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Introduction

This white paper identifies 12 characteristics essential to any organization offering construction industry certification. Typically, these characteristics are found within the national not-for-profit *technical institutes* established to provide a consensus-driven forum for the development and continuous refinement of engineering, design, and quality standards and related certification programs. Owners and specifiers of both public and private facilities have depended on such organizations for conformity assessment and quality standards for more than 40 years.

Technical Institutes

Technical institutes are usually national or international in scope. Each is recognized as the preeminent forum for exchanging information and as the principal body of knowledge for the industry it serves. National technical institutes facilitate the exchange of knowledge between many different industry stakeholders, including subject matter experts, academics, designers, contractors, owners, code officials, fabricators, erectors, and manufacturers. With well organized membership bases and a focus on collaboration and dissemination of information, technical institutes provide a framework that independent industry organizations cannot. While any number of associations may serve an industry for a variety of professional and economic reasons, there is only one technical institute. When one industry overlaps with, or is a subset of, another, the technical institutes involved typically have well-established collaborative relationships with one another to effectively combine their bodies of knowledge. Technical institutes are not developed overnight; establishing expertise, standard-setting authority, and a reputation for reliability takes time, often decades.

Certification Programs

Because their properties may be difficult to verify at the construction site, prefabricated engineered components must be manufactured to meet contract requirements and to ensure quality and reliability. Direct independent observation and assessment of a fabricator's quality management system saves time and money, and provides assurance that a particular product has met a minimum level of acceptable quality standards. Specifiers need to rely on the nationally recognized *certification program* of an industry's technical institute to provide assurance that a fabricator has the personnel, organization, experience, procedures, knowledge, equipment, capability, and commitment to produce quality work.

In order to successfully and reliably perform this important function, a certification program cannot stand alone; it must be part of a comprehensive quality system *specific to the engineered components addressed*. The essential functional elements of a comprehensive quality system are listed in the attached discussion.

Certification Organization

Some public sector agencies establish certification programs in-house, often drawing upon the body of knowledge promulgated by the appropriate technical institutes (either directly or via public sector standards bodies) as the basis of their quality systems. Recognizing the resources and expertise necessary to establish the entire quality system for a given class of engineered components, owners may alternatively choose to specify institute-developed certification programs to provide prequalification of component fabricators.

Many commercial companies and industry associations also offer certification services. However, not all such offerings are supported by the necessary functional elements of comprehensive quality systems typically embodied in an industry's technical institute.

A certification program developed and run by an independent technical institute ensures transparency, allows for continued process improvement, and removes any fear of bias towards one or more companies.

In the construction industry, *only the technical institute serving the corresponding industry segment provides all of the necessary functional elements of a comprehensive quality system and therefore currently serves as a singular, standardized, and accredited certification organization*.

1. Industry Standing.

A comprehensive quality system must be able to apply the most broad and diverse knowledge base. A technical institute is recognized within the industry it serves as the principal body of knowledge. National technical institutes facilitate the exchange of knowledge across the full spectrum of industry stakeholders. With well organized membership bases and a focus on collaboration and dissemination of information, technical institutes provide a framework other organizations cannot.

2. Clearly Stated Purpose.

A comprehensive quality system must serve as an effective engine for quality improvement, with a core purpose consistent with the advancement of quality and technology. Its purpose must be stated transparently, with no hidden agenda. Not-for-profit technical institutes support the overall industry and do not cater to corporate or individualistic agendas, but form strategic relationships for the greater good of the industry.

3. Broad Professional Involvement.

A comprehensive quality system must apply the best available professional qualifications and operational experience to the development of technical methods and quality standards. A technical institute has membership and committee participation that reflects a diverse and balanced mix of stakeholders, including technical professionals and academicians in the applicable fields as well as business interests within the subject industry.

4. Governance and Consensus.

A comprehensive quality system must apply its body of knowledge in a fair and balanced manner that reflects the true consensus of the subject industry and involved professions. Technical institutes have defined governance structures with established procedures controlling the development of technical methods and quality standards, including rules for committee composition, balance, rules of order, balloting, and resolution of objections in accordance with the American National Standards process.

5. Research.

A comprehensive quality system must be able to address problems and drive continuous improvement, which may require that new procedures, processes, or standards be developed. Technical institutes fund and support practical research to expand technical knowledge and improve quality. In addition to publishing the results of their own research, technical institutes assist in monitoring and disseminating information from the global independent research community.

6. Validation.

A comprehensive quality system must be able to validate key elements of knowledge and quality standards prior to application. Technical institutes provide consensus-based program development, oversight committees, expert review panels, and public review procedures for this purpose.

7. Dissemination.

A comprehensive quality system must inform and educate personnel within the subject industry to maintain the necessary competence to produce quality results, including keeping current with changing technical methods, quality standards, manufacturing practices, and regulatory standards. It must also be able to immediately alert the industry to significant technical and quality issues. Technical institutes offer educational programs developed by technical experts and delivered by qualified instructors, and have also established journals, periodicals, manuals, bulletins, and other publications, as well as conferences, for this purpose.

8. Certification of Personnel.

A comprehensive quality system must validate the competence of personnel whose function is critical to the quality assurance system. Technical institutes scrutinize employees that serve critical functions based upon measured and documented competence, experience, and qualifications. It is also essential that a certification program review a company's quality management system from receipt of contract through final product delivery. In addition, effective certification programs should review specific project requirements, audit project records, interview key personnel, and observe practices and equipment to confirm that proper quality standards and procedures are in place.

9. Certification of Fabrication Process.

A comprehensive quality system must ensure that the fabrication process, including facilities, equipment, key personnel, production methods, quality of materials and supplies, quality system documentation, and overall standard of care, is maintained at levels consistent with the contract quality standards. This requires promulgating quality standards, establishing certification procedures, administering the certification process, and publishing accessible listings of currently certified facilities. Certification procedures must provide explicit means of resolving non-conformances and appealing certification results. Technical institutes have established committees to set quality standards that are balanced, that represent various professional categories, and that may also include customers, professional design engineers, plant engineers, plant managers, and other industry stakeholders.

10. Independent Audits.

A comprehensive quality system must ensure that a facility has achieved and is maintaining the necessary standards of excellence to meet all applicable quality standards. This requires periodic verification through on-site audits by independent, technically qualified, and professionally accredited personnel. To ensure independence, no linkage may exist between the auditor and the certified facility. Technical institutes conduct their audits using third-party audit personnel who are independent, accredited, trained, qualified, and coordinated for consistency. Technical institutes employ a program for verifying the quality and effectiveness of their auditors.

11. Feedback and Recourse.

A comprehensive quality system must ensure that the body of knowledge developed and promulgated within the subject industry, as well as the quality criteria applied to personnel and facility certification programs, reflect the most current needs, problems, issues, best practices, and quality trends. This requires that feedback from field-related activities, including certification audits, be brought promptly into the body of knowledge. Technical institutes take advantage of their conference, communication, education, and certification programs to gather and immediately apply such feedback. Their quality systems include formal complaint procedures to process complaints involving certified fabricators.

12. Continuing Commitment.

A comprehensive quality system must maintain stability, reliability, and consistency over the long term. Technical institutes are organized and supported by their respective industries to make consistent allocations of staff, volunteer time, and funding commensurate to support their respective industries over the long term.

Summary

Credible Certification programs are an effective method of assuring that a component fabricator has the personnel, organization, experience, procedures, knowledge, equipment, capability and commitment to produce quality work. Effective certification programs provide customer-focused, management driven, and process-based quality management systems and derive from, at a minimum, these twelve elements. While commercial companies can provide audit services (element #10), and associations may offer checklist-based facility certification (elements from items #9 and #10), only the technical institute associated with the class of engineered components addressed can today provide all the required elements that are necessary of a credible plant certification program. Stakeholders and project decision makers must forge ahead together with a vision to support quality assurance and certification programs that are based on these principles. The work of the technical institute within a strong, unified, and quality-focused industry benefits all stakeholders, the end user, and the general public.

About AISC

The American Institute of Steel Construction, headquartered in Chicago, is a not-for-profit technical institute and trade association established in 1921 to serve the structural steel design community and construction industry. AISC's mission is to make structural steel the material of choice by being the leader in structural steel-related technical and market-building activities, including: specification and code development, research, education, technical assistance, quality certification, standardization, and market development. AISC has a long tradition of service to the steel construction industry of providing timely and reliable information.

About PCI

The Precast/Prestressed Concrete Institute (PCI), founded in 1954, is the foremost developer of standards and methods for designing, fabricating, and constructing precast concrete structures. PCI also operates the world's leading certification program for firms and individuals in the precast concrete structures industry.

PCI publishes a broad array of periodicals, technical manuals, reports, and other informational documents, including an award-winning technical journal. It also conducts educational seminars, technical conferences, conventions, exhibitions, and awards programs.

Institute members include firms comprising the precast concrete structures industry as well as architects, consultants, contractors, developers, educators, engineers, materials suppliers, service providers, and students.

PCI has 11 regional affiliates across the United States, and maintains relationships with other organizations, both national and worldwide, having interest in precast concrete.

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