SECTION 05 1200

STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Structural steel framing members.
2. Grouting base plates.

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.

1.2 REFERENCES

A. American Institute of Steel Construction (AISC) - Specifications for Structural Steel for Buildings.

B. American Welding Society (AWS) D1.1 - Structural Welding Code - Steel.

C. ASTM International (ASTM):
1. A36/A36M - Standard Specification for Carbon Structural Steel.
2. A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
3. A108 - Standard Specification for Steel Bars, Carbon, Cold-Finished, Standard Quality.
4. A307 - Standard Specification for Low-Carbon Steel Externally and Internally Threaded Standard Fasteners.
5. A325 - Standard Specification for High-Strength Bolts for Structural Steel Joints, Including Suitable Nuts and Plain Hardened Washers.
6. A490 - Standard Specification for Quenched and Tempered Alloy Steel Bolts for Structural Steel Joints.
7. A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
8. A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
9. A572/A572M - Standard Specification for High Strength Low Alloy Columbium-Vanadium Steels of Structural Quality.
10. A992 - Standard Specification for Steel for Structural Shapes for Use in Building Framing.
11. C109 - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-In. or 50-mm Cube Specimens).
12. E164 - Standard Practice for Ultrasonic Contact Examination of Weldments.

D. Society for Protective Coatings (SSPC) - Painting Manual.

1.3 SUBMITTALS

A. Submittals for Review:
1. Shop Drawings: Indicate profiles, sizes, spacing, and location of structural members, openings, attachments, and fasteners, and connections not detailed.

B. Quality Control Submittals:
1. Welder Qualifications: As required by AWS D1.1.

1.4 QUALITY ASSURANCE

A. Fabricator and Erector Qualifications: Minimum 5 years experience in work of this Section.

B. Welder Qualifications: AWS D1.1.

C. Design Requirements: Design connections not detailed on Drawings under supervision of a Professional Structural Engineer experienced in this work and with current registration in the State of Alabama.

1.5 DELIVERY, STORAGE AND HANDLING

A. Store steel above ground on platforms, skids, or other supports; separate with wooden separators.

B. Protect steel from corrosion.

C. Prevent damage to prime coat; use wooden protectors to prevent damage from chain or cable cinches.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Steel:
1. Shapes, bars, and plates: ASTM A36/A36M, Grade 50.ASTM A992.
2. Hollow structural sections: ASTM A500, Grade B.
3. Pipe: ASTM A53/A53M, Grade B.
4. Shear Connectors: ASTM A108, Grade 1015,forged steel, headed, unfinished.

2.2 ACCESSORIES

A. Anchor Bolts: ASTM A307.

B. High Strength Bolts: ASTM A325, Type 1, uncoated.

C. Standard Bolts: ASTM A307, Grade A.

D. Primer Paint: SSPC Paint 15, Type 1, red oxide.

E. Non Shrink Grout: Premixed, consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; minimum 7,000 PSI compressive strength at 28 days.

F. Welding Materials: AWS D1.1, type required for materials being welded.

2.3 FABRICATION

A. Fabricate structural steel in accordance with AISC Manual.

B. Welding: AWS D1.1. Stress relieve welded assemblies by heat treatment.

C. Where collection of water inside structural tubing could occur, provide drain hole at lowest point.

D. Cap open ends of tubes and seal weld. Wherever practical, weld connections all around. Seal seams that cannot be practically welded with joint sealer.

E. Shop Painting:
1. Shop prime steel surfaces except:
   a. Surfaces to be welded.
   b. Contact surfaces of high strength friction type bolted connections.
   c. Surfaces to receive direct-applied fireproofing.
2. Surface preparation: SSPC Method SP2 - Hand Tool Cleaning or Method SP3 - Power Tool Cleaning.
3. Application: One coat; follow coating manufacturer's instructions.
4. Minimum dry film thickness: 2.0 mils.

PART 3 - EXECUTION

3.1 ERECTION OF STRUCTURAL STEEL

A. Erect structural steel in accordance with AISC Specifications.

B. Accurately assemble to lines and elevations indicated, within specified erection tolerances.

C. Align and adjust members forming parts of complete frame or structure after assembly but before fastening.

D. Provide temporary shoring and bracing members with connections of sufficient strength to resist imposed loads.

E. Align column bases with leveling plates.

F. Align bearing plates with wedges or shims.

G. Fasten splices of compression members after abutting surfaces have been brought completely into contact.

H. Clean bearing surfaces and surfaces that will be in permanent contact before members are assembled.

I. Locate splices only where indicated.

J. Tighten erection bolts and leave in place

K. Do not correct fabrication by gas cutting on major members.

L. Remove temporary shoring and bracing members after permanent members are in place and final connections have been made.

M. Installation Tolerances:
   1. Maximum variation from plumb: 1/4 inch per story, noncumulative.
   2. Maximum variation from level: 1/4 inch in 10 feet, noncumulative.
   3. Maximum offset from alignment of adjacent members: 1/4 inch.

3.2 PLACEMENT OF GROUT

A. Remove loose and foreign matter from concrete; lightly roughen bonding surface.

B. Remove foreign materials from steel surfaces; align and level members in final position.

C. Just prior to grouting, thoroughly wet concrete surfaces; remove excess water.

D. Mix grout in accordance with manufacturer's instructions. Do not re-temper.

E. Place grout continuously, by most practical means; avoid entrapped air. Do not vibrate grout.

F. Do not remove leveling shims for at least 48 hours after grouting. After removing shims, fill voids with sand-cement grout.

3.3 FIELD QUALITY CONTROL

A. Testing and Inspection Services:
   1. Inspect steel elements for conformance to specified requirements including:
      a. Location and adequacy of bracing.
      b. Location and set of anchor bolts and other inserts.
      c. Alignment, plumb, camber, and other required attributes.
   2. Inspect high strength bolted construction in accordance with AISC Specification and as follows:
      a. Visually inspect high strength bolted connections.
      b. Check at least two bolts of every third connection with calibrated torque wrench for proper torque.
   3. Inspect field welds in accordance with AWS D1.1 and as follows:
      a. Visually inspect welds.
   4. Make one set of six test cubes for each 1/3 cubic yard of grout placed or fraction thereof:
      a. Mold and test cubes in accordance with ASTM C109; three at 7 days and three at 28 days.
      b. Restrain grout from expansion by use of top plate.

3.4 ADJUSTING

A. Touch up bolt heads, nuts, field welds, and abrasions in shop coating with same primer used in shop.

END OF SECTION

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Dec 2009