



American Welding Society



Welding Inspection Technology

WELDING INSPECTION TECHNOLOGY

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Table of Contents

Module	Title	Page
1	Welding Inspection and Certification	1-1
2	Safe Practices for Welding Inspectors	2-1
3	Metal Joining and Cutting Processes	3-1
4	Weld Joint Geometry and Welding Symbols	4-1
5	Documents Governing Welding Inspection and Qualification	5-1
6	Metal Properties and Destructive Testing	6-1
7	Metric Practice for Welding Inspection	7-1
8	Welding Metallurgy for the Welding Inspector	8-1
9	Weld and Base Metal Discontinuities	9-1
10	Visual Inspection and Other NDE Methods and Symbols	10-1

Module 1

Welding Inspection and Certification

Contents

Introduction	1-2
Who is the Welding Inspector?	1-3
Important Qualities of the Welding Inspector	1-4
Ethical Requirements for the Welding Inspector	1-6
The Welding Inspector as a Communicator	1-7
Personnel Certification Programs	1-10
Key Terms and Definitions	1-13

Module 1—Welding Inspection and Certification

Introduction

In today's world there is increasing emphasis placed on the need for quality, and weld quality is an important part of the overall quality effort. This concern for product quality is due to several factors, including economics, safety, government regulations, global competition, and the use of less conservative designs. While not singularly responsible for the attainment of weld quality, the welding inspector plays a large role in any successful welding quality control program. In reality, many people participate in the creation of a quality welded product. However, the welding inspector is one of the "front line" individuals who must check to see if all of the required manufacturing steps have been completed properly.

To do this job effectively, the welding inspector must have a wide range of knowledge and skills, because it involves more than simply looking at welds. Consequently, this course is specifically designed to provide both experienced and novice welding inspectors a basic background in the more critical job aspects. This does not imply, however, that each welding inspector will use all of this information while working for a particular company. Nor does it mean that the material presented will include all of the information for every welding inspector's situation. Selection of these various topics is based on the general knowledge desirable for an individual to do general welding inspection.

The important thing to realize is that effective welding inspection involves much more than just looking at finished welds. Section 4 of AWS QC1, *Standard for AWS Certification of Welding Inspectors* (see Figure 1.1) outlines the various functions of the welding inspectors. You should become familiar with these various responsibilities because the welding inspector's job is an ongoing

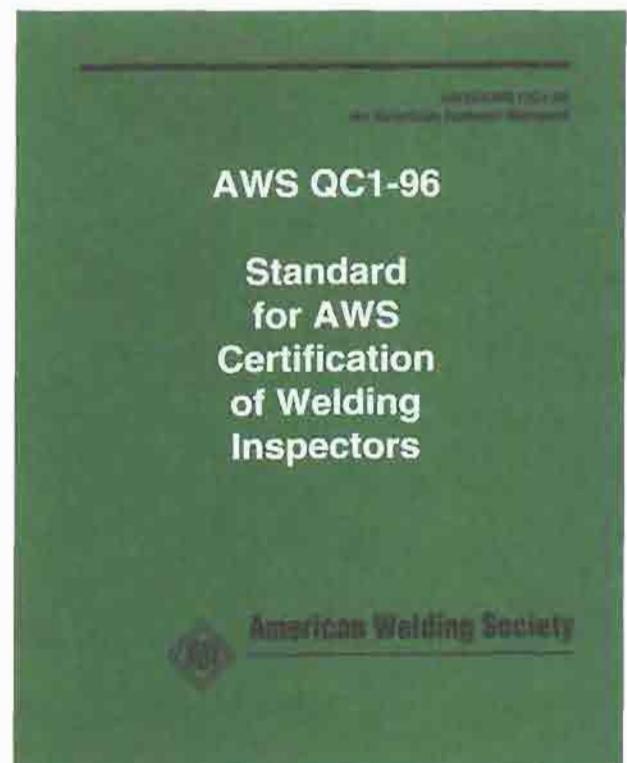


Figure 1.1—AWS QC1, *Standard for AWS Certification of Welding Inspectors*

process. A successful quality control program begins well before the first arc is struck. Therefore, the welding inspector must be familiar with many facets of the fabrication process. Before welding, the inspector will check drawings and specifications to determine such information as the configuration of the component, its specific weld quality requirements, and what degree of inspection is required. This review will also show the need for any special processing during manufacturing. Once welding begins, the welding inspector may observe various processing steps to assure that they are done prop-

erly. If all these subsequent steps have been completed satisfactorily, then final inspection should simply confirm the success of those operations.

Another benefit of this course is that it has been designed to provide the welding inspector with the necessary information for the successful completion of the American Welding Society's Certified Welding Inspector (CWI) examination. The ten modules listed below are sources for examination information. The welding inspector must have at least some knowledge in each of these areas. Typically, the information presented will simply be a review, while sometimes it may represent an introduction to a new topic.

Module 1:	Welding Inspection and Certification
Module 2:	Safe Practices for Welding Inspectors
Module 3:	Metal Joining and Cutting Processes
Module 4:	Weld Joint Geometry and Welding Symbols
Module 5:	Documents Governing Welding Inspection and Qualification
Module 6:	Metal Properties and Destructive Testing
Module 7:	Metric Practice for Welding Inspection
Module 8:	Welding Metallurgy for the Welding Inspector
Module 9:	Weld and Base Metal Discontinuities
Module 10:	Visual Inspection and Other NDE Methods and Symbols

Additionally, selected technical references are included in the "Body of Knowledge" required. These include:

- A Selected Code (AWS D1.1, API 1104, etc.)
- Welding Inspection (WI-80)
- AWS A1.1, *Metric Practice Guide for the Welding Industry*

- AWS A2.4, *Standard Symbols for Welding, Brazing, and Nondestructive Examination*
- AWS A3.0, *Standard Welding Terms and Definitions*
- AWS B1.10, *Guide for the Nondestructive Inspection of Welds*
- AWS B1.11, *Guide for the Visual Inspection of Welds*
- ANSI Z49.1, *Safety in Welding, Cutting, and Allied Processes*
- AWS QC1, *Standard for AWS Certification of Welding Inspectors*

Who is the Welding Inspector?

Before turning our discussion to the technical subjects, let us talk about the welding inspector as an individual and the typical responsibilities that accompany the position. The welding inspector is a responsible person, involved in the determination of weld quality according to applicable codes and/or specifications. In the performance of inspection tasks, welding inspectors operate in many different circumstances, depending primarily for whom they are working. Thus, there is a special need for job specifications due to the complexity of some components and structures.

The inspection workforce may include destructive testing specialists, nondestructive examination (NDE) specialists, code inspectors, military or government inspectors, owner representatives, in-house inspectors, and others. These individuals may, at times, consider themselves "welding inspectors," since they inspect welds as part of their job responsibility. The three general categories into which the welding inspectors' work-functions can be grouped are:

- Overseer
- Specialist
- Combination Overseer—Specialist

An overseer can be one individual or many individuals whose skills vary such that any amount or type of workmanship may be inspected. Both economics and technical requirements will decide the extent to which these types of inspectors will group