Bridge Capacity Summary

The Federal Highway Administration requires specific bridge data to be submitted to the National Bridge Inventory (NBI). This includes load capacity information which is determined during the design process. This information is placed on the Bridge Capacity Summary Sheet(s) as follows:

Design Load: The National Bridge Inventory recognizes these choices:

Metric Loading	English Equivalent
M 9	H 10
M 13.5	H 15
MS 13.5	HS 15
M 18	H 20
MS 18	HS 20
MS 18 Modified for Military Load	HS 20 Modified for Military Load
MS 22.5	HS 25
Pedestrian	
Railroad	
Other or Unknown	

Design Method: Choices are as follows:

Unknown
WSD
LFD
LRFD

Rating Method: The NBI recognizes these choices:

Load Factor Rating
Allowable Stress Rating
Load and Resistance Factor Rating
Load Testing
By Inspection

The NBI requires all load ratings be done by Load Factor Rating Methods and requires that the rating method be reported separately for the Inventory and Operating ratings, and entered on the bottom of the form.

Plan File: The location of plans in the Bureau of Bridge Design.

Route: The facility carried by the bridge.

Town: The Town where the bridge is located.

Bridge Number: The six digit code locating the bridge in its Town in the form of 123/456.

Rated by: The initials of the engineer performing the load rating

Date: Date rated.

Checked by: The initials of the engineer performing the load rating check.

Date: The date checked.

Rated Member: The portion of the bridge being rated, i.e. Deck, Stringer, Floorbeam etc.

Longitudinal Effective Span Length: The longitudinal effective span represents how much of a bridge is being loaded by a truck to cause the maximum effects in the member under consideration. This gives us an opportunity to compare a specific truck to the fictitious HS Truck.

Examples:

Decks: A transverse deck sees in effect 1 wheel at a time, the longitudinal effective span is 1'-0".
The Required Capacity is HS 14.0 for Ordinary Legal Load.
The Required Capacity is HS 15.4 for Certified Single Unit Vehicles
The Required Capacity is HS 15.4 for Certified Multiple Unit Vehicles

Stringers: A stringer sees all the wheels on it. Its effective length is the same as the center to center of bearing dimension

Girders: For positive moment, where a girder sees the effect of the wheels in that span, the Longitudinal Effective Span is the same as the true span length.

For negative moment, a girder generally sees the effect of the wheels in one span or the other. The effective span length should be the same as each adjacent span, with two entries in the table.

Floorbeams: Intermediate Transverse Floorbeams see the effects of the wheels in the span on either side of the floorbeam. The Longitudinal Effective Span length is the sum of the adjacent floorbeam spaces.

End Floorbeams: End Floorbeams see the wheel loads transmitted to them by the span on one side only. The load that the floorbeam sees is the end shear of the wheels in the adjacent span. The Longitudinal Effective Span is the length of deck supported by the floorbeam, and for the required capacity take the values from the Shear Equivalent column. The Shear Equivalent Column should be used even if the bending moment in the floorbeam governs the rating.

Trusses & Arches: Use the loaded length of span required to produce the maximum load effect in the member. For top and bottom chords, and end posts, this is generally the entire truss length. For intermediate diagonal members subject to stress reversals, there may be two effective span lengths; one for the length of deck loaded for maximum tension, and the other for the length of span loaded to produce maximum compression.

Flexible pipes: Flexible pipes are analyzed using distribution of wheel loads through earth fill, rather than a moment and shear analysis. The effects of vehicles can be determined by: adding 18" (1'-6") to the depth of cover to get a Longitudinal Effective Span and using the HS Equivalents from the Shear Equivalents Columns.

Recommended Posting: Any time the required capacity exceeds the Operating Available capacity, a load posting is required. If a load posting is required or if the Certified Vehicle required Capacity exceeds the posting capacity, see the Chief, Existing Bridge Section for direction.

Recommended Postings are generally:

"E-2"
"Weight Limit 15 Tons"
"Weight Limit 10 Tons"
"Weight Limit 6 Tons"
"Weight Limit 3 Tons" and "Passenger Cars Only"
"This bridge should be Closed and Barricaded"

Required Capacity: From charts.

Available Capacity: From calculations, using AASHTO Guidelines.

The "posting" column represents three quarters of the way from the inventory rating to the operating rating.

These are to be represented in HS Tons. HS 20 is a designation for the AASHTO standard design vehicle. This should be entered as HS 20, not HS 36.

The "Single Lane Loaded" columns are for the single lane loaded case. The "Multiple Lanes Loaded" columns are for as many lanes loaded as the AASHTO Code allows.

64(Op): The Gross Tonnage of the HS vehicle that governs the Operating rating. The NBI requires submittal in Metric tons; this figure should be entered also.

66(Inv): The Gross Tonnage of the HS vehicle that governs the Inventory rating.

The form should be signed and stamped by the New Hampshire Licensed Professional Engineer who is responsible for the load rating.

Form 4
N.H. D.O.T.

BRIDGE CAPACITY SUMMARY

TOWN: LANCASTER, NH - GUILDHALL, VT

BRIDGE NUMBER: 112/130

DESIGN LOAD: HL-93 *DESIGN METHOD:* LRFD

RATED BY: XXX *DATE:* XX/XX/XXXX

RATING METHOD: LRFR *PLAN FILE:* 132-4-1

CHECK BY: XXX *DATE:* XX/XX/XXXX

ROUTE: US ROUTE 2

OVER: CONNECTICUT RIVER

RATED MEMBER	LONGITUD. EFFECTIVE SPAN LENGTH	REQUIRED CAPACITY (HS Tons)			AVAILABLE CAPACITY (HS Tons)					
		CURRENT LEGAL LOADS	CERTIFIED VEHICLES		MULTIPLE LANES LOADED			SINGLE LANE LOADED		
			SINGLE UNIT	MULTIPLE UNIT	INVENTORY	OPERATING	POSTING	INVENTORY	OPERATING	POSTING
CONCRETE DECK	1'-0"	HS 14.0	HS 15.4	HS 15.4	HS 32.5	HS 42.1	HS 39.7	HS 32.5	HS 42.1	HS 39.7
DECK PANEL SERVICE III	1'-0"	HS 14.0	HS 15.4	HS 15.4	HS 27.5			HS 27.5		
INTERIOR GIRDER										
SPAN 1 POS. MOMENT	200'-0"	HS 16.4	HS 17.9	HS 22.1	HS 72.5	HS 94.3	HS 88.8	HS 109.7	HS 142.6	HS 134.3
SPAN 1 NEG. MOMENT	200'-0"	HS 16.4	HS 17.9	HS 22.1	HS 42.3	HS 54.8	HS 51.7	HS 63.9	HS 82.8	HS 78.1
SPAN 1 SHEAR	200'-0"	HS 15.4	HS 16.5	HS 20.8	HS 45.1	HS 58.5	HS 55.2	HS 54.4	HS 70.5	HS 66.5
SPAN 2 POS. MOMENT	200'-0"	HS 16.4	HS 17.9	HS 22.1	HS 72.5	HS 94.3	HS 88.8	HS 109.7	HS 142.6	HS 134.3
SPAN 2 NEG. MOMENT	200'-0"	HS 16.4	HS 17.9	HS 22.1	HS 42.3	HS 54.8	HS 51.7	HS 63.9	HS 82.8	HS 78.1
SPAN 2 SHEAR	200'-0"	HS 15.4	HS 16.5	HS 20.8	HS 45.1	HS 58.5	HS 55.2	HS 54.4	HS 70.5	HS 66.5
EXTERIOR GIRDER										
SPAN 1 POS. MOMENT	200'-0"	HS 16.4	HS 17.9	HS 22.1	HS 62.3	HS 80.8	HS 76.2	HS 72.4	HS 93.9	HS 88.5
SPAN 1 NEG. MOMENT	200'-0"	HS 16.4	HS 17.9	HS 22.1	HS 39.8	HS 51.5	HS 48.6	HS 46.2	HS 59.9	HS 56.4
SPAN 1 SHEAR	200'-0"	HS 15.4	HS 16.5	HS 20.8	HS 55.5	HS 71.9	HS 67.8	HS 64.4	HS 83.5	HS 78.7
SPAN 2 POS. MOMENT	200'-0"	HS 16.4	HS 17.9	HS 22.1	HS 62.3	HS 80.8	HS 76.2	HS 72.4	HS 93.9	HS 88.5
SPAN 2 NEG. MOMENT	200'-0"	HS 16.4	HS 17.9	HS 22.1	HS 39.8	HS 51.5	HS 48.6	HS 46.2	HS 59.9	HS 56.4
SPAN 2 SHEAR	200'-0"	HS 15.4	HS 16.5	HS 20.8	HS 55.5	HS 71.9	HS 67.8	HS 64.4	HS 83.5	HS 78.7

Rating Method		English Tons		Metric Tons
(Op.) 63.	LRFR	64. (Op.)	75.8	68.7
(Inv.) 65.	LRFR	66. (Inv.)	49.5	44.9

RECOMMENDED POSTING: NO POSTING REQUIRED

PE STAMP
&
SIGNATURE