

Michigan Department of Transportation

Historic Bridge Inventory Update



NBI_Bridge_ID # 08200054000B010 **Structure #:** 558 **County:** BARRY
NR Recommendation: Eligible **City:** HASTINGS TWP

MDOT Region: 5- SOUTHWEST **Owner:** COUNTY

Location: 5 MI SE OF HASTINGS **Milepoint:** 5

Feature On: CHARLTON PARK ROAD

Feature Intersected: THORNAPPLE RIVER

Type: BOX BEAM **Design:** ADJACENT

Material: PRESTRESSED CONCRETE

Railing Type: MSHD R-4 CONCRETE POST & OPEN METAL PANEL RAILINGS

Spans: 3 **Overall Length (ft):** 135 **Deck Width (ft):** 30.2

Year Built: 1956 **Alteration (Date):** **Source:** PLAQUE

Designer/Builder: CO RD COMM/GENE FEWELL, CONTRACTOR

Setting/Context:

RURAL

Physical Description:

The 3 span, 110'-long, adjacent prestressed concrete box beam bridge has a maximum span length of 45'. It is finished with MSHD R-4 railings. The bridge is supported on steel piles with concrete cap beams bents and concrete abutments with stepped wingwalls. The piles have been encased in concrete below the waterline. Deck drainage is accommodated by openings in the curbs.

Summary of Significance:

The 1956 adjacent box beam bridge placed by the Barry County Road Commission is among the nine earliest examples in the state of what would become one of the most significant new bridge types from the last half of the 20th century. It is historically and technologically significant. The 1955 and 1956 examples represent not only the introduction of the significant bridge type in Michigan, but also share a context with many other states where it was the counties, not the state highway department, that initially embraced the material and demonstrated its usefulness and economy to state engineers. Credit also goes to Lamar Pipe and Tile Company of Grand Rapids, which, under the leadership of plant manager J. W. Corson, headed the effort to bring precast, prestressed concrete bridges to Michigan. Lamar was established in 1923 to produce concrete and terra-cotta pipes for sanitary sewer and drainage systems. It was acquired in 1954 by American-Marietta Company, the largest concrete pipe manufacturer in the country. Corson, who recognized the potential of prestressed concrete, encouraged American-Marietta to acquire Concrete Products Company of America, the company that developed the prestressed concrete box beam in 1949-50. American-Marietta now had the license for the prestressed concrete voided beam, and Lamar immediately constructed a casting yard at its Grand Rapids facility based on the layout of Concrete Products's yard in Pottstown, Pennsylvania. They also had a casting yard in Jackson (closed in 1978). As both bridge designer and salesman, Lamar worked to educate potential clients about their new product, illustrating its strength, economy, and ease of construction, especially in poor weather conditions when cast-in-place concrete was impractical. Lamar hosted a test-beam demonstration attended by 65 city and county officials, contractors, and engineering students at its Grand Rapids fabricating yard in October 1954.

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The bridge was built by the county using federal (secondary road) and state aid, both typical funding sources for county bridge projects. The design of the beams is standard.

The voided box beam bridge type was developed by Concrete Products Company of America in 1949-50. The company was associated with construction of America's first prestressed concrete bridge, the 1949-51 Walnut Lane bridge at Philadelphia. It was looking for a way to increase the capacity of the channel beam, a precast reinforced concrete unit that was being used with great frequency on secondary roads after World War II. By enclosing the C-shaped channel beam into a box shape and then applying the new reinforcing system of prestressing with seven-strand wire developed by John A. Roebling's Sons, they came up with the 17" and 21"-deep precast hollow box beam that is longer and stronger than the channel beam. One of the keys features of their design was using cylindrical cardboard sono-tubes to form the voids. Concrete Products worked with the Pennsylvania State Highway Department, which placed its first adjacent box beam bridges late in 1950. While other engineers also produced different prestressed beam designs, it was the voided box beam developed by Concrete Products and produced in Michigan under their license starting in 1954 that came to be one of the dominant beam designs during the last half of the 20th century. In 1986, prestressed concrete overtook steel as Michigan's preferred bridge material.

Reviewed By: LCE (7/07)

Notes: