

Construction quality management programs: Keys to successful project delivery

Construction companies with a track record of safety excellence tend to be better managed companies with more sophisticated quality management programs.



"Doing it right the first time" is the goal of any practitioner in every field of human endeavor, whether laying a brick or writing a new software application. However, in few realms are the stakes of getting things right — or the consequences of getting things wrong — as high as in the arena of major construction projects, where errors can cost millions of dollars and months of lost production and profits.

Contractors and project owners around the world understand the importance of reducing costly, even potentially disastrous, construction defects. As the tempo of commercial construction picks up in the wake of the global recession, identifying, preventing and, when necessary, correcting construction defects will continue to be a major concern for project owners, who are the ones who ultimately must absorb the costs.

If work has to be redone after the project is built, these costs can be significant. Among the most serious construction defects are those associated with the primary building envelope, i.e., the interior and exterior walls and roof structures. In situations of major leaks or settling, a \$20 million building could potentially cost \$10 million in rework, penetrating and exhausting all insurance and resulting in huge business interruption costs.

Selecting contractors with formal quality management programs

For project owners, there are many benefits to working only with contractors having formal quality management protocols. For one, working with such a contractor will reduce project costs and completion time, while enhancing safety. For another, a robust quality management program is also likely to reduce the potential for construction defect (CD) claims and warranty call-backs, minimizing rework and punch list items and reducing business interruptions for the project owner. The challenge to project owners is the relative scarcity of contractors and subcontractors with formal quality management programs — estimated to be only between 5 and 10 percent of the industry overall.

If there are many benefits to the project owner in researching and selecting contractors with formal quality management programs, there are also many obvious benefits to contractors as well. The maintenance of quality management programs creates a high-performance team atmosphere and a culture of continuous improvement, making it possible to work toward a zero rework environment. As a result, the contractor's reputation for workmanship, efficiency and few, if any, reworks will result in referrals by satisfied customers.

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Consequences of poor quality management can be dire

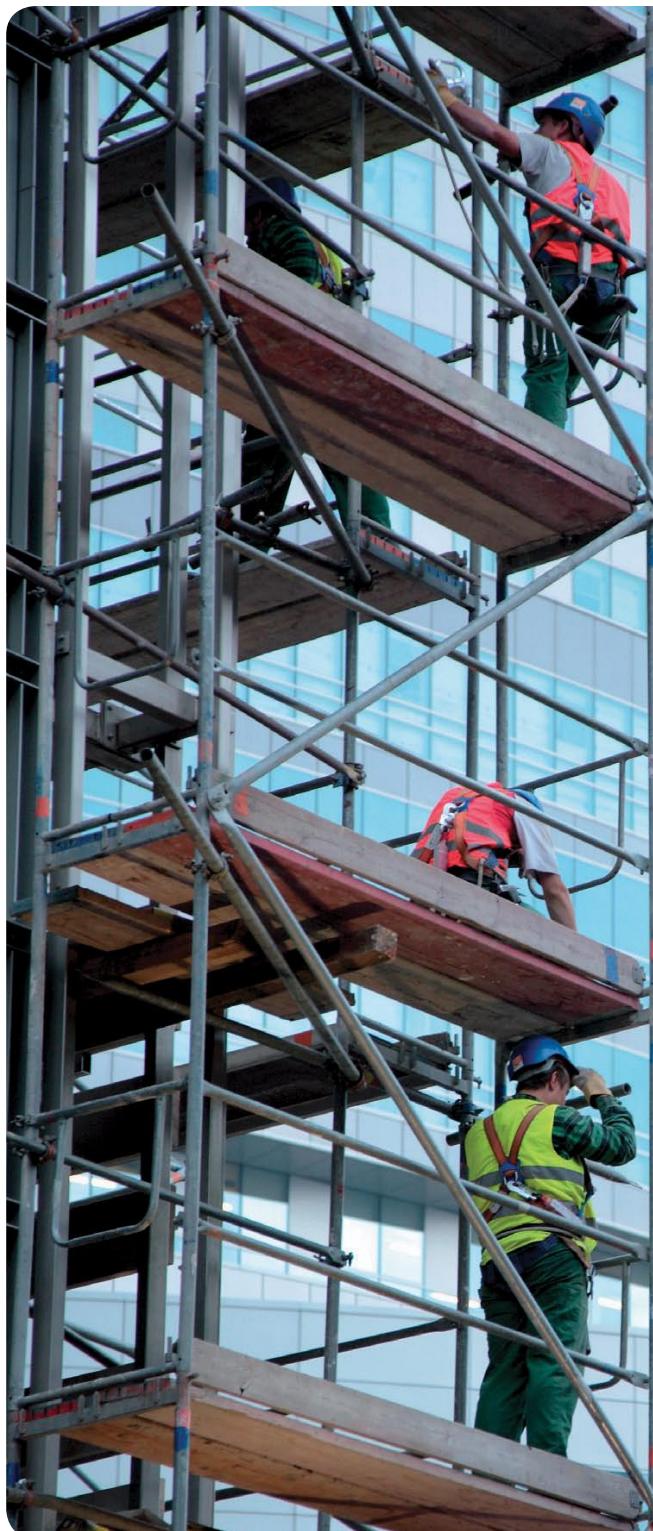
Construction defects due to poor quality management can be costly in the extreme, including the potential for serious injury or death. One such example was the 2004 partial collapse of Terminal 2E at Paris — Charles de Gaulle Airport, which took the lives of four people. The extremely advanced design, which included a high, vaulted ceiling, left little margin for safety in the event of construction defects that might compromise the structure.

Following a lengthy administrative review and enquiry, the collapse was attributed to a number of interconnected causes, rather than a single, overriding design or structural fault. The design of the arched, concrete roof proved to be insufficiently flexible to withstand normal stress factors. In addition, strength was further compromised by a series of openings and metallic pillars piercing the structure.

It was also reported that to minimize costs, construction was executed as close to practical design limits as possible, allowing little margin for error. It is very likely that a robust quality management protocol throughout the construction process might have identified and corrected design and construction shortcomings as they occurred, saving both money and lives in the long term.

Zurich believes that as an industry, construction quality management systems are in an early stage of development — similar to where construction safety management systems were in the 1960s. But industry leaders are beginning to recognize and quantify both the direct and indirect benefits of robust quality management systems. From our own analysis of customer's losses, we have determined a direct correlation between quality and safety excellence.

Specifically, our customers with the best safety records tend to be the same group of customers as those with the best quality records. The simple message is this: Construction companies with a track record of safety excellence tend to be better managed companies with more sophisticated quality management programs. Furthermore, better managed construction companies, having robust safety and quality management programs in place, are more likely to deliver your project on time and on budget.



Zero defects: the ultimate goal

Formal quality management programs will vary in detail from one contractor to another. However, there are a number of components and activities that owners should insist upon, including:

- 100 percent verification that every piece of material delivered is correct for the job. Roughly 20 percent of CD losses involve the removal and replacement of incorrect materials.
- Over-inspect early work to make sure crews are following instructions properly from the outset, with large numbers of photographs taken to document.
- The contractor's and owner's representatives should do weekly quality tours to identify any non-conforming work.
- The pre-closure inspection should include the taking of additional photographs to document that work was completed properly and up to the design specifications.

The ultimate goal of any quality management program is the execution of a building project completed on time, on budget and with zero punch list construction defects upon completion. An impossible goal? Not at all. It can and has been done by contractors with serious commitments to the maintenance of and adherence to formal quality management programs.

The challenge for project owners is to investigate, choose and partner exclusively with general contractors that have demonstrated their commitment to such programs. Such a search process can make the difference between a project delivered on time, on budget and ready for business versus a costly remediation process that can result in months of lost production time and millions of dollars in additional expense.

Most common construction defects reported:

- Building envelope and structure
 - Door, window and exterior wall deficiencies
 - Roof leaks
 - Damp proofing and waterproofing deficiencies
 - Deck and balcony deficiencies
 - Foundation movement
- Infrastructure
 - Drainage deficiencies
 - Road and driveway deficiencies
 - Electrical and high ventilation air conditioning deficiencies — condensation
 - Plumbing and other leaks to internal systems — “wet walls”
 - Sound, vibration, odor, vapor transmission and code compliance deficiencies
- Approximately 75 percent of CDs involve water in some way.

Keys to improving quality

As the project owner-manager, the following points should be communicated to your contractor before and throughout the construction process:

- The contractor should develop a thorough knowledge of your needs and expectations as the customer.
- The contractor must improve processes that define, produce and support your products.
- Processes, not people, are the problem.
- Gain control over processes by working with employees and managers to identify and eliminate process problems.
- Review process performance and make adjustments.
- Make every employee responsible for quality.
- Provide training resources, e.g., Risk Engineering.
- Measure and review process performance (metrics).

Quality management lessons learned

Keys to successful project delivery include:

- Using an effective photo documentation process before areas are closed-in or covered-up will assist in litigation — “prove your innocence, not defend your guilt.”
- Third-party inspection firms can and should be used to identify deficient areas of construction.
- Hire the best inspection company, not just the lowest price.
- Flood test a representative sample of windows/door assemblies to determine the quality of installations — 2.5 percent to 10 percent sample size is becoming an industry standard.
- Having an effective warranty call-back process in place that quickly addresses post-completion, owner-customer service issues will reduce litigation.
- Have an effective document retrieval system for the time period of the statute of repose or other international legal time requirement where the work was completed.
- Document corrective actions made either prior to or after construction completion.
- Document “as-built” construction conditions — maintain accurate record drawings.
- Select subcontractors based on past quality performance, not just price.
- Make sure your contractor provides adequate supervision of subcontractors’ installed work.
- Hire the following consultants if the contractor does not:
 - Design peer review consultant
 - Waterproofing/roofing consultant
 - Sound and vibration consultant

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