

## 10. VISUAL INSPECTION

Visual inspection is the primary method which should be used to confirm that the procedures, materials and workmanship incorporated in the Work are those that have been specified and approved for the project. Visual inspection should be conducted by appropriately qualified personnel, in accordance with a written practice.

### 10.1 Personnel Qualification

Visual inspection personnel should be qualified under AWS D1.1, Chapter 6. The basis of qualification should be specified by the Engineer. Acceptable qualification bases are :

- a) Current or previous certification as an AWS Certified Welding Inspector (CWI) in accordance with the provisions of AWS QC1, *Standard and Guide for Qualification and Certification of Welding Inspectors*, or
- b) Current or previous qualification by the Canadian Welding Bureau (CWB) to the requirements of the Canadian Standard Association (CSA) Standard W178.2, *Certification of Welding Inspectors*, or
- c) An engineer or technician who, by training or experience, or both, in metals fabrication, inspection and testing, is competent to perform inspection work.

The qualification of an inspector will remain in effect indefinitely, provided the inspector remains active in the inspection of welded steel fabrication, unless there is a specific reason to question the inspector's ability.

The Engineer should have the authority to verify the qualification of inspectors.

### 10.2 Written Practice

- a) The employer (Testing Agency or Fabricator/Erector) should maintain a written practice for the control and administration of inspection personnel training and qualification.
- b) The written practice should describe the employer's procedures for visual welding inspection and material controls for determining the acceptability of materials and weldments in accordance with the applicable codes, standards, specifications and procedures.
- c) The employer's written practice should describe the training and experience and requirements for qualification.

### 10.3 Duties

- a) The inspector should review and understand the applicable portions of the Specifications, the Contract Drawings and the Shop Drawings for the project.
- b) The inspector should verify that all applicable welding Procedure Qualification Records (PQR)s, welder and welding operator qualifications and welding procedure specifications (WPS) are available, current and accurate.
- c) The inspector should require requalification of any welder, welding operator or tack welder who has, for a period of six months, not used the process for which the person was qualified.
- d) The inspector should check all mill certificates for material compliance with the project requirements.
- e) The inspector should verify the electrode/wire specification sheets for compliance with the Contract Documents.
- f) The inspector should make certain that all electrodes are used only in the positions and with the type of welding parameters specified in the WPS.
- g) The inspector should, at suitable intervals, observe joint preparation, assembly practice, preheat temperatures, interpass temperatures, welding techniques, welder performance and post-weld dressing to make certain that the applicable requirements of the WPS and Code are met.
- h) The inspector should inspect the work to ensure compliance with AWS D1.1, Sections 3 and 8.15. Size and contour of welds should be measured with suitable gauges. Visual inspection may be aided by a strong light, magnifiers, or other devices which may be helpful.
- i) The QC inspector should be responsible for scheduling the NDT technicians in a timely manner, after the visual inspection is complete and the assembly has cooled. For repair welding, the NDT should not be performed sooner than 48 hours after the welding is complete and cooled to ambient temperature.
- j) Inspectors should identify the inspected and accepted welds, assemblies and connections with a personal mark or stamp, or maintain adequate records to indicate the status of inspection work. The accepted and rejected items should be documented in a written report. The report should be transmitted to the designated recipients in a timely manner.

*Commentary: Depending on how the QA and QC functions are structured for any particular project, the role of the visual inspector may vary considerably. Ideally, the QC inspector is an employee of the contractor and answers to a QA*

*department head who is not connected with production. If this is not the case, an inherent conflict of interest may be present. The level of involvement of the QA agency is highly dependent on the structure of the contractor's QC program. If the contractor's QC program is well organized, has competent inspection and testing personnel and is truly independent of production, the QA function can operate in the classical manner as an overseer wherein random spot inspection and testing suffice. In the opposite case where the QC department is being run by production, the QA agency must take a very active role and perform many of the QC duties.*

*The definitions of these roles can directly affect the project structure and associated budgets. The Owner cannot accurately budget for QA testing and inspection until the contractor is selected and the QC program established. Alleviating this dilemma requires the designer to tightly specify the QC and QA programs.*

*Although AWS D1.1 allows inspector qualification without the CWI certification under the QCI criteria, it is strongly recommended that the inspection personnel be CWI certified (or previously certified), by experience and written examination.*

*This Page Intentionally Left Blank*