Memorandum

U.S. Department of Transportation
Federal Highway Administration

Subject: ACTION: Bridge Load Ratings for the National Bridge Inventory

Date: NOV 5 1993

Reply to Attn. of: HNG-33

From: Chief, Bridge Division
Office of Engineering

To: Regional Federal Highway Administrators
Federal Lands Highway Program Administrator

The 1988 Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges (Coding Guide) called for the National Bridge Inventory (NBI) updated data for 1993 to report the inventory and operating ratings (Items 64 and 66) in an equivalent HS loading regardless of the loading used to calculate the ratings. To date, not all States have fully complied. This memorandum is a reminder of the requirement, and further discusses the conversion of non-HS ratings to equivalent HS ratings for NBI purposes, and the analysis methods being used to load rate bridges.

Bridge load ratings reported to the NBI weigh heavily in the determination of the Sufficiency Rating. Load ratings are also relied upon and used extensively by the FHWA and others in the preparation of highway needs studies, Congressional reporting, cost allocation studies, truck size and weight studies, and numerous other bridge management tasks. The Department of Defense uses NBI load ratings to determine the adequacy of bridges on defense highways to safely carry special military loadings. States, in addition, use the ratings in prioritizing projects, distributing bridge funds to local governments, posting bridges, and issuing load permits. These uses require that bridge load ratings are reliable, uniformly consistent, and current.

The factors for converting various loadings to an equivalent HS loading are provided in the Coding Guide's Item 67 and Appendix B (paragraph b of the Sufficiency Rating Formula). These factors are neither consistent nor sufficiently accurate to give a reasonable equivalent HS load for inventory and operating ratings, and should not be used for that purpose. Rating calculations using an HS vehicle shall be used, or alternately, current load ratings may be converted to equivalent HS ratings by more exact methods which consider span configuration, continuity, and other appropriate factors.

The National Bridge Inspection Standards (NBIS), 23 CFR 650.303(c), prescribes that load ratings be in accordance with the AASHTO "Manual for the Maintenance Inspection of Bridges, 1983." The most recent version of that AASHTO Manual is the "Manual for Condition Evaluation of Bridges." It was adopted by AASHTO and will be published in December.

FEDERAL HIGHWAY ADMINISTRATION 1893 1993

Item 64, page 41 of the Coding Guide, advises the States and other bridge owners to anticipate that the FHWA will require a single uniform method to be used to calculate the operating and inventory ratings reported to the NBI. The AASHTO Manual provides a choice of load rating methods. The methods include the new load and resistance factor (LRFD) rating method, in addition to the traditional allowable stress (AS) and load factor (LF) methods. The AASHTO Manual recognizes that a wide range of ratings may result depending on the method of rating, but it does not address the issue of inconsistency in results using the load rating method.

Of the three rating methods, the LF method is the most suitable for use as a national standard. The AS and LRFD methods are less suitable because of inconsistencies or potential variability in the rating methods. For these reasons, the FHWA has choosen the LF method as the standard for computing load ratings reported to the NBI. The States may, however, elect to use LF, AS or LRFD to establish load limits for purposes of load posting.

The States should be advised that the inventory and operating ratings reported to the NBI for all bridges constructed, replaced, or rehabilitated after January 1, 1994, shall be based on the LF method of rating. In addition, the load ratings of all bridges that require updating in conformity with the AASHTO Manual shall be based on the LF method. The AASHTO Manual states that "... As part of every inspection cycle, bridge load ratings should be reviewed and updated to reflect any relevant changes in condition or dead load noted during the inspection." Because of the Federal emphasis on the National Highway System, LF based inventory and operating ratings for bridges on that system shall be reported to the FHWA with the 1995 NBI update.

Apparent discrepancies in load ratings being reported by some States suggests that load rating practices and frequency of review may, in those cases, be at variance with the NBIS and the AASHTO Manual. Regional and Division Offices are, therefore, requested to include load rating practices in their 1994 NBIS reviews, and to report on the practices and status of bridge load rating in each State.

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