bridges are to be classified into one of three general risk levels with inspection intervals not to exceed 12, 24, and 48 months.

The FHWA proposes to amend § 650.311(d) to require the State DOT, Federal agency, or Tribal government to document the criteria used to determine the level and interval to which damage, in-depth, and special inspections are to be completed.

The FHWA proposes a new § 650.311(e)(1), which describes bridge inspection interval tolerance. Through discussions with stakeholders and FHWA’s experience with the National Bridge Inspection Program, it was determined that a formalized inspection

tolerance period would greatly improve the management of inspection scheduling. This proposed paragraph provides a tolerance that is the inspection due date plus 3 months. Although the expectation is that the inspection due date be met, this proposed tolerance provides a 3-month time period beyond the due date for a bridge inspection organization to begin an inspection and still be in compliance with the NBIS. The next inspection due date would be established by adding the interval to the actual inspection date. Inspections done before the inspection due date would have the effect of making the following inspection due date earlier; however, with the establishment of an inspection tolerance, this should not represent a problem. Inspections beyond the inspection due date plus the tolerance would not comply with the proposed regulation provisions.

As an example, if the inspection of a bridge was performed in June 2017 and the interval for the inspection is 24 months, the next inspection due date would be June 2019. With a 3-month tolerance, the next inspection could be performed any time before the June 2019 inspection due date or in July, August, or September of 2019 and still meet the inspection tolerance. Below are three examples demonstrating how the next inspection due date would be determined for this bridge with a 24-month inspection interval depending on when the actual inspection occurred.

- If the 2019 inspection occurred in April 2019, ahead of schedule, the next inspection due date would be April 2021.
- If the 2019 inspection occurred in September 2019, within the tolerance, the next inspection due date would be September 2021.

- If the 2019 inspection occurred in October 2019, then the tolerance has been exceeded and the inspection would be out of compliance with this regulation unless prior FHWA approval was granted.

It should be noted that FHWA does not intend the normal inspection interval to be the interval plus the 3-month tolerance. The tolerance is to cover weather and other inspection program administration considerations.

The FHWA proposes a new § 650.311(e)(2). This section provides for an exception to the inspection tolerance with prior FHWA approval before the current inspection tolerance is exceeded. It is understood that unpredictable events, such as extreme weather, may make it impossible to seek prior approval, but these cases should be rare.

The FHWA proposes a new § 650.311(f). This proposed section would require that, at the completion of every inspection, the bridge information that is gathered is to be reviewed to determine if the current interval is still applicable for all inspection types or if a different interval is appropriate. This is a common practice under the current regulation; however, with the introduction of risk-based processes to establish appropriate inspection intervals into the proposed regulation, FHWA believes it is important to emphasize this step in the inspection process within the regulation.

### **Section 650.313 Inspection Procedures**

The FHWA proposes to amend § 650.313(a) to clarify the expected outcomes of an inspection by adding the phrase “to determine condition, identify deficiencies, and document results in an inspection report.” The FHWA proposes to amend the reference

to the AASHTO MBE to specifically cite Section 1.4, Section 2.1, Section 4, and Section 6. The more exact reference would point the reader to the specific material within the AASHTO MBE that is applicable to this proposed provision. In addition, FHWA proposes to clarify that an inspection plan would be required and proposes that the plan should document the inspection equipment, including advanced technologies, that are needed to complete the inspection.

Bridge inspections are multisensory operations requiring inspectors to see, feel, and listen as they perform inspections. Equipment to perform bridge inspections take on many forms, including personal safety equipment, access equipment, and tools to complete the inspection. Personal safety equipment includes items such as hard hats, vests, gloves, safety goggles, and more. Access equipment includes items such as ladders, under bridge inspection trucks, boats, and diving equipment. Tools for performing the inspection include cleaning tools (brushes, scrapers, etc.), sounding tools (hammers, chain drag, etc.), visual aid tools (binoculars, flashlights, mirrors, etc.), tools for measuring (tape measures, crack gauges, tiltmeter, etc.), and tools for documentation (cameras, kiel, clipboards, etc.).

Advancements in technology have played a critical role in the inspection program. Today, inspectors use a variety of advancements that were not commonplace decades ago. Laser measuring devices are replacing range poles and tape measures to determine bridge clearances and component lengths. Non-destructive evaluation equipment are used to assist in determining structural integrity without damaging the bridge members or to find deficiencies inside bridge members that are not visible with the naked eye. Depth

measuring and monitoring devices are helping inspectors identify scour in waterways. Computers, tablets, and other electronic devices readily replace clipboards and paper forms.

In this day of significant technological advancements, other disruptive technologies will be developed that will change the way inspectors perform bridge inspection. As they are developed, FHWA will continue to evaluate these new tools in partnership with our stakeholders and update its bridge inspection guidance document, the Bridge Inspector's Reference Manual, to allow these technological advancements to make their way into the National Bridge Inspection Program (NBIP). Two recent examples of new technologies that FHWA is evaluating are sonar technologies for underwater bridge inspection and unmanned aerial systems (UAS).

The FHWA issued a report in 2018 to evaluate the use of sonar devices for underwater inspection. The study led to two broad conclusions. First, sonar technologies offer significant opportunities for improving underwater bridge inspections, especially in adverse environments or to inspect extensive areas. Second, sonar inspections have not demonstrated the ability to identify some smaller scale elements of substructure condition that may be important in assessing the bridge and recommending maintenance. The FHWA can now use this information to identify the proper uses of this technology to replicate typical diver experience to improve diver safety without jeopardizing the safety to the public.

The FHWA is currently performing research on UAS technologies since this industry is experiencing significant growth. The ability to fly UAS into positions that are

difficult to reach by an inspector has the potential to save time, reduce costs, and improve safety margins. An increasing number of bridge owners are exploring the use of UAS for bridge inspections through pilot studies and exploring the potential of these versatile systems. The FHWA is aware of the introduction of UAS into the bridge inspection process and commissioned this research to enhance its understanding of the benefits and limitations of UAS. As this research continues, FHWA will be in a better position to provide guidance on the proper use of UAS in the NBIP.

These are just two examples of recent technological advancements the FHWA is evaluating to improve the NBIP. The FHWA will continue to monitor the advancement of UAS and other technologies and update the bridge inspection policies accordingly. The FHWA would like to hear from users of these technologies as FHWA continues its evaluation and research of these technologies to develop guidance for their use in the National Bridge Inspection Program. What bridge inspection environments are better suited for these technologies? What are minimum standards (device offset, camera resolution, optical and digital zoom capabilities, payload capacity, member cleanliness, etc.) FHWA should consider for the use of these technologies? How often should an in-depth inspection (diver be placed in the water to check the results of the sonar devices or a hands-on inspection be performed for members inspected with a UAS) to verify no defects are missed?

The FHWA proposes to establish the inspection requirements for initial, routine, and in-depth inspections in § 650.313(b) through (d), respectively, and proposes procedures be developed to inspect bridges in phased construction and temporary bridges.

For the purposes of these sections, the phrase “entire bridge being open to traffic” means construction is substantially complete and all lanes of the final cross section are completed and open to traffic. The term “phased construction” means building a bridge’s cross section in stages and opening to traffic as such until the final cross section is completed. The FHWA proposes that State DOTs, Federal agencies, and Tribal governments establish the requirements for the inspection type, inspection frequency, and inspector qualifications for bridges during phased construction and temporary bridges based upon their knowledge and practice. It is FHWA’s position that ensuring the safety of the travelling public is important during these situations.

The FHWA proposes a new § 650.313(e), to discuss underwater inspection procedures by using language from current § 650.313(e) introductory text and (e)(2). In addition, FHWA is proposing to require that the first underwater inspection for new, replaced, and rehabilitated bridges occurs within 6 months of the bridge opening to traffic. Unlike the initial inspection which is proposed to be performed before the bridge is open to traffic, FHWA realizes owners may need some discretion in scheduling this type of inspection. However, FHWA believes it is important for the safety of the travelling public that an underwater inspection occur relatively soon to understand the overall condition of the bridge and to develop a baseline for the future inspections.

The FHWA proposes a new § 650.313(f) to discuss nonredundant steel tension member inspection procedures by using language from the current § 650.313(e) introductory text and (e)(1). The paragraph also proposes to change the term fracture critical member to nonredundant steel tension member to be consistent with the other

proposed changes in §§ 650.305, 650.309, and 650.311. This paragraph also proposes to clarify that NSTM inspections must be hands-on inspections. The current regulation addresses hands-on inspection of fracture critical members in § 650.305, which FHWA believes is not an appropriate location for a procedural process. In addition, FHWA is proposing the first nonredundant steel tension member inspection for new, replaced, and rehabilitated bridges would occur within 6 months of the bridge being open to traffic. Unlike the initial inspection, which is proposed to be performed before the bridge is open to traffic, FHWA realizes owners may need some discretion in scheduling this type of inspection. However, FHWA believes it is important for the safety of the travelling public that a nonredundant steel tension member inspection occur relatively soon to understand the overall condition of the bridge and to develop a baseline for the future inspections.

The FHWA proposes to establish the requirements for NSTM, underwater, in-depth, and complex feature inspection procedures in a new § 650.313(g). These requirements were previously covered in § 650.313(e)(1) and (2) and (f). The FHWA proposes that inspection procedures for NSTM, underwater, in-depth, and complex feature inspections be in accordance with Section 4.2 of the AASHTO MBE. It is FHWA's position that the intent of § 650.313(f) still be included in the NBIS but be more strategically focused on those parts of bridges that warrant additional attention due to their inherent complexity rather than an entire bridge that may have many noncomplex and complex elements. The FHWA proposes to incorporate by reference this section of the AASHTO MBE. In addition, this section proposes to clarify that some inspection

procedures can be contained in an agency-wide procedures manual while procedures for unique situations and complex features should be bridge specific and contained in the bridge file.

The FHWA proposes to redesignate and amend the current § 650.313(b), proposed § 650.313(h). The proposal modifies the language to highlight the importance of the team leader to participate actively in the initial, routine, in-depth, NSTM, and underwater inspections.

The FHWA proposes to redesignate and amend the current § 650.313(c) to be proposed § 650.313(i). The FHWA proposes to require State DOTs, Federal agencies, and Tribal governments to establish documented procedures for timely completion of load ratings. Timely completion of load ratings is important for maintaining the safety of the traveling public; therefore, it is proposed that the time for completion of load ratings shall not exceed 3 months from the time the need for a load rating is identified by such things as a change in condition of a structural element, change in dead load, change in live load, or completion of construction. The requirement to load rate a bridge in 3 months for State and Federal agency bridges is required by the current § 650.315. The proposed provision would reduce the time for all other bridges to be load rated from 180 days to 3 months, which is aligned with the NTIS. In addition, FHWA proposes language to clarify the intent that all permit vehicles must be analyzed to ensure the bridge can safely carry the load.

The FHWA proposes to add § 650.313(j), which establishes requirements for timely installation of load posting signs aligned with the NTIS. The requirement of the

proposed § 650.313(j)(1) for load posting, which is currently addressed in the existing § 650.313(c), is also proposed to be amended by replacing the phrase “or equivalent rating factor” with “legal load rating or permit load analysis.” The reason for this proposed change is to clearly account for the Load and Resistance Factor Rating method. For the Load and Resistance Factor Rating method, a legal load rating or permit load analysis that result in a rating factor of less than one is an indication that a bridge needs to be posted. The existing regulation also does not identify a maximum timeframe for the installation of load posting signs. Timely installation of load posting signs is important for maintaining the safety of the traveling public; therefore, it is proposed that the State DOTs, Federal agencies, and Tribal governments establish procedures for timely installation of load posting signs based upon the associated risks and need. The FHWA also proposes that the maximum timeframe for proper load posting of a bridge be no more than 30 days from the time the need is identified, which is consistent with the NTIS.

The FHWA proposes to add § 650.313(k) for closing of bridges. Section 6A.8.1 of the AASHTO MBE describes that a bridge owner must close a bridge when it cannot carry three tons and lists some factors to consider when closing bridges that can carry more than three tons. It is unclear as to the type of vehicle(s) that is to be considered when a determination to close a bridge needs to be made. The proposal would require State DOTs, Federal agencies, and Tribal governments to establish condition thresholds at which a bridge must be closed. This includes identifying vehicle types for the rating analysis for the minimum load carrying capacity.

The FHWA proposes to redesignate and amend the current § 650.313(d), to proposed § 650.313(l). The FHWA proposes that the preparation and maintenance of bridge files are to be in accordance with Section 2.1 of the AASHTO MBE. The more exact reference will point the reader to the specific material within the AASHTO MBE that is applicable to this proposed provision.

The FHWA proposes to delete current § 650.313(e)(2). The requirements for underwater inspection procedures would be addressed in proposed § 650.313(g).

The use of underwater imaging technology for performing an underwater inspection is not excluded in the current or proposed NBIS; however, FHWA Technical Advisory 5140.21 clarifies minimum level I and level II inspection protocols for an underwater inspection. FHWA recently completed a research project, “Underwater Inspection of Bridge Substructures Using Underwater Imaging Technology” (<http://trid.trb.org/view.aspx?id=1328379>) to determine the effectiveness of underwater imaging technology as a possible alternative to the accepted level I underwater inspection protocols. In the meantime, there may be instances in which an underwater inspection cannot be safely performed using traditional methods. In these instances, underwater imaging technologies may be used for a level I underwater inspection. The program manager must identify and document all requirements for performing underwater acoustic imaging for underwater inspection.

The FHWA proposes a new § 650.313(m), which requires a “scour appraisal” for all bridges over water. The FHWA has interpreted existing § 650.313(e)(3) to mean that in order to determine whether a bridge requires a plan of action, the bridge owner must

first perform a scour appraisal. The scour appraisal considers both the scour evaluation and observed scour. Also, if a bridge has unknown foundations, no appraisal can determine scour susceptibility, therefore, such a bridge requires a plan of action. The intent of the proposed section is to make clear that all bridges over water must have a scour appraisal and bridges that are scour critical or have unknown foundations must have a plan of action to address the associated risks. The proposal also specifies that a plan of action document must establish a schedule for repairing or installing physical and/or hydraulic scour countermeasures, and/or the use of monitoring countermeasures that includes inspecting, closing, and opening of each applicable bridge to traffic during and after flood events to protect the traveling public. The FHWA recognizes that Hydraulics Engineering Circular (HEC) 18, 20, and 23 are the state of knowledge and practice for the appraisal, design, evaluation, observation, and inspection of stream stability, bridge scour, and scour countermeasures.

The FHWA proposes to redesignate and amend § 650.313(g) to proposed § 650.313(n). A proposed reference to Section 1.4 of the AASHTO MBE would be incorporated to improve alignment and consistency between the regulations and the AASHTO MBE. In addition, the proposed language clarifies that quality assurance is to be performed by individuals other than those who completed the initial work. The importance of documenting quality assurance activities is also emphasized through the proposed language. Documentation is important in order to track and implement improvement opportunities.

The FHWA proposes to move the requirements for periodic bridge inspection refresher training for program managers and team leaders in the current § 650.313(g) to the proposed § 650.309(a)(3) and (b)(2). This requirement is directly related to the qualifications of the program manager and team leaders rather than a bridge inspection organization's quality control (QC) and quality assurance (QA) program.

In accordance with 23 U.S.C. 144(h)(3)(b), FHWA proposes to establish procedures for States to follow in reporting information on critical findings by redesignating and amending § 650.313(h) to proposed § 650.313(o). The need for clarity in the current § 650.313(h) was identified in FHWA's Summary Report of Critical Findings Reviews for the National Bridge Inspection Standards dated December 2011 (<http://www.fhwa.dot.gov/bridge/nbip/critical.pdf>) and the initial FHWA outreach to stakeholders regarding the current NBIS. Under the proposed rule, the definition for critical finding does not substantially change from the existing regulations; however, State DOTs, Federal agencies, and Tribal governments would be required to identify what it considers a critical finding based upon the minimum requirements proposed in § 650.313(o). The FHWA proposes an improved reporting process for monitoring activities and corrective actions taken in response to critical findings.

For the proposed reporting procedures, State DOTs are to report critical findings information to their respective FHWA Division office. Similarly, Federal agencies and Tribal governments should report required information to the Federal Lands Highway Division office. Although 23 U.S.C. 144(h)(3)(B) only specifies that States are to report on critical findings, Federal agencies and Tribal governments should also report on

critical findings. The FHWA’s goal is safety and national consistency. Therefore, it is appropriate that Federal agencies and Tribal governments should follow the same procedures as those proposed for State DOTs.

Specific requirements of the proposed § 650.313(o) would direct State DOTs, Federal agencies, and Tribal governments to include in their procedures that a nonredundant bridge member on a bridge on the National Highway System with a quantity in condition state 4<sup>4</sup> is a critical finding. Bridges are composed of many members and some members may be nonredundant. The intent of the proposed requirement is to report on critical findings that affect structural, nonredundant members such as beams and piers, not members that do not affect the structural integrity of a bridge such as bridge rails and ancillary structures.

In accordance with 23 U.S.C. 144(h)(4), FHWA proposes a new § 650.313(p) to assist in FHWA’s assessment of State DOTs, Federal agencies, and Tribal governments for compliance with these standards. Although the statute only refers to States’ compliance with these regulations, Federal agencies’ and Tribal governments’ compliance with these regulations is vital to ensuring safety and consistency.

### **Section 650.315 Inventory**

The FHWA proposes to amend § 650.315(a) to replace the term “Structure Inventory and Appraisal data” with “inventory data.” The proposed term “inventory data” as defined in § 650.305 provides clarity as to the type of information that bridge

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<sup>4</sup> See the AASHTO document “Manual for Element Level Inspection.” Condition State 4 is described for each of the individual elements included in the manual.

owners would provide to FHWA for bridges subject to the NBIS. The FHWA also proposes to amend this section to add Tribal governments to be consistent with 23 U.S.C. 144(h)(2). The FHWA proposes to revise the language to align with current FHWA language requiring annual inventory data submittal.

The FHWA proposes to replace the reference to the “Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation’s Bridges” with a reference to the “Specifications for the National Bridge Inventory” in order to align with the reference in § 650.317. The FHWA proposes the addition of the requirement to include element level bridge inspection data for bridges on the NHS as required by 23 U.S.C. 144(d)(2).

The FHWA proposes to have State DOTs, Federal agencies, and Tribal governments enter changes to inventory data in § 650.315(b) for all inspection types.

The FHWA proposes to amend § 650.315(b) through (d) by replacing “SI&A data” with “inventory data.” The proposed term “inventory data” as defined in § 650.305 provides clarity as to the type of information that is to be provided for bridges subject to the NBIS. The FHWA proposes to further amend this section to add “Tribal governments” to be consistent with 23 U.S.C. 144(h)(2). The FHWA proposes to revise the requirement of submitting inventory data within 90 days to 3 months to be consistent with other proposed units of time in the NBIS. The FHWA proposes to change the requirement for submittal of inventory data for all bridges to 3 months. It is FHWA’s position that due to current technological capabilities, the current requirement of 180 days for non-State DOT- and Federal-owned bridges is an excessive amount of time for

inventory data to be submitted to a centralized database. This is also consistent with the NTIS. A 3-month limit would help keep the NBI more current. The FHWA proposes to revise the beginning of the referenced timeframe from “date of inspection” to “field portion of the inspection is completed” to clarify when the time limit starts.

The FHWA proposes to add § 650.315(e), requiring State DOTs, Federal agencies, and Tribal governments to document processes to track and measure their performance in submitting inventory data within the required time constraint.

### **Section 650.317 Reference manuals**

The FHWA proposes to amend this section by incorporating by reference the more current versions of the manuals listed and updating the section to be consistent with requirements of the Office of the Federal Register.

The AASHTO’s 2008 “Manual for Bridge Evaluations,” is proposed to be replaced with a more current edition of the “AASHTO Manual for Bridge Evaluation.” This document was developed by AASHTO to assist bridge owners by establishing inspection procedures and evaluation practices that meet the FHWA’s National Bridge Inspection Standards regulatory requirements. The manual is been divided into eight sections, with each section representing a distinct phase of an overall bridge inspection and evaluation program.

In addition, FHWA proposes to add the AASHTO’s “Manual for Bridge Element Inspection” (AASHTO MBEI), First Edition, and its Interim Revision. This document is a reference for standardized element definitions, element quantity calculations, condition state definitions, element feasible actions, and inspection conventions. Its goal is to

capture the condition of bridges in a simple, effective way that can be standardized nationwide, while providing enough flexibility to be adapted by both large and small agencies. AASHTO designed the document for use by State departments of transportation and other agencies that perform element-level bridge inspections. This reference is proposed to support the Section 1111(a) of MAP-21 for element level data to be reported to FHWA for bridges on the NHS. The AASHTO MBEI is referenced in FHWA's "Specification for the National Bridge Inventory Bridge Elements," and would establish a uniform understanding of the inventory data to be reported in order to satisfy the statutory requirement.

The FHWA proposes to incorporate by reference FHWA's "Specifications for the National Bridge Inventory" (SNBI). The SNBI details how to code and submit data gathered on highway bridges for the national bridge inventory, including items on location, structure type, condition ratings, and inspection dates. This document replaces the current Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges (Coding Guide) and define the required inventory data that is submitted to FHWA to fulfill the requirements of § 650.315. The FHWA recognizes that bridge owners reporting data would incur a one-time cost associated with changing from the Coding Guide to the SNBI. However, as many of the data items are the same or similar and there is a wide variety of data management and reporting systems being used, FHWA was unable to estimate these costs. The FHWA requests information regarding any costs associated with this proposed change.

The documents that FHWA proposes to incorporate by reference are reasonably available to interested parties, primarily State DOTs and local agencies carrying out Federal-aid highway projects. The documents listed in this section are available on the docket with this notice of proposed rulemaking and at the sources identified in the regulatory text below. The specific standards are discussed in greater detail elsewhere in this preamble.

#### **Subpart D- Highway Bridge Replacement and Rehabilitation Program**

The Highway Bridge Program was not reauthorized by MAP-21. The MAP-21 restructured core highway formula programs. Activities that were carried out under the Highway Bridge Program were incorporated into the National Highway Performance Program and the Surface Transportation Program (now Surface Transportation Block Grant Program). The Highway Bridge Program was first authorized under Section 124 of the Surface Transportation Assistance Act of 1978 (initially called the Highway Bridge Replacement and Rehabilitation Program) and was last reauthorized under Section 1114 of the Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users. As such, FHWA no longer needs the Highway Bridge Replacement and Rehabilitation Program regulations found in 23 CFR part 650, subpart D, and proposes to rescind the regulations.

#### **Subpart G – Discretionary Bridge Candidate Rating Factor**

The Discretionary Bridge Program was a component of the Highway Bridge Replacement and Rehabilitation Program. The Discretionary Bridge Program was initially authorized under Section 124 of the Surface Transportation Assistance Act of

1978, and was last reauthorized under Section 1109 of the Transportation Equity Act for the 21<sup>st</sup> Century. Since no new funds have been authorized for this program, FHWA proposes to repeal the regulations found in 23 CFR part 650, subpart G, which were used to describe the rating factors FHWA would use when awarding Discretionary Bridge Program grants.

**Executive Order 12866 (Regulatory Planning and Review), Executive Order 13563 (Improving Regulation and Regulatory Review), Executive Order 13771 (Reducing Regulations and Controlling Regulatory Costs), and DOT Regulatory Policies and Procedures**

The proposed rule is a significant regulatory action within the meaning of Executive Order (EO) 12866 and DOT regulatory policies and procedures. This action complies with EOs 12866, 13563, and 13771 to improve regulation. This action is considered significant because of widespread public interest in the safety of highway bridges, although not economically significant within the meaning of EO 12866. The FHWA has filed into the docket a Regulatory Impact Analysis (regulatory analysis or RIA) in support of the NPRM on NBIS. The regulatory analysis estimates the economic impact, in terms of costs and benefits, on Federal, State, and local governments, as well as private entities regulated under this action, as required by EO 12866 and EO 13563.

This section of the NPRM identifies the estimated costs and benefits resulting from the proposed rule in order to inform policy makers and the public of the relative value of the current proposal. The complete RIA may be accessed from the rulemaking's docket (FHWA-2017-0047) and contains a discussion of the benefits. The proposed

regulation will result in both qualitative and quantitative benefits. On the qualitative side, the rule adds several features that are aimed at improving bridge safety including, more consistent inspection procedures, better qualified inspection personnel, and reporting of structural and safety-related deficiencies. The incorporation of the more rigorous, risk-based process for the determination of routine inspection intervals can result in quantitative benefits. By assuming an additional one percent of bridges will be inspected at longer intervals, the cost analysis performed resulted in an estimated annualized savings of more than \$250,000 discounted at 7 percent, or nearly \$2.63 million dollars in the first 10 years. The proposed rule is expected to be an EO 13771 regulatory action. Details on the estimated costs of this proposed rule can be found in the rule’s economic analysis, which may be accessed from the docket.

### **Estimated Cost of the Proposed Rule**

Table 1 displays the total cost of the proposed rule for the 10-year study period (2020–29). Total annualized costs are estimated to be \$1.65 million discounted at 7 percent, and \$1.62 million discounted at 3 percent.

Table 1: Total Cost of the Proposed Rule

Cost Components	10-year Total Cost		Annualized Cost	
	0.07	0.03	0.07	0.03
Section 650.303, 650.307 -Applicability	\$3,948,096	\$4,981,212	\$562,120	\$583,950
Inspection of Bridges on and off Federal-aid Highways	-\$2,150,904	-\$2,713,740	-\$306,240	-\$318,133
Establish Inspection Organizations	\$6,099,000	\$7,694,952	\$868,360	\$902,083
Section 605.305 - Definitions	\$0	\$0	\$0	\$0

Cost Components	10-year Total Cost		Annualized Cost	
	0.07	0.03	0.07	0.03
<b>Section 650.307 - Bridge Inspection Organization Responsibilities</b>	\$1,749,810	\$1,930,116	\$249,134	\$226,268
<b>Establish Agreements for Border Bridges</b>	\$1,520,985	\$1,641,414	\$216,554	\$192,424
<b>Maintain Registry of Certified Inspectors</b>	\$228,824	\$288,702	\$32,579	\$33,845
<b>Section 650.309 - Qualifications of Personnel</b>	\$2,683,459	\$3,029,054	\$382,064	\$355,098
<b>Refresher Training for Program Managers and Team Leaders</b>	\$1,226,175	\$1,438,843	\$174,580	\$168,676
<b>Training on NSTM Inspections for Team Leaders</b>	\$1,271,182	\$1,371,831	\$180,988	\$160,820
<b>Proprietary Training Review</b>	\$186,102	\$218,379	\$26,497	\$25,601
<b>Section 650.313 - Inspection Procedures</b>	\$2,055,326	\$2,394,884	\$292,632	\$280,754
<b>Initial and Routine Inspections for Bridges with Phased Const. or Temp. Bridges</b>	\$438,203	\$552,870	\$62,390	\$64,813
<b>Written Policies for Closing Bridges</b>	\$1,086,418	\$1,172,438	\$154,681	\$137,446
<b>Critical Findings Reporting and Tracking</b>	\$530,704	\$669,576	\$75,560	\$78,495
<b>Section 315 - Inventory</b>	\$1,186,836	\$1,497,400	\$168,979	\$175,541
<b>Bridge Inventory for Tribal Governments</b>	\$1,186,836	\$1,497,400	\$168,979	\$175,541
<b>Total Cost of Proposed Rule</b>	\$11,623,526	\$13,832,666	\$1,654,929	\$1,621,610

## Regulatory Flexibility Act

In compliance with the Regulatory Flexibility Act (Pub. L. 96–354, 5 U.S.C. 601–612), FHWA has evaluated the effects of this NPRM on small entities. Because the regulations are primarily intended for States and Federal agencies, FHWA has determined that the action is not anticipated to have a significant economic impact on a

substantial number of small entities. States and Federal agencies are not included in the definition of small entity set forth in 5 U.S.C. 601. Therefore, FHWA certifies that the action will not have a significant economic impact on a substantial number of small entities.

### **Unfunded Mandates Reform Act of 1995**

The FHWA has determined that this NPRM will not impose unfunded mandates as defined by the Unfunded Mandates Reform Act of 1995 (Pub. L. 104-4, March 22, 1995, 109 Stat. 48). The NBIS is needed to ensure safety for the users of the Nation's bridges and to help protect Federal infrastructure investment. As discussed above, FHWA finds that this regulatory action will not result in the expenditure by State, local, and Tribal governments, in the aggregate, or by the private sector, of \$155,000,000 or more in any one year (2 U.S.C. 1532). In addition, the definition of "Federal mandate" in the Unfunded Mandates Reform Act excludes financial assistance of the type in which State, local, or Tribal governments have authority to adjust their participation in the program in accordance with changes made in the program by the Federal Government. The Federal-aid highway program permits this type of flexibility.

### **Executive Order 13132 (Federalism Assessment)**

The FHWA has analyzed this NPRM in accordance with the principles and criteria contained in EO 13132. The FHWA has determined that this action will not have sufficient federalism implications to warrant the preparation of a federalism assessment. The FHWA has also determined that this action will not preempt any State law or State

regulation or affect the States' ability to discharge traditional State governmental functions.

**Executive Order 12372 (Intergovernmental Review)**

The regulations implementing EO 12372 regarding intergovernmental consultation on Federal programs and activities apply to this program. Local entities should refer to the Catalog of Federal Domestic Assistance Program Number 20.205, Highway Planning and Construction, for further information.

**Paperwork Reduction Act**

Under the Paperwork Reduction Act of 1995 (PRA) (44 U.S.C. 3501, *et seq.*), Federal agencies must obtain approval from the Office of Management and Budget (OMB) for each collection of information they conduct, sponsor, or require through regulations. This action contains a collection of information requirement under the PRA that is covered under existing OMB Control number 2125-0501.

**National Environmental Policy Act**

The Department has analyzed this action for the purpose of the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 *et seq.*), and has determined that this action would not have a significant effect on the quality of the environment and qualifies for the categorical exclusion at 23 CFR 771.117(c)(20).

**Executive Order 12630 (Taking of Private Property)**

This action will not affect a taking of private property or otherwise have taking implications under EO 12630, Governmental Actions and Interference With Constitutionally Protected Property Rights.

**Executive Order 12988 (Civil Justice Reform)**

This action meets applicable standards in section 3(a) and 3(b)(2) of Executive Order 12988, Civil Justice Reform, to minimize litigation, eliminate ambiguity, and reduce burden.

**Executive Order 13045 (Protection of Children)**

The FHWA has analyzed this action under EO 13045, Protection of Children from Environmental Health Risks and Safety Risks. This proposed rule does not concern an environmental risk to health or safety that may disproportionately affect children.

**Executive Order 13175 (Tribal Consultation)**

In accordance with EO 13175, FHWA identified potential effects on federally recognized Indian tribes that might result from this proposed rule. Accordingly, on August 7, 2014, a webinar was conducted by FHWA in furtherance of its duty to consult with Tribal governments under EO 13175 “Consultation and Coordination With Indian Tribal governments.” The webinar dealt with the NBIS and mentioned that FHWA was planning to publish an NPRM sometime in the future that would include requirements for bridges owned by Tribal governments. The date and time of the webinar had been announced to the Tribal governments through the seven Tribal Technical Assistance Program (TTAP) centers. A total of 35 connections were on the webinar with one or more persons on each connection. Two Tribal governments were identified on the connections and at least one consultant that works with the Tribes was on the webinar. A number of the personnel on the webinar were from the BIA and FHWA.

The webinar was conducted by three bridge engineers and one attorney all from FHWA. The PowerPoint presentation and narrative covered the history of the NBIS, the NBIS general requirements based on the current NBIS, and a final section considering the impacts on the Tribal governments caused by the 23 U.S.C. 144(h)(2) amendments to the NBIS. There was a question and answer period after the presentation where general questions about the NBIS were discussed as well as impacts to bridges owned by Tribal governments. Issues discussed included why a NPRM was needed, if trail bridges and pedestrian bridges were subject to the NBIS, and what funding was available for the bridge inspections. The webinar lasted for nearly an hour and was terminated when no more questions were asked. The webinar was recorded and uploaded onto the Tribal Transportation Program Bridge Web site<sup>5</sup> maintained by FHWA.

The FHWA will fully consider tribal views in the development of further rulemaking proceedings.

### **Executive Order 13211 (Energy Effects)**

The FHWA has analyzed this proposed rule under EO 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use. We have determined that the rule will not constitute a significant energy action under that order because, although it is considered a significant regulatory action under EO 12866, it is not likely to have a significant adverse effect on the supply, distribution, or use of energy.

### **Regulation Identification Number**

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<sup>5</sup> <https://flh.fhwa.dot.gov/programs/ttp/bridges/bip.htm>

A regulation identification number (RIN) is assigned to each regulatory action listed in the Unified Agenda of Federal Regulations. The Regulatory Information Service Center publishes the Unified Agenda in April and October of each year. The RIN contained in the heading of this document can be used to cross reference this action with the Unified Agenda.

**List of Subjects in 23 CFR Part 650**

Bridges, Grant programs—transportation, Highways and roads, Incorporation by reference, Reporting and recordkeeping requirements.

Issued in Washington, DC, under authority delegated in 49 CFR 1.85(a)(1).

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Nicole R. Nason,  
Administrator,  
Federal Highway Administration.

In consideration of the foregoing, FHWA proposes to amend title 23, Code of Federal Regulations, part 650, as set forth below:

**PART 650—BRIDGES, STRUCTURES, AND HYDRAULICS**

1. The authority citation for part 650 continues to read as follows:

**Authority:** 23 U.S.C. 119, 144, and 315.

2. Revise subpart C to read as follows:

## **Subpart C—National Bridge Inspection Standards**

Sec.

650.301 Purpose.

650.303 Applicability.

650.305 Definitions.

650.307 Bridge inspection organization responsibilities.

650.309 Qualifications of personnel.

650.311 Inspection interval.

650.313 Inspection procedures.

650.315 Inventory.

650.317 Reference manuals.

## **Subpart C—National Bridge Inspection Standards**

### **§ 650.301 Purpose.**

This subpart sets the national minimum standards for the proper safety inspection and evaluation of all highway bridges in accordance with 23 U.S.C. 144(h) and the requirements for preparing and maintaining an inventory in accordance with 23 U.S.C. 144(b).

### **§ 650.303 Applicability.**

The National Bridge Inspection Standards (NBIS) in this subpart apply to all structures defined as highway bridges located on all public roads, on and off Federal-aid highways, including tribally-owned, federally-owned, and privately-owned bridges that are connected to a public road on both ends of the bridge.

### **§ 650.305 Definitions.**

The following terms used in this subpart are defined as follows:

*AASHTO Manual.* The term “AASHTO Manual” means the American Association of State Highway and Transportation Officials (AASHTO) “Manual for Bridge Evaluation” incorporated by reference in § 650.317.

*Attribute.* Characteristic of the design, loading, conditions, and environment that affect the reliability of a bridge or bridge element.

*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 under copings of abutments or spring lines of arches, or extreme ends of openings for multiple boxes; it includes 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. Some of the experience may come from relevant bridge design, bridge construction, and bridge maintenance experience provided it develops the skills necessary to properly perform a NBIS bridge inspection.

*Bridge inspection refresher training.* The National Highway Institute<sup>1</sup> (NHI) “Bridge Inspection Refresher Training Course” or other State, federally, or tribally developed instruction aimed to improve quality of inspections, introduce new techniques, and maintain consistency in the inspection program.

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<sup>1</sup> The NHI training may be found at the following URL: <http://www.nhi.fhwa.dot.gov/>.

*Bridge Inspector's Reference Manual (BIRM).* A comprehensive FHWA manual on procedures and techniques for inspecting and evaluating a variety of in-service highway bridges. This manual may be purchased from the U.S. Government Publishing Office, Washington, DC 20402 and from National Technical Information Service, Springfield, Virginia, 22161, and is available at the following URL:

<http://www.fhwa.dot.gov/bridge/bripub.htm>.

*Complex feature.* Bridge component(s) or member(s) with advanced or unique structural elements or operational characteristics, construction methods, and/or requiring specific inspection procedures. This includes mechanical and electrical elements of moveable spans and cable-related elements of suspension and cable-stayed superstructures.

*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 BIRM for the recommended material to be covered in a comprehensive training course).

*Consequence.* A measure of impacts to structural safety and serviceability in a hypothetical scenario where a damage mode progresses to the point of requiring immediate action. This may include costs to restore the bridge to safe operating condition or other costs.

*Critical finding.* A structural or safety related deficiency that requires immediate action to ensure public safety.

*Damage inspection.* An unscheduled inspection to assess structural damage resulting from environmental factors or human actions.

*Damage mode.* Typical damage affecting the condition of a bridge element that may affect the structural safety or serviceability of the bridge.

*Element level bridge inspection data.* Quantitative condition assessment data, collected during bridge inspections, that indicates the severity and extent of defects in bridge elements.

*End-of-course assessment.* A comprehensive examination given to students after the completion of the delivery of a training course.

*Hands-on inspection.* Inspection within arms length of the member. Inspection uses visual techniques that may be supplemented by nondestructive evaluation techniques.

*Highway.* The term “highway” is defined in 23 U.S.C. 101.

*In-depth inspection.* A close-up, detailed inspection of one or more bridge members located above or below water, using visual or nondestructive evaluation techniques as required to identify any deficiencies not readily detectable using routine inspection procedures. Hands-on inspection may be necessary at some locations. In-depth inspections may occur more or less frequently than routine inspections, as outlined in bridge specific inspection procedures.

*Initial inspection.* An initial inspection is the first routine inspection and first underwater and nonredundant steel tension member inspections, when necessary, of a new, replaced, or rehabilitated bridge. This inspection serves to record required bridge

inventory data, establish baseline conditions, and establish the intervals for other inspection types.

*Inspection date.* The date on which an inspection begins for a bridge.

*Inspection due date.* The last inspection date plus the current inspection interval.

*Inspection report.* The document which summarizes the bridge inspection findings and recommendations, signed by a team leader.

*Inventory data.* All data reported to the National Bridge Inventory in accordance with the “Specifications for the National Bridge Inventory” incorporated by reference in § 650.317.

*Legal load.* The maximum legal load for each vehicle configuration permitted by law for the State in which the bridge is located.

*Load posting.* Regulatory signs installed in accordance with the “Manual on Uniform Traffic Control Devices” and State or local law which represent the maximum vehicular live load which the bridge may safely carry.

*Load rating.* The analysis to determine the safe vehicular live load carrying capacity of a bridge using bridge plans and supplemented by measurements and other information gathered from an inspection.

*Nationally certified bridge inspector.* An individual meeting the team leader requirements of § 650.309(b).

*Nonredundant member.* A member without load path redundancy or other redundancy demonstrated through an FHWA-approved process.

*Nonredundant steel tension member (NSTM) inspection.* A hands-on inspection of nonredundant steel members subject to tension.

*Nonredundant steel tension member inspection training.* Training that covers all aspects of NSTM inspections to relate conditions observed on a bridge to established criteria.

*Operating rating.* The maximum permissible live load to which the structure may be subjected for the load configuration used in the load rating.

*Plan of action (POA).* Procedures for bridge inspectors and engineers in managing each bridge determined to be scour critical or that has unknown foundations.

*Procedures.* Written documentation of policies, methods, considerations, criteria, and other conditions that direct the actions of personnel so that a desired end result is achieved consistently.

*Probability.* Extent to which an event is likely to occur during a given interval. This may be based on the frequency of events, such as in the quantitative probability of failure, or on degree of belief or expectation. Degrees of belief about probability can be chosen using qualitative scales, ranks, or categories such as, remote, low, moderate, or high.

*Professional engineer (PE).* An individual, who has fulfilled education and experience requirements and passed examinations that, under State licensure laws, permits the individual to offer engineering services within areas of expertise directly to the public.

*Program manager.* The individual(s) responsible for bridge inspection, load rating, load posting, reporting, and inventory. The individual(s) provide(s) overall leadership and is available to inspection teams and load raters to provide guidance.

*Public road.* The term “public road” is defined in 23 U.S.C. 101.

*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.

*Risk.* The exposure to the possibility of structural safety or serviceability loss during the interval between inspections. It is the combination of the probability of an event and its consequence.

*Risk assessment panel.* A group, made up of the NBIS program manager and at least three experts with collective experience in bridge design, evaluation, inspection, maintenance, materials, and construction, that develops the policy for a more rigorous assessment of risk when establishing inspection intervals.

*Routine inspection.* Regularly scheduled comprehensive inspection consisting of observations and measurements needed to determine the physical and functional condition of the bridge, identifying changes from previously recorded conditions, and identifying critical findings.

*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.

*Safe load capacity.* A live load that can safely utilize a bridge repeatedly over the duration of a specified inspection interval.

*Scour.* Erosion of streambed or bank material due to flowing water; often considered as being localized around piers and abutments of bridges.

*Scour appraisal.* A determination of the stability of a bridge from scour made using either an evaluation process, an observed condition, or both.

*Scour critical bridge.* A bridge with a foundation element that has been determined to be unstable for the observed or evaluated scour condition.

*Service inspection.* An inspection to detect major visible safety deficiencies, performed by personnel with general knowledge of bridges with the results documented in the bridge file.

*Special inspection.* An inspection scheduled at the discretion of the bridge owner, used to monitor a particular known or suspected deficiency, or to monitor special details or unusual characteristics of a bridge that do not necessarily have defects.

*Special 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 and routine permit loads, typically authorized for single or limited trips.

*State transportation department.* The term “State transportation department” is defined in 23 U.S.C. 101.

*Team leader.* The on-site, nationally certified bridge inspector in charge of an inspection team and responsible for planning, preparing, performing, and reporting on bridge field inspections.

*Temporary bridge.* A bridge which is constructed to carry highway traffic until the permanent facility is built, repaired, rehabilitated, or replaced.

*Underwater bridge inspection training.* Training that covers all aspects of underwater bridge inspection 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 an underwater 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 or by wading or probing, and generally requiring diving or other appropriate techniques.

**§ 650.307 Bridge inspection organization responsibilities.**

(a) Each State transportation department must perform, or cause to be performed, the proper inspection and evaluation of all highway bridges that are fully or partially located within the State's boundaries, except for bridges that are owned by Federal agencies or tribal governments.

(b) Each Federal agency must perform, or cause to be performed, the proper inspection and evaluation of all highway bridges that are fully or partially located within the respective Federal agency's responsibility or jurisdiction.

(c) Each tribal government, in consultation with the Bureau of Indian Affairs (BIA), must perform, or cause to be performed, the proper inspection and evaluation of all highway bridges that are fully or partially located within the respective tribal government's responsibility or jurisdiction.

(d) Where a border bridge crosses between a State transportation department, Federal agency, or tribal government jurisdictions, all bordering entities must determine through a joint written agreement the inspection responsibilities of each entity for that bridge.

(e) Each State transportation department, Federal agency, and tribal government must include a bridge inspection organization that is responsible for the following:

- (1) Developing and implementing written Statewide, Federal agency wide, or tribal government wide bridge inspection policies and procedures;
- (2) Documenting inspection intervals for the inspection types identified in the standards in this subpart;
- (3) Documenting the roles and responsibilities of personnel involved in the bridge inspection program;
- (4) Maintaining a central registry of nationally certified bridge inspectors that work in their State or for their Federal agency or tribal government that includes, at a minimum, a method to positively identify each inspector, inspector's qualification records, inspector's current contact information, and detailed information about any adverse action that may affect the good standing of the inspector;

- (5) Managing bridge inspection reports and files;
- (6) Performing quality control and quality assurance activities;
- (7) Preparing, maintaining, and reporting bridge inventory data;
- (8) Load rating, load posting, and determining other restrictions;
- (9) Managing the critical finding activities;
- (10) Managing scour appraisals and plans of action; and
- (11) Managing other requirements of the standards in this subpart.

(f) Functions identified in paragraphs (e)(1) through (11) of this section may be delegated to other individuals, agencies, or entities. The delegated roles and functions of all individuals, agencies, and entities involved must be documented in a formal written agreement by the responsible State transportation department, Federal agency, or tribal government. Except as provided in paragraph (f) of this section, such delegation does not relieve the State transportation department, Federal agency, or tribal government of any of its responsibilities under this subpart. A tribal government may, with BIA's concurrence via a formal written agreement, delegate its functions and responsibilities under this subpart to the BIA.

(g) Each State transportation department, Federal agency, or tribal government bridge inspection organization must have a program manager(s) with the qualifications defined in § 650.309(a). An employee of the BIA having the qualification of a program manager as defined in § 650.309(a) may serve as the program manager for a tribal government if the tribal government delegates this responsibility to the BIA in accordance with paragraph (f) of this section. When there is more than one program

manager, a lead program manager who is responsible for coordinating the Statewide, Federal agency wide, or tribal government wide policies and procedures must be identified.

**§ 650.309 Qualifications of personnel.**

(a) A program manager must, at a minimum:

(1) Be a registered professional engineer, or have ten years of bridge inspection experience;

(2) Complete an FHWA-approved comprehensive bridge inspection training course as described in paragraph (g) of this section and score 70 percent or greater on an end-of-course assessment (completion of comprehensive bridge inspection training under prior regulations satisfy the intent of the requirement in this paragraph (a));

(3) Complete a cumulative total of 18 hours of FHWA-approved bridge inspection refresher training over each 60 month period;

(4) Maintain documentation supporting the satisfaction of paragraphs (a)(1) through (3) of this section; and

(5) Satisfy the requirements of this paragraph (a) within 24 months from [EFFECTIVE DATE OF FINAL RULE] if serving as a program manager who was qualified under prior regulations.

(b) A team leader must, at a minimum:

(1) Complete an FHWA-approved comprehensive bridge inspection training course as described in paragraph (g) of this section and score 70 percent

or greater on an end-of-course assessment (completion of comprehensive bridge inspection training under prior regulations satisfies the intent of the requirement in this paragraph (b));

(2) Complete a cumulative total of 18 hours of FHWA-approved bridge inspection refresher training over each 60 month period; and

(3) Meet one of the four qualifications listed in paragraphs (b)(3)(i) through (iv) of this section:

(i) Be a registered professional engineer and have six months of bridge inspection experience;

(ii) Have five years of bridge inspection experience;

(iii) Have all of the following:

(A) A bachelor'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; and

(B) Successfully passed the National Council of Examiners for Engineering and Surveying Fundamentals of Engineering examination; and

(C) Two years of bridge inspection experience; or

(iv) Have all of the following:

(A) 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; and

(B) Four years of bridge inspection experience.

(4) Provide documentation supporting the satisfaction of paragraphs (b)(1) through (3) of this section to the program manager of each State transportation department, Federal agency, or tribal government for which they are performing bridge inspections.

(5) Satisfy the requirements of this paragraph (b) within 24 months from [EFFECTIVE DATE OF FINAL RULE] if serving as a team leader who was qualified under prior regulations.

(c) Team leaders on nonredundant steel tension member inspections must, at a minimum:

(1) Meet the requirements in paragraph (b) of this section; and

(2) Complete an FHWA-approved training course on the inspection of nonredundant steel tension members as defined in paragraph (g) of this section and score 70 percent or greater on an end-of-course assessment.

(3) Satisfy the requirements of this paragraph (c) within 24 months from [EFFECTIVE DATE OF FINAL RULE] if serving as a team leader for inspections of NSTMs under prior regulations.

(d) Load ratings must be performed by, or under the direct supervision of, a registered professional engineer.

(e) An underwater bridge inspection diver must complete FHWA-approved underwater bridge inspection training as described in paragraph (g) of this section and score 70 percent or greater on an end-of-course assessment.

(f) State transportation departments, Federal agencies, and tribal governments must establish and document inspection personnel qualifications for damage, service, and special inspections.

(g) The following are considered acceptable bridge inspection training:

(1) *National Highway Institute (NHI) training*. Acceptable NHI courses include:

- (i) Comprehensive bridge inspection training which must include topics on importance of bridge inspection; bridge mechanics and terminology; personal and public safety issues associated with bridge inspections; properties and deficiencies of concrete, steel, timber and masonry; inspection equipment needs for various types of bridges and site conditions; inspection procedures, evaluations, documentation, data collection and critical findings for bridge decks, superstructures, substructures, culverts, waterways (including underwater elements), joints, bearings, drainage systems, lighting, signs, and traffic safety features; inspection

procedures, evaluations, documentation, data collection; nondestructive evaluation techniques; load path redundancy and fatigue concepts; and practical applications of the concepts listed in this paragraph (g)(1)(i);

- (ii) Bridge inspection refresher training, which must include topics on documentation of inspections, commonly miscoded items, recognition of critical inspection findings, recent events impacting bridge inspections, and quality assurance activities;
- (iii) Underwater bridge inspection training, which must include topics on the need for and benefits of underwater bridge inspections; typical defects and deterioration in underwater members; inspection equipment needs for various types of bridges and site conditions; inspection planning and hazard analysis; and underwater inspection procedures, evaluations, documentation, data collection and critical findings;  
and
- (iv) Nonredundant steel tension member inspection training, which must include topics on the identification of NSTMs and related problematic

structural details, the recognition of areas most susceptible to fatigue and fracture, the evaluation and recording of defects on NSTM, and the application of nondestructive evaluation techniques.

(2) *FHWA approval of alternate training.* Alternates to the NHI training courses listed in paragraph (g)(1) of this section must include all the topics described in paragraph (g)(1) and be submitted to the FHWA by a State transportation department, Federal agency, or tribal government. The FHWA must approve alternate course materials and end-of-course assessments for national consistency and certification purposes. Alternate training courses must be reviewed by the program manager every five years to ensure the material is current. Updates to approved course materials and end-of-course assessments must be resubmitted to the FHWA for approval. Instructors of alternate training courses shall meet the qualification requirements for a program manager or team leader as defined in this section.

(3) *Existing FHWA-approved alternate training.* Agencies that have alternate training courses approved by the FHWA prior to [EFFECTIVE DATE OF FINAL RULE] have 24 months to review the prior training materials and certify to the FHWA that the training satisfies the requirements as defined in § 650.305.

**§ 650.311 Inspection interval.**

(a) *Routine inspections.* Inspect each bridge at regular intervals not to exceed the maximum intervals established using the risk-based processes outlined in paragraph (a)(1) or (2) of this section.

(1) *Method 1.* In the method in this paragraph (a)(1), inspection intervals are determined by a simplified assessment of risk to classify each bridge into one of three risk levels with an inspection interval not to exceed 12, 24, or 48 months.

(i) Inspect each bridge at regular intervals not to exceed 24 months.

(ii) Certain bridges must be inspected at intervals less than 24 months. State transportation departments, Federal agencies, or tribal governments must develop and document criteria used to determine the interval to which these inspections will occur considering such factors as structure type, design characteristics, materials, age, condition, scour characteristics, environment, traffic characteristics, history of vehicle impact damage, loads and safe load capacity, and other known deficiencies. Bridges meeting any of the following criteria must have a maximum inspection interval of 12 months:

(A) The lowest condition rating for the deck, superstructure, substructure, or culvert items as recorded in the National Bridge Inventory (see § 650.315) is coded three (3) or less;

(B) Scour condition rating as recorded in the National Bridge Inventory (see § 650.315) that is coded three (3) or less; or

(C) Details, loading, conditions, or inspection findings that are known to affect the performance of the bridge or its elements within the next 24 months.

(iii) Certain bridges may be inspected at intervals greater than 24 months, not to exceed 48 months. State transportation departments, Federal agencies, or tribal governments must have a documented extended interval policy and notify the FHWA in writing prior to implementation. All FHWA approved extended inspection interval policies prior to the [EFFECTIVE DATE OF FINAL RULE] must be reviewed and updated, if necessary, within 24 months to meet the criteria in this section. Bridges with a maximum inspection interval of more than 24 months must meet all of the following criteria:

(A) Condition ratings for the deck, superstructure, substructure, and culvert items as recorded in the National Bridge Inventory (see § 650.315) are coded seven (7) or greater;

(B) Condition ratings for the channel and channel protection items as recorded in the National Bridge Inventory (see § 650.315) are coded six (6) or greater;

(C) Operating rating factor or legal load rating factor greater than or equal to 1.1 for all vehicles legally allowed to cross the selected bridges, including any routine permit loads;

(D) Steel bridges with existing fatigue cracks which have been arrested, no details with AASHTO fatigue categories E and E', no details with a history of fatigue cracking, or no fracture-prone details in primary members;

(E) Have no history of overheight vehicular damage and have a minimum vertical over or underclearances of 16'-0" for interstates, freeways, and other arterials or 14'-0" for local roads and collectors;

(F) Designs limited to a concrete slabs, multi-girders, frames, or culverts or steel multi-girders or frames;

(G) Substructure materials limited to concrete in all environments; steel or timber in dry environments;

(H) Evaluated for scour, is not scour critical, and has a scour condition rating as recorded in the National Bridge Inventory (see § 650.315) that is coded six (6) or greater; and

(I) Details, loading, conditions, and inspection findings that are not expected to affect the performance of the bridge or its elements within the next 48 months.

(2) *Method 2.* In the method in this paragraph (a)(2), inspection intervals are determined by a more rigorous assessment of risk to classify each bridge, or a group of bridges, into one of four risk levels with an inspection interval not to exceed 12, 24, 48, or 72 months. The risk assessment process, criteria, and

resulting intervals must be documented and submitted by the State transportation department, Federal agency, or tribal government with a request for FHWA approval. Changes to the risk assessment process or criteria must be resubmitted for FHWA approval. The request must include paragraphs (a)(2)(i) through (vi) of this section:

(i) Endorsement from a Risk Assessment Panel (RAP), which must be used to develop a formal policy.

(ii) Definitions for risk levels, categories, and the probability and consequence levels that are used to define the risk for each bridge to be assessed.

(iii) Damage modes and attributes that are used in classifying probability and consequence levels, depending on their relevance to the bridge being considered. A system of screening, scoring, and thresholds are defined by the RAP to assess the risks. Scoring is based on prioritizing attributes and their relative influence on damage modes.

(A) A set of screening criteria must be used to determine if a bridge should be considered in the assessment and to establish maximum inspection intervals. The screening criteria must include:

(1) Requirements for flexure and shear cracking in concrete primary load members;

(2) Requirements for fatigue cracking and corrosion in steel primary load members;

(3) Requirements for other details, loadings, conditions, and inspection findings that are known to affect the performance of the bridge or its elements;

(4) Bridges classified as in poor condition cannot have an inspection interval greater than 24 months; and

(5) Bridges classified as in fair condition cannot have an inspection interval greater than 48 months.

(B) The attributes in each assessment must include material properties, loads and safe load capacity, and condition.

(C) The damage modes in each assessment must include:

(1) For steel elements: section loss, fatigue, and fracture;

(2) For concrete elements: flexural cracking, shear cracking, and reinforcing steel corrosion;

(3) For superstructure elements: seismic, overload, and vehicle/vessel impact; and

(4) For substructure elements: seismic, scour, and settlement.

(D) A set of criteria to assess risk for each bridge element in terms of probability and consequence of structural safety or serviceability loss in the time between inspections.

(iv) A set of risk assessment criteria, written in standard logical format amenable for computer programming.

(v) Supplemental inspection procedures and data collection that are aligned with the level of inspection required to obtain the data to apply the criteria.

(vi) A list classifying each bridge into one of four risk levels with a routine inspection interval not to exceed 12, 24, 48, or 72 months.

(3) *Service inspection.* A service inspection must be performed every 24 months when a risk-based, routine inspection interval exceeds 48 months. The results of the service inspection must be documented in the bridge file.

(4) *Additional routine inspection interval eligibility.* Any new, rehabilitated, or structurally modified bridge must receive an initial inspection, be in service for at least 24 months, and receive its next routine inspection before being eligible for inspection intervals greater than 24 months.

(b) *Underwater inspections.* Inspect each bridge at regular intervals not to exceed the maximum intervals established using the risk-based processes outlined in paragraph (b)(1) or (2) of this section.

(1) *Method 1.* In the method in this paragraph (b)(1), inspection intervals are determined by a simplified assessment of risk to classify each bridge into one of three risk levels with an interval not to exceed 36, 60, or 72 months.

(i) Inspect underwater structural elements and the surrounding channel of bridges at regular intervals not to exceed 60 months.

(ii) Certain underwater structural elements and the surrounding channel of bridges must be inspected at intervals less than 60 months.

State transportation departments, Federal agencies, or tribal governments must develop and document criteria used to determine the interval to which these inspections will occur considering such factors as structure type, design characteristics, materials, age, condition, scour characteristics, environment, traffic characteristics, history of vehicle/vessel impact damage, loads and safe load capacity, and other known deficiencies. Bridges meeting either of the following criteria must have a maximum underwater inspection interval of 36 months:

(A) The lowest rating for the substructure, culvert, channel, and channel condition ratings items as recorded in the National Bridge Inventory (see § 650.315) is coded three (3) or less; or

(B) Scour condition rating as recorded in the National Bridge Inventory (see § 650.315) that is coded three (3) or less.

(iii) Certain underwater structural elements and the surrounding channel of bridges may be inspected at intervals greater than 60 months, not to exceed 72 months. States, Federal agencies, or tribal governments must have a documented underwater extended interval policy and must notify the FHWA in writing prior to implementation. Bridges with a maximum underwater inspection interval of more than 60 months must meet all of the following criteria:

(A) Benign freshwater environments;

(B) Condition rating values for the substructure, culvert, channel, and channel protection items as recorded in the National Bridge Inventory (see § 650.315) that are coded six (6) or greater;

(C) The bridge has been evaluated for scour, is not scour critical, and has a scour condition rating as recorded in the National Bridge Inventory (see § 650.315) that is coded six (6) or greater; and

(D) Details, loading, conditions, and inspection findings that are not expected to affect the performance of the bridge or its elements within the next 72 months.

(2) *Method 2.* In the method in this paragraph (b)(2), inspection intervals are determined by a more rigorous assessment of risk. The risk assessment process, criteria, and resulting intervals must be documented and submitted by the

State transportation department, Federal agency, or tribal government with a request for FHWA approval. The process and criteria must be similar to that outlined in paragraph (a)(2) of this section except that each bridge must be classified into one of three risk levels with an underwater inspection interval not to exceed 36, 60, and 72 months.

(c) *Nonredundant steel tension member inspections.* Inspect each member at regular intervals not to exceed the maximum intervals established using the risk-based processes outlined in paragraph (c)(1) or (2) of this section.

(1) *Method 1.* In the method in this paragraph (c)(1), inspection intervals are determined by a simplified assessment of risk to classify each bridge into one of three risk levels with an interval not to exceed 12, 24, or 48 months.

(i) Inspect nonredundant steel tension members at intervals not to exceed 24 months.

(ii) Certain nonredundant steel tension members must be inspected at intervals less than 24 months. State transportation departments, Federal agencies, or tribal governments must develop and document criteria used to determine the interval to which these inspections will occur considering such factors as structure type, design characteristics, materials, age, condition, scour characteristics, environment, traffic characteristics, history of vehicle impact damage, loads and safe load capacity, and other known deficiencies. Nonredundant

steel tension members meeting any of the following criteria must have a maximum inspection interval of 12 months:

(A) Primary member with fatigue cracks which have not been arrested;

(B) Primary member with significant corrosion; or

(C) Primary member with details, loading, conditions, or inspection findings that are known to affect the expected fatigue performance.

(iii) Certain nonredundant steel tension members of bridges may be inspected at intervals greater than 24 months, not to exceed 48 months. State transportation departments, Federal agencies, or tribal governments must have a documented extended interval policy, and notify the FHWA in writing prior to implementation. Bridges with a maximum nonredundant steel tension member inspection interval of more than 24 months must meet all of the following criteria:

(A) Bridge was constructed after 1978 in accordance with a fracture control plan;

(B) Member has no fatigue details with finite life;

(C) Member has no history of fatigue cracks; and

(D) Member has details, loading, conditions, and inspection findings that are not expected to affect the fatigue performance within the next 48 months.

(2) *Method 2.* In the method in this paragraph (c)(2), inspection intervals are determined by a more rigorous assessment of risk. The risk assessment process, criteria, and resulting intervals must be documented and submitted by the State transportation department, Federal agency, or tribal government with a request for FHWA approval. The process and criteria must be similar to that outlined in paragraph (a)(2) of this section except that each bridge must be classified into one of three risk levels with a nonredundant steel tension member inspection interval not to exceed 12, 24, or 48 months.

(d) *Damage, in-depth, and special inspections.* State transportation department, Federal agency, or tribal government must document the criteria to determine the level and interval for these inspections in its bridge inspection policies and procedures.

(e) *Bridge inspection interval tolerance.* (1) The acceptable tolerance for the next inspection is up to three months after the inspection due date.

(2) Exceptions to the inspection interval tolerance due to rare and unusual circumstances must be approved by FHWA in advance of the inspection due date.

(f) *Next inspection.* Review intervals for every inspection type after each inspection to ensure the proper interval is assigned. Establish the next inspection due date for each inspection type based on the established interval and the last inspection date.

### **§ 650.313 Inspection procedures.**

(a) *General.* Inspect each bridge to determine condition, identify deficiencies, and document results in an inspection report in accordance with the inspection procedures

in Section 4, AASHTO Manual (incorporated by reference, *see* § 650.317). Any portion of the bridge not visible using standard access methods must be assessed via another method. Appropriate equipment to complete the inspection must be documented in the inspection plan. The equipment may include advanced technologies listed in the Bridge Inspector's Reference Manual to access and determine the condition of the bridge.

(b) *Initial inspection.* (1) Perform an initial inspection for each new, replaced, and rehabilitated bridge after all construction is completed and prior to the entire bridge being open to traffic. Submit NBI data after the initial inspection of the entire bridge being open to traffic.

(2) Develop and implement inspection procedures for bridges in phased construction and temporary bridges open to traffic. The portion of the bridge under phased construction must be inspected prior to it being open to traffic.

(c) *Routine inspection.* (1) Each routine inspection must include observations of all areas and elements of the bridge including viewable access from the deck, ground surfaces, water surfaces by boat, and by wading or probing underwater elements. Any portion of the bridge not visible using the standard access methods in the preceding sentence must be accessed or viewed by other methods to determine the condition of the bridge for all areas and elements.

(2) Develop and implement routine inspection procedures for bridges in phased construction and temporary bridges open to traffic. The routine interval for inspections for the portions of a bridge open to traffic shall not be greater than

the intervals established in § 650.311. Submit NBI data for temporary bridges which are to remain open for more than 24 months.

(d) *In-depth inspection.* Identify the location of bridge members that need an in-depth inspection in the bridge files. Perform in-depth inspections in accordance with the procedures developed in paragraph (g) of this section.

(e) *Underwater inspection.* Identify the locations of underwater elements in the bridge files that cannot be inspected using wading and probing during a routine inspection. Perform underwater inspections in accordance with the procedures developed in paragraph (g) of this section. Perform the first underwater inspection for each new, replaced, and rehabilitated bridge after all construction is completed and within 6 months of the entire bridge being open to traffic.

(f) *Nonredundant steel tension member inspection.* Identify the location of the NSTMs in the bridge files. Perform hands-on inspections of NSTMs in accordance with the procedures developed in paragraph (g) of this section. Perform the first NSTM inspection for each new, replaced, and rehabilitated bridge after all construction is completed and within 6 months of the entire bridge being open to traffic.

(g) *NSTM, underwater, in-depth, and complex feature inspection procedures.* Develop and document inspection procedures for bridges which require NSTM, underwater, in-depth, and complex feature inspections in accordance with Section 4.2, AASHTO Manual (incorporated by reference, see § 650.317). Exceptions to traditional inspection methods must be approved by FHWA. State transportation departments, Federal agencies, and tribal governments can include general procedures applicable to

many bridges in their procedures manual. Specific procedures for unique and complex structural elements must be developed for each bridge and contained in the bridge file.

(h) *Team leader.* Provide at least one team leader, who meets the minimum qualifications stated in § 650.309, at the bridge and actively participating in the inspection at all times during each initial, routine, in-depth, NSTM, and underwater inspection.

(i) *Load rating.* (1) Rate each bridge as to its safe load capacity in accordance with Section 6, AASHTO Manual (incorporated by reference, *see* § 650.317).

(2) Develop and document procedures for completion of new and updated bridge load ratings. Load ratings must be completed as soon as practical, but no later than 3 months after the initial inspection and when a change is identified that warrants a re-rating, such as, but not limited to, changes in condition, reconstruction, new construction, or changes in dead or live loads.

(3) Analyze routine and special permit loads for each bridge that these loads cross to verify the bridge can safely carry the load.

(j) *Load posting.* (1) Implement load posting for a bridge in accordance with Section 6, AASHTO Manual (incorporated by reference, *see* § 650.317), when the maximum unrestricted legal loads or State routine permit loads exceed that allowed under the operating rating, legal load rating, or permit load analysis.

(2) Develop and document procedures for timely load posting based upon the load capacity and characteristics such as average daily traffic (ADT), average daily truck traffic (ADTT), and loading conditions. Posting shall be made as soon

as possible but not later than 30 days after a valid load rating determines a need for such posting. Implement load posting in accordance with these procedures.

(k) *Closed bridges.* Develop and document criteria for closing a bridge which considers condition and load carrying capacity for each legal vehicle. Bridges that meet the criteria must be closed immediately. Bridges must be closed when the gross live load capacity is less than 3 tons.

(l) *Bridge files.* Prepare and maintain bridge files in accordance with Section 2.1, AASHTO Manual (incorporated by reference, *see* § 650.317).

(m) *Scour.* (1) Perform a scour appraisal for all bridges over water. The appraisal shall be based upon the least stable of either the evaluation process or observed scour condition.

(2) For bridges which are determined to be scour critical or have unknown foundations, prepare a plan of action for deployment of scour countermeasures for known and potential deficiencies and to address safety concerns. The plan of action must address a schedule for repairing or installing physical and/or hydraulic scour countermeasures, and/or the use of monitoring countermeasures that includes, inspecting, closing, and opening of each applicable bridge to traffic prior to, during and after flood events to protect the traveling public.

(3) Execute action in accordance with the plan.

(n) *Quality control and quality assurance.* (1) Assure systematic quality control (QC) and quality assurance (QA) procedures identified in Section 1.4, AASHTO Manual

(incorporated by reference, see § 650.317) are used to maintain a high degree of accuracy and consistency in the inspection program.

(2) Document the extent, interval, and responsible party for the review of inspection teams in the field, inspection reports, NBI data, and computations, including scour appraisal and load ratings. QA reviews should not be performed by the personnel who completed the original work.

(3) Perform QC/QA reviews and document the results of the QC/QA process, including the tracking and completion of actions identified in the procedures.

(4) Address the findings of the QC/QA reviews.

(o) *Critical findings.* (1) Document procedures to address critical findings in a timely manner. Procedures must:

(i) Define critical findings considering the magnitude, location and consequence of a deficiency. Deficiencies include, but are not limited to scour, impact, corrosion, section loss, settlement, cracking, deflection, distortion, delamination, loss of bearing, and invalid or missing load posting signs. At a minimum, include findings which result in the following:

(A) Full or partial closure of any bridge;

(B) A program manager recommendation for full or partial closure of any bridge;

(C) A nonredundant member with any quantity in condition state 4, as defined in the AASHTO MBEI (incorporated by reference, *see* § 650.317);

(D) Superstructure or substructure condition rating of serious (3) or worse;

(E) Immediate load restriction or posting, or immediate repair work to a bridge, including shoring, in order to remain open; and

(F) Missing required load posting signage.

(ii) Develop and document timeframes to address critical findings identified in paragraph (o)(1)(i) of this section.

(2) Periodically, or as requested, provide written reports to FHWA for all critical findings and actions taken to resolve or monitor critical findings.

Notification and reporting procedures are as follows:

(i) State transportation departments, Federal agencies, and tribal governments must report, or cause to be reported, to the FHWA within 24 hours of discovery of any critical finding that involves:

(A) Full or partial closure of any bridge;

(B) Program manager recommends full or partial closure of any bridge; or

(C) A National Highway System (NHS) bridge with a nonredundant member with any quantity in condition state 4, as defined in the AASHTO MBEI.

(ii) The initial report must include the owner, NBI structure number, date of discovery of the critical finding, and a description.

(iii) State transportation departments, Federal agencies, and tribal governments must submit a monthly status report to FHWA for all critical finding as identified in paragraph (o)(1)(i) of this section. The report must contain:

(A) Owner;

(B) National Bridge Inventory Structure Number;

(C) Date of finding;

(D) Description and photos (if available) of critical finding;

(E) Description of completed, temporary and/or planned corrective actions to address critical finding;

(F) Status of corrective actions: Active/Completed;

(G) Estimated date of completion if corrective actions are active; and

(H) Date of completion if corrective actions are completed.

(iv) All critical findings must remain on the monthly report until permanently resolved.

(p) *Review of compliance.* Provide information annually or as required in cooperation with any FHWA review of compliance with the NBIS.

**§ 650.315 Inventory.**

(a) Each State transportation department, Federal agency, or tribal government must prepare and maintain an inventory of all bridges subject to the NBIS. Inventory data must be collected, updated, and retained by the responsible State transportation department, Federal agency, or tribal government and submitted to FHWA on an annual basis or whenever requested. Specifications for collecting and reporting this data are contained in the “Specifications for the National Bridge Inventory” (incorporated by reference in § 650.317) together with subsequent interim changes or the most recent version. Inventory data must include element level bridge inspection data for bridges on the NHS.

(b) For all inspection types, enter changes to the inventory data into the State transportation department, Federal agency, or tribal government inventory within three months of when the field portion of the inspection is completed.

(c) For modifications to existing bridges that alter previously recorded inventory data and for newly constructed bridges, enter the inventory data into the State transportation department, Federal agency, or tribal government inventory within three months after opening to traffic.

(d) For changes in load restriction or closure status, enter the revised inventory data into the State transportation department, Federal agency, or tribal government

inventory within three months after the change in load restriction or closure status of the bridge is implemented.

(e) Each State transportation department, Federal agency, or tribal government must establish and document a process that ensures the time constraint requirements of paragraphs (b) through (d) of this section are fulfilled.

**§ 650.317 Reference manuals.**

Certain material is incorporated by reference (IBR) into this subpart with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. All approved material is available for inspection at the Department of Transportation Library, 1200 New Jersey Avenue, SE., Washington, DC 20590 in Room W12-300 and may be obtained from the sources listed in paragraphs (a) and (b) of this section. It is also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of these documents at NARA email [fedreg.legal@nara.gov](mailto:fedreg.legal@nara.gov) or go to [www.archives.gov/federal-register/cfr/ibr-locations.html](http://www.archives.gov/federal-register/cfr/ibr-locations.html).

(a) American Association of State Highway and Transportation Officials (AASHTO), Suite 249, 444 N. Capitol Street, NW., Washington, DC 20001. Tel: 1-800-231-3475, <https://bookstore.transportation.org>.

(1) AASHTO Manual: “Manual for Bridge Evaluation,” Second Edition, 2011, IBR approved for §§ 650.305 and 650.313. The Manual includes the following interim revisions:

(i) 2011 Interim Revisions.

(ii) 2013 Interim Revisions.

(iii) 2014 Interim Revisions.

(iv) 2015 Interim Revisions.

(v) 2016 Interim Revisions.

(2) AASHTO MBEI: “Manual for Bridge Element Inspection,” First Edition, 2014, including 2015 Interim Revisions, IBR approved for § 650.313.

(b) The following documents are available from the Federal Highway Administration, 1200 New Jersey Avenue, SE, Washington, DC 20590, tel: 202-366-4000, <http://www.fhwa.dot.gov/bridge/nbi.cfm>.

(1) “Specifications for the National Bridge Inventory,” FHWA, 2019 IBR approved for §§ 650.305 and 650.315.

(2) [Reserved]

**Subpart D—[Removed and Resered]**

3. Remove and reserve subpart D.

**Subpart G—[Removed and Reserved]**

4. Remove and reserve Subpart G.

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