

BRIDGE RATING 101



Class Description:

With the ever increasing load demands on our local bridges, and a heightened awareness on bridge safety, there is no better time to bring our Minnesota County Engineers together to start the education process on "Bridge Load Rating". At the request of the County Engineer's Standards & Bridge Committee, the Mn/DOT Bridge Office has developed a one day basic bridge rating workshop for the County Engineers and their assistants.

What can the County Engineer expect to learn by attending the Bridge Load Rating Workshop? They will learn the what, why, when and how on rating local bridges. Common questions such as why rate, when to rate, and who is qualified to rate will be addressed. Truck trends and effects on bridge rating, and the ideal bridge rating history will be discussed in the workshop.

The workshop will cover rating procedures, discussing the applied loads and the capacity of distressed members. There will be rating example problems and class exercises to help you gain the necessary knowledge to assess whether or not an existing simple span local bridge can tolerate additional dead weight from a proposed overlay, etc... The workshop will discuss important information related to posting, and permitting bridges. Legal loads, special hauling vehicles, and posting rules will also be discussed!

The workshop will allow time for discussing common mistakes when rating and posting bridges, and offer ample time to take questions and comments for discussion and answer, and take requests for possible follow up materials.

The class participant will also go home with worked out rating examples and other valuable reference materials.

Who should attend? The class is designed for the County Engineers and their assistants interested in learning the basics of local bridge rating and posting. Interested City Engineers and their assistants are also welcomed. So leave your calendars open for the date and convenient location listed below. Sign up early, class size is limited to 50 participants. Your attendance is appreciated.

Class Locations and Times:

- Duluth, March 26th, 2008
- Bemidji, March 27th, 2008
- St Cloud, March 4th, 2008
- Marshall, March 5th, 2008
- Owatonna, March 13th, 2008

*(All classes will run from 9:00 am to 3:30 pm)
(A big lunch will be included)*



2008 Bridge Load Rating Class 101 Agenda

- I. Introductions - Dave 9:00-9:05 (5 min)
 - a. Presenters
- II. Load Rating Basics - Dave 9:05-9:40 (35 min)
 - a. Rating information
 - i. Why rate?
 - ii. What code to use?
 - iii. When to do a new rating?
 - iv. Who is qualified?
 - v. When to hire a consultant?
 - b. Current rating ages
 - c. Ideal bridge rating history
 - d. Truck trends
- III. General Equations - Brian 9:40-10:00 (20 min)
 - a. Rating Equation
 - b. Inventory level
 - c. Operating level
- Break 10:00-10:10 (10 min)
- IV. Load Rating Procedure - Brian 10:10-10:40 (30 min)
 - a. Applied Loads
 - i. Dead Load
 - ii. Live Load
 - b. Capacity
 - c. Equation calculations
 - d. Submitting results to MnDOT
- V. Incorporating Member Distress - Ed 10:40-10:55 (15 min)
 - a. Loss of Capacity
 - b. High stress areas
 - i. Moment
 - ii. Shear
 - iii. Bearing
 - iv. Compression
 - v. Tension
- VI. Posting, SHV's and Permitting - Ed 10:55-11:40 (45 min)
 - a. Legal loads
 - b. Posting trucks
 - c. Specialized Hauling Vehicles
 - d. Posting rules
 - e. Overweight permits
- Lunch 11:40-12:40 (60 min)
- VII. Load Rating Ex. #1 - Simple span non-composite steel – Brian 12:40-1:15 (35 min)
 - a. With/without overlay
 - b. With/without section loss
 - c. Posting load
 - d. Overweight Permit

- VIII. Load Rating Ex. #2 - Simple span nail laminated timber - Dave 1:15-1:45 (30 min)
deck (without distress)
- a. Calculate wheel load distribution
 - b. Calculate section modulus and capacity
 - c. Calculate dead load flexural stress
 - d. Calculate live load flexural stress
 - e. Calculate load ratings and postings
- IX. Class Exercise - Simple span timber slab (with distress) - Dave 1:45-2:10 (25 min)
- a. Group 1 – Wheel load distribution, section modulus, capacity
 - b. Group 2 – Dead load flexural stress
 - c. Group 3 – Live load flexural stress
 - d. Group 4 – Operating ratings
 - e. Group 5 – Postings
- Break 2:10-2:25 (15 min)
- X. Brief worked out example reviews - Dave 2:25-2:40 (15 min)
- a. Abutment Timber piling (without decay)
 - b. Abutment Timber piling (with decay)
 - c. Abutment timber pile cap with loss of pile
 - d. Calculating section properties with section loss
 - e. Additional considerations for different bridge types
 - f. Other example from manuals
- XI. Submittal to MnDOT and Review of process - Ed 2:40-3:10 (30 min)
- a. Forms
 - i. Bridge Load Rating Form
 - ii. Culvert rating sheet
 - iii. Physical Inspection Form
 - b. Website
 - c. Bridge Management/Pontis
 - d. Results of Timber Haulers county rating project
- XII. Common mistakes/questions - Ed 3:10-3:30 (20 min)

**2008
Bridge Load Rating
Class 101**



Workshop Agenda

- I. Introductions
- II. Load Rating Basics
- III. General Equations
- IV. Load Rating Procedure
- V. Incorporating Member Distress
- VI. Posting, SHV's and Permitting
- VII. Load Rating Example #1
 - Simple Span Non-composite Steel

Workshop Agenda

- VIII. Load Rating Example #2
 - Simple Span Nail Laminated Timber Deck (without distress)
- IX. Class Exercise
 - Simple Span Nail Laminated Timber Deck (with distress)
- X. Review of worked out examples
- XI. Submittal to MN/DOT and Review of Process
- XII. Common mistakes and questions

**Bridge Load Rating Class 101
Presenters**

- Dave Conkel, P.E.
State Aid Bridge Engineer
- Brian Homan, P.E.
Assistant State Aid Bridge Engineer
- Ed Lutgen, P.E.
North Region Bridge Engineer

**Special Thanks to our Class
Sponsors**

- Minnesota County Engineers Association
Bridge Committee
Alan Forsberg, Blue Earth Co.
Jim Grube, Hennepin Co.,
& Members
- Standards Committee
Gary Danielson, Kandiyohi Co.
Dave Enblom, Cass Co.,
& Members

**Special Thanks to our Class
Sponsors**

- Special County Engineers
Class Planning
Duane Blanck (Retired), Crow-Wing Co.
David Halbersma, Pipestone Co.
- Mn/DOT
State Aid Office
Patti Loken, Mary Ann Hillyer, Julie Skallman, Rick Kjonaas
& Staff
- Bridge Office
Dan Dorgan, Gary Peterson, Lowell Johnson,
Kevin Western, Jim Pierce, Steve Brown
& Staff

**Bridge Load Rating Class 101
Course Goal**

- The class was born from legislation, dubbed the "Timber Haulers Bill", which allows special permits with appropriate fees for increased vehicle loading.
- This class is financed with money from the Timber Haulers Bill, and was developed due to an overall general interest of the Minnesota County Engineer in load rating and posting.

**Bridge Load Rating Class 101
Course Goal**

- This class was created with input from other Minnesota County Engineers and Mn/DOT Bridge Rating Engineers to give us:
 - A basic understanding of local bridge rating and posting.
 - Provide information on the use of load rating equations, and load rating procedures.
 - Provide informational handouts with rating and posting examples for various types of bridges.

**Bridge Load Rating Class 101
Course Goal**

- Provide information on special hauling vehicles, posting rules and overweight permits.
- Provide information on bridge load rating forms, culvert rating sheets, and other Mn/DOT related materials.
- Note, this class is not intended, however, to make all class participants proficient at rating bridges.

