LOUISIANA DEPARTMENT OF TRANSPORTATION & DEVELOPMENT

DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

INTRADEPARTMENTAL CORRESPONDENCE

REFERRED TO

____ REFERRED FOR ACTION
____ ANSWER FOR MY SIGNATURE
____ FOR FILE
____ FOR YOUR INFORMATION
____ FOR SIGNATURE
____ RETURN TO ME
____ PLEASE SEE ME
____ PLEASE TELEPHONE ME
____ FOR APPROVAL
____ PLEASE ADVISE ME

BY _____ DATE _____
BY _____ DATE _____
BY _____ DATE _____

Memorandum

To: Christopher Knotts, P.E.
DOTD Chief Engineer Administrator

From: William J. Metcalf Jr., P.E.
Bridge Rating Expert
(225) 379-1741

Subject: Request to revise EDSM I.1.1.8-Louisiana Bridge Load Rating Standards

Date: June 8, 2021

With this memorandum, we are requesting approval to revise EDSM I.1.1.8 to incorporate the FWHA requirements to load rate and post bridges for emergency vehicles. Following are the updates:

1. Added a new rating requirement for emergency vehicles;
2. Updated posting categories to include emergency vehicles;
3. Published new bridge posting signs for emergency vehicles;

For your review and approval, I have attached the existing EDSM I.1.1.8 dated January 10, 2018, and the revised EDSM I.1.1.8 and the comparison redline file.

The revised EDSM I.1.1.8 have been reviewed and concurred by Bridge Maintenance Section. If you have any questions or require any additional information, please contact this office.

WJM/wjm
Attachment(s):
Current and Revised EDSM I.1.1.8

cc: David Miller – Chief Maintenance Engineer
Nick Fagerburg – Bridge Maintenance Administrator
Chad Winchester – Project Development Division Chief
Zhengzheng "Jenny" Fu – Bridge Design Engineer Administrator

RECOMMENDED FOR APPROVAL DATE 9/23/21
RECOMMENDED FOR APPROVAL DATE 9/23/21
RECOMMENDED FOR APPROVAL DATE 9-24-21
APPROVED DATE 9/24/2021

DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

ENGINEERING DIRECTIVES AND STANDARDS

Volume	Chapter	Section	Directive Number	Effective Date
I	1	1	8	9/24/2021

SUBJECT: **ESTABLISHMENT OF UNIFORM, REGULATORY TRUCK WEIGHT LIMIT FOR STRUCTURALLY DEFICIENT HIGHWAY BRIDGES LOCATED ON PUBLIC ROAD**

1. **PURPOSE:** This directive establishes a policy for determining the need for legal truck weight limits on structurally deficient bridges in accordance with the rules set forth in the *National Bridge Inspection Standards* published in the Federal Register, the *Manual on Uniform Traffic Control Devices for Streets and Highways*, *The Manual for Bridge Evaluation* (MBE) by American Association of State Highway and Transportation Official (AASHTO), the LADOTD *Bridge Inspection Manual (BIM),* and LADOTD *Bridge Design and Evaluation Manual (BDEM).*

2. **SCOPE:** This directive is applicable to all bridges located on public roads in the State of Louisiana.

   POLICY: It is the policy of the Department to require the placement of regulatory truck weight limits on all bridges which are not structurally adequate to carry the maximum legal truck weights allowed by Louisiana law. All regulatory truck weight limits shall be recorded in the Department's file management databases and the proper public officials shall be notified of this act.

   All bridges shall be structurally evaluated according to the latest version of the AASHTO *MBE*, and LADOTD *BDEM*. Trucks used to evaluate bridges are listed in LADOTD *BDEM*. These trucks are selected to simulate Louisiana design, legal, emergency, and overload trucks. Legal trucks are utilized to estimate the weight limits required for structurally deficient bridges.

   The weight limit requirements shall be determined using legal truck (including Specialized Hauling Vehicle (SHV) and Emergency Vehicles (EV)) rating factors to select one of the eleven posting categories as shown in Table-1, and an emergency vehicle safe load in tons. Category 8, 9, and 10 signs are not to be used on Interstate bridges due to the 40T weight limit restriction stipulated by FHWA on Interstate highways.

   When truck weight limits are required, they shall be expressed by one of seven regulatory highway signs from the R12 Series of FHWA's Manual of Uniform Traffic Control Devices (MUTCD). Weight limit values will be provided in five (5) ton increments with noted exceptions to minimize the sign legend variations and thereby standardize the weight limit signing practice of the Department. When emergency vehicle weight limits are required, they shall be expressed by one of three regulatory highway signs for emergency vehicles from the R12-7 series of FHWA's MUTCD. Emergency vehicle weight limit values will be provided in ten (10) ton increments with noted exceptions to minimize the sign legend variations and thereby standardize the weight limit signing practice of the Department.

TABLE 1 - POSTING CATEGORIES AND WEIGHT LIMITS

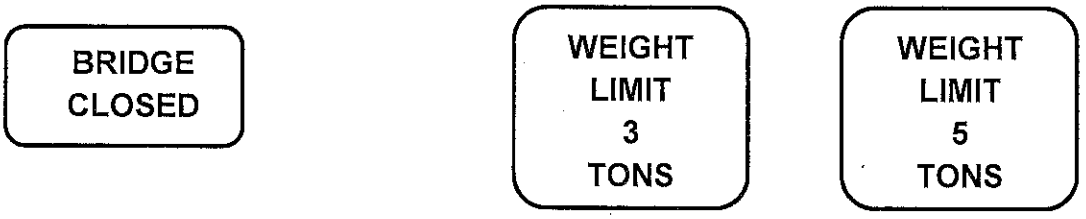
CATEGORY	SIGN TYPE	WEIGHT LIMIT
1	R11-2	CLOSED
2	R12-1	03T
3	R12-1	05T
4	R12-5	10T Single Unit Truck – 15T Combination Truck
5	R12-5	15T Single Unit Truck – 25 T Combination Truck
6	R12-5	20T Single Unit Truck – 35T Combination Truck
7	R12-5	25T Single Unit Truck – 40T Combination Truck
8	R12-5	25T Single Unit Truck – 44T Combination Truck
9	R12-5	30T Single Unit Truck – 44T Combination Truck
10	R12-5	35T Single Unit Truck – 44T Combination Truck
11		NO LIMIT REQUIRED

TABLE 2 - EMERGENCY VEHICLE POSTING CATEGORIES AND WEIGHT LIMITS

CATEGORY	SIGN TYPE	WEIGHT LIMIT
1	R12-7 or R12-7aP	7T Single, 14T Tandem, 20T Gross Vehicle
2	R12-7 or R12-7aP	11T Single, 21T Tandem, 30T Gross Vehicle
3	R12-7 or R12-7aP	15T Single, 28T Tandem, 40T Gross Vehicle
4		NO LIMIT REQUIRED

These signs depicted in Figure 1 are interpreted to restrict truck weight limit in the following context:

A. The bridge closed sign (R11-2) closes a bridge to all traffic.
B. The weight limit sign (R12-1) limits the gross weight of all vehicles and all vehicle combinations to no more than the specified weight limit.



A. BRIDGE CLOSED SIGN (R11-2) B. WEIGHT LIMIT SIGN (R12-1)

FIGURE 1 – BRIDGE WEIGHT LIMIT SIGNS R11-2 AND R12-1

These weight limit signs (R12-5) depicted in Figure 2 are interpreted to restrict truck weight limit of the gross weight of all single truck vehicles to the displayed first number and the gross weight of all vehicle combinations to the displayed second number. The depicted legal trucks are interpreted to merely symbolize all vehicles and all vehicle combinations respectively.

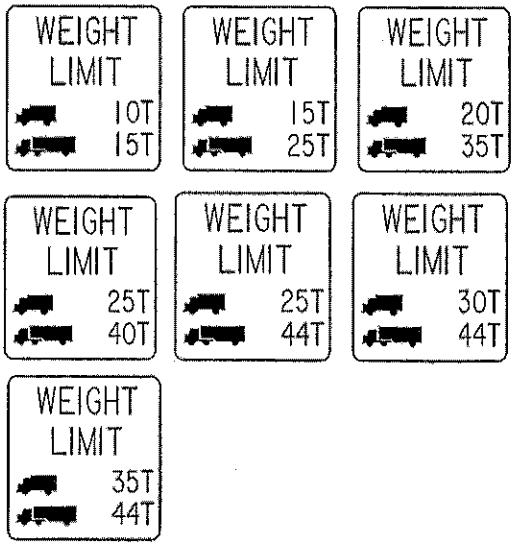
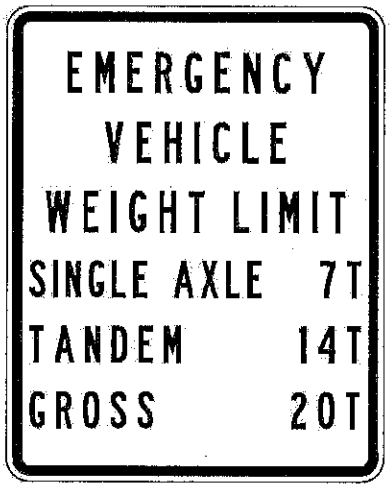
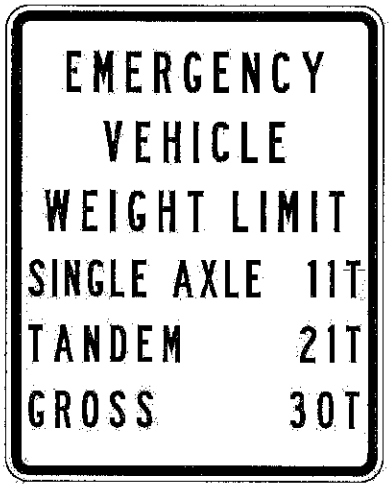


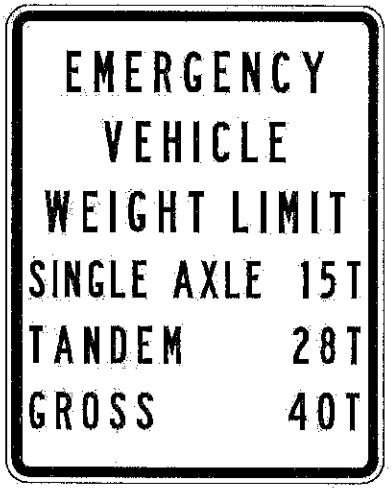
FIGURE 2 – BRIDGE WEIGHT LIMIT SIGNS R12-5

An emergency vehicle as defined in the Fixing America's Surface Transportation Act (FAST Act) (Pub. L.114-94). Section 1410 of the FAST Act amended 23 U.S.C. 127, Vehicle weight limitations—Interstate System, is designed to be used under emergency conditions to transport personnel and equipment to support the suppression of fires and mitigation of other hazardous situations (23 U.S.C. 127(r)(2)). The R12-7 and R12-7aP signs show in figure 3 are interpreted to restrict emergency vehicle axle load, tandem load, and gross vehicle weight. For bridges already posted with the R12-5 signs shown above the R12-7aP is used otherwise the R12-7 sign is used.

Standalone Sign

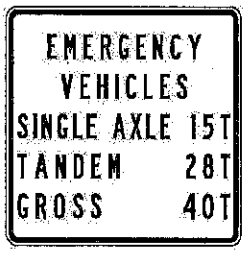






R12-7

Plaque Below R12-5 Sign



R12-7aP

Bridge weight limit sign locations: When regulatory weight limits are required for a bridge, weight limit signs shall be installed near each abutment and approximately 1000 feet in advance of each abutment. Additionally, the heads of the route on which the bridge is located shall be signed with the weight limits and the distance to the bridge along the route. If there is a series of bridges with weight limits on a route, the most restrictive weight limit and distance to the nearest affected bridge shall appear on the head of the route sign. Figure 3 illustrates the head of route signage. MUTCD must be followed.

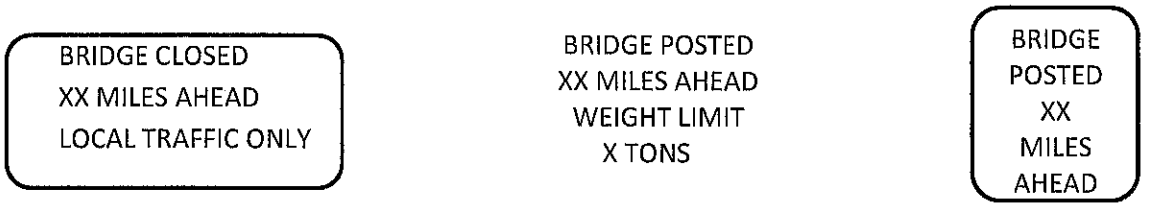


FIGURE 3 – WEIGHT LIMIT SIGNS AT THE HEAD OF ROUTE

IMPLEMENTATION: The State Bridge Rating Engineer shall be responsible for the implementation of this policy.

- **STATE MAINTAINED HIGHWAY SYSTEM (ON-SYSTEM)**

All requests to change the status of weight limits for bridges on the State maintained highway system shall be directed to the office of the Chief Engineer of the Office of Engineering through the State Bridge Rating Engineer for implementation.

In the event of an emergency, signing may be installed at the bridge site in advance of the request for weight limits, and the limit action shall be filed immediately with the notification of advanced placement or removal of signing.

The State Bridge Rating Engineer is responsible for initiating and determining the weight limits of Louisiana bridges on State maintained highway system. The Chief Engineer of the Office of Engineering shall be the only approval authority for regulatory weight limit actions for bridges.

By copy of the Chief Engineer's Orders (CEOs), the following engineering function shall be advised.

a. The Chief Maintenance Engineer is requested to have his or her personnel take the necessary action relative to the proper erection or removal of signing.

b. The District ADA Engineer is given notice so that his or her personnel can plan the location for the head of route signs in advance of the bridge when necessary.

c. The appropriate District Administrator is advised of the request so that he or she may provide any input they desire prior to the execution of weight limits and have a record of the original request for the District's bridge files.

d. Transport Permit Manager is advised of the request so that permitting operations can prohibit routing of overload trucks over deficient bridges in handling permit loads.

e. Bridge Maintenance Administrator, Bridge Design Engineer Administrator, and Highway Bridge Program Manager are advised so that the Bridge Maintenance file can be updated and bridge replacement/rehab project maybe initialized.

The bridge rating unit has the responsibility to assisting the State Bridge Rating Engineer in reviewing the on-system weight limit requirements after a report of a structural change in condition or due to modification and/or additions made to the structure. The Bridge Maintenance Section has the responsibility to assistant the State Bridge Rating Engineer in reviewing all the timber bridges and off-system bridge weight limits and cooperates with the appropriate District representatives.

When a structurally deficient bridge is rehabilitated in order to sustain the status, the District Administrator is responsible to submit to the State Bridge Rating Engineer a request for a revised evaluation.

When a structurally deficient bridge is permanently removed from service, weight limit signs associated with the bridge shall be removed accordingly. The sign removal shall be concurrent with the notification of the District Administrator who is responsible to immediately advise the Chief Engineer and the State Bridge Rating Engineer of the action.

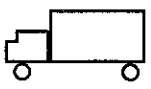
- **NON-STATE MAINTAINED HIGHWAY SYSTEM (OFF-SYSTEM)**

The responsibility for implementing weight limits for structurally deficient bridges on public roads which are not on the State maintained highway system (off-system) shall rest with the owner. The owner is responsible to implement procedures of routine review of weight limit requirements and establish weight limits on structurally deficient bridges within the policy of this directive. Compliance with the terms of this directive is subject to audit by the District Bridge Engineer. The weight limits shall be reported to the Bridge Maintenance Section quarterly for reviewing in accordance with the LADOTD *BIM*

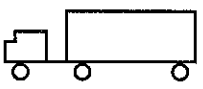
- **ALLOWABLE STRESS RATING FOR TIMBER BRIDGES (ON-SYSTEM AND OFF-SYSTEM)**

Timber bridges may be evaluated and posted using either the Allowable Stress Rating (ASR) method or the Load and Resistance Factor Rating (LRFR) method. The instructions and tables contained in this section are intended to be used for timber bridges rated and posted using the ASR - Allowable Stress Rating method.

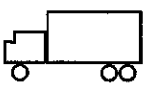
The ASR rating and posting legal trucks are shown in Figure 4 and Figure 5.



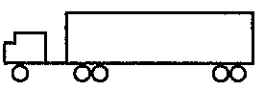
Vehicle type 2
Rating Vehicle Code 1
H-15



Vehicle type 2-S1
Rating Vehicle Code 2
HS-20



Vehicle type 3
Rating Vehicle



Vehicle type 3-S2
Rating Vehicle Code

FIGURE 4. TIMBER BRIDGES ASR METHOD RATING VEHICLES

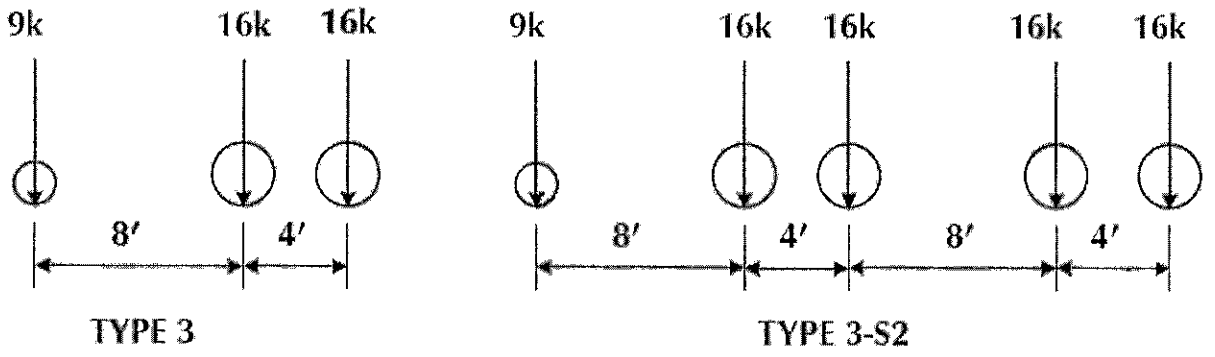


FIGURE 5. POSTING VEHICLES CONFIGURATION

The structural capacity of a bridge is expressed in terms of operating and posting loads. If the operating load is a Type 2 or Type 2-S1 truck configuration, the corresponding posting load is a Type 3 or Type 3-S2 truck configuration correspondingly. The structural capacity of a timber bridge is expressed as a three (3) digit code. The first digit designates the type of truck with Rating Vehicle Code 1, 2, 4, and 5. The remaining two (2) digits represent the gross weight of the truck in tons that the bridge should be limited for the designated truck type. If the weight for the operating load and posting load is in excess of the maximum statutory weight for each designated truck type, the bridge does not require weight limits. Otherwise, weight limits may be required.

To determine the weight limit requirements, find the applicable range of value for the operating and posting loads in the Bridge Weight Limit Requirements (Table 2) in the first two (2) columns respectively. Find the weight limit requirements for each in the third column. If the applicable range for the operating load is above the double line, select the lower weight limit requirement; if the applicable range for the operating load is below the double line, select the higher weight limit requirements.

Table 2- BRIDGE WEIGHT LIMITS REQUIREMENTS TABLE (ASR METHOD-TIMBER BRIDGES)

Operating Load Range or Value	Posting Load Range or Value	Weight Limit Requirements
100-102	400-402	R11-2 (CLOSED)
104-	404-	R12-1 (03T)
105-109	405-409	R12-1 (05T)
209-214	509-514	R12-1 (05T)
110-114	410-414	R12-5 (10T-15T)
215-224	515-524	R12-5 (10T-15T)
115-117	415-419	R12-5 (15T-25T)
225-228	525-534	R12-5 (15T-25T)

118-119		R12-5 (15T-25T)
229-234		R12-5 (15T-25T)
120-124	420-424	R12-5 (20T-35T)
235-239	535-539	R12-5 (20T-35T)
125-129	425-429	R12-5 (25T-40T)
240-243	540-543	R12-5 (25T-40T)
130-199	430-499	NO LIMITS REQUIRED
244-299	544-599	NO LIMITS REQUIRED

3. **OTHER ISSUANCES AFFECTED**: All directives, memoranda, or instructions issued heretofore in conflict with this directive are hereby rescinded.

4. **EFFECTIVE DATE:** This policy will become effective upon signature of the Chief Engineer.

Christopher P. Knotts, P.E.
Chief Engineer