

Load Ratings For Secondary Bridges

**Final Report
Highway Research Advisory Board
Project HR-239**

May 1991

Highway Division



**Iowa Department
of Transportation**

ENGINEERING STUDY
HIGHWAY RESEARCH ADVISORY BOARD
PROJECT HR-239

LOAD RATINGS FOR SECONDARY BRIDGES

IOWA DEPARTMENT OF TRANSPORTATION
AMES, IOWA 50010

MAY 1991

TABLE OF CONTENTS

Acknowledgement	1
Introduction	2
Summary Ratings	
H Series	6
J Series	19
V Series	27

ACKNOWLEDGEMENT

Project HR-239 was sponsored by the Highway Research Advisory Board and the Iowa Department of Transportation. The Highway Research Advisory Board approved expenditures from the Secondary Road Research Fund to conduct the engineering study. The engineering determinations for this project were conducted by Stanley Consultants, Inc.

INTRODUCTION

- Load Rating: Evaluation of the capacity of a bridge to carry vehicle loads
- Standard Bridge: Bridge built according to standards issued by the Iowa Department of Transportation
- Inventory Rating: Load level which can safely utilize the bridge for an indefinite period of time
- Operating Rating: Absolute maximum permissible load level for the bridge

A load rating states the load in tons which a vehicle can impose on a bridge. Changes in guidelines, standards, and customary uses of bridges require analyses of bridges to be updated and re-evaluated.

In this report, twenty-two secondary bridge standards for three types of bridges are rated for the AASHTO HS20-44 vehicle configuration and three typical Iowa legal vehicles. The twenty-two rated standards are:

<u>Precast Beam</u>	<u>Reinforced Concrete Slab</u>	<u>Steel Beam</u>
H14-1	J7	V15-75
H15-75	J8	V16-70
H16-70	J15	V30C-79
H17-73	J16	
H24-84	J24-84	
H24S-85	J24-87	
H24-87	J30C-79	
H24S-87	J30C-87	
H30M-79		
H30-87		
H30S-87		

The ratings apply only to those bridges which:

- (1) are built according to the applicable bridge standard plans,
- (2) have no structural deterioration or damage, and
- (3) have no added wearing surface in excess of one-half inch integral wearing surface.

The Iowa vehicle loads applied to the structures are diagrammed on page 5. The Inventory and Operating Ratings are based on the standard AASHTO HS20-44 loading. The legal load ratings are based on the three typical Iowa legal vehicles using allowable Operating Rating stresses. The term "Legal" indicates the Iowa vehicle does not induce stresses exceeding allowable Operating Rating stresses.

Allowable stresses for specified materials are shown on page 4. Load ratings listed in this report are in compliance with the 1983 AASHTO Manual for Maintenance Inspection of Bridges, including interim revisions through 1990. Load distribution complies with AASHTO guidelines. All bridges were rated for two lanes of traffic.

Summary sheets contain any additional qualifications for interpreting the load ratings.

The proper use and application of these bridge ratings requires due consideration and evaluation by a qualified engineer of all relevant factors affecting these ratings. Anyone using any part of these bridge ratings assumes sole responsibility for their proper application.

References:

Manual for Maintenance Inspection of Bridges

including Revisions from Interim Specifications for Bridges 1984, 1985, 1986, 1987-1988, 1989, 1990

prepared by Highway Subcommittee on Bridges and Structures
publ. American Association of State Highway and Transportation
Officials, Washington, D.C., 1983.

Standard Specifications for Highway Bridges, 14th ed.

as amended by Interim Specifications - Bridges - 1990

prepared by Highway Subcommittee on Bridges and Structures
publ. American Association of State Highway and Transportation
Officials, Washington, D.C., 1989.

TABLE OF ALLOWABLE STRESSES
FOR
RATING OF IOWA SECONDARY BRIDGE STANDARDS

Prestressed Precast Concrete Beam Bridges

<u>Bridge Standard</u>	<u>Year of Issue</u>	<u>Prestress Strand f_s', psi</u>	<u>Precast Beam f_c', psi</u>	<u>Slab concrete f_c', psi</u>
H14-1	1960	250,000	5,000	3,000
H15-75	1975	270,000	5,000	3,000
H16-70	1969	270,000	5,000	3,000
H17-73	1973	270,000	5,000	3,000
H24-84	1984	270,000	5,000	3,500
H24S-85	1985	270,000	5,000	3,500
H24-87	1987	270,000	5,000	3,500
H24S-87	1987	270,000	5,000	3,500
H30M-79	1979	270,000	5,000	3,500
H30-87	1987	270,000	5,000	3,500
H30S-87	1987	270,000	5,000	3,500

Reinforced Concrete Slab Bridges

<u>Bridge Standard</u>	<u>Year of Issue</u>	<u>f_y (psi)</u>	<u>f_c' (psi)</u>	<u>Allowable Stress for Rating Type, psi</u>			
				<u>INVENTORY</u>		<u>OPERATING</u>	
				<u>Reinf. Steel</u>	<u>Concrete*</u>	<u>Reinf. Steel</u>	<u>Concrete*</u>
J7	1960	40,000	3,000	20,000	1,200	28,000	1,900
J8	1960	40,000	3,000	20,000	1,200	28,000	1,900
J15	1975	40,000	3,000	20,000	1,200	28,000	1,900
J16	1970	40,000	3,000	20,000	1,200	28,000	1,900
J24-84	1984	60,000	3,500	24,000	1,400	36,000	1,900
J24-87	1987	60,000	3,500	24,000	1,400	36,000	1,900
J30C-79	1979	40,000	3,500	20,000	1,400	28,000	1,900
J30C-87	1987	60,000	3,500	24,000	1,400	36,000	1,900

Steel Beam Bridges

<u>Bridge Standard</u>	<u>Year of Issue</u>	<u>f_y (psi)</u>	<u>Allowable Stress for Rating Type, psi</u>	
			<u>INVENTORY</u>	<u>OPERATING</u>
V15-75	1975	36,000	20,000	27,000
V16-70	1970	36,000	20,000	27,000
V30C-79	1979	36,000	20,000	27,000

* Compression due to flexure in the slab concrete.

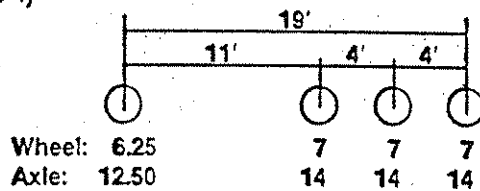
IOWA RATING VEHICLES

Typical Iowa Legal Truck Types

Wheel and Axle Loads Shown Are In Kips

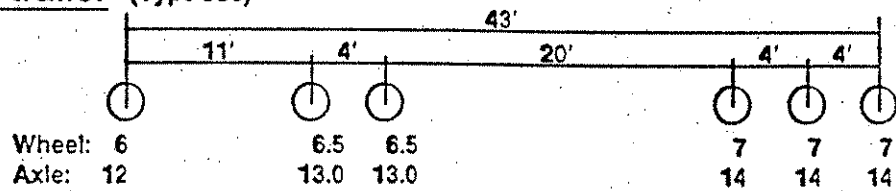
Straight Truck (Type 4)

Total Wt. = 54.5 Kips
(27.25 Tons)



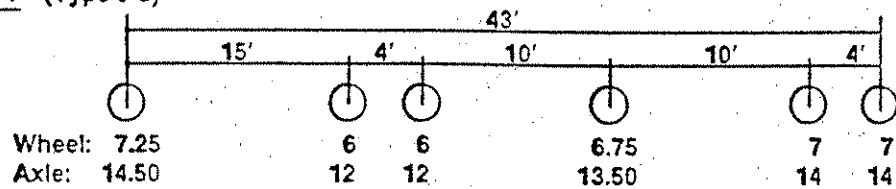
Truck + Semi-trailer (Type 3S3)

Total Wt. = 80 Kips
(40 Tons)



Truck + Trailer (Type 3-3)

Total Wt. = 80 Kips
(40 Tons)



H14-1 STANDARD ISSUED JULY 1960

12" High Curb and Steel Handrail
6.25" Thick Deck Slab

Bridge Length	Inventory	Operating	Type 4	Legal Loads in Tons	
				Type 3S3	Type 3-3
30'-0"	HS 23.3	HS 32.0	Legal	Legal	Legal
42'-6"	HS 20.2	HS 31.3	Legal	Legal	Legal
55'-0"	HS 15.7	HS 33.7	Legal	Legal	Legal
67'-6"	HS 15.4	HS 34.9	Legal	Legal	Legal
80'-0"	HS 15.1	HS 38.1	Legal	Legal	Legal
92'-6"	HS 23.3	HS 32.0	Legal	Legal	Legal
105'-0"	HS 20.2	HS 31.3	Legal	Legal	Legal
130'-0"	HS 20.2	HS 31.3	Legal	Legal	Legal
142'-6"	HS 15.7	HS 31.3	Legal	Legal	Legal
167'-6"	HS 15.7	HS 33.7	Legal	Legal	Legal
180'-0"	HS 15.4	HS 33.7	Legal	Legal	Legal
205'-0"	HS 15.4	HS 34.9	Legal	Legal	Legal
217'-6"	HS 15.1	HS 34.9	Legal	Legal	Legal
242'-6"	HS 15.1	HS 38.1	Legal	Legal	Legal

H14-1 STANDARD REVISED AUGUST 1967

12" High Curb and Aluminum Handrail
6.25" Thick Deck Slab

Bridge Length	Inventory	Operating	Type 4	Legal Loads in Tons	
				Type 3S3	Type 3-3
30'-0"	HS 23.4	HS 32.0	Legal	Legal	Legal
42'-6"	HS 20.3	HS 31.4	Legal	Legal	Legal
55'-0"	HS 15.7	HS 33.8	Legal	Legal	Legal
67'-6"	HS 15.5	HS 35.0	Legal	Legal	Legal
80'-0"	HS 15.2	HS 38.2	Legal	Legal	Legal
92'-6"	HS 23.4	HS 32.0	Legal	Legal	Legal
105'-0"	HS 20.3	HS 31.4	Legal	Legal	Legal
130'-0"	HS 20.3	HS 31.4	Legal	Legal	Legal
142'-6"	HS 15.7	HS 31.4	Legal	Legal	Legal
167'-6"	HS 15.7	HS 33.8	Legal	Legal	Legal
180'-0"	HS 15.5	HS 33.8	Legal	Legal	Legal
205'-0"	HS 15.5	HS 35.0	Legal	Legal	Legal
217'-6"	HS 15.2	HS 35.0	Legal	Legal	Legal
242'-6"	HS 15.2	HS 38.2	Legal	Legal	Legal

- Note:
1. Ratings were calculated using 1/2" integral wearing surface deducted from the slab as shown on the standard plans.
 2. Nominal roadway width is 28 feet.

H14-1 STANDARD REVISED JULY 1979

18" High Curb and Aluminum Handrail
6.75" Thick Deck Slab

Bridge Length	Inventory	Operating	Type 4	Legal Loads in Tons	
				Type 3S3	Type 3-3
30'-0"	HS 23.5	HS 32.3	Legal	Legal	Legal
42'-6"	HS 19.7	HS 31.5	Legal	Legal	Legal
55'-0"	HS 15.0	HS 33.8	Legal	Legal	Legal
67'-6"	HS 14.6	HS 34.8	Legal	Legal	Legal
80'-0"	HS 14.2	HS 37.9	Legal	Legal	Legal
92'-6"	HS 23.5	HS 32.3	Legal	Legal	Legal
105'-0"	HS 19.7	HS 31.5	Legal	Legal	Legal
130'-0"	HS 19.7	HS 31.5	Legal	Legal	Legal
142'-6"	HS 15.0	HS 31.5	Legal	Legal	Legal
167'-6"	HS 15.0	HS 33.8	Legal	Legal	Legal
180'-0"	HS 14.6	HS 33.8	Legal	Legal	Legal
205'-0"	HS 14.6	HS 34.8	Legal	Legal	Legal
217'-6"	HS 14.2	HS 34.8	Legal	Legal	Legal
242'-6"	HS 14.2	HS 37.9	Legal	Legal	Legal

- Note:
1. Ratings were calculated using 1/2" integral wearing surface deducted from the slab as shown on the standard plans.
 2. Nominal roadway width is 28 feet.

H15-75 ISSUED DECEMBER 1975

12" High Curb and Aluminum Handrail

<u>Bridge Length</u>	<u>Inventory</u>	<u>Operating</u>	<u>Legal Loads in Tons</u>		
			<u>Type 4</u>	<u>Type 3S3</u>	<u>Type 3-3</u>
30'-0"	HS 36.9	HS 50.1	Legal	Legal	Legal
42'-6"	HS 26.1	HS 43.9	Legal	Legal	Legal
55'-0"	HS 20.1	HS 42.4	Legal	Legal	Legal
67'-6"	HS 20.5	HS 45.9	Legal	Legal	Legal
80'-0"	HS 18.9	HS 47.3	Legal	Legal	Legal

H15-75 REVISED JULY 9, 1979

18" High Curb and Aluminum Handrail

<u>Bridge Length</u>	<u>Inventory</u>	<u>Operating</u>	<u>Legal Loads in Tons</u>		
			<u>Type 4</u>	<u>Type 3S3</u>	<u>Type 3-3</u>
30'-0"	HS 36.8	HS 50.0	Legal	Legal	Legal
42'-6"	HS 25.9	HS 43.7	Legal	Legal	Legal
55'-0"	HS 19.9	HS 42.2	Legal	Legal	Legal
67'-6"	HS 20.3	HS 45.6	Legal	Legal	Legal
80'-0"	HS 18.7	HS 47.1	Legal	Legal	Legal

- Note:
1. Ratings were calculated using 1/2" integral wearing surface deducted from the slab as shown on the standard plans.
 2. Nominal roadway width is 30 feet.

H16-70 STANDARD ISSUED JUNE 1969

12" High Curb and Aluminum Handrail

Bridge Length	Inventory	Operating	Legal Loads in Tons		
			Type 4	Type 3S3	Type 3-3
93'-0"	HS 37.0	HS 50.1	Legal	Legal	Legal
101'-4"	HS 28.2	HS 41.5	Legal	Legal	Legal
113'-10"	HS 26.1	HS 43.2	Legal	Legal	Legal
126'-4"	HS 23.0	HS 41.5	Legal	Legal	Legal
138'-10"	HS 22.6	HS 43.9	Legal	Legal	Legal
151'-4"	HS 20.1	HS 42.3	Legal	Legal	Legal
163'-10"	HS 21.5	HS 39.4	Legal	Legal	Legal
176'-4"	HS 22.2	HS 40.9	Legal	Legal	Legal
188'-10"	HS 20.5	HS 42.8	Legal	Legal	Legal
201'-4"	HS 20.9	HS 44.2	Legal	Legal	Legal
213'-10"	HS 19.9	HS 45.3	Legal	Legal	Legal
226'-4"	HS 18.9	HS 44.9	Legal	Legal	Legal
243'-0"	HS 18.9	HS 47.3	Legal	Legal	Legal

- Note:
1. Ratings were calculated using 1/2" integral wearing surface deducted from the slab as shown on the standard plans.
 2. Nominal roadway width is 30 feet.

H17-73 STANDARD ISSUED AUGUST 1973

12" High Curb and Aluminum Handrail

Bridge Length	Inventory	Operating	Legal Loads in Tons		
			Type 4	Type 3S3	Type 3-3
75'-0"	HS 24.2	HS 47.6	Legal	Legal	Legal
87'-6"	HS 21.7	HS 37.0	Legal	Legal	Legal
100'-0"	HS 20.2	HS 37.1	Legal	Legal	Legal
112'-6"	HS 18.2	HS 36.4	Legal	Legal	Legal
125'-0"	HS 16.4	HS 28.4	Legal	Legal	Legal

- Note:
1. Ratings were calculated using 1/2" integral wearing surface deducted from the slab as shown on the standard plans.
 2. Nominal roadway width is 30 feet.

H24-84 ISSUED AUGUST 1984

32" High Jersey Barrier Rail

<u>Bridge Length</u>	<u>Inventory</u>	<u>Operating</u>	<u>Type 4</u>	<u>Legal Loads in Tons</u>	
				<u>Type 3S3</u>	<u>Type 3-3</u>
126'-4"	HS 23.3	HS 41.2	Legal	Legal	Legal
138'-10"	HS 22.7	HS 41.4	Legal	Legal	Legal
151'-4"	HS 17.6	HS 37.5	Legal	Legal	Legal
163'-10"	HS 21.6	HS 38.9	Legal	Legal	Legal
176'-4"	HS 22.4	HS 40.3	Legal	Legal	Legal
188'-10"	HS 17.9	HS 40.8	Legal	Legal	Legal
201'-4"	HS 18.3	HS 39.9	Legal	Legal	Legal
213'-10"	HS 19.8	HS 44.5	Legal	Legal	Legal
226'-4"	HS 16.4	HS 39.9	Legal	Legal	Legal
243'-0"	HS 16.4	HS 42.3	Legal	Legal	Legal

H24-84 ISSUED AUGUST 1984

29" High Open Barrier Rail

<u>Bridge Length</u>	<u>Inventory</u>	<u>Operating</u>	<u>Type 4</u>	<u>Legal Loads in Tons</u>	
				<u>Type 3S3</u>	<u>Type 3-3</u>
126'-4"	HS 23.9	HS 41.8	Legal	Legal	Legal
138'-10"	HS 23.3	HS 42.0	Legal	Legal	Legal
151'-4"	HS 18.2	HS 38.2	Legal	Legal	Legal
163'-10"	HS 22.3	HS 39.6	Legal	Legal	Legal
176'-4"	HS 23.1	HS 41.0	Legal	Legal	Legal
188'-10"	HS 18.7	HS 41.7	Legal	Legal	Legal
201'-4"	HS 19.1	HS 40.8	Legal	Legal	Legal
213'-10"	HS 20.6	HS 45.3	Legal	Legal	Legal
226'-4"	HS 17.2	HS 40.8	Legal	Legal	Legal
243'-0"	HS 17.2	HS 43.2	Legal	Legal	Legal

- Note:
1. Ratings were calculated using 1/2" integral wearing surface deducted from the slab as shown on the standard plans.
 2. Nominal roadway width is 24 feet.

H24S-85 STANDARD ISSUED AUGUST 1985

32" High Jersey Barrier Rail

<u>Bridge Length</u>	<u>Inventory</u>	<u>Operating</u>	<u>Type 4</u>	<u>Legal Loads in Tons</u>	
				<u>Type 3S3</u>	<u>Type 3-3</u>
30'-0"	HS 37.3	HS 50.1	Legal	Legal	Legal
42'-6"	HS 25.5	HS 41.4	Legal	Legal	Legal
55'-0"	HS 17.6	HS 37.5	Legal	Legal	Legal
67'-6"	HS 17.9	HS 40.8	Legal	Legal	Legal
80'-0"	HS 16.4	HS 42.3	Legal	Legal	Legal

H24S-85 ISSUED AUGUST 1985

29" High Open Barrier Rail

<u>Bridge Length</u>	<u>Inventory</u>	<u>Operating</u>	<u>Type 4</u>	<u>Legal Loads in Tons</u>	
				<u>Type 3S3</u>	<u>Type 3-3</u>
30'-0"	HS 37.6	HS 50.6	Legal	Legal	Legal
42'-6"	HS 26.0	HS 42.0	Legal	Legal	Legal
55'-0"	HS 18.2	HS 38.2	Legal	Legal	Legal
67'-6"	HS 18.7	HS 41.6	Legal	Legal	Legal
80'-0"	HS 17.2	HS 43.2	Legal	Legal	Legal

- Note:
1. Ratings were calculated using 1/2" integral wearing surface deducted from the slab as shown on the standard plans.
 2. Nominal roadway width is 24 feet.

H24-87 ISSUED JANUARY 1987

32" High Jersey Barrier Rail

Bridge Length	Inventory	Operating	Type 4	Legal Loads in Tons	
				Type 3S3	Type 3-3
126'-4"	HS 23.3	HS 41.2	Legal	Legal	Legal
138'-10"	HS 22.7	HS 43.0	Legal	Legal	Legal
151'-4"	HS 21.9	HS 41.8	Legal	Legal	Legal
163'-10"	HS 23.8	HS 38.9	Legal	Legal	Legal
176'-4"	HS 23.4	HS 46.4	Legal	Legal	Legal
188'-10"	HS 22.8	HS 47.0	Legal	Legal	Legal
201'-4"	HS 23.5	HS 43.5	Legal	Legal	Legal
213'-10"	HS 24.1	HS 49.5	Legal	Legal	Legal
226'-4"	HS 21.8	HS 48.7	Legal	Legal	Legal
243'-0"	HS 21.8	HS 51.3	Legal	Legal	Legal

H24-87 ISSUED JANUARY 1987

29" High Open Barrier Rail

Bridge Length	Inventory	Operating	Type 4	Legal Loads in Tons	
				Type 3S3	Type 3-3
126'-4"	HS 23.6	HS 41.5	Legal	Legal	Legal
138'-10"	HS 23.0	HS 43.3	Legal	Legal	Legal
151'-4"	HS 22.2	HS 42.1	Legal	Legal	Legal
163'-10"	HS 24.1	HS 39.3	Legal	Legal	Legal
176'-4"	HS 23.7	HS 46.7	Legal	Legal	Legal
188'-10"	HS 23.1	HS 47.3	Legal	Legal	Legal
201'-4"	HS 23.9	HS 43.9	Legal	Legal	Legal
213'-10"	HS 24.5	HS 49.9	Legal	Legal	Legal
226'-4"	HS 22.2	HS 49.1	Legal	Legal	Legal
243'-0"	HS 22.2	HS 51.8	Legal	Legal	Legal

- Note:
1. Ratings were calculated using 1/2" integral wearing surface deducted from the slab as shown on the standard plans.
 2. Nominal roadway width is 24 feet.

H24S-87 ISSUED JANUARY 1987

32" High Jersey Barrier Rail

<u>Bridge Length</u>	<u>Inventory</u>	<u>Operating</u>	<u>Type 4</u>	<u>Legal Loads in Tons</u>	
				<u>Type 3S3</u>	<u>Type 3-3</u>
30'-0"	HS 37.3	HS 50.1	Legal	Legal	Legal
42'-6"	HS 26.5	HS 43.4	Legal	Legal	Legal
55'-0"	HS 21.9	HS 44.1	Legal	Legal	Legal
67'-6"	HS 22.8	HS 49.0	Legal	Legal	Legal
80'-0"	HS 21.8	HS 51.3	Legal	Legal	Legal

H24S-87 ISSUED JANUARY 1987

29" High Open Barrier Rail

<u>Bridge Length</u>	<u>Inventory</u>	<u>Operating</u>	<u>Type 4</u>	<u>Legal Loads in Tons</u>	
				<u>Type 3S3</u>	<u>Type 3-3</u>
30'-0"	HS 37.4	HS 50.3	Legal	Legal	Legal
42'-6"	HS 26.8	HS 43.7	Legal	Legal	Legal
55'-0"	HS 22.2	HS 44.4	Legal	Legal	Legal
67'-6"	HS 23.1	HS 49.4	Legal	Legal	Legal
80'-0"	HS 22.3	HS 51.8	Legal	Legal	Legal

- Note:
1. Ratings were calculated using 1/2" integral wearing surface deducted from the slab as shown on the standard plans.
 2. Nominal roadway width is 24 feet.

H30M-79 STANDARD ISSUED JUNE 1979
and REVISED NOVEMBER 29, 1982

32" High Jersey Barrier Rail

Bridge Length	Inventory	Operating	Legal Loads in Tons		
			Type 4	Type 3S3	Type 3-3
126'-4"	HS 22.3	HS 40.7	Legal	Legal	Legal
138'-10"	HS 21.8	HS 43.0	Legal	Legal	Legal
151'-4"	HS 16.7	HS 37.2	Legal	Legal	Legal
163'-10"	HS 20.6	HS 38.5	Legal	Legal	Legal
176'-4"	HS 21.3	HS 39.8	Legal	Legal	Legal
188'-10"	HS 17.1	HS 40.5	Legal	Legal	Legal
201'-4"	HS 17.2	HS 39.5	Legal	Legal	Legal
213'-10"	HS 18.8	HS 44.1	Legal	Legal	Legal
226'-4"	HS 15.4	HS 39.5	Legal	Legal	Legal
243'-0"	HS 15.4	HS 42.0	Legal	Legal	Legal

H30M-79 STANDARD ISSUED JUNE 1979
and REVISED NOVEMBER 29, 1984

32" High Jersey Barrier Rail
New Strand Pattern for A42 Beam (11/29/84)

Bridge Length	Inventory	Operating	Legal Loads in Tons		
			Type 4	Type 3S3	Type 3-3
138'-10"	HS 21.8	HS 41.0	Legal	Legal	Legal

- Note:
1. Ratings were calculated using 1/2" integral wearing surface deducted from the slab as shown on the standard plans.
 2. Nominal roadway width is 30 feet.

H30M-79 STANDARD REVISED MAY 10, 1982

34" High Jersey Barrier Rail

<u>Bridge Length</u>	<u>Inventory</u>	<u>Operating</u>	<u>Legal Loads in Tons</u>		
			<u>Type 4</u>	<u>Type 3S3</u>	<u>Type 3-3</u>
126'-4"	HS 22.2	HS 40.7	Legal	Legal	Legal
138'-10"	HS 21.8	HS 42.9	Legal	Legal	Legal
151'-4"	HS 16.7	HS 37.1	Legal	Legal	Legal
163'-10"	HS 20.5	HS 38.4	Legal	Legal	Legal
176'-4"	HS 21.3	HS 39.8	Legal	Legal	Legal
188'-10"	HS 17.0	HS 40.5	Legal	Legal	Legal
201'-4"	HS 17.1	HS 39.4	Legal	Legal	Legal
213'-10"	HS 18.7	HS 44.0	Legal	Legal	Legal
226'-4"	HS 15.3	HS 39.4	Legal	Legal	Legal
243'-0"	HS 15.3	HS 41.8	Legal	Legal	Legal

H30M-79 REVISED MAY 10, 1982

34" High Jersey Barrier Rail
New Strand Pattern for A42 Beam (11/29/84)

<u>Bridge Length</u>	<u>Inventory</u>	<u>Operating</u>	<u>Legal Loads in Tons</u>		
			<u>Type 4</u>	<u>Type 3S3</u>	<u>Type 3-3</u>
138'-10"	HS 21.8	HS 40.9	Legal	Legal	Legal

- Note:
1. Ratings were calculated using 1/2" integral wearing surface deducted from the slab as shown on the standard plans.
 2. Nominal roadway width is 30 feet.

H30-87 ISSUED JUNE 1987

32" High Jersey Barrier Rail

<u>Bridge Length</u>	<u>Inventory</u>	<u>Operating</u>	<u>Type 4</u>	<u>Legal Loads in Tons</u>	
				<u>Type 3S3</u>	<u>Type 3-3</u>
126'-4"	HS 23.7	HS 41.6	Legal	Legal	Legal
138'-10"	HS 23.2	HS 43.4	Legal	Legal	Legal
151'-4"	HS 22.3	HS 42.2	Legal	Legal	Legal
163'-10"	HS 24.2	HS 39.4	Legal	Legal	Legal
176'-4"	HS 23.9	HS 46.9	Legal	Legal	Legal
188'-10"	HS 23.3	HS 47.5	Legal	Legal	Legal
201'-4"	HS 24.1	HS 44.0	Legal	Legal	Legal
213'-10"	HS 24.7	HS 50.0	Legal	Legal	Legal
226'-4"	HS 22.4	HS 49.2	Legal	Legal	Legal
243'-0"	HS 22.4	HS 52.0	Legal	Legal	Legal

H30-87 ISSUED JUNE 1987

29" High Open Barrier Rail

<u>Bridge Length</u>	<u>Inventory</u>	<u>Operating</u>	<u>Type 4</u>	<u>Legal Loads in Tons</u>	
				<u>Type 3S3</u>	<u>Type 3-3</u>
126'-4"	HS 23.9	HS 41.8	Legal	Legal	Legal
138'-10"	HS 23.4	HS 43.7	Legal	Legal	Legal
151'-4"	HS 22.6	HS 42.5	Legal	Legal	Legal
163'-10"	HS 24.5	HS 39.6	Legal	Legal	Legal
176'-4"	HS 24.1	HS 47.2	Legal	Legal	Legal
188'-10"	HS 23.6	HS 47.8	Legal	Legal	Legal
201'-4"	HS 24.4	HS 44.3	Legal	Legal	Legal
213'-10"	HS 25.0	HS 50.3	Legal	Legal	Legal
226'-4"	HS 22.7	HS 49.6	Legal	Legal	Legal
243'-0"	HS 22.7	HS 52.3	Legal	Legal	Legal

- Note:
1. Ratings were calculated using 1/2" integral wearing surface deducted from the slab as shown on the standard plans.
 2. Nominal roadway width is 30 feet.

H30S-87 ISSUED JUNE 1987

32" High Jersey Barrier Rail

<u>Bridge Length</u>	<u>Inventory</u>	<u>Operating</u>	<u>Type 4</u>	<u>Legal Loads in Tons</u>	
				<u>Type 3S3</u>	<u>Type 3-3</u>
30'-0"	HS 37.5	HS 50.4	Legal	Legal	Legal
42'-6"	HS 26.9	HS 43.8	Legal	Legal	Legal
55'-0"	HS 22.3	HS 44.6	Legal	Legal	Legal
67'-6"	HS 23.3	HS 49.6	Legal	Legal	Legal
80'-0"	HS 22.4	HS 52.0	Legal	Legal	Legal

H30S-87 ISSUED JUNE 1987

29" High Open Barrier Rail

<u>Bridge Length</u>	<u>Inventory</u>	<u>Operating</u>	<u>Type 4</u>	<u>Legal Loads in Tons</u>	
				<u>Type 3S3</u>	<u>Type 3-3</u>
30'-0"	HS 37.6	HS 50.6	Legal	Legal	Legal
42'-6"	HS 27.0	HS 44.1	Legal	Legal	Legal
55'-0"	HS 22.6	HS 44.9	Legal	Legal	Legal
67'-6"	HS 23.6	HS 49.9	Legal	Legal	Legal
80'-0"	HS 22.8	HS 52.4	Legal	Legal	Legal

- Note:
1. Ratings were calculated using 1/2" integral wearing surface deducted from the slab as shown on the standard plans.
 2. Nominal roadway width is 30 feet.

J7 STANDARD ISSUED 1960

12" High Curb and Steel Handrail

<u>Bridge Length</u>	<u>Inventory</u>	<u>Operating</u>	<u>Legal Loads in Tons</u>		
			<u>Type 4</u>	<u>Type 3S3</u>	<u>Type 3-3</u>
18'-0"	HS 17.5	HS 27.7	Legal	Legal	Legal
24'-0"	HS 19.2	HS 32.3	Legal	Legal	Legal
30'-0"	HS 18.9	HS 33.8	Legal	Legal	Legal

J7 STANDARD REVISED 1967

12" High Curb and Aluminum Handrail

<u>Bridge Length</u>	<u>Inventory</u>	<u>Operating</u>	<u>Legal Loads in Tons</u>		
			<u>Type 4</u>	<u>Type 3S3</u>	<u>Type 3-3</u>
18'-0"	HS 17.5	HS 27.7	Legal	Legal	Legal
24'-0"	HS 19.2	HS 32.3	Legal	Legal	Legal
30'-0"	HS 18.9	HS 33.9	Legal	Legal	Legal

J7 STANDARD REVISED 1979

18" High Curb and Aluminum Handrail

<u>Bridge Length</u>	<u>Inventory</u>	<u>Operating</u>	<u>Legal Loads in Tons</u>		
			<u>Type 4</u>	<u>Type 3S3</u>	<u>Type 3-3</u>
18'-0"	HS 17.4	HS 27.6	Legal	Legal	Legal
24'-0"	HS 19.1	HS 32.2	Legal	Legal	Legal
30'-0"	HS 18.7	HS 33.7	Legal	Legal	Legal

- Note: 1. Ratings were calculated using 1/2" integral wearing surface deducted from the slab as shown on the standard plans.
2. Nominal roadway width is 28 feet.

J8 STANDARD ISSUED 1960

12" High Curb and Steel Handrail

<u>Bridge Length</u>	<u>Inventory</u>	<u>Operating</u>	<u>Legal Loads in Tons</u>		
			<u>Type 4</u>	<u>Type 3S3</u>	<u>Type 3-3</u>
75'-0"	HS 16.3	HS 28.3	Legal	Legal	Legal
100'-0"	HS 18.6	HS 30.6	Legal	Legal	Legal
125'-0"	HS 18.6	HS 32.0	Legal	Legal	Legal

J8 STANDARD REVISED 1967

12" High Curb and Aluminum Handrail

<u>Bridge Length</u>	<u>Inventory</u>	<u>Operating</u>	<u>Legal Loads in Tons</u>		
			<u>Type 4</u>	<u>Type 3S3</u>	<u>Type 3-3</u>
75'-0"	HS 16.3	HS 28.3	Legal	Legal	Legal
100'-0"	HS 18.7	HS 30.7	Legal	Legal	Legal
125'-0"	HS 18.6	HS 32.0	Legal	Legal	Legal

J8 STANDARD REVISED 1979

18" High Curb and Aluminum Handrail

<u>Bridge Length</u>	<u>Inventory</u>	<u>Operating</u>	<u>Legal Loads in Tons</u>		
			<u>Type 4</u>	<u>Type 3S3</u>	<u>Type 3-3</u>
75'-0"	HS 16.2	HS 28.2	Legal	Legal	Legal
100'-0"	HS 18.5	HS 30.5	Legal	Legal	Legal
125'-0"	HS 18.5	HS 31.9	Legal	Legal	Legal

- Note: 1. Ratings were calculated using 1/2" integral wearing surface deducted from the slab as shown on the standard plans.
2. Nominal roadway width is 28 feet.

J15 STANDARD ISSUED 1975

12" High Curb and Aluminum Handrail

<u>Bridge Length</u>	<u>Inventory</u>	<u>Operating</u>	<u>Legal Loads in Tons</u>		
			<u>Type 4</u>	<u>Type 3S3</u>	<u>Type 3-3</u>
18'-0"	HS 20.9	HS 32.6	Legal	Legal	Legal
24'-0"	HS 22.1	HS 36.4	Legal	Legal	Legal
30'-0"	HS 20.2	HS 36.7	Legal	Legal	Legal

J15 STANDARD REVISED 1979

18" High Curb and Aluminum Handrail

<u>Bridge Length</u>	<u>Inventory</u>	<u>Operating</u>	<u>Legal Loads in Tons</u>		
			<u>Type 4</u>	<u>Type 3S3</u>	<u>Type 3-3</u>
18'-0"	HS 20.8	HS 32.5	Legal	Legal	Legal
24'-0"	HS 21.9	HS 36.2	Legal	Legal	Legal
30'-0"	HS 20.0	HS 36.5	Legal	Legal	Legal

- Note: 1. Ratings were calculated using 1/2" integral wearing surface deducted from the slab as shown on the standard plans.
2. Nominal roadway width is 30 feet.

J16 STANDARD ISSUED 1970

12" High Curb and Aluminum Handrail

Built with Flat Bottom Option:

<u>Bridge Length</u>	<u>Inventory</u>	<u>Operating</u>	<u>Legal Loads in Tons</u>		
			<u>Type 4</u>	<u>Type 3S3</u>	<u>Type 3-3</u>
75'-0"	HS 23.9	HS 36.4	Legal	Legal	Legal
87'-6"	HS 21.2	HS 33.2	Legal	Legal	Legal
100'-0"	HS 21.2	HS 33.9	Legal	Legal	Legal
112'-6"	HS 20.0	HS 33.1	Legal	Legal	Legal
125'-0"	HS 20.3	HS 34.8	Legal	Legal	Legal

Built with Sloped Bottom Option:

<u>Bridge Length</u>	<u>Inventory</u>	<u>Operating</u>	<u>Legal Loads in Tons</u>		
			<u>Type 4</u>	<u>Type 3S3</u>	<u>Type 3-3</u>
75'-0"	HS 20.2	HS 32.1	Legal	Legal	Legal
87'-6"	HS 18.6	HS 29.7	Legal	Legal	Legal
100'-0"	HS 18.4	HS 30.5	Legal	Legal	Legal
112'-6"	HS 17.5	HS 30.0	Legal	Legal	Legal
125'-0"	HS 18.5	HS 31.9	Legal	Legal	Legal

- Note: 1. Ratings were calculated using 1/2" integral wearing surface deducted from the slab as shown on the standard plans.
 2. Nominal roadway width is 30 feet.

J24-84 STANDARD ISSUED 1984

2'-8" High Barrier Rail

Built with Flat Bottom Option:

Bridge Length	Inventory	Operating	Legal Loads in Tons		
			Type 4	Type 3S3	Type 3-3
75'-0"	HS 22.6	HS 42.6	Legal	Legal	Legal
87'-6"	HS 23.8	HS 40.9	Legal	Legal	Legal
100'-0"	HS 22.9	HS 40.3	Legal	Legal	Legal
112'-6"	HS 20.7	HS 37.9	Legal	Legal	Legal
125'-0"	HS 20.2	HS 38.7	Legal	Legal	Legal

Built with Sloped Bottom Option:

Bridge Length	Inventory	Operating	Legal Loads in Tons		
			Type 4	Type 3S3	Type 3-3
75'-0"	HS 19.3	HS 35.9	Legal	Legal	Legal
87'-6"	HS 20.9	HS 36.3	Legal	Legal	Legal
100'-0"	HS 20.4	HS 36.2	Legal	Legal	Legal
112'-6"	HS 18.5	HS 34.2	Legal	Legal	Legal
125'-0"	HS 18.2	HS 35.3	Legal	Legal	Legal

2'-5" High Open Rail

Built with Flat Bottom Option:

Bridge Length	Inventory	Operating	Legal Loads in Tons		
			Type 4	Type 3S3	Type 3-3
75'-0"	HS 23.3	HS 43.0	Legal	Legal	Legal
87'-6"	HS 24.2	HS 41.3	Legal	Legal	Legal
100'-0"	HS 23.2	HS 40.6	Legal	Legal	Legal
112'-6"	HS 21.1	HS 38.4	Legal	Legal	Legal
125'-0"	HS 20.7	HS 39.1	Legal	Legal	Legal

Built with Sloped Bottom Option:

Bridge Length	Inventory	Operating	Legal Loads in Tons		
			Type 4	Type 3S3	Type 3-3
75'-0"	HS 20.0	HS 36.5	Legal	Legal	Legal
87'-6"	HS 21.3	HS 36.7	Legal	Legal	Legal
100'-0"	HS 20.8	HS 36.6	Legal	Legal	Legal
112'-6"	HS 18.9	HS 34.7	Legal	Legal	Legal
125'-0"	HS 18.7	HS 35.8	Legal	Legal	Legal

- Note:
1. Ratings were calculated using 1/2" integral wearing surface deducted from the slab as shown on the standard plans.
 2. Nominal roadway width is 24 feet.

J24-87 STANDARD ISSUED 1987

2'-8" High Barrier Rail

Built with Flat Bottom Option:

Bridge Length	Inventory	Operating	Legal Loads in Tons		
			Type 4	Type 3S3	Type 3-3
75'-0"	HS 25.6	HS 42.7	Legal	Legal	Legal
87'-6"	HS 24.8	HS 42.2	Legal	Legal	Legal
100'-0"	HS 25.5	HS 44.3	Legal	Legal	Legal
112'-6"	HS 26.2	HS 45.3	Legal	Legal	Legal
125'-0"	HS 26.4	HS 46.9	Legal	Legal	Legal

Built with Sloped Bottom Option:

Bridge Length	Inventory	Operating	Legal Loads in Tons		
			Type 4	Type 3S3	Type 3-3
75'-0"	HS 22.1	HS 37.8	Legal	Legal	Legal
87'-6"	HS 21.9	HS 37.6	Legal	Legal	Legal
100'-0"	HS 22.7	HS 38.7	Legal	Legal	Legal
112'-6"	HS 23.4	HS 38.2	Legal	Legal	Legal
125'-0"	HS 23.1	HS 40.1	Legal	Legal	Legal

2'-5" High Open Rail

Built with Flat Bottom Option:

Bridge Length	Inventory	Operating	Legal Loads in Tons		
			Type 4	Type 3S3	Type 3-3
75'-0"	HS 25.8	HS 42.9	Legal	Legal	Legal
87'-6"	HS 25.0	HS 42.4	Legal	Legal	Legal
100'-0"	HS 25.6	HS 44.5	Legal	Legal	Legal
112'-6"	HS 26.3	HS 45.5	Legal	Legal	Legal
125'-0"	HS 26.6	HS 47.1	Legal	Legal	Legal

Built with Sloped Bottom Option:

Bridge Length	Inventory	Operating	Legal Loads in Tons		
			Type 4	Type 3S3	Type 3-3
75'-0"	HS 22.4	HS 38.0	Legal	Legal	Legal
87'-6"	HS 22.1	HS 37.8	Legal	Legal	Legal
100'-0"	HS 22.8	HS 38.9	Legal	Legal	Legal
112'-6"	HS 23.6	HS 38.5	Legal	Legal	Legal
125'-0"	HS 23.7	HS 40.4	Legal	Legal	Legal

- Note: 1. Ratings were calculated using 1/2" integral wearing surface deducted from the slab as shown on the standard plans.
 2. Nominal roadway width is 24 feet.

J30C-79 STANDARD ISSUED 1979

2'-8" High Barrier Rail

Built with Flat Bottom Option:

<u>Bridge Length</u>	<u>Inventory</u>	<u>Operating</u>	<u>Legal Loads in Tons</u>		
			<u>Type 4</u>	<u>Type 3S3</u>	<u>Type 3-3</u>
75'-0"	HS 22.6	HS 37.5	Legal	Legal	Legal
87'-6"	HS 22.9	HS 36.7	Legal	Legal	Legal
100'-0"	HS 21.4	HS 34.3	Legal	Legal	Legal
112'-6"	HS 20.1	HS 33.2	Legal	Legal	Legal
125'-0"	HS 20.4	HS 34.6	Legal	Legal	Legal

Built with Sloped Bottom Option:

<u>Bridge Length</u>	<u>Inventory</u>	<u>Operating</u>	<u>Legal Loads in Tons</u>		
			<u>Type 4</u>	<u>Type 3S3</u>	<u>Type 3-3</u>
75'-0"	HS 19.1	HS 32.5	Legal	Legal	Legal
87'-6"	HS 19.5	HS 32.3	Legal	Legal	Legal
100'-0"	HS 18.9	HS 30.4	Legal	Legal	Legal
112'-6"	HS 17.8	HS 29.6	Legal	Legal	Legal
125'-0"	HS 18.2	HS 31.1	Legal	Legal	Legal

- Note: 1. Ratings were calculated using 1/2" integral wearing surface deducted from the slab as shown on the standard plans.
 2. Nominal roadway width is 30 feet.

J30C-87 STANDARD ISSUED 1987

2'-8" High Barrier Rail

Built with Flat Bottom Option:

Bridge Length	Inventory	Operating	Legal Loads in Tons		
			Type 4	Type 3S3	Type 3-3
75'-0"	HS 25.8	HS 42.9	Legal	Legal	Legal
87'-6"	HS 25.1	HS 42.5	Legal	Legal	Legal
100'-0"	HS 25.7	HS 44.5	Legal	Legal	Legal
112'-6"	HS 26.3	HS 45.5	Legal	Legal	Legal
125'-0"	HS 26.6	HS 47.1	Legal	Legal	Legal

Built with Sloped Bottom Option:

Bridge Length	Inventory	Operating	Legal Loads in Tons		
			Type 4	Type 3S3	Type 3-3
75'-0"	HS 22.5	HS 38.0	Legal	Legal	Legal
87'-6"	HS 22.2	HS 37.9	Legal	Legal	Legal
100'-0"	HS 22.9	HS 38.9	Legal	Legal	Legal
112'-6"	HS 23.7	HS 38.4	Legal	Legal	Legal
125'-0"	HS 23.8	HS 40.4	Legal	Legal	Legal

2'-5" High Open Rail

Built with Flat Bottom Option:

Bridge Length	Inventory	Operating	Legal Loads in Tons		
			Type 4	Type 3S3	Type 3-3
75'-0"	HS 25.9	HS 43.0	Legal	Legal	Legal
87'-6"	HS 25.1	HS 42.6	Legal	Legal	Legal
100'-0"	HS 25.8	HS 44.7	Legal	Legal	Legal
112'-6"	HS 26.5	HS 45.6	Legal	Legal	Legal
125'-0"	HS 26.8	HS 47.2	Legal	Legal	Legal

Built with Sloped Bottom Option:

Bridge Length	Inventory	Operating	Legal Loads in Tons		
			Type 4	Type 3S3	Type 3-3
75'-0"	HS 22.7	HS 38.1	Legal	Legal	Legal
87'-6"	HS 22.3	HS 38.0	Legal	Legal	Legal
100'-0"	HS 23.1	HS 39.1	Legal	Legal	Legal
112'-6"	HS 23.8	HS 38.6	Legal	Legal	Legal
125'-0"	HS 24.3	HS 40.6	Legal	Legal	Legal

- Note: 1. Ratings were calculated using 1/2" integral wearing surface deducted from the slab as shown on the standard plans.
 2. Nominal roadway width is 30 feet.

V15-75 STANDARD ISSUED 1975

Bridge Length	Inventory	Operating	Legal Loads in Tons		
			Type 4	Type 3S3	Type 3-3
23'-9"	HS 25.4	HS 39.0	Legal	Legal	Legal
30'-0"	HS 23.6	HS 36.7	Legal	Legal	Legal
42'-6"	HS 18.4	HS 30.2	Legal	Legal	Legal
55'-0"	HS 14.4	HS 25.2	Legal	Legal	Legal
67'-0"	HS 14.3	HS 26.3	Legal	Legal	Legal
80'-0"	HS 15.4	HS 29.1	Legal	Legal	Legal

V16-70 STANDARD ISSUED 1970

Bridge Length	Inventory	Operating	Legal Loads in Tons		
			Type 4	Type 3S3	TYPE 3-3
125'-0"	HS 33.4	HS 48.0	Legal	Legal	Legal
150'-0"	HS 24.6	HS 36.1	Legal	Legal	Legal
175'-0"	HS 23.6	HS 35.0	Legal	Legal	Legal
200'-0"	HS 18.7	HS 29.0	Legal	Legal	Legal
225'-0"	HS 17.6	HS 27.2	Legal	Legal	Legal
250'-0"	HS 18.6	HS 29.3	Legal	Legal	Legal

V30C-79 STANDARD ISSUED 1979

Bridge Length	Inventory	Operating	Legal Loads in Tons		
			Type 4	Type 3S3	TYPE 3-3
125'-0"	HS 32.1	HS 46.2	Legal	Legal	Legal
150'-0"	HS 23.5	HS 34.7	Legal	Legal	Legal
175'-0"	HS 23.0	HS 34.2	Legal	Legal	Legal
200'-0"	HS 18.0	HS 28.0	Legal	Legal	Legal
225'-0"	HS 16.9	HS 26.3	Legal	Legal	Legal
250'-0"	HS 17.7	HS 28.3	Legal	Legal	Legal

- Notes:
1. Ratings were calculated using 1/2" integral wearing surface deducted from the slab as shown on the standard plans.
 2. Nominal roadway width is 30 feet.