Quality Assurance – Your Lifeline to a Better Project

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Objectives

• How a Quality Assurance program impacts design and safety
• What are Quality Assurance Programs
• The essential elements of a Quality Assurance Program
• Specification guidance

Introduction

• All projects are designed to meet specifications
• It is impossible for any one person to observe or inspect all the materials, components, and construction
• Thus, it is vital that other procedures be in place to provide assurance that the project is built as expected
Quality & Safety

• Designers’ number one priority = Safety
  – Society relies on design professionals
  – Construction, Service Life, Deconstruction
• Ensure construction in accordance with safe design? → Quality Assurance
• Therefore, QA and Safety directly linked

Quality & Safety

• What is QA?
  – an integrated and ongoing system of knowledge, programs, activities, people, inspections, tests, documentation, and assessment with the sole purpose of making sure that the intended design requirements are met
• Quality and safety are a commitment!

Quality Assurance & Certification

Why Certification?
• Certification helps ensure that essential components of a QA system are:
  – Present
  – Functioning properly
• Highest probably of a successful project
• Certification is a vital component of QA but is not QA by itself
Quality Assurance & Certification

Why Certification?
Certification assures owners, specifiers, and designers that structural components are:
– Manufactured by companies that subscribe to nationally accepted standards
– Have comprehensive internal quality systems in place
– Are audited to ensure compliance

QA vs. QC

Quality Assurance vs. Quality Control:
• Quality Control is the operational activities used to fulfill requirements of quality
• Testing, inspection and documentation
• QC is only a part of the larger QA system

Facts About Certification

Cost:
• Certification does not increase cost
• Majority of fabricator cost is the cost of doing the job right
• Why would a fabricator not want to take the necessary steps
• What are the consequences? Risks?
Other Costs:
- Administration of third-party audits
  – Already included in certification programs
- Alternative is special inspection
  – Increasing project owner’s costs

Common Standard:
- Enables Prequalification of bidders
- Uniform yardstick of performance for all
- Reduces temptation to cut corners
- Levels playing field – appreciated by all parties

Reliable Project Partner:
- Significant investments made
- Habits of quality developed
- Becomes a part of an organization’s culture
Facts About Certification

As-Designed Becomes As-Built:
• Designer’s vision and reputation depend on fabricator
• Certification helps ensure that the finished product meets expectations
• Less supervision and field inspection saves time and money

Selecting a Certification Program

• Proliferation of certification programs has created confusion in the marketplace
• Not all certification programs are created equal

Institute-Based Certification

• Certification is more than checklists, paperwork and inspections
• The most effective programs are those that are part of a comprehensive quality system
  – PCI, AISC, ACI…
• Institute-based certification programs are directly linked to an industry’s Body of Knowledge
Body of Knowledge

- Collective knowledge of an industry
  - Building codes, design guides, education programs, certification
- Several key elements of an institute are necessary to develop a BOK
- Many elements feed directly into the BOK and result in continuous feedback

Institute-Based Certification

- Institutes develop and maintain an industry’s body of knowledge
- Therefore, Institute-based certification provides the highest degree of quality assurance
- Technical Institutes are uniquely qualified to offer certification programs

Agency Endorsement

- American Association of State and Highway Transportation Officials (AASHTO) Resolutions
  - Subcommittee on Materials
  - Subcommittee on Bridges
- Certification should be provided by Technical Institutes
Quality Assurance White Paper

- PCI joined with the American Institute of Steel Construction (AISC)
- Identified 12 characteristics essential to any organization offering construction-industry certification

Quality Assurance White Paper

- An effective Quality Assurance Program must support all 12 points
- White Paper transcends competition between concrete and steel industries
- Only an industry’s Technical Institute has the Body of Knowledge needed to serve as the industry’s singular, standardized, and accredited certification organization

12 Essential Elements
12 Essential Characteristics

1. Industry Standing
   • Custodian of principal Body of Knowledge
   • Facilitates knowledge exchange across full spectrum of industry stakeholders
   • Maintain recognition in industry

2. Clearly Stated Purpose
   • Serve as engine for quality improvement
   • Core purpose consistent with advancing quality and technology
   • Form strategic relationships

3. Broad Professional Involvement
   • Industry professionals
   • Committees and overall membership reflect diversity and balance
   • Best practices identified
12 Essential Characteristics

4. Governance and Consensus
   • Governed by volunteers with no ownership interest
   • Formal consensus process applied in a fair and balanced manner

5. Research
   • Addresses problems and drives continuous improvement
   • Funds and supports practical research to expand technical knowledge
   • Improves quality programs

6. Validation
   • Validation process for knowledge and quality standards
   • Expert and public review procedures
   • Goal of achieving high quality standards
12 Essential Characteristics

7. Dissemination
- Informs and educates
- Publishes journals, periodicals
- Holds conferences

8. Certification of Personnel
- Sets standards for employees in critical functions
- Verifies qualifications; conducts testing

9. Certification of Fabrication Process
- Maintains committees to set balanced quality standards
- Ensures fabrication process is maintained at levels consistent with contract quality standards
- Provides means of resolving non-conformances
10. Independent Audits
- Conducts on-site audits
- Audit personnel are independent and accredited
- Audits are coordinated for consistency
- Program for verifying quality and effectiveness

11. Feedback and Recourse
- Feedback is brought promptly into Body of Knowledge
- Gather/apply feedback during industry events
- Formal complaint procedures

12. Continuing Commitment
- Maintains stability, reliability, consistency over long term
- Makes consistent allocations of staff, volunteer time, and funding commensurate with long-term support
**Body of Knowledge**

- More than one BOK is impractical, inefficient, and possibly dangerous.
- Technical institutes have clearly defined domains.
- There may be several trade associations, but there is generally only one technical institute.

**PCI Certification Programs**

**Three PCI Certification Programs Available:**

- Personnel Certification
- Plant Certification
- Erector Certification

Each is a critical component in the overall PCI Quality Assurance Program.

**How to Specify PCI Certification**

**Personnel Qualification Guide Specification:**

- "The manufacturer shall employ a minimum of one person, regularly present in the plant, who is certified by PCI for Plant Quality Personnel, Level II."

Note: All PCI-certified plants are required to employ at least one PCI-certified individual.
How to Specify PCI Certification

PCI Plant Certification Program:
- Over 40 years
- Prequalified list
- Widely recognized in specifications
  - AIA Masterspec, state and federal agencies

Manufacturer Qualifications:
- "The precast concrete manufacturing plant shall be certified under the PCI Certified Plant Program. The manufacturer shall be certified at the time of bidding. Certification shall be in the following product group(s) and category(ies):"
  - [Choose one or more of the following, as applicable]
    - Group A, B, C and/or G

Manufacturer Qualifications:
GROUP A: ARCHITECTURAL
- AT – Architectural Trim Units
- A1 – Architectural Precast Products
(Based on PCI MNL-117)
How to Specify PCI Certification

Manufacturer Qualifications:
GROUP B: BRIDGE PRODUCTS
• B1 or B1A – Precast Bridge Products (No Prestressed Reinforcement)
• B2 or B2A – Prestressed Miscellaneous Bridge Products (Non-superstructure)
• B3 or B3A – Prestressed Straight-Strand Bridge Beams (Superstructure)
• B4 or B4A – Prestressed Deflected-Strand Bridge Beams (Superstructure)

GROUP C: COMMERCIAL (STRUCTURAL) PRODUCTS
• C1 or C1A – Precast Concrete Products (No Prestressed Reinforcement)
• C2 or C2A – Prestressed Hollow-Core and Repetitive Products
• C3 or C3A – Prestressed Straight-Strand Structural Members
• C4 or C4A – Prestressed Deflected-Strand Structural Members

GROUP G: GLASS-FIBER-REINFORCED CONCRETE PRODUCTS (GFRC)

In the specifications, list each precast concrete product and each required group and category included in the project’s scope
**Erector Qualifications:**

- "Erector Qualification: Prior to beginning any work at the jobsite, the erecting organization, including all crews erecting precast concrete, shall be Qualified [or Certified] in category[ies] [A, S1, and/or S2] under the Precast/Prestressed Concrete Institute (PCI) Erector Qualification [or Certification] Program."

**Essentials of QA System**

**Conclusion:**

- Quality and Safety go hand-in-hand
- Certification is more than just a checklist, paperwork and inspections
- It is part of an integrated, comprehensive, continuously improving QA System
- Technical Institutes are uniquely qualified to offer certification as a part of a larger Quality Assurance System
Thank you!

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