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Controlling Quality Construction - Part 3

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In my previous article entitled "Controlling Quality Construction, Part 2", I illustrated various aspects of how the construction process can and should incorporate Due Diligence and Quality Control systems and methods, as they relate to the Masonry phases of the work.

At the risk of being redundant, I want to repeat a portion of my previous articles, and hopefully drive home the need for skilled Supervision and Inspection by all Contractors.

It is the duty of the contractor to complete the work covered by his or her contract, in accordance with the Approved Plans and Specifications. The contractor must carefully study the Approved Plans and Specifications and should plan their schedule of operations well ahead of time. If at any time it is discovered that the work which is being done is not in accordance with the Approved Plans and Specifications, the Contractor should immediately correct the work.

In order to assure that the work being done is in accordance with the Approved Plans and Specifications, the Contractor must provide for and furnish adequate, experienced, competent supervision, and coordination of all of the work he or she is contracted to perform.

Inspection is a crucial function that does not start with the Building Inspector, or the Special Inspector. Inspection must begin with the Superintendent. It is critically important that the Superintendent be thoroughly knowledgeable of each and every trade that he is supervising. This doesn't necessarily mean that he has to be an expert in all trades, but it does mean that the superintendent must be aware of the resources available to him to gather sufficient information to assure that the work is being performed in accordance with the Approved Plans and Specifications, and the manufacturer's recommendations for the use and installation of the material products being used, and that the work is in conformance with the requirements of the Codes.

The following, is a recommended check list that should be followed by the Project Superintendent and Special Inspector for STRUCTURAL STEEL AND WELDING INSPECTIONS:

1. Plan Reading

1.1 General Project Requirements:
Review general notes and/or Specifications and typical details for general project requirements for steel strengths, fabrication tolerances and special requirements.

1.2 Orientation and Frame Member Sizes:
Review the Approved Plans for structural steel orientation and frame elevation member sizes.

1.3 Decking:
Review the Approved Plans for structural steel decking requirements, shear anchor requirements and welding requirements.

1.4 Columns and Base Plates:
Review the Approved Plans for column and base plate member sizes.

1.5 Joints:
Review the Approved Plans for all steel-to-steel connections.

1.6 Other Details:
Review the Approved plan details for structural steel and welding requirements for stairs, elevator shafts, concrete-to-steel connections and other structural steel requirements.

1.7 Shop Drawings:
Review the Shop Drawings for completeness, and conformance to the Project's Approved Plans. The Shop Drawings are only to be used as a reference and guide pertaining to specific details of construction which are not shown on the Approved Plans. Shop Drawings do not supersede the Project's Approved Plans. All work shall be performed in conformance with the Requirements of the Approved Plans, and Certified to, accordingly.

2. General Inspection Practice

2.1 Responsibilities and Authority:
The Special Inspector should apply his or her responsibilities and authority, and comply with requirements of the Uniform Building Code (U.B.C.).

2.2 Presence at Job:
The Special Inspector should arrive at the job site (or fabrication shop) prior to the scheduled starting time. Report to the Project Superintendent. Review the Approved Plans, and Specifications. Be present for Continuous Inspection during execution of all work for which the Special Inspector has been engaged.

2.3 Acceptable Conditions:
Verify that the Building Inspector, or previous Special Inspector has Approved the conditions at the site when required.

2.4 Progress Report:
The Special Inspector should submit periodic written and verbal progress reports to the Building Inspector, and copy the Superintendent.

2.5 Correct Discrepancies:
The Special Inspector should notify the Contractor when discrepancies occur, and see that discrepancies are corrected.

2.6 Uncorrected Discrepancies:
The Special Inspector should notify the Building Inspector when discrepancies are not corrected.

2.7 Plan Changes:
Verify that structural plan changes are properly documented and Approved by the Structural Engineer of Record and the Building Official.

2.8 Record Keeping:
Maintain records of all work Inspected, including discrepancies and action(s) taken.

2.9 Compliance Report:
The Special Inspector should submit progress and final report(s) of compliance to the Building Inspector, and copy the Superintendent.

3. Steel and Welding Materials

3.1 Structural Steel Materials:
Verify mill test reports, steel identification markings, or other documentation of structural steel for compliance with the Approved Plans and Specifications. Visually Inspect bolts, nuts and washers for conformance.

3.2 Welding Materials:
Verify mill test reports, container identification markings, or other documentation of welding materials for compliance with the Approved Plans and Specifications. Verify that rod containers are undamaged or electrodes are otherwise dried when required.

4. Welding

4.1 Qualification of Welders:
Verify the qualification of the welders, welding operators and tackers for conformance with AWS Specifications and the Uniform Building Code (U.B.C.) Certification Requirements. Furnish a list to the Building Inspector.

4.2 Drying Ovens:
Verify that appropriate drying ovens are utilized when required.

4.3 Welding and Joint Preparation:
Verify that base metal to be welded is smooth, uniform, free from fins, tears and cracks, and that cut edges are acceptable.

4.4 Welding Procedures:
Visually verify that welding is done in conformance with AWS requirements for process, materials, workmanship, number of passes, preheat and interpass temperatures, cleaning between passes, weld lengths, welding technique and welding sequence.

4.5 Welding Process:
Verify that the welding process is in conformance with approved procedures, Approved Plans and Specifications.

4.6 Weld Repairs and Heat Straightening:
Verify that weld repairs and heat straightening of structural members is done in accordance with approved procedures.

4.7 Fabrication and Materials Tolerances:
Verify that fabrication and materials are within permissible tolerances and the Approved Plans and Specifications.

4.8 Rebar Welding:
Verify that welding of reinforcing steel is done in conformance with approved procedures, and performed by Welders Certified for Welding Reinforcing Steel.

4.9 Production Tests:
Verify that preproduction and production welding tests are correctly performed.

5. Steel Erection

5.1 Base Plates and Anchor Bolts:
Verify correct size, location and setting of base plates, and size of anchor bolts and base plate holes.

5.2 Welding Sequence:
Verify that welding sequence is followed where specified.

5.3 Faying Surfaces:
Verify that faying surfaces on connections utilizing high-strength bolts, for cleanliness, smoothness, and compliance to applicable standards.

5.4 Bolts:
Verify correct type, location and size of bolts, size of bolt holes in connections and tightness of high-strength bolts to applicable standards.

6. Samples and Nondestructive Tests

6.1 Bolt and Nut Sampling:
Sample bolts, nuts and washers for testing, if required.

6.2 Steel Sampling:
The Special Inspector should mark steel members for sampling, record sample numbers and locations, observe specimen cutting and arrange for transportation of specimens to the testing laboratory, with appropriate documentation. Copy the Building Inspector, the Superintendent, and retain a copy for their records.

6.3 Nondestructive Testing:
Arrange for and/or verify nondestructive testing in accordance with approved procedures.

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