



Valmont Bridge System installed in St. Clair

## Valmont<sup>®</sup> Bridge Systems Case Study St. Clair County

# Saving Time in St. Clair County with the Valmont Bridge System

St. Clair County Road Commission (SCRC) needed to replace two severely deteriorated superstructures on Marine City Highway. Marine City Highway is a two lane road which sees more than 10,000 vehicles per day and is the main road into and out of Marine City for commercial and school traffic. The existing bridges consisted of a 25' span steel beam bridge (Structure 4-08) and a 35' span steel beam bridge (Structure 4-09). Both bridges were constructed with a concrete deck and had been overlaid with asphalt multiple times. These steel beam bridges were originally built in the early 1950's and designed for H-15 loading and had come to the end of their long 60 year service life. The existing beams for both bridges consisted of hot rolled W18 wide flange sections, 18" deep. The entire bridge cross section depth, including concrete deck and overlays, totaled 2'-4 1/2". Detour routes for these bridges takes traffic down 7 miles of gravel roads and more than 15 minutes out of the way, for each bridge closure. Due to this, SCRC looked for alternatives to expedite the construction schedule for a full closure construction project. To reduce the duration of the construction closure and reduce costs, it was imperative to utilize and rehabilitate the existing abutments. This required the new superstructure to match the existing superstructure weight and depth. SCRC also wanted to maintain constructability by the county maintenance crews. The press-brake-formed steel tub girder bridge system allowed SCRC to meet all of these goals.



Existing abutments were reused and rehabilitated



18" deep Galvanized Steel Tub Girder



Existing bridges on Marine City Highway



## Construction Methods & Fabrication

The existing abutments were reused and rehabilitated, eliminating expensive and time consuming substructure demolition and replacement work in the water. This was made possible by the light weight of the press-brake-formed steel girder superstructure, which provided no additional dead load pressure on the spread footing abutments. Additionally, special steel tub girders were fabricated to match the depth of the existing superstructure so that no modifications needed to be made to the existing abutment bearing elevations. This also limited the roadway approach pavement replacement limits and saved cost.

The Valmont Bridge System was chosen for its light weight, adjustable depth, low cost, integral backwalls and ease of construction. The bridge system consists of a precast concrete deck on galvanized, press-brake- formed steel tub girders. The superstructure was prefabricated by ADL Systems in Portland, MI who provided a quality, cost-effective final product. Our bridge system was designed for the required HL-93 (MOD) MDOT live load and met all applicable MDOT and AASHTO design criteria. The 8" thick precast concrete deck was overlaid with a thin epoxy overlay which provided the final driving surface and further protection from deicing salts. The galvanized steel tub girders were designed to be 18" deep, providing a total superstructure thickness of 2'-4", which closely matched the depth of the removed superstructure. The Valmont Bridge System superstructure was also manufactured with integral backwalls which allowed no substructure concrete to be cast in the field and further expedited the installation schedule. Both superstructures

# Shipping & Erection

were transported to the construction site in 6 individual units. The 25' span units (4-08) weighed approximately 10 tons and required only a county owned excavator for erection. The 35' span units (4-09) weighed 15 tons, so the county chose to rent a 150 ton crane to set the units. For Structure 4-08, the superstructure units arrived at the job site before 8:00 a.m. and were all set in place by the county before 11:30 a.m. The crane for Structure 4-09 arrived at roughly 9:00 a.m. and was ready to lift the bridge units within an hour. Delivery of the superstructure units was timed to coincide with the readiness of the crane. By 1:00 p.m. the 6 units for Structure 4-09 were all set in place.

The 6 individual units were then tied together with a concrete closure pour. The SCRC maintenance crew cast a 6" wide High Performance Concrete deck joint, creating a continuous 41'-6" wide concrete bridge deck. Transpo Industries T-17 Methacrylate Polymer Concrete was used in the deck joint. The deck joint width and rebar lap length, was specifically designed for the T-17 material based on rebar development length testing provided by Transpo Industries.

The deck for Structure 4-08 was overlaid with a thin epoxy overlay to further protect the concrete driving surface. Due to weather limitations the thin epoxy overlay on Structure 4-09 was placed the following spring under temporary lane closures.



Forming deck joints for Transpo T-17 methacrylate polymer concrete deck joint



Shipping and setting the Valmont Bridge System

Forming and grouting deck joints



Units connected with a high performance concrete deck joint pour

# Final Product

Over the next three days, the roadway approaches were paved with asphalt, and the drainage ditches in all four quadrants were re-graded and seeded. Guardrail was also installed on the bridge deck utilizing anchor bolt holes that were precast into the bridge deck fascia units. The St. Clair County Road Commission was able to successfully replace these two (2) existing deteriorated bridges in just over a week by using innovative prefabricated structural elements. With the use of the prefabricated Valmont Bridge System, this project provided a new structure with a service life over 75 years that is sustainable, cost effective, aesthetically pleasing and environmentally friendly.



Complete bridge on Marine City Highway

# Where can I get it?

Contact your Regional Sales Manager today to request a quote!

Or contact Valmont Structures at (402) 359-2201.



Complete bridge on Marine City Highway



Complete 4-08 Marine City Highway Bridge with epoxy overlay



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