

Standards for Bridge Design, Construction, Inspection and Maintenance Northern Region

Standards for bridge design, construction, and inspection have been established by the American Association of State Highway and Transportation Officials (AASHTO). The Forest Service has adopted these standards, which apply to all bridges located on NFS lands, regardless of bridge ownership or road jurisdiction, to ensure public safety and resource protection.

Forest Service policy (FSM 7736) directs the agency to follow the requirements of the Federal Highway Safety Act of 1968, et seq., and direction provided via the National Bridge Inspection Standards (NBIS, 23 CFR Part 650) on National Forest System (NFS) roads open to public use. If a NFS road accesses an area under special use authorization, road jurisdiction lies with the Forest Service, and the Forest Service is responsible for NFS bridges.

Privately-owned bridges on authorized private (non-NFS) roads located on NFS land, but not open to general public use, are also subject to applicable federal, state and local standards for design, construction, inspection, maintenance and safety. Special use authorization holders are responsible for private bridges authorized on NFS land. The following regional standards have been developed specifically for bridges under special use authorization:

A. DESIGN

All bridge and approach roadway designs and calculations shall be:

1. Completed, signed and sealed by a Professional Engineer registered in the state of the bridge location.
2. Completed in accordance with the latest edition of AASHTO *Specifications for Highway Bridge Design*. At a minimum, the bridge design shall include appropriate approach roadways and site drainage, topographical site surveys, hydraulic and scour analysis, and geotechnical evaluation. Additional design criteria and guidance for bridge widths, approach roadways, and railing shall be in accordance with AASHTO *Guidelines for Geometric Design of Very Low-Volume Local Roads*.
3. Designed to meet AASHTO design loads.
4. Designed to accommodate a 100-year flood, with appropriate freeboard for debris, and to allow for passage of aquatic wildlife. At a minimum, abutments shall be located outside the bank-full stream channel and installed so as to minimize resource damage.
5. Designed to provide drainage away from the bridge and stream, incorporate appropriate other drainage features, such as sediment traps and cross drains, and provide at least a 50-foot filtration or buffer from the stream channel for roadway drainage to reduce the flow of sediment into the stream.
6. May use a curb-only or other railing system instead of a bridge rail and approach rail system as specified per AASHTO *Standard Specifications for Highway Bridge Design*. A design engineer must evaluate which system to use in terms of public safety and consistency with AASHTO *Guidelines for Geometric Design of Very Low-Volume Local Roads*.
7. Submitted to the Forest Service for review and approval.

B. CONSTRUCTION

The design engineer shall establish construction quality assurance measures. The design or construction engineer shall oversee implementation and documentation of implementation of these measures. Upon completion of construction, the design engineer shall inspect the bridge and certify, in writing, that the bridge was built in accordance with the approved plans and specifications. The authorization holder shall submit a copy of the documentation and certification to the Forest Service.

C. ROUTINE INSPECTIONS AND LOAD RATINGS

Bridges covered by a special use authorization shall meet the requirements of the National Bridge Inspection Standards (NBIS), 23 CFR Part 650.

1. Routine inspections shall be completed by an individual meeting the qualifications specified by the NBIS and in accordance with *AASHTO Manual for Condition Evaluation of Bridges*, as referenced in the NBIS.
2. All bridges shall have a load rating, completed by a professional engineer registered in the state where the bridge is located, which establishes the safe carrying capacity of the bridge in accordance with *AASHTO Manual for Condition Evaluation of Bridges*. The legal bridge load limits for various vehicles are:

Type 3 Truck - 25 tons

Type 3S2 Truck - 36 tons

Type 3-3 Truck - 40 tons

If the load rating of a bridge is less than the legal load limit, the holder shall post the load rating for the bridge in accordance with *AASHTO Manual for Condition Evaluation of Bridges* and the *Manual for Uniform Traffic Control Devices (MUTCD)*. Figure R12-5 below is an example of a MUTCD-compliant sign indicating a bridge with a load rating which is less than the legal load limit. The three vehicles illustrated on the sign below are typical legal load configurations used in load rating and posting.



R12-5

If a bridge has a load rating of less than three (3) tons, the holder of the authorization shall close the bridge to motor vehicle traffic, using MUTCD-compliant barricades posted with “Road Closed” signs.

3. In accordance with the NBIS, routine inspections shall be conducted every two (2) years. The interval may be extended to a maximum of four (4) years, if the bridge meets all the requirements of the Federal Highway Administration's Technical Advisory (TA) 5140.21. The following list taken from TA 5140.21 is intended as a guide for identifying classes of bridges that, in general, would not be eligible for routine inspection at intervals longer than two (2) years. This list may also be used to identify bridges that are candidates for routine inspection at intervals more frequent than every two (2) years.
 - (a) Bridges with any condition rating of five (5) or less.
 - (b) Bridges that have inventory ratings less than the state's legal load.
 - (c) Bridges with spans greater than 100 feet in length.
 - (d) Bridges without load path redundancy.
 - (e) Bridges which are very susceptible to vehicular damage, e.g., bridges with a vertical over- or under-clearance of less than 14 feet, 0 inches, narrow through- or pony-trusses.
 - (f) Uncommon or unusual designs or designs with little performance history, such as segmental or cable-stayed designs.

In addition, the authorization holder shall arrange for bridge inspection(s) following an event or occurrence that has damaged or potentially damaged the bridge(s). The holder shall immediately report the results of such inspection(s) to the Forest Service.

4. The authorization holder shall maintain a bridge inspection file for each authorized bridge. The holder shall make the bridge inspection file(s) available to the Forest Service upon request. At a minimum, the bridge inspection file(s) shall include the following:
 - (a) A current inspection report.
 - (b) Load rating calculations.
 - (c) Bridge design calculations and plans, if available.
 - (d) Photographs of the bridge, approaches, elevation, the channel upstream and downstream of the bridge, and any visible deficiencies in the bridge structure.

D. MAINTENANCE, REPAIR OR REPLACEMENT

The authorization holder shall provide a copy of any proposed bridge maintenance, repair and/or replacement plans to the authorized officer for review and approval. The holder and the authorized officer will then agree upon how and when the required repairs and/or maintenance or replacement work will be completed. For major maintenance, repair or replacement projects, the authorized officer may require the holder to develop a design, construction plans and abide by construction standards, as specified under B. Construction, above.

E. STRUCTURES OTHER THAN BRIDGES

A structure such as a large concrete box culvert, for which the top of the structure serves as the actual travel surface, shall be treated as a bridge for the purposes of design, construction, inspection and maintenance standards. Stream crossing structures other than bridges, such as large concrete box culverts or large bottomless arches and culverts, also must be designed by a professional engineer in accordance with applicable federal, state and local standards and requirements for bridges.

F. ADMINISTRATION OF SPECIAL USE ROAD AUTHORIZATIONS WITH BRIDGES

Special use authorization holders are responsible for maintaining authorized bridges located on private roads open only to authorized users. Special use authorization clause **R1-G1: Inspection of Bridges**, is mandatory for use in all private road authorizations that contain bridges, and applies specifically to privately-owned bridges on private roads authorized on NFS land. Also include WO clause G-1 if the private road (and bridge) is a secondary use, such as a road providing access to a communications site, where the communications use lease provides for the road access, and a separate road authorization is not necessary.

If more than one landowner or access proponent will use an access road and bridge, the authorized officer may require - as a condition of authorizing the requested access - that the landowners or other access proponents form a road user association so that a single special use authorization may be issued to the association. In such cases, a single cost recovery processing fee and annual use fee would be assessed from the association. Special use clause R1-G1 shall be included in the authorization. WO clause G-1 may also be included in the authorization, or in an attached operation and maintenance plan, if the access road and bridge are secondary to the primary use.

If all parties needing access are unable or refuse to form a road user association, the authorized officer may consider authorizing use of the road and bridge individually to each landowner or access proponent, however the authorized officer is under no obligation to provide individual access authorizations. If the authorized officer elects to issue individual special use access authorizations, such authorizations shall include clauses R1-G1, and may include WO clause G-1, if appropriate. The authorized officer should assess each individual authorization holder the full applicable cost recovery and annual use fees, and each individual would also be fully responsible for road and bridge inspection and maintenance to Forest Service and other applicable standards.

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