CHAPTER 10
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SHOP DRAWING REVIEW

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.

TYPES OF SHOP DRAWINGS

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 (11-26-99)
E. Expansion Joints (If not pre-approved.)
F. Mechanical Equipment
G. Electrical Equipment and Circuitry
H. Water Mains
I. Structural Steel

Structural steel shop drawings shall be reviewed for the following items:

A. Erection Diagram, showing general layout of the steel and marking scheme for identifying members.
B. The number and the size of all members.
C. The details of all splices, showing the number, size, and type of bolts, the type, size, and length of all welds and a section showing the size of all splice materials.
D. The details of all field connections, showing number, size and type of bolts, and the locations where reaming is required.
E. The number, size and spacing of shear developers. The use of shop welded shear developers is acceptable. (8-6-92)
F. The amount and location of camber and the permissible tolerances.
G. The ASTM designation of the steel to be fabricated.
H. The steel surface preparation and the type of shop painting to be applied.
I. All notes that appear on the design plans must be reflected on the shop drawings.
J. Structural steel weights (shop bills) must be checked and should include weight adjustments cited in the Standard Specifications for Construction.
K. Blocking and lifting diagrams.
10.01.02

Prestressed Concrete

Shop drawings for prestressed concrete elements shall be reviewed for the following items:

A. Erection Diagram, showing the general layout of the concrete elements.
B. The number and size of all members.
C. The number, size, and type of prestressing strands or rods, and the forces in these prestressing elements.
D. Bearing details showing size, type, and materials.
E. The location and the details of lifting devices and of support points if the beam does not rest on its bearings while being transported.
F. The location and type of any inserts required for attachments.
G. The layout of the casting bed to be used for casting the prestressed beams. This should show the location of hold-down devices for any draped strands.
H. The location and length of any bond-breaker.
I. The details and type of the reinforcing steel.
J. All notes that appear on the design plans must be reflected on the shop drawings.

10.01.03

Bearings

Shop drawings for fabricator designed bearings shall be reviewed for the following items:

A. Location Diagram, showing the general layout of the structure and the locations of the bearings.
B. The number, size, and types of all bearings.
C. The details of the bearings, showing all materials, dimensions, and welding.
D. The steel surface preparation and shop coating details.
E. Notes listing the material specifications for all parts of the bearings, and the design and specifications used for the design of the bearings.
10.01.04 Metal Stay-In-Place Forms (11-26-99)

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

A. That all criteria listed in the Special Provision 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 into deck depth.

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

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

H. Welding criteria or procedures for metal forms and steel beams.

10.01.05 Expansion Joints

Shop drawings are not required for proprietary expansion joints installed in bridge decks where the maximum opening is 100 mm, and where standard shop drawings have been pre-approved 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 will be provided to the Project Engineer by the Design Division. When the maximum opening in the bridge deck is larger than 100 mm, a modular expansion joint is required and shop drawings for these joints shall be handled as the shop drawings for structural steel in Section 10.01.01.

10.01.06 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.

10.01.07 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.

10.01.08 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.
10.02

SHOP DRAWING PRODUCTION

The Contractor shall make arrangements to permit MDOT to deal directly with the fabricator or supplier for the following or similar items:

A. Fabricated Structural Elements
B. Mechanical Equipment
C. Electrical Equipment and Circuitry
D. Water Mains

10.02.01

Shop Drawing Submittal

The fabricator shall submit four(4) sets of drawings to MDOT, for highway and pedestrian bridges designed by MDOT. For structures carrying railroads over highways and for projects designed by consultants, submittals should be according to Subsections 10.03.02 and 10.04.02 respectively.

10.02.02

Shop Drawing Review

The Design Division, the Bridge Fabrication Engineer of the Construction and Technology Division, and any Railroad or consultant involved shall review the drawings. Normally, the Bridge Fabrication Engineer will review only shop drawings for structural steel, prestressed concrete beams, and fabricator designed bearings and metal stay-in-place forms. The Design Division shall stamp all drawings either "Approved" or "Approved Subject to Correction." The drawings will also be stamped with the signature of the Engineer of Bridge Design. One(1) set will be returned to the fabricator. The shop bills for structural steel weights letter of transmittal shall show the fabricator's weight, the Design Division's checked weight, and the contract weight.

10.02.03

Shop Drawing Distribution

After the necessary corrections have been made by the fabricator, he/she shall submit eleven(11) sets of shop drawings to the Design Division for distribution. All sets must be stamped "Approved" and must be stamped with the signature of the Engineer of Bridge Design. The Design Division will distribute the eleven(11) sets as follows: one(1) set to Design Files, three(3) sets returned to fabricator or supplier and five(5) sets to the Project Engineer, and two(2) sets to the Construction and Technology Division together with two(2) sets of prints of the sheets of contract plans which show prestressed concrete beam details. For shop bills for steel items the fabricator shall submit four(4) sets to the Design Division. Sets will be stamped as noted above. One(1) set will be returned to fabricator, two(2) sets will be sent to the Project Engineer and one(1) set will go to the Design Files. (11-26-99)
10.03

SHOP DRAWINGS FOR
RAILROAD STRUCTURES

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

10.03.01

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.

10.03.02

Prints Required

The fabricator shall transmit six (6) sets of shop drawings to MDOT for review and thirteen (13) sets for distribution. Two (2) sets are to be forwarded by MDOT to the Railroad for review and, after approval, for distribution.
SHOP DRAWINGS FOR CONSULTANT-DESIGNED JOBS

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 sections 10.01-10.03. The consultant shall send copies of all correspondence to the MDOT Consultant Coordinator. (11-26-99)

10.04.01 Review Time

Except for the time required for transmittal to and from the consultant, there will be no extra time allotted for the review of the shop drawings by the consultant.

10.04.02 Prints Required

The consultant shall receive shop drawings from the fabricator for review. A copy of the transmittal letter from the fabricator to the consultant and one(1) set of prints shall also be sent to MDOT Consultant Coordinator. Two(2) sets of prints should be forwarded by the consultant to the Bridge Fabrication Engineer, Construction & Technology Division, for review. If a railroad crosses over a highway, the railroad company must also be sent two(2) sets of drawings for review and approval. (11-26-99)

10.04.03 Shop Drawing Review

(11-26-99) After reviewing the details and receiving comments from other reviewing agencies, the consultant shall coordinate the comments on one(1) set of shop drawings and send them back to the fabricator. These plans shall be stamped approved or approved subject to correction. The approval stamp shall imprint APPROVED FOR MDOT By “consultant’s name”, along with the date. The consultant shall keep one copy of the drawings and comments to review the fabricator’s corrected drawings.

10.04.04 Shop Drawing Distribution

(11-26-99) The consultant shall receive twelve(12) sets of corrected shop drawings from the fabricator for distribution (fourteen(14) sets if the job includes a railroad bridge over a highway). If all corrections have been made, the consultant shall stamp all the drawings approved. The consultant shall return three(3) sets of the drawings to the fabricator, send five(5) sets to the Construction Project Engineer, send two(2) sets to the Bridge Fabrication Engineer, send one(1) set to MDOT’s Design Consultant Coordinator and keep one(1) set for the consultants files. If the job involves a railroad over a highway, two(2) sets shall be sent to the railroad company.

10.04.05 Structural Steel and Other Pay Weights

(11-26-99) The consultant shall review and approve the structural steel pay weights submitted by the fabricator. The fabricator shall submit five(5) sets to the consultant. Sets will be stamped as noted in section 10.04.03. One(1) set will be returned to fabricator, two(2) sets will be sent to the Construction Project Engineer, one(1) set will go to the consultant files and one(1) set will be sent to the MDOT Design Consultant Coordinator.