SECTION 05120 - STRUCTURAL STEEL

PART 1 GENERAL

1.01 WORK INCLUDED

A. Furnish, fabricate and erect structural steel and appurtenances as shown on the Drawings and specified herein.

1.02 RELATED WORK

A. Section 05500, Miscellaneous Metal

1.03 QUALITY ASSURANCE

A. Standards: Except as otherwise specified herein or shown on the Drawings, conform to the applicable requirements of the following reference standards and codes which are hereby made a part of this Section, as they relate to structural steel work.

1. BOCABuilding Code.
2. AISC Specification for the Design, Fabrication and Erection of Structural Steel for Buildings
3. AISC Code of Standard Practice for Steel Buildings and Bridges
4. AWS, Structural Welding Code, AWS D1.1
5. ASTM A 6, General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet and Bars for Structural Use
6. Steel Structures Painting Council (SSPC), Surface Preparation Specifications
7. AISC Specification for Structural Joints Using ASTM A 325 or A 490 Bolts as approved by Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation.

B. Welder Qualification: For welding in shop and field use only welders holding evidence of qualification under AWS procedures for the type of weld involved and who hold current State of Maine certificates. Perform welding procedures and welding operations in accordance with AWS Code.

C. Source Quality Control:

1. Give the Resident at least 10 days notice prior to the beginning of work at the mill or shop where material for the work is to be manufactured or fabricated, in order that inspection may be arranged. Do not fabricate material until inspection has been performed or is waived by the Resident.
2. Cooperate with the Resident to ensure that the inspection work is properly carried out during all stages of construction.

3. Perform radiographic and magnetic particle inspection in accordance with the provision of AWS, as required by the Resident.
4. Cut and machine test specimens in accordance with ASTM A370, as required by the Resident.
5. Test a random selection of at least five bolts from each bin of bolts or rivets to be used, as required by the Resident.

D. Allowable Tolerances:

1. Structural Members, General:

   a. Fabricate structural members which consist primarily of a single rolled shape, to be straight within the appropriate tolerances allowed by ASTM A 6 or otherwise indicated.
   b. Fabricate built-up structural members assembled by bolting or welding, to be straight within the tolerances allowed for wide flange shapes by ASTM A 6 or as otherwise indicated.
   c. Maintain the straightness of compression members within 1/1000 of the axial length between points laterally supported.

2. Setting of Anchor Bolt Sleeves, Shear Key Blockouts and Shear Key Sleeves: Locate the sleeves accurately enough to ensure that the amount of adjustment permitted by moving the bolts or shear keys within the sleeves is sufficient to allow proper centering of the bolts and shear keys.

E. Stock Material:

1. When it is proposed to use stock material, advise the Resident of such intention at least 10 days in advance of commencing fabrication to permit sampling and testing.
2. Use only stock materials which can be positively identified as having been rolled from a given heat and for which certified mill tests can be produced.

F. Welder's Identification Mark:

1. Assign each welder and welding operator an identification mark to stamp on the pieces he has welded in the shop and in the field.
2. Welder or welding operator shall place his identification mark by metal die stamp in letters 3/8 inch high in the position that the identification of the welder or operator will appear adjacent to each of his welds in the finally assembled members for ready reference to the radiographic films and identification by the Resident.

G. Material Acceptance: Replace rejected material promptly and make good rejected workmanship at no cost to the DEPARTMENT.

1.04 SUBMITTALS

A. Submit complete shop drawings, details, erection drawings and certifications for review prior to fabrication.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver anchor bolts and other anchorage devices to be embedded in the work of other trades to the project site in sufficient time to permit their timely installation. Provide proper setting drawings, templates and directions for installation.

B. Store structural steel members above ground on platforms, skids or other supports and avoid bending, scraping and overstressing the incumbers. Store all fasteners and welding electrodes in a weather-tight and dry place until ready for use. Store packaged materials in their original containers.

PART 2 PRODUCTS

2.01 MATERIALS

A. Shapes, Plates and Bars: ASTM A 36

B. Steel, Pipe, Welded and Seamless: ASTM A 53

1. Electric-Resistance Welded: Type E, Grade B (Fy = 35 ksi)
2. Seamless: Type S, Grade B (Fy = 35 ksi)

C. Structural Tubing, Carbon Steel, Welded and Seamless:

1. Cold-Formed: ASTM A500, Grade B (Fy = 46 ksi)
2. Hot-Formed: ASTM A501 (Fy = 36 ksi)

D. Bolts:

1. Anchor Bolts - ASTM A 307
2. Structural Steel - ASTM A 325

E. Welding Electrodes: E70 Series, conforming to AWS Code for method employed.

F. Shop Paint Primer: Lead-free, low VOC, rust inhibitive metal primer compatible with the intermediate and top coats specified in Section 09900.

2.02 FABRICATION

A. Meet all requirements of the specified standards.

B. For steel members called to be galvanized, a zinc coating shall be applied after fabrication in conformance with ASTM A 123.

C. Fabricate and assemble structural steel in the shop to the greatest extent possible. Do all shearing and flame cutting carefully and accurately using machine equipment where at all possible.

D. Weld connections or bolt as indicated. Weld shop connections not otherwise shown. Eccentric connections are not permitted unless shown in detail on the Structural Drawings.

E. Drift pins may be used for assembling parts provided metal is not distorted or holes enlarged. Ream holes requiring enlargement to admit bolts. Misaligned holes will subject members to rejection.

F. Use of gas cutting torch will be allowed where metal being cut is not carrying stress during the operation and provided stresses will not be transmitted through a flame- cut surface. Make cuts smooth and regular in contour. Cuts exposed in the finished work shall be ground and dressed smooth without nicks or gouges. To determine effective width of members so cut, deduct 1/8-inch from least width at gas cut edge. Make radius or re-entrance of cut fillets as large as practical, but in no case less than 1/2-inch. All such cuts are subject to prior approval of the Resident. Do not use cutting torch to align bolt holes.

G. Shop Cleaning and Painting:

1. Cleaning: Thoroughly clean all loose mill scale, rust, dirt, grease, and other foreign matter from structural steel items. Prepare surfaces for painting in accordance with SSPC-SP6, Commercial Blast Cleaning or SSPC-SP8, Pickling, or as otherwise recommended by the coating manufacturer.
2. Painting: Except where encased in concrete or secured as contact surfaces in joints connected by high strength bolts, apply one shop coat of primer, all as per paint manufacturer's specifications for application and coverage. Do not shop paint surfaces to be field welded. Prior to assembly give two coats of shop paint to parts inaccessible after assembly. Provide shop paint conforming with and compatible with the coating system specified in Section 09900. Coat non-painted bearing surfaces with an approved rust preventative applied in the shop. Remove such coating immediately prior to field erection, using a remover approved by the coating manufacturer.

PART 3 EXECUTION

3.01 PREPARATION

A. Before starting work, verify locations and elevations of bearings and anchor bolts. Ensure accurate bearing of steel and correct location of anchorage.

3.02 ERECTION

A. Erect structural steel in accordance with the requirements of the specified standards.

B. Weld or bolt field connections as indicated.

C. Bolting:

1. As erection progresses, bolt up work to take care of all dead loads, construction live loads, lateral forces and erection stresses.
2. Unless otherwise noted, erection bolts used in welded construction may be either tightened securely and left in place or removed and the holes filled with plug welds.

D. Temporary Bracing: Provide temporary bracing wherever necessary to provide for all loads to which structure is subjected including erection equipment and its operation. Leave in place until no longer required for safety. Make proper provisions for construction loads, piles of materials, equipment, etc., carried by structural frame during erection.

E. Touch-up Painting: After erection, clean all fixed connections (bolts and welds) and spot paint all abrasions, with same primer used in shop.

3.03 FIELD QUALITY CONTROL

A. Erection Tolerances: Erect individual pieces so that the deviation from plumb, level and alignment shall not exceed 1:500.

END OF SECTION