

The New *Building Standard*

How did we end up here?

By Roberta L. Marsteller, P.E.

Even more than price, the eroding market share for many U.S. manufacturers in the latter half of the 20th Century was the result of a perception of a decline in quality. During the late 1970s, for example, Detroit's share of the car market plummeted when U.S. carmakers couldn't compete with lengthening warranties from Japanese carmakers. Today, the 50,000 mile/five year warranty is standard throughout the industry—so much so that it's no longer a selling point but rather a necessity.

Consumers' expectations of quality have risen in all areas—including the design and construction industries. The construction industry is vastly different from the automobile industry. Cars take advantage of interchangeable parts and learning curves attributed to mass production, whereas every construction project is different—different materials, level of complexity, scope, end use, location, etc. Engineers must evaluate these differences and establish the proper specifications to adequately address them without compromising the quality of the project.

In the construction industry we rely on two very different means of ensuring project quality: inspection and contractor certification. Essentially, inspection looks at the end product, while certification evaluates the processes and procedures used to manufacture the product.

Inspection is often referred to as quality control whereby the quality is "inspected in." The concept of quality control arose out of mass production manufacturing industries where thousands of parts were expected to be identical and finding the ones that didn't meet product specifications was a black and white process. Finding non-conformances post-production can be costly to fix, especially if the product is a steel truss already on the job site. Quality in construction isn't black and white—mistakes are not always obvious.

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Contractor certification is characterized by a quality assurance or total quality approach to controlling errors and non-conformances. Quality assurance is the prevention of quality problems through planned and systematic activities including documentation (Davies, 2003)—or simply put, the quality is "built in." In the late 1980s the concept of total quality migrated to the U.S. from the United Kingdom. Depending on the approach taken, total quality can mean the quality is "organized or managed in." If quality were a spectrum, quality control would be at one end with total quality management at the other end.

Contractor Certification for Steel Building Fabricators

The American Institute of Steel Construction started a fabricator certification program in the mid 1970s. For years the program focused primarily on the fabrication processes happening on the shop floor. However, as the concept of quality evolved over time, AISC's Certification program also evolved. Today it is a sophisticated program that represents a complete quality management system approach. The *Certification Standard for Steel Building Structures* (the *Building Standard*) applies uniformly to all fabricators, regardless of size and complexity of project. On our quality spectrum the *Building Standard* encompasses elements of quality assurance and total quality management philosophies.

Prior to issuing the *Building Standard*, the AISC fabricator certification program relied on a checklist system to certify fabricators in the categories of Conventional or Complex Steel Building Structures. While easy for auditors to use, the system did not adequately communicate to building owners and specifying engineers exactly what the program provided. The *Building Standard* is more descriptive than a checklist, and it is in a language more familiar to engineers. When an engineer specifies an AISC Certified fabricator it is clear what they will receive and how it will contribute to the quality of their project.

When switching over to the *Building Standard*, AISC eliminated the categories. AISC believes there is a basic level of quality that all fabricators need to maintain regardless of company size or shop capacity. The *Building Standard* places equal emphasis on all aspects of the fabricator's business processes. In addition to fabrication processes, these include: Management Responsibility; Contract and Project Specification Review and Communication; Detailing; Document and Data Control; Purchasing; Material Identification; Inspection and Testing; Calibration of Inspection, Measuring and Test Equipment; Control of Non-conformances; Corrective Action; Handling, Storing and Delivery of Product and Materials; Control of Quality Records; and Training.

Audits are performed yearly by Quality Management Company, LLC (QMC), an independent, third-party firm using professional auditors with specific training and experience in structural steel and audit science. The auditors review contract requirements and records for real projects; interview personnel from the shop floor to the president; and observe practices and equipment to confirm that proper quality standards and procedures are in place and implemented. The audit process can uncover common causes of

variation. And in most manufacturing processes, including steel fabrication, the majority of defects or non-conformances arise from a limited number of causes (McMurtrie and Gupta, 2003). The audit process helps fabricators identify these causes if in fact non-conformances have been reported.

When the Conventional and Complex categories were eliminated in favor of a single standard, many engineers questioned how they could be assured an AISC Certified fabricator had the shop capacity or project experience to sufficiently meet their project needs. In fact the categories never really addressed this—they were too subjective. People have different ideas of what constitutes a complex project. Shop capacity and project experience are not direct measures of

a fabricator's ability to deliver a quality project. If you are working with a fabricator for the first time, don't be afraid to ask what other projects they have been involved in or ask for references. Available shop capacity, while a function of shop size, is more directly related to what else is going through a fabricator's shop at the time—again ask questions.

The notion of quality in construction is nothing new. According to the Code of Hammurabi (circa 1800 BC), "If a builder build a house for some one, and does not construct it properly, and the house which he built fall in and kill its owner, then that builder shall be put to death." The construction industry has come a long way since the days of Babylon and Hammurabi. And in spite of today's pervasive low-bid mentality, quality is here

to stay and is certain to evolve as marketplace demands change and consumer expectations continue to rise. AISC is prepared to meet those expectations and continue to ensure the quality of steel construction. ★

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Bibliography

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Ron McMurtrie and Naren Gupta, "Quality—The Timeless Quest", *Engineering Management*, April 2003.