

**Federal Highway Administration, DOT**

**§ 650.105**

**PART 650—BRIDGES, STRUCTURES,  
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**Subpart A—Location and Hydraulic Design  
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AUTHORITY: 23 U.S.C. 119, 144, and 315.

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**Subpart A—Location and Hydraulic  
Design of Encroachments  
on Flood Plains**

SOURCE: 44 FR 67580, Nov. 26, 1979, unless otherwise noted.

**Subpart B—Erosion and Sediment Control  
on Highway Construction Projects**

**§ 650.101 Purpose.**

To prescribe Federal Highway Administration (FHWA) policies and procedures for the location and hydraulic design of highway encroachments on flood plains, including direct Federal highway projects administered by the FHWA.

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**§ 650.103 Policy.**

It is the policy of the FHWA:

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(a) To encourage a broad and unified effort to prevent uneconomic, hazardous or incompatible use and development of the Nation's flood plains,

(b) To avoid longitudinal encroachments, where practicable,

(c) To avoid significant encroachments, where practicable,

(d) To minimize impacts of highway agency actions which adversely affect base flood plains,

(e) To restore and preserve the natural and beneficial flood-plain values that are adversely impacted by highway agency actions,

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(f) To avoid support of incompatible flood-plain development,

(g) To be consistent with the intent of the Standards and Criteria of the National Flood Insurance Program, where appropriate, and

(h) To incorporate "A Unified National Program for Floodplain Management" of the Water Resources Council into FHWA procedures.

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**Subpart G [Reserved]**

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**§ 650.105 Definitions.**

(a) *Action* shall mean any highway construction, reconstruction, rehabilitation, repair, or improvement undertaken with Federal or Federal-aid highway funds or FHWA approval.

(b) *Base flood* shall mean the flood or tide having a 1-percent chance of being exceeded in any given year.

(c) *Base flood plain* shall mean the area subject to flooding by the base flood.

(d) *Design Flood* shall mean the peak discharge, volume if appropriate, stage or wave crest elevation of the flood associated with the probability of exceedance selected for the design of a highway encroachment. By definition, the highway will not be inundated from the stage of the design flood.

(e) *Encroachment* shall mean an action within the limits of the base flood plain.

(f) *Floodproof* shall mean to design and construct individual buildings, facilities, and their sites to protect against structural failure, to keep water out or to reduce the effects of water entry.

(g) *Freeboard* shall mean the vertical clearance of the lowest structural member of the bridge superstructure above the water surface elevation of the overtopping flood.

(h) *Minimize* shall mean to reduce to the smallest practicable amount or degree.

(i) *Natural and beneficial flood-plain values* shall include but are not limited to fish, wildlife, plants, open space, natural beauty, scientific study, outdoor recreation, agriculture, aquaculture, forestry, natural moderation of floods, water quality maintenance, and groundwater recharge.

(j) *Overtopping flood* shall mean the flood described by the probability of exceedance and water surface elevation at which flow occurs over the highway, over the watershed divide, or through structure(s) provided for emergency relief.

(k) *Practicable* shall mean capable of being done within reasonable natural, social, or economic constraints.

(l) *Preserve* shall mean to avoid modification to the functions of the natural flood-plain environment or to maintain it as closely as practicable in its natural state.

(m) *Regulatory floodway* shall mean the flood-plain area that is reserved in an open manner by Federal, State or local requirements, *i.e.*, unconfined or unobstructed either horizontally or vertically, to provide for the discharge of the base flood so that the cumulative increase in water surface elevation

is no more than a designated amount (not to exceed 1 foot as established by the Federal Emergency Management Agency (FEMA) for administering the National Flood Insurance Program).

(n) *Restore* shall mean to reestablish a setting or environment in which the functions of the natural and beneficial flood-plain values adversely impacted by the highway agency action can again operate.

(o) *Risk* shall mean the consequences associated with the probability of flooding attributable to an encroachment. It shall include the potential for property loss and hazard to life during the service life of the highway.

(p) *Risk analysis* shall mean an economic comparison of design alternatives using expected total costs (construction costs plus risk costs) to determine the alternative with the least total expected cost to the public. It shall include probable flood-related costs during the service life of the facility for highway operation, maintenance, and repair, for highway-aggravated flood damage to other property, and for additional or interrupted highway travel.

(q) *Significant encroachment* shall mean a highway encroachment and any direct support of likely base flood-plain development that would involve one or more of the following construction-or flood-related impacts:

(1) A significant potential for interruption or termination of a transportation facility which is needed for emergency vehicles or provides a community's only evacuation route.

(2) A significant risk, or

(3) A significant adverse impact on natural and beneficial flood-plain values.

(r) *Support base flood-plain development* shall mean to encourage, allow, serve, or otherwise facilitate additional base flood-plain development. Direct support results from an encroachment, while indirect support results from an action out of the base flood plain.

#### § 650.107 Applicability.

(a) The provisions of this regulation shall apply to all encroachments and to all actions which affect base flood

plains, except for repairs made with emergency funds (23 CFR part 668) during or immediately following a disaster.

(b) The provisions of this regulation shall not apply to or alter approvals or authorizations which were given by FHWA pursuant to regulations or directives in effect before the effective date of this regulation.

**§ 650.109 Public involvement.**

Procedures which have been established to meet the public involvement requirements of 23 CFR part 771 shall be used to provide opportunity for early public review and comment on alternatives which contain encroachments.

[53 FR 11065, Apr. 5, 1988]

**§ 650.111 Location hydraulic studies.**

(a) National Flood Insurance Program (NFIP) maps or information developed by the highway agency, if NFIP maps are not available, shall be used to determine whether a highway location alternative will include an encroachment.

(b) Location studies shall include evaluation and discussion of the practicability of alternatives to any longitudinal encroachments.

(c) Location studies shall include discussion of the following items, commensurate with the significance of the risk or environmental impact, for all alternatives containing encroachments and for those actions which would support base flood-plain development:

- (1) The risks associated with implementation of the action,
- (2) The impacts on natural and beneficial flood-plain values,
- (3) The support of probable incompatible flood-plain development,
- (4) The measures to minimize flood-plain impacts associated with the action, and
- (5) The measures to restore and preserve the natural and beneficial flood-plain values impacted by the action.

(d) Location studies shall include evaluation and discussion of the practicability of alternatives to any significant encroachments or any support of incompatible flood-plain development.

(e) The studies required by § 650.111 (c) and (d) shall be summarized in envi-

ronmental review documents prepared pursuant to 23 CFR part 771.

(f) Local, State, and Federal water resources and flood-plain management agencies should be consulted to determine if the proposed highway action is consistent with existing watershed and flood-plain management programs and to obtain current information on development and proposed actions in the affected watersheds.

**§ 650.113 Only practicable alternative finding.**

(a) A proposed action which includes a significant encroachment shall not be approved unless the FHWA finds that the proposed significant encroachment is the only practicable alternative. This finding shall be included in the final environmental document (final environmental impact statement or finding of no significant impact) and shall be supported by the following information:

- (1) The reasons why the proposed action must be located in the flood plain,
  - (2) The alternatives considered and why they were not practicable, and
  - (3) A statement indicating whether the action conforms to applicable State or local flood-plain protection standards.
- (b) [Reserved]

[44 FR 67580, Nov. 26, 1979, as amended at 48 FR 29274, June 24, 1983]

**§ 650.115 Design standards.**

(a) The design selected for an encroachment shall be supported by analyses of design alternatives with consideration given to capital costs and risks, and to other economic, engineering, social and environmental concerns.

(1) Consideration of capital costs and risks shall include, as appropriate, a risk analysis or assessment which includes:

- (i) The overtopping flood or the base flood, whichever is greater, or
- (ii) The greatest flood which must flow through the highway drainage structure(s), where overtopping is not practicable. The greatest flood used in the analysis is subject to state-of-the-art capability to estimate the exceedance probability.

**§ 650.117**

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(2) The design flood for encroachments by through lanes of Interstate highways shall not be less than the flood with a 2-percent chance of being exceeded in any given year. No minimum design flood is specified for Interstate highway ramps and frontage roads or for other highways.

(3) Freeboard shall be provided, where practicable, to protect bridge structures from debris- and scour-related failure.

(4) The effect of existing flood control channels, levees, and reservoirs shall be considered in estimating the peak discharge and stage for all floods considered in the design.

(5) The design of encroachments shall be consistent with standards established by the FEMA, State, and local governmental agencies for the administration of the National Flood Insurance Program for:

(i) All direct Federal highway actions, unless the standards are demonstrably inappropriate, and

(ii) Federal-aid highway actions where a regulatory floodway has been designated or where studies are underway to establish a regulatory floodway.

(b) Rest area buildings and related water supply and waste treatment facilities shall be located outside the base flood plain, where practicable. Rest area buildings which are located on the base flood plain shall be floodproofed against damage from the base flood.

(c) Where highway fills are to be used as dams to permanently impound water more than 50 acre-feet ( $6.17 \times 10^4$  cubic metres) in volume or 25 feet (7.6 metres) deep, the hydrologic, hydraulic, and structural design of the fill and appurtenant spillways shall have the approval of the State or Federal agency responsible for the safety of dams or like structures within the State, prior to authorization by the Division Administrator to advertise for bids for construction.

**§ 650.117 Content of design studies.**

(a) The detail of studies shall be commensurate with the risk associated with the encroachment and with other economic, engineering, social or environmental concerns.

(b) Studies by highway agencies shall contain:

(1) The hydrologic and hydraulic data and design computations,

(2) The analysis required by § 650.115(a), and

(3) For proposed direct Federal highway actions, the reasons, when applicable, why FEMA criteria (44 CFR 60.3, formerly 24 CFR 1910.3) are demonstrably inappropriate.

(c) For encroachment locations, project plans shall show:

(1) The magnitude, approximate probability of exceedance and, at appropriate locations, the water surface elevations associated with the overtopping flood or the flood of § 650.115(a)(1)(ii), and

(2) The magnitude and water surface elevation of the base flood, if larger than the overtopping flood.

**Subpart B—Erosion and Sediment Control on Highway Construction Projects**

SOURCE: 59 FR 37939, July 26, 1994, unless otherwise noted.

**§ 650.201 Purpose.**

The purpose of this subpart is to prescribe policies and procedures for the control of erosion, abatement of water pollution, and prevention of damage by sediment deposition from all construction projects funded under title 23, United States Code.

**§ 650.203 Policy.**

It is the policy of the Federal Highway Administration (FHWA) that all highways funded in whole or in part under title 23, United States Code, shall be located, designed, constructed and operated according to standards that will minimize erosion and sediment damage to the highway and adjacent properties and abate pollution of surface and ground water resources. Guidance for the development of standards used to minimize erosion and sediment damage is referenced in § 650.211 of this part.

**§ 650.205 Definitions.**

*Erosion control measures and practices* are actions that are taken to inhibit

the dislodging and transporting of soil particles by water or wind, including actions that limit the area of exposed soil and minimize the time the soil is exposed.

*Permanent erosion and sediment control measures and practices* are installations and design features of a construction project which remain in place and in service after completion of the project.

*Pollutants* are substances, including sediment, which cause deterioration of water quality when added to surface or ground waters in sufficient quantity.

*Sediment control measures and practices* are actions taken to control the deposition of sediments resulting from surface runoff.

*Temporary erosion and sediment control measures and practices* are actions taken on an interim basis during construction to minimize the disturbance, transportation, and unwanted deposition of sediment.

#### § 650.207 Plans, specifications and estimates.

(a) Emphasis shall be placed on erosion control in the preparation of plans, specifications and estimates.

(b) All reasonable steps shall be taken to insure that highway project designs for the control of erosion and sedimentation and the protection of water quality comply with applicable standards and regulations of other agencies.

[39 FR 36332, Oct. 9, 1974]

#### § 650.209 Construction.

(a) Permanent erosion and sediment control measures and practices shall be established and implemented at the earliest practicable time consistent with good construction and management practices.

(b) Implementation of temporary erosion and sediment control measures and practices shall be coordinated with permanent measures to assure economical, effective, and continuous control throughout construction.

(c) Erosion and sediment control measures and practices shall be monitored and maintained or revised to insure that they are fulfilling their intended function during the construction of the project.

(d) Federal-aid funds shall not be used in erosion and sediment control actions made necessary because of contractor oversight, carelessness, or failure to implement sufficient control measures.

(e) Pollutants used during highway construction or operation and material from sediment traps shall not be stockpiled or disposed of in a manner which makes them susceptible to being washed into any watercourse by runoff or high water. No pollutants shall be deposited or disposed of in watercourses.

#### § 650.211 Guidelines.

(a) The FHWA adopts the AASHTO Highway Drainage Guidelines, Volume III, "Erosion and Sediment Control in Highway Construction," 1992,<sup>1</sup> as guidelines to be followed on all construction projects funded under title 23, United States Code. These guidelines are not intended to preempt any requirements made by or under State law if such requirements are more stringent.

(b) Each State highway agency should apply the guidelines referenced in paragraph (a) of this section or apply its own guidelines, if these guidelines are more stringent, to develop standards and practices for the control of erosion and sediment on Federal-aid construction projects. These specific standards and practices may reference available resources, such as the procedures presented in the AASHTO "Model Drainage Manual," 1991.<sup>2</sup>

(c) Consistent with the requirements of section 6217(g) of the Coastal Zone Act Reauthorization Amendments of 1990 (Pub. L. 101-508, 104 Stat. 1388-299), highway construction projects funded

<sup>1</sup>This document is available for inspection from the FHWA headquarters and field offices as prescribed by 49 CFR part 7, appendix D. It may be purchased from the American Association of State Highway and Transportation Officials offices at Suite 225, 444 North Capitol Street, NW., Washington, DC 20001.

<sup>2</sup>This document is available for inspection from the FHWA headquarters and field offices as prescribed by 49 CFR part 7, appendix D. It may be purchased from the American Association of State Highway and Transportation Officials offices at Suite 225, 444 North Capitol Street, NW., Washington, DC 20001.

under title 23, United States Code, and located in the coastal zone management areas of States with coastal zone management programs approved by the United States Department of Commerce, National Oceanic and Atmospheric Administration, should utilize “Guidance Specifying Management Measures for Sources of Nonpoint Source Pollution in Coastal Waters,” 84-B-92-002, U.S. EPA, January 1993.<sup>3</sup> State highway agencies should refer to this Environmental Protection Agency guidance document for the design of projects within coastal zone management areas.

**Subpart C—National Bridge Inspection Standards (NBIS)**

SOURCE: 87 FR 27429, May 6, 2022, unless otherwise noted.

**§ 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 and federally-owned bridges, private bridges that are connected to a public road on both ends of the bridge, temporary bridges, and bridges under construction with portions open to traffic.

**§ 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”, including Interim Revisions, excluding

<sup>3</sup>This document is available for inspection and copying as prescribed by 49 CFR part 7, appendix D.

the 3rd paragraph in Article 6B.7.1, incorporated by reference in § 650.317.

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

*Bridge.* A structure including supports erected over a depression or an obstruction, such as water, highway, or railway, and having a track or passage-way 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 smallest contiguous opening.

*Bridge inspection experience.* Active participation in bridge inspections in accordance with the this subpart, in either a field inspection, supervisory, or management role. Some of the experience may come from relevant bridge design, bridge load rating, 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.

*Bridge Inspector’s Reference Manual or the BIRM.* A comprehensive FHWA manual on procedures and techniques for inspecting and evaluating a variety of in-service highway bridges. This manual is available at the following URL: [www.fhwa.dot.gov/bridge/nbis.cfm](http://www.fhwa.dot.gov/bridge/nbis.cfm). This manual may be purchased from the Government Publishing Office, Washington, DC 20402 and from National Technical Information Service, Springfield, VA 22161.

*Complex feature.* Bridge component(s) or member(s) with advanced or unique structural members or operational characteristics, construction methods, and/or requiring specific inspection

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

procedures. This includes mechanical and electrical elements of moveable spans and cable-related members 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 deterioration 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.

*Deterioration mode.* Typical deterioration or damage affecting the condition of a bridge member 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 arm's 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.* The first inspection 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 the field portion of the bridge inspection is completed.

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

*Inspection report.* The document which summarizes the bridge inspection findings, recommendations, and identifies the team leader responsible for the inspection and report.

*Internal redundancy.* A redundancy that exists within a primary member cross-section without load path redundancy, such that fracture of one component will not propagate through the entire member, is discoverable by the applicable inspection procedures, and will not cause a portion of or the entire bridge to collapse.

*Inventory data.* All data reported to the National Bridge Inventory (NBI) in accordance with the § 650.315.

*Legal load.* The maximum load for each vehicle configuration, including the weight of the vehicle and its payload, permitted by law for the State in which the bridge is located.

*Legal load rating.* The maximum permissible legal load to which the structure may be subjected with the unlimited numbers of passages over the duration of a specified bridge evaluation period. Legal load rating is a term used in Load and Resistance Factor Rating method.

*Load path redundancy.* A redundancy that exists based on the number of primary load-carrying members between points of support, such that fracture of the cross section at one location of a member will not cause a portion of or the entire bridge to collapse.

*Load posting.* Regulatory signs installed in accordance with 23 CFR 655.601 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 Steel Tension Member (NSTM).* A primary steel member fully or partially in tension, and without load path redundancy, system redundancy or internal redundancy, whose failure may cause a portion of or the entire bridge to collapse.

*NSTM inspection.* A hands-on inspection of a nonredundant steel tension member.

*NSTM 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. Allowing unlimited numbers of vehicles to use the bridge at operating level may shorten the life of the bridge. Operating rating is a term used in either the Allowable Stress or Load Factor Rating method.

*Private bridge.* A bridge open to public travel and not owned by a public authority as defined in 23 U.S.C. 101.

*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 for professional engineering and/or structural engineering license that, under State licensure laws, permits the individual to offer engineering

services within areas of expertise directly to the public.

*Program manager.* The individual in charge of the program, that has been assigned the duties and responsibilities for bridge inspection, reporting, and inventory, and has the overall responsibility to ensure the program conforms with the requirements of this subpart. The program manager provides overall leadership and is available to inspection team leaders 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 QC 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.

*Rehabilitation.* The major work required to restore the structural integrity of a bridge as well as work necessary to correct major safety defects.

*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 (RAP).* A group of well experienced panel members that performs a rigorous assessment of risk to establish policy for bridge inspection intervals.

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

*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 risk-based and data-driven determination of a bridge's vulnerability to scour, resulting from the least stable result of scour that is either observed, or estimated through a scour evaluation or a scour assessment.

*Scour assessment.* The determination of an existing bridge's vulnerability to scour which considers stream stability and scour potential.

*Scour critical bridge.* A bridge with a foundation member that is unstable, or may become unstable, as determined by the scour appraisal.

*Scour evaluation.* The application of hydraulic analysis to estimate scour depths and determine bridge and substructure stability considering potential scour.

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

*Service inspection.* An inspection to identify major deficiencies and safety issues, performed by personnel with general knowledge of bridge maintenance or bridge inspection.

*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 does 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.

*System redundancy.* A redundancy that exists in a bridge system without load path redundancy, such that fracture of the cross section at one location of a primary member will not cause a portion of or the entire bridge to collapse.

*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 diver.* The individual performing the inspection of the underwater portion of the bridge.

*Underwater Bridge Inspection Manual.* A comprehensive FHWA manual on the procedures and techniques for underwater bridge inspection. This manual is available at the following URL: [www.fhwa.dot.gov/bridge/nbis.cfm](http://www.fhwa.dot.gov/bridge/nbis.cfm). This manual may be purchased from the Government Publishing Office, Washington, DC 20402 and from National Technical Information Service, Springfield, VA 22161.

*Underwater bridge inspection training.* Training that covers all aspects of underwater bridge inspection to relate the conditions of underwater bridge members to established criteria (see Underwater Bridge Inspection Manual and the BIRM 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.

*Unknown Foundations.* Foundations of bridges over waterways where complete details are unknown because either the foundation type and depth are unknown, or the foundation type is known, but its depth is unknown, and therefore cannot be appraised for scour vulnerability.

#### **§ 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) or FHWA, 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 bridge crosses a border between a State transportation department, Federal agency, or Tribal government jurisdiction, all entities must determine through a joint written agreement the responsibilities of each entity for that bridge under this subpart, including the designated lead State for reporting NBI data.

(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 governmentwide bridge inspection policies and procedures;

(2) Maintaining a registry of nationally certified bridge inspectors that are performing the duties of a team leader in their State or 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;

(3) Documenting the criteria for inspection intervals for the inspection types identified in these standards;

(4) Documenting the roles and responsibilities of personnel involved in the bridge inspection program;

(5) Managing bridge inspection reports and files;

(6) Performing quality control and quality assurance activities;

(7) Preparing, maintaining, and reporting bridge inventory data;

(8) Producing valid load ratings and when required, implementing load posting or other restrictions;

(9) Managing the activities and corrective actions taken in response to a critical finding;

(10) Managing scour appraisals and scour plans of action; and

(11) Managing other requirements of these standards.

(f) Functions identified in paragraphs (e)(3) 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 by the responsible State transportation department, Federal agency, or Tribal government. Except as provided below, 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 or FHWA's concurrence via a formal written agreement, delegate its functions and responsibilities under this subpart to the BIA or FHWA.

(g) Each State transportation department, Federal agency, or Tribal government bridge inspection organization must have a program manager with the qualifications defined in § 650.309(a). An employee of the BIA or FHWA 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 or FHWA in accordance with paragraph (f) of this section.

**§ 650.309 Qualifications of personnel.**

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

(1) Be a registered Professional Engineer, or have 10 years of bridge inspection experience;

(2) Complete an FHWA-approved comprehensive bridge inspection training course as described in paragraph (h) of this section and score 70 percent or greater on an end-of-course assessment (completion of FHWA-approved comprehensive bridge inspection training

under FHWA regulations in this subpart in effect before June 6, 2022, satisfies 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 June 6, 2022, if serving as a program manager who was qualified under prior FHWA regulations in this subpart.

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

(1) Meet one of the four qualifications listed in paragraphs (b)(1)(i) through (iv) of this section:

(i) Be a registered Professional Engineer and have 6 months of bridge inspection experience;

(ii) Have 5 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 (2) 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 (4) years of bridge inspection experience;

(2) Complete an FHWA-approved comprehensive bridge inspection training course as described in paragraph (h) of this section and score 70 percent or greater on an end-of-course assessment (completion of FHWA-approved comprehensive bridge inspection training under FHWA regulations in this subpart in effect before June 6, 2022, satisfies the intent of the requirement in this paragraph (b));

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

(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; and

(5) Satisfy the requirements of this paragraph (b) within 24 months from June 6, 2022, if serving as a team leader who was qualified under prior FHWA regulations in this subpart.

(c) Team leaders on NSTM inspections must, at a minimum:

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

(2) Complete an FHWA-approved training course on the inspection of NSTMs as defined in paragraph (h) of this section and score 70 percent or greater on an end-of-course assessment (completion of FHWA-approved NSTM inspection training prior to June 6, 2022, satisfies the intent of the requirement in this paragraph (c)); and

(3) Satisfy the requirements of this paragraph (c) within 24 months from June 6, 2022.

(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 (h) of this section and score 70 percent or greater on an end-of-course assessment (completion of FHWA-approved comprehensive bridge inspection training or FHWA-approved underwater bridge inspection training under FHWA regulations in this subpart in effect before June 6, 2022, satisfies the intent of the requirement in this paragraph (e)).

(f) State transportation departments, Federal agencies, and Tribal governments must establish documented personnel qualifications for Damage and Special Inspection types.

(g) State transportation departments, Federal agencies, and Tribal governments that establish risk-based routine inspection intervals that exceed 48 months under §650.311(a)(2) must establish documented personnel

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qualifications for the Service Inspection type.

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

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

(i) Comprehensive bridge inspection training, which must include topics of importance to 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 members), joints, bearings, drainage systems, lighting, signs, and traffic safety features; nondestructive evaluation techniques; load path redundancy and fatigue concepts; and practical applications of the concepts listed in this paragraph (h)(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) NSTM 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 NSTMs; and the application of nondestructive evaluation techniques.

(2) *FHWA approval of alternate training.* A State transportation department, Federal agency, or Tribal government may submit to FHWA a training course as an alternate to any of the

NHI courses listed in paragraph (h)(1) of this section. An alternate must include all the topics described in paragraph (h)(1) and be consistent with the related content. 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 5 years to ensure the material is current. Updates to approved course materials and end-of-course assessments must be resubmitted to FHWA for approval.

(3) *FHWA-approved alternate training under prior regulations.* Agencies that have alternate training courses approved by FHWA prior to June 6, 2022, have 24 months to review and update training materials to satisfy requirements as defined in §650.305 and paragraph (h)(1) of this section and resubmit to FHWA for approval.

§ 650.311 Inspection interval.

(a) *Routine inspections.* Each bridge must be inspected at regular intervals not to exceed the interval established using one of the risk-based methods outlined in paragraph (a)(1) or (2) of this section.

(1) *Method 1.* Inspection intervals are determined by a simplified assessment of risk to classify each bridge into one of three categories with an inspection interval as described below.

(i) *Regular intervals.* Each bridge must be inspected at regular intervals not to exceed 24 months, except as required in paragraph (a)(1)(ii) of this section and allowed in paragraphs (a)(1)(iii) of this section.

(ii) *Reduced intervals.* (A) State transportation departments, Federal agencies, or Tribal governments must develop and document criteria used to determine when intervals must be reduced below 24 months. Factors to consider include structure type, design, materials, age, condition ratings, scour, environment, annual average daily traffic and annual average daily truck traffic, history of vehicle impact damage, loads and safe load capacity, and other known deficiencies.

(B) Certain bridges meeting any of the following criteria as recorded in the National Bridge Inventory (NBI)

(see § 650.315) must be inspected at intervals not to exceed 12 months:

(1) One or more of the deck, superstructure, or substructure, or culvert components is rated in serious or worse condition, as recorded by the Deck, Superstructure, or Substructure Condition Rating items, or the Culvert Condition Rating item, coded three (3) or less; or

(2) The observed scour condition is rated serious or worse, as recorded by the Scour Condition Rating item coded three (3) or less.

(C) Where condition ratings are coded three (3) or less due to localized deficiencies, a special inspection limited to those deficiencies, as described in § 650.313(h), can be used to meet this requirement in lieu of a routine inspection. In such cases, a complete routine inspection must be conducted in accordance with paragraph (a)(1)(i) of this section.

(iii) *Extended intervals.* (A) Certain bridges meeting all of the following criteria as recorded in the NBI (see § 650.315) may be inspected at intervals not to exceed 48 months:

(1) The deck, superstructure, and substructure, or culvert, components are all rated in satisfactory or better condition, as recorded by the Deck, Superstructure, and Substructure Condition Rating items, or the Culvert Condition Rating item coded six (6) or greater;

(2) The channel and channel protection are rated in satisfactory or better condition, as recorded by the Channel Condition and Channel Protection Condition items coded six (6) or greater;

(3) The inventory rating is greater than or equal to the standard AASHTO HS-20 or HL-93 loading and routine permit loads are not restricted or not carried/issued, as recorded by the Inventory Load Rating Factor item coded greater than or equal to 1.0 and the Routine Permit Loads item coded A or N;

(4) A steel bridge does not have Category E or E' fatigue details, as recorded by the Fatigue Details item coded N;

(5) All roadway vertical clearances are greater than or equal to 14'-0", as recorded in the Highway Minimum Vertical Clearance item;

(6) All superstructure materials limited to concrete and steel and all superstructure types limited to certain arches, box girders/beams, frames, girders/beams, slabs, and culverts, as recorded by the Span Material items coded C01-C05 or S01-S05, and the Span Type items coded A01, B02-B03, F01-F02, G01-G08, S01-S02, or P01-P02; and

(7) Stable for potential scour and observed scour condition is rated satisfactory or better, as recorded by the Scour Vulnerability item coded A or B and the Scour Condition Rating item coded six (6) or greater.

(B) State transportation departments, Federal agencies, or Tribal governments that implement paragraph (a)(1)(iii)(A) of this section must develop and document an extended interval policy and must notify FHWA in writing prior to implementation. Factors to consider include structure type, design, materials, age, condition ratings, scour, environment, annual average daily traffic and annual average daily truck traffic, history of vehicle impact damage, loads and safe load capacity, and other known deficiencies.

(2) *Method 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 categories, with inspection intervals not to exceed 12, 24, 48, or 72 months. The risk assessment process must be developed by a Risk Assessment Panel (RAP) and documented as a formal policy. The RAP must be comprised of not less than four people, at least two of which are professional engineers, with collective knowledge in bridge design, evaluation, inspection, maintenance, materials, and construction, and include the NBIS program manager. The policy and criteria which establishes intervals, including subsequent changes, must be submitted by the State transportation department, Federal agency, or Tribal government for FHWA approval. The request must include the items in paragraphs (a)(2)(i) through (vi) of this section:

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

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

(iii) Deterioration 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 deterioration modes.

(A) A set of screening criteria must be used to determine how 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 likely to affect the safety or serviceability of the bridge or its members;

(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 deterioration modes in each assessment must include:

(1) For steel members: Section loss, fatigue, and fracture;

(2) For concrete members: Flexural cracking, shear cracking, and reinforcing and prestressing steel corrosion;

(3) For superstructure members: Settlement, rotation, overload, and vehicle/vessel impact; and

(4) For substructure members: Settlement, rotation, and scour.

(D) A set of criteria to assess risk for each bridge member 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 categories with a routine inspection interval not to exceed 12, 24, 48, or 72 months.

(3) *Service inspection.* A service inspection must be performed during the month midway between routine inspections when a risk-based, routine inspection interval exceeds 48 months.

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

(b) *Underwater inspections.* Each bridge must be inspected at regular intervals not to exceed the interval established using one of the risk-based methods outlined in paragraph (b)(1) or (2) of this section.

(1) *Method 1.* Inspection intervals are determined by a simplified assessment of risk to classify each bridge into one of three categories for an underwater inspection interval as described in this section.

(i) *Regular intervals.* Each bridge must be inspected at regular intervals not to exceed 60 months, except as required in paragraph (b)(1)(ii) of this section and allowed in paragraph (b)(1)(iii) of this section.

(ii) *Reduced intervals.* (A) State transportation departments, Federal agencies, or Tribal governments must develop and document criteria used to determine when intervals must be reduced below 60 months. Factors to consider include structure type, design, materials, age, condition ratings, scour, environment, annual average daily traffic and annual average daily truck traffic, history of vehicle/vessel impact damage, loads and safe load capacity, and other known deficiencies.

(B) Certain bridges meeting at least any of the following criteria as recorded in the NBI (see § 650.315) must

be inspected at intervals not to exceed 24 months:

(1) The underwater portions of the bridge are in serious or worse condition, as recorded by the Underwater Inspection Condition item coded three (3) or less;

(2) The channel or channel protection is in serious or worse condition, as recorded by the Channel Condition and Channel Protection Condition items coded three (3) or less; or

(3) The observed scour condition is three (3) or less, as recorded by the Scour Condition Rating item.

(C) Where condition ratings are coded three (3) or less due to localized deficiencies, a special inspection of the underwater portions of the bridge limited to those deficiencies, as described in § 650.313(h), can be used to meet this requirement in lieu of a complete underwater inspection. In such cases, a complete underwater inspection must be conducted in accordance with paragraph (b)(1)(i) of this section.

(iii) *Extended intervals.* (A) Certain bridges meeting all of the following criteria as recorded in the NBI (see § 650.315) may be inspected at intervals not to exceed 72 months:

(1) The underwater portions of the bridge are in satisfactory or better condition, as recorded by the Underwater Inspection Condition item coded six (6) or greater;

(2) The channel and channel protection are in satisfactory or better condition, as indicated by the Channel Condition and Channel Protection Condition items coded six (6) or greater;

(3) Stable for potential scour, Scour Vulnerability item coded A or B, and Scour Condition Rating item is satisfactory or better, coded six (6) or greater.

(B) State transportation departments, Federal agencies, or Tribal governments that implement paragraph (b)(1)(iii)(A) of this section must develop and document an underwater extended interval policy and must notify FHWA in writing prior to implementation. Factors to consider include structure type, design, materials, age, condition ratings, scour, environment, annual average daily traffic and annual average daily truck traffic, history of vehicle/vessel impact damage, loads

and safe load capacity, and other known deficiencies.

(2) *Method 2.* Inspection intervals are determined by a more rigorous assessment of risk. The policy and criteria which establishes intervals, including subsequent changes, must be submitted by the State transportation department, Federal agency, or Tribal government 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 categories with an underwater inspection interval not to exceed 24, 60, and 72 months.

(c) *NSTM inspections.* NSTMs must be inspected at regular intervals not to exceed the interval established using one of the risk-based methods outlined in paragraph (c)(1) or (2) of this section.

(1) *Method 1.* Inspection intervals are determined by a simplified assessment of risk to classify each bridge into one of three risk categories with an interval not to exceed 12, 24, or 48 months.

(i) *Regular intervals.* Each NSTM must be inspected at intervals not to exceed 24 months except as required in paragraph (c)(1)(ii) of this section and allowed in paragraph (c)(1)(iii) of this section.

(ii) *Reduced intervals.* (A) State transportation departments, Federal agencies, or Tribal governments must develop and document criteria to determine when intervals must be reduced below 24 months. Factors to consider include structure type, design, materials, age, condition, environment, annual average daily traffic and annual average daily truck traffic, history of vehicle impact damage, loads and safe load capacity, and other known deficiencies.

(B) Certain NSTMs meeting the following criteria as recorded in the NBI (see § 650.315) must be inspected at intervals not to exceed 12 months:

(1) The NSTMs are rated in poor or worse condition, as recorded by the NSTM Inspection Condition item, coded 4 or less; or

(2) [Reserved].

(iii) *Extended intervals.* (A) Certain NSTMs meeting all of the following criteria may be inspected at intervals not to exceed 48 months:

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(1) Bridge was constructed after 1978 as recorded in the NBI (see § 650.315) Year Built item and fabricated in accordance with a fracture control plan;

(2) All NSTMs have no fatigue details with finite life;

(3) All NSTMs have no history of fatigue cracks;

(4) All NSTMs are rated in satisfactory or better condition, as recorded in the NBI (see § 650.315) by the NSTM Inspection Condition item, coded 6 or greater; and

(5) The bridge's inventory rating is greater than or equal to the standard AASHTO HS-20 or HL-93 loading and routine permit loads are not restricted or not carried/issued, as recorded in the NBI (see § 650.315) by the Inventory Load Rating Factor item coded greater than or equal to 1.0 and the Routine Permit Loads item coded A or N;

(6) All NSTMs do not include pin and hanger assemblies.

(B) State transportation departments, Federal agencies, or Tribal governments that implement paragraph (c)(1)(iii)(A) of this section must develop and document an extended interval policy, and notify FHWA in writing prior to implementation. Factors to consider include structure type, design, materials, age, condition, environment, annual average daily traffic and annual average daily truck traffic, history of vehicle impact damage, loads and safe load capacity, and other known deficiencies.

(2) *Method 2.* Inspection intervals are determined by a more rigorous assessment of risk. The policy and criteria which establishes intervals, including subsequent changes must be submitted by the State transportation department, Federal agency, or Tribal government 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 categories with a NSTM inspection interval not to exceed 12, 24, or 48 months.

(d) *Damage, in-depth, and special inspections.* A 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 intervals of less than 24 months for the next inspection is up to two (2) months after the month in which the inspection was due.

(2) The acceptable tolerance for intervals of 24 months or greater for the next inspection is up to three (3) months after the month in which the inspection was due.

(3) Exceptions to the inspection interval tolerance due to rare and unusual circumstances must be approved by FHWA in advance of the inspection due date plus the tolerance in paragraphs (e)(1) and (2) of this section.

(f) *Next inspection.* Establish the next inspection interval for each inspection type based on results of the inspection and requirements of this section.

(g) *Implementation.* (1) The requirements of paragraphs (a)(1)(ii), (b)(1)(ii), and (c)(1)(ii) of this section must be satisfied within 24 months from June 6, 2022.

(2) Prior FHWA approved extended inspection interval policies will be rescinded 24 months after June 6, 2022.

#### § 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 4.2, AASHTO Manual (incorporated by reference, see § 650.317). Special equipment or techniques, and/or traffic control are necessary for inspections in circumstances where their use provide the only practical means of accessing and/or determining the condition of the bridge. The equipment may include advanced technologies listed in the BIRM.

(b) *Initial inspection.* Perform an initial inspection in accordance with Section 4.2, AASHTO Manual (incorporated by reference, see § 650.317) for each new, replaced, rehabilitated, and temporary bridge as soon as practical, but within 3 months of the bridge opening to traffic.

(c) *Routine inspection.* Perform a routine inspection in accordance with Section 4.2, AASHTO Manual (incorporated by reference, see § 650.317).

(d) *In-depth inspection.* Identify the location of bridge members that need an in-depth inspection and document 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 portions of the bridge 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 bridge and for each bridge with portions underwater that have been rehabilitated as soon as practical, but within 12 months of the bridge opening to traffic.

(f) *NSTM inspection.* (1) Identify the locations of NSTMs in the bridge files.

(i) A State transportation department, Federal agency, or Tribal government may choose to demonstrate a member has system or internal redundancy such that it is not considered an NSTM. The entity may develop and submit a formal request for FHWA approval of procedures using a nationally recognized method to determine that a member has system or internal redundancy. FHWA will review the procedures for approval based upon conformance with the nationally recognized method. The request must include:

(A) Written policy and procedures for determining system or internal redundancy.

(B) Identification of the nationally recognized method used to determine system or internal redundancy. Nationally recognized means developed, endorsed and disseminated by a national organization with affiliates based in two or more States; or currently adopted for use by one or more State governments or by the Federal Government; and is the most current version.

(C) Baseline condition of the bridge(s) to which the policy is being applied.

(D) Description of design and construction details on the member(s) that may affect the system or internal redundancy.

(E) Routine inspection requirements for bridges with system or internally redundant members.

(F) Special inspection requirements for the members with system or internal redundancy.

(G) Evaluation criteria for when members should be reviewed to ensure they still have system and internal redundancy.

(ii) Inspect the bridge using the approved methods outlined in paragraphs (f)(1)(i)(E) and (F) of this section.

(2) Perform hands-on inspections of NSTMs in accordance with the procedures developed in paragraph (g) of this section.

(3) Perform the first NSTM inspection for each bridge and for each bridge with rehabilitated NSTMs as soon as practical, but within 12 months of the bridge opening 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). 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 features must be developed for each bridge and contained in the bridge file.

(h) *Special inspection.* For special inspections used to monitor conditions as described in §650.311(a)(1)(ii) and (b)(1)(ii), develop and document procedures in accordance with Section 4.2, AASHTO Manual (incorporated by reference, see § 650.317).

(i) *Service inspection.* Perform a service inspection when the routine inspection interval is greater than 48 months. Document the inspection date and any required follow up actions in the bridge file.

(j) *Team leader.* Provide at least one team leader at the bridge who meets the minimum qualifications stated in §650.309 and actively participates in the

inspection at all times during each initial, routine, in-depth, NSTM, underwater inspection, and special inspection described in paragraph (h) of this section.

(k) *Load rating.* (1) Rate each bridge as to its safe load capacity in accordance with Sections 6 and 8, excluding the 3rd paragraph in Article 6B.7.1, 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.

(1) *Load posting.* (1) Implement load posting or restriction for a bridge in accordance with the incorporated articles in 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 annual average daily traffic, annual average daily truck traffic, and loading conditions. Posting shall be made as soon as possible but not later than 30 days after a load rating determines a need for such posting. Implement load posting in accordance with these procedures.

(3) Missing or illegible posting signs shall be corrected as soon as possible but not later than 30 days after inspection or other notification determines a need.

(m) *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.

(n) *Bridge files.* Prepare and maintain bridge files in accordance with Section 2.2, AASHTO Manual (incorporated by reference, *see* § 650.317).

(o) *Scour.* (1) Perform a scour appraisal for all bridges over water, and document the process and results in the bridge file. Re-appraise when necessary to reflect changing scour conditions. Scour appraisal procedures should be consistent with Hydraulic Engineering Circulars (HEC) 18 and 20. Guidance for scour evaluations is located in HEC 18 and 20, and guidance for scour assessment is located in HEC 20.

(2) For bridges which are determined to be scour critical or have unknown foundations, prepare and document a scour POA for deployment of scour countermeasures for known and potential deficiencies, and to address safety concerns. The plan must address a schedule for repairing or installing physical and/or hydraulic scour countermeasures, and/or the use of monitoring as a scour countermeasure. Scour plans of actions should be consistent with HEC 18 and 23.

(3) Execute action in accordance with the plan.

(p) *Quality control and quality assurance.* (1) Assure systematic QC and 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. QC and QA reviews are to be performed by personnel other than the individual who completed the original report or calculations.

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

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

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

(i) Define critical findings considering the location and the redundancy

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of the member affected and the extent and consequence of a deficiency. Deficiencies include, but are not limited to scour, damage, corrosion, section loss, settlement, cracking, deflection, distortion, delamination, loss of bearing, and any condition posing an imminent threat to public safety. At a minimum, include findings which warrant the following:

(A) Full or partial closure of any bridge;

(B) An NSTM to be rated in serious or worse condition, as defined in the NBI (*see* § 650.315) by the NSTM Inspection item, coded three (3) or less;

(C) A deck, superstructure, substructure, or culvert component to be rated in critical or worse condition, as defined in the NBI (*see* § 650.315) by the Deck, Superstructure, or Substructure Condition Rating items, or the Culvert Condition Rating item, coded two (2) or less;

(D) The channel condition or scour condition to be rated in critical or worse condition as defined in the NBI (*see* § 650.315) by the Channel Condition Rating or Scour Condition Rating items, coded critical (2) or less; or

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

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

(2) State transportation departments, Federal agencies, and Tribal governments must inform FHWA of all critical findings and actions taken, underway, or planned to resolve critical findings as follows:

(i) Notify FHWA within 24 hours of discovery of each critical finding on the National Highway System (NHS) as identified in paragraphs (q)(1)(i)(A) and (B) of this section;

(ii) Provide monthly, or as requested, a written status report for each critical finding as identified in paragraph (q)(1)(i) of this section until resolved. The report must contain:

(A) Owner;

(B) NBI 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.

(r) *Review of compliance.* Provide information annually or as required in cooperation with any FHWA review of compliance with this subpart.

[87 FR 27429, May 6, 2022, as amended at 87 FR 57821, Sept. 22, 2022]

### § 650.315 Inventory.

(a) Each State transportation department, Federal agency, or Tribal government must prepare and maintain an inventory of all bridges subject to this subpart. Inventory data, as defined in § 650.305, 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. For temporary bridges open to traffic greater than 24 months, inventory data must be collected and submitted per this section. Inventory data must include element level bridge inspection data for bridges on the NHS collected in accordance with the “Manual for Bridge Element Inspection” (incorporated by reference, *see* § 650.317). Specifications for collecting and reporting this data are contained in the “Specifications for the National Bridge Inventory” (incorporated by reference, *see* § 650.317).

(b) For all inspection types, enter changes to the inventory data into the State transportation department, Federal agency, or Tribal government inventory within 3 months after the month 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 3 months after the month of opening to traffic.

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

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department, Federal agency, or Tribal government inventory within 3 months after the month 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 Incorporation by reference .

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 U.S. Department of Transportation (DOT) and the National Archives and Records Administration (NARA). Contact DOT at: U.S. Department of Transportation Library, 1200 New Jersey Avenue SE, Washington, DC 20590 in Room W12-300, (800) 853-1351, [www.ntl.bts.gov/ntl](http://www.ntl.bts.gov/ntl). For information on the availability of this material at NARA email: [fr.inspection@nara.gov](mailto:fr.inspection@nara.gov) or go to: [www.archives.gov/federal-register/cfr/ibr-locations.html](http://www.archives.gov/federal-register/cfr/ibr-locations.html). The material may be obtained from the following sources:

(a) AASHTO. American Association of State Highway and Transportation Officials, 555 12th Street NW, Suite 1000, Washington, DC 20004; 1-800-231-3475; <https://store.transportation.org>.

(1) MBE-3. “The Manual for Bridge Evaluation,” Third Edition, 2018; IBR approved for § 650.305 and 650.313.:

(2) MBE-3-I1-OL. The Manual for Bridge Evaluation, 2019 Interim Revisions [to 2018 Third Edition], copyright 2018; IBR approved for § 650.305 and 650.313.

(3) MBE-3-I2. The Manual for Bridge Evaluation, 2020 Interim Revisions [to 2018 Third Edition], copyright 2020; IBR approved for § 650.305 and 650.313.

(4) MBEI-2: Manual for Bridge Element Inspection, Second Edition, 2019, IBR approved for § 650.315.

(b) FHWA. Federal Highway Administration, 1200 New Jersey Avenue SE, Washington, DC 20590; 1-202-366-4000; [www.fhwa.dot.gov/bridge/nbi.cfm](http://www.fhwa.dot.gov/bridge/nbi.cfm).

(1) FHWA-HIF-22-017: Specifications for the National Bridge Inventory, March, 2022, IBR approved for § 650.315.

## 23 CFR Ch. I (4-1-24 Edition)

(2) [Reserved].

### Subpart D [Reserved]

### Subpart E—National Tunnel Inspection Standards

SOURCE: 80 FR 41368, July 14, 2015, unless otherwise noted.

#### § 650.501 Purpose.

This subpart sets the national minimum standards for the proper safety inspection and evaluation of all highway tunnels 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).

#### § 650.503 Applicability.

The National Tunnel Inspection Standards (NTIS) in this subpart apply to all structures defined as highway tunnels on all public roads, on and off Federal-aid highways, including tribally and federally owned tunnels.

#### § 650.505 Definitions.

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

*American Association of State Highway and Transportation Officials (AASHTO) Manual for Bridge Evaluation.* The term “AASHTO Manual for Bridge Evaluation” means the “Manual for Bridge Evaluation”, incorporated by reference in § 650.517.

*At-grade roadway.* The term “at-grade roadway” means paved or unpaved travel ways within the tunnel that carry vehicular traffic and are not suspended or supported by a structural system.

*Bridge inspection experience.* The term “bridge inspection experience” has the same meaning as in § 650.305.

*Complex tunnel.* The term “complex tunnel” means a tunnel characterized by advanced or unique structural elements or functional systems.

*Comprehensive tunnel inspection training.* The term “comprehensive tunnel inspection training” means the FHWA-approved training that covers all aspects of tunnel inspection and enables

inspectors to relate conditions observed in a tunnel to established criteria.

*Critical finding.* The term “critical finding” has the same meaning as in § 650.305.

*Damage inspection.* The term “damage inspection” has the same meaning as in § 650.305.

*End-of-course assessment.* The term “end-of-course assessment” means a comprehensive examination given to students after the completion of a training course.

*Federal-aid highway.* The term “Federal-aid highway” has the same meaning as in 23 U.S.C. 101(a)(5).

*Functional systems.* The term “functional systems” means non-structural systems, such as electrical, mechanical, fire suppression, ventilation, lighting, communications, monitoring, drainage, traffic signals, emergency response (including egress, refuge room spacing, or carbon monoxide detection), or traffic safety components.

*Hands-on inspection.* The term “hands-on inspection” has the same meaning as in § 650.305.

*Highway.* The term “highway” has the same meaning as in 23 U.S.C. 101(a)(11).

*In-depth inspection.* The term “in-depth inspection” means a close-up inspection of one, several, or all tunnel structural elements or functional systems to identify any deficiencies not readily detectable using routine inspection procedures. In-depth inspections may occur more or less frequently than routine inspections, as outlined in the tunnel-specific inspection procedures.

*Initial inspection.* The term “initial inspection” means the first inspection of a tunnel to provide all inventory, appraisal, and other data necessary to determine the baseline condition of the structural elements and functional systems.

*Inspection Date.* The term “Inspection Date” means the date established by the Program Manager on which a regularly scheduled routine inspection begins for a tunnel.

*Legal load.* The terms “legal load means the maximum legal load for each vehicle configuration permitted

by law for the State in which the tunnel is located.

*Load rating.* The term “load rating” means the determination of the safe vehicular live load carrying capacity within or above the tunnel using structural plans, and information gathered from an inspection. The results of the load rating may include the need for load posting.

*Operating rating.* The term “operating rating” has the same meaning as in § 650.305.

*Portal.* The term “portal” means the entrance and exit of the tunnel exposed to the environment; portals may include bare rock, constructed tunnel entrance structures, or buildings.

*Procedures.* The term “procedures” means the 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.

*Professional Engineer (P.E.).* The term “Professional Engineer (P.E.)” means 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 term “Program Manager” means the individual in charge of the inspection program who has been assigned or delegated the duties and responsibilities for tunnel inspection, reporting, and inventory. The Program Manager provides overall leadership and guidance to inspection Team Leaders and load raters.

*Public road.* The term “public road” has the same meaning as in 23 U.S.C. 101(a)(21).

*Quality assurance (QA).* The term “quality assurance (QA)” means the use of sampling and other measures to ensure the adequacy of quality control procedures in order to verify or measure the quality of the entire tunnel inspection and load rating program.

*Quality control (QC).* The term “quality control (QC)” means the procedures that are intended to maintain the quality of a tunnel inspection and load rating at or above a specified level.

*Routine inspection.* The term “routine inspection” means a regularly scheduled comprehensive inspection encompassing all tunnel structural elements and functional systems and consisting of observations and measurements needed to determine the physical and functional condition of the tunnel, to identify any changes from initial or previously recorded conditions, and to ensure that tunnel components continue to satisfy present service requirements.

*Routine permit load.* The term “routine permit load” means a vehicular load that has a gross weight, axle weight, or distance between axles not conforming with State laws for legally configured vehicles, and is authorized for unlimited trips over an extended period of time to move alongside other heavy vehicles on a regular basis.

*Special inspection.* The term “special inspection” means an inspection, scheduled at the discretion of the tunnel owner, used to monitor a particular known or suspected deficiency.

*State transportation department (State DOT).* The term “State transportation department (State DOT)” has the same meaning as in 23 U.S.C. 101(a)(28).

*Team Leader.* The term “Team Leader” means the on-site individual in charge of an inspection team responsible for planning, preparing, performing, and reporting on tunnel inspections.

*Tunnel.* The term “tunnel” means an enclosed roadway for motor vehicle traffic with vehicle access limited to portals, regardless of type of structure or method of construction, that requires, based on the owner’s determination, special design considerations that may include lighting, ventilation, fire protection systems, and emergency egress capacity. The terms “tunnel” does not include bridges or culverts inspected under the National Bridge Inspection Standards (subpart C of this part).

*Tunnel inspection experience.* The term “tunnel inspection experience” means active participation in the performance of tunnel inspections in accordance with the National Tunnel Inspection Standards, in either a field inspection, supervisory, or management role.

*Tunnel inspection refresher training.* The term “tunnel inspection refresher training” means an FHWA-approved training course that aims to improve the quality of tunnel inspections, introduce new techniques, and maintain the consistency of the tunnel inspection program.

*Tunnel Operations, Maintenance, Inspection and Evaluation (TOMIE) Manual.* The term “Tunnel Operations, Maintenance, Inspection and Evaluation (TOMIE) Manual” means the “Tunnel Operations, Maintenance, Inspection and Evaluation (TOMIE) Manual” (incorporated by reference, see § 650.517).

*Tunnel-specific inspection procedures.* The term “tunnel-specific inspection procedures” means the written documentation of the directions necessary to plan for, and conduct an inspection. Directions include coverage of inspection methods, frequency of each method, inspection equipment, access equipment, identification of tunnel elements, components and functional systems, traffic coordination, and specialized qualifications for inspecting personnel.

**§ 650.507 Tunnel inspection organization responsibilities.**

(a) Each State DOT shall inspect, or cause to be inspected, all highway tunnels located on public roads, on and off Federal-aid highways, that are fully or partially located within the State’s boundaries, except for tunnels that are owned by Federal agencies or tribal governments.

(b) Each Federal agency shall inspect, or cause to be inspected, all highway tunnels located on public roads, on and off Federal-aid highways, that are fully or partially located within the respective agency’s responsibility or jurisdiction.

(c) Each tribal government shall inspect, or cause to be inspected, all highway tunnels located on public roads, on and off Federal-aid highways, that are fully or partially located within the respective tribal government’s responsibility or jurisdiction.

(d) Where a tunnel is jointly owned, all bordering States, Federal agencies, and tribal governments with ownership interests should determine through a

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joint formal written agreement the inspection responsibilities of each State, Federal agency, and tribal government.

(e) Each State that contains one or more tunnels subject to these regulations, or Federal agency or tribal government with a tunnel under its jurisdiction, shall include a tunnel inspection organization that is responsible for all of the following:

(1) Statewide, Federal agency-wide, or tribal government-wide tunnel inspection policies and procedures (both general and tunnel-specific), quality control and quality assurance procedures, and preparation and maintenance of a tunnel inventory.

(2) Tunnel inspections, written reports, load ratings, management of critical findings, and other requirements of these standards.

(3) Maintaining a registry of nationally certified tunnel 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, documentation that the inspector's training requirements are up-to-date, the inspector's current contact information, and detailed information about any adverse action that may affect the good standing of the inspector.

(4) A process, developed under the direction of a Professional Engineer and approved by FHWA, to determine when an inspection Team Leader's qualifications must meet § 650.509(b)(4) in order to adequately and appropriately lead an inspection of a complex tunnel or a tunnel with distinctive features or functions. At a minimum, the process shall consider a tunnel's type of construction, functional systems, history of performance, and physical and operational conditions.

(f) A State DOT, Federal agency, or tribal government may delegate functions identified in paragraphs (e)(1), (2), and (3) of this section through a formal written agreement, but such delegation does not relieve the State DOT, Federal agency, or tribal government of any of its responsibilities under this subpart.

(g) The State DOT, Federal agency, or tribal government tunnel inspection organization shall have a Program Manager with the qualifications listed

in § 650.509(a), who has been delegated responsibility for paragraphs (e)(1), (2), and (3) of this section.

### § 650.509 Qualifications of personnel.

(a) A Program Manager shall, at a minimum:

(1) Be a registered Professional Engineer, or have 10 years of tunnel or bridge inspection experience;

(2) Be a nationally certified tunnel inspector;

(3) Satisfy the requirements of paragraphs (a)(1) and (2) of this section by August 13, 2017; and

(4) Be able to determine when a Team Leader's qualifications must meet the requirements of paragraph (b)(1)(i) of this section in accordance with the FHWA approved process developed in accordance with § 650.507(e)(4).

(b) A Team Leader shall, at a minimum:

(1) Meet at least one of the four qualifications listed in paragraphs (b)(1)(i) through (iv) of this section:

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

(ii) Have 5 years of tunnel or 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 or determined as substantially equivalent by the Accreditation Board for Engineering and Technology.

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

(C) Two (2) years of tunnel or bridge inspection experience.

(iv) Have all of the following:

(A) An associate's degree in engineering or engineering technology from a college or university accredited or determined as substantially equivalent by the Accreditation Board for Engineering and Technology.

(B) Four years of tunnel or bridge inspection experience.

(2) Be a nationally certified tunnel inspector.

(3) Provide documentation supporting the satisfaction of paragraphs

(b)(1) and (2) of this section to the Program Manager of each State DOT, Federal agency, or tribal government for which they are performing tunnel inspections.

(4) Be a registered Professional Engineer and have six months of tunnel or bridge inspection experience if the Program Manager determines through the approved process developed under § 650.507(e)(4) that the tunnel being inspected is complex or has distinctive features or functions that warrant this level of qualifications.

(c) Load ratings shall be performed by, or under the direct supervision of, a registered Professional Engineer.

(d) Each State DOT, Federal agency, and tribal government shall determine inspection personnel qualifications for damage, cursory, and special inspections.

(e) A nationally certified tunnel inspector shall:

(1) Complete an FHWA-approved comprehensive tunnel inspection training course and score 70 percent or greater on an end-of-course assessment;

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

(3) Maintain documentation supporting the satisfaction of paragraphs (e)(1) and (2) of this section, and, upon request, provide documentation of their training status and current contact information to the Tunnel Inspection Organization of each State DOT, Federal agency, or tribal government for which they will be performing tunnel inspections.

(f) Acceptable tunnel inspection training includes the following:

(1) *National Highway Institute training.* NHI courses on comprehensive tunnel inspection training.

(2) *FHWA approval of alternate training.* A State DOT, Federal agency, or tribal government may submit to FHWA a training course as an alternative to the NHI course. The FHWA shall approve alternative course materials and end-of-course assessments for national consistency and certification purposes. The Program Manager shall review the approved alternative training course every 5 years to ensure the

material is current. Updates to approved course materials and end-of-course assessments shall be resubmitted to FHWA for approval.

(g) In evaluating the tunnel inspection experience requirements under paragraphs (a) and (b) of this section, a combination of tunnel design, tunnel maintenance, tunnel construction, and tunnel inspection experience, with the predominant amount in tunnel inspection, is acceptable. Also, the following criteria should be considered:

(1) The relevance of the individual's actual experience, including the extent to which the experience has enabled the individual to develop the skills needed to properly lead a tunnel safety inspection.

(2) The individual's exposure to the problems or deficiencies common in the types of tunnels being inspected by the individual.

(3) The individual's understanding of the specific data collection needs and requirements.

**§ 650.511 Inspection interval.**

(a) *Initial inspection.* A State DOT, Federal agency, or tribal government tunnel inspection organization shall conduct, or cause to be conducted, an initial inspection for each tunnel described in § 650.503 as follows:

(1) For existing tunnels, conduct a routine inspection of each tunnel according to the inspection guidance provided in the Tunnel Operations, Maintenance, Inspection and Evaluation (TOMIE) Manual (incorporated by reference, *see* § 650.517) by August 13, 2017.

(2) For tunnels completed after these regulations take effect, the initial routine inspection shall be conducted after all construction is completed and prior to opening to traffic, according to the inspection guidance provided in the Tunnel Operations, Maintenance, Inspection and Evaluation (TOMIE) Manual (incorporated by reference, *see* § 650.517).

(b) *Routine inspections.* A State DOT, Federal agency, or tribal government tunnel inspection organization shall conduct, or cause to be conducted, routine inspections for each tunnel described in § 650.503 as follows:

(1) Establish for each tunnel the NTIS routine Inspection Date in a

month and year (MM/DD/YYYY) format. This date should only be modified by the Program Manager in rare circumstances.

(2) Inspect each tunnel at regular 24-month intervals.

(3) For tunnels needing inspection more frequently than 24-month intervals, establish criteria to determine the level and frequency to which these tunnels are inspected, based on a risk analysis approach that considers such factors as tunnel age, traffic characteristics, geotechnical conditions, and known deficiencies.

(4) Certain tunnels may be inspected at regular intervals up to 48 months. Inspecting a tunnel at an increased interval may be appropriate when past inspection findings and analysis justifies the increased inspection interval. At a minimum, the following criteria shall be used to determine the level and frequency of inspection based on an assessed lower risk: Tunnel age, time from last major rehabilitation, tunnel complexity, traffic characteristics, geotechnical conditions, functional systems, and known deficiencies. A written request that justifies a regular routine inspection interval between 24 and 48 months shall be submitted to FHWA for review and comment prior to the extended interval being implemented.

(5) Inspect each tunnel in accordance with the established interval. The acceptable tolerance for inspection interval is within 2 months before or after the Inspection Date established in paragraph (b)(1) of this section in order to maintain that date. The actual month, day, and year of the inspection are to be reported in the National Tunnel Inventory.

(c) *Damage, in-depth, and special inspections.* The Program Manager shall establish criteria to determine the level and frequency of damage, in-depth, and special inspections. Damage, in-depth, and special inspections may use non-destructive testing or other methods not used during routine inspections at an interval established by the Program Manager. In-depth inspections should be scheduled for complex tunnels and for certain structural elements and functional systems when necessary to fully ascertain the condi-

tion of the element or system; hands-on inspection may be necessary at some locations.

#### § 650.513 Inspection procedures.

Each State DOT, Federal agency, or tribal government tunnel inspection organization, to carry out its inspection responsibilities, shall perform or cause to be performed all of the following:

(a) Inspect tunnel structural elements and functional systems in accordance with the inspection guidance provided in the Tunnel Operations, Maintenance, Inspection and Evaluation (TOMIE) Manual (incorporated by reference, *see* § 650.517).

(b) Provide at least one Team Leader, who meets the minimum qualifications stated in § 650.509, at the tunnel at all times during each initial, routine, and in-depth inspection. The State DOT, Federal agency, or tribal government shall report the nationally certified tunnel inspector identification for each Team Leader that is wholly or partly responsible for a tunnel inspection must be reported to the National Tunnel Inventory.

(c) Prepare and document tunnel-specific inspection procedures for each tunnel inspected and inventoried that shall:

(1) Take into account the design assumptions and the tunnel complexity; and

(2) Identify the—

(i) Tunnel structural elements and functional systems to be inspected;

(ii) Methods of inspection to be used;

(iii) Frequency of inspection for each method; and

(iv) Inspection equipment, access equipment, and traffic coordination needed.

(d) Establish requirements for functional system testing, direct observation of critical system checks, and testing documentation.

(e) For complex tunnels, identify specialized inspection procedures and additional inspector training and experience required to inspect complex tunnels. Inspect complex tunnels according to the specialized inspection procedures.

(f) Conduct tunnel inspections with qualified staff not associated with the

operation or maintenance of the tunnel structure or functional systems.

(g) Rate each tunnel's safe vehicular load-carrying capacity in accordance with the Sections 6 or 8, AASHTO Manual for Bridge Evaluation (incorporated by reference, *see* § 650.517). A State DOT, Federal agency, or tribal government shall conduct a load rating evaluation as soon as practical, but not later than three months after the completion of the inspection, if a change in condition is identified. Post or restrict the highways in or over the tunnel in accordance with Section 6, AASHTO Manual for Bridge Evaluation (incorporated by reference, *see* § 650.517), or in accordance with State law, when the maximum unrestricted legal loads or State routine permit loads exceed those allowed under the operating rating or equivalent rating factor. Postings shall be made as soon as possible but not later than 30 days after a valid load rating determines a need for such posting. At-grade roadways in tunnels are exempt from load rating. A State DOT, Federal agency, or tribal government, shall maintain load rating calculations or input files with a summary of results as a part of the tunnel record.

(h) Prepare tunnel inspection documentation as described in the Tunnel Operations, Maintenance, Inspection and Evaluation (TOMIE) Manual (incorporated by reference, *see* § 650.517), and maintain written reports or electronic files on the results of tunnel inspections, together with notations of any action taken to address the findings of such inspections. Maintain relevant maintenance and inspection data to allow assessment of current tunnel condition. At a minimum, information collected will include data regarding basic tunnel information (e.g., tunnel location, posted speed, inspection reports, repair recommendations, and repair and rehabilitation work completed), tunnel and roadway geometrics, interior tunnel structural features, portal structure features, and tunnel systems information. When available, tunnel data collected shall include diagrams, photos, condition of each structural and functional system component, notations of any action taken to address the findings of such

inspections, and the national tunnel inspector certification registry identification for each Team Leader responsible in whole or in part for the inspection.

(i) Use systematic quality control and quality assurance procedures to maintain a high degree of accuracy and consistency in the inspection program. Include periodic field review of inspection teams, data quality checks, and independent review of inspection reports and computations.

(j) Establish a Statewide, Federal agency-wide, or tribal government-wide procedure to ensure that critical findings are addressed in a timely manner. Notify FHWA within 24 hours of any critical finding and the activities taken, underway, or planned to resolve or monitor the critical finding. Update FHWA regularly or as requested on the status of each critical finding until it is resolved. Annually provide a written report to FHWA with a summary of the current status of the resolutions for each critical finding identified within that year or unresolved from a previous year.

(k) Provide information at least annually, or more frequently upon request, in cooperation with any FHWA review of State DOT, Federal agency, or tribal government compliance with the NTIS. The FHWA will assess annually State DOT compliance using statistical assessments and well-defined measures based on the requirements of this subpart.

#### **§ 650.515 Inventory.**

(a) *Preliminary inventory.* Each State, Federal agency, or tribal government shall collect and submit the inventory data items described in the Specifications for the National Tunnel Inventory (incorporated by reference, *see* § 650.517) for all tunnels subject to the NTIS by December 11, 2015.

(b) *National Tunnel Inventory.* Each State, Federal agency, or tribal government shall prepare, maintain, and make available to FHWA upon request, an inventory of all highway tunnels subject to the NTIS that includes the preliminary inventory information submitted in paragraph (a) of this section, reflects the findings of the most recent tunnel inspection conducted,

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and is consistent and coordinated with the Specifications for the National Tunnel Inventory.

(c) *Data entry for inspections.* For all inspections, each State DOT, Federal agency, or tribal government shall enter the appropriate tunnel inspection data into its inventory within 3 months after the completion of the inspection.

(d) *Data entry for tunnel modifications and new tunnels.* For modifications to existing tunnels that alter previously recorded data and new tunnels, each State DOT, Federal agency, or tribal government shall enter the appropriate data into its inventory within 3 months after the completion of the work.

(e) *Data entry for tunnel load restriction and closure changes.* For changes in traffic load restriction or closure status, each State DOT, Federal agency, or tribal government shall enter the data into its inventory within 3 months after the change in status of the tunnel.

### § 650.517 Incorporation by reference.

(a) Certain material is incorporated by reference into this part with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. To enforce any edition other than that specified in this section, the FHWA must publish notice of change in the FEDERAL REGISTER and the material must be available to the public. All approved material is available for inspection at 1200 New Jersey Avenue SE., Washington, DC 20590. For questions regarding the availability of this material at FHWA, call the FHWA Regulations Officer, Office of the Chief Counsel, HCC-10, 202-366-0761. This material is also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030 or go to [http://www.archives.gov/federal\\_register/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html).

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

(1) “The Manual of Bridge Evaluation,” Section 6 “Load Rating” and Section 8 “Nondestructive Load Testing,” Second Edition, 2011, copyright 2011, incorporation by reference approved for §§ 650.505 and 650.513(a).

(2) 2011 Interim Revisions to “The Manual of Bridge Evaluation,” Section 6 “Load Rating,” Second Edition, 2010, copyright 2011, incorporation by reference approved for §§ 650.505 and 650.513(a).

(3) 2013 Interim Revisions to “The Manual of Bridge Evaluation,” Section 6 “Load Rating,” Second Edition, 2010, copyright 2013, incorporation by reference approved for §§ 650.505 and 650.513(a).

(4) 2014 Interim Revisions to “The Manual of Bridge Evaluation,” Section 6 “Load Rating,” Second Edition, 2010, copyright 2013, incorporation by reference approved for §§ 650.505 and 650.513(a).

(5) 2015 Interim Revisions to “The Manual of Bridge Evaluation,” Section 6 “Load Rating,” Second Edition, 2010, copyright 2014, incorporation by reference approved for §§ 650.505 and 650.513(a).

(c) Office of Bridges and Structures, Federal Highway Administration, U.S. Department of Transportation, 1200 New Jersey Avenue SE., Washington, DC 20590.

(1) FHWA-HIF-15-005, “Tunnel Operations, Maintenance, Inspection and Evaluation (TOMIE) Manual,” 2015 edition, available in electronic format at <http://www.fhwa.dot.gov/bridge/inspection/tunnel/>. Incorporation by reference approved for §§ 650.505, 650.511(a), and 650.513(a) and (h).

(2) FHWA-HIF-15-006, “Specifications for National Tunnel Inventory,” 2015 edition, available in electronic format at <http://www.fhwa.dot.gov/bridge/inspection/tunnel/>. Incorporation by reference approved for § 650.515(a) and (b).

### Subparts F–G [Reserved]

### Subpart H—Navigational Clearances for Bridges

SOURCE: 52 FR 28139, July 28, 1987, unless otherwise noted.

**§ 650.801**

**23 CFR Ch. I (4-1-24 Edition)**

**§ 650.801 Purpose.**

The purpose of this regulation is to establish policy and to set forth coordination procedures for Federal-aid highway bridges which require navigational clearances.

**§ 650.803 Policy.**

It is the policy of FHWA:

(a) To provide clearances which meet the reasonable needs of navigation and provide for cost-effective highway operations,

(b) To provide fixed bridges wherever practicable, and

(c) To consider appropriate pier protection and vehicular protective and warning systems on bridges subject to ship collisions.

**§ 650.805 Bridges not requiring a USCG permit.**

(a) The FHWA has the responsibility under 23 U.S.C. 144(h) to determine that a USCG permit is not required for bridge construction. This determination shall be made at an early stage of project development so that any necessary coordination can be accomplished during environmental processing.

(b) A USCG permit shall not be required if the FHWA determines that the proposed construction, reconstruction, rehabilitation, or replacement of the federally aided or assisted bridge is over waters (1) which are not used or are not susceptible to use in their natural condition or by reasonable improvement as a means to transport interstate or foreign commerce and (2) which are (i) not tidal, or (ii) if tidal, used only by recreational boating, fishing, and other small vessels less than 21 feet in length.

(c) The highway agency (HA) shall assess the need for a USCG permit or navigation lights or signals for proposed bridges. The HA shall consult the appropriate District Offices of the U.S. Army Corps of Engineers if the susceptibility to improvement for navigation of the water of concern is unknown and shall consult the USCG if the types of vessels using the waterway are unknown.

(d) For bridge crossings of waterways with navigational traffic where the HA believes that a USCG permit may not

be required, the HA shall provide supporting information early in the environmental analysis stage of project development to enable the FHWA to make a determination that a USCG permit is not required and that proposed navigational clearances are reasonable.

(e) Since construction in waters exempt from a USCG permit may be subject to other USCG authorizations, such as approval of navigation lights and signals and timely notice to local mariners of waterway changes, the USCG should be notified whenever the proposed action may substantially affect local navigation.

**§ 650.807 Bridges requiring a USCG permit.**

(a) The USCG has the responsibility (1) to determine whether a USCG permit is required for the improvement or construction of a bridge over navigable waters except for the exemption exercised by FHWA in § 650.805 and (2) to approve the bridge location, alignment and appropriate navigational clearances in all bridge permit applications.

(b) A USCG permit shall be required when a bridge crosses waters which are: (1) tidal and used by recreational boating, fishing, and other small vessels 21 feet or greater in length or (2) used or susceptible to use in their natural condition or by reasonable improvement as a means to transport interstate or foreign commerce. If it is determined that a USCG permit is required, the project shall be processed in accordance with the following procedures.

(c) The HA shall initiate coordination with the USCG at an early stage of project development and provide opportunity for the USCG to be involved throughout the environmental review process in accordance with 23 CFR part 771. The FHWA and Coast Guard have developed internal guidelines which set forth coordination procedures that both agencies have found useful in streamlining and expediting the permit approval process. These guidelines include (1) USCG/FHWA Procedures for Handling Projects which Require a

USCG Permit<sup>1</sup> and (2) the USCG/FHWA Memorandum of Understanding on Coordinating The Preparation and Processing of Environmental Projects.<sup>2</sup>

(d) The HA shall accomplish sufficient preliminary design and consultation during the environmental phase of project development to investigate bridge concepts, including the feasibility of any proposed movable bridges, the horizontal and vertical clearances that may be required, and other location considerations which may affect navigation. At least one fixed bridge alternative shall be included with any proposal for a movable bridge to provide a comparative analysis of engineering, social, economic and environmental benefit and impacts.

(e) The HA shall consider hydraulic, safety, environmental and navigational needs along with highway costs when designing a proposed navigable waterway crossing.

(f) For bridges where the risk of ship collision is significant, HA's shall consider, in addition to USCG requirements, the need for pier protection and warning systems as outlined in FHWA Technical Advisory 5140.19, Pier Protection and Warning Systems for Bridges Subject to Ship Collisions, dated February 11, 1983.

(g) Special navigational clearances shall normally not be provided for accommodation of floating construction equipment of any type that is not required for navigation channel maintenance. If the navigational clearances are influenced by the needs of such equipment, the USCG should be consulted to determine the appropriate clearances to be provided.

(h) For projects which require FHWA approval of plans, specifications and estimates, preliminary bridge plans shall be approved at the appropriate level by FHWA for structural concepts,

<sup>1</sup>This document is an internal directive in the USCG Bridge Administration Manual, Enclosure 1a, COMDT INST M16590.5, change 2 dated Dec. 1, 1983. It is available for inspection and copying from the U.S. Coast Guard or the Federal Highway Administration as prescribed in 49 CFR part 7, appendices B and D.

<sup>2</sup>FHWA Notice 6640.22 dated July 17, 1981, is available for inspection and copying as prescribed in 49 CFR part 7, appendix D.

hydraulics, and navigational clearances prior to submission of the permit application.

(i) If the HA bid plans contain alternative designs for the same configuration (fixed or movable), the permit application shall be prepared in sufficient detail so that all alternatives can be evaluated by the USCG. If appropriate, the USCG will issue a permit for all alternatives. Within 30 days after award of the construction contract, the USCG shall be notified by the HA of the alternate which was selected. The USCG procedure for evaluating permit applications which contain alternates is presented in its Bridge Administration Manual (COMDT INST M16590.5).<sup>3</sup> The FHWA policy on alternates, Alternate Design for Bridges; Policy Statement, was published at 48 FR 21409 on May 12, 1983.

#### § 650.809 Movable span bridges.

A fixed bridge shall be selected wherever practicable. If there are social, economic, environmental or engineering reasons which favor the selection of a movable bridge, a cost benefit analysis to support the need for the movable bridge shall be prepared as a part of the preliminary plans.

### PART 652 [RESERVED]

## PART 655—TRAFFIC OPERATIONS

### Subparts A–E [Reserved]

#### Subpart F—Traffic Control Devices on Federal-Aid and Other Streets and Highways

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APPENDIX TO SUBPART F OF PART 655—ALTERNATE METHOD OF DETERMINING THE COLOR OF RETROREFLECTIVE SIGN MATERIALS AND PAVEMENT MARKING MATERIALS

### Subpart G [Reserved]

<sup>3</sup>United States Coast Guard internal directives are available for inspection and copying as prescribed in 49 CFR part 7, appendix B.