SECTION 13

NONDESTRUCTIVE TESTING (NDT)

OBJECTIVE

The purpose of nondestructive testing is to verify that structural steel and/or completed welds are sound with respect to the given project criteria. Visual observation may not detect hidden fusion defects, cracking, and lamellar tearing. Therefore, it is important that all means necessary be available to the special inspector for reasonable verification of sound welds. Proper scheduling and coordination by the general contractor is paramount to proper inspections.

The Statement of Special Inspections, prepared by the responsible design professional, will define the special inspection task(s) required. Qualified NDT special inspectors performing standard test methods under the direction of the materials engineering laboratory can best achieve this objective. Since NDT tests are indirect (relying on a probing medium to disclose defects), accurate evaluation depends upon experienced, qualified personnel who are thoroughly trained in theory and applications.

OBSERVATION DUTIES

A. Documents

1. Review the approved plans, specifications, and approved shop drawings.
2. Review applicable sections of referenced codes, particularly CBC Section 1708.4 and Section 6 of the AWS Structural Welding Code D1.1.
3. Where applicable, review welding procedures and sequences.

B. Personnel

1. All NDT personnel shall be qualified in accordance with the American Society for Nondestructive Testing, Recommended Practice SNT-TC-1A, (also CP189) and the supplement applicable to the method to be used. Only Level II and III inspectors, or Level I inspectors working under the direct supervision of a Level II or III inspector, are permitted to conduct the tests.

C. Method Selection

1. Method to be used shall be as prescribed by project specifications, building codes, or as recommended by the materials engineering laboratory under the direction of the design professional.
2. Effective use of NDT depends on utilizing the proper test method and techniques. Where field conditions or sequences affect the specified methods, the materials engineering laboratory will contact the project architect or engineer for suitable approved methods or techniques.

D. Tests

1. Perform tests as prescribed by contract documents, for welds, laminations, or lamellar tearing.
2. Upon detection of a defect, mark the defect and notify the foreman.
3. Keep written records of pieces, welds, welder identification marks, length and location of defects, method and date of repair, number of retests, records of performance of each welder (percent of rejected welds), and sampling rate.

E. Reports

1. Submit written progress reports describing the tests and observations made, their location, and any corrective actions taken.
2. Report the current percent of rejectable welds.

F. Standards

1. Many nondestructive testing standards and codes are presently available for information and reference. Most standards and codes specify equipment and personnel requirements, operational steps, and acceptance standards tied to the end-use function. Following is a partial list of the more common standard test methods.
   a) Radiography—AWS D1.1, ASTM E94 and E99, ASME Section V.
   b) Ultrasonic Testing—AWS D1.1, AWS D1.8, ASTM E164, ASME Section V.
   c) Magnetic Particle Testing—ASTM E109, ASME Section V.
   d) Penetrant Testing—ASTM E165, ASME Section V.