



2012 - Rock County Road 55 Bridge over Railroad

Description

Meta Fields

Project Summary : GRS IBS [Geosynthetic Reinforced Soil Integrated Bridge System]

Project Location : 0.1 Miles South of JCT. C.S.A.H. 4 on C.R. 55 over Minnesota southern railway in Magnola Township

Mobility Impact Time :

- ABC: 60 days
- Conventional: same time

Impact Category : Tier 5 (within 3 months)

Dimensions : 82.5-ft-long and 33-ft-wide one-span prestressed concrete adjacent box beam bridge, 0° skew

Average Daily Traffic At Time Of Construction : 135

Existing Bridge Description : No bridge previously existed at this RR crossing.

Replacement Or New Bridge : The new bridge consists of 82-ft-long single-span prestressed concrete side-by-side boxes utilizing Geosynthetic Reinforced Soil Integrated Bridge System (GRS-IBS) technology. The bridge has a roadway width of 30 ft with two 11-ft wide traffic lanes and two 4-ft-wide shoulders. The cross-section consists of eight 2.75-ft-deep adjacent box beams with a 2- to 5.75-inch-thick bituminous overlay. The adjacent box beams are post-tensioned transversely through the deck. The GRS abutments were founded on glacial till. The total height of the abutments from top of reinforced soil foundation to bridge low member is 22 ft. The front facing of the GRS abutment is gravity stacked 8-inch concrete blocks. The lower layers, where contact with water is anticipated, are constructed with solid concrete blocks to prevent water from accumulating and freezing.

Construction Method : The GRS technology used in this project consists of three main components: the reinforced soil foundation, the abutment, and the integrated approach. Alternating layers of compacted granular fill and geosynthetic reinforcement provide support for the bridge. The closely spaced reinforcement and granular soil create a composite material that is capable of carrying bridge loads with predictable performance. The bridge abutment went up quickly. Three to five layers of the abutment were completed each day, about 220 to 360 square feet. Wing walls meet the abutment at an angle, so 45-degree CMU (concrete masonry units) were specified to help speed construction.

Stakeholder Feedback : We would not envision using GRS abutments again for such a tall abutment (â?? 20-ft exposed height) which generates an excessively large foot print of geosynthetic reinforcement, and reduces the cost saving feature of GRS. The hollow core CMU facing is vulnerable to construction damage, stress concentrations, etc. In the future, we would opt to use wet cast solid concrete blocks for both better freeze-thaw protection and to better distribute possible stress concentrations, etc.

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Costs : The engineerâ??s estimate for the project was \$616,969. The low bid was \$834,769. There were 2 bidders. The cost per square foot of bridge was \$230 compared to \$120 for conventional construction in this region during the same time period.

Funding Source : Federal and State

Incentive Program : \$350,000 IBRD Program

Contract Plans : 1

Foundations & Walls : GRS IBS [Geosynthetic Reinforced Soil Integrated Bridge System]

Year Abc Built : 2012

State : MN

Owner : County

Location : Rural

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Spans : One-span

Beam Material : Concrete

Max Span Length Ft : 82.5

