



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

JAMES H. TROGDON, III
SECRETARY

MEMORANDUM TO: Project Engineers
Project Team Leaders

FROM: Brian Hanks, P. E.
State Structures Engineer

DATE: February 8, 2018

SUBJECT: Load Ratings for Highway Structures

To facilitate timely update of Structure Inventory and Appraisal (SI&A) data, the policy for updating load ratings has been revised. Historically, structures have been load rated after the biennial inspection. Effective immediately, a load rating will only be necessary when changes to the structure condition, configuration, or loading warrant. The revised policy maintains consistency with FHWA's *Metrics for the Oversight of the National Bridge Inspection Program*.

General

Load ratings for new, rebuilt or existing bridges shall be in accordance with the AASHTO *Manual for Bridge Evaluation* (MBE) and recorded in the SI&A structure data. Load ratings at the inventory and operating level shall be performed for design loads and applicable State legal loads. State legal loads are derived from the NC General Statutes § 20-118 – *Weight of vehicles and load*, and are categorized as follows:

- Legal loads for bridges carrying interstate traffic
- Legal loads for all bridges except those carrying interstate traffic.

Each category of State legal loads includes a suite of single vehicles (SV) and a suite of truck tractor semi-trailer (TTST) combination vehicles. Bridge load limits are posted for the controlling SV and the controlling TTST. For all structures, an equivalent HS truck and its corresponding actual tonnage shall be used to record the following SI&A structure data items:

- (64) – Operating Rating
- (66) – Inventory Rating

For bridges that receive a load and resistance factor rating (LRFR), include a load rating for an HS truck. When provided only with inventory and operating ratings that reflect the **actual HS tonnage**, for consistency in the recorded SI&A recorded data, divide the tonnage by 1.8 to determine the **HS equivalency**. For example, if an actual tonnage of 39.6 tons is provided for a

given rating, divide the tonnage by 1.8 to determine the equivalent HS truck as follows: $39.6 \text{ tons} \div 1.8 = \text{HS } 22$.

The WIGINS application assists with managing the workflow from inspection to load rating and finally SI&A structure data updates. The application is programmed to route inspection reports for bridges that require a revised load rating to the responsible Field Operations Project Group.

Initial Load Rating

For new and widened structures, an initial load rating sheet should be included in the structure plans. Refer to Section 6.9 of the Structures Management Unit (SMU) *Design Manual* for the requirements of the initial load rating.

When the initial inspection of a new or widened structure is approved by the Area Inspection Supervisor, the Field Operations Engineer shall review the initial load ratings prior to sending the structure data to SI&A. The review, at a minimum, shall consist of generating the initial load rating summary in WIGINS, documenting the basis for the initial load rating, and ensuring the inventory and operating ratings are provided in terms of an equivalent HS truck. A load rating shall be performed if the initial load rating sheet is omitted from the plans or the initial inspection reflects deviations from the plans were made to the structure during construction.

For reconstructed structures, use the information in the contract plans, the *Form for New and Rebuilt Structures* (Form 501), and the inspection report to perform an initial load rating for inventory and operating loads and applicable State legal loads.

The initial load rating will remain unchanged as long as there is no substantial change to the structural condition, configuration, or loading.

Revised Load Rating

To ensure a safe load rating for each bridge, a revised load rating after each inspection shall be provided for structures in poor condition. Structures with any general condition rating ≤ 4 are considered to be in poor condition. Structures with all general condition ratings ≥ 5 are considered to be in fair or good condition. The following SI&A structural data items define the condition of the structure:

- (58) – Deck.
- (59) – Substructure.
- (60) – Superstructure.
- (62) – Culvert.

To ensure the load rating for structures in fair or good condition reflect a safe load carrying capacity, a load rating shall be performed if any of the following are documented during a routine inspection:

- Current SV or TTST load posting ≤ 18 Tons
- Critical Finding or Priority Maintenance is assigned.
- Changes in structural configuration (crutch bents, additional primary members, changes to spacing of primary members, preservation work or repairs performed, etc.)
- Reconstructed bridge (with Form 501 documentation)

- Change in permanent load (wearing surface, median, etc.)
- Temporary repairs present.

Structures in fair or good condition that do not meet any of the above criteria do not require a load rating. The SI&A structure data shall be updated once the Area Supervisor approves the inspection report.

For bridges requiring a revised load limit, the SMU's SI&A Group shall notify Division Traffic Services via emailing a standardized *Posting Letter*. Division Traffic Services shall attest to updating bridge load limit sign by completing, signing and returning the form letter to SMU. *Posting Letters* shall be archived in the WIGINS bridge file.

Bridge load limits are posted for State legal loads, the legal load ratings for all bridges shall be updated when statutory changes to legal loads are enacted.

The *Inspection Manual* will be updated at a later date.

BCH/DCM/DNS/ksl

Cc: W.K. Fischer, P.E.
G. Muchane, P.E.
Tom Drda, FHWA
Division Bridge Engineer, FHWA
Division Bridge Maintenance Engineers
Division Maintenance Engineers
Division Traffic Services Supervisor