Load Rating

How do they know the load limit on bridges, Dad?

They drive bigger and bigger trucks over the bridge until it breaks.

Then they weigh the last truck and rebuild the bridge.

Oh, I should've guessed.

Dear, if you don't know the answer, just tell him!
Why is Load Rating Important?

Definition

The determination of the live-load carrying capacity of an existing bridge.

-AASHTO Manual for Bridge Evaluation (MBE) Third Edition
Load Rating Equation

\[ RF = \frac{\text{Capacity}}{\text{Dead Load}} \times \frac{(D E A D \text{ Load})}{(L I V E \text{ Load} + I M)} \]
Live Load (Design Level)

HL-93 Design Load

(a) HL-93 Design Truck
(* Varies for maximum effect)

(b) HL-93 Design Tandem

(c) HL-93 Design Lane Load

Uniform Load of 0.64-kip/ft
Live Load (Legal Level)

AASHTO Legal Vehicles

Special Hauling Vehicles
Capacity & Dead Load

- Data needed from Plans, Shop Drawings, As-builts
  - Structure Type
  - Span Length
  - Beam Spacing
  - Cross Sections & Beam Sizes
  - Material Properties
  - Reinforcement Size and Locations
  - Deck Type and Thickness
Load Rating Intervals

- Initial Load Rating
  - During the Design & Construction phase

- Re-load Rating
  - Changes in Dead Load Conditions
  - Deterioration in Structural Elements
  - Changes in Live Load
  - Damage
Permit Load Rating

- Any load over legal weight must have a permit
  - 80,000 lbs G.V.W. Interstate
  - 105,500 lbs G.V.W. on State Highways
- Each bridge crossed by an Overweight load must be analyzed individually

- Automated Routing System
  - Collaboration between Highway Patrol, NDIT, Promiles, and Bridge Division.
  - 137,500 Permits Issued in 2019
Super Loads

- Loads in Excess of 300,000 lbs
- Non-standard configurations
  - Greater than 6ft wide
  - 8 tires per axle
- 886 Super Load Permits Analyzed by the Bridge Division in 2019
Wrap-Up

- Additional Resources
  - AASHTO Manual for Bridge Evaluation
  - NDDOT Load Rating Manual

Disclaimer: This is not an approved method of posting bridges in North Dakota.
Thank You!

Contact Information

- Nancy Huether P.E.
  - nhuether@nd.gov
  - 701-328-4450

- Kristen Leier E.I.
  - kleier@nd.gov
  - 701-328-4448

- Matthew Luger P.E
  - mmluger@nd.gov
  - 701-328-4844