Bridge Load Ratings

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MnDOT Bridge Rating Engineer

Outline

1. Introduction
2. Loads and Load Factors
3. Process of Load and Resistance Factor Rating (LRFR)
4. Limit States & Reliability
5. Special Type Superstructures
6. Load Posting
7. Assigned Bridge Ratings & Physical Inspection Rating (PIR)
8. MnDOT Rating Forms

Introduction

- Purposes of Load Rating
  - Ensure Bridge Safety
  - Comply with Federal Regulations
  - Rehabilitation or Replacement Needs
  - Processing of Overload Permits
  - Posting Needs

Introduction

- When Should a Load Rating be Performed?
  - New Bridges
  - Change in the Live Loads
  - Change in the Dead Loads
  - Change in the Physical Condition
  - Change in the Specifications, Laws, or Software

Introduction

Introduction

- References
  - The Manual for Bridge Evaluation (MBE), 2nd Edition, AASHTO
  - MnDOT LRFD Bridge Design Manual, Chapter 15
  - MnDOT Inspection Manual, Appendix B
  - AASHTO LRFD Bridge Design Specifications, 5th Edition

Introduction

- Definition of Load Rating
  - Live Load Capacity of a Bridge
    - Using as-built bridge plans including all modification/rehabilitation plans
    - Using latest field inspection report (NBIS)
  - Expressed as a Rating Factor (RF) – LRFR
    - For example: RF = 1.3
  - Expressed in a Tonnage for a Particular Vehicle – LFR/ASR
    - For example: HS 26

Introduction

- Rating Levels
  - Inventory Rating
    - Safe for state legal loads within federal weight laws (Formula B) and LRFD exclusion limits
    - Comparable to new design
  - Operating Rating
    - Safe for state legal loads within federal weight laws
    - Safe for permit crossing

Introduction

- Rating Methods
  - Load and Resistance Factor Rating (LRFR)
    - Uniform reliability
    - Probabilistic methods to derive load and resistance factors
  - Load Factor Rating
    - Strength Based
    - No guidance on adjusting Load & Resistance factors
  - Allowable Stress Rating

Introduction

- MnDOT Status
  - Load and Resistance Factor Rating (LRFR) is used for
    - New bridges (mainly after 2010)
    - Major rehab bridges designed by HL-93
    - Major complex bridges
    - Some existing curved steel girder bridges
  - Load Factor Rating is used for
    - Existing bridges
    - Minor rehab/repair bridges
    - Posting and permitting requests
  - Allowable Stress Rating is used for
    - Timber bridges
    - Any bridges can not be rated by other methods

Loads and Load Factors

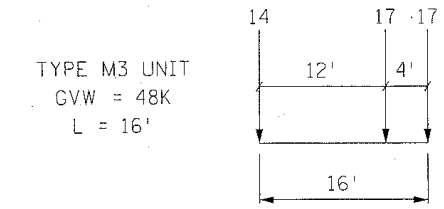
- Loads for Ratings
  - Design Load – HL-93 (LRFR) or HS 20 (LFR/ASR)
    - Notional load for screening
    - Inventory rating level and Operating rating level
    - Bridge plan data block
  - MN Legal Trucks and AASHTO Special Hauling Vehicles (SHVs)
    - Operating rating level only
    - Bridge posting determination
  - MN Standard Permit Trucks
    - Operating rating level only
    - Overweight permit determination

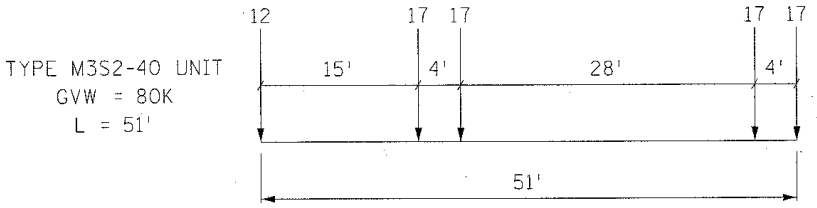
Loads and Load Factors

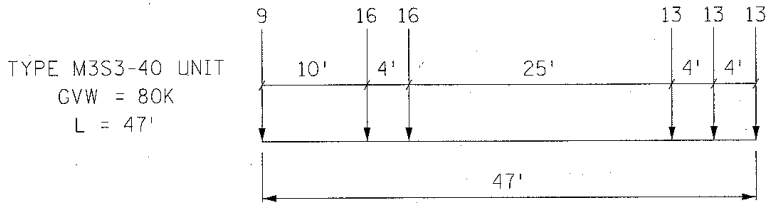
- MN Legal Loads

APPENDIX 15-D

MINNESOTA LEGAL (POSTING) LOADS

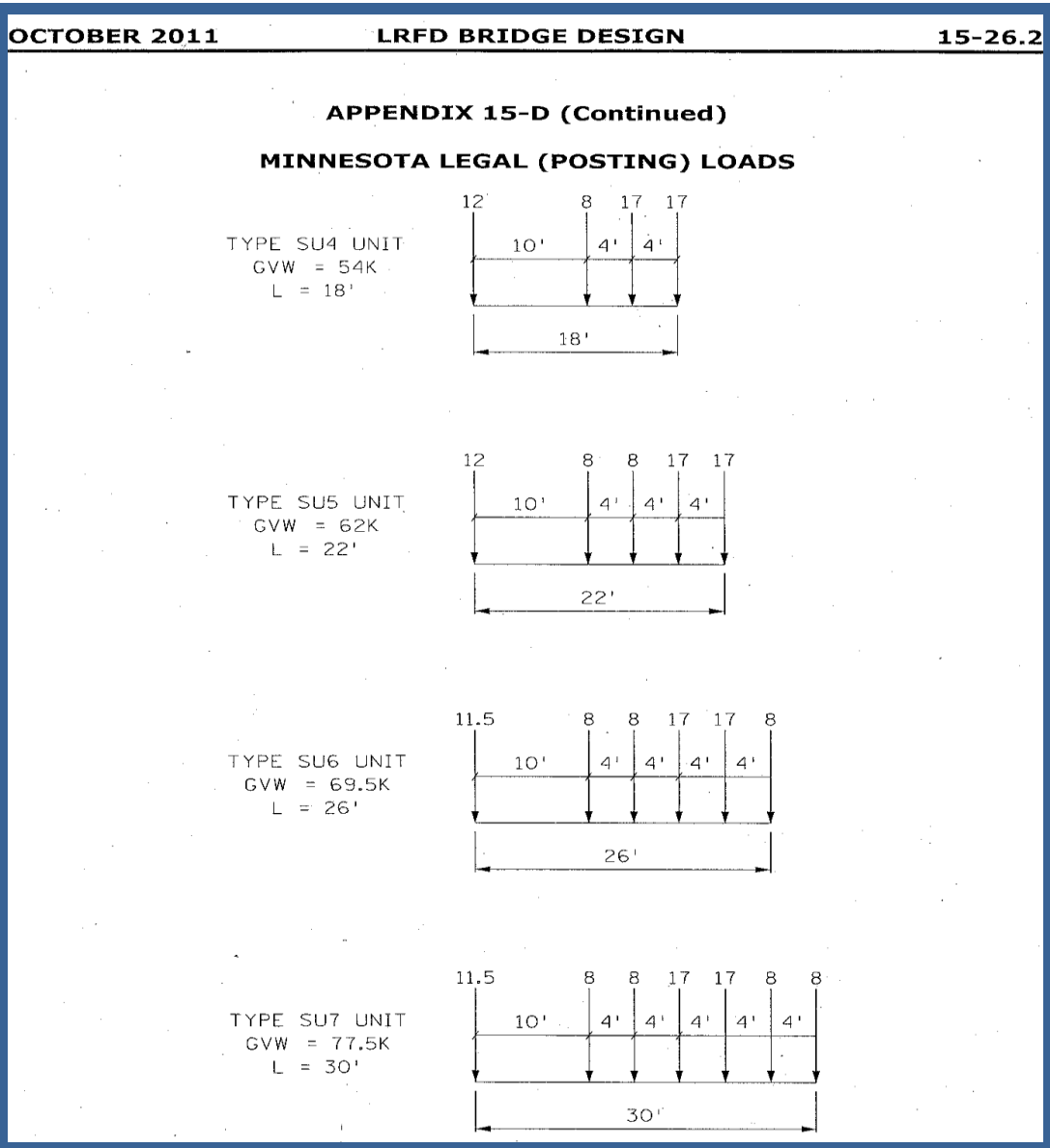






Loads and Load Factors

- AASHTO SHVs



OCTOBER 2011 LRFD BRIDGE DESIGN 15-26.2

APPENDIX 15-D (Continued)

MINNESOTA LEGAL (POSTING) LOADS

TYPE SU4 UNIT
GVW = 54K
L = 18'

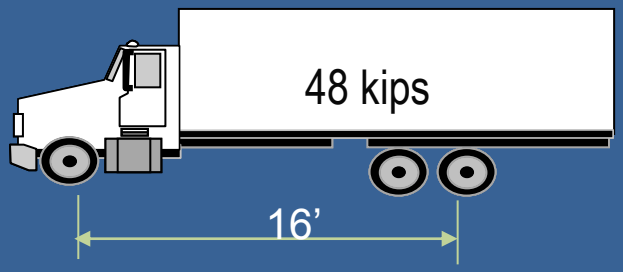
TYPE SU5 UNIT
GVW = 62K
L = 22'

TYPE SU6 UNIT
GVW = 69.5K
L = 26'

TYPE SU7 UNIT
GVW = 77.5K
L = 30'

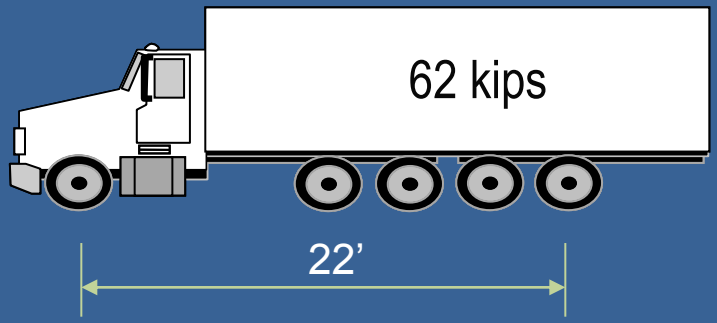
Loads and Load Factors

MnDOT Single Truck Posting Model



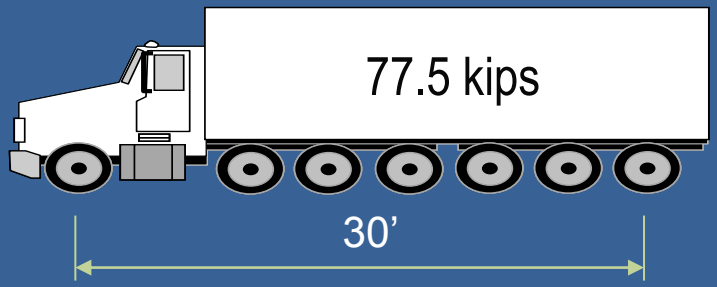
Type 3

New AASHTO Specialized Hauling Vehicle – 5 axle Posting Model



SU5

New AASHTO Specialized Hauling Vehicle – 7 axle Posting Model



SU7

Loads and Load Factors

1960 -1970 ‘s

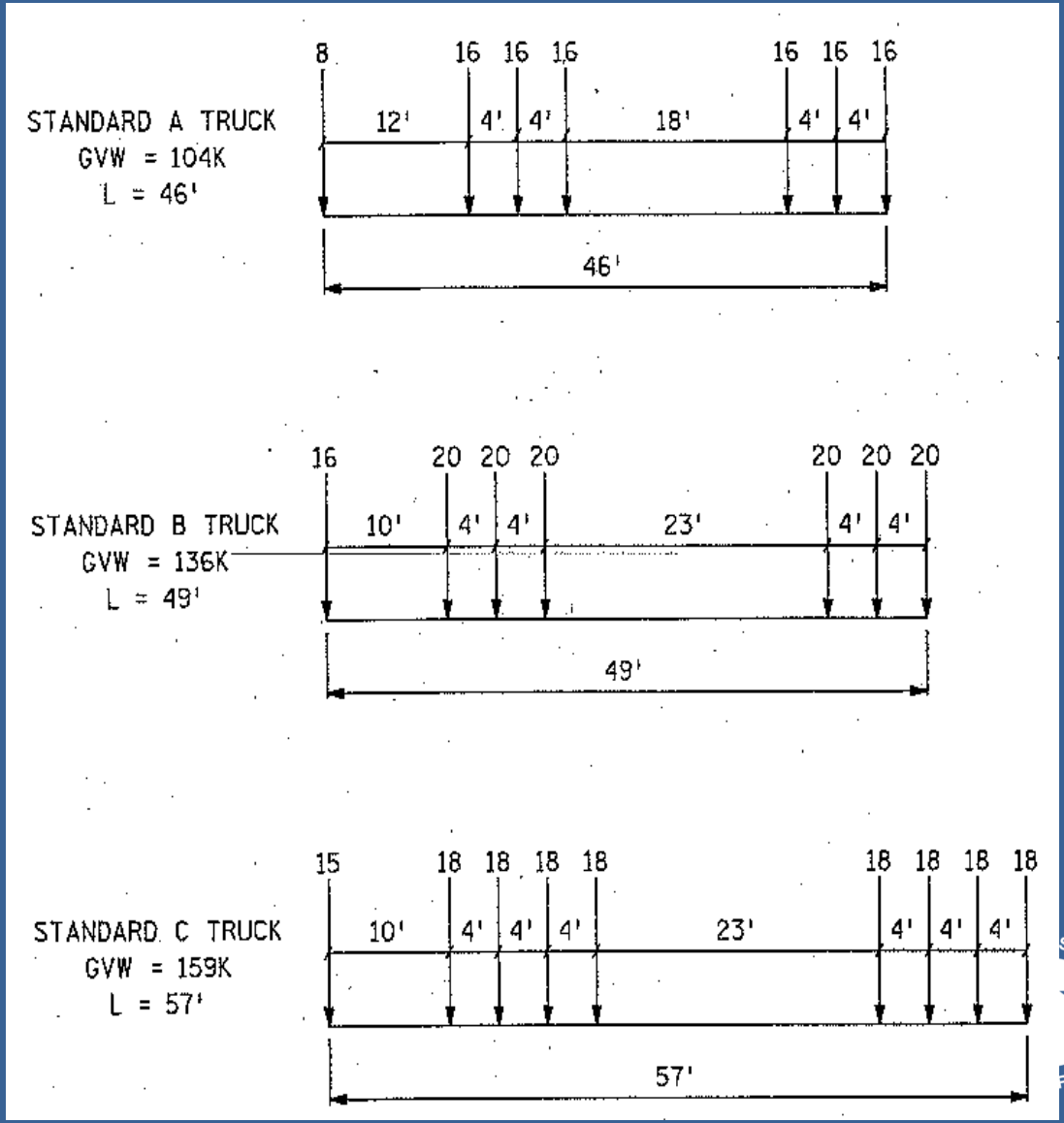
Today

Loads and Load Factors

- MnDOT Standard Permit Loads
  - Annual Permit Truck Models
    - Standard A, B, and C
    - Total Weight ≤145,000 LB
  - Single Trip Permit Trucks Models
    - P411 and P413
    - Additional Standard Permit Trucks G-07
  - Uniform Lane Load of 200 PLF for Span>200’

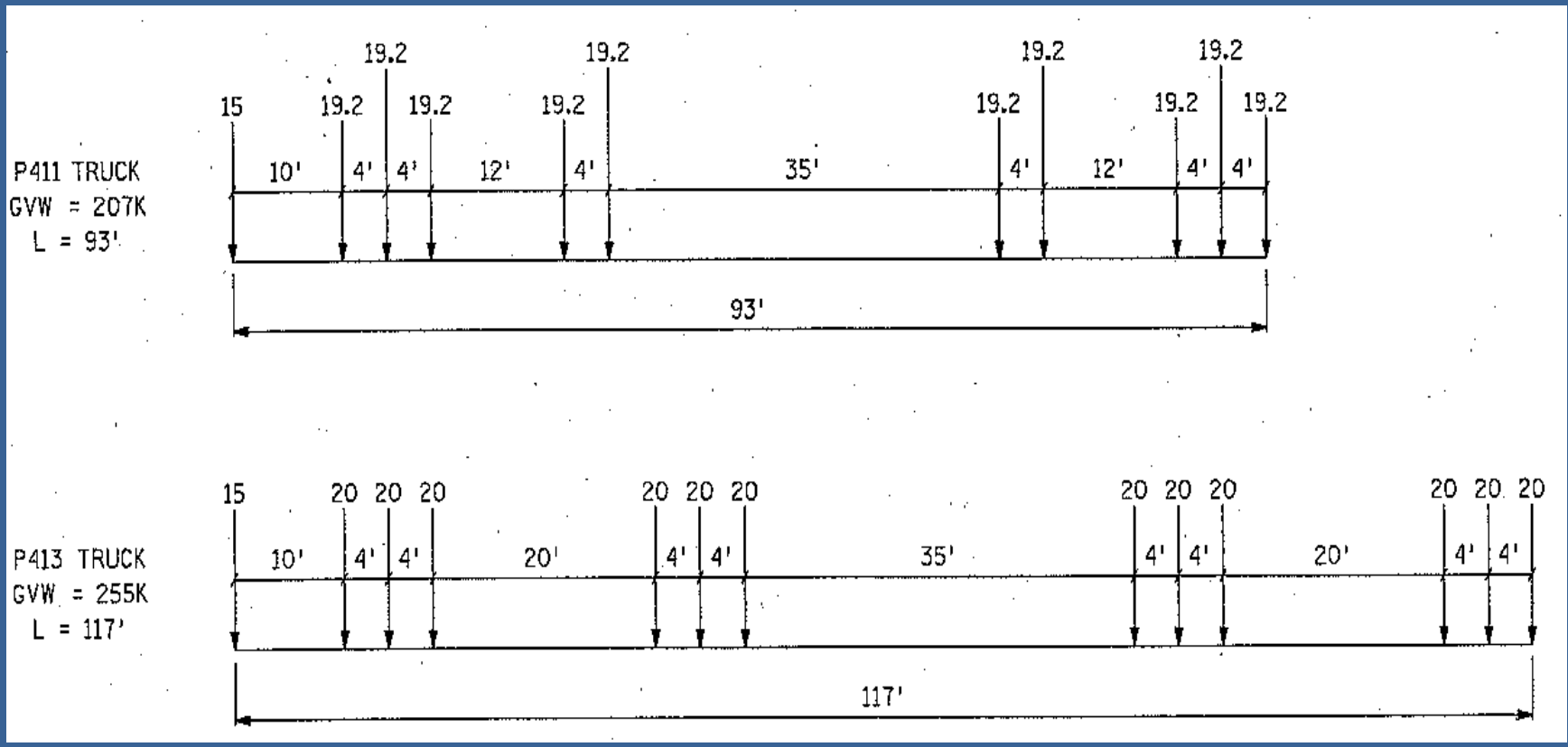
Loads and Load Factors

MnDOT Standard Annual Permit Load Models



Loads and Load Factors

MnDOT Standard Single Trip Permit Load Models



Loads and Load Factors

Total Weight = 703,000 LB

Loads and Load Factors

- LFR Load Factors
  - DL load factor = 1.3
  - LL load factor at inventory level = 2.17
  - LL load factor at operating level = 1.3

Loads and Load Factors

- LRFR Load Factors

Table B6A-1—Limit States and Load Factors for Load Rating (6A.4.2.2-1)

Bridge Type	Limit State*	Dead Load *DC*	Dead Load *DW*	Design Load Inventory *LL*	Design Load Operating *LL*	Legal Load *LL*	Permit Load *LL*
Steel	Strength I	1.25	1.50	1.75	1.35	Tables 6A.4.4.2.3a-1 and 6A.4.4.2.3b-1	—
	Strength II	1.25	1.50	—	—	—	Table 6A.4.5.4.2a-1
	Service II	1.00	1.00	1.30	1.00	1.30	1.00
	Fatigue	0.00	0.00	0.75	—	—	—
Reinforced Concrete	Strength I	1.25	1.50	1.75	1.35	Tables 6A.4.4.2.3a-1 and 6A.4.4.2.3b-1	—
	Strength II	1.25	1.50	—	—	—	Table 6A.4.5.4.2a-1
	Service I	1.00	1.00	—	—	—	1.00
Prestressed Concrete	Strength I	1.25	1.50	1.75	1.35	Tables 6A.4.4.2.3a-1 and 6A.4.4.2.3b-1	—
	Strength II	1.25	1.50	—	—	—	Table 6A.4.5.4.2a-1
	Service III	1.00	1.00	0.80	—	1.00	—
	Service I	1.00	1.00	—	—	—	1.00
Wood	Strength I	1.25	1.50	1.75	1.35	Tables 6A.4.4.2.3a-1 and 6A.4.4.2.3b-1	—
	Strength II	1.25	1.50	—	—	–	Table 6A.4.5.4.2a-1

Loads and Load Factors

- LRFR Load Factors

Table B6A-2—Generalized Live Load Factors for Legal Loads: γ_L (6A.4.4.2.3a-1)

Traffic Volume (one direction)	Load Factor
Unknown	1.80
$ADTT \geq 5000$	1.80
$ADTT = 1000$	1.65
$ADTT \leq 100$	1.40

Table B6A-3—Generalized Live Load Factors, γ_L for Specialized Hauling Vehicles (6A.4.4.2.3b-1)

Traffic Volume (one direction)	Load Factor for NRL, SU4, SU5, SU6, and SU7
Unknown	1.60
$ADTT \geq 5000$	1.60
$ADTT = 1000$	1.40
$ADTT \leq 100$	1.15

Loads and Load Factors

- LRFR Load Factors

Table B6A-4—Permit Load Factors: γ_L (6A.4.5.4.2a-1)

Permit Type	Frequency	Loading Condition	*DF*[a]	*ADTT* (one direction)	Load Factor by Permit Weight[b]	
					Up to 100 kips	≥150 kips
Routine or Annual	Unlimited Crossings	Mix with traffic (other vehicles may be on the bridge)	Governing of one lane or two or more lanes	>5000	1.80	1.30
				=1000	1.60	1.20
				<100	1.40	1.10
					All Weights	
Special or Limited Crossing	Single-Trip	Escorted with no other vehicles on the bridge	One lane	N/A	1.15	
	Single-Trip	Mix with traffic (other vehicles may be on the bridge)	One lane	>5000	1.50	
				=1000	1.40	
				<100	1.35	
	Multiple-Trips (less than 100 crossings)	Mix with traffic (other vehicles may be on the bridge)	One lane	>5000	1.85	
				=1000	1.75	
				<100	1.55	

Notes:

[a] *DF* = LRFD distribution factor. When one-lane distribution factor is used, the built-in multiple presence factor should be divided out.

[b] For routine permits between 100 kips and 150 kips, interpolate the load factor considering also the *ADTT* value. Use only axle weights on the bridge.

Loads and Load Factors

- LRFR Multiple Presence Factor (MPF)
  - HL-93 per AASHTO LRFD
  - MN Legal Loads and SHV trucks per AASHTO LRFD
  - Annual Permit Loads per AASHTO LRFD
  - Single Trip Permit Loads MPF=1.0

- Number of Lanes (LRFR)
  - Number of design lanes shall be used for all strength checks at both inventory and operating levels
  - Number of striped lanes shall be used for service check at operating level

LRFR Process

- Process based on Live Load Distribution Factors
  - Use LRFD distribution analysis methods in LRFD Article 4.6.2
  - One or Two+ lane distribution factor
  - Virtis Software

- Process based on Finite Element model
  - Complex bridges only
  - Load patterning for HL93 only and combinations of HL93 and permit loads

LRFR Process

- LRFR Basic Formula

Rating Factor:

$$RF = \frac{\emptyset_c \emptyset_s \emptyset R - \gamma_{DL} DL}{\gamma_{LL}(LL + I)}$$

$$\emptyset_c \emptyset_s \geq 0.85 \qquad \text{MBE 6A4.2.1-1}$$

$\gamma_{(DL)}$ – MBE table 6A.4.2.2-1

$\gamma_{(LL)}$ – MBE table 6A.4.2.2-1

LRFR Process

- System Factor ϕ_s
  - MBE Table 6A.4.2.4-1
  - System Factor = 1.0 for shear at the strength limit state.

LRFR Process

- Condition Factor ϕ_c

Table 6A.4.2.3-1—Condition Factor: φ_c

Structural Condition of Member	φ_c
Good or Satisfactory	1.00
Fair	0.95
Poor	0.85

Table C6A.4.2.3-1—Approximate Conversion in Selecting φ_c

Superstructure Condition Rating (SI & A Item 59)	Equivalent Member Structural Condition
6 or higher	Good or Satisfactory
5	Fair
4 or lower	Poor

Limit States

- MnDOT Requirements
  - No fatigue check required
  - For new HL-93 designed bridges, service state checks of permit loads are required

Table B6A-1—Limit States and Load Factors for Load Rating (6A.4.2.2-1)

Bridge Type	Limit State*	Dead Load *DC*	Dead Load *DW*	Design Load Inventory *LL*	Design Load Operating *LL*	Legal Load *LL*	Permit Load *LL*
Steel	Strength I	1.25	1.50	1.75	1.35	Tables 6A.4.4.2.3a-1 and 6A.4.4.2.3b-1	—
	Strength II	1.25	1.50	—	—	—	Table 6A.4.5.4.2a-1
	Service II	1.00	1.00	1.30	1.00	1.30	1.00
	Fatigue	0.00	0.00	0.75	—	—	—
Reinforced Concrete	Strength I	1.25	1.50	1.75	1.35	Tables 6A.4.4.2.3a-1 and 6A.4.4.2.3b-1	—
	Strength II	1.25	1.50	—	—	—	Table 6A.4.5.4.2a-1
	Service I	1.00	1.00	—	—	—	1.00
Prestressed Concrete	Strength I	1.25	1.50	1.75	1.35	Tables 6A.4.4.2.3a-1 and 6A.4.4.2.3b-1	—
	Strength II	1.25	1.50	—	—	—	Table 6A.4.5.4.2a-1
	Service III	1.00	1.00	0.80	—	1.00	—
	Service I	1.00	1.00	—	—	—	1.00
Wood	Strength I	1.25	1.50	1.75	1.35	Tables 6A.4.4.2.3a-1 and 6A.4.4.2.3b-1	—
	Strength II	1.25	1.50	—	—	—	Table 6A.4.5.4.2a-1

Limit States

- Service I Permit Load Check
  - Limiting the steel stress to 90% of yield stress

    $f_r = 0.9\ f_y$ or $0.9\ f_{py}$

  - Ensure no permanent deformations from overweight loads
  - Alternate approach – Limit unfactored moments to 75% of nominal flexural capacity (Mn),

    MBE C6A.5.4.2.2b

Reliability

- Reliability Index
  - Inventory Level = 3.5 (same as design)
  - Operation Level = 2.5 (target inspection cycle)

Special Type Superstructures

- Curved Steel Superstructure
  - Load Patterning – One/Two HL-93 or Permit Trucks
  - Load Factors – Using MBE Tables
  - MnDOT Guidance – Under development

- Post-Tensioned concrete segmental box
  - Load Patterning – All combinations
  - Design Loads - Including permit trucks
  - Load Factors – Past:1.35 used
    Future: new MBE revision

Special Type Superstructures

- Truss and Gusset Plates
  - MnDOT Bridge Design Memo – will be revised
  - FHWA Guidance and Examples – Flexure not required
  - AASHTO – Future Revisions

- Prestressed Concrete Beam Bridges with Shear Issue
  - Current University of Minnesota's Research Project
  - Shear Analysis Process

Load Posting

- Posting Rules
  - AASHTO and Minnesota rules require posting bridges when bridge condition has deteriorated and reduced its capacity to safely carry legal loads
  - Must close a bridge when the capacity of a bridge is less than 3 Ton
  - A vehicle type shall not be allowed when the rating factor of that vehicle type falls below 0.3

Load Posting

- LFR/ASR Methods – Currently Used

  Follow MnDOT LRFD Design Manual Chapter 15

- LRFR Method – Currently not Implemented by MnDOT

  Safe Posting Load= $\frac{W}{0.7}[(RF) - 0.3]$

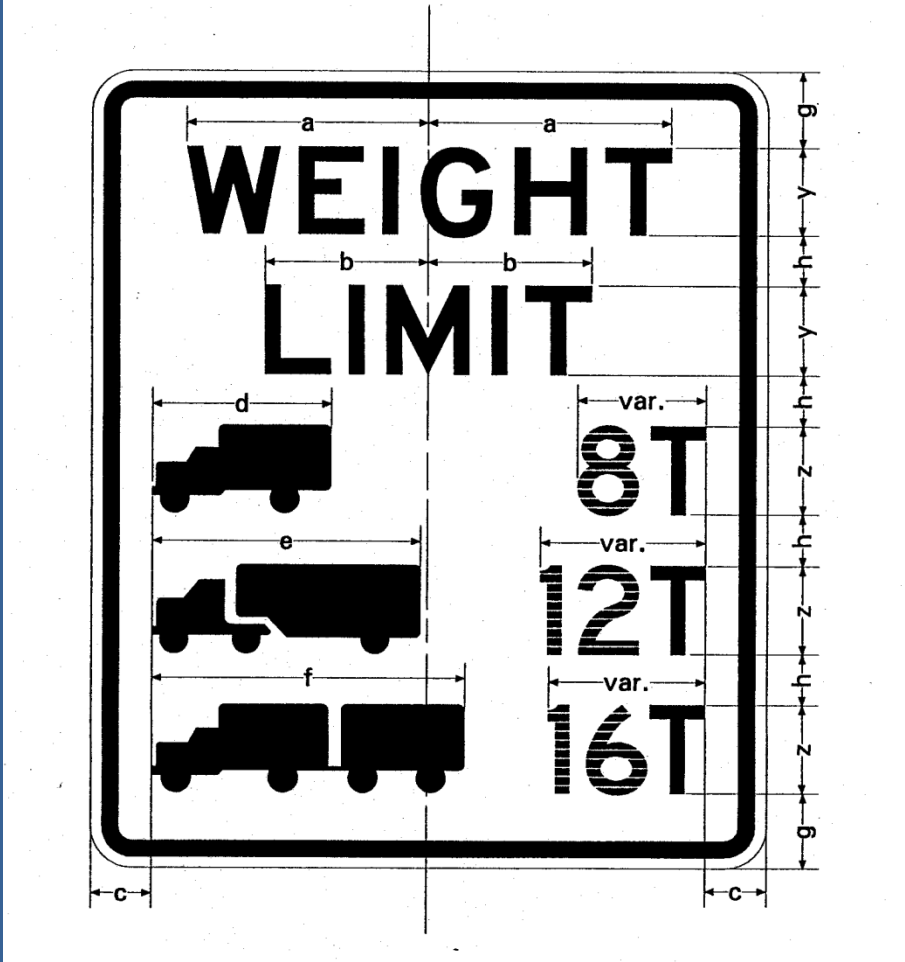
  W = Weight of rating vehicle

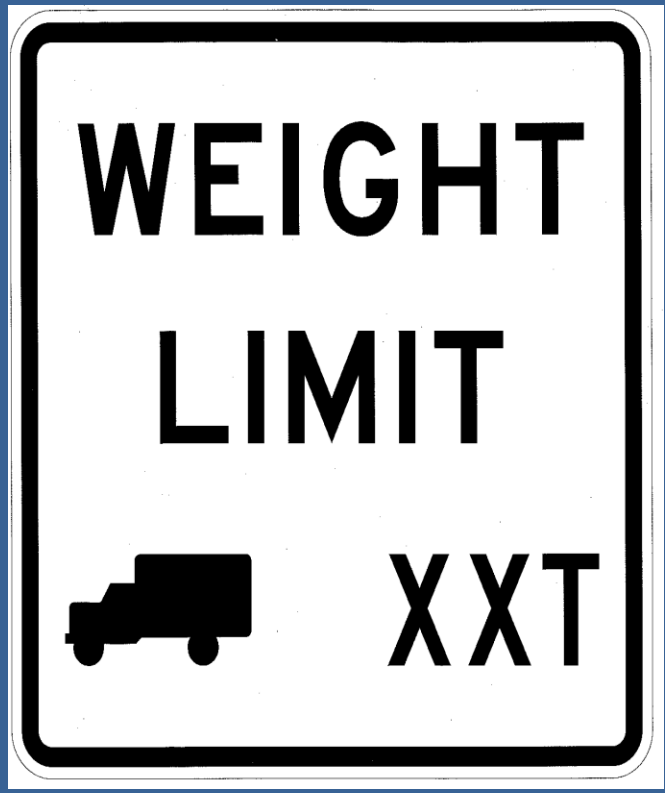
  RF = Legal load rating factor

  MBE 6A.8.3-1

Load Posting

- Sign Samples – R12-5 and R12-5a





Assigned Rating

- MBE requirements
  - Bridges designed by HL-93 or HS 20/HS 25
  - Bridge condition not changed
  - Bridges only carry MN Legal loads
    - ➢Inventory Rating Factor = 1.0
    - ➢HL93 Operating Rating Factor = 1.3 or
    - ➢HS 20 Operating Rating = HS 33.4
- FHWA requirements

Physical Inspection Rating (PIR)

Use when a numerical rating value cannot readily be calculated.

The reason can be:

- No bridge plan available
- Concrete with unknown reinforcement
- Deteriorated culverts

Physical Inspection Rating (PIR)

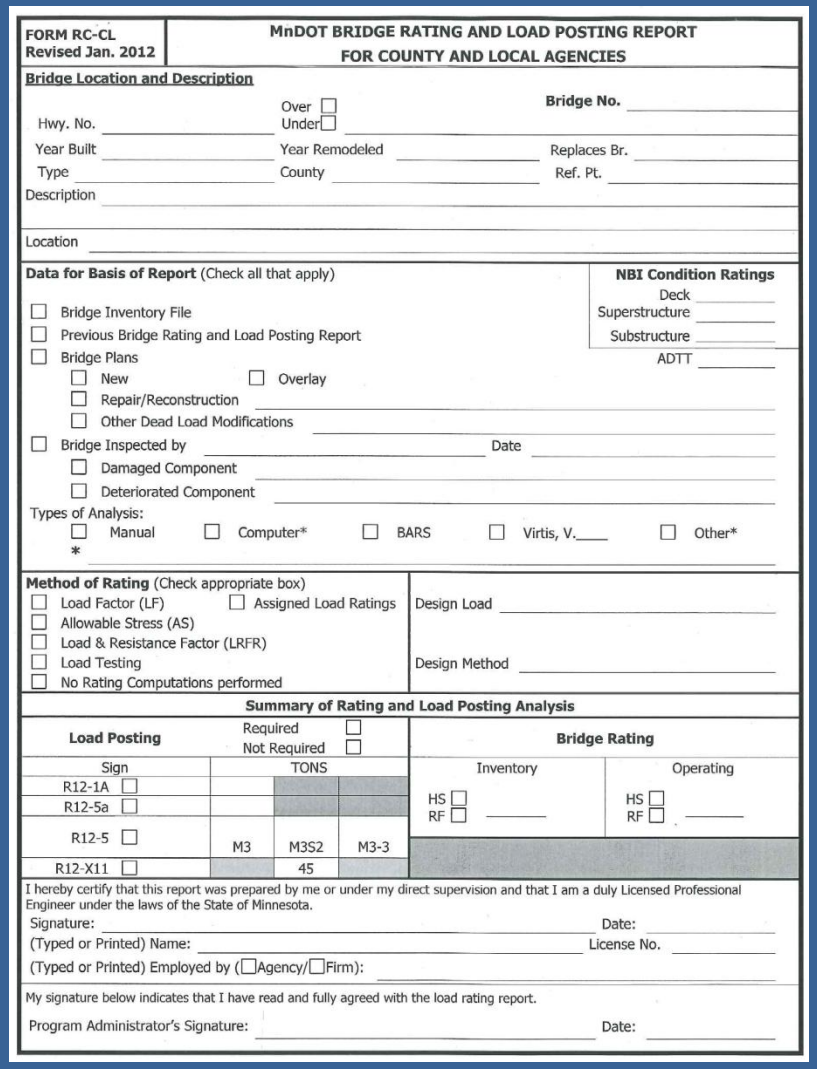
- PIR Procedure
  - Form PIR + cover sheet (form RC-TH or RC-CL)
  - Consider condition, age, type, redundancy, ADTT, loading, etc.
  - Rating determined by the engineer based on all available information and his/her judgment

Rating Forms

- All forms are available online

http://www.dot.state.mn.us/bridge/docsdown.html

Rating Form for County & Local Agencies



FORM RC-CL
Revised Jan. 2012

MnDOT BRIDGE RATING AND LOAD POSTING REPORT FOR COUNTY AND LOCAL AGENCIES

Bridge Location and Description

Hwy. No. _____ Over ☐ Under ☐ **Bridge No.** _____

Year Built _____ Year Remodeled _____ Replaces Br. _____

Type _____ County _____ Ref. Pt. _____

Description _____

Location _____

Data for Basis of Report (Check all that apply)

- ☐ Bridge Inventory File
- ☐ Previous Bridge Rating and Load Posting Report
- ☐ Bridge Plans
  - ☐ New ☐ Overlay
  - ☐ Repair/Reconstruction _____
  - ☐ Other Dead Load Modifications _____
- ☐ Bridge Inspected by _____ Date _____
  - ☐ Damaged Component _____
  - ☐ Deteriorated Component _____

Types of Analysis:
☐ Manual ☐ Computer* ☐ BARS ☐ Virtis, V.____ ☐ Other*
*

NBI Condition Ratings
Deck _____
Superstructure _____
Substructure _____
ADTT _____

Method of Rating (Check appropriate box)
- ☐ Load Factor (LF) ☐ Assigned Load Ratings
- ☐ Allowable Stress (AS)
- ☐ Load & Resistance Factor (LRFR)
- ☐ Load Testing
- ☐ No Rating Computations performed

Design Load _____
Design Method _____

Summary of Rating and Load Posting Analysis

Load Posting	Required ☐ Not Required ☐			Bridge Rating	
Sign	TONS			Inventory	Operating
R12-1A ☐				HS ☐ RF ☐ _____	HS ☐ RF ☐ _____
R12-5a ☐					
R12-5 ☐	M3	M3S2	M3-3		
R12-X11 ☐		45			

I hereby certify that this report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

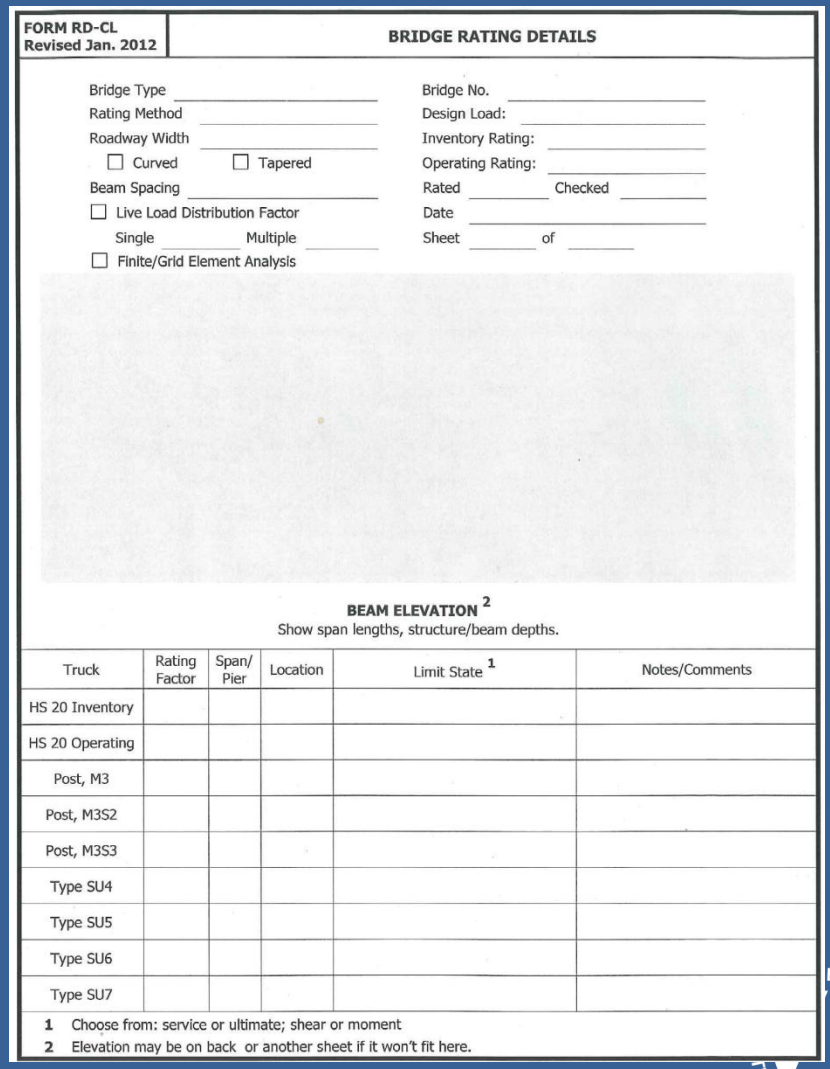
Signature: _____ Date: _____

(Typed or Printed) Name: _____ License No. _____

(Typed or Printed) Employed by (☐Agency/☐Firm): _____

My signature below indicates that I have read and fully agreed with the load rating report.

Program Administrator's Signature: _____ Date: _____



FORM RD-CL
Revised Jan. 2012

BRIDGE RATING DETAILS

Bridge Type _____ Bridge No. _____
Rating Method _____ Design Load: _____
Roadway Width _____ Inventory Rating: _____
☐ Curved ☐ Tapered Operating Rating: _____
Beam Spacing _____ Rated _____ Checked _____
☐ Live Load Distribution Factor Date _____
Single _____ Multiple _____ Sheet _____ of _____
☐ Finite/Grid Element Analysis

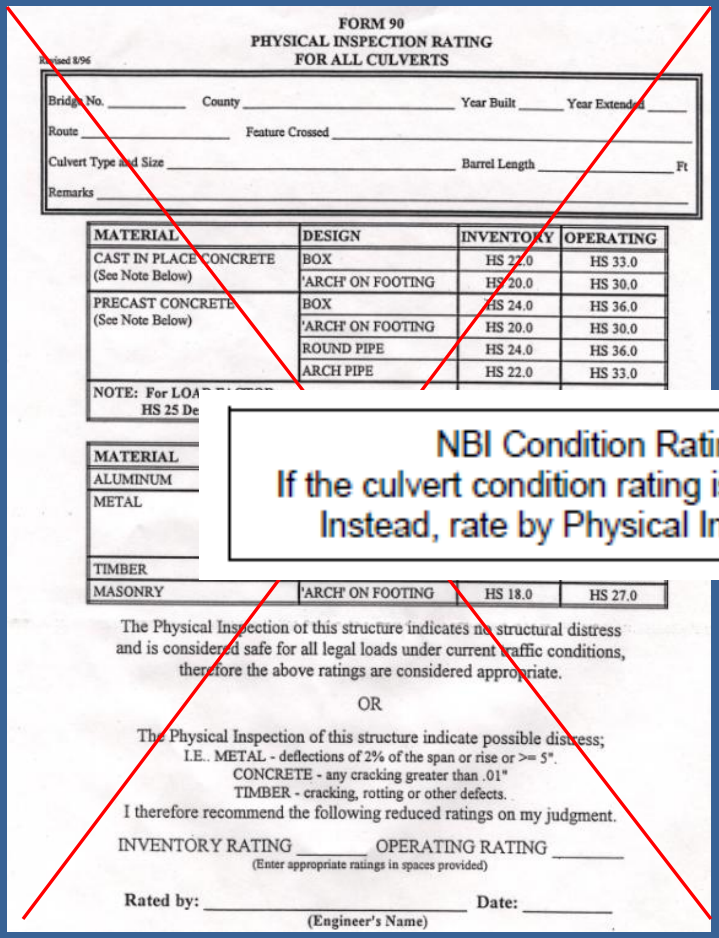
BEAM ELEVATION [2]
Show span lengths, structure/beam depths.

Truck	Rating Factor	Span/ Pier	Location	Limit State [1]	Notes/Comments
HS 20 Inventory					
HS 20 Operating					
Post, M3					
Post, M3S2					
Post, M3S3					
Type SU4					
Type SU5					
Type SU6					
Type SU7					

1 Choose from: service or ultimate; shear or moment
2 Elevation may be on back or another sheet if it won't fit here.

Culvert Rating (Form 90)

OLD



FORM 90
PHYSICAL INSPECTION RATING
FOR ALL CULVERTS

Revised 8/96

Bridge No. _____ County _____ Year Built _____ Year Extended _____

Route _____ Feature Crossed _____

Culvert Type and Size _____ Barrel Length _____ Ft

Remarks _____

MATERIAL	DESIGN	INVENTORY	OPERATING
CAST IN PLACE CONCRETE (See Note Below)	BOX	HS 22.0	HS 33.0
	'ARCH' ON FOOTING	HS 20.0	HS 30.0
PRECAST CONCRETE (See Note Below)	BOX	HS 24.0	HS 36.0
	'ARCH' ON FOOTING	HS 20.0	HS 30.0
	ROUND PIPE	HS 24.0	HS 36.0
	ARCH PIPE	HS 22.0	HS 33.0

NOTE: For LOA... HS 25 De...

MATERIAL			
ALUMINUM			
METAL			
TIMBER			
MASONRY	'ARCH' ON FOOTING	HS 18.0	HS 27.0

The Physical Inspection of this structure indicates no structural distress and is considered safe for all legal loads under current traffic conditions, therefore the above ratings are considered appropriate.

OR

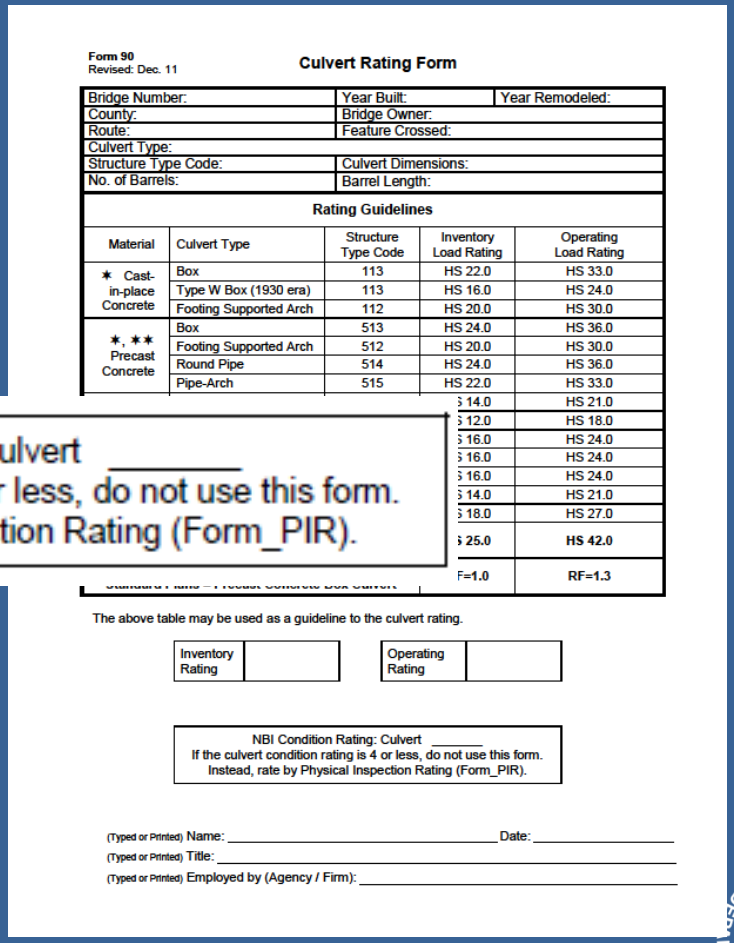
The Physical Inspection of this structure indicate possible distress;
I.E.. METAL - deflections of 2% of the span or rise or >= 5".
CONCRETE - any cracking greater than .01"
TIMBER - cracking, rotting or other defects.
I therefore recommend the following reduced ratings on my judgment.

INVENTORY RATING _____ OPERATING RATING _____
(Enter appropriate ratings in spaces provided)

Rated by: _____ Date: _____
(Engineer's Name)

NBI Condition Rating: Culvert _____
If the culvert condition rating is 4 or less, do not use this form.
Instead, rate by Physical Inspection Rating (Form_PIR).

NEW



Form 90
Revised: Dec. 11

Culvert Rating Form

Bridge Number:	Year Built:	Year Remodeled:
County:	Bridge Owner:	
Route:	Feature Crossed:	
Culvert Type:		
Structure Type Code:	Culvert Dimensions:	
No. of Barrels:	Barrel Length:	

Rating Guidelines

Material	Culvert Type	Structure Type Code	Inventory Load Rating	Operating Load Rating
* Cast-in-place Concrete	Box	113	HS 22.0	HS 33.0
	Type W Box (1930 era)	113	HS 16.0	HS 24.0
	Footing Supported Arch	112	HS 20.0	HS 30.0
*, ** Precast Concrete	Box	513	HS 24.0	HS 36.0
	Footing Supported Arch	512	HS 20.0	HS 30.0
	Round Pipe	514	HS 24.0	HS 36.0
	Pipe-Arch	515	HS 22.0	HS 33.0
			5 14.0	HS 21.0
			5 12.0	HS 18.0
			5 16.0	HS 24.0
			5 16.0	HS 24.0
			5 16.0	HS 24.0
			5 14.0	HS 21.0
			5 18.0	HS 27.0
			5 25.0	HS 42.0
			F=1.0	RF=1.3

The above table may be used as a guideline to the culvert rating.

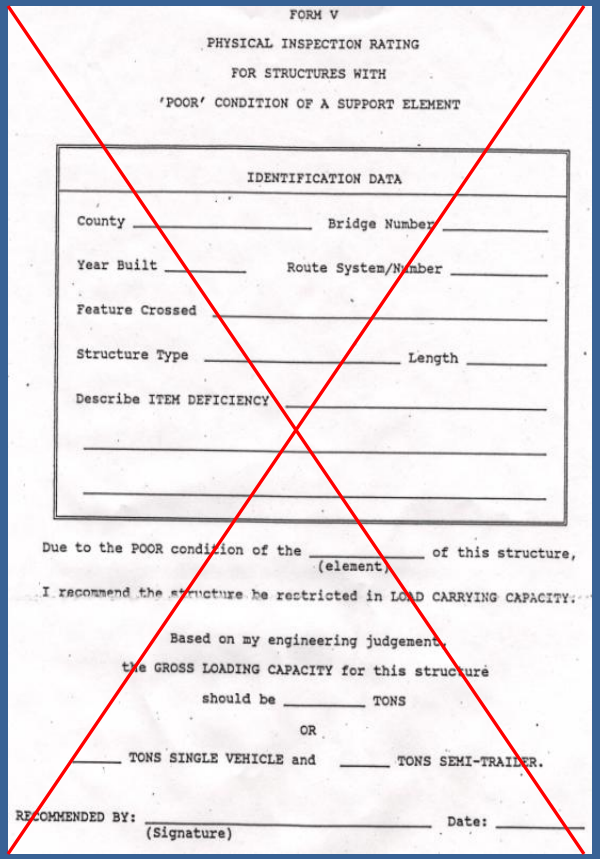
Inventory Rating		Operating Rating	

NBI Condition Rating: Culvert _____
If the culvert condition rating is 4 or less, do not use this form.
Instead, rate by Physical Inspection Rating (Form_PIR).

(Typed or Printed) Name: _____ Date: _____
(Typed or Printed) Title: _____
(Typed or Printed) Employed by (Agency / Firm): _____

Physical Inspection Rating (PIR)

Old



FORM V

PHYSICAL INSPECTION RATING

FOR STRUCTURES WITH

'POOR' CONDITION OF A SUPPORT ELEMENT

IDENTIFICATION DATA

County _____ Bridge Number _____

Year Built _____ Route System/Number _____

Feature Crossed _____

Structure Type _____ Length _____

Describe ITEM DEFICIENCY _____

Due to the POOR condition of the _____ (element) of this structure,

I recommend the structure be restricted in LOAD CARRYING CAPACITY.

Based on my engineering judgement,

the GROSS LOADING CAPACITY for this structure

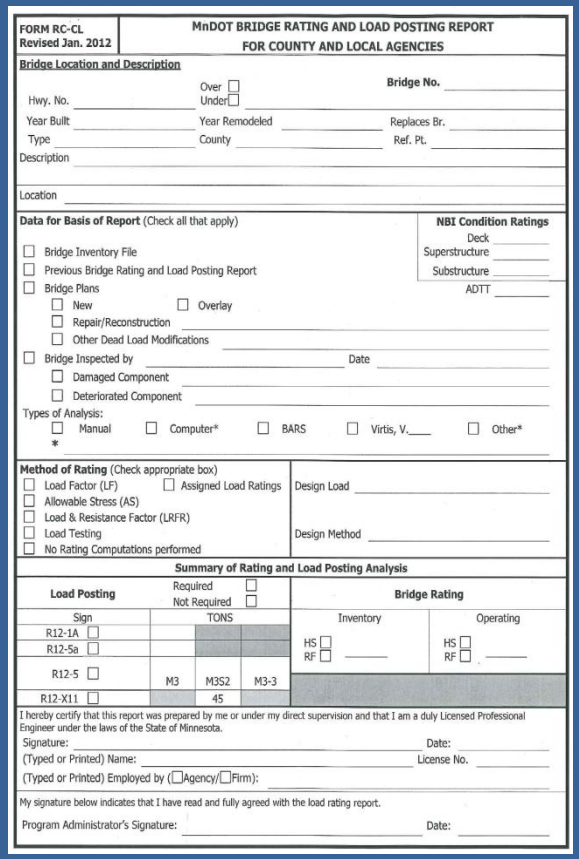
should be _____ TONS

OR

_____ TONS SINGLE VEHICLE and _____ TONS SEMI-TRAILER.

RECOMMENDED BY: _____ (Signature) Date: _____

New



FORM RC-CL
Revised Jan. 2012

MnDOT BRIDGE RATING AND LOAD POSTING REPORT
FOR COUNTY AND LOCAL AGENCIES

Bridge Location and Description

Hwy. No. _____ Over ☐ Under ☐ Bridge No. _____

Year Built _____ Year Remodeled _____ Replaces Br. _____

Type _____ County _____ Ref. Pt. _____

Description _____

Location _____

Data for Basis of Report (Check all that apply)

NBI Condition Ratings
Deck _____
Superstructure _____
Substructure _____
ADTT _____

☐ Bridge Inventory File
☐ Previous Bridge Rating and Load Posting Report
☐ Bridge Plans
☐ New ☐ Overlay
☐ Repair/Reconstruction _____
☐ Other Dead Load Modifications _____
☐ Bridge Inspected by _____ Date _____
☐ Damaged Component _____
☐ Deteriorated Component _____

Types of Analysis:
☐ Manual ☐ Computer* ☐ BARS ☐ Virtis, V.____ ☐ Other*
* _____

Method of Rating (Check appropriate box)
☐ Load Factor (LF) ☐ Assigned Load Ratings
☐ Allowable Stress (AS)
☐ Load & Resistance Factor (LRFR)
☐ Load Testing
☐ No Rating Computations performed

Design Load _____
Design Method _____

Summary of Rating and Load Posting Analysis

Load Posting — Required ☐ Not Required ☐

Sign	TONS		
R12-1A ☐			
R12-5a ☐			
R12-5 ☐	M3	M3S2	M3-3
R12-X11 ☐		45	

Bridge Rating

Inventory	Operating
HS ☐ RF ☐ _____	HS ☐ RF ☐ _____

I hereby certify that this report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

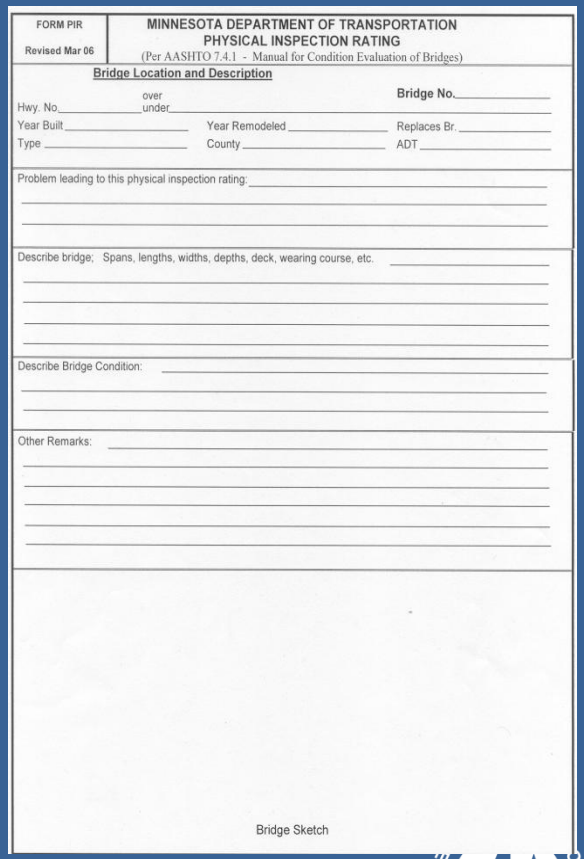
Signature: _____ Date: _____

(Typed or Printed) Name: _____ License No. _____

(Typed or Printed) Employed by (☐Agency/☐Firm): _____

My signature below indicates that I have read and fully agreed with the load rating report.

Program Administrator's Signature: _____ Date: _____



FORM PIR
Revised Mar 06

MINNESOTA DEPARTMENT OF TRANSPORTATION
PHYSICAL INSPECTION RATING
(Per AASHTO 7.4.1 - Manual for Condition Evaluation of Bridges)

Bridge Location and Description

Hwy. No. _____ over under _____ Bridge No. _____

Year Built _____ Year Remodeled _____ Replaces Br. _____

Type _____ County _____ ADT _____

Problem leading to this physical inspection rating: _____

Describe bridge; Spans, lengths, widths, depths, deck, wearing course, etc. _____

Describe Bridge Condition: _____

Other Remarks: _____

Bridge Sketch

Questions?

Rating Unit List

Yihong Gao at 651-366-4492

Moises Dimaculangan at 651-366-4522

Jim Pierce at 651-366-4555