

Design Memorandum

TO: All Design Section Staff
FROM: Bijan Khaleghi
DATE: July 25, 2014
SUBJECT: Design Requirements for Temporary Bridges

This design memorandum defines WSDOT policy for design of temporary bridges. Temporary bridges are in service for 5 years or less. Any bridge that is expected to be in service for more than five years shall be designed using the requirements for permanent structures. These requirements apply to all temporary bridges regardless of the delivery contracting methods.

The approaches to the temporary bridge, including but not limited to, slopes, reinforced slopes, and retaining walls, shall be designed in accordance with the WSDOT Geotechnical Design Manual (M46-03).

Temporary bridges shall be designed in accordance with the requirements of the current edition of AASHTO LRFD Bridge Design Specifications, AASHTO Guide Specifications for LRFD Seismic Bridge Design, WSDOT Bridge Design Manual M 23-50, WSDOT Geotechnical Design Manual (M46-03), and as specified herein:

General Requirements:

1. Additional future overlay of 25 pounds per square foot need not be considered for temporary bridges.
2. Live loading of the temporary bridge may be reduced to 75 percent of HL-93, except the deck design which shall use 100% of the HL-93 loading.

Seismic Requirements:

1. The seismic design of temporary bridges shall be in accordance with the requirements of the current edition of AASHTO guide specifications for LRFD seismic bridge design, except the design response spectra shall be reduced by a factor not greater than 2.5.
2. The minimum support length provisions shall apply to all temporary bridges.
3. The Seismic Design Category (SDC) of the temporary bridge shall be obtained on the basis of the reduced/modified response spectrum except that a temporary bridge classified in SDC B, C, or D based on the unreduced spectrum cannot be reclassified to SDC A based on the reduced/modified spectrum.

Deck requirements:

1. Traffic barriers for temporary bridges shall be designed in accordance with the requirements of the current edition of AASHTO LRFD Bridge Design Specifications, but not less than TL-3 collision load requirements. The TL demand may be adjusted on a case-by-case basis for vehicle size and speed per AASHTO LRFD Bridge Design Specifications Tables 13.7.2-1 and 2.
2. The fall restraint specifications of WAC 296-155-24615 Section 2a requiring minimum vertical height of thirty-nine inches for traffic barriers shall be considered for temporary bridges.
3. Concrete bridge deck thickness may be reduced to 7 in. for concrete superstructure, and to 7 ½” for steel superstructures.
4. Epoxy coating requirement for bridge deck reinforcement may be waived for temporary bridges with 2” min cover for the top mat of reinforcement.
5. The driving surface of the temporary bridge shall be durable, skid resistant deck, with an initial skid number of at least 35 and maintaining a skid number of 26 minimum, in accordance with AASHTO T 242. The Contractor shall maintain the temporary bridge, including the driving surface, for the life of the temporary bridge in the project.

Superstructure Requirements:

1. A 3 inches minimum HMA overlay could be used for temporary bridges made of adjacent precast concrete members.
2. Steel temporary bridges need not be painted.
3. Fatigue need not be checked for temporary bridges with steel superstructure.
4. All welding, repair welding, and welding inspection, of steel components of the temporary bridge shall conform to the WSDOT Standard Specifications Section 6-03.3(25) and 6-03.3(25)A requirements specified for steel bridges.
5. Allowable tensile stress for precast-prestressed concrete girders under service limit state load combinations per AASHTO LRFD Bridge Design Specifications Article 5.9.4.2.2 may be used in lieu of those specified in WSDOT BDM Section 5.2.1C.

Foundation Requirements:

1. Pile types such as precast, prestressed concrete piles, steel H piles, timber piles, micropiles and steel pipe piles may be used for temporary bridges.
2. Soldier pile wall with treated timber lagging may be used for temporary bridges.

NBI Requirements:

1. Temporary or re-commissioned bridges used as a detour and in-service longer the 90 days shall receive full NBIS (all SI&A data; ex., NBIS inspection, load ratings and scour evaluation). All SI&A data is to be submitted to the Washington State NBI data base within 90 days of opening to vehicle traffic. An “open” bridge is defined as a bridge that is near substantial completion with general highway traffic accessing/operating on the bridge in a configuration that is the final planned configuration.
2. Phased construction stages, if carrying traffic for 90 days or longer shall fall into this same criteria.
3. Bridges open less than 90 days will need regular “safety” type inspections to ensure the safe operation of traffic on the bridge.
4. Contracts are to clearly identify the owner and who is responsible for all of this NBIS criteria.
5. Load ratings for legal trucks and special hauling vehicles are required for temporary and phased construction stages bridges. The minimum rating factor shall not be less than 1.0.

Submittal Requirements:

1. The Contractor shall submit drawings and copies of supporting design calculations of the temporary bridge to the Engineer for approval in accordance with WSDOT Standard Specifications Section 6-01.9. The submittal shall include an erection plan and procedure in accordance with WSDOT Standard Specifications Section 6-03.3(7)A.
2. Submittals for temporary bridges with total length of more than 200 ft shall be stamped and signed by a Washington State registered structural engineer (SE) in accordance with the requirements of WAC 196-23.
3. The Contractor shall construct the temporary bridge in accordance with the working drawings and erection plan as approved by the Engineer, environmental permit conditions specified in Section 1-07.5 as supplemented in these Special Provisions and as shown in the Plans, and in accordance with the details shown in the Plans.
- 4.

Re-commissioned bridges used as detour bridges shall comply with the above requirements.

The above provisions are the minimum requirements for temporary bridges. Additional provisions may be specified on a case-by-case basis. Where such additional requirements are specified in the Contract Documents, they shall be site or project specific and are tailored to a particular structure type.

Background:

This design memorandum summarizes the minimum design and NBI requirements for temporary bridges that are in service for five years or less. Requirement for stamping and signature (WAC

196-23), fall restraint specifications (WAC 296-155-24615 Section 2a), and NBI Bridge Inspection and Load rating are addressed in this memorandum. Re-commissioned bridges used as detour shall comply with the above requirements.

Re-commissioned bridges are existing bridges that are phased out (by lateral sliding, SPMT, etc.) and repositioned for use as detour bridge during construction.

The load rating factor for legal trucks and special hauling vehicles in some cases may be less than 1.0. In these cases, design refinements can easily remedy the problem. The rating factor of less than 1.0 is not acceptable.

The construction requirements for temporary bridges will be addressed in the WSDOT Temporary Bridge Special provisions.

If you have any questions regarding this issue, please contact Harvey Coffman at 570-2556 (Harvey.Coffman@wsdot.wa.gov) or Bijan Khaleghi at 705-7181 (Bijan.Khaleghi@wsdot.wa.gov).

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