

GOVERNMENT OF THE DISTRICT OF COLUMBIA
DEPARTMENT OF TRANSPORTATION



Infrastructure Project Management Administration

MEMORANDUM

TO: TEAM LEADERS
DEPUTY TEAM LEADERS

FROM: Ronaldo T. Nichols, P.E.
Chief Engineer 

RE: Guidelines for Bridge Load Rating Analysis and Reporting

DATE: July 21, 2010

The primary purpose of bridges load rating is to determine the live load that structures can safely carry to preserve public safety. In addition, load rating is required by the NBIS (National Bridge Inspection Standards, 23 CRF 650) regulations and for future improvement. The following guidelines shall be used to load rate bridges within the jurisdictional boundary of the District of Columbia. Some bridges have not previously been load rated and others must be load rated due to changes in Codes, changes in existing conditions, or due to rehabilitation. All new and rehabilitated bridges must be load rated as part of the design phase and based on the as-built plans. The Inventory and Operating ratings shall appear on the plan cover sheet. The guidelines are as follows:

1. **Methodology**
 - I. All bridges designed using LRFD design specifications shall be load rated using LRFR.
 - II. In-Service bridges that have been designed by another method other than LRFD shall be load rated by the LRF method. In some special cases, where DDOT would like to know more about the behavior of a structure under live loads, DDOT may request the Consultant to load rate a specific bridge by the LRFR method, in which case the bridge will be load rated for the HL-93 loading.
2. **Specifications:** The AASHTO Manual for Bridge Evaluation
3. **Trucks/Loads to be Evaluated**
 - I. For routes where permitted or overloaded trucks are likely, bridge shall be load rated for the following load:
 1. AASHTO Design Loads, HS-20-44 or HS-25-44 or HL93, based on design load.
 2. AASHTO Legal Loads, Type 3S2, Type 3-3

3. AASHTO Notional Rating Load (NRL) for screening for all AASHTO SHV. Bridges that do not pass the NRL loading should be investigated for Type 3 and SHVs (AASHTO Specialized Hauling Vehicles) to determine posting requirements.
 4. Permit Truck, 90,000 lbs, truck configuration attached
 5. Permit Truck, 147,000 lbs, truck configuration attached
- II. Routes where Permit Trucks are unlikely; bridge shall be load rated for the following load:
1. AASHTO Design Loads, HS-20-44 or HS-25-44 or HL93, based on design load.
 2. AASHTO Legal Loads, Type 3S2, Type 3-3
 3. AASHTO Notional Rating Load (NRL) for screening and all AASHTO SHV. Bridges that do not pass the NRL loading should be investigated for Type 3 and SHVs (AASHTO Specialized Hauling Vehicles) to determine posting requirements.

4. **Selection of Bridge Elements**

Prior to rating an existing bridge, the most recent detailed inspection report shall be thoroughly reviewed. In addition, as-built plans, and any modification since the bridge was built, and its present condition shall be completely reviewed. In special circumstances, DDOT may request field measurement.

Select only the primary load-carrying members in a bridge such as concrete deck, steel stringers, floor beams, structural plate girders, steel box girders, concrete T-beams, gusset plate connections, and in some cases, steel bracket overhangs, and other configurations. For each span or spans, only one interior beam or girder, for each geometric condition, shall be load rated for the worst-case scenario. In reinforced concrete arch bridges, the load rating of the reinforced arch ribs are not necessary; however, if the reinforced arch deck rests on fill, then the reinforced arch ribs will be load rated. In special circumstances, some elements of the substructure may be load rated.

5. **Software**

DDOT does not have specific software requirements for bridge load ratings. However, Virtis is preferred. The Consultant may use software such as BAR 7, Merlin Dash, MDX, DESCUS, BRASS, STAAD PRO and other related programs. Occasionally, the load rating may be performed by hand calculations.

6. **Load Rating Reports**

Each bridge load rating report shall be submitted to the Asset Management Division and shall include the following elements:

- a. **Data Input Calculation:** Hand calculations or electronic calculations (MathCAD) to come up with data to enter in the appropriate software/or hand calculation. Provide electronic data files, in both, working and PDF files, and printed copies of the data file after the data calculations. Executive summary that include description of the bridge, material property, loading assumptions, bridge history, etc., shall be included.
- b. **Framing Plan and others:** Provide the Plan and Elevation, Framing Plan, Girder Elevations and Typical Sections of the bridge. Indicate the elements in the framing plan that is being load rated. For simplicity, photocopy from bridge plans clearly showing span lengths and girder spacing and others. Provide half-size plans and make sure relevant

information from bridge plans are readable (written by hand if necessary). Only relevant sheets or sketches shall be included in the rating report.

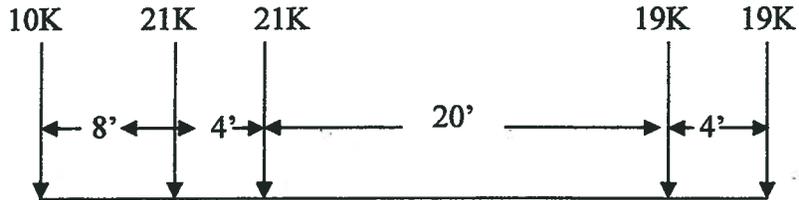
- c. **Load Rating Output:** Submit printed and PDF copies of the full bridge load rating output if the software used is specifically for load rating tasks such as BAR 7. Submit selected output sheets if software used is general analysis purpose software such as STAAD PRO, and output hand calculations. Submit an executive summary letter stating the outcome and methodology of the load ratings of all bridge elements with the load rating output clearly describing the controlling elements of the structure.
- d. **CD Submission:** Submit the above elements of the report for each bridge on CDs, in text, and PDF format. For simplicity, submit the load rating report corresponding to each task order in one CD. Provide a listing of load-rated bridges on a printed label for easy identification.
- e. **Reports:** Submit two (2) copies of each bridge load rating report containing the above elements a through c; provide these reports in 8 ½" x 11" formats.

cc: Terry Bellamy, Deputy Director
Greer Gillis, P.E., Deputy Chief Engineer
Aaron S Horton, P.E., Asset Management Division

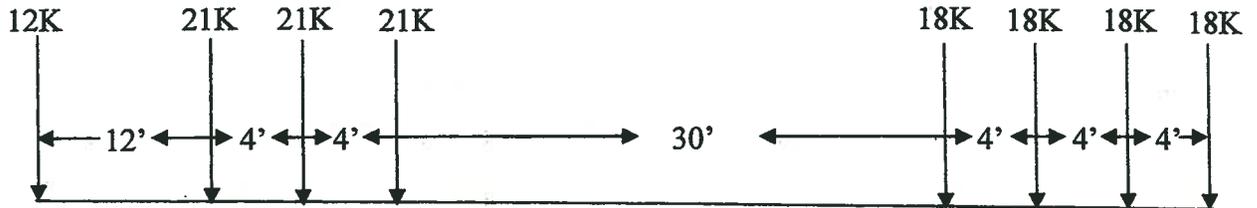
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DC 90K Permit Truck: 90 Kips



DC 147K Permit Truck: 147 Kips