WASHINGTON, IDAHO & MONTANA RAILWAY

RAILROAD BRIDGE MANAGEMENT PROGRAM

MANUAL

Original version		August 28, 2025
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The Washington, Idaho and Montana Railway LLC ("WIM LLC"), also referred herein as the ***Railway,*** extends approximately 18 miles from the Wahington/Idaho state line, where it connects with the Spokane, Spangle & Palouse Railway (SSP), to Harvard, Idaho. Bennett Lumber Products, Inc. is the ***Track Owner,*** with operations, primarily freight service, delegated to the ***Railway***. There are nine railroad bridges on the line.

The railway has adopted this Bridge Management Program to ensure these bridges are adequately maintained so they may safely bear the locomotives and cars that operate over them. The program was greatly influenced by, and strives to maintain compliance with, the Code of Federal Regulations (CFR) 49 Part 237 Subparts A through G "Bridge Safety Standards," most recently revised in 2022. These regulations can be found in ***Appendix G.*** The part, subpart and paragraph of the corresponding regulation is noted appropriately throughout the manual.

This program applies to anyone and everyone involved with the railway's bridges, including:

- ✓ ***Employees of the railway working in operations***
- ✓ ***Employees of the railway working in maintenance of way***
- ✓ ***Contractors to the railroad in operations***
- ✓ ***Contractors of the railroad in maintenance of way***
- ✓ ***Employees of Bennett Lumber Products***
- ✓ ***Consultants to the railroad and Bennett Lumber.***

These individuals shall be made aware of this program and its expectations. They are expected to act in accordance with its guidelines and requirements.

To remain useful and relevant the railway's Bridge Management Program must be kept up to date. Therefore, this manual shall be reviewed at least once per calendar year and revised accordingly, responsive to changes, especially in regulations, operating practices, scope of track in operation and inventory of bridges.

Why Railroad Bridges are Regulated

Like all structures, railroad bridges require regular maintenance, and occasionally repairs, to perform their function safely and reliably, but the intensity and nature of the loading they bear is unlike that of other structures. Railroad loadings tend to be heavier than highway loadings, for example, and intensely concentrated. Highway bridges are publicly owned, whereas in North America most railroad bridges are privately owned. Over the course of more than one hundred years, these factors resulted in the emergence of two engineering philosophies, each optimized for their respective roles.

In the United States, highway bridges are constructed and maintained following practices developed in each state and nationwide specifications developed by the American Association of State Highway and Transportation Officials (AASHTO). Although each railroad developed and strongly defended its own deigns and practices, railroad bridge engineers came together in what is

now known as AREMA (the American Railway Engineering and Maintenance of Way Association) and worked, voluntarily, to write specifications applying to all railroad bridges. Many decades of successful and safe railroad bridge service have been the result.

Problems arose with the proliferation of short lines after passage of the Staggers Act in 1980. The new, small railroads lacked the robust engineering oversight of Class 1 railroads, and incidents of bridge failures, primarily on these new railroads, began making news. Regulators at the U.S. Federal Railroad Administration (FRA) sounded the alarm. They told short line operators they did not want to enforce another regulation, but unless the problem was addressed, they would have no choice. Congress would make them do it.

And that is what happened. While some short lines took steps to improve, many continued to ignore the issue, and bridge problems continued. A few made national news. Other railroad safety issues were causing public concern around the same time and in 2008 congress passed the Railroad Safety Improvement Act (RSIA) which, in turn, tasked the FRA to create appropriate regulations, just as they predicted.

By far, the most consequential effect of that legislation was to require Class 1 and passenger railroads to integrate PTC (Positive Train Control) into operations - a huge endeavor. But another part of those regulations entitled "***Bridge Safety Standards***" focused on railroad bridges, aimed at improving safety for all railroad bridges, whether owned by Class 1, shortline, port, industry or historic railroad.

The regulators at the FRA knew Class 1 railroads were already managing their bridges successfully and they recognized the difference between railroad and highway bridges, not just in design, but in the management of construction and upkeep. New bridge specialists with railroad experience were hired, and the agency worked closely with Class 1s to write the CFR.

At the time, the FRA had already developed and was enforcing other railroad safety regulations, including track specifications (49 CFR Part 213), a collection of discrete limiting measurements (gauge, sound ties per rail, etc.) that do not require engineering judgement. Such an objective approach was not workable with railroad bridges, however. While it certainly is possible to define some requirements, like the maximum interval between bridge inspections for example, railroad bridge design varies too widely for a practical regulation that defines maximum and minimum bridge measurements. It had to be approached from another angle.

The FRA knew that Class 1s had bridge engineers who designed new bridges and made sure existing bridges were not overloaded. Those engineers also maintained bridge drawings and other records. They knew Class 1s had bridge inspectors who regularly inspected every bridge on the system. They knew they had bridge supervisors, individuals who had the field know-how to repair bridges and build new ones, usually without disrupting train traffic. They reasoned that if they could promulgate the methods Class 1s used to manage their bridges into an enforceable regulation, bridge safety of all railroad bridges would improve.

New rules were drafted and circulated among all affected stakeholders. Comments were invited, and the new "part" was hammered out and published in the Code of Federal Regulations or "CFR" Part 237 – "Bridge Safety Standards" with subparts A through F. They have been updated once, in 2022.

2) DEFINITIONS — Subpart A §237.5

The railroad industry and the bridge profession each possess their own technical terminologies as well as slang. To help with technical terms, ***Appendix F*** titled ***Railroad and Bridge Terms and Definitions***, may be useful.

The following four terms are specifically defined in the regulation and are repeated here due to their importance.

bridge modification ___ A change to the configuration of a railroad bridge that affects the load capacity of the bridge.

bridge repair _____ Remediation of damage or deterioration which has affected the structural integrity of a railroad bridge.

railroad bridge _____ Any structure with a deck, regardless of length, which supports one or more railroad tracks, or any other undergrade structure with an individual span length of 10 feet or more located at such a depth that it is affected by live loads.

track owner _____ A person responsible for compliance in accordance with §237.3.

3) RESPONSIBILITIES AND QUALIFICATIONS — Subparts A and C §237.3

The railway employs, either directly or through consultants, individuals with specific qualifications to inspect bridges, provide engineering support, and to supervise construction and repair. These are explicitly defined in the CFR and reproduced here. In addition, the CFR frequently references the "track owner," a general term referring to the person responsible for administering the bridge program. That person is typically referred to as the "Bridge Program Manager" in the shortline industry and has been adopted by this railway.

Bridge Program Manager (BPM) _____ **§237.3**

The **Bridge Program Manager (BPM)** is responsible for compliance with federal regulations and for employing, either directly or by contract, the engineers, inspectors and supervisors qualified to provide inspection, operation, maintenance, repair and safety of the Railway's bridges. That person is:

Jason J. Hill
Superintendent
Washington, Idaho & Montana Railway
3759 Highway 6
Princeton, ID 83857
Cell: (253) 961-0944
eMail: jason@wimry.com

Railroad Bridge Engineer (RBE) §237.51

(a) A **Railroad Bridge Engineer** shall be a person who is determined by the track owner (Bridge Program Manager) to be competent to perform the following functions as they apply to the particular engineering work to be performed:

(1) Determine the forces and stresses in railroad bridges and bridge components;

(2) Prescribe safe loading conditions for railroad bridges;

(3) Prescribe inspection and maintenance procedures for railroad bridges; and

(4) Design repairs and modifications to railroad bridges.

(b) The educational qualifications of an RBE shall include either:

(1) A degree in engineering granted by a school of engineering with at least one program accredited by ABET, Inc. or its successor organization as a professional engineering curriculum, or a degree from a program accredited as a professional engineering curriculum by a foreign organization recognized by ABET, Inc. or its successor, or

(2) Current registration as a professional engineer.

(c) Nothing in this part affects the States' authority to regulate the professional practice of engineering.

Railroad Bridge Inspector (RBI) §237.53

A **Railroad Bridge Inspector** shall be a person who is determined by the track owner (Bridge Program Manager) to be technically competent to view, measure, report and record the condition of a railroad bridge and its individual components which that person is designated to inspect. An inspector shall be designated to authorize or restrict the operation of railroad traffic over a bridge according to its immediate condition or state of repair.

Railroad Bridge Supervisor (RBS) §237.55

A **Railroad Bridge Supervisor** shall be a person, regardless of position title, who is determined by the track owner (Bridge Program Manager) to be technically competent to supervise the construction, modification or repair of a railroad bridge in conformance with common or particular specifications, plans and instructions applicable to the work to be performed, and to authorize or restrict the operation of railroad traffic over a bridge according to its immediate condition or state of repair.

The following individuals are qualified to act as the roles described above as Bridge Program Manager (BPM), railroad bridge engineers (RBE), railroad bridge inspectors (RBI) and railroad bridge supervisors (RBS):

INDIVIDUAL	BPM	RBE	RBI	RBS
Jason J. Hill Phone - (253) 961-0944 E-mail – jason@wimry.com	YES			
Ken Kirschling, P.E. Phone – (206) 408-7032 E-mail - ken@railstarengineering.com		YES	YES	YES
Jeff Schmaus Phone – (206) 799-4465 E-mail - jeff@railstarengineering.com		YES	YES	YES
Chester Pruett Phone – (206) 817-7299 E-mail - chester@railstarengineering.com		YES	YES	
Paul Riemann Phone – (208) 582-1934 E-mail – paul.riemann@stmariesriverrr.com			YES	YES
Kasey Kirschling Phone – (206) 465-8827 E-mail - kasey@railstarengineering.com			YES	

Railstar Engineering, LLC provides bridge engineers and inspectors, maintains this manual, and assists in the execution of the Bridge Management Program.

In addition to 49 CFR 237, the railway requires all individuals who access, inspect or perform work on the railroad's bridges to comply with the following regulations:

- 49 CFR 214 "Railroad Workplace Safety" including:
  - Subpart B "Bridge Worker Safety Standards," which addresses fall protection and PPE (Personal Protective Equipment).
  - Subpart C "Roadway Worker Protection," which describes measures required when working near railroad track to prevent workers from being struck by trains or adversely affecting the safe passage of trains.
  - Subpart D "On-Track Roadway Maintenance Machines and Hi-Rail Vehicles," which governs the safe operation of on-track equipment.
- 49 CFR 219 "Control of Alcohol and Drug Use"
- 49 CFR 243 "Training Qualifications and Oversight"

Training is required to familiarize workers with all regulations. Subparts C and D of CFR 214 require ***annual*** training and certification. CFR 219 requires random drug and alcohol testing.

4) BRIDGE ID, INVENTORY, NUMBERING OF COMPONENTS Subpart B §237.33

Unique Bridge Identifier (UBI) §237.33(a)

To prevent confusion, each bridge possesses a ***Unique Bridge Identifier*** (UBI), commonly referred to as the "Bridge Number."

On the Washington, Idaho and Montana the UBI is defined as the milepost location, to the nearest hundredth of a mile (0.01), of the front face of the backwall of the first bent, pier or abutment. Since the Railway has only one line without branches or spurs, this number suffices as a unique identifier.

Bridge Inventory §237. 33(a)

The Washington, Idaho & Montana Railway has nine bridges as identified in the ***Bridge List*** in ***Appendix A***. Each bridge is composed of at least one ***section***. A "section" of a bridge is a portion or segment of bridge with uniform construction. While it is possible for bridges to have multiple sections, the track currently operated by the Washington, Idaho and Montana Railway has single section bridges only.

The ***Bridge Inventory*** is more detailed than the Bridge List. ***Bridge inventory information*** also includes the properties of each bridge (and each section in bridges with multiple sections) that do not typically change over time. The ***Bridge Inventory*** for the Railway can be found in ***Appendix B.***

Each record for each bridge includes, at minimum, the following:

- Line Name
- Bridge Number (UBI)
- Unique Electronic Bridge Identifier (UEBI)
- Mile Post location
- Owner
- Latitude and Longitude
- County
- Nearest town or station name.
- Feature intersected (waterway, road, railroad, etc.)
- Bridge Name (if one exists)

Each record for each SECTION includes the following information:

- Section Number
- Number of Spans
- Type of Bridge Construction (Span Type and Substructure Type)
- Section Length
- Estimated Height in feet to top of tie
- Description of deviation from typical type of Construction (if any)
- Number of tracks
- Deck Type (Open, Ballast or Direct Fixation)
- Date of original construction (if available)
- Number of Abutments, Piers (Conc or Steel), Bents (Timber), Piers (Timber)

- Lengths of individual spans or a nominal span length if spans are of uniform construction
- Presence of Skewed Spans (yes/no)
- Alignment (Tangent or Curved)
- Presence of Guard Rails (timber tie spacers are not guard rails)
- Presence and Location of Walkway
- Presence and Location of Fiber Optic Line or Other Fixture
- Repairs, Strengthening or Renovation affecting Load Capacity specific to Structure feature (members) that work was performed upon and Date of Work if possible.

In the event a new structure is placed in service, or there is major modification of a bridge affecting its inventory properties, the BPM shall notify the RBE, who shall update the inventory accordingly.

Structure Type _____ §237.33(d)(5)

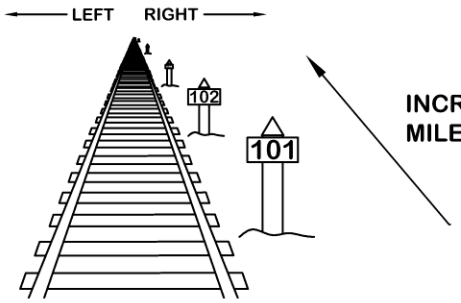
The Washington, Idaho and Montana Railway has two types of bridge construction with the following abbreviations:

CONSTRUCTION DESCRIPTION	ABBREVIATION	MATERIAL
Open Deck Pile Trestle	ODPT	Timber
Rolled Steel Beam Span	RBS	Steel

Direction and Numbering Protocol _____ §237.33(d)(6)

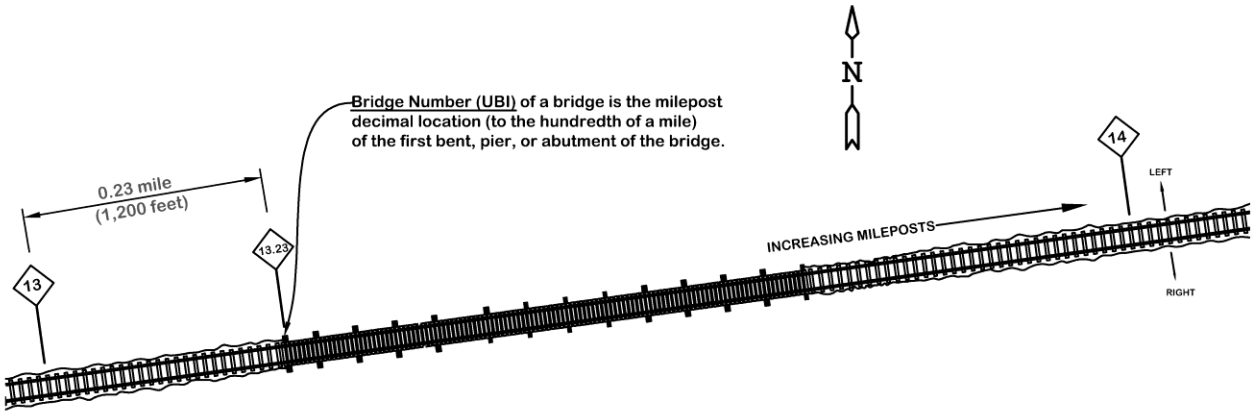
The Washington, Idaho and Montana Railway has adopted the direction and numbering protocol for bridges and bridge components employed by the predecessor railroad. The following pages describe those protocols for direction, numbering of components and measurement of span and section lengths adopted by the Railway.

Direction and Numbering Protocol



INCREASING MILEPOSTS

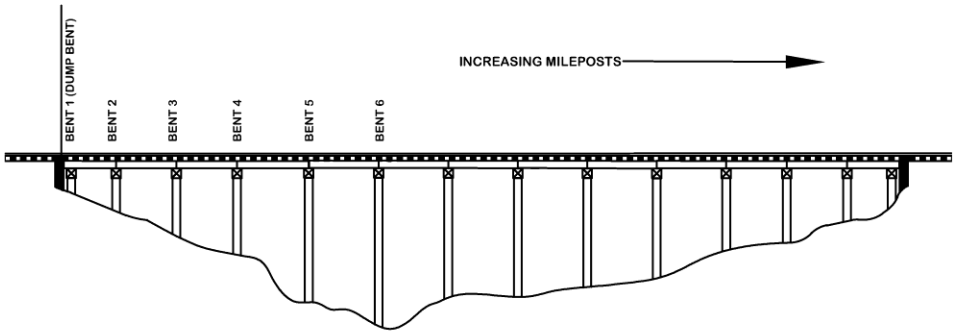
Left and Right are defined by facing towards increasing mileposts.



Unique Bridge Identifier

Plan View of Typical Bridge

The Unique Bridge Identifier (UBI) is the bridge number, which is the milepost location of the first bent or pier. Mileposts increase to the EAST on the Washington, Idaho & Montana.

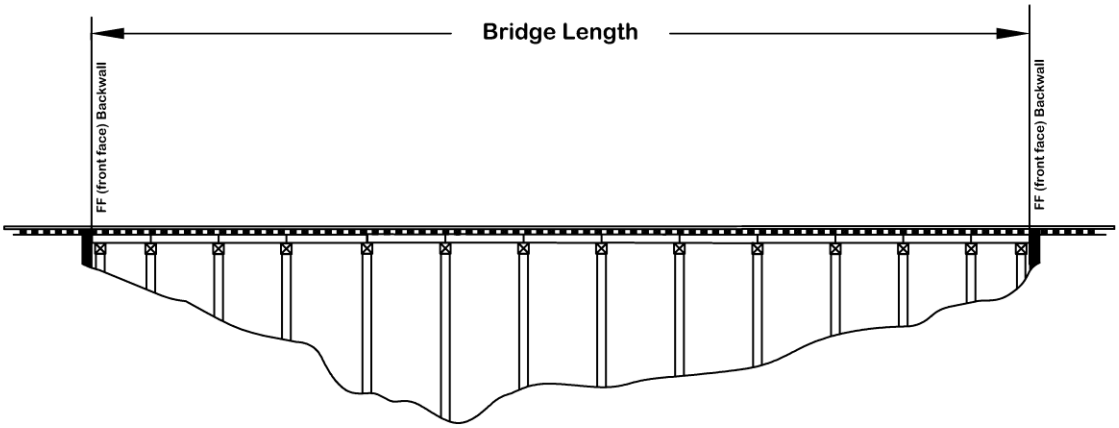


Numbering Bents and Piers

Profile of Typical Bridge

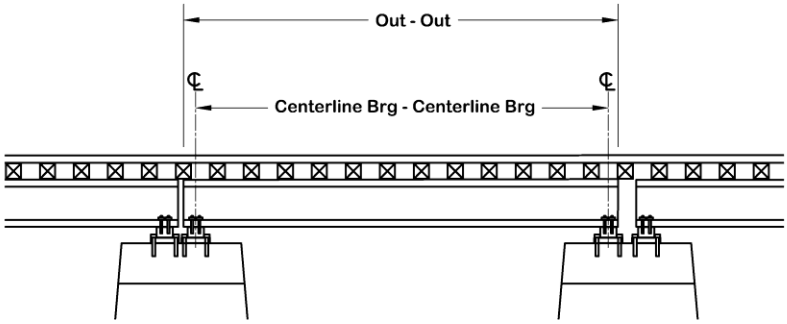
Bent and pier numbering increases in the direction of increasing milepost.

Numbering and Lengths of Spans and Bridge



Bridge Length

Showing Limits for Measurement of Bridge Length

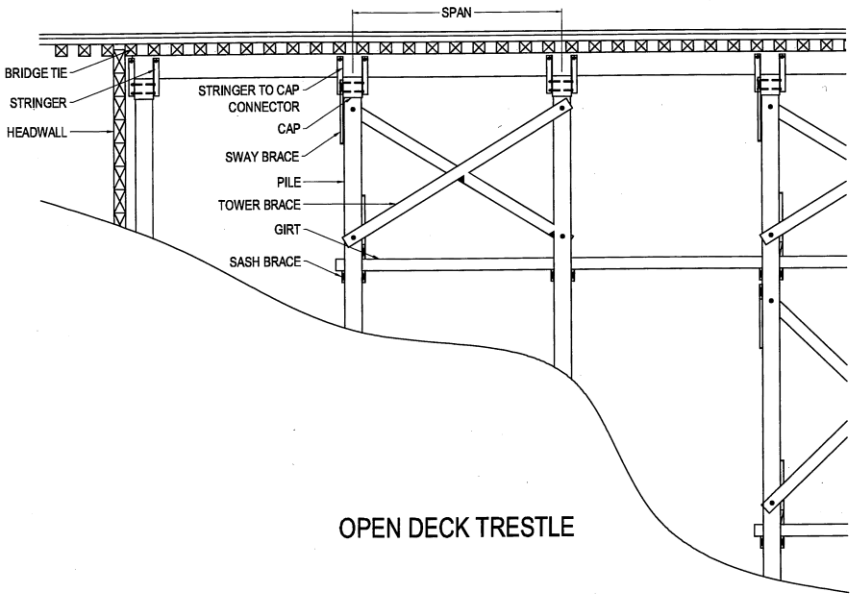


Span Length

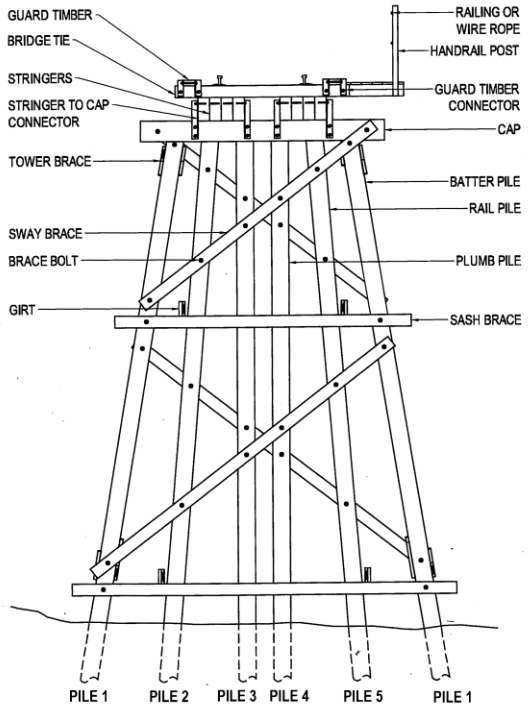
Defining Span Length Measurement

Terms		Definition
Span Length	→	Can be centerline of bearing to centerline of bearing or out-to-out (o. - o.)
"Average span length"	→	Show ONLY when the spans are uniform - usually for Timber, centerline of bent to centerline of bent.
Bridge Length	→	Complete length of all spans, including the space between spans.
"Lines of beams, girders, stringers"	→	Number of supporting beams: No. of plys in timber bridges, stringers in floor system, beams in beam spans, or girders in DPGs.

Timber Bridge Terminology



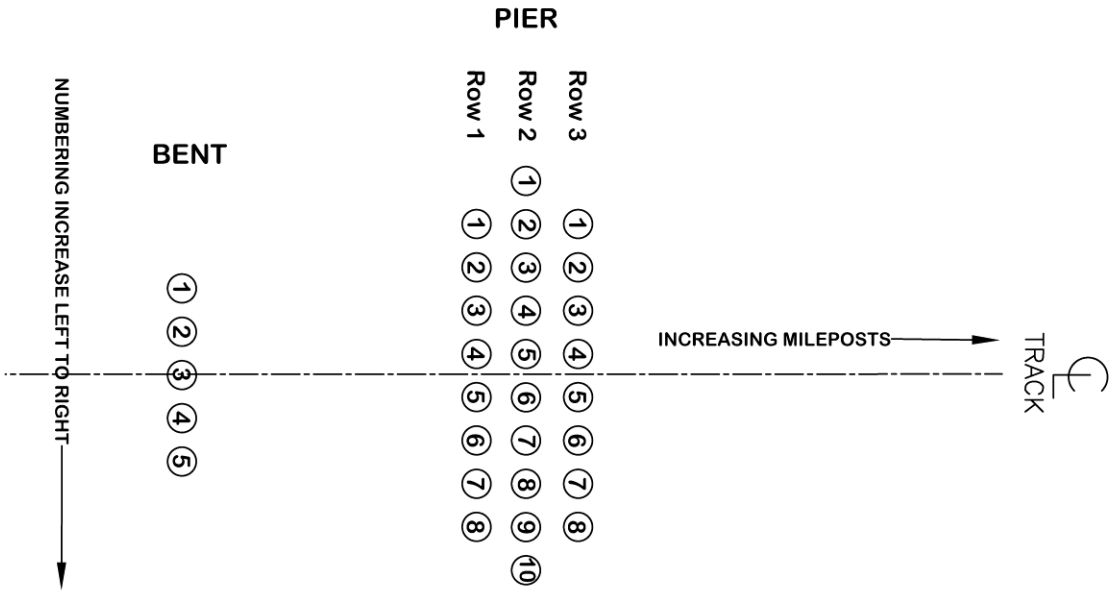
OPEN DECK TRESTLE



TYPICAL PILE BENT
FACING INCREASING MILEPOSTS

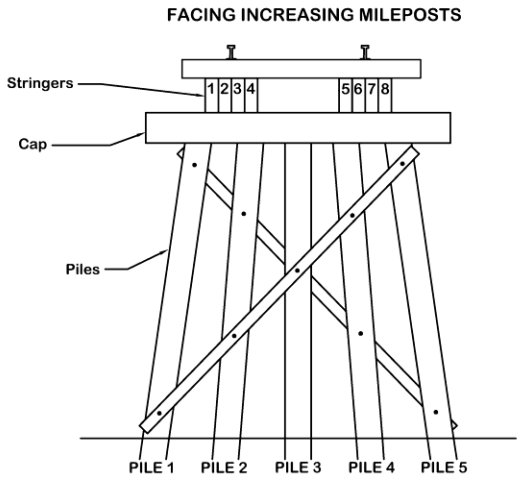
AREMA Bridge Inspection Handbook © 2017

Numbering Piles/Posts in Bents and Piers



Plan

Typical Bent and Pile Pier



Elevation

Typical Bent

5) LOAD CAPACITY Subpart D §237.71

The bridge capacities, including all calculation details can be found under separate cover as the ***Railroad Bridge Rating Report*** prepared for Bennett Lumber Products, Inc., most recently revised May 27th, 2025.

The safe load capacity of each bridge has been determined by Railroad Bridge Engineers in accordance with the 2019 edition of the AREMA Manual for Railway Engineering, Chapter 7 for timber structures and Chapter 15 for steel. All capacities are expressed in terms of Cooper E.

Cooper E loading varies with span length and operating speed. The length of the span controlling each bridge's capacity is stated and the normal operating speed used in calculations and stated in all related reports, summaries and addendums. If a lower speed is required to provide adequate capacity to safely support equipment normally operated, that restricted speed must be plainly indicated in reports and operation over that bridge restricted accordingly. Additional pertinent and useful information is typically included in the report such as capacities at various operating speeds and/or the equivalent Cooper E effect of various equipment operated by the railroad or in common use.

In addition to the calculations, the following information is stated within the Rating Report:

- For the report and any addendums:
  - The date of calculations
  - The RBE who performed the calculations
  - The basis for determination (design drawings, field measurements, etc.)
  - The method and load system used
- For each bridge:
  - The Unique Bridge Identifier (UBI) per the Bridge List and Bridge Inventory
  - The Design ("normal") Safe Load Capacity
  - The Maximum ("rating") Safe Load Capacity
  - The speed of operation at the given capacities
  - The limiting section, span length and component

A brief summary of rating information is provided in ***Appendix C***. The DESIGN (Normal) rating for each bridge at 10 mph is provided, along with the effective span length and the equivalent Cooper effect of common railroad loadings and equipment specific to the railroad.

The BPM shall notify the RBE immediately of any meaningful changes in condition due to:

- Derailment
- Strike from a vehicle
- Erosion or undermining
- Deterioration due to decay, corrosion or other means

The BPM, in consultation with the RBE, shall immediately take action to assure safe operation of rail traffic over the bridge or prohibit operation altogether. The RBE may judge inspection and measurement of the affected bridge necessary to recalculate its capacity. The BPM may decide to forgo repair and permanently restrict loading as determined by the RBE in which case notice shall be given in a general order or bulletin.

In the case of repair, rehabilitation, strengthening or replacement in response to an incident above, or for any reason, the capacity shall be recalculated, revised, and notice given in a general order or bulletin.

The revised safe load capacity or notice the bridge has been taken out of service shall be reflected in the Railroad Bridge Rating Report (or addendums) within 30 days of the incident, or completion of any work affecting its capacity. The updated data shall be archived in a historical record including the name of the individual and the date, maintained as described in Section 7 of this manual.

6) HIGH/WIDE/HEAVY LOAD CLEARANCE PROCEDURES Subpart D §237.73

The dimensional restrictions and bridge load capacities of Washington, Idaho and Montana Railway have been determined.

Bridge Load Capacities _____ §237. 73(b)

As determined in the Railroad Bridge Rating Report described in Section 5, typical 4-axle cars or locomotives having a gross weight up to 132 tons (263,000 lb) and total length 42-feet or greater are allowed on all bridges without restrictions. Also, 4-axle cars or locomotives having a gross weight up to 143 tons (286,000 lb) and total length 80-feet or greater are allowed on all bridges without restrictions. 6-axle locomotives having a gross weight up to 215 tons (430,000 lb) and a total length of 60-feet or greater are allowed on all bridges without restrictions.

Any cars or locomotives exceeding these gross weights for their corresponding lengths are considered RESTRICTED and must be approved in advance by the BPM.

Dimensional Restrictions _____ §237. 73(c)

Dimensional clearances on the railroad are controlled by the depot platform in Potlatch. The limiting clearances are:

Vertical: None

Horizontal: 5-ft 9-in from Centerline of Track

These dimensions clear AAR Plates B, C, E, F, H and K.

Any cars or loads exceeding these dimensions are considered RESTRICTED and must be approved in advance by the BPM.

Instructions and Procedures **§237. 73(a)&(d)**

Instructions and procedures for the operation of all equipment must be approved by the Superintendent who, on this railway, is the BPM. Standard equipment within the bridge load capacities and dimensional restrictions described above require no advance approval. Any equipment exceeding those weights or dimensions must be approved in advance.

For locomotives, cars or loads exceeding the maximum gross weight corresponding to length, the number of axles and distances between all axles must be submitted to the BMP at least 14 days in advance of intended operation. The BPM shall immediately forward the information to the RBE who shall, within 7 days, advise the BPM. The BPM may approve equipment, approve it with restrictions (e.g., speed restrictions, adjacent tracks, weight limitations on adjacent cars in the same train, etc.), or reject it. If approved, it shall be documented, including restricting conditions and provided to all operating personnel involved with and/or responsible for the handling of the overweight equipment, and the documentation retained by the RBE and BPM.

For cars or loads exceeding the restricting dimensions, a detailed diagram of the required clearances, in relation to the top of rail and centerline of car (including load) must be submitted to the Superintendent at least 14 days in advance of intended operation. If approved, it shall be documented, including restricting conditions and provided to all operating personnel involved with and/or responsible for the handling of the oversize equipment, and the documentation retained by the Superintendent.

These instructions are to be stated in the railroad's timetable or special instructions.

7) BRIDGE DOCUMENTS — Subpart D §237.155

The BPM is ultimately responsible for the organization, maintenance, accessibility and security of all bridge documents and records. The BPM may delegate the handling of bridge documents to other individuals.

Bridge documents include, but are not limited to:

- This Bridge Management Program manual
- Inventory records
- Load capacity and rating records
- Crossing Permits and Agreements
- Design and construction records and drawings
- Repair/modification records and drawings
- Inspection reports
- Damage, assessment and repair records
- Bridge safety and training material and records
- Bridge Program audits

The railroad has made a conscientious effort to acquire pertinent documents and records, but at the time this program manual was last revised (2025) limited historical information was available. Requests for any information from previous structure owners, engineers or other parties shall be documented in letters or emails, and copies of that correspondence retained on file.

Upon final acceptance of newly constructed or completed repair/modification projects involving railroad bridges, the design and construction records along with as-built plans shall be retained.

Bridge documents may be physical, electronic or a combination. Most bridge documents and records were originally created on physical media. Current practice utilizes electronic media. The railroad has adopted a combined approach for managing this information, as follows:

Physical Documents and Records _____ §237.155

Most bridge documents and records were originally created on physical media such as paper, mylar, vellum and linen. Physical documents are valuable and typically irreplaceable. Every effort must be made to retain them from the original an/or former owner. They are also vulnerable to damage from moisture, fire, heat, bright light, theft and vandalism. Some may fade over time, eventually becoming unreadable. All physical bridge files shall be organized and readily accessible, while being protected from damage, theft and vandalism.

Large format, such as 24”x36”, drawings shall be neatly arranged by bridge so that documents for a specific bridge may be easily retrieved and replaced. If possible, physical drawings shall be stored flat, either hanging vertically, or lying horizontally in drawers or slots, separated by bridge. Other hangers, drawers or slots may be required for drawings pertaining to several bridges or of another nature.

Documents in letter (8½”x11”) or legal (8½”x14”) format, shall be organized by bridge and stored in file folders within file cabinets. Information pertaining to several bridges or of another nature shall be arranged in folders enabling efficient access.

At the time of the last revision of this manual (2025), no physical records (i.e. paper, mylar, velum, etc. exist that are not primarily electronic documents. Thus, the storage of physical documents and records is a moot point. In the event any come to light, they shall be stored at:

Washington, Idaho and Montana Railway, LLC
c/o Jeff Abbot, Plant Engineer
Bennett Lumber Products, Inc.
3759 Highway 6
Princeton, ID 83857

As time and budget permit, all bridge documents shall be scanned and stored in electronic format. Scans shall be legible, at a resolution of 600 dpi or greater (if possible) and stored in a lossless file format, preferably TIFF or PDF.

Preferably, physical bridge documents are retained indefinitely. To conserve office and storage space, however, consideration may be given to disposal, but only after the following steps have been taken for each sheet before disposal.

1) The document is scanned at a resolution of 600 dpi or greater, and an archive quality, fully legible electronic document created in a lossless file format, preferably TIFF or PDF.

2) The electronic file has been backed up and filed per instructions for electronic documents.
3) The BPM has reviewed and given permission for its release.
4) If considered historically significant it is offered to a museum or historical society for preservation.

Electronic Documents and Records §237.155(a)

Electronic or digital documents and records are varied and diverse in their content, file format, and respective default programs. There are individual files such as, for example, Microsoft Word documents contained in a files with the suffix ".doc". These are referred to herein as "digital files." Information for several bridges may be combined and contained in a system such as a database or server. These are referred to herein as "digital information." Digital files and information may reside on a desktop computer in a specific location, in a "server" located elsewhere, accessed through the internet, or spread across several computers in the "cloud." Personal devices such as iPhones, iPads and Android devices, further complicate, and make more difficult, the BPM's responsibility for maintaining bridge documents and records.

There shall be at least one computer at a defined location containing a file system with a specific drive or folder (directory) dedicated solely to the railroad's bridges. The responsibility for the provision and maintenance of that computer and dedicated bridge folder has been assigned to

Railstar Engineering, LLC
c/o Kenneth R Kirschling, P.E.
18850 103rd Ave. SW
Suite 204
Vashon, WA 98070
Cell: (206) 304-7496
eMail: ken@railstarengineering.com

There shall be at least one subfolder (subdirectory) within the bridge folder for each bridge containing digital files such as drawings, reports, correspondence, photographs and so on, pertaining to that bridge. There shall also be at least one subfolder for digital files containing information pertaining to multiple bridges or to all bridges, including this manual, inspection reports, bridge safety training documents, and so on.

The bridge information on this computer shall be protected from physical damage, file corruption, theft and so on by backing up the digital files at least weekly on medium such as another hard drive, tape, or DVD so that, should the computer containing bridge documents and records at the office location fail or be destroyed, corrupted, stolen or otherwise compromised, the bridge documents and records within it may be reestablished and accessed from a replacement computer. The backup media shall be secure, password protected, protected from damage, destruction, loss or theft. Restoration of all digital files shall not require access to the internet.

Retention of Records §237.109(f)

Digital storage of information has become compact, economical and manageable. Limitation based on physical space is not an issue, although an argument can be made for discarding information no longer relevant or useful. In any case, records shall be retained as follows:

- Bridge design and construction records - life of the structure

- Bridge repair and modification records - life of the structure
- Bridge capacities and ratings - life of the structure
- Bridge inspection records (field paper records) - minimum of two years
- Bridge inspection records (digital) – life of the structure
- Underwater inspection records - upon review of subsequent underwater inspection
- Audits – upon review of superseding audit

It is essential that digital files and information important information regarding each bridge can be retrieved from the office location in the form of either physical records or digital bridge files without reliance on the internet.

Access to Bridge Documents Afforded to the FRA _____ §237.155

All documents are available to FRA personnel upon request to, and through the coordination of, the BPM. Electronic documents can typically be provided as attachments to email, or via link for larger files. Although not typical, access can be provided to the physical documents or computers if necessary. This would be (again) through coordination of the BPM.

8) BRIDGE INSPECTION Subpart B & Subpart E

Bridge inspection is essential for insuring safe operation of trains and for planning repairs and maintenance. At minimum, every structure is inspected annually by experienced railroad bridge inspectors (**RBIs)** and their reports reviewed by an experienced railway bridge engineer (**RBE)**.

There are occasions where more frequent or more detailed inspections are required. On occasion, special access provisions are necessary and there are times when it's necessary to inspect bridges after an unexpected event. These are covered in this section.

Safety Considerations for Inspection Personnel _____ §237.33(d)(1)

Regardless of the type of inspection, those involved must consider their own safety and the safety of those they are working with. The following documents contain information and safety requirements that every railroad bridge inspector must be familiar with and abide by:

- The railway's Safety and Operating Rules
- The railway's Timetable and Special instructions
- 49 CFR Part 214 Railroad Workplace Safety
    - Subpart A, General
    - Subpart B, Bridge Worker Safety Standards
    - Subpart C, Roadway Worker Protection
    - Subpart D, On Track Roadway Maintenance Machines and Hi Rail Vehicles
- AREMA BRIDGE INSPECTION HANDBOOK developed by Committee 10 - Structures, Maintenance & Construction of AREMA ©2017. The following topics in Chapter 1 specific to safety:
    - Safety Practices
    - Personal Protection

  - Accident Prevention
  - Safety Precautions
  - Climbing Safety
  - Confined Spaces
- Railstar Policy for Free Climbing, Rev. 4, 3/16/2022.

A thorough safety briefing involving all individuals must be conducted at the beginning of the inspection effort. Discussion must cover the nature of the work, why it's important, the role of each individual, and expected hazards. All involved must understand the physical track limits of the work, the nature of train traffic, and the method for protecting individuals from being struct by a train or adversely affecting train operation. This is known as "On-Track Safety" or "Roadway Worker Protection." All inspectors must be trained in it and must understand how it is being used in the inspection.

This thorough briefing must be repeated at the beginning of each successive day of inspection. A briefing must be conducted if conditions change to ensure all individuals understand what has changed and how it affects them. A brief review is encouraged at any time, and particularly when starting the inspection of a new bridge.

Types of Inspections and Inspection Procedures _____ §237.103

Inspections of the types noted in this program shall be performed in accordance with the recommendations and practices contained in the following documents unless specifically noted otherwise:

- AREMA Bridge Inspection Handbook, published in 2008: Chapters 3 and 6-14.
- AREMA Manual for Railway Engineering, current edition, Chapter 7, Part 5, Inspection of Timber Structures.
- AREMA Manual for Railway Engineering, current edition, Chapter 8, Part 21, Inspection of Concrete and Masonry Structures
- AREMA Manual for Railway Engineering, current edition, Chapter 9, Part 1.2, Post-Seismic Event Operation Guidelines
- AREMA Manual for Railway Engineering, current edition, Chapter 15, Part 7.2, Steel Structures, Existing Bridges, Inspection

Annual Inspection_____ §237.101(a)

An annual inspection is a regular comprehensive inspection which, by law (49 CFR 237.101) must be performed on every railroad bridge at least once each calendar year, not to exceed 540 days between successive inspections.

It is a methodical effort to view each structure in its entirety, and to document that each and every member of that structure has been inspected. An inspector employs visual, tactile, and auditory skills with sufficient intensity and attention to detail to detect cracks, decay, deterioration, damaged or broken components, signs of wear and tear, distress caused by overload or the misapplication of loads, changes in condition from previous inspection, or changes from the designed/constructed condition. Inspectors may employ cameras, binoculars, and drones as aids to view difficult to access portions of a structure. If it is obvious to the inspector that a member is normal and fully

capable of performing its function until the next annual inspection, a checkmark shall be entered in the appropriate space in the inspection record form. If there is an abnormality or defect, that shall be noted instead.

The inspector (RBI) may encounter a condition that, by the inspector's judgment, is not capable of safely supporting rail traffic. In such a case the RBI shall immediately notify the BPM that the bridge is unsafe and closed to traffic. The inspector shall confer, as soon as possible, with the RBE to decide appropriate action.

The RBI and/or the RBE may recommend further investigation through the use of a ***Detailed Inspection***. The inspector may determine that a detailed inspection is necessary on a structure or a portion of it to determine whether it is safe for use and may decide to conduct the detailed investigation during the annual inspection. The RBI, in consultation with the RBE, may recommend detailed inspection as a separate effort, or an effort that can be phased into future annual inspections.

Interim Inspection

When the Annual Inspection identifies a substandard condition or changed operating condition, additional inspections may be required until condition is repaired. An interim inspection may also consist of a walk-through inspection of short duration; primarily performed to detect any major defects in primary load carrying members that are visually detectable without employing tactile methods. The procedures, frequency and necessity of this type of inspection are at the discretion of the Railroad Bridge Engineer, often occurring between Annual Inspections or in conjunction with accompaniment of the Railroad Bridge Engineer

Reactivation of Bridges to Service

Any railroad bridge that has not carried rail traffic or has not been inspected in accordance with this BMP within the previous 540 days must receive an inspection and the inspection report reviewed by a railroad bridge engineer (RBI) prior to the resumption of service.

Limits of Inspection _____

Any inspection other than the annual inspection or interim inspection of all structures which is, by definition, inspections of all structures on a line or subdivision are typically limited in scope. In these circumstances the LIMITS of INSPECTION must be clearly determined and recorded on inspection records, reports and documents. Limits include the UBI (Bridge Number, typically) and, if applicable, the portion of the structure, such as spans, piers, bents and abutments, to which the inspection is limited.

Detailed Inspections

A close-up, comprehensive inspection of one or more members or components to identify or quantify deficiencies not normally detected during an Annual Inspection. This inspection may include the use of more advanced techniques and provide sufficient details and measurements to permit the railroad bridge engineer to perform an evaluation of the load capacity of the structure or components.

The forms for annual inspections are designed to accommodate detailed inspection information, and their use is encouraged. However, such forms may be insufficient, and a separate document used instead or in addition. In any case, the fact that a detailed inspection was performed shall be clearly indicated and the limits of that inspection clearly described.

Underwater Inspection and Scour Inspection **§237.105(b)**

The Washington, Idaho and Montana Railway has no bridges requiring underwater inspection. All bridge components, down to the groundline or stream bed, are plainly visible to the naked eye year-round, or at most, accessible using waders. Inspections are scheduled to coincide with dry periods, which is typically late summer or fall, and waders are employed if necessary to reach all components.

Bridges susceptible to scour are identified during the Annual Inspections and often from testimony of local track and bridge employees who have witnessed bridges during high water. These are bridges that may be founded on shallow footings, have highly erodible soils or be located in areas subject to flash flooding.

Scour inspections may include soundings or probing. This type of inspection shall be done in accordance with AREMA Bridge Inspection Handbook, Chapter 13 and the Emergency Inspection section of this BMP.

Special and Emergency Inspection **§237.105(a)**

An ***Emergency Inspection*** is performed after an event that has changed or may have changed the condition of one or more structure. These events include:

- Accidents / Collision Impacts
- Derailments
- Fires
- Flash Floods / Floods
- Earthquakes

Operation over the affected structure after any of these events is not permitted until ***evaluated*** by the RBE. ***"Evaluation" means communication with the RBE and taking action as directed by the RBE.*** The RBE may issue instructions allowing operation over the structure, operation at reduced speed and/or with load restrictions. The RBE may declare the structure unsafe for operation, requiring the railway to cease traffic. This is typically referred to as "taking the bridge out of service."

The RBE may require inspection by the RBE or an RBI before or after evaluation. The details of the inspection will be determined by the nature of the emergency. When an RBI is not physically available, the RBE may allow a railroad employee with basic bridge knowledge to provide photographs electronically (typically by email or by "texting") and communicate electronically and vocally with the RBE.

Further information and guidance is contained in the AREMA Bridge Inspection Handbook, Chapters 13 and 14. Deserving special notice here are flooding and earthquakes.

Flooding

A flash flood is a rapid flooding of low-lying areas such as washes, rivers and streams and is caused by the intense rainfall associated with a thunderstorm, or multiple thunderstorms. Flash floods can also occur after the collapse of a dam, manmade or natural. Flash floods are distinguished from a regular flood by a timescale less than six hours. Scour or underwater inspection may be necessary for a structure experiencing a flash flood.

After receipt of a warning of flooding which might damage bridges or their approaches, the railroad shall notify train crews operating on ail track / bridges subject to damage from the flood. The speed of all trains and light locomotives shall be limited to that which will permit safe operation consistent with the potential water levels and visibility conditions. This limitation shall continue until an emergency inspection has been performed and it is determined that a hazard no longer exists.

Earthquakes

After an earthquake is reported to the Railroad, the officer in charge shall notify all trains and engines within a 100 mile radius of the reporting area to run at restricted speed until magnitude and epicenter have been determined by the officer in charge, inspection of track, structures, and signal and communication systems shall be initiated.

Upon determination of the magnitude and epicenter, the following response levels will govern operations within the specified radius from the epicenter:

Earthquake (Richter)	Response Level	Response Radius
0.0-4.99	I	
5.0-5.99	II	100 miles (160 km)
6.0-6.99	III II	200 miles (320 km) 300 miles (480 km)
7.0 or greater	III II	As directed, but not less than for 6.0 - 6.99 As directed, but not less than for 6.0 - 6.99

Response Levels:

I - Resume maximum operating speed. The need for the continuation of inspections will be determined by the BPM.

II - All trains and engines will run at restricted speed within the specified radius of the epicenter until inspections have been made and appropriate speeds established by the 8PM.

III - All trains and engines within the specified radius of the epicenter must stop and may not proceed until proper inspections have been performed and appropriate speed restrictions established by the BPM,

For earthquakes of 7.0 (Richter) or greater, operations shall be as directed by BPM, but the radius shall not be less than that specified for earthquakes between 6.0 an

Condition Codes **§237.33(3)**

A recommended repair or action shall accommodate each substandard condition or maintenance item. A ***condition code*** shall reflect the urgency for each repair or action, and shall be referred to as a "PRIORITY" with the urgency defined as follows:

PRIORITY	DEFINITION
1	Unsafe. Stop operation over structure.
2	Repair as soon as possible. Condition must be monitored at least weekly.
3	Repair within one year. Condition must be monitored at least monthly.
4	Repair within five years.
5	Repair as funds permit.

Each identified substandard condition or maintenance item and the recommended repair or action shall be explained in narrative and assigned an appropriate Priority number.

Bridge Inspection Reports **§237.109**

A separate physical paper record shall be prepared for each structure in advance of each inspection, following the format described in ***Appendix E***. Observations, explanations and recommended repairs and actions shall be recorded on these records. These records represent significant time and effort to generate and shall be handled with attention and care. As soon as possible following inspection, not to exceed 7 days, these shall be scanned and stored as an electronic file. The data on each record shall be "keyed" (entered) in the secure railroad bridge database, preferably by the RBI who recorded them. The paper records, the files from the scanned records, and the data in the bridge database shall be maintained as defined in Section 7.

In addition to ***inventory information*** as defined in Section 4, the Bridge Inspection Report shall consist of the following:

A. Identification and Location
   - The bridge mile post location and subdivision as shown in the bridge inventory
   - Bridge location as shown in the bridge inventory

B. Inspection Date & Type
   - Date(s) of inspection
   - Type of Inspection

C. Bridge Inspector
   - The name and written or electronic signature of the railroad bridge inspector

D. For each of the following, condition is to be recorded
   - Line & Surface (on the structure)
   - Deck (in the case of ballast deck, primarily)
   - Ties
   - Walkways (including hand railings)
   - Deck, by span unit/type
   - Approaches
   - Headwalls
   - Wingwalls (if present)
   - Erosion
   - Drift
   - Vegetation
   - Substructure, by substructure unit/type

E. Narrative describing any unusual or all-encompassing issues not covered within other parts of the report.

F. Brief narrative summary of condition of bridge, bringing attention to any critical issues requiring attention.

G. Slow order assigned, if any.

H. Details of the conditions of members respective to their type of construction:
   - Caps and piles for timber bents
   - Timber stringers and (if present) deck planks on timber spans
   - Panel by panel assessment of steel superstructures such as girders and trusses
   - Pier by pier assessment of concrete and steel piers

I. For any item rated condition code 1-3, narrative will be used to describe the condition and corrective work recommended. If the inspection is detailed, such narrative descriptions will be quantitative providing information such as percentage of section loss, widths and lengths of cracks, dimensions of spalls, etc. in order to provide the reviewing engineer sufficient detail to accurately interpret the conditions present at the bridge. Photos or sketches should also be used to further detail the condition.

Photographs shall be taken, at least two of each section of each bridge, one on each side (if possible) and additional photographs of defects and conditions of concern or interest. Additional photos are always encouraged. Photos (some, but not all linked to the database) are stored on a physical disk drive in the office of the RBE. This information is retained for the life of the structure, if possible. Backups of all bridge database information and linked photos are made weekly, as described in Section 7

A PRELIMINARY REPORT of each bridge inspection shall be filed at the location designated in Section 7 within 30 calendar days of the completion of the field portion of the inspection. The Preliminary Report consists of a BRIDGE INSPECTION SUMMARY Report which provides the information in Item F (above, in italics) for each section of each bridge inspected. If the FINAL BRIDGE INSPECTION REPORT is filed within 30 days of the completion of the inspection, a PRELIMINARY REPORT is not required.

The FINAL BRIDGE INSPECTION REPORT must include the information listed above and must be filed within 120 days of the completion of the inspection.

Review of Bridge Inspection Reports §237.111

Every bridge inspection report shall be reviewed by the RBE. Reviews will:

- Determine whether inspections have been performed in accordance with the prescribed schedule and specified procedures.
- Evaluate whether any items on the report represent a present or potential hazard to safety;
- Prescribe any modifications to the inspection procedures or frequency for that particular bridge.
- Schedule any repairs or modifications to the bridge required to maintain its structural integrity; and
- Determine the need for a detailed or interim inspection.

Use of Electronic Database

In addition to the written (paper) inspection documents required, bridge inspection information is also recorded in a secure bridge inspection and management database as specified in Section 7, Maintenance/Storage of Bridge Documents and Records. The presence of the bridge inspector's signature is noted in a dedicated field within the bridge database at the time the field information is entered. Modification of this information is restricted to the Railroad Bridge Inspector (RBI) who conducted the inspection. Bridge inspection records are retained for the life of the structure in the database.

9) DESIGN AND REPAIR ENGINEERING §237.13

Should the need arise for design of a

- Bridge modification
- Bridge repair
- Construction of a new ***railroad bridge***

or any other ***railroad bridge*** analysis, design or load rating, the Railroad will engage a ***railroad bridge engineer*** **(RBE)**.

The Railroad requires the engineer to follow current AREMA (American Railway Engineering & Maintenance of Way Association) guidelines, specifically:

- AREMA Manual for Railway Engineering, current edition, Chapter 7, Timber Structures.
- AREMA Manual for Railway Engineering, current edition, Chapter 8, Concrete Structures and Foundations
- AREMA Manual for Railway Engineering, current edition, Chapter 9, Seismic Design for Railway Structures
- AREMA Manual for Railway Engineering, current edition, Chapter 15, Steel Structures

10) BRIDGE WORK §237.131 - 133

Bridge Maintenance Program

Upon completion of the annual inspection, The BPM and RBE and/or RBS will meet to review the inspection and determine the priority of the repair or replacement. An RBS will supervise all railroad bridge repairs and modifications. The RBS will ensure that all work is accomplished in accordance with the plans and specifications. When repairs and/or modifications are completed, a Bridge Repair/Modification Record will be submitted to the BPM by the RBS within 30 days of the date of the repair.

Bridge Repair and Modification Procedures

Bridges shall be repaired/modified in accordance with plans and procedures prepared by a Railroad Bridge Engineer for the railroad and approved by the Bridge Program Manager.

Repairs or modifications by plans and procedures of a common configuration, such as for in kind replacement of components, may be issued as a common standard by the Railroad Bridge Engineer and the Bridge Program Manager.

The Railroad requires a railroad bridge engineer, as defined and listed in the Responsibilities section, to determine and advise if any bridge work requires engineering design, drawings, specifications or other engineering information to ensure it is performed safely and satisfactorily.

The Railroad requires all bridge work, including maintenance, repairs, modifications and strengthening, be performed under the supervision of a *railroad bridge supervisor* as defined and listed in the Responsibilities section.

During bridge work, rail traffic shall not be permitted over the affected structure except as advised by the *railroad bridge supervisor*.

The BPM or RBS may delegate the duties and responsibilities of an RBS to a foreman, superintendent or consultant engaged by the Railroad in work performed by Railroad forces or a construction contractor.

The RBS, at his or her discretion, need not be physically present at the bridge if he or she determines the work does not affect the capacity for the bridge to safely support rail traffic. The RBS may require photographs to make this decision.

All bridge work, either recommended or completed, is to be recorded and tracked in a running list referred to as a ***Bridge Work Record***, in conformance with §237.33(c).

Included in the *Bridge Work Record* shall be the prioritized repairs generated during annual bridge inspections. Each recommendation is to be dated at its inception and assigned a priority as described in the Bridge Inspection section.

These recommendations are to be reviewed by the BPM, who is responsible for addressing them. Minor work, such as clearing debris, may be handled by the Railroad maintenance personnel, while more involved work may be contracted.

The Railroad may elect not to complete all recommended bridge work. It is understood that restrictions to rail traffic, including cessation, may be necessary in some cases unless the work is completed.

During subsequent inspections, if a work item is not completed, it is to be reaffirmed (including the date reaffirmed) or modified as appropriate and dated. When completed, it is to remain in the Bridge Work Record and the date of completion included.

This Bridge Work Record may be a part of a bridge inspection and management database, such as that used by Railstar.

11) QA/QC PROCEDURES AND AUDITING PROCESS

Reviews and Audits of Inspection and Repair Procedures (49 CFR 237.153)

The BPM and/or RBE shall review the Bridge inspection Reports to verify that inspections are occurring within the required schedule and for completeness and conformance to this policy. Discrepancies will be discussed and reviewed with the Railroad Bridge Inspector(s).

Annual General Program Audit (49 CFR 237.151)

The BPM and RBE shall audit the effectiveness of this program to ensure the validity of procedures and compliance with applicable regulations on an ***annual*** basis. The audit consists of the following:

- Review of bridge inventory data for accuracy
- Review of bridge inspection reports to verify that all inspection types are occurring as required and in compliance with the requirements of Section 8 Bridge Inspection Records
- Review of instructions regarding bridge load capacity limits and dimensional limits
- Review of the handling of loads with exceptional weight or dimensions for compliance with Section 6.
- Review the provisions of this policy to ensure the validity and effectiveness of the written program.

The BPM will keep an audit report on file summarizing the findings of the audit (Audit File).

The BPM or RBE will accompany the Railroad Bridge Inspector to verify that inspection work in the field is being completed in accordance with this policy and to determine the accuracy of the report findings. This inspection audit will be done as part of the general program audit and will include 50% of the bridges or whatever ratio and/or specific bridges the RBE determines necessary.

The BPM or RBE shall conduct field site visits to observe maintenance and repair projects for overall conformance to this policy. Observations from these visits will be reviewed with the Railroad Bridge Supervisor, and other involved personnel as necessary. A summary of the observations and the discussions and direction provided personnel will be retained in an Audit File.

12) PERIODIC REVIEW OF BRIDGE MANAGEMENT PRACTICES §237.151 - 155

The BPM may, at his or her discretion, organize a meeting with key personnel in the operation and maintenance of the railroad to inform, review, clarify and troubleshoot practices described in this manual.

At present, these individuals are:

NAME	TITLE	BMP ROLE	EMAIL ADDRESS
Jason Hill	General Manager	BPM	jason@wimry.com

Special attention is to be placed upon procedures to be followed in the event of damage to a bridge and the steps to be followed prior to the operation of any unusual or heavy loads over the bridge. (i.e. "High/Wide/Heavies")

Language in the timetable and special instructions must be reviewed and revised if necessary. Changes in personnel, contractors and/or consultants involved in bridges are to be announced or clarified.

Proposed changes to this manual are to be discussed, and record of the meeting made in a summary statement to be made a part of this document as ***Appendix G***.

APPENDICES

Bridge List

OWNER: **Bennett Lumber Products, Inc.**

REGION:

RAILROAD: **Washington Idaho & Montana**

Bridge List - Washington Idaho & Montana - WIM Line

Line	Mile Post	Bridge	Sec	Section Name	Spans	Type	Intersects	Near	
WIM	6.71	6.71	1		6	RBS	Palouse River	Kennedy Ford	ID
WIM	7.61	7.61	1		10	ODPT	Palouse River	Kennedy Ford	ID
WIM	8.83	8.83	1		6	ODPT	Palouse River	Kennedy Ford	ID
WIM	9.17	9.17	1		8	ODPT	Deep Creek	Kennedy Ford	ID
WIM	12.90	12.90	1		3	ODPT	Drainage	Potlatch	ID
WIM	13.23	13.23	1		4	ODPT	Gold Creek	Princeton	ID
WIM	14.57	14.57	1		3	ODPT	Lemmen Creek	Princeton	ID
WIM	16.77	16.77	1		1	ODPT	Cattle Pass	Princeton	ID
WIM	20.16	20.16	1		1	ODPT	Maple Creek	Harvard	ID

Number of Sections: **9** ***Number of Spans:*** **42**

Number of Bridges: **9**

OWNER: **Bennett Lumber Products, Inc.**

REGION:

RAILROAD: **Washington Idaho & Montana**

LINE: **WIM Line**

Total Number of Bridges: **9**

Total Number of Sections: **9**

Total Number of Spans: **42**

BRIDGE INVENTORY RECORD

Lat. N 46° 54' 58.6"
Long. W 116° 52' 36.7"
UBI: 12.90
UEBI: 16354 Mile Post 12.90

Owner: Bennett Lumber Products, Inc.
Region:
Railroad: WASHINGTON IDAHO & MONTANA
Line: WIM Line
Gen Bridge Notes: 112# CWR across bridge.

Bridge Name:
Nearest Station: Potlatch ID
County: Latah Overhead?
Crosses/Carries: Drainage No
Access: Hyrail.

Mileposts increase to E
Members increase to S

Abutments		Alignment	Curve		Section	1	
Conc/Steel Piers		Guard Rail?	No	3	Spans (type)	ODPT	
Timber Bents		Walk	None				
Timber Piers		Fiber Optic?					
Skewed?	No	Other Fixtures					
Lines of Beams, Girders or Stringers	6						

Est Height 8 No Tracks 1 Deck Open Year Const
Ave Span 15'-5" Section Lgth 47'-10"
Gen Section Notes: Ties: 8x7½x10' @14"
Caps: 13¾x13¾x14'
Stringers: 10x17½

BRIDGE INVENTORY RECORD

Lat. N 46° 54' 57.3"
Long. W 116° 52' 12.1"
UBI: 13.23
UEBI: 16355 Mile Post 13.23

Owner: Bennett Lumber Products, Inc.
Region:
Railroad: WASHINGTON IDAHO & MONTANA
Line: WIM Line
Gen Bridge Notes: 115# CWR across bridge.

Bridge Name:
Nearest Station: Princeton ID
County: Latah Overhead?
Crosses/Carries: Gold Creek No
Access:

Mileposts increase to E
Members increase to S

Abutments		Alignment	Tangent		Section	1	
Conc/Steel Piers		Guard Rail?	No	4	Spans (type)	ODPT	
Timber Bents		Walk	None				
Timber Piers		Fiber Optic?					
Skewed?	No	Other Fixtures					
Lines of Beams, Girders or Stringers	6						

Est Height 12 No Tracks 1 Deck Open Year Const
Ave Span 15-8 Section Lgth 64'-2"
Gen Section Notes: Ties: 8x7½x10' @12"
Caps: 14x13½x14'
Stringers: 10x17½

BRIDGE INVENTORY RECORD

Lat. N 46° 54' 48.1" | Long. W 116° 50' 40.9" | UBI: 14.57 | UEBI: 16356 | Mile Post 14.57

Owner: Bennett Lumber Products, Inc.
Region:
Railroad: WASHINGTON IDAHO & MONTANA
Line: WIM Line
Gen Bridge Notes: 70# 1905 rail across bridge.

Bridge Name:
Nearest Station: Princeton ID
County: Latah | Overhead?
Crosses/Carries: Lemmen Creek | No
Access: Hyrail.

Mileposts increase to: E | Members increase to: S

Abutments		Alignment	Tangent		Section	1	
Conc/Steel Piers		Guard Rail?	No	3	Spans (type)	ODPT	
Timber Bents		Walk	None				
Timber Piers		Fiber Optic?					
Skewed?	No	Other Fixtures					
Lines of Beams, Girders or Stringers	6						

Est Height: 7 | No Tracks: 1 | Deck: Open | Year Const:
Ave Span: 15'-6" | Section Lgth: 48'
Gen Section Notes: Ties: 8x7½x10' @14"; Caps: 14x13½x14'; Stringers: 10x17½

BRIDGE INVENTORY RECORD

Lat. N 46° 54' 57.5" | Long. W 116° 47' 55.6" | UBI: 16.77 | UEBI: 16357 | Mile Post 16.77

Owner: Bennett Lumber Products, Inc.
Region:
Railroad: WASHINGTON IDAHO & MONTANA
Line: WIM Line
Gen Bridge Notes: 112# CWR across bridge.

Bridge Name:
Nearest Station: Princeton ID
County: Latah | Overhead?
Crosses/Carries: Cattle Pass | No
Access: Walk in from farm crossing.

Mileposts increase to: E | Members increase to: S

Abutments		Alignment	Curve		Section	1	
Conc/Steel Piers		Guard Rail?	No	1	Spans (type)	ODPT	
Timber Bents		Walk	None				
Timber Piers		Fiber Optic?					
Skewed?	No	Other Fixtures					
Lines of Beams, Girders or Stringers	6						

Est Height: 7 | No Tracks: 1 | Deck: Open | Year Const:
Ave Span: 12'-2" | Section Lgth: 14'
Gen Section Notes: Ties: 7½x7½x10' @12"; Caps: 14x13½x14'; Stringers: 10x17½; Osmose treated 1988. (Caps/Piles).

BRIDGE INVENTORY RECORD

Lat. N 46° 54' 58.2" Long. W 116° 43' 45.8"

UBI: 20.16

UEBI: 16358 Mile Post 20.16

Owner: Bennett Lumber Products, Inc.
Region:
Railroad: WASHINGTON IDAHO & MONTANA
Line: WIM Line
Gen Bridge Notes: 112# CWR across bridge

Bridge Name:
Nearest Station: Harvard ID
County: Latah Overhead?
Crosses/Carries: Maple Creek No
Access: Walk in from Hwy 6

Mileposts increase to E Members increase to S

Abutments		Alignment	Curve		Section	1	
Conc/Steel Piers		Guard Rail?	No	1	Spans (type)	ODPT	
Timber Bents		Walk	North	Est Height 10	No Tracks 1	Deck Open	Year Const
Timber Piers		Fiber Optic?					
Skewed?	No	Other Fixtures		Ave Span	14'-5"	Gen Section Notes:	Ties: 8x7½x10' @12" Caps: 14x14x14' Stringers: 10x17½
Lines of Beams, Girders or Stringers	6			Section Lgth	16'		

BRIDGE INVENTORY RECORD

Lat. N 46° 54' 48.4" Long. W 116° 58' 32.3"

UBI: 6.71

UEBI: 16350 Mile Post 6.71

Owner: Bennett Lumber Products, Inc.
Region:
Railroad: WASHINGTON IDAHO & MONTANA
Line: WIM Line
Gen Bridge Notes: 112RE CWR across bridge.

Bridge Name:
Nearest Station: Kennedy Ford ID
County: Latah Overhead?
Crosses/Carries: Palouse River No
Access: Hyrail

Mileposts increase to E Members increase to S

Abutments	2	Alignment	Curve		Section	1	
Conc/Steel Piers	5	Guard Rail?	No	6	Spans (type)	RBS	
Timber Bents		Walk	None	Est Height 24'	No Tracks 1	Deck Open	Year Const
Timber Piers		Fiber Optic?					
Skewed?	No	Other Fixtures		Ave Span	30'	Gen Section Notes:	Beams are est. 24x100# (8 total) Ties: 10x10x12' @16" Caps: 36x39x15'-06" Conc.
Lines of Beams, Girders or Stringers	8			Section Lgth	180'-2"		

BRIDGE INVENTORY RECORD

Lat. N 46° 55' 12.5" | Long. W 116° 57' 51.1" | **UBI: 7.61** | UEBI: 16351 | Mile Post 7.61

Owner: Bennett Lumber Products, Inc.
Region:
Railroad: WASHINGTON IDAHO & MONTANA
Line: WIM Line
Gen Bridge Notes: 112RE CWR across bridge. Bridge at end of spiral.

Bridge Name: "Frankenstein"
Nearest Station: Kennedy Ford ID
County: Latah Overhead?
Crosses/Carries: Palouse River No
Access: Can walk from farm road close to Idaho Hwy 6. Note very light highway thru truss next to bridge, visible from highway.

Mileposts increase to E | Members increase to S

Abutments		Alignment	Tangent		Section	1	
Conc/Steel Piers		Guard Rail?	No	10	Spans (type)	ODPT	
Timber Bents		Walk	None	Est Height 16	No Tracks 1	Deck Open	Year Const
Timber Piers		Fiber Optic?					
Skewed?	No	Other Fixtures		Ave Span 15'-8"	Gen Section Notes:	Ties: 8x7½x10' @12" Caps: Various Stringers: 10x17½	
Lines of Beams, Girders or Stringers				Section Lgth 158'-3"			

BRIDGE INVENTORY RECORD

Lat. N 46° 55' 24.4" | Long. W 116° 56' 32.4" | **UBI: 8.83** | UEBI: 16352 | Mile Post 8.83

Owner: Bennett Lumber Products, Inc.
Region:
Railroad: WASHINGTON IDAHO & MONTANA
Line: WIM Line
Gen Bridge Notes: 70# rail across bridge.

Bridge Name:
Nearest Station: Kennedy Ford ID
County: Latah Overhead?
Crosses/Carries: Palouse River No
Access: Hyrail

Mileposts increase to E | Members increase to S

Abutments		Alignment	Curve		Section	1	
Conc/Steel Piers		Guard Rail?	No	6	Spans (type)	ODPT	
Timber Bents		Walk	None	Est Height 14	No Tracks 1	Deck Open	Year Const
Timber Piers		Fiber Optic?					
Skewed?	No	Other Fixtures		Ave Span 13'	Gen Section Notes:	Ties: 7½x7½x10' @14" Caps: 14x14x14' Stringers: 10x17½	
Lines of Beams, Girders or Stringers				Section Lgth 77'-4"			

BRIDGE INVENTORY RECORD

Lat. N 46° 55' 30.5"
Long. W 116° 56' 11.7"

UBI: 9.17

UEBI: 16353 Mile Post 9.17

Owner: **Bennett Lumber Products, Inc.**
Region:
Railroad: **WASHINGTON IDAHO & MONTANA**
Line: **WIM Line**

Gen Bridge Notes:

70# rail across bridge. Treated by Osmose, 1988.

Mileposts increase to **E**
Members increase to **S**

Bridge Name:
Nearest Station: **Kennedy Ford** **ID**
County: **Latah** Overhead?
Crosses/Carries: **Deep Creek** **No**
Access: Hyrail

Abutments		Alignment	Tangent		**Section**	1			
Conc/Steel Piers		Guard Rail?	No	8	**Spans** (type)	ODPT			
Timber Bents		Walk	None	Est Height	9	No Tracks	1	Deck	Open	Year Const	
Timber Piers		Fiber Optic?							
Skewed?	No	Other Fixtures		Ave Span	13'-6"	Gen Section Notes:	Ties: 8x7½x10 @14" Caps: 14x13½x14' Stringers: 10x17½		
Lines of Beams, Girders or Stringers	6			Section Lgth	108'				

Washington, Idaho & Montana Railway

Bridge Rating Summary

Bridge No.	Crossing	RATING at 10 mph except as noted	E-effect of 42' 263K Cars	E-effect of 42' 286K cars	E-effect of 80'6" 286K cars	E-effect of EMD GP-40 Locos	E-effect of SD70Mac Locos	No. Spans	Span Type	Effective Span Length
6.71	Palouse River	**E-60**	**E-57**	E-62	**E-43**	**E-33**	**E-55**	6	Beam Span	30'-00"
7.61	Palouse River	**E-65**	**E-53**	**E-58**	**E-55**	**E-37**	**E-53**	10	ODPT	16'-05"
8.83	Palouse River	**E-81**	**E-54**	**E-59**	**E-59**	**E-42**	**E-53**	6	ODPT	13'-10"
9.17	Deep Creek	**E-79**	**E-54**	**E-58**	**E-58**	**E-42**	**E-53**	8	ODPT	13'-11"
12.90	Drainage	**E-59**	**E-53**	**E-57**	**E-55**	**E-37**	**E-52**	3	ODPT	16'-00"
13.23	Gold Creek	**E-55**	**E-54**	**E-58**	**E-55**	**E-37**	**E-53**	4	ODPT	16'-07"
14.57	Lemmen Creek	**E-59**	**E-53**	**E-57**	**E-55**	**E-37**	**E-52**	3	ODPT	16'-00"
16.77	Cattle X-ing	**E-101**	**E-62**	**E-67**	**E-67**	**E-42**	**E-63**	6	ODPT	12'-02"
20.16	Maple Creek	**E-74**	**E-53**	**E-57**	**E-57**	**E-40**	**E-53**	6	ODPT	14'-05"

LEGEND	
	Under allowable stress.
	Within 5% of allowable stress.
	Exceeds **allowable stress.**

Note: See W. I. & M. Bridge Rating Report under seperate cover.

WIM Line

Bridge 6.71 WIM Line

Section	Type	Priority	Item	Repair Description	Since	Done	Low Effort	Work By
1	RBS	4	3	In the approaches, assure ties are tight to bottom of rail and spiked. Add ballast and tamp up.	2024	☐	☐	Railroad
1	RBS	6	4	Remove the rail anchors on the bridge deck and box anchor at least 100-ft on both approaches.	2024	☐	☑	Railroad
1	RBS		1	Ballast leak at SW corner repaired by Koppers in 2024.	2023	2024	☐	Contractor
1	RBS		2	All ties replaced with new by Koppers.	2023	2024	☐	Contractor

Bridge 7.61 WIM Line

Section	Type	Priority	Item	Repair Description	Since	Done	Low Effort	Work By
1	ODPT	4	8	In the approaches, assure ties are tight to bottom of rail and spiked. Add ballast and tamp up.	2024	☐	☐	Railroad
1	ODPT	6	9	Remove the rail anchors on the bridge deck and box anchor at least 100-ft on both approaches.	2024	☐	☑	Railroad
1	ODPT		1	Two new timbers at bottom of west headwall. NW return wall timbers replaced; wall repaired and backfilled.	2023	2024	☐	Contractor
1	ODPT		2	Ballast and debris cleaned off tops of stringers by Koppers.	2023	2024	☑	Contractor
1	ODPT		3	Gaps above Piles 2-4 in Bent 9 shimmed by Koppers in 2024.	2023	2024	☑	Contractor
1	ODPT		5	All 8 stringers in Spans 1 & 3, and all 10 stringers in Spans 9 & 10 replaced by Koppers.	2023	2024	☐	Contractor
1	ODPT		6	All ties replaced with new by Koppers.	2023	2024	☐	Contractor
1	ODPT		7	Caps in Bents 4 & 8 replaced by Koppers.	2023	2024	☐	Contractor

Bridge 8.83 WIM Line

Section	Type	Priority	Item	Repair Description	Since	Done	Low Effort	Work By
1	ODPT	4	8	In the approaches, assure ties are tight to bottom of rail and spiked. Add ballast and tamp up.	2024	☐	☐	Railroad
1	ODPT	6	9	Although arguably a track rather than bridge issue, place additional riprap along the south side of both approaches to restore and maintain the original riverbank (especially around and along the west dump bent) and reconstruct lost roadbed and ballast section.	2024	☐	☐	Railroad
1	ODPT		1	Southwest and southeast returnwalls repaired by Koppers.	2023	2024	☐	Railroad
1	ODPT		2	Ballast and debris cleaned off tops of stringers by Koppers.	2023	2024	☑	Railroad
1	ODPT		3	A concrete bag blanket was built along south side of Bent 1, riprap added along groundline of Bents 2 - 5, and a few cement bags were placed at the base of the south return wall at Bent 7, by Koppers to combat erosion.	2023	2024	☐	Contractor

Bridge 8.83 (Cont.)

Section	Type	Priority	Item	Repair Description	Since	Done	Low Effort	Work By
1	ODPT		4	Caps on Bents 1 & 6 replaced by Koppers.	2023	2024	☐	Contractor
1	ODPT		5	All ties replaced with new by Koppers.	2023	2024	☐	Contractor
1	ODPT		6	Various crushing tapered shims replaced by Koppers.	2023	2024	☐	Contractor
1	ODPT		7	Pile 4 in Bent 7 posted by Koppers.	2023	2024	☐	Contractor

Bridge 9.17 WIM Line

Section	Type	Priority	Item	Repair Description	Since	Done	Low Effort	Work By
1	ODPT	4	2	In the approaches, assure ties are tight to bottom of rail and spiked. Add ballast and tamp up.	2023	☐	☐	Railroad
1	ODPT		1	Caps on Bents 1, 3 & 4 replaced by Koppers.	2023	2024	☐	Contractor
1	ODPT		3	All ties replaced with new by Koppers.	2023	2024	☐	Contractor

Bridge 12.90 WIM Line

Section	Type	Priority	Item	Repair Description	Since	Done	Low Effort	Work By
1	ODPT		1	Cap on Bent 1 by Koppers.	2023	2024	☐	Contractor
1	ODPT		2	All ties replaced with new by Koppers.	2023	2024	☐	Contractor
1	ODPT		3	Ply 6 stringer in all spans and Ply 1 in Span 3 replaced by Koppers.	2023	2024	☐	Contractor

Bridge 13.23 WIM Line

Section	Type	Priority	Item	Repair Description	Since	Done	Low Effort	Work By
1	ODPT	6	1	Add ballast and tamp approaches.	2023	☐	☐	Railroad
1	ODPT		2	Caps on Bents 1 & 3 replaced by Koppers.	2023	2024	☐	Contractor
1	ODPT		3	All ties replaced with new by Koppers.	2023	2024	☐	Contractor
1	ODPT		4	Cap on Bent 2 replaced by Koppers.	2023	2024	☐	Contractor

Bridge 14.57 WIM Line

Section	Type	Priority	Item	Repair Description	Since	Done	Low Effort	Work By
1	ODPT	6	1	Add ballast and tamp approaches.	2023	☐	☐	Railroad
1	ODPT		2	Caps in Bents 1 & 2 replaced by Koppers. Bent 2 was double-capped and Pile 5 posted in the same bent.	2023	2024	☐	Contractor
1	ODPT		3	All ties replaced with new by Koppers.	2023	2024	☐	Contractor
1	ODPT		4	Ply 4 stringer replaced in Spans 1 & 2 by Koppers.	2023	2024	☐	Contractor
1	ODPT		5	Cap in Bent 4 replaced by Koppers.	2023	2024	☐	Contractor

Bridge 16.77 WIM Line

Section	Type	Priority	Item	Repair Description	Since	Done	Low Effort	Work By
1	ODPT	6	6	Remove the rail anchors on the bridge deck and box anchor at least 100-ft on both approaches.	2024	☐	☑	Railroad
1	ODPT		1	Replace cap on Bent 1.	2023	2024	☐	Contractor
1	ODPT		2	Debris cleaned off tops of caps and stringers by Koppers.	2023	2024	☑	Contractor
1	ODPT		3	All ties replaced with new by Koppers.	2023	2024	☐	Contractor
1	ODPT		4	Repair kink in track in east approach.	2023	2024	☐	Railroad

Bridge 20.16 WIM Line

Section	Type	Priority	Item	Repair Description	Since	Done	Low Effort	Work By
1	ODPT	6	2	Construct planks and handrail for walkway.	2023	☐	☐	Railroad
1	ODPT	6	7	Remove the rail anchors on the bridge deck and box anchor at least 100-ft on both approaches.	2024	☐	☑	Railroad
1	ODPT		1	Was 3-ply chord bridge, changed to 4-ply by Koppers in 2024. Stringer Plies 1, 5, 6 & 7 new. Stringer Plies 2, 3, 4 & 8 reused but moved.	2023	2024	☐	Contractor
1	ODPT		3	Cap in Bent 1 by Koppers.	2023	2024	☐	Contractor
1	ODPT		4	Debris cleaned off tops of caps and stringers by Koppers.	2023	2024	☑	Railroad
1	ODPT		5	Pile 1 in Bent 2 posted by Koppers.	2023	2024	☐	Contractor
1	ODPT		6	All ties replaced with new by Koppers.	2024	2024	☐	Contractor

Unique Electronic Bridge Identifier (UEBI)

BRIDGE INSPECTION RECORD

UBI:

Owner: Bennett Lumber Products, Inc.
Region:
Railroad: WASHINGTON IDAHO & MONTANA
Line: WIM Line
Gen Bridge Notes:

Lat. N
Long. W
UEBI: 14301
Mile Post
Bridge Name
Nearest Station
County
Overhead?
Crosses/Carries
Access

Mileposts increase to E
Members increase to S

Abutments | Alignment | Section
Conc/Steel Piers | Guard Rail? | Spans (type)
Timber Bents | Walk
Timber Piers | Fiber Optic?
Skewed? | Other Fixtures | Ave Span | Gen Section Notes:
Lines of Beams, Girders or Stringers | Section Lgth
Est Height | No Tracks | Deck | Year Const

Line & Surface
Deck
Ties
Walkway
Approaches
Headwalls
Wingwalls
Erosion
Drift
Vegetation

Date | Inspection Type
Project No | Inspector(s)
General Inspection Comments
Brief Summary including Urgent Condition
Slow Order?

Recommended and Completed Work

WrkItm No.	Date Recmnd	Date Confirmd	Recommended Work Description	Priority	By:	Done?	Completed
1						☐	
2						☐	
3						☐	

BENTS

Bent	Date	H2O	Hgt	Cap	#Piles	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
1															
2															
3															
4															

5															
6															
7															
8															

STRINGERS

Span	Date	Lgth	#Plys	Ply1	Ply2	Ply3	Ply4	Ply5	Ply6	Ply7	Ply8	Ply9	Ply10	Ply11	Ply12
1															
2															
3															
4	08/20/17	Stringer Notes: Longitudinal brace fell out													
			8	✓	✓	✓	✓	✓	✓	✓	✓				
5	08/20/17		8	✓	VX	✓	✓	✓	✓	✓	✓				
6															
7															

Signed (Inspector):

Acknowleged (Supervisor):

Supervisor Signature Date:

Pink cell indicates Reject Member
Yellow indicates Possible Reject

Checkmark used to indicate member was inspected and no anomalies found

PHOTO

21 **Deck view looking North**

RAILROAD BRIDGE GLOSSARY

Abutment – That part of a pier from which an arch springs. A structure sustaining one end of a bridge span and at the same time supporting the embankment which carries the track or roadway.

Aggregate – The inert material such as sand, broken stone, etc., with which the cement or other adhesive material is mixed to form a concrete or mortar.

Anchor Pier – A pier used in cantilever bridges to resist the uplift at the end of the anchor arm.

Arch – Any bow-like curve, structure, or object, usually having the convex side upward, generally spanning an opening and producing horizontal as well as vertical reactions.

Arch Bridge – A curved structure which produces reactions inclined to the vertical.

Arch Culvert – A culvert having an arch roof.

Axle Load – The load which comes on an axle of a car, or locomotive and is in turn transferred to the structure through two wheels.

Babbitt Metal – An alloy of tin with copper and antimony, used for lining bearings and making bushings.

Back Wall (or Head Wall) – The wall above the bridge seats on abutments at the end of a structure.

Ballast Deck – A bridge floor under a railway track upon which ballast is placed with ties embedded therein.

Ballast Retainer – A timber, concrete, or steel riser on both edges or ends of a ballast deck that keeps ballast from falling off of the bridge.

Bank Protection – The prevention of erosion of a bank of a stream by use of riprap, mattresses, or other artificial means.

Bascule Bridge – A bridge having a span that opens by rotating in a vertical plane.

Base Casting – A steel or iron casting upon which the bridge-shoe rests.

Base of Rail – The bottom of any rail placed in final position. It generally determines the elevation from which the heights of the various parts of the structure are measured.

Base Plate – The foundation plate of metal on which a heavy piece of machinery or the end of a bridge rests. This plate is usually set on masonry or concrete. Also called a masonry plate.

Batten Plate – A stay plate at the ends of a compression member. Sometimes termed tie plate.

Batter Pile – The outside pile of a bent that is driven at an angle from vertical to provide lateral stability to the bent.

Beam – A member the principal function of which is to carry a transverse load, or more simply, a member stressed primarily in bending.

Bearing – A casting, fabrication, block or other construction which transfers the load of the superstructure (e.g. beam, girder or truss) to the substructure (e.g. abutment, pier or bent).

Bearing Pile – A pile which obtains its primary load capacity through end bearing on a hard stratum of soil or rock at the pile tip.

Bearing Pin – A truss pin at the end of a span connecting the truss to the shoe.

Bending Moment – The moment which produces or tends to produce bending in a beam or other member of a structure. It is measured by the algebraic sum of the products of all the forces by their respective lever arms.

Bent – A supporting frame consisting of posts or piles with bracing, caps, and sills.

Blocking – A set of timber blocks which is placed under bridge bearings or members to raise and support them.

Boat Spike – A square, chisel-pointed spike with a rounded head, ordinarily from eight to ten inches long, used to fasten heavy planks in wooden floors, railroad crossings, etc.

Bore – The internal diameter of a hole, tube, or pipe.

Bottom Lateral Bracing – Lateral bracing in the plane of the bottom chords of truss spans or bottom flange of girder spans.

Box Beam or Girder – A hollow beam, generally rectangular in section, having its sides made of plates united by angle-irons or welds, or a concrete beam with a rectangular cross-section and a hollow core.

Box Culvert – A square or rectangular shaped culvert.

Brace – Generally a strut supporting or fixing in position another member.

Brick Masonry – Masonry composed of brick.

Bridge Database – A digital (i.e. computer) system for inputting, storing and retrieving information about bridges such as inventory, inspection, bridge repair and load rating.

Bridge Frog – A contrivance built of two or more pieces of rails mounted on a common base and used for passing the car or locomotive wheels across the ends of a movable bridge.

Bridge List – A list of bridges including sections if there is more than one section in a bridge. The bridge list is in milepost order and includes milepost, bridge number (UBI), section number and section name, if appropriate. Also included are the number of spans, span type, maximum height, name of intersected feature and nearest station. The Bridge List is not an inventory.

Bridge Length – The distance between front face of backwall to front face of back wall measured along the centerline of the track.

Bridge Modification – A change to the configuration of a railroad bridge that affects the load capacity of the bridge. (49 CFR §237.5)

Bridge Repair – Remediation of damage or deterioration which has affected the structural integrity of a railroad bridge. (49 CFR §237.5)

Bridge Seat – That part of the top of a bridge pier or abutment where the pedestals or bearings of the superstructure rest.

Built-up Beam or Girder – A beam or girder made up of structural shapes, such as plates and angles, riveted, bolted or welded together.

Buttress – A short cross-wall built against the main wall to increase its stability.

Caisson – A bottomless box or enclosure, surmounted by a crib or shaft which is excavated at the bottom to sink the entire structure to a required depth to form the foundation for a pier structure.

Camber – The upward curvature of a span above its nominal position.

Cantilever Bridge – A structure at least one portion of which acts as an anchorage for sustaining another portion which projects beyond the supporting pier.

Cap – A beam, usually short and transverse to the track, that supports stringers or beams. A cap usually rests directly on piles or posts and can be timber, steel or concrete.

Cap Plate – The top plate on a steel column or post.

Cast Steel – Steel that is cast into shape directly from the furnace instead of being cast into ingots and rolled or melted.

Cement – Hydraulic calcium silicates that react chemically with water and are combined with aggregate to form concrete.

Center Bearing Swing Span – A term applied to swing spans to indicate that the dead load support is near the axis of the pivot pier instead of near the outer edge.

Centerline – Centerline of the track, used as the horizontal reference.

Centrifugal Force – The outward force exerted by a train going around a curve due to its inertia, against that force which is causing it to deviate from a straight-line motion and to travel in a curved path.

Chamfer – To bevel a sharp edge or corner, typically on concrete.

Channel – (1) The deepest part of a river or stream; usually that part available for navigation. (2) A structural or rolled steel shape used in bridge building and in other steel construction.

Check – A small crack in wood due to seasoning, or in concrete or mortar due to drying.

Chord – (1) Timber stringers bolted together to form one larger timber beam. (2) The primary members on the top or bottom of a truss span that run the full length of the span parallel to the track(s). The top chord is usually in compression and the bottom chord is usually in tension (except on continuous spans).

Chord Bolt – A bolt through individual timber stringers fastening them together to form a chord.

Clearance Line – A line on a diagram showing the minimum clearance allowed.

Cofferdam – A temporary enclosing structure, practically watertight, from which the water is pumped to create a safe working area.

Collision Strut (post) – A short, diagonal strut used to provide support to a truss end post.

Column – A vertical compression member which supports a part of a bridge.

Composite Steel Bridge – A steel span with a concrete deck rigidly attached to the steel using shear connectors so both the steel and concrete carry the bending and, in some cases, shear forces.

Compression – The state of being compressed; shortening by pressure.

Concrete – A material composed of cement, sand, gravel, and water.

Continuous Span – A span that rests on three or more supports with main members being continuous over one or more internal supports.

Cope – To notch steel beams, channels, etc.

Coping – The top or cover of a wall, column, or pier. Usually made so as to project beyond the face below.

Corbel – A small shelf cantilevered out from a beam, wall, or column in order to support a beam or superincumbent load.

Corbel Block – Short timber blocks placed under pier caps or submaps to provide support for additional caps or bridge bearings.

Corrosion – The disintegration of a substance by the action of chemical agents.

Counter – One of a pair of diagonals placed in a truss panel, in the form of an X, where a single diagonal would be subjected to stress reversals.

Counterweight – A weight that counterbalances span weight on a movable bridge, used on lift spans, bascules, swing spans, etc.

Course – A horizontal layer of stone in a masonry wall or substructure unit such as a pier or abutment.

Cover Plate – A plate fastened on the flanges of a girder to give additional cross-section thereto; a top or bottom plate of a chord member.

Creosoted Timber – Wood which is preserved through a pressure-treatment process using creosote, where penetration of wood with preservative provides long-term protection against decay.

Cribbing – Timbers piled cross-wise in order to form a support for a load.

Cross-Frame – A transverse bracing frame between stringers or girders. Also termed a “Buck Brace.”

Cross Girder – Any girder passing across a bridge from one truss or main girder to another, and, generally, perpendicular to the truss or girder planes.

Cross Level – The vertical position of one rail respective to the other. On tangent track both rails should be at the same elevation.

Cross-over – An arrangement of turnouts enabling movement from one track to another.

Crossing – An intersection. The place where two railroads cross or a roadway crosses the tracks. The term is also used for a bridge crossing a stream, river, railroad, or highway.

Culvert – Any undergrade structure other than a bridge which supports one or more railroad tracks, typically designed to allow surface water to pass under the railroad.

Cutoff – That part of a pile that has been sawed off after the pile is in place. The elevation or line at which piles or posts are given a final cut before the cap, abutment, pier, or whatever they support are installed.

Cutting Edge – An edge of timber or steel angles placed on the bottom of the working chamber of a caisson.

Cutwater – A starling; the projecting ends of a bridge pier, etc. Usually shaped so as to allow water, ice, drift, etc. to strike without injury to the structure.

Cylinder Pier – A pier made of a cylindrical steel shell filled with concrete.

Dead Load – The weight of all the parts of a bridge itself and anything that may remain upon it for any length of time, such as tracks, walkways, utilities, etc.

Deck – The portion of the bridge that supports the track, in the case of ballast deck, or supports the rails, in the case of open deck or direct fixation where the deck is a part of the track structure.

Deck Bridge – A bridge where most or all of the structure is below track level.

Deck Plate Girder – A deck bridge fabricated from steel plates and angles riveted, bolted, or welded together.

Deck Truss – A truss span where the entire structure is at or below track level.

Defect – A condition of deterioration or damage to a railroad bridge component that may impact the safe load carrying capacity of the structure or overall integrity or safety for trains and personnel using the structure.

Deflection – The vertical displacement of the bridge or a bridge member caused by loading.

Deformation – A change of shape in a member due to applied loads.

Diagonal – A member running at an angle across the vertical panel of a truss.

Diagonal Bracing – Bracing along diagonal lines.

Diaphragm – A stiffening plate or section used in the interior of a column or between bending members to give them additional strength and rigidity.

Dolphin – A cluster of piles driven some distance ahead of the ends of the channel span piers of a bridge to protect the faces of the piers against blows from passing vessels.

Double Cap – Two caps set on top of one another.

Draw – The movable portion of a draw-bridge.

Draw Bridge – A movable bridge that may be drawn or turned to one side, or lifted up, either bodily or in sections, so as to permit boats to pass under or through it.

Drift Bolt – A short rod or square bar to drive into holes bored in timber for attaching adjacent members to each other or to piles. The length generally varies from one foot to two feet. A drift bolt is generally provided with some sort of head. Drift bolts with a sharpened end are often referred to as drift pins.

Drip – A small channel cut under the lower projecting edge of a coping, etc., so that when rain reaches that point, it will drip or fall off.

Drum – A revolving cylinder around which ropes or belts either travel or are wound, such as on a movable bridge.

Drum Girder – The circular, main support girder at the center portion of a swing span.

Dump – The backfill area immediately behind a bridge abutment.

Dump Bent – The end bent on a timber bridge.

Earth Pressure – The lateral pressure exerted by a bank of earth when supported by a retaining wall or an abutment.

Eccentric Load – A load which is applied off-center to the axis of a member, producing a bending moment on the member considered.

Eddy – A whirl or backward current of water. A vortex. That portion of the water in a stream that actually swirls.

Efflorescence – A powder-like incrustation formed on the surface of concrete.

Elongation – The stretching or extension of a part beyond its natural dimensions.

Embankment – A bank, a dike, or an earthwork raised for any purpose.

End Floorbeam – The floorbeam at the end of a span.

End-lift Machinery – The machinery that releases the ends of a swing span for turning.

End Post – The post at the end of a truss. Also referred to as the batter post.

End Stiffener – Vertical angles fastened to the web of a plate girder at its ends for the purpose of stiffening it and transferring the end shear to the shoe or base plate.

Erosion – The lateral loss of stream bank material.

Expansion Bearing – A support at the end of a span where provision is made for expansion and contraction of the structure. An expansion bearing may also allow rotation to accommodate span deflection.

Expansion Joint – A joint in which movement for expansion and contraction is allowed.

Expansion Rollers – A group of steel cylinders nested in a box or suitable frame placed under the shoe of a span to facilitate its movement during temperature changes and loading. (See roller nest)

Eye-bar – A bar with an eye at either one end or each end (also I-bar).

Fatigue Cycle – The loading and unloading of a bridge member during the passage of trains, and having a sufficient range of stress to accumulate fatigue damage.

Fender – A guard for protection. Timbers, piles, etc., to protect vessels from striking, rubbing, and scarring piers.

Fender Pile – A pile which is driven at wharfs, or in front of large masonry piers or other important works, to protect them from sudden blows by vessels.

Fill Plate – A plate used to fill open spaces between members or components of members.

Fillet – A plain, narrow, flat molding in a cornice or a corner. The rounding of sharp corners.

Fish Plates – Splice plates used to join to beams on the webs.

Fish Bellied Girder – A girder having the tip flange horizontal and the bottom flange curved to provide a smaller depth at the end.

Fixed Bearing – A support at the end of a span where it is firmly connected to prevent any longitudinal movement of the structure. A fixed bearing may allow rotation to accommodate span deflection.

Fixed Bridge – A bridge in a fixed location that does not move except for expansion and contraction.

Flange – Angles or plates at the top and bottom of a beam or girder which resist tension or compression caused by bending.

Flange Angle – One of the upper or lower chord angles in a beam or girder; or the angles which either alone or with cover plates make up the flange of a built-up beam or girder.

Flange Coupling – A coupling made up of two parts, each firmly attached to the end of its shaft, bolted together to form a permanent connection.

Flange Splice – A splice made in the flange of a beam or girder.

Flexure – Bending

Floorbeam – A transverse beam or girder placed at the panel points of a span to support the stringers which carry the deck. In some instances, on through plate girders, floor beams are closely spaced to support the deck without stringers.

Floor System – The system of members in a bridge that carries the deck and its load, transferring the loads to the main girders or trusses.

Footing – The spreading course or enlarged portion at the base of a pier or abutment.

Force – That which moves or tends to move matter. The action between two bodies either causing or tending to cause change in their relative rest or motion.

Foundation – That portion of a structure, usually below the surface of the ground, which distributes the pressure upon its support. Also applied to the supporting material itself.

Fracture – To break or split. A partial or total separation of parts of a continuous solid body under the action of force.

Framed Bent – A bent consisting of a sill, posts, and a cap in contrast to a bent that is a cap on driven piles.

Friction Pile – A pile in which the bearing capacity is mostly developed from the friction of the soil surrounding it.

Gage – The distance between the inside faces of both rail heads; 4’8 ½” for US Standard Gage.

Gear – A wheel having teeth on its periphery or face. A piece of mechanism for transmitting motion.

Girder – A primary beam or built-up member carrying loads to the bridge bearings or supports.

Girder Bridge – A bridge composed of plate or lattice girders.

Girt – Longitudinal brace on a timber bridge.

Grade – The degree of inclination from the horizontal, expressed usually in percentage.

Grade Crossing – A crossing where road and track are at the same elevation.

Grillage – Steel beams and other shapes riveted, bolted or welded together to provide a riser or platform to support bearings.

Grout – A mortar composed of sand, cement, and water of such liquid consistency that it can easily be poured.

Guard Timber – A timber or steel strap that is connected to both ends of open deck bridge ties in order to keep the ties evenly spaced. Also referred to as spacer timber or tie spacer.

Gusset Plate – A large connecting plate used at panel points to join the chord and the web members of a truss or bracing members.

Hammer Head Pier – A pier consisting of a relatively slender shaft flaring to a wide top to accommodate the bridge bearings.

Hangers – A hip-vertical or suspender of a truss acting in tension. Also, a tension member supporting a floor system in an arch or in a suspension bridge.

Hardpan – A very compact layer or bed of material under the track.

Headwall – Timber planking or precast concrete panels, attached to the back side of a dump bent or abutment that act as a retaining wall.

Heartwood – The oldest, central rings of any timber. Typically, preservative treatment will not penetrate the heartwood, making it susceptible to decay.

Hogjaw – A diagonal bracing strut from the bottom of one bent on a timber bridge to the top of an adjacent bent to provide longitudinal stability.

Hydration – The process of combining or impregnating with water, or the resulting condition.

I-Beam – A rolled structural shape having a cross-section resembling the letter "I."

I-Beam Bridge – A small bridge consisting of a floor supported on I-beams.

Ice Guard – A fender placed at the up-stream end of a bridge pier to divert the ice or else to break up the large floes into small pieces.

Ice-Breaker – A structure of masonry or timber (as a pier or a cluster of piles) for the protection of bridge piers against moving ice.

Impact Load – (1) A dynamic increment of load created by moving loads traversing a bridge. (2) A short duration, often high magnitude load, striking a portion of a structure. This can include flat train wheels, wheels moving over rail joints, vessel or vehicle strikes, etc.

Inner Guard-rails – Guard-rails placed between the running rails of a track.

Interlocking – Signal appliances that are interconnected so that each of their movements follows the other in a proper sequence.

Intermediate Floorbeam – Any floor-beam between the end floor beams.

Intermediate Sill – A horizontal member in the plane of a timber trestle bent between the elevations of a cap and sill, to which the posts are framed.

Intermediate Stiffener – Any one of the stiffeners on a plate girder between the end stiffeners.

Invert – The flow line of a sewer, culvert or tunnel.

Jacket – A layer of concrete placed over an existing pier or abutment surface to strengthen, stabilize, confine, or protect it.

Jetty – A structure of wood, stone, or other materials extending into a body of water and serving for a wharf or pier, or as a mole, rampart, or wall. Also used to restrain, charge, or direct a current, and to protect a harbor, shore, channel or the like.

Journal – That part of a shaft or axle which rests on the bearings.

Key-way – A slot cut in a shaft or hub of a gear or pulley to receive the key.

Knee Brace – A short diagonal brace, used to connect or stabilize members against buckling and out-of-plane bending.

Knife-edge – A sharp edge on corroded steel similar to that of a knife blade.

Lacing Bars – A system of bars not intersecting each other at the middle, used to connect two members of a strut in order to make them act as one member.

Lag Screw – A large-sized wood screw with a square head larger than the shank for convenient turning with a wrench, and having a special thread to increase the holding strength.

Lateral Bracing – A system of tension or compression members, or both, forming the web of a horizontal truss connecting the corresponding chords or flanges of the opposite trusses or girders of a span.

Lattice Bars – A system of bars crossing each other at mid-length, used to connect the two members of a strut in order to make them act as one member. Generally, the crossed bars are riveted together at their intersection.

Lattice Truss Bridge – A bridge having riveted trusses with multiple intersection web systems.

Leaves – The portions of a moving bridge which revolve.

Lift Bridge – A style of movable bridge which travels in a vertical plane, sometimes called a hoist bridge.

Line – The lateral, or side to side, tolerance of a section of track to its original survey. Also called “alignment,” and can be straight or curved.

Live Load – A moving load on a structure, such as a train.

Load – The weight carried by a beam, girder, truss, span, or structure of any sort, including its own weight.

Longitudinal Shear – A shear parallel to the longitudinal axis of a member.

Masonry – A general term applied to structures made of stone, brick, or concrete.

Masonry Joint – A joint between masonry stones that is filled with mortar.

Masonry Plate – A plate used under a bridge-shoe for the purpose of distributing the load on the masonry.

Mattress – A combination of willow pole and wire rope woven together, forming a mat which is placed on the bed or the bank of a stream to prevent scouring.

Mortar – A sand, cement, and water mixture used to fill the voids and transfer loads between stones or bricks in masonry structures.

Mud Line – The soil/water interface in a profile of a river crossing.

Mud Sill – Timber blocking resting on the earth, to support a framed bent.

Nose – A pointed or tapering projection on the upstream or downstream edge of a pier, may act as an ice-break.

Operator's House – A bridge-tender's house from which the operation of a movable span is controlled.

Out of Face – Usually in reference to track maintenance, it means work that is continuous rather than broken up. In bridges it is usually used regarding the track on the deck. For example, all the bridge ties can be replaced "*out of face*" rather than "spotting in" a few under the joints.

Overhead Bridge – A bridge which supports any transportation, occupation, or industrial process, active or not, over the railroad's track.

Overhead Crossing – See ***Overpass***.

Overpass – Any structure, regardless of length, which supports any transportation, occupation, or industrial process, active or not, over the railroad's track.

Packing Bolt – A bolt which holds together the several parts of a member, also called chord bolts.

Packing Diagram – The arrangement of eye-bars on a truss pin.

Panel – That portion of a truss between adjacent panel-points lying in the same chord.

Panel Length – The distance between two adjacent panel points in the same chord of a truss.

Panel-point – The point at which the axis of a principal web member intersects the axis of a chord of a truss.

Parapet – (1) A raised wall or curb at the periphery of bridge spans or abutments to retain ballast. (2) A wall-like step placed on bridge piers to accommodate different span depths.

Parting Line – The location over a bent or pier where two stringers butt up against each other end to end on a timber bridge.

Pedestal – A footing that raises a bearing above the bridge seat, typically of steel or concrete.

Pier – A structure composed of masonry, concrete, steel, timber, or a combination of same which is used to transmit the loads from a bridge superstructure to the foundation.

Pilaster – A thin, flat projection from the face of a wall made to resemble a column, for ornamental purposes.

Pile – A long, heavy post or pole of timber, concrete, or steel driven into the ground to carry a vertical load, resist a horizontal force or both. Some piles may be driven as hollow shells and later filled with concrete or grout.

Pile Bent – A bent having piles for supporting posts.

Pile Cluster – Several piles driven close together forming a group or cluster.

Pile Foundation – A foundation formed in soft soil by driving a group of piles to a depth which will give them the requisite capacity to carry the load.

Pile Pier – A pier formed by driving a cluster of piles and capping them in the form of a grillage to carry the shoes of the span.

Pile Trestle – A trestle having pile bents for supporting the stringers.

Pin Plate – A plate riveted to the outside of the end of a member where it connects to a pin to give additional strength and greater bearing on the pin.

Pin-connected Truss – A term applied to the method of joining the members of a truss by pins instead of using riveted connections.

Pinion – Any toothed gear of small size as compared with the gear which it engages.

Pivot Pier – The pier supporting a swing span and upon which it turns.

Plan – The general layout of a structure.

Plank – A piece of lumber thicker than a board; usually measures from two to four inches in thickness and from six inches upward in width.

Plate Girder – A girder built of structural plates and angles.

Plumb – Vertical.

Plumb Pile – A pile driven vertically, usually one of the inside piles of a bent.

Pony Truss – A low truss without any overhead bracing.

Portal Bracing – The combination of struts and ties in the plane of the end posts at a truss span portal which helps to transfer the wind pressure from the upper lateral system to the pier or abutment.

Post – A vertical, or nearly vertical, compression member.

Quarter Pile – A bent pile driven with some incline to the vertical, located between the interior plumb piles and the exterior batter piles. Also called a rail pile, it is often located below the rail.

Rack-circle – A rack bent into the form of a circle that is engaged by drive pinions on swing or turn spans.

Radial Strut – One of a series of struts radiating from a fixed point such as the radial braces of a turntable, or a swing-span drum.

Rail-lift – A device used on swing spans for lifting the ends of the rails, so as to clear obstructions on adjacent spans as draw is swung open.

Rail-lock – A device used on swing spans for locking the rails at the ends of the span after closing the draw.

Railroad Bridge – Any structure with a deck, regardless of length, which supports one or more railroad tracks, or any other undergrade structure with an individual span length of 10 feet or more located at such a depth that it is affected by live loads. (49 CFR §237.5)

Railroad Bridge Engineer –§ 237.5:
(a) A railroad bridge engineer shall be a person who is determined by the track owner to be competent to perform the following functions as they apply to the particular engineering work to be performed: (1) Determine the forces and stresses in railroad bridges and bridge components; (2) Prescribe safe loading conditions for railroad bridges; (3) Prescribe inspection and maintenance procedures for railroad bridges; and (4) Design repairs and modifications to railroad bridges.

(b) The educational qualifications of a railroad bridge engineer shall include either: (1) A degree in engineering granted by a school of engineering with at least one program accredited by ABET, Inc. or its successor organization as a professional engineering curriculum, or a degree from a program accredited as a professional engineering curriculum by a foreign organization recognized by ABET, Inc. or its successor; or (2) Current registration as a professional engineer.

(c) Nothing in this part affects the States' authority to regulate the professional practice of engineering.

Railroad Bridge Inspector – A person who is determined by the track owner to be technically competent to view, measure, report and record the condition of a railroad bridge and its individual components which that person is designated to inspect. An inspector shall be designated to authorize or restrict the operation of railroad traffic over a bridge according to its immediate condition or state of repair. (§237.55)

Railroad Bridge Supervisor – A person, regardless of position title, who is determined by the track owner to be technically competent to supervise the construction, modification or repair of a railroad bridge in conformance with common or particular specifications, plans and instructions applicable to the work to be performed, and to authorize or restrict the operation of railroad traffic over a bridge according to its immediate condition or state of repair. (§237.55)

Reaction – A passive force set up in opposition to an initial, active force, e.g., the upward pressure on the bottom of a beam resting on a support, equal in amount to the downward force from the loads on a beam.

Reinforced Concrete – Concrete in which steel bars are inserted to strengthen it, principally by resisting the tensile stresses induced by external forces.

Reinforcing Plate – An extra plate used to reinforce or strengthen a member.

Rest Pier – A pier which supports one of the ends of a draw span.

Retaining Wall – A wall built to sustain a lateral pressure, such as an earth thrust.

Return Wall – A retaining wall parallel with the track that extends outward from an abutment or headwall to contain the soil and ballast of an embankment. Also referred to as a "u-wall."

Revetment – A facing of wood, mattress, stone, or concrete placed to prevent erosion.

Rim Bearing Draw – A term applied to swing spans to indicate that the dead load is supported by a circular girder near the periphery of the pivot pier instead of near its axis.

Riprap – A facing of stone, concrete, or planks placed on the bank slope of a stream or around a pier to prevent erosion.

Riveted Truss – Any truss having its main members riveted together.

Rocker – A casting or built-up steel frame fastened to the end of a span or column to permit a slight rotation.

Rocker Bearing – A bearing, or support, for spans which permits a slight rocking with the changing position of the live load and with variations of temperature.

Roll Rack – A rack on which a pinion works.

Rolled Steel – Steel that has been cast into ingots and then passed through a succession of rolls until the desired final shape is obtained.

Roller – Any short, round bar under an object to facilitate its movement.

Roller Bearing – A shoe or plate resting on rollers which in turn rest on a base casting at the expansion end of the span.

Roller Nest – A group of rollers, enclosed in a suitable frame or box, which support a bridge shoe.

Rolling Lift Bridge – A bascule bridge in which the moving arm rolls on a plane or upon friction rollers.

Rolling Stock – Railroad cars and locomotives.

Sap Wood – The outer and lighter colored portion of a timber.

Sash Brace – A horizontal member secured to the posts or piles of a bent between the cap and sill.

Scour – The general or local vertical deepening in normal stream bed elevation. Scour often occurs around obstructions in a stream such as piers or abutments.

Seat Angle or Shelf Angle – A short angle fastened to a column or beam to temporarily support a beam during erection.

Secondary Member – A subordinate part of a bridge. Generally refers to the suspenders and sub-diagonals of trusses.

Section – A designated (named, numbered or both) group of one or more consecutive spans, usually of the same construction. A bridge may have one section or several. When crossing a river or highway with long spans, several more economical (shorter) ***approach spans*** may be employed, defined as a separate section.

Section Length – the distance between the centerlines of piers where sections meet, or to front face of backwall at an abutment or dump bent, measured along the centerlines of spans. The length of a single section bridge is the length of its section, which is the length between front faces of backwalls.

Shaft – A long, cylindrical bar capable of rotating and transmitting torque.

Shaft Coupling – Any of the several devices for joining the ends of two shafts.

Shakes – Splits or checks in timber which usually cause a separation of the wood between the annular rings.

Shale – A hard, clay-like formation having a closely laminated structure.

Shear – To slide one part of a body upon an adjacent part. The stress set up in opposition to a shearing action.

Sheave – A wheel with a grooved face for carrying a rope or cable.

Sheet Pile – A form of piling used to shut out water or retain earth, generally made of steel and arranged to secure a tongued and grooved effect when driven close together.

Shim – A small piece of wood, metal, or other material placed between two parts or members of a structure to bring them to a desired relative position.

Shoe – That part or detail of a bearing assembly which transfers the load from the end pin to the bearing plate or to the intervening rollers. Also, a point used on piles when driving them through hard ground.

Shop Drawing – A drawing of a structure or machine showing all parts and dimensions so that the shop can actually build what is indicated on the drawing without other information.

Silica – A dioxide of silicon (SiO2). It occurs in nature as quartz.

Sill – The lower horizontal member of a framed bent.

Skew Bridge – A bridge in which the ends of the bridge are not square or perpendicular to the centerline of the bridge.

Skew Crossing – Any crossing that is not perpendicular to the tracks.

Skin Friction – The friction between the outer surface of a pile or caisson and the surrounding materials.

Slab – A flat, relatively thin, mass of wood, stone, concrete, or metal.

Slope Wall – A thin wall of concrete or of flat stones laid upon the face of a sloping bank of earth to protect it from the erosive action of water.

Sole Plate – A plate riveted to the bottom flange of a plate girder to bear on the masonry plate.

Sounding – Measuring the depth of water.

Spacer Timber – See guard timber.

Spalling – A surface deterioration of concrete resulting from several factors including moisture damage, poor concrete, and reactive aggregates.

Span –A structure resting on supports such as abutments, bents, caps, columns, piers or walls to carry a load. *Also,* the distance between supports. (See ***Span Length***)

Span Length – The distance between the centerline of bearings. *Also,* the distance between the furthest ends of a span, usually referred to as the ***out-to-out span length,*** or the ***out-to-out*** of the span.

Spandrel – The space from abutment to abutment in an arch bridge extending from the top of the arch masonry to the top of the roadway.

Spider-rod – Steel rod that extends from the center casting of a rim bearing swing span through each individual roller to hold a constant distance or diameter from the center. Also called radial rods.

Splice Plate – A plate used in splicing or joining two parts of a member.

Spot In – Usually in reference to track maintenance, it means work that is selective to a few locations rather than continuous. In bridges it is usually used regarding the track on the deck. For example, ties were "spotted in" where defective rather than replaced "*out of face*" to conserve cost.

Spring Line – The line connecting the two opposite points where the curve of an arch begins.

Starling – A cutwater; the projecting end of a bridge-pier, usually so shaped as to allow ice, drift, etc., to strike it without damage.

Stiffener – A secondary member, usually an angle, attached to a plate to prevent buckling.

Stone Masonry – A masonry structure constructed with stone.

Strain – The deformation per unit length caused by an external force applied to any piece of material or to any bridge member.

Strand – One of the small threads or wires used in making rope.

Stress – An internal distributed force per unit area that resists the change in shape and size of a body subjected to external forces.

Stringer – A longitudinal member extending from panel to panel of a bridge and supporting the ties or the flooring.

Stringer Bracing – Diagonal bracing in the plane of the upper flanges of the stringers.

Strut – A bridge member carrying compression.

Sub-diagonal – A secondary member connecting the mid-point of a main diagonal with an adjacent panel point.

Substructure –The part of any construction which supports the superstructure, such as piers and abutments.

Superstructure – The part of a structure which receives the live load directly and carries the load to the substructure.

Surcharge – The earth that lies both above and behind a retaining wall.

Surface – The vertical alignment of a section of track relative to its original survey.

Sway Bracing – (1) Bracing transverse to the planes of the trusses; used to resist wind pressure and to prevent undue vibration. (2) Cross bracing in the plane of timber pile or frame bents.

Swing Bridge – A span that rotates about a vertical axis, to provide openings for the passage of vessels.

T-beam – A reinforced concrete beam or a rolled structural section having a cross-section resembling the letter "T."

Tangent – (1) The straight part of a railroad track. (2) A straight line touching a curve at only one point.

Tension – The state or condition of being stretched.

Through Bridge – A bridge where a significant portion of the structure is above track level.

Through Girder – A type of structure where the support girders project above track level outside of the tracks.

Through Plate Girder Span – A through span fabricated from steel plates and angles riveted, bolted, or welded together where the sides of the girders come up above track level.

Through Truss – A truss that projects above track level and is braced across the top.

Tie Bolt – A round bolt with a square shank and lip for hooking ties to the flange of stringers.

Tie Spacer – A timber or steel strap that is connected to both ends of open deck bridge ties in order to keep the ties evenly spaced. Also called a guard timber or spacer timber.

Toe – The foot of a slope. The front part of the base of an abutment or retaining wall.

Top Lateral Bracing – Lateral bracing in the plane of the top truss chords or beam/girder flanges.

Torque – The moment of a force or a system of forces tending to produce rotation.

Torsion – The twist or deformation of a body set up by a torque.

Tower – A vertical structure consisting of two or more bents of framework connected by bracing.

Tower Bracing – Bracing attached to the posts of a tower. Tower bracing is usually parallel to the track, whereas sway bracing is transverse to the track. In a timber bridge, tower bracing extends from bent to bent.

Tower Post – A member of a tower which carries load directly to the pedestal. A tower column.

Track Gage – The distance between the balls of the rails. (See Gage) Also, the tool or device for measuring or setting that distance.

Track Owner – A person responsible for compliance in accordance with § 237.3 (49 CFR §237.5) *Comment:* The track owner may be a railroad, museum, public agency, or other private company. If a bridge carries tracks owned by two or more owners, then the track owners can choose to make an assignment of responsibility for compliance with this part.

Traction Bracing – Bracing in the plane of the bottom laterals which transfers the thrust of a braking or accelerating train from the stringers to the trusses.

Transverse Beam – Any beam of a bridge that passes from one truss or girder to an adjacent truss or girder.

Tread Plate – The bearing surface over which a wheel or roller moves.

Trestle – A bridge structure composed of bents or towers and supporting stringers or girders, which may include a floor system.

Truss – A framed or jointed structure designed to act as a beam while each of its members is primarily subjected to tension or compression stresses only.

Truss Pin – A pin used at the panel point of a truss to connect the several intersecting members.

Tunnel – A passageway through earth, soil rock or water.

Turntable – A movable bridge for rotating rolling stock and aligning with tracks around its perimeter. *Less common:* The framework under a swing span which transmits the load to the bearings.

Underpass – Any structure supporting the railroad's track over any transportation, occupation, or industrial process, active or not.

Unique Bridge Identifier (UBI) – the unique alphanumeric designation assigned to a bridge, such that it cannot be confused with any other bridge or structure.

Unique Bridge Electronic Identifier (UBEI) – the unique integer assigned to a bridge within the *Bridge Database*. Used as an index within a database, visible on some records and reports, having no function otherwise, not to be confused with the unique bridge identifier.

Unsupported Length – The length of a compression member between the nearest points of lateral restraint.

U-Wall – See "return wall."

Viaduct – An extended bridge of many spans, mainly over dry ground. Usually consists of alternate towers and open spaces or bays.

Wale – A flat piece of timber laid horizontally for bracing upright timbers and for guiding them during driving, as in sheet piling.

Water Line – The intersection of the free surface of a body of water with any surface or object.

Web Plate – The plate forming the part of a girder between the top and bottom flanges.

Weep-hole – A hole in a wall for draining the water that tends to accumulate at the back.

Wind Loads – A load on a structure and train due to the pressure of the wind.

Wing Wall – A retaining wall that extends outward from an abutment or headwall to contain the soil and ballast of an embankment. A wing wall may extend in line with the backwall (transverse to the track) or at an angle. A wing wall at right angles with the headwall (parallel with the track) is typically referred to as a "return wall" or "u-wall."

Wire Rope – A rope made of small strands of twisted wire often with a cotton or hemp center.

Worm – A helix or helical gear on a shaft which meshes into the worm gear.

Wrought Iron – In its perfect condition, wrought iron is simply pure iron, but, owing to impurities (to a certain degree) being present, it only approximates to that condition.

sufficient to provide confidence that all unaudited modules were developed in compliance with railroad, vendor, supplier, industry, national, or international standards

(h) The reviewer shall evaluate and comment on the plan for installation and test procedures of the PTC system for revenue service.

(i) The reviewer shall prepare a final report of the assessment. The report shall be submitted to the railroad prior to the commencement of installation testing and contain at least the following information:

(1) Reviewer's evaluation of the adequacy of the PSP or PTCSP including the supplier's MTTHE and risk estimates for the PTC system, and the supplier's confidence interval in these estimates;

(2) PTC system vulnerabilities, potentially hazardous failure modes, or potentially hazardous operating circumstances which the reviewer felt were not adequately identified, tracked or mitigated;

(3) A clear statement of position for all parties involved for each PTC system vulnerability cited by the reviewer;

(4) Identification of any documentation or information sought by the reviewer that was denied, incomplete, or inadequate;

(5) A listing of each applicable vendor, supplier, industry, national or international standard, process, or procedure which was not properly followed;

(6) Identification of the hardware and software verification and validation procedures for the PTC system's safety-critical applications, and the reviewer's evaluation of the adequacy of these procedures;

(7) Methods employed by PTC system manufacturer to develop safety-critical software; and

(8) If directed by FRA, methods employed by PTC system manufacturer to develop safety-critical hardware.

[75 FR 2721, Jan. 15, 2010]

PART 237—BRIDGE SAFETY STANDARDS

Subpart A—General

Subpart B—Railroad Bridge Safety Assurance

Subpart C—Qualifications and Designations of Responsible Persons

Subpart D—Capacity of Bridges

Subpart E—Bridge Inspection

Subpart F—Repair and Modification of Bridges

Subpart G—Documentation, Records, and Audits of Bridge Management Programs

AUTHORITY: 49 U.S.C. 20102–20114; 28 U.S.C. 2461 note; Div. A, Sec. 417, Pub. L. 110–432, 122 Stat. 4848; and 49 CFR 1.89.

SOURCE: 75 FR 41302, July 15, 2010, unless otherwise noted.

Subpart A—General

§ 237.1 Application.

(a) Except as provided in paragraphs (b) or (c) of this section, this part applies to all owners of railroad track with a gage of two feet or more and which is supported by a bridge.

(b) This part does not apply to bridges on track used exclusively for rapid transit operations in an urban area that are not connected with the general railroad system of transportation.

(c) This part does not apply to bridges located within an installation which is not part of the general railroad system of transportation and over

which trains are not operated by a railroad.

§ 237.3 Responsibility for compliance.

(a) Except as provided in paragraph (b) of this section, an owner of track to which this part applies is responsible for compliance.

(b) If an owner of track to which this part applies assigns responsibility for the bridges that carry the track to another person (by lease or otherwise), written notification of the assignment shall be provided to the appropriate FRA Regional Office at least 30 days in advance of the assignment. The notification may be made by any party to that assignment, but shall be in writing and include the following—

(1) The name and address of the track owner;

(2) The name and address of the person to whom responsibility is assigned (assignee);

(3) A statement of the exact relationship between the track owner and the assignee;

(4) A precise identification of the track segment and the individual bridges in the assignment;

(5) A statement as to the competence and ability of the assignee to carry out the bridge safety duties of the track owner under this part; and

(6) A statement signed by the assignee acknowledging the assignment to him of responsibility for purposes of compliance with this part.

(c) The Administrator may hold the track owner or the assignee, or both, responsible for compliance with this part and subject to penalties under § 237.7.

(d) A common carrier by railroad which is directed by the Surface Transportation Board to provide service over the track of another railroad under 49 U.S.C. 11123 is considered the owner of that track for the purposes of the application of this part during the period the directed service order remains in effect.

(e) When any person, including a contractor for a railroad or track owner, performs any function required by this part, that person is required to perform that function in accordance with this part.

(f) Where an owner of track to which this part applies has previously assigned responsibility for a segment of track to another person as prescribed in 49 CFR 213.5(c), additional notification to FRA is not required.

(g) FRA reserves the right to reject an assignment of responsibility under § 237.3(b) for cause shown.

§ 237.5 Definitions.

For the purposes of this part—

Bridge modification means a change to the configuration of a railroad bridge that affects the load capacity of the bridge.

Bridge repair means remediation of damage or deterioration which has affected the structural integrity of a railroad bridge.

Railroad bridge means any structure with a deck, regardless of length, which supports one or more railroad tracks, or any other undergrade structure with an individual span length of 10 feet or more located at such a depth that it is affected by live loads.

Track owner means a person responsible for compliance in accordance with § 237.3.

§ 237.7 Penalties.

(a) Any person who violates any requirement of this part or causes the violation of any such requirement is subject to a civil penalty of at least $976 and not more than $31,928 per violation, except that: Penalties may be assessed against individuals only for willful violations, and, where a grossly negligent violation or a pattern of repeated violations has created an imminent hazard of death or injury to persons, or has caused death or injury, a penalty not to exceed $127,712 per violation may be assessed. ''Person'' means an entity of any type covered under 1 U.S.C. 1, including but not limited to the following: A railroad; a manager, supervisor, official, or other employee or agent of a railroad; any owner, manufacturer, lessor, or lessee of railroad equipment, track, or facilities; any independent contractor providing goods or services to a railroad; any employee of such owner, manufacturer,

lessor, lessee, or independent contractor; and anyone held by the Administrator of the Federal Railroad Administration to be responsible under §237.3(d). Each day a violation continues shall constitute a separate offense. See FRA's website at *www.fra.dot.gov* for a statement of agency civil penalty policy.

(b) Any person who knowingly and willfully falsifies a record or report required by this part may be subject to criminal penalties under 49 U.S.C. 21311.

[75 FR 41302, July 15, 2010, as amended at 77 FR 24422, Apr. 24, 2012; 81 FR 43112, July 1, 2016; 82 FR 16134, Apr. 3, 2017; 83 FR 60749, Nov. 27, 2018; 84 FR 23736, May 23, 2019; 84 FR 37075, July 31, 2019; 86 FR 1759, Jan. 11, 2021; 86 FR 23255, May 3, 2021; 87 FR 15869, Mar. 21, 2022]

§237.9 Waivers.

(a) Any person subject to a requirement of this part may petition the Administrator for a waiver of compliance with such requirement. The filing of such a petition does not affect that person's responsibility for compliance with that requirement while the petition is being considered.

(b) Each petition for waiver must be filed in the manner and contain the information required by part 211 of this chapter.

(c) If the Administrator finds that a waiver of compliance is in the public interest and is consistent with railroad safety, the Administrator may grant the waiver subject to any conditions the Administrator deems necessary. If a waiver is granted, the Administrator publishes a notice in the FEDERAL REGISTER containing the reasons for granting the waiver.

Subpart B—Railroad Bridge Safety Assurance

§237.31 Adoption of bridge management programs.

Each track owner shall adopt a bridge safety management program to prevent the deterioration of railroad bridges by preserving their capability to safely carry the traffic to be operated over them, and reduce the risk of human casualties, environmental damage, and disruption to the Nation's railroad transportation system that would result from a catastrophic bridge failure, not later than the dates in the following schedule:

(a) March 14, 2011: Class I carriers;

(b) March 14, 2011: Owners of track segments which are part of the general railroad system of transportation and which carry more than ten scheduled passenger trains per week;

(c) September 13, 2011: Class II carriers to which paragraph (b) of this section does not apply; and

(d) September 13, 2012: All other track owners subject to this part and not described paragraphs (a) through (c) of this section.

§237.33 Content of bridge management programs.

Each bridge management program adopted in compliance with this part shall include, as a minimum, the following:

(a) An accurate inventory of railroad bridges, which shall include a unique identifier for each bridge, its location, configuration, type of construction, number of spans, span lengths, and all other information necessary to provide for the management of bridge safety;

(b) A record of the safe load capacity of each bridge;

(c) A provision to obtain and maintain the design documents of each bridge if available, and to document all repairs, modifications, and inspections of each bridge; and

(d) A bridge inspection program covering as a minimum:

(1) Inspection personnel safety considerations;

(2) Types of inspection including required detail;

(3) Definitions of defect levels along with associated condition codes if condition codes are used;

(4) The method of documenting inspections including standard forms or formats;

(5) Structure type and component nomenclature; and

(6) Numbering or identification protocol for substructure units, spans, and individual components.

Subpart C—Qualifications and Designations of Responsible Persons

§ 237.51 Railroad bridge engineers.

(a) A railroad bridge engineer shall be a person who is determined by the track owner to be competent to perform the following functions as they apply to the particular engineering work to be performed:

(1) Determine the forces and stresses in railroad bridges and bridge components;

(2) Prescribe safe loading conditions for railroad bridges;

(3) Prescribe inspection and maintenance procedures for railroad bridges; and

(4) Design repairs and modifications to railroad bridges.

(b) The educational qualifications of a railroad bridge engineer shall include either:

(1) A degree in engineering granted by a school of engineering with at least one program accredited by ABET, Inc. or its successor organization as a professional engineering curriculum, or a degree from a program accredited as a professional engineering curriculum by a foreign organization recognized by ABET, Inc. or its successor; or

(2) Current registration as a professional engineer.

(c) Nothing in this part affects the States' authority to regulate the professional practice of engineering.

§ 237.53 Railroad bridge inspectors.

A railroad bridge inspector shall be a person who is determined by the track owner to be technically competent to view, measure, report and record the condition of a railroad bridge and its individual components which that person is designated to inspect. An inspector shall be designated to authorize or restrict the operation of railroad traffic over a bridge according to its immediate condition or state of repair.

§ 237.55 Railroad bridge supervisors.

A railroad bridge supervisor shall be a person, regardless of position title, who is determined by the track owner to be technically competent to supervise the construction, modification or repair of a railroad bridge in conformance with common or particular specifications, plans and instructions applicable to the work to be performed, and to authorize or restrict the operation of railroad traffic over a bridge according to its immediate condition or state of repair.

§ 237.57 Designations of individuals.

Each track owner shall designate those individuals qualified as railroad bridge engineers, railroad bridge inspectors and railroad bridge supervisors. Each individual designation shall include the basis for the designation in effect and shall be recorded.

Subpart D—Capacity of Bridges

§ 237.71 Determination of bridge load capacities.

(a) Each track owner shall determine the load capacity of each of its railroad bridges. The load capacity need not be the ultimate or maximum load capacity, but must be a safe load capacity.

(b) The load capacity of each bridge shall be documented in the track owner's bridge management program, together with the method by which the capacity was determined.

(c) The determination of load capacity shall be made by a railroad bridge engineer using appropriate engineering methods and standards that are particularly applicable to railroad bridges.

(d) Bridge load capacity may be determined from existing design and modification records of a bridge, provided that the bridge substantially conforms to its recorded configuration. Otherwise, the load capacity of a bridge shall be determined by measurement and calculation of the properties of its individual components, or other methods as determined by a railroad bridge engineer.

(e) If a track owner has a group of bridges for which the load capacity has not already been determined, the owner shall schedule the evaluation of those bridges according to their relative priority, as established by a railroad bridge engineer. The initial determination of load capacity shall be completed not later than five years following the required date for adoption

of the track owner's bridge management program in conformance with § 237.31.

(f) Where a bridge inspection reveals that, in the determination of the railroad bridge engineer, the condition of a bridge or a bridge component might adversely affect the ability of the bridge to carry the traffic being operated, a new capacity shall be determined.

(g) Bridge load capacity may be expressed in terms of numerical values related to a standard system of bridge loads, but shall in any case be stated in terms of weight and length of individual or combined cars and locomotives, for the use of transportation personnel.

(h) Bridge load capacity may be expressed in terms of both normal and maximum load conditions. Operation of equipment that produces forces greater than the normal capacity shall be subject to any restrictions or conditions that may be prescribed by a railroad bridge engineer.

§ 237.73 Protection of bridges from over-weight and over-dimension loads.

(a) Each track owner shall issue instructions to the personnel who are responsible for the configuration and operation of trains over its bridges to prevent the operation of cars, locomotives and other equipment that would exceed the capacity or dimensions of its bridges.

(b) The instructions regarding weight shall be expressed in terms of maximum equipment weights, and either minimum equipment lengths or axle spacing.

(c) The instructions regarding dimensions shall be expressed in terms of feet and inches of cross section and equipment length, in conformance with common railroad industry practice for reporting dimensions of exceptional equipment in interchange in which height above top-of-rail is shown for each cross section measurement, followed by the width of the car of the shipment at that height.

(d) The instructions may apply to individual structures, or to a defined line segment or group(s) of line segments where the published capacities and dimensions are within the limits of all structures on the subject line segments.

Subpart E—Bridge Inspection

§ 237.101 Scheduling of bridge inspections.

(a) Each bridge management program shall include a provision for scheduling an inspection for each bridge in railroad service at least once in each calendar year, with not more than 540 days between any successive inspections.

(b) A bridge shall be inspected more frequently than provided for in the bridge management program when a railroad bridge engineer determines that such inspection frequency is necessary considering conditions noted on prior inspections, the type and configuration of the bridge, and the weight and frequency of traffic carried on the bridge.

(c) Each bridge management program shall define requirements for the special inspection of a bridge to be performed whenever the bridge is involved in an event which might have compromised the integrity of the bridge, including but not limited to a flood, fire, earthquake, derailment or vehicular or vessel impact.

(d) Any railroad bridge that has not been in railroad service and has not been inspected in accordance with this section within the previous 540 days shall be inspected and the inspection report reviewed by a railroad bridge engineer prior to the resumption of railroad service.

§ 237.103 Bridge inspection procedures.

(a) Each bridge management program shall specify the procedure to be used for inspection of individual bridges or classes and types of bridges.

(b) The bridge inspection procedures shall be as specified by a railroad bridge engineer who is designated as responsible for the conduct and review of the inspections. The inspection procedures shall incorporate the methods, means of access, and level of detail to be recorded for the various components of that bridge or class of bridges.

(c) The bridge inspection procedures shall ensure that the level of detail and

the inspection procedures are appropriate to: the configuration of the bridge; conditions found during previous inspections; the nature of the railroad traffic moved over the bridge (including equipment weights, train frequency and length, levels of passenger and hazardous materials traffic); and vulnerability of the bridge to damage.

(d) The bridge inspection procedures shall be designed to detect, report and protect deterioration and deficiencies before they present a hazard to safe train operation.

§ 237.105 Special inspections.

(a) Each bridge management program shall prescribe a procedure for protection of train operations and for inspection of any bridge that might have been damaged by a natural or accidental event, including but not limited to a flood, fire, earthquake, derailment or vehicular or vessel impact.

(b) Each bridge management program shall provide for the detection of scour or deterioration of bridge components that are submerged, or that are subject to water flow.

§ 237.107 Conduct of bridge inspections.

Bridge inspections shall be conducted under the direct supervision of a designated railroad bridge inspector, who shall be responsible for the accuracy of the results and the conformity of the inspection to the bridge management program.

§ 237.109 Bridge inspection records.

(a) Each track owner to which this part applies shall keep a record of each inspection required to be performed on those bridges under this part.

(b) Each record of an inspection under the bridge management program prescribed in this part shall be prepared from notes taken on the day(s) the inspection is made, supplemented with sketches and photographs as needed. Such record will be dated with the date(s) the physical inspection takes place and the date the record is created, and it will be signed or otherwise certified by the person making the inspection.

(c) Each bridge management program shall specify that every bridge inspection report shall include, as a minimum, the following information:

(1) A precise identification of the bridge inspected;

(2) The date on which the physical inspection was completed;

(3) The identification and written or electronic signature of the inspector;

(4) The type of inspection performed, in conformance with the definitions of inspection types in the bridge management program;

(5) An indication on the report as to whether any item noted thereon requires expedited or critical review by a railroad bridge engineer, and any restrictions placed at the time of the inspection;

(6) The condition of components inspected, which may be in a condition reporting format prescribed in the bridge management program, together with any narrative descriptions necessary for the correct interpretation of the report; and

(7) When an inspection does not encompass the entire bridge, the portions of the bridge which were inspected shall be identified in the report.

(d) An initial report of each bridge inspection shall be placed in the location designated in the bridge management program within 30 calendar days of the completion of the inspection unless the complete inspection report is filed first. The initial report shall include the information required by paragraphs (c)(1) through (c)(5) of this section.

(e) A complete report of each bridge inspection, including as a minimum the information required in paragraphs (c)(1) through (c)(6) of this section, shall be placed in the location designated in the bridge management program within 120 calendar days of the completion of the inspection.

(f) Each bridge inspection program shall specify the retention period and location for bridge inspection records. The retention period shall be no less than two years following the completion of the inspection. Records of underwater inspections shall be retained until the completion and review of the next underwater inspection of the bridge.

(g) If a bridge inspector, supervisor, or engineer discovers a deficient condition on a bridge that affects the immediate safety of train operations, that person shall report the condition as promptly as possible to the person who controls the operation of trains on the bridge in order to protect the safety of train operations.

§ 237.111 Review of bridge inspection reports.

Bridge inspection reports shall be reviewed by railroad bridge supervisors and railroad bridge engineers to:

(a) Determine whether inspections have been performed in accordance with the prescribed schedule and specified procedures;

(b) Evaluate whether any items on the report represent a present or potential hazard to safety;

(c) Prescribe any modifications to the inspection procedures or frequency for that particular bridge;

(d) Schedule any repairs or modifications to the bridge required to maintain its structural integrity; and

(e) Determine the need for further higher-level review.

Subpart F—Repair and Modification of Bridges

§ 237.131 Design.

Each repair or modification which materially modifies the capacity of a bridge or the stresses in any primary load-carrying component of a bridge shall be designed by a railroad bridge engineer. The design shall specify the manner in which railroad traffic or other live loads may be permitted on the bridge while it is being modified or repaired. Designs and procedures for repair or modification of bridges of a common configuration, such as timber trestles, or instructions for in-kind replacement of bridge components, may be issued as a common standard. Where the common standard addresses procedures and methods that could materially modify the capacity of a bridge or the stresses in any primary load-carrying component of a bridge, the standard shall be designed and issued by a qualified railroad bridge engineer.

§ 237.133 Supervision of repairs and modifications.

Each repair or modification pursuant to this part shall be performed under the immediate supervision of a railroad bridge supervisor as defined in § 237.55 of this part who is designated and authorized by the track owner to supervise the particular work to be performed. The railroad bridge supervisor shall ensure that railroad traffic or other live loads permitted on the bridge under repair or modification are in conformity with the specifications in the design.

Subpart G—Documentation, Records, and Audits of Bridge Management Programs

§ 237.151 Audits; general.

Each program adopted to comply with this part shall include provisions for auditing the effectiveness of the several provisions of that program, including the validity of bridge inspection reports and bridge inventory data, and the correct application of movement restrictions to railroad equipment of exceptional weight or configuration.

§ 237.153 Audits of inspections.

(a) Each bridge management program shall incorporate provisions for an internal audit to determine whether the inspection provisions of the program are being followed, and whether the program itself is effectively providing for the continued safety of the subject bridges.

(b) The inspection audit shall include an evaluation of a representative sampling of bridge inspection reports at the bridges noted on the reports to determine whether the reports accurately describe the condition of the bridge.

§ 237.155 Documents and records.

Each track owner required to implement a bridge management program and keep records under this part shall make those program documents and records available for inspection and reproduction by the Federal Railroad Administration.

(a) *Electronic recordkeeping; general.* For purposes of compliance with the

recordkeeping requirements of this part, a track owner may create and maintain any of the records required by this part through electronic transmission, storage, and retrieval provided that all of the following conditions are met:

(1) The system used to generate the electronic record meets all requirements of this subpart;

(2) The electronically generated record contains the information required by this part;

(3) The track owner monitors its electronic records database through sufficient number of monitoring indicators to ensure a high degree of accuracy of these records;

(4) The track owner shall train its employees who use the system on the proper use of the electronic recordkeeping system; and

(5) The track owner maintains an information technology security program adequate to ensure the integrity of the system, including the prevention of unauthorized access to the program logic or individual records.

(b) *System security*. The integrity of the bridge inspection records must be protected by a security system that incorporates a user identity and password, or a comparable method, to establish appropriate levels of program and record data access meeting all of the following standards:

(1) No two individuals have the same electronic identity;

(2) A record cannot be deleted or altered by any individual after the record is certified by the employee who created the record;

(3) Any amendment to a record is either—

(i) Electronically stored apart from the record that it amends; or

(ii) Electronically attached to the record as information without changing the original record;

(4) Each amendment to a record uniquely identifies the person making the amendment; and

(5) The electronic system provides for the maintenance of inspection records as originally submitted without corruption or loss of data.

APPENDIX A TO PART 237—SUPPLEMENTAL STATEMENT OF AGENCY POLICY ON THE SAFETY OF RAILROAD BRIDGES

A Statement of Agency Policy on the Safety of Railroad Bridges was originally published by FRA in 2000 as Appendix C of the Federal Track Safety Standards, 49 CFR Part 213. With the promulgation of 49 CFR Part 237, Bridge Safety Standards, many of the non-regulatory provisions in that Policy Statement have been incorporated into the bridge safety standards in this part.

However, FRA has determined that other non-regulatory items are still useful as information and guidance for track owners. Those provisions of the Policy Statement are therefore retained and placed in this Appendix in lieu of their former location in the Track Safety Standards.

GENERAL

1. The structural integrity of bridges that carry railroad tracks is important to the safety of railroad employees and to the public. The responsibility for the safety of railroad bridges is specified in §237.3, ''Responsibility for compliance.''

2. The capacity of a bridge to safely support its traffic can be determined only by intelligent application of engineering principles and the law of physics. Track owners should use those principles to assess the integrity of railroad bridges.

3. The long term ability of a structure to perform its function is an economic issue beyond the intent of this policy. In assessing a bridge's structural condition, FRA focuses on the present safety of the structure, rather than its appearance or long term usefulness.

4. FRA inspectors conduct regular evaluations of railroad bridge inspection and management practices. The objective of these evaluations is to document the practices of the evaluated railroad, to disclose any program weaknesses that could affect the safety of the public or railroad employees, and to assure compliance with the terms of this regulation. If the evaluation discloses problems, FRA seeks a cooperative resolution. If safety is jeopardized by a track owner's failure to resolve a bridge problem, FRA will use appropriate measures, including assessing civil penalties and issuance of emergency orders, to protect the safety of railroad employees and the public.

5. This policy statement addresses the integrity of bridges that carry railroad tracks. It does not address the integrity of other types of structures on railroad property (i.e., tunnels, highway bridges over railroads, or other structures on or over the right-of-way).

6. The guidelines published in this statement are advisory. They do not have the

force of regulations or orders, which FRA may enforce using civil penalties or other means. The guidelines supplement the requirements of part 237 and are retained for information and guidance.

GUIDELINES

1. *Responsibility for safety of railroad bridges.*

(a) The responsibility for the safety of railroad bridges is specified in §237.3.

(b) The track owner should maintain current information regarding loads that may be operated over the bridge, either from its own engineering evaluations or as provided by a competent engineer representing the track owner. Information on permissible loads may be communicated by the track owner either in terms of specific car and locomotive configurations and weights, or as values representing a standard railroad bridge rating reference system. The most common standard bridge rating reference system incorporated in the Manual for Railway Engineering of the American Railway Engineering and Maintenance-of-Way Association is the dimensional and proportional load configuration devised by Theodore Cooper. Other reference systems may be used where convenient, provided their effects can be defined in terms of shear, bending and pier reactions as necessary for a comprehensive evaluation and statement of the capacity of a bridge.

(c) The owner of the track on a bridge should advise other railroads operating on that track of the maximum loads permitted on the bridge stated in terms of car and locomotive configurations and weights. No railroad should operate a load which exceeds those limits without specific authority from, and in accordance with restrictions placed by, the track owner.

2. *Capacity of railroad bridges.*

(a) The safe capacity of bridges should be determined pursuant to §237.71.

(b) Proper analysis of a bridge requires knowledge of the actual dimensions, materials and properties of the structural members of the bridge, their condition, and the stresses imposed in those members by the service loads.

(c) The factors which were used for the design of a bridge can generally be used to determine and rate the load capacity of a bridge provided:

(i) The condition of the bridge has not changed significantly; and

(ii) The stresses resulting from the service loads can be correlated to the stresses for which the bridge was designed or rated.

3. *Railroad bridge loads.*

(a) Control of loads is governed by §237.73.

(b) Authority for exceptions. Equipment exceeding the nominal weight restriction on a bridge should be operated only under conditions determined by a competent railroad bridge engineer who has properly analyzed the stresses resulting from the proposed loads and has determined that the proposed operation can be conducted safely without damaging the bridge.

(c) Operating conditions. Operating conditions for exceptional loads may include speed restrictions, restriction of traffic from adjacent multiple tracks, and weight limitations on adjacent cars in the same train.

4. *Railroad bridge records.*

(a) The organization responsible for the safety of a bridge should keep design, construction, maintenance and repair records readily accessible to permit the determination of safe loads. Having design or rating drawings and calculations that conform to the actual structure greatly simplifies the process of making accurate determinations of safe bridge loads. This provision is governed by §237.33.

(b) Organizations acquiring railroad property should obtain original or usable copies of all bridge records and drawings, and protect or maintain knowledge of the location of the original records.

5. *Specifications for design and rating of railroad bridges.*

(a) The recommended specifications for the design and rating of bridges are those found in the Manual for Railway Engineering published by the American Railway Engineering and Maintenance-of-Way Association. These specifications incorporate recognized principles of structural design and analysis to provide for the safe and economic utilization of railroad bridges during their expected useful lives. These specifications are continually reviewed and revised by committees of competent engineers. Other specifications for design and rating, however, have been successfully used by some railroads and may continue to be suitable.

(b) A bridge can be rated for capacity according to current specifications regardless of the specification to which it was originally designed.

6. *Periodic inspections of railroad bridges.*

(a) Periodic bridge inspections by competent inspectors are necessary to determine whether a structure conforms to its design or rating condition and, if not, the degree of nonconformity. See §237.101. Section 237.101(a) calls for every railroad bridge to be inspected at least once in each calendar year. Deterioration or damage may occur during the course of a year regardless of the level of traffic that passes over a bridge. Inspections at more frequent intervals may be required by the nature or condition of a structure or intensive traffic levels.

7. *Underwater inspections of railroad bridges.*

(a) Inspections of bridges should include measuring and recording the condition of substructure support at locations subject to erosion from moving water.

(b) Stream beds often are not visible to the inspector. Indirect measurements by sounding, probing, or any other appropriate means are necessary in these cases. A series of records of these readings will provide the best information in the event unexpected changes suddenly occur. Where such indirect measurements do not provide the necessary assurance of foundation integrity, diving inspections should be performed as prescribed by a competent engineer.

8. *Seismic considerations.*

(a) Owners of bridges should be aware of the risks posed by earthquakes in the areas in which their bridges are located. Precautions should be taken to protect the safety of trains and the public following an earthquake.

(b) Contingency plans for seismic events should be prepared in advance, taking into account the potential for seismic activity in an area.

(c) The predicted attenuation of ground motion varies considerably within the United States. Local ground motion attenuation values and the magnitude of an earthquake both influence the extent of the area affected by an earthquake. Regions with low frequency of seismic events produce less data from which to predict attenuation factors. That uncertainty should be considered when designating the area in which precautions should be taken following the first notice of an earthquake. In fact, earthquakes in such regions might propagate their effects over much wider areas than earthquakes of the same magnitude occurring in regions with frequent seismic activity.

9. *Special inspections of railroad bridges.*

Requirements for special inspections of railroad bridges are found in §237.105.

10. *Railroad bridge inspection records.*

(a) The requirements for recording and reporting bridge inspections are found in §237.109.

(b) Information from bridge inspection reports should be incorporated into a bridge management program to ensure that exceptions on the reports are corrected or accounted for. A series of inspection reports prepared over time should be maintained so as to provide a valuable record of trends and rates of degradation of bridge components. The reports should be structured to promote comprehensive inspections and effective communication between an inspector and an engineer who performs an analysis of a bridge.

(c) An inspection report should be comprehensible to a competent person without interpretation by the reporting inspector.

11. *Railroad bridge inspectors and engineers.*

(a) Bridge inspections should be performed by technicians whose training and experience enable them to detect and record indications of distress on a bridge. Inspectors should provide accurate measurements and other information about the condition of the bridge in enough detail so that an engineer can make a proper evaluation of the safety of the bridge. Qualifications of personnel are addressed in subpart C to part 237.

(b) Accurate information about the condition of a bridge should be evaluated by an engineer who is competent to determine the capacity of the bridge. The inspector and the evaluator often are not the same individual; therefore, the quality of the bridge evaluation depends on the quality of the communication between them. Review of inspection reports is addressed in §237.111.

12. *Scheduling inspections.*

(a) A bridge management program should include a means to ensure that each bridge under the program is inspected at the frequency prescribed for that bridge by a competent engineer. Scheduling of bridge inspections is addressed in §237.101.

(b) Bridge inspections should be scheduled from an accurate bridge inventory list that includes the due date of the next inspection.

13. *Special considerations for railroad bridges.*

Railroad bridges differ from other types of bridges in the types of loads they carry, in their modes of failure and indications of distress, and in their construction details and components. Proper inspection and analysis of railroad bridges require familiarity with the loads, details and indications of distress that are unique to this class of structure. Particular care should be taken that modifications to railroad bridges, including retrofits for protection against the effects of earthquakes, are suitable for the structure to which they are to be applied. Modifications should not adversely affect the serviceability of neither the bridge nor its accessibility for periodic or special inspection.

14. *Railroad implementation of bridge safety programs.*

FRA recommends that each track owner or other entity which is responsible for the integrity of bridges which support its track should comply with the intent of this regulation by adopting and implementing an effective and comprehensive program to ensure the safety of its bridges. The bridge safety program should incorporate the following essential elements, applied according to the configuration of the railroad and its bridges. The basis of the program should be in one comprehensive and coherent document which is available to all railroad personnel and other persons who are responsible for the application of any portion of the program. The program should include:

(a) Clearly defined roles and responsibilities of all persons who are designated or authorized to make determinations regarding the integrity of the track owner's bridges. The designations may be made by position or by individual;

(b) Provisions for a complete inventory of bridges that carry the owner's track, to include the following information on each bridge:
(1) A unique identifier, such as milepost location and a subdivision code;
(2) The location of the bridge by nearest town or station, and geographic coordinates;
(3) The name of the geographic features crossed by the bridge;
(4) The number of tracks on the bridge;
(5) The number of spans in the bridge;
(6) The lengths of the spans;
(7) Types of construction of:
(i) Substructure;
(ii) Superstructure; and
(iii) Deck;
(8) Overall length of the bridge;
(9) Dates of:
(i) Construction;
(ii) Major renovation; and
(iii) Strengthening; and
(10) Identification of entities responsible for maintenance of the bridge or its different components.
(c) Known capacity of its bridges as determined by rating by competent railroad bridge engineer or by design documents;
(d) Procedures for the control of movement of high, wide or heavy loads exceeding the nominal capacity of bridges;
(e) Instructions for the maintenance of permanent records of design, construction, modification, and repair;
(f) Railroad-specific procedures and standards for design and rating of bridges;
(g) Detailed bridge inspection policy, including:
(1) Inspector qualifications; including:
(i) Bridge experience or appropriate educational training;
(ii) Training on bridge inspection procedures; and
(iii) Training on Railroad Workplace Safety; and
(2) Type and frequency of inspection; including:
(i) Periodic (at least annually);
(ii) Underwater;
(iii) Special;
(iv) Seismic; and
(v) Cursory inspections of overhead bridges that are not the responsibility of the railroad;
(3) Inspection schedule for each bridge;
(4) Documentation of inspections; including:
(i) Date;
(ii) Name of inspector;
(iii) Reporting Format; and
(iv) Coherence of information;
(5) Inspection Report Review Process;
(6) Record retention; and
(7) Tracking of critical deficiencies to resolution; and
(h) Provide for the protection of train operations following an inspection, noting a critical deficiency, repair, modification or adverse event and should include:
(1) A listing of qualifications of personnel permitted to authorize train operations following an adverse event; and
(2) Detailed internal program audit procedures to ensure compliance with the provisions of the program.

PART 238—PASSENGER EQUIPMENT SAFETY STANDARDS

Subpart A—General

Sec.

Subpart B—Safety Planning and General Requirements

Attach proposed changes here.