

# Structural Steel in project sites

An integral element of most construction projects is structural steel and steelwork. Few points on inspection of the same in a construction project site, especially for construction personnel with no or very less experience in this field, are briefly discussed here:

Upon arrival of structural steel at construction project site, various documents related to those, such as, material quality documents like test certificates etc., material consignment notes, purchase order copies etc. need to be carefully checked in order to ensure receipt of the proper and quality materials.

All components may be visually examined for discrepancies, such as, distortions, cracks, twists, lamination, pitting, dents, kinks, imperfect edges, straightness etc. Some of these could very well happen during handling, transportation etc. Unacceptable materials may be immediately quarantined in area demarcated for that, with records maintained.

Proper care must be taken while unloading and storing the materials. Guidelines for the same are usually specified in contract specifications or other similar documents.

For construction ( fabrication & erection ) purpose, relevant Quality Assurance & Quality Control documents, e.g., codes, specifications, job procedures, inspection test plans, necessary QC formats, approved fabrication drawings, WPS etc. need to be in place.

Welder's qualification in accordance with approved WPS, ASME Section IX etc. needs to be ensured prior to commencement of welding activities.

During construction, cutting, bending, grinding of structural steel are examined well as per relevant guidelines.

Fit-up & welding of structural steel members are carefully inspected as per approved drawings, codes, specifications etc.

Welds are often examined using Non Destructive Tests (NDT), such as, Dye Penetration Test or DPT etc.

Elaborate guidelines are available for mechanical testing of fillet & butt welds, such as, macro ETCH examination for fillet welds or tensile & bend tests for butt welds. These are important for checking the quality of welds. For example, in case of a butt weld, the tensile strength of weld should not be less than that of the metal on which the welding is done or no crack should show up on the weld in bend test.

Radiographic tests are also performed on welds, requiring to meet high degree of quality, as and when necessary. Welding itself is an elaborate subject and persons qualified & experienced in this field only should check important welds or welding activities. Radiographic scrutinies may be done only by qualified radiographers.

Camber or sweep (where necessary), dimensions, layout etc. are checked as per fabrication & erection drawings.

Priming & painting of structural steel members are examined as per relevant guidelines. Dry film thickness of paint coats may be checked with ELCO meter.

Fabricated structural members are well identified with erection marks in order to ensure smooth & correct erection. Centreline and elevation marking of members to be erected are also very much parts of erection procedure.

Quality of bolts, nuts, washers etc. should conform to relevant quality documents. Dimensions of holes, pitch distance & diagonals of bolts, tightening of bolts etc. need careful observation.

Verticality of columns or suchlike, various dimensional checks of structural members as well as those of layouts are necessary. Fabrication & erection tolerances are usually well laid down in various quality assurance documents such as, codes, contract specifications etc.

Proper care needs to be taken while grouting base plates in columns, trestle foundations as grouting connects the superstructure to it's foundation rendering it monolithic. Hence, no air pockets must remain inside the finished grout.

Where packer plates are necessary, these are locked by tack welding for which visual inspection is sufficient.

NDT requirement of fillet welds is usually DPT. For butt welds, besides DPT and careful visual inspections, other NDTs like ultrasonic or radiography tests and X-ray test are also performed as & where prescribed in QA guidelines. Usually, contract specifications over and above the concerned codes, prescribes clear guidelines on procedure & acceptance criteria for NDTs, including frequency of such tests.

Preheating and post-welding heat treatments are performed, wherever necessary, as per contract specifications or other relevant quality documents. Structural steel members of certain thicknesses are usually subjected to these treatments as prescribed.

As already mentioned, welding, electrodes etc. itself are extensive subjects and persons with relevant qualification, sufficient knowledge or experience would be aware of much more detail on it. The points briefly discussed above are just some of the many important aspects of the subject matter posted with a view of providing a quick macro-level or general idea.

Source: <http://civilconstructionresourcez.wordpress.com/2011/11/22/structural-steel/>