

M-69: Paint River Bridge Rehabilitation

Context

The bridge spans the Paint River in the city of Crystal Falls, located in Iron County.

Purpose and Description

Built in 1924, the structure is the only non-redundant open spandrel concrete arch bridge in Michigan. The project purpose was to maintain safe traffic flow over the river. Rehabilitation efforts included deck replacement, replacement of the spandrel columns, substructure repair, approach work, and sidewalk replacement on both sides.



Public Engagement

In addition to meetings with the city of Crystal Falls and the State Historic Preservation Office, a public meeting was held to obtain input for the project. MDOT staff addressed concerns related to aesthetics, safety, the detour route, and the historic nature of the bridge. The city preferred to keep traffic on the main street during construction by building a temporary bridge or by utilizing part width construction. Although it was determined that keeping traffic on the main street was not feasible, MDOT invested about \$350,000 on upgrades to the detour route on city streets.

Challenges

The historic nature of the bridge, protection of the river resource, and engineering limitations presented several challenges to the project. Structurally, the bridge consists of two primary members (the arch ribs), making collapse highly possible if either rib was compromised.

Context Sensitive Solutions Approach

The bridge was designed, with critical modifications, following the essence of the historical design, including the spandrel columns, superstructure, railing, lighting columns, and lamps. Staging construction on one span at a time minimized potential disruption to the structural equilibrium of the bridge and virtually eliminated environmental impacts. Drainage problems were addressed and new lighting, based on the original design, added to the safety and ambiance of the rehabilitated bridge. MDOT responded to the issue of some motorists feeling crowded when sharing the bridge with trucks carrying wide loads. Although the existing deck was essentially wide enough, MDOT widened the superstructure by six inches and each sidewalk was reduced by six inches without impacting non-motorized and snowmobile users and without increasing dead load. MDOT also addressed the community's concerns about the impact of the detour on downtown businesses as well as controlling speed on the detour route, which went through a residential area. The department provided signs on the detour route to indicate that the downtown business district was open. MDOT also funded dedicated work zone law enforcement for the detour route, which was in effect for five months.

Outcome

Returned to service in 2002, the bridge is both a gateway into Crystal Falls and a focal point for a non-motorized path along the Paint River. As viewed from the adjacent park, the bridge fits well with its surroundings lending an element of charm to the landscape.

Funding

The project was completed in one construction season at a final cost of \$1,130,545. A new, modern bridge would have cost approximately 25% more, would have had greater environmental impacts, and would not have been as visually respectful of history or as harmonious with its surroundings.

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