

STATE UNIVERSITY CONSTRUCTION FUND

PROGRAM DIRECTIVES

DIRECTIVE 5-1

Issue date: October 2014

STRUCTURAL STEEL

1. General: It is the Fund's policy that the design of the structural steel is the prime responsibility of the project's Structural Engineer. Design should anticipate and accommodate the Contractor's means and methods, especially those mandated by the Occupational Safety and Health Administration (OSHA) and other local practices that may have a significant cost impact.
 - a. Where connection, modification or other use of existing steel is part of the design, perform field investigations to determine and document the size, type and other essential data for the existing steel, to test coatings on the steel for lead, and show such information on the drawings and in the specifications. Unless included in the lump sum fee or the Schedule B of the Consultant's Agreement, the services and fees related to field investigations as described in this Directive may be provided through extra compensation when approved by the Fund.

2. Rolled Steel Sections, Trusses, Plate Girders and Built-up Sections
 - a. The Structural Engineer shall design all of the structural steel framing for the project. This shall include all special connections (as define in 2.c below). Submit the letter required by Directive 1C-13 Design Delegation describing proposed design delegation, if any. To verify alignment with local practices for work delegated, it would be prudent to review the specifications requirements with local fabricators prior to bidding.

 - b. The Structural Engineer shall design all connections, except that "Standard Framed Beam Connections", as compiled in the American Institute of Steel Construction (AISC) "Manual of Steel Construction" can be selected and detailed by the steel fabricator. The Structural Engineer shall clearly identify the minimum load required to be carried by each connection in the bid documents, especially in cases where eccentric loads and concentrated loads apply and where composite beams are called for. Reactions at uniformly loaded beams can be specified to be one half the total uniform load capacity as identified in the "Allowable Uniform Load Tables" of the AISC Manual of Steel Construction by the fabricator. The steel fabricator shall be required to indicate the basis for the standard connection designed in the steel shop drawing submission.

STATE UNIVERSITY CONSTRUCTION FUND

PROGRAM DIRECTIVES

- c. Unless otherwise approved by the Fund, the Structural Engineer shall design all special connections, which shall include, but not be limited to, eccentric connections, connections in tension or compression, all moment connections, seated beam connections, clevis and pin connections, and end plate shear connections. Further, gusset plate connections joining steel angles or light beams shall be designed rather than stating loads.
 - d. Sizes shall be provided for all welds shown on the contract drawings.
 - e. Column base plates and anchor rod size and embedment shall be designed by the Structural Engineer and detailed on the contract drawings. For architecturally exposed steel, specify all design criteria concerning appearance of connections.
3. Steel Bar Joists and Joist Girders
- a. The Structural Engineer shall identify on the drawings the required size, spacing, and the type and/or model number of steel joists. This shall include the bridging required, the end bearing condition required and any special top or bottom chord extension.
 - b. It is the responsibility of the manufacturer of the steel joists to assure that their products will carry the loads described in the product literature. The Structural Engineer may require the manufacturer to provide structural calculations to be submitted when he deems it to be appropriate.
 - c. Where uplift forces due to wind are a design requirement, these forces must be indicated on the contract drawings in terms of net uplift per square foot.
4. Steel Deck
- a. The Structural Engineer shall identify on the drawings the required depth, gauge and type and/or model number of the steel deck. Also when required the Structural Engineer shall identify any required negative steel over the reaction identifying bar size, spacing, and length. When selecting the steel deck it is important that the engineer consider any unusual loads which the floor or roof will be subjected to during construction (for example, over pouring, storage of building materials and/or equipment, etc.) and dead loads due to mechanical, plumbing and electrical systems. See Directive 3-1 Concrete.

STATE UNIVERSITY CONSTRUCTION FUND

PROGRAM DIRECTIVES

- b. The maximum allowable unshored span for the steel deck shall be stated on the contract drawings. Shoring shall remain in place until the Structural Engineer determines the concrete has developed sufficient strength.
 - c. It is the responsibility of the manufacturer of the metal deck to assure that it will carry the load described in the product literature. The Structural Engineer may require the manufacturer to provide structural calculations to be submitted when he deems it to be appropriate.
 - d. Shear connectors must be designed to accommodate the specified deck. If the deck submitted and approved is not the same as specified, it is the responsibility of the Structural Engineer to determine if any modification in shear connector spacing is necessary and, if necessary, to design and provide the supplemental information showing the modification(s).
5. Mill Test Reports: The specifications shall require the following:
- a. Submit certified copies of mill test reports for all steel furnished. Comply with all applicable parts of ASTM specifications. Beyond ordering information normally provided by Contractor, the mill shall be instructed to color-code in accordance with ASTM A6, and to mark with heat number, size, and type and grade of steel.
 - b. Submit manufacturer's certification of bolts, nuts, washers, DTIs, and the like for each production of each grade of each type and each size of fastener component and filler material for welding.
 - c. Mill test reports shall state clearly the governing ASTM specification and shall be certified by Contractor during its review of the submittal as conforming in all respects to that specification.
 - d. Material provided in accordance with the above requirements may be used in the work without further in situ tests. In the case of dispute, Contractor shall perform tension, bend and such other tests as are required to demonstrate compliance with the requirements of the Contract Documents.
 - e. Tests for unidentified steel: In the event that steel cannot be identified by heat or melt numbers but is accompanied by mill analysis and test reports, such stock may be used provided that one tension and one bend test is made for each 30 tons or fraction thereof. Complete, six-sided surface inspection shall be performed for such materials. The costs of testing, retesting, and inspection

STATE UNIVERSITY CONSTRUCTION FUND

PROGRAM DIRECTIVES

shall be the responsibility of the Contractor.

- f. All steel that is not properly identified or whose source is subject to question shall be rejected.
 - g. Steel pipe and tubing shall have not less than one tension, one bend, and one flattening test for each 100 lengths or fraction thereof, for each size, for each wall thickness and for each grade. Both tension and bend tests shall be made from coupons taken longitudinally.
 - h. The specification shall require that shop drawings be accompanied by an affidavit, countersigned by the appropriate contractor(s), attesting that all materials and products will conform to applicable specifications, standards, yield points, grades and the like.
 - i. The specifications shall require that the fabricator's shop drawings flag welds that will be inaccessible for field testing upon completion of the shop fabrication. Fabrication shall not progress until a method of testing or inspection of the inaccessible welds is recommended by the Structural Engineer. If welds have not been shop inspected and are inaccessible for field testing after fabrication, and the adequacy of the fabricated assembly cannot be confirmed, the Structural Engineer shall design and the Contractor shall install the additional reinforcing members with accessible welds that are required to insure adequate reinforcement at critical connections.
6. Safety
- a. The specifications should make the Contractor solely responsible for the safe execution of the work in the shop and in the field.
 - b. The design should accommodate the mandatory as well as the recommended safety enhancements the Contractor should make, such as four (4) anchor bolts per column along with other column stability requirements, anchor bolts modifications, double connections at columns restrictions, joist bridging and method of attachment, bridging terminus anchors, facilitation of fall protection system installation, etc.

STATE UNIVERSITY CONSTRUCTION FUND

PROGRAM DIRECTIVES

7. U.S. Steel

All structural steel, reinforcing steel, or other major steel items to be incorporated in the work shall, if in excess of \$100,000, be produced or made in whole or substantial part in the United States, its territories or possessions.

8. AISC Certified Fabricators and Erectors

The requirement for AISC Certified Fabricators and Erectors shall be determined on a per project basis and approved by the Fund. Prior to bidding, provide a list of local fabricators and erectors who can meet this requirement.

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