BRIDGE DESIGN MANUAL

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CHAPTER 9 • SHOP DRAWINGS

9.00 SHOP DRAWING REVIEW

9.01 TYPES OF SHOP DRAWINGS

9.01.01 Structural Steel

9.01.02 Prestressed Concrete

9.01.03 Bearings

9.01.04 Metal Stay-In-Place Forms

9.01.05 Expansion Joints

9.01.06 Mechanical Equipment

9.01.07 Electrical Equipment and Circuitry

9.01.08 Water Mains

9.01.09 MSE Walls

9.01.10 Precast Three Sided, Arch & Box Culverts

9.02 SHOP DRAWING PRODUCTION

9.03 SHOP DRAWINGS FOR RAILROAD STRUCTURES

9.03.01 Review Time

9.04 SHOP DRAWINGS FOR CONSULTANT - DESIGNED JOBS

CHAPTER 9 • SHOP DRAWINGS

9.00 SHOP DRAWING REVIEW

(revised 8-20-2009)

When reviewing shop drawings, it is not necessary to check the exact dimensions. It is the responsibility of MDOT to ascertain that the fabricator is supplying the items specified, while it is the contractor's responsibility that all items are fabricated to the correct dimensions. See Subsection 104.02 of the Standard Specifications for Construction. Fabricators shall submit all drawings in Adobe Acrobat “PDF” format.

9.01 TYPES OF SHOP DRAWINGS

(revised 8-20-2009)

Shop drawings for the following construction items require the review and approval by MDOT prior to authorizing fabrication:

A. Structural Steel

B. Prestressed Concrete Beams

C. Bearings

D. Metal Stay-In-Place forms

E. Expansion Joints (If not pre-approved.)

F. Mechanical Equipment

G. Electrical Equipment and Circuitry

H. Water Mains

I. Mechanically Stabilized Earth (MSE) Walls

J. Precast Three Sided, Arch or Box Culverts greater than 10 feet in span length.

K. Steel Sheet Piling & Cofferdams

    1. Reviewed by Geotech, Stamped by Bridge

L. Articulating Concrete Block

    1. Reviewed by Hydraulics, Stamped by Bridge

M. Other Various Shop Drawing Types

    1. Aluminum Multi-Plate Pipe Arch Culverts
    2. EPS Block
    3. Modular Block Walls
    4. FRP Wraps
    5. ITS components
    6. Miscellaneous, etc.

9.01.01 Structural Steel

(revised 3-26-2018)

Structural Steel shop drawings shall be reviewed for the items included on the Structural Steel Shop Drawing Review List (pages 13-15) accessible through the Structural Fabrication Unit website. This list includes items to be reviewed by MDOT Bridge Design as well as MDOT Structural Fabrication.

The Design Engineer shall review and approve structural steel pay weights submitted on the Structural Steel Shop Drawings. Pay weights will be stamped in same manner as Structural Steel Shop Drawings.

9.01.02 Prestressed Concrete

(revised 3-26-2018)

Prestressed Concrete shop drawings shall be reviewed for the items included on the Structural Precast Concrete Shop Drawing Review List (pages 11-12) accessible through the Structural Fabrication Unit website. This list includes items to be reviewed by MDOT Bridge Design as well as MDOT Structural Fabrication Unit.

9.01.03 Bearings

(revised 3-26-2018)

Elastomeric Bearing shop drawings shall be reviewed for the items included on the Elastomeric Bearing Shop Drawing Review List (page 10) accessible through the Structural Fabrication Unit website. This list includes items to be reviewed by MDOT Bridge Design as well as MDOT Structural Fabrication Unit.

9.01.04 Metal Stay-In-Place Forms

(revised 8-23-2021)

Shop drawings for fabricator designed metal stay-in-place forms shall be reviewed for the following items:

A. That all criteria listed in section 706.03 D of the Standard Specifications for Construction have been adhered to.

B. Voids are filled or not filled with concrete based upon original design.

C. Deck depth has not been compromised (increased or decreased) as result of using forms.

D. All materials are galvanized.

E. Support angles do not protrude above proposed top of haunch (or top of the beam where there is no proposed haunch)

F. Caulk or grout is applied along longitudinal seam between support angles and beam.

G. Gauge (thickness) of metal deck form. Generally, 0.0456 in.(19 gauge) or 0.0336 in. (22 gauge) is acceptable.

H. Welding or mechanically fastening permanent metal deck forms or accessories to structural steel is prohibited.

9.01.05 Expansion Joints

(revised 3-26-2018)

Shop drawings are not required for proprietary expansion joints installed in bridge decks where the maximum opening is 4 in., and where standard shop drawings have been preapproved by MDOT. The Contractor may select any joint that satisfies the design requirements from a number of joints listed on the plans and in the supplemental specifications. Copies of the standard shop drawings of the devices selected are available at the MDOT website or will be provided to the Resident/Delivery Engineer by MDOT Bridge Design. When the maximum opening in the bridge deck is larger than 4 in., a modular expansion joint is required and shop drawings for these joints shall be handled as the shop drawings for structural steel in BDM Section 9.01.01.

9.01.06 Mechanical Equipment

Shop drawings for mechanical equipment must be reviewed for general conformance with the design specifications and plan details. The Contractor may submit copies of catalogue cuts, parts lists, operating procedures, etc., for review.

9.01.07 Electrical Equipment and Circuitry

Shop drawings for electrical equipment and circuitry must be reviewed for general conformance with the design specifications and plan details. The Contractor may submit copies of catalogue cuts, parts lists, operating procedures, etc., for review.

9.01.08 Water Mains

Shop drawings for water mains must be reviewed for general conformance with the design specifications and plan details. The drawings shall, as a minimum, show the plan and profile of the water mains, the type and quantity of material, all details for special connectors and fittings, and a listing of all specialty items.

9.01.09 MSE Walls

(revised 8-20-2009)

Shop drawings and design calculations shall be reviewed for general conformance with the design specifications (including Special Provision for MSE Retaining Wall System), plan details and the following items:

A. Geometry.

B. Factored bearing pressure versus factored bearing resistance.

C. Minimum soil reinforcement length(s).

D. Conformance to the plans and specifications.

E. Corrosion protection of soil reinforcements.

F. Coping details.

G. Aesthetic details.

H. Load and resistance factors in calculations.

I. How the MSE wall supplier is dealing with obstructions.

J. Quantities.

K. Calculations use correct parameters (such as phi angle, unit weight of soil, surcharges, etc.) specified in specifications.

L. Calculations supplied for precast panel reinforcement.

M. Professional Engineer seal from MSE wall designer.

9.01.10 Precast Three-Sided, Arch & Box Culverts

(revised 5-24-2021)

Shop drawings for precast culverts must be reviewed for general conformance with the design specifications and plan details.

9.02 SHOP DRAWING PRODUCTION

(revised 3-26-2018)

MDOT's Bridge Design Shop Drawing Review Process has been incorporated into MDOT's E-Construction Shop Drawing Review Process document accessible through the Structural Fabrication Unit website. This document details the production, submittal, review and distribution process for shop drawings for all fabricated structural elements.

9.03 SHOP DRAWINGS FOR RAILROAD STRUCTURES

When a railroad crosses over a highway, the Railroad must review and approve shop drawings for that structure.

9.03.01 Review Time

At the pre-construction meeting the Contractor must be made aware of the extra time required for review of the shop drawings by the Railroad.

9.03.02 Fabricator Submittal

(revised 8-20-2009)

The fabricator shall submit shop drawings (in PDF format) to MDOT for review. MDOT will forward shop drawings (in PDF format) to the Railroad for review and after approval.

9.04 SHOP DRAWINGS FOR CONSULTANT - DESIGNED JOBS

(revised 3-26-2018)

When a structure has been designed by a consultant, shop drawing review will, in general, be a separate part of the Scope of Work defined in the Consultant Agreement. The review of shop drawings and structural steel pay weights shall be as described in BDM Sections 9.01 - 9.03. The consultant shall complete all shop drawing reviews utilizing ProjectWise and following the appropriate workflows whenever possible.