Minnesota Timber Bridge Maintenance and Construction – A County Perspective

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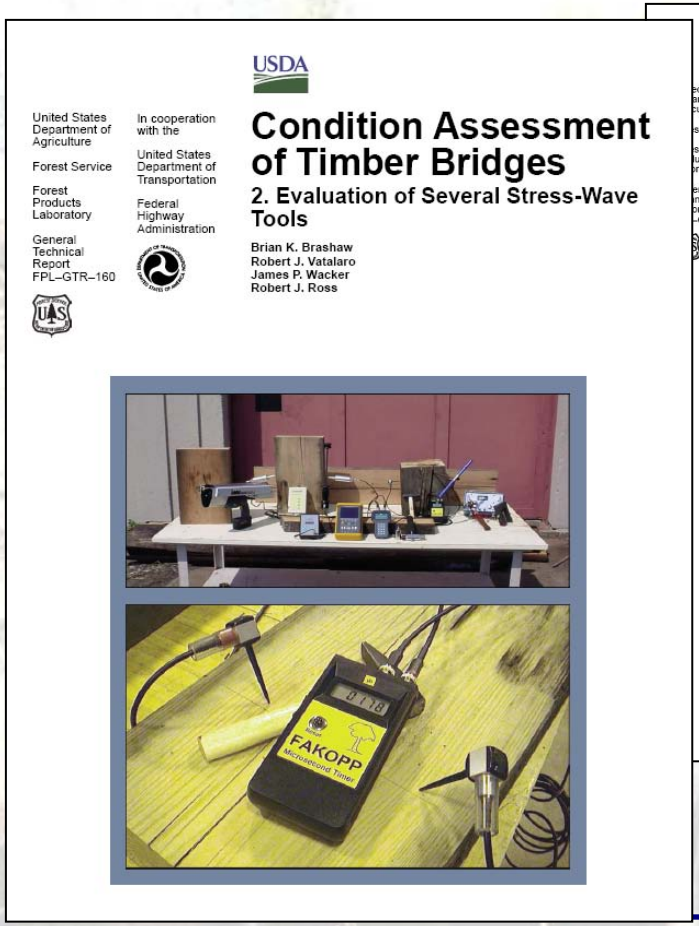
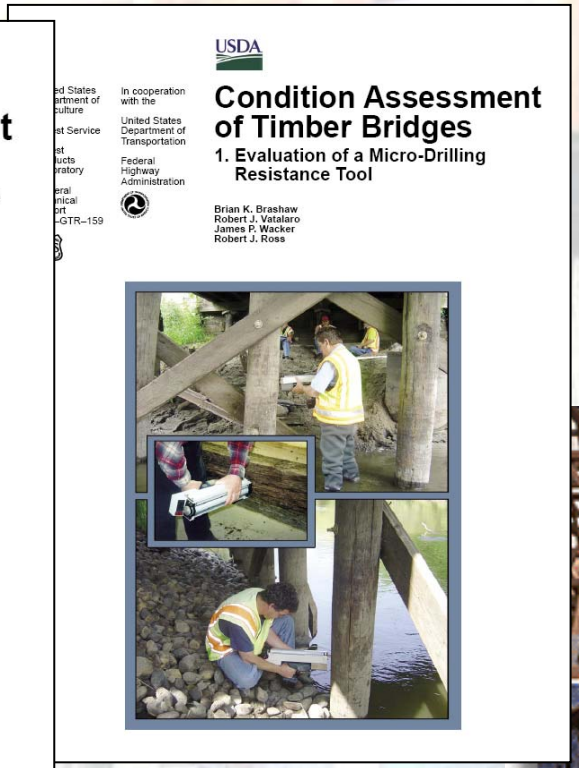
SmallWood 2010
April 21, 2010

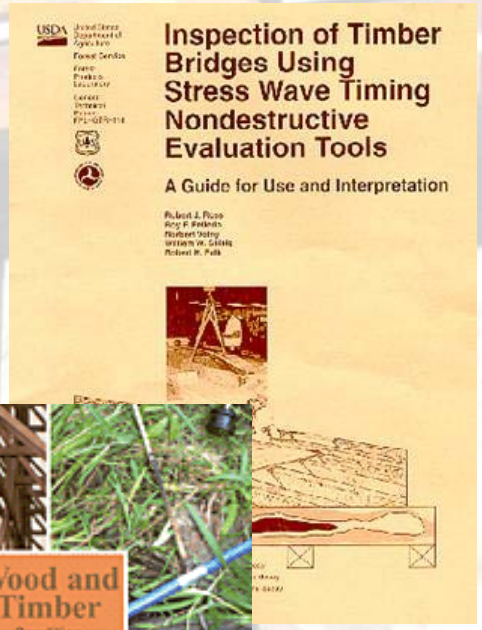
UMD/St. Louis County, Minnesota Cooperation

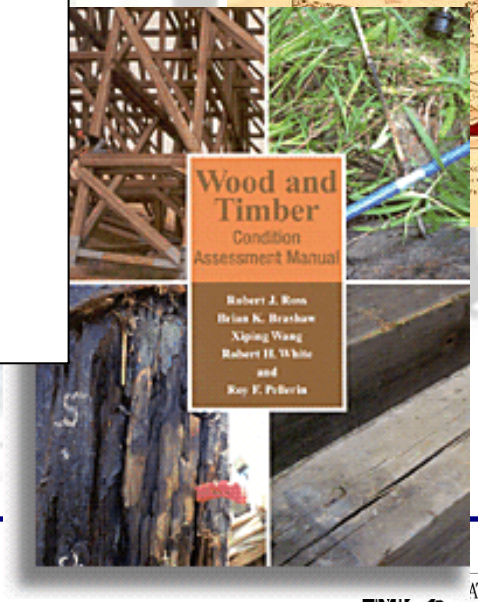
- Training
- Inspections
  - Advanced inspection equipment
  - Hands-on and cooperative
- Research
  - Vibration monitoring approach
  - Load testing

USDA Forest Products Laboratory and University of Minnesota Duluth Publications









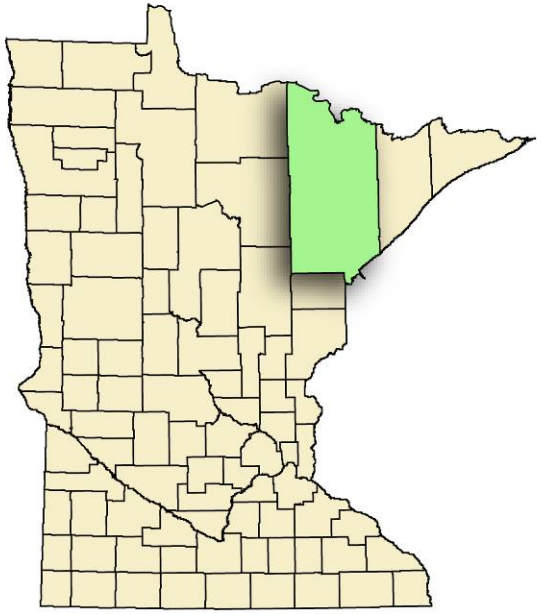
ATURAL RESOURCES RESEARCH INSTITUTE


905-018


WRIGHT COUNTY OF MINNESOTA
1855
145
2004 8 2


2004 8 2

St. Louis County Background

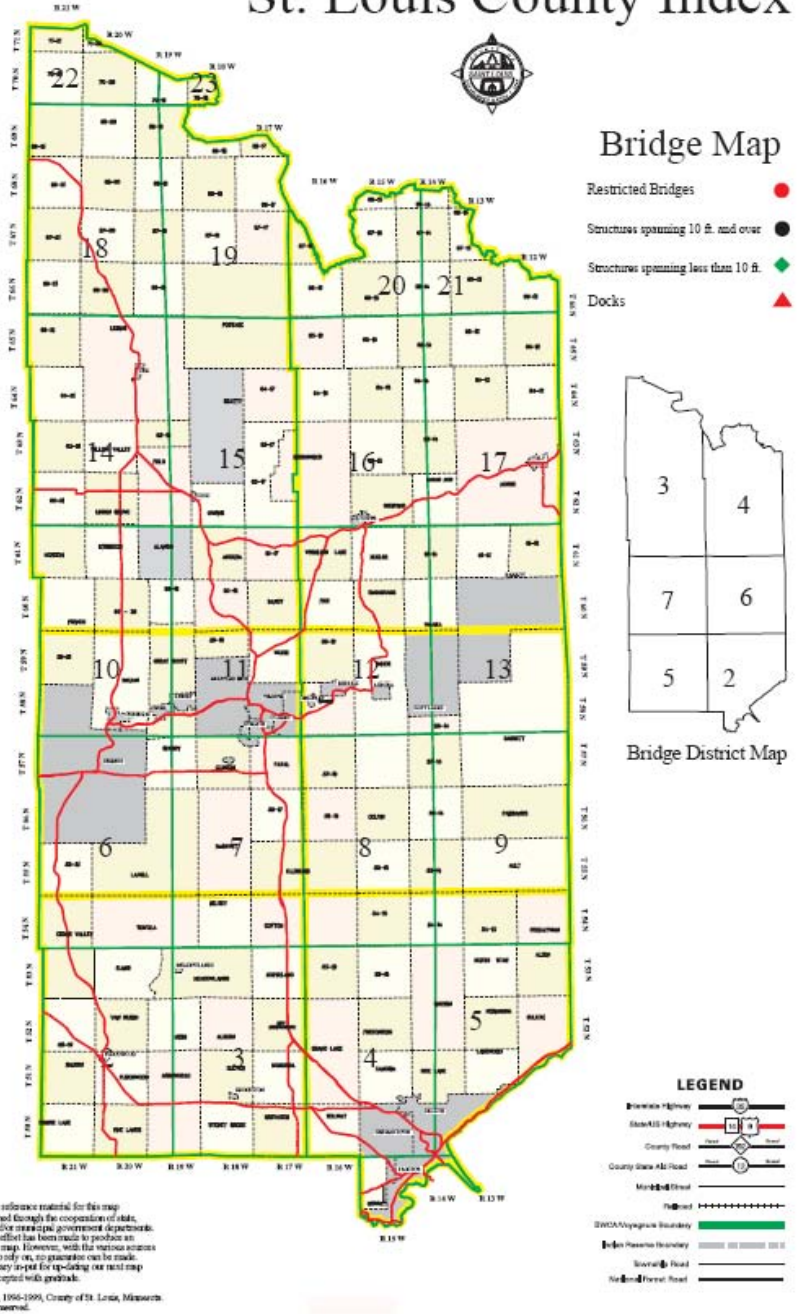


- Total Size
  6,860 miles^2 (17,767 km^2)
- Land
  6,225 miles^2 (16,123 km^2)
- Water
  635 miles^2 (1,644 km^2) 9.25%

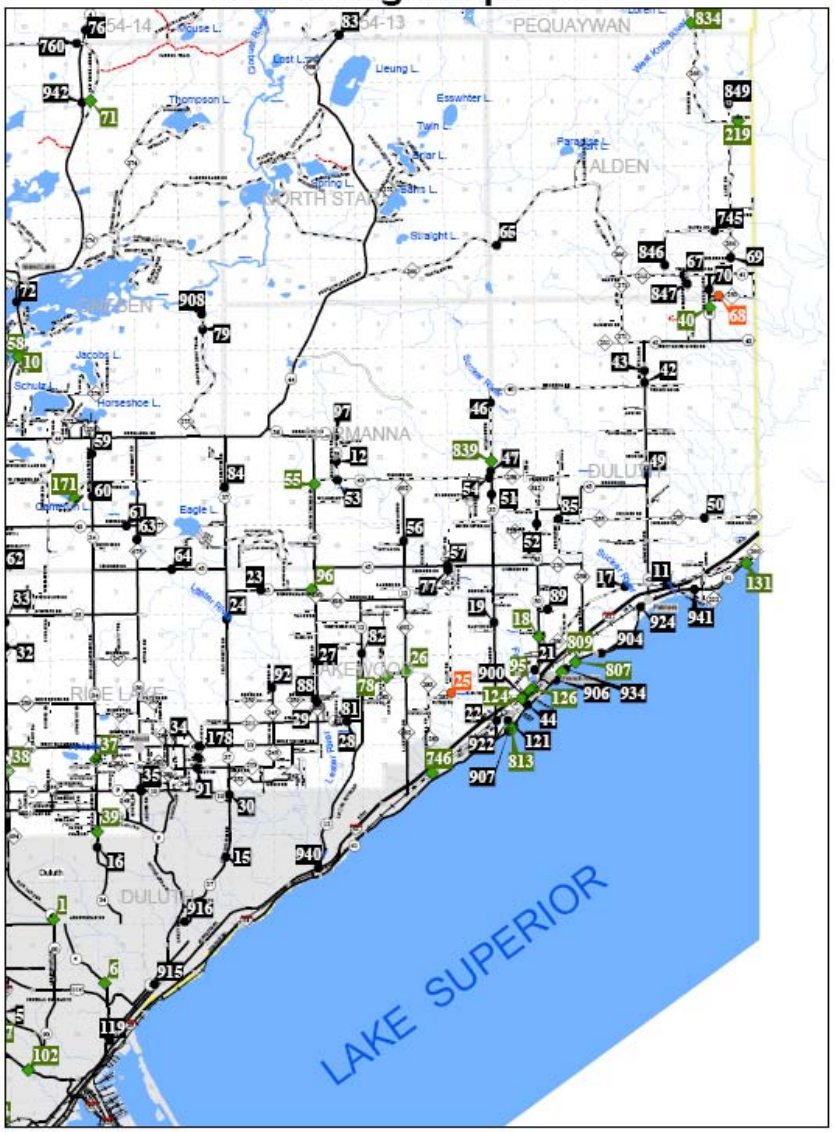
Bridge Inventory

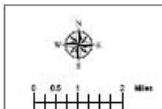
- 568 Bridges
- ~100 Timber Bridges
  - Timber girders or stringer
  - Panelized dowel laminated
    - Wheeler Consolidated bridges
  - Timber deck with steel girders

St. Louis County Index



SLC BridgeMap 2004





SLC Public Works GIS
Dec 09, 2003

Bridge Legend

- Structures spanning 10 ft and over
- Restricted Bridge
- Structures spanning less than 10 ft


Wheeler

Public Works Structure

Engineering

- Bridge Engineer
- 5 technicians
  - Inspections
  - Design for contractors & maintenance
  - Survey/topos

Maintenance

- Superintendent
- 2 four-man crews
  - Routine maintenance
  - Significant repairs
  - New construction

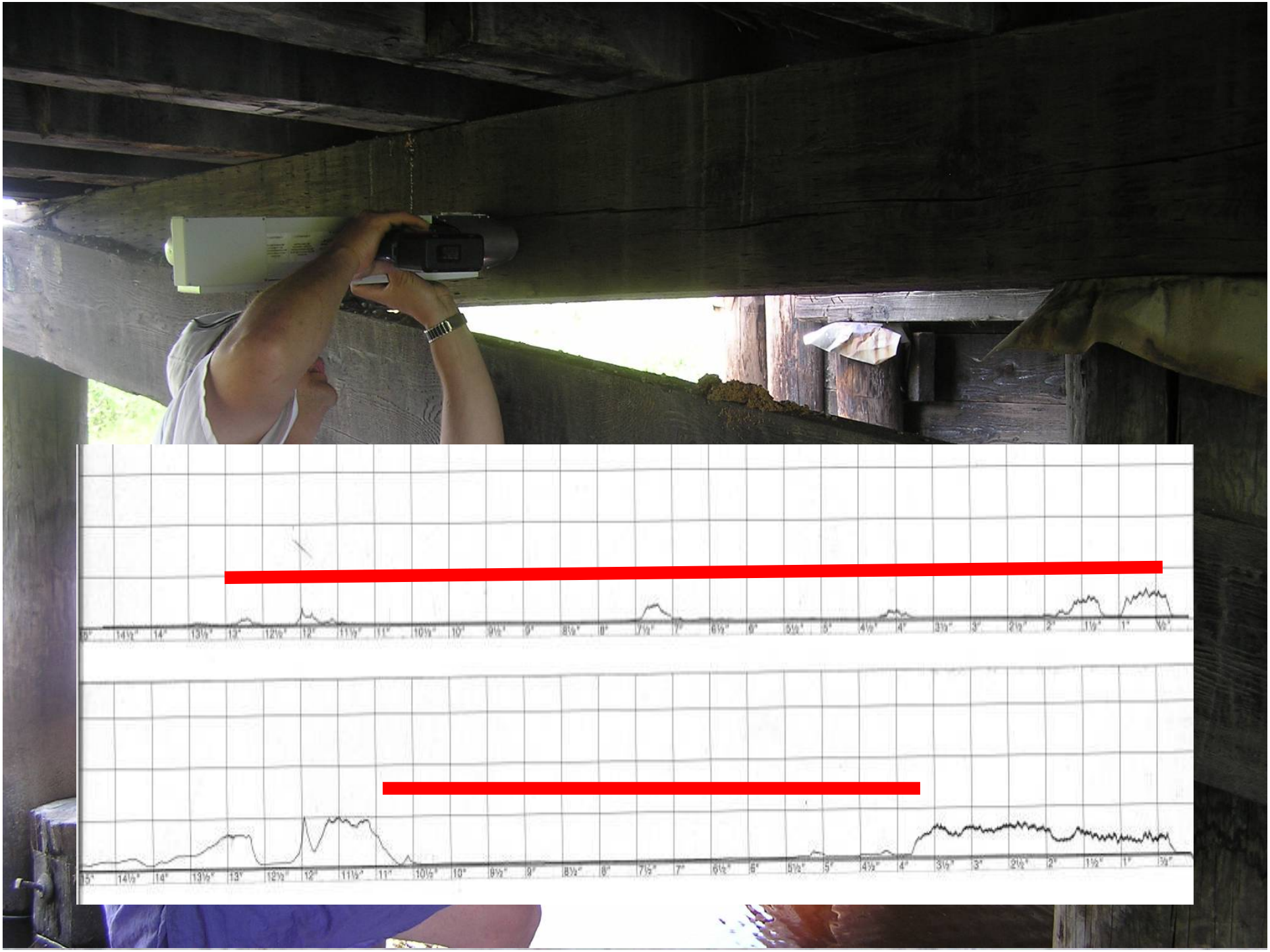
Bridge Program – Inspections

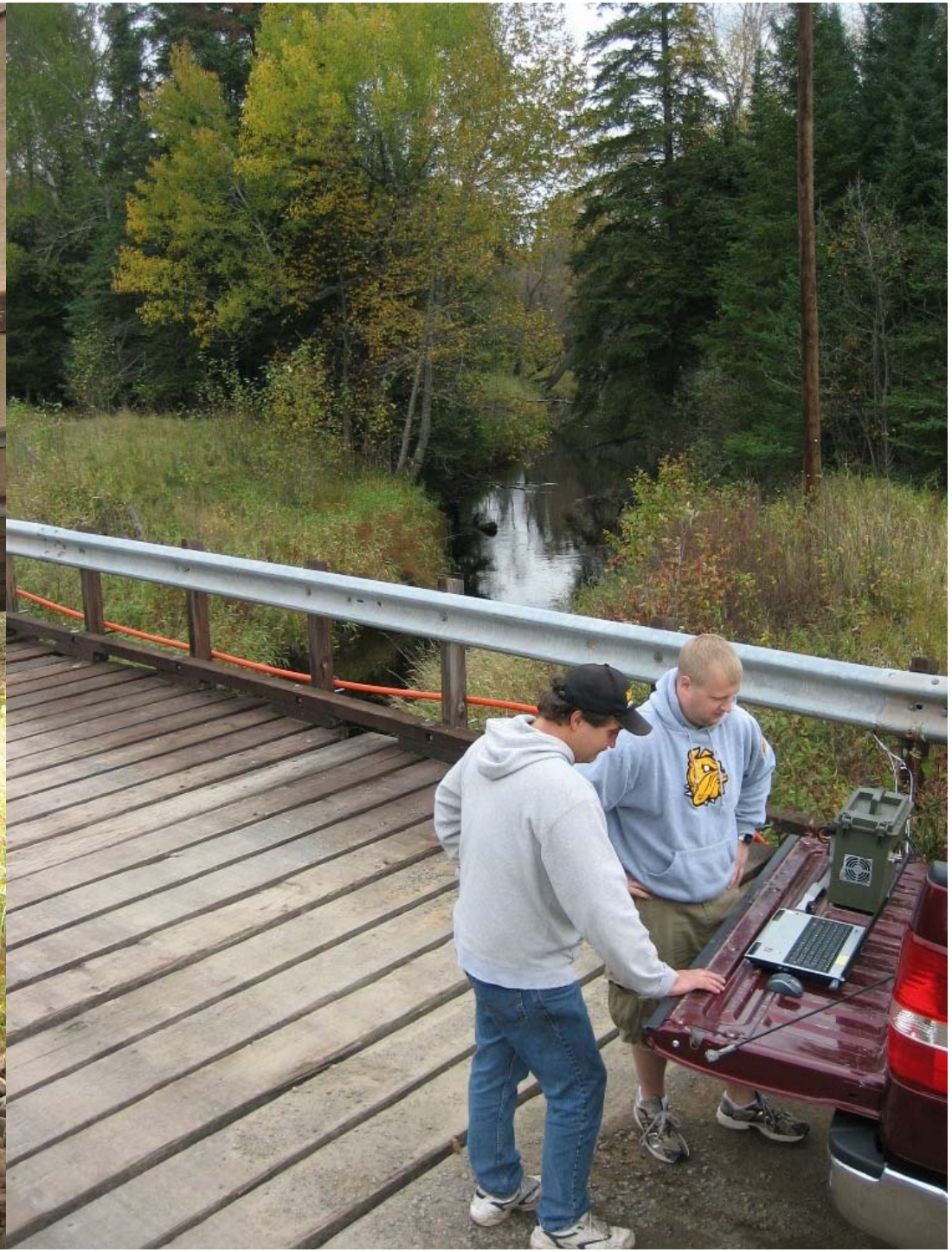
- Lots to do, not enough time
  - 170 every 12 months
  - Remainder on 24 month schedule
- Recent purchase and use of
  - Stress wave timers
  - Resistance microdrills

Bridge Program – Maintenance / Repairs


1308
1185
1432
X21
1370


BIG
RED





Bridge Program Replacement

- Decision factors
  - Cost, site, span length, staffing
- Designs
  - Dowel laminated slab span
    - Panel-Lam from Wheeler
    - Copper naphthenate
    - Steel pilings

Recent Activity

- 2010 Superstructure replacement Bridge 184
- 2009 Replacement Bridge 85.
- 2008 Superstructure replacement Bridge 53; Nichols Lake
- 2007 Repairs to two bridges to replace pile caps and partial repairs to pilings

Bridge 53

- Steel girders with timber deck, timber pile caps and pilings
- 1964
- 22 ft span
- Restricted load ratings


JOHN DEERE


5 3
3 1


690E LC
JOHN DEERE


4x4


FRENCH RIVER

Bridge 85

- 1946
- DF girders
- SYP pilings
- Timber deck
- Creosote
- 40 ft
- 2 spans
- 2 lanes


6145


FMC
Link-Belt
FMC Link-Belt

Summary

- Timber will continue to be used on shorter spans
- Currently using Wheeler Panel-Lam systems installed by their own crews
- Steel pilings will be used for all replacements
- Ongoing emphasis on maintenance/repair
- Strategic research partnership with UMD is a priority

Acknowledgments