

GRAVES CROSSING BRIDGE, ANTRIM COUNTY, MI



DESIGN TYPE: STRESS-LAMINATED SLAB DECK

YEAR BUILT: 1990

DESIGN ENGINEER: WHEELER CONSOLIDATED

FABRICATED BY: WOODSTOCK, INC. & SCHAAF
LUMBER COMPANY

INSTALLED BY: ANLAAN CORP., GRAND RAPIDS

SPANS: JORDAN RIVER

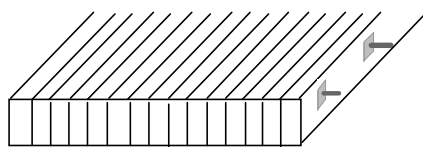
LOCATION: NE $\frac{1}{4}$ OF SEC. 32 T31N R6W

FROM JCT OF US-131 IN MANCELONA GO NORTH ON M-66
ABOUT 9 MILES TO GRAVES CROSSING ROAD. TURN EAST AND GO
ABOUT $\frac{1}{4}$ MILE TO BRIDGE.



Graves Crossing Bridge

BRIDGE GEOMETRY



STRESS-LAMINATED SLAB

Spans:	2	Load Rating:	HS-20
Number of Lanes:	2	Average Daily Traffic:	100
Total Length (feet):	38	Abutment Material:	TimberPiling
Out-to-Out Width (feet):	27	Superstructure Lumber Tally:	11.8 MBF
Curb-to-Curb Width:	25	Superstructure Cost:	\$46,000
Lamina Size:	4"x12"	Superstructure Cost/ft ² :	\$45
		Total Project Cost:	\$142,000

BRIDGE MATERIALS

DECK

Species: Red Pine
 Quantity: 11.8 MBF Lbr Tally
 Preservative: CCA w/ water repellent
 Retention : 0.4 lbs./ft³
 Stressing Rods: 8

SUBSTRUCTURE

Type: Timber Piling
 Species: Red Pine
 Preservative: Creosote

GUIDERAILS

Species: Glu-Lam Douglas Fir 6" x 8"
 Preservative: Creosote

WEARING SURFACE

Asphalt (3") over geotextile fabric

LOCAL IMPACT

Before replacement in 1991, Graves Crossing consisted of a series of four corrugated steel culverts with a 3-ton posted load limit. The culverts were in poor condition and insufficient to meet hydraulic flow requirements at the site. Past roadway washouts and severe scour problems required that the culverts be replaced with a new bridge structure designed for greater hydraulic capacity. In addition, a new bridge capable of supporting standard highway loads was needed to provide safe access for fire-fighting vehicles, school buses, and logging trucks. Replacement of the existing culverts with a skewed bridge was determined to be the best alternative, because it would allow alignment of the abutments with the natural stream channel and reduce adverse impacts on the Jordan River.

Construction of the Graves Crossing bridge was contractually administered by the Antrim County Road Commission. A temporary bridge (Bailey-type) was installed by the Michigan National Guard to provide uninterrupted traffic flow to residents during bridge construction.

BRIDGE PERFORMANCE

Reference: *Field Performance of Timber Bridges - Graves Crossing Stress-Laminated Deck Bridge* - Forest Service Research Paper FPL-RP-539. The document reports, based on 2 years of field observations, the bridge is performing well with no structural or serviceability deficiencies.

FABRICATION & ERECTION

The bridge is constructed from locally grown, CCA treated red pine lumber with water repellent additive to minimize wood swelling and contracting. Panels were nailed together for shipment to the bridge site where they were placed on a timber substructure and stressed together. Along side of the traffic bridge is a pedestrian bridge made from stringers and decking connecting the walkway from State Forest Campground on one side of the river with the canoe livery on the other side. The bridge site was configured so as to ease the launching of canoes while minimizing erosion of soil into the river.

FUNDING SOURCES

USDA Forest Service: 17%

Other Sources: 83%

LOCAL CONTACT

Fred Hunt
 Antrim county Road Commission
 Box 308
 Mancelona, Michigan 49659-0308
 Phone: 616-587-8521 FAX: 616-587-8156

WIT Program Proposal Number: NA-11-90

Federal Grant Identifier: NA-90-0135

COOPERATING AGENCIES



December 1999

Conservation Resource Alliance

