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NEW YORK STATE DEPARTMENT OF TRANSPORTATION

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SUBJECT: Technical Policy and Procedures Manual:
Users Manual For Bridge Inventory and Inspection
Part III - Rating - DISTRIBUTION OF LOAD RATINGS
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Acting Deputy Chief Engineer (Structures)

PURPOSE: This issuance has been prepared to explain the attached results of the Level 2 Load Ratings for bridges.

LOAD RATING LEVELS: Load ratings are classified by level, which is a measure of the sophistication of the analysis performed to determine the rating values. Level 1 load ratings are the most thorough and result from a complete, detailed superstructure analysis and an evaluation of the substructure. The superstructure analysis should take into account the condition of superstructure elements and any design details which might affect load carrying capability. The substructure evaluation is important since it may control the rating in some cases. Load posting, if needed, should only be based on a Level 1 load rating.

The enclosed ratings are Level 2 load ratings, which may not be accurate enough to determine load postings from directly. Level 2 load ratings are estimates of the load capacity of the superstructure based on a limited analysis. Level 2 load ratings do not represent a complete analysis of the superstructure or consider the possibility that the substructure may control the load rating.

It is important that the difference between Level 1 and Level 2 load ratings is clearly understood. It is also important to understand that there is no acceptable method available at this time to mass-produce Level 1 load ratings, nor is there likely to be in the near future. Level 1 load ratings must be the result of careful inspection and analysis, "hand-crafted" for each bridge.

Attached is a copy of EI 88-4, which gives more information on different rating levels and the uses of each.

INVENTORY RATING AND OPERATING RATING: Bridges are generally rated at two stress levels, one known as the "Inventory Rating" (lower stress rating) and the second as the "Operating Rating" (higher stress rating). In general, the Inventory Rating corresponds to the load which can safely utilize an existing bridge for an indefinite period of time, while the Operating Rating is the absolute maximum permissible load to which a structure should be subjected. Reference should be made to the current "Manual For Maintenance Inspection of Bridges" prepared by the American Association of State Highway and Transportation Officials (AASHTO) for more precise definitions of these terms and other

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INVENTORY RATING AND OPERATING RATING: (cont'd)

bridge load rating information. The current "Manual for Maintenance Inspection of Bridges" can be purchased for \$5.25 by writing to: AASHTO, 444 North Capitol Street, N.W. Suite No. 225, Washington, D.C. 20001.

Bridge owners are given some latitude in determining the stress level used for bridge posting. Reference should be made to the AASHTO Manual cited above for further details. In addition, EI 88-6 has been prepared to provide further guidance in establishing posting values for State owned bridges. A copy of this EI is attached.

LOAD RATING INFORMATION TRANSMITTED: This issuance transmits Level 2 load ratings for selected bridges in your Region. This information is presented in four formats: the first a "Detailed Listing", the second a "One-Line Summary Listing", the third is a "Rating Lines Listing", and fourth is a "Posting Candidate Screen Listing." Also included are separate input "Data File Listings" for each bridge. For Local bridges, two copies of this information are being transmitted. One copy should be forwarded to the bridge owner, while the second copy shall be retained in the Region Office, with "Detailed Listings" and "Data File Listings" for each bridge placed into the appropriate BIN folders.

1. Detailed Listings - The Detailed Listing show all input data used for the load rating computation and numerous intermediate calculated values. This information will be useful in reviewing bridge ratings and performing follow-up Level 1 Load Ratings. The Load Ratings shown on the detailed listings are presented in the following format:

*** Live Load -- HS 20 ***
Inventory Rating 1.30 Equals 46 Tons
Operating Rating 2.14 Equals 76 Tons

This means that the particular bridge element analyzed is estimated to be able to support 1.3 HS 20 Loadings before being stressed to the Inventory Stress Level. The gross weight of 1.3 HS 20 Loadings is 46 Tons. Likewise, the bridge element is estimated to be able to support 2.14 HS 20 Loadings before it would be stressed to the Operating Stress Level. The gross weight of 2.14 HS 20 Loadings is 76 Tons.

If a computed Inventory Rating is equal to or greater than 1.0 for an HS 20 loading (State's current design standard), the bridge is only analyzed for the HS 20 Loading. However, if the computed Inventory Rating is less than 1.0 HS 20 Loadings, the bridge is also analyzed for other loading configurations, including an H Loading which simulates a 2-axle truck. Reference should be made to the AASHTO Manual cited above and the New York State "Standard Specification for Highway Bridges" for details on different loading configurations.

2. Summary Listing - The headings on the Summary Listing are explained in EI 83-56 titled "Explanation of Headings for Level 2 Rating Summary Listings", copy attached. The Summary Listing shows the critical Level 2 Inventory and Operating Rating computed for each bridge included in the Detailed Listings. The Summary Listing also shows any existing load posting at the bridge as recorded in the State Bridge Inventory File. This listing should be valuable to bridge owners for scanning purposes.

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Rating Lines Listing - This is a listing of all the "RATING" lines from the Detailed Listings. These records provide the load rating values, in tons, for the various controlling secondary and main members that are analyzed. The "RATING BRIDGE" lines give the controlling ratings for the bridge, which is taken as the lowest value secondary or main member rating line for the bridge in question. Rating values are printed for HS20, H20 and 3-3 load types. To the right of each load type, the inventory and operating rating values are listed. The third value after each load type (normally output as OT) is not implemented, and is ignored.

Rating values are given in tons. A value of 99T means that the rating is at least that large. A value of 00T indicates that the analysis is incomplete; and a field of **T indicates an unratable member or bridge. The minimum values output are OT for inventory rating and IT for operating ratings. These values indicate that the actual ratings are equal to or less than the values listed.

4. Posting Candidate Screen Listing - This is generated from the Rating Lines Listing, and consists of "RATING BRIDGE" lines whose operating rating values indicate low structure capacities and the need for load posting is likely. The list contains all rated bridges with a controlling operating rating less than the value specified at the bottom of the listing. It is intended to serve as an initial screen for identifying and prioritizing bridges that must be evaluated for posting. It is important to note that this screen listing is approximate, and will not necessarily contain all bridges in need of load posting, but only the most likely candidates. It may also contain a few bridges that, based on further review and analysis, may not require load posting.

Posting evaluation for these bridges, including field verification of data and Level 1 rating analysis, should be given first priority. It is likely that some of the bridges listed are already posted; however these should be checked to determine whether the existing posting value is appropriate. For guidelines in determining postings from load ratings, refer to EI88-6 "Bridge Load Posting Guidelines for State Owned Bridges," and its attached paper entitled "Method For Establishing Bridge Load Postings from Load Ratings."

5. Other - The following items should be distributed whenever detailed level 2 rating listings and/or level 2 rating summary listings are distributed.

EI 88-4 Technical Policy and Procedures Manual: Load Rating of Bridges

EI 88-5 Technical Policy and Procedure Manual: Users Manual For Bridge Inventory and Inspection, Part III - Rating - Distribution of Load Ratings.

EI 83-56 Explanation of Headings For Level 2 Rating Summary Listings. (Send only with Summary Listings).

EI 88-6 Technical Policy and Procedure Manual: Bridge Load Posting Guidelines For State Owned Bridges.

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5. Other - (cont'd)

"Analysis Review and Commentary - NYSDOT Level 2 Load Rating Program."

This document gives a general commentary on the analysis review process as well as the main features and limitations of the Level 2 program. It provides specific comments on commonly encountered review items.

REQUIRED ACTIONS. While the enclosed Level 2 Load Ratings may not be accurate enough to determine postings from directly, they are an important source of information for use by those responsible for bridges as an aid in determining which bridge should be considered for Level 1 Load Ratings and posting evaluations. One method of accomplishing this is by comparing the approximate capacities indicated to the actual posted values.

It is the responsibility of those owning bridges to arrange for Level 1 Load Ratings when they believe such ratings may be required. The Structures Division will not perform these ratings for local bridges, and can only perform a very limited number of such ratings for State owned bridges.

PROBLEMS WITH ENCLOSED RATINGS: If any problems are found with the enclosed load rating data, the Regional Office should inform the Structures Load Rating Unit of the Structures Design and Construction Division as quickly as possible. When reporting a problem be as specific as possible in describing the problem, as well as reporting the BIN or BINS for which the problem is known to exist. This request for information should not be used as an invitation to request Level 1 Load Ratings on specific bridges. Bridges with low Level 2 Load Ratings should be investigated further by the bridge owners if appropriate.

Only problems directly associated with the Level 2 Load Rating computer program or associated inspection information should be reported.