

MODULAR VEHICLE STEEL BRIDGE SPECIFICATIONS

A. GENERAL REQUIREMENTS – Short span beam bridges

Design-build -The bridge supplier shall, under the provisions contained herein, design, fabricate, and deliver to the job site, ready for installation (**one (1)**) shop assembled, two-piece modular steel bridge rated for (**HL93, or suitably defined multi-axle load rating**), complete with guard rail system. The guardrail system should conform to roadway applications for impact strength, including full AASHTO (American Association of State Highway and Transportation Officials) highway ratings when appropriate.

Dimensions - The bridge superstructure shall be (**__-feet - __-inches**) long and (**__-feet - __-inches**) wide. (**Note: When practical, bridge length should be specified in increments of 5-feet, and module widths should be specified in 7, 8, or 12-foot modules to maximize pre-engineered standards and material availability**). The length of superstructure shall be from out-to-out and does not include wing-wall or back-wall dimensions which must be added for total bridge system layout. The width shall be the clear roadway between guard rails.

Bolt-together - The modular bridge should incorporate a full bolt-together design that eliminates the need or requirement for field-welding on the bridge. Minimal field welding may be required for the anchoring system. Each bridge module should incorporate more than one main support beam to maximize safety and eliminate a “fracture critical” designation.

Abutments and Back-walls – Abutments and back-walls are an integral part of the bridge system and should provide appropriate strength for the bridge application. “Perched” abutments should be specified when the soil-bearing capacity meets or exceeds 2500 PSF (pounds per square foot). The abutments and back-walls should be designed and supplied by the bridge manufacturer to ensure conformance with design parameters, load-ratings, and appropriate fit-up. In all cases, abutments and back-walls should be designed and/or approved by a registered Professional Engineer.

Bridge Handling – Each bridge module should be designed and supplied with a minimum of four (4) or more integral lifting lugs to facilitate safe handling and placement of the bridge module.

Bridge Installation – Each modular steel bridge should be delivered with a comprehensive installation plan that provides manufacturer’s recommended handling, placement, fit-up and securing to the abutment system. The installation plan should be laminated and suitable for review in a field environment. Offloading of the bridge at the delivery site, general bridge installation, and approach work necessary for the bridge to accept traffic will be supplied by contractors approved by the owner under separate contract from the bridge.

B. REFERENCE SPECIFICATIONS AND STANDARDS

The materials and workmanship shall be in accordance with the best standard practices of modern bridge construction. All materials used in fabrication of the superstructure shall conform to the applicable specifications. Bridge fabrication must be conducted in an AISC (American Institute of Steel Construction) shop approved for Major Bridge fabrication; otherwise, a Certified Welding Inspector (CWI) must be contracted at the approval of the owner to document and observe all shop fabrication.

Copies of any referenced specifications, standards, or codes may be procured from the following;

AASHTO American Association of State Highway and Transportation Officials
444 North Capital Street, N.W.
Washington, DC 20001

AISI American Iron and Steel Institute
1101 17th Street N.W.
Washington, DC 20036-4700

ASTM American Society for Testing and Materials
1916 Race Street
Philadelphia, PA 19103

AWS American Welding Society
550 North Le June Road
Miami, FL 33126

C. TECHNICAL SPECIFICATIONS

Design: The bridge superstructure shall be designed in accordance with AASHTO “*Standard Specifications for Highway Bridges, 17th Edition.*”

Load Rating: The bridge shall be designed with the following considerations:

- **GVW (Gross Vehicle Rating) of _____, or**
 - **HS-20** □ **HS-25** □ **HL93**
- Camber shall be installed to offset the dead load and appear flat on bridges exceeding 70-feet in length; otherwise, the camber should be _____ % of the total bridge span.
- Bridge deflection shall not exceed a ratio of L/500 of bridge length.

Materials:

Structural Steel - All structural steel shall be of domestic (USA) manufacture with full material traceability provided upon customer request and shall conform to ASTM Specification A709 Grade 50W (A588 Weathering Steel), with exposed exterior surfaces of girders being blast cleaned prior to shipment to assure uniform weathering.

Structural Decking - The steel decking shall be ASTM grade 50, galvanized, roll-formed, and (minimum), 4 ¼" X 12" steel construction as described in the AISI – Handbook of Steel Drainage and Highway Construction Products, Type A Steel Flooring, and shall be oriented perpendicular to the direction of travel. The deck shall have a positive connection to the modular bridge sections, either through welding or bolting each deck panel to the support beams.

Side Dams – ASTM A588 weathering steel side dams shall be integrally welded to the grade 50 decking. The side dams should extend at least 3½ inches above the top of the deck. Extended side dams of similar material should be utilized in applications where road gravel or debris is required to be contained without overflow into the stream system.

Guard rail - □ **Weathering steel**, or □ **Galvanized steel** W-beam guard rail system bolted to guard-rail posts and side dams, providing dual-point load sharing and impact resistance.

System Hardware - Manufacturer's recommended bearing plates, elastomeric bearing pads, and all assembly bolts shall be included.

Certification and Traceability of Materials – Certified Mill test results shall be furnished when requested for all steel and bridge deck. Charpy V-notch impact test results for main steel supports must be available for review.

Welding - All welding shall be completed to D1.1 specifications by certified welders meeting requirements and qualifications tests of the American Welding Society. All welds shall conform to specifications of the American Welding Society.

D. WORKING DRAWINGS & COMPUTATIONS

Complete design drawings prepared, stamped and signed by a registered Professional Engineer. These shall include shop drawings illustrating the location and bolt-hole configuration for the bearing pads.

Drawings will be reviewed by the customer or customer's engineer to confirm dimensional conformance and site-specific application suitability. The bridge manufacturer is responsible for bridge design and conformance with applicable standards for simple bridge design and fabrication. Written approval, or rejection of submittals, will be provided within seven (7) calendar days after receipt of submittals.

Installation drawings and instructions shall be provided with each bridge to provide aid and guidance in the handling, fit-up, and bolting together of the bridge system according to the manufacturer's recommendations.

E. MATERIALS AND WORKMANSHIP

All materials used in the fabrication of the superstructure, frame, deck, and guardrails shall be new and conform to the standards and quality for this type of fabrication and best engineering practices.

F. ACCEPTANCE OF BRIDGE

Acceptance of the structure will occur after it has been fabricated and delivered in accordance with the specifications contained herein, and after all required certifications have been furnished.

G. DELIVERY

The bridge supplier shall fabricate and deliver the bridge, complete with guard rail and abutments when required, to the bridge installation site to terms including FOB Manufacturers Plant, freight added.

The bridge/bridges shall be furnished and delivered no later than **Day-Month, Year**.

The bridge manufacturer shall provide notice of delivery fourteen (14) days prior to the anticipated delivery date. The manufacturer will provide seven (7) days notice to the firm delivery date. The bridge should not be delivered on a weekend or holiday.