

AISC 207-20

Standard for Certification Programs

October 2, 2020

Supersedes the *Certification Standard for Steel
Fabrication and Erection, and Manufacturing of
Metal Components* (AISC 207-16)

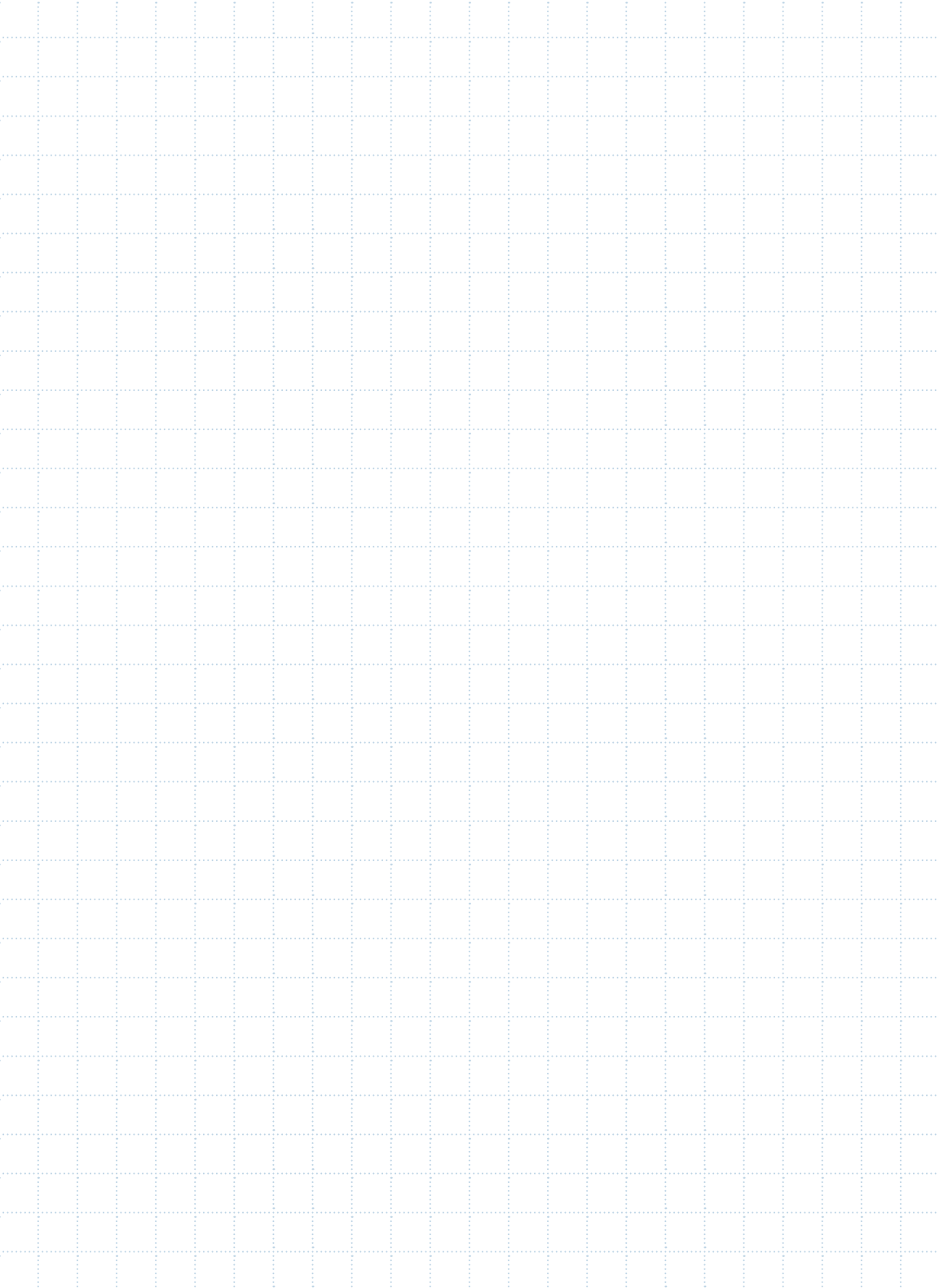
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PREFACE

This Preface is not a part of AISC 207-20, *Standard for Certification Programs*. It is intended for informational purposes only.

This Standard is the result of the deliberations of a balanced committee, the membership of which included engineers, fabricators, erectors, quality control consultants, a code official, a state bridge official, and a general contractor. This Standard is proprietary and has been created for the sole use of the AISC Certification Program as part of its policies and procedures for auditing and certification.

This Standard brings together provisions from four individual predecessor standards relating to the four industry segments: steel building fabrication (Chapter 2), metal component manufacturing (Chapter 3), steel bridge fabrication (Chapters 4, 4.I, 4.A, and 4.F), and steel erection (Chapter 5) that have been a part of the AISC Certification Program since its beginnings in 1975. A new chapter has been added with requirements for hydraulic metal structures (Chapter 6). Chapter 6 is the work of a task group comprised of members of the hydraulic structures industry, whose work is gratefully acknowledged. Chapter 1 provides general requirements that apply to all industry segments, and Chapters 2, 3, 4, 4.I, 4.A, 4.F, 5, 6, 6.A, and 6.F contain supplementary requirements in addition to those in Chapter 1.

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GLOSSARY

The terms listed below are to be used in addition to those in the *AISC Code of Standard Practice for Steel Buildings and Bridges*, hereafter referred to as the *Code of Standard Practice*; some commonly used terms are repeated here for convenience and marked with an †. Where used, terms are italicized to alert the user that the term is defined in this Glossary.

AASHTO. The American Association of State Highway and Transportation Officials.

AISC.† American Institute of Steel Construction.

Approval documents.† The structural steel shop drawings, erection drawings, and embedment drawings, or, where the parties have agreed in the contract documents to provide digital model(s), the fabrication and erection models. A combination of drawings and digital models also may be provided.

Approved construction documents. Those construction documents approved by the building official as part of the building permit issuance process.

AREMA.† The American Railway Engineering and Maintenance of Way Association.

ASNT. The American Society for Nondestructive Testing.

Assembly. Two or more components that are joined together. Joining methods include welding, bolting, pressure fit, molding, and adhesion.

ASTM.† American Society for Testing and Materials.

AWS.† American Welding Society.

Calibration. The process of comparing the measurements of a device of known accuracy or standard to the device under calibration to determine if the difference is acceptable when compared to the desired accuracy.

Checker. A person in a detailing organization who, because of experience and ability, has advanced successfully to a position of responsibility with the ability to perform the final verification of fabrication and erection documents without direct supervision.

Checking (of fabrication documents and erection documents). A detailed review of all graphical depictions on the fabrication documents and erection documents by a *checker* other than the original detailer. Checking is performed to ensure that the fabrications and erection documents have accurately and completely transferred the information from the contract documents. Checking will compare the fabrication documents and erection documents to design documents, specifications, and project requirements.

Coating. Coatings may include paint, powder coatings, galvanizing, metalizing, Teflon, and electro-deposited metals.

Component. A bridge- or transportation-related item that contract documents stipulate to be obtained from an AISC Certified Bridge and Highway Metal Component Manufacturer

and that is not covered by the AISC Bridge Fabricator Certifications. A component may be entirely produced by the manufacturer or comprised of subassemblies and parts from subcontractors and suppliers, assembled by the manufacturer. A finished component may ship as a single piece or multiple elements and may require field assembly or adjustment, based upon installation instructions provided by the manufacturer.

Construction documents. Written, graphic, and pictorial documents prepared or assembled for describing the design (including the structural system), location, and physical characteristics of the elements of a building necessary to obtain a building permit and construct a building. See also *approved construction documents*.

Contract documents.† The documents that define the responsibilities of the parties that are involved in bidding, fabricating, and erecting structural steel. These documents normally include the design documents, the specifications, and the contract.

Corrective action. The action or actions undertaken to identify and eliminate the root cause of a service or process nonconformance to prevent its recurrence. Corrective action is not the repair or rework of a nonconformance.

Corrective measure. The action taken to bring a nonconformance into conformance.

Customer furnished material. Material or products that the fabricator, erector, or manufacturer receives from the customer directly for incorporation into their work.

Detailer. See *steel detailer*.

Detailing. The function that produces fabrication and erection (or installation) documents from contract documents.

Design documents.† The design drawings or, where parties have agreed in the contract documents to provide digital model(s), the design model. A combination of drawings and digital models also may be provided.

Design drawings.† The graphic and pictorial portions of the contract documents showing the design, location, and dimensions of the work. These documents generally include, but are not limited to, plans, elevations, sections, details, schedules, diagrams, and notes.

Design model.† A dimensionally accurate 3D digital model of the structure that conveys the structural steel requirements given in *Code of Standard Practice* Section 3.1 for the building.

Documentation (documented). Material that provides information or evidence. Documentation may include written instructions, drawings, models, diagrams, charts, photographs, electronic media, specifications, and references to or excerpts from appropriate technical standards and codes.

Documented procedure. A procedure that is established, documented, implemented, and maintained. The documentation provides information about how to perform an activity or process consistently.

Documented training. Training in which there is a record of the course outline, a record of who attended, the date it was given, and the instructor who provides the training.

Embedment drawings.† Drawings that show the location and placement of items that are installed to receive structural steel.

Erection. The process of assembling individual members into a structural steel building or bridge in accordance with all contract documents.

Erection documents.† The erection drawings or, where the parties have agreed in the contract documents to provide digital model(s), the erection model. A combination of drawings and digital models may also be provided.

Erection drawings.† Field-installation or member-placement drawings that are prepared by the fabricator to show the location and attachment of the individual structural steel shipping pieces.

Erection model.† A dimensionally accurate 3D digital model produced to convey the information necessary to erect the structural steel. This may be the same digital model as the fabrication model but is not required to be.

Erection plan. The documentation of major resources and activities anticipated to be needed in performance of the work as it is affected by the conditions and requirements of one singular project.

Erector.† The entity that is responsible for the erection of the structural steel.

Executive management. The highest ranking official(s) in the company, e.g., CEO, President, General Manager, Owner, etc. Executive management has full authority in final decision making for all aspects of the quality management system and safety management system.

Fabrication. The process of preparation and assembly of individual parts into a shipping piece in accordance with all contract documents (e.g., *assembly*, drilling, sawing, milling, thermal and mechanical cutting, and shipping).

Fabrication documents.† The shop drawings or, where parties have agreed in the contract documents to provide digital model(s), the fabrication model. A combination of drawings and digital models may also be provided.

Fabrication model.† A dimensionally accurate 3D digital model produced to convey the information necessary to fabricate the structural steel. This may be the same digital model as the erection model but is not required to be.

Fabricator.† The entity that is responsible for detailing (except in Section 4.5 of the *Code of Standard Practice*) and fabricating the structural steel.

Installation documents. The installation drawings or, where the parties have agreed in the contract documents to provide digital model(s), the installation model. A combination of drawings and digital models may also be provided.

Installation drawings. Field-installation or member placement drawings that are prepared by the manufacturer to show the location and attachment of the individual manufactured components.

Installation model. A dimensionally accurate 3D digital model to show the location and attachment of the individual manufactured components.

Key position. Executive management and positions in the fabricator's, manufacturer's, or erector's quality management system that manage detailing, purchasing, quality assurance, quality control, fabrication processes, erection, project management, and the erector's safety functions.

Management systems. See *safety management system* and *quality management system*.

Manufacture (manufacturing, manufactured). The process of designing, producing, testing, and assembling components by the manufacturer.

Manufacturer. The entity that manufactures components.

Manufacturing documents. Documents, drawings or, where parties have agreed in the contract documents to provide digital model(s), the manufacturing model that illustrates the manufacturing of components for production.

Manufacturing model. A dimensionally accurate, 3D digital model produced to convey the information necessary to manufacture components.

MTR. Mill test report as defined in Section 14 of ASTM A6.

Nonconformance. Attributes of materials, consumables, fabricated work, manufactured components, erected members, or processes that do not meet contract, regulatory, or internally defined requirements.

NDT. Nondestructive testing.

Objective evidence. Data supporting the existence or verification of something. Records, statements of fact, or other information that are relevant to the audit criteria and verifiable. In this context, it is evidence of whether the quality management system is functioning properly. Objective evidence may be obtained through:

- (a) Observation
- (b) Measurements
- (c) Tests
- (d) Review of a record, document, or procedure
- (e) The result of an interview with one or more employees about their duties or performance of a task

Owner.† The entity that is identified as such in the contract documents.

Owner's designated representative for construction.† The *owner* or the entity that is responsible to the *owner* for the overall construction of the project, including its planning, quality, and completion. This is usually the general contractor, the construction manager, or similar authority at the job site.

Owner's designated representative for design.† The *owner* or the entity that is responsible to the *owner* for the overall structural design of the project, including the structural steel frame. This is usually the structural engineer of record.

Procedure. See *documented procedure*.

PQR. Procedure Qualification Record as defined by AWS A3.0M/A3.0.

Quality assurance (QA). That part of quality management focused on providing confidence that quality requirements will be fulfilled. For the purposes of this program, quality assurance is the planned system of documented procedures and organizational requirements developed and implemented for the purpose of measuring and assuring compliance with customer requirements and providing confidence that quality goals are achieved. Quality assurance encompasses such areas as compliance with project specification requirements, compliance with referenced standards, and achievement of customer service objectives. Specific functions included in quality assurance are:

- Determination of quality criteria
- Establishment of a plan to monitor quality, including assignment of quality control (inspection)
- Determination of acceptance criteria
- Determination of QC personnel qualifications
- Oversight (periodic monitoring) of QC activities
- Summarizing and reporting quality conformance measures to management

The foregoing definition is solely applicable to this Standard. It is mutually exclusive of other definitions for the term *quality assurance* that are found in other AISC publications, such as the *Specification for Structural Steel Buildings*.

Quality control (QC). Controls and inspections implemented by the fabricator or erector, as applicable, to ensure that the material provided and work performed meet the requirements of the *approved construction documents* and referenced standards.

Quality control records. Documents that report the results of inspections mandated by the documented procedures and the contract documents.

Quality manual. A document stating the quality policy and describing the quality management system.

Quality management system. A system to establish policy, objectives, plans, and resources to direct and control an organization with regard to quality.

Quality record. A document that provides objective evidence of activities performed or results achieved.

RCSC.† Research Council on Structural Connections.

Repair. Action taken on nonconforming work to make it acceptable for the intended use.

Registered design professional. An individual who is registered or licensed to practice his/her respective design profession as defined by the statutory requirements of the professional registration laws of the state or jurisdiction in which the project is to be constructed.

Released for fabrication. Status of the work as described in AISC *Code of Standard Practice* Section 4.

Rework. Action taken on nonconforming work to make it conform to the requirements.

RFI.† A documented request for information or clarification generated during the construction phase of the project.

Safety management system. A system to establish policy, goals, plans, and resources to identify and document hazards and their elimination, mitigation, or isolation related to the safety and health of employees and third parties and to eliminate property and equipment damage that may be caused by unsafe acts or unsafe conditions. Safety management systems only apply to erectors.

Safety manual. A document stating the safety policy and describing the safety management system of the erector's organization.

Safety plan. The identification and documentation of specific hazards related to a singular project and the means and methods to be used to eliminate, mitigate, or isolate those hazards.

Shop drawings.† Drawings of the individual structural steel shipping pieces that are to be produced in the fabrication shop.

Specifications.† The portion of the contract documents that consists of the written requirements for materials, standards, and workmanship.

SSPC.† The Society for Protective Coatings, which was formerly known as the Steel Structures Painting Council.

Steel detailer.† The entity that produces the *approval documents*.

Structural engineer of record.† The licensed professional who is responsible for sealing the contract documents, which indicate that he or she has performed or supervised the analysis, design, and document preparation for the structure and has knowledge of the load-carrying structural system. See also *registered design professional*.

Structural steel.† Elements of the structural frame as given in AISC *Code of Standard Practice* Section 2.1.

Structural steel buildings and other structures. Buildings and other structures designed, fabricated, and erected in accordance with the AISC *Specification for Structural Steel Buildings*. See AISC *Specification* Section A1.

Subcontractor. A firm that performs a portion of the fabricator's, manufacturer's, or erector's contract work, such as fabrication, erection, detailing, *coating* application, inspection, or consulting services.

Supplier. A firm that supplies materials (including, but not limited to, mill materials, process supplies, welding consumables, *coatings*, and process machinery) and completed purchased product (including, but not limited to, fasteners, decking, joists, and proprietary buy-out items) needed to fulfill the contract requirements.

Training. See *documented training*.

Verification. The confirmation through objective evidence that the quality management system requirements have been met.

WPS. Welding procedure specification as defined by AWS A3.0/A3.0M.

CHAPTER 1

GENERAL REQUIREMENTS

1.1. PURPOSE

The purpose of this Standard is to confirm to *owners*, the design community, the construction industry, and public officials that certified participants who adhere to the requirements in this Standard have the personnel, organization, experience, *documented procedures*, knowledge, equipment, and commitment to quality to perform *fabrication*, manufacturing, and/or *erection* as described in this Standard.

1.2. SCOPE

The requirements in this Standard shall apply as follows:

- (a) Chapters 1 and 2 shall apply to building *fabricators*, who fabricate and supply the *structural steel* frames for buildings where elements of the frames are as defined in AISC *Code of Standard Practice* Section 2.1.
- (b) Chapters 1 and 3 shall apply to metal *component manufacturers*, who *manufacture components* that include bracing not designed for primary loads (diaphragms, cross frames, and lateral bracing); camera, light, sign, and signal support structures; bridge rail; stairs; walkways; grid decks; drains; scuppers; expansion joints; bearings; ballast plates; and mechanical movable bridge equipment. *Manufacturers* of camera, light, sign, and signal support structures; high mast light towers; bridge rail; complex expansion joints; high load multi-rotational (HLMR) bearings; and mechanical movable bridge equipment shall also be required to meet specific supplemental requirements to this Standard.
- (c) Chapters 1 and 4 shall apply to bridge *fabricators*, who fabricate and supply steel highway or railroad bridges.
- (d) Chapters 1 and 5 shall apply to *erectors* of *structural steel*.
- (e) Chapters 1 and 6 shall apply to hydraulic metal structure *fabricators*.

In Chapters 2 through 6, only those subsections that are supplementary to Chapter 1 are indicated.

The Glossary is an integral part of this Standard. Nonmandatory Commentaries are provided for background, and the user is encouraged to consult them.

1.3. REFERENCES

The reference documents and standards necessary to make personnel aware of work requirements shall be consistent with the requirements of existing *contract documents* and shall be readily available to those who need them.

The ability to work to and meet the requirements of the latest edition of the following documents shall be demonstrated:

- (a) ANSI/AISC 303 *Code of Standard Practice for Steel Buildings and Bridges*
- (b) RCSC *Specification for Structural Joints Using High-Strength Bolts*
- (c) *Selected ASTM Standards for Structural Steel Fabrication*, as published for AISC, or equivalent content
- (d) AWS A2.4 *Symbols*
- (e) AWS A3.0M/A3.0 *Terms and Definitions*
- (f) AWS D1.1/D1.1M *Structural Welding Code—Steel*

1.4. DEFINITIONS

As used in this Standard, the words **shall**, **must**, or **will** denote a mandatory requirement. The word **should** denotes a guideline or recommendation. The words **may** or **can** denote an opportunity to make a choice.

1.5. MANAGEMENT RESPONSIBILITY

1.5.1. Policy for Quality

Executive management shall ensure that a policy for quality is communicated, implemented, and maintained. The policy for quality shall include:

- (a) A commitment to quality that includes a commitment to meet the requirements in *contract documents*.
- (b) A *quality management system* that provides a framework for establishing, communicating, and reviewing quality goals.

Executive management shall establish goals to improve quality. Goals shall be measurable and documented through *objective evidence*. As quality goals are achieved, new goals shall be set that demonstrate commitment to continuous improvement.

Commentary: New quality goals can be a new level of achievement of a previous goal, or a new goal that has not been previously identified.

1.5.2. Quality Management System

The *quality management system* shall satisfy all of the requirements of this Standard and the requirements of the *contract documents* and referenced standards. The *quality management system* shall include a *quality manual*, *documented procedures*, and records. The *quality management system* must address both *quality control* and *quality assurance* as defined in the Glossary of this Standard. Documented procedures shall contain:

- (a) The purpose of the procedure.
- (b) Process definition that includes steps required for completion.

- (c) Assignment of responsibility for performance.
- (d) Assignment of responsibility for review, revision, and/or approval of the procedure.
- (e) Identification of records that are generated.
- (f) For inspection activities, frequency of observations or inspections and how those observations or inspections are documented.

Commentary: The extent of the *quality management system documentation* can differ from one organization to another due to the size of organization, the type of activities, and the complexity and interaction of processes. Requirements may be satisfied in a single document called the *quality manual* that may incorporate separate documents by reference.

1.5.3. Management Review

Executive management shall conduct a review of the *quality management system* at planned intervals, but annually at a minimum. Further, at a minimum, management review shall include assessment and *documentation* of the following:

- (a) A summary of previous management reviews.
- (b) Results of any internal and external audits conducted since the previous management review.
- (c) Customer feedback and feedback mechanisms, identifying opportunities for improving quality.
- (d) Work *nonconformances*. Both the number and severity of *nonconformances* shall be assessed.
- (e) Process *nonconformances*, including compliance with the *documented procedures* comprising the *quality management system*.
- (f) Effectiveness of the *corrective actions* taken.
- (g) Results of equipment maintenance and preventive maintenance, including the adequacy of equipment resources.
- (h) Adequacy of the *training* program with respect to the levels of qualification required.
- (i) Proposed or required modifications to the *quality management system*.

The management review record shall include the decisions and actions required for implementation of:

- (a) Improvement of the effectiveness of the *quality management system* and its processes.
- (b) Improvement of quality.
- (c) Resource needs.

Records from management reviews shall be maintained in accordance with the *documented procedure* as required in Section 1.9.

1.5.4. Responsible Quality Personnel

Executive management shall designate a management representative or representatives for quality who shall report directly to (or be a part of) *executive management*. The designated management representative(s) for quality may perform other functions within the company, provided that those functions do not conflict with the quality responsibilities. The designated management representative(s) shall have the ability, responsibility, and authority to:

- (a) Ensure that *documented procedures* needed for the *quality management systems* are established, implemented, and maintained in accordance with this Standard.
- (b) Report to *executive management* on the performance of the *quality management system* and any need for improvement.
- (c) Communicate with external parties on matters relating to the *quality management system*.

1.5.5. Resource Management

Resources necessary to comply with the *contract documents* shall be available. Resources are applicable to both personnel and non-personnel. The qualification requirements, responsibility, authority, and the interrelation of functional positions that manage, perform, and verify work affecting quality shall be defined as required in Section 1.5.4 and in the industry-specific chapters. Other provisions relating to personnel are found elsewhere in the Standard. See Sections 2.5.4, 3.5.4, 4.5.4, 4.I.5.4, and 5.5.4.3, and 6.5.4.2 for non-personnel, industry-specific resource requirements.

Commentary: *Objective evidence* of qualification may be demonstrated through biographies, resumes, *documented training*, and individual licenses or certifications. Personnel may be assigned to more than one function, provided they are qualified and able to perform fully the duties of each position.

1.5.6. Internal Communication

Executive management shall ensure that appropriate communication processes are established and that communication takes place on a regular basis regarding the effectiveness of *management systems*.

1.5.7. Quality Manual

The *quality manual* shall include a page showing the current revision date and the name and location of the facility or organization.

The *quality manual* shall include or incorporate by reference the following documents at a minimum:

- (a) Documented statements of a quality policy and quality objectives as required by this Standard.
- (b) *Documented procedures* established for the *quality management system*.
- (c) Documents needed by the organization to ensure the effective planning, operation, and control of its processes.
- (d) Organizational chart describing the interrelationship of functional positions that affect quality.
- (e) Job descriptions outlining and describing responsibilities, authority, required qualifications, and activities for *key positions*.
- (f) Qualification evidence for individuals in *key positions/functions*.

Executive management shall define additional *documented procedures*, drawings or other documents that are required beyond the minimum requirements set by this Standard to meet the needs of the organization and its customers.

The highest ranking member of *executive management* shall sign and date the *quality manual*.

Commentary: *Executive management* determines the level of detail in the *quality manual* and *procedures*. At a minimum, these documents should be detailed enough to adequately describe the *quality management system* used to assure the end work meets the required quality.

1.6. CONSTRUCTION DOCUMENT REVIEW AND COMMUNICATION

A *documented procedure* shall be developed for contract and project specification review. The *procedure* shall require these reviews for each project, and the review shall begin no later than the acceptance of responsibility for performing the work. Records of this review shall be maintained in accordance with the *documented procedure* as required in Section 1.9.

Commentary: Ideally, the review should begin during the project estimation or bid process.

The review should identify, plan for, and record the specific project requirements. The *documented procedure* should provide for review of the *contract documents* and referenced standards to ensure awareness of the contract requirements.

Evidence of contract review may take the form of technical summaries, sign-offs, schedules, change orders, and allocation of adequate resources, as well as development of an *erection plan* and a *safety plan* as applicable. Such evidence should indicate consideration of pertinent Sections of this Standard and other critical project requirements that, if missed, will have a major impact on project quality.