



Quality & Safety

# Cover Your A\$\$

Real Time Quality Assurance at  
the Job Site

PROCORE



ConstructionOS

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## When it comes to construction, there's getting the job done...and there's getting the job done right.

As with most systems, this involves a series of quality and safety checks. During project build-out, one of the most important checks is the completion of regular inspections.

For as long as there have been building codes and standards, inspections have been an important part of the construction process. As a result, inspection routines are a familiar, and somewhat entrenched, part of any project's workflow. In recent years, however, technological changes and market regulations have brought construction quality and safety issues into the spotlight.

With the ever-present problem of construction risk, having the ability to leverage new digital technologies to improve inspections is a boon for companies.

New software tools are making work more efficient and saving companies millions of dollars.





# I. Formalized Quality Management

Part of early-stage project planning (and related project management goal-setting) is the establishment of a project-specific quality assurance and quality control (QA/QC) plan or quality management plan. Quality assurance (QA) plans focus on laying groundwork and articulating the processes that will lead to the best results. Quality control (QC) is a set of activities that determine whether the results of work performed meet the criteria that were outlined in the QA plan, which means QC relies heavily on inspections.

**TYPICALLY, FORMALIZED QC PROCESSES INVOLVE SITE SUPERVISION AND A RIGOROUS HELD INSPECTION SCHEDULE.**

Audits, using metrics that have been established early in the project's front-end planning, are used to aggressively benchmark quality throughout construction. Existing QC systems established by large national and international organizations often serve as models for construction firms to base their own QC systems upon.

Two popular systems are the phases of control developed by the U.S. Army Corps of Engineers (USACE) and the ISO (International Organization for Standardization) 9000 Standards.



## USACE PHASES OF CONTROL

The three phases of control developed by the USACE form the basis of the Corps' Construction Quality Management Systems for all military-related QC and represent good 'checkpoints' for any project. They include:



### **Phase 1** Preparatory Phase.

This phase is performed prior to beginning work on each definable feature of work. The project team reviews existing site conditions as well as applicable work procedures, safety hazards, equipment, and materials.



### **Phase 2** Initial Phase.

This phase is accomplished at the beginning of a definable work feature and verifies that control for the work developed in the Preparatory Phase is implemented. The project team should check preliminary work to confirm that workmanship meets expectations and resolve any differences and all work should be in compliance with the safety plan.



### **Phase 3** Follow-up Phase.

This phase consists of regular—often daily—monitoring of construction to assure compliance with contract requirements through completion of a definable feature of work. Records of quality checks should be documented, and any deficiencies should be corrected prior to beginning the next feature of work.

## ISO 9000 STANDARDS

ISO, the world's largest developer of voluntary international standards, created the ISO, the world's largest developer of voluntary international standards, created the widely used ISO 9000 family of quality management standards. The 9000 series is based upon eight quality management principles:

- 1 Customer focus
- 2 Leadership
- 3 Involvement of people
- 4 Process approach
- 5 System approach to management
- 6 Continual improvement
- 7 Factual approach to decision making
- 8 Mutually beneficial supplier relationships

Foundational documents within the ISO 9000 series include ISO 9001:2008, which sets forth the requirements for a quality management system, and ISO 9000:2005, which introduces basic quality management concepts and language.

Aligning your company's QC efforts with these proven methods gives your company credibility with owners, who are increasingly differentiating contractors based upon QC operations in the field.



## II. Inspections: The Never-Ending Paper Trail

Like many construction practices, it may seem as though inspections are such an established part of the process that making changes won't result in significant cant added value. But the changes coming to the field aren't peripheral. In addition to changing work habits, they improve outcomes.

Traditionally, inspection forms are completed using pen and paper. Pages are signed and dated by the inspector, catalogued in binders, and then shelved for reference. When you're on the job site performing an inspection, all of the "moving parts" make sense: with form in hand, you work your way through the checklist, making notes and taking photos to document and support your findings. All of those notes and photos are logically linked together to form a cohesive whole. But with an end product that involves hundreds of individual paper items, that cohesion falls apart.

On large projects, the scale and number of details involved in construction inspections are overwhelming. Consider the following:

- Building inspectors must examine a variety of construction details and assess them for compliance with local and national building codes, zoning laws, and contract specifications.
- Commercial construction inspections must be undertaken for all building systems (foundation work, framing, mechanical systems, roofing, plumbing, electrical, etc.) and performed at multiple stages of building completion.
- Quality control efforts also address owner requirements and material manufacturer recommendations.
- Inspector responsibilities can range from materials and soil testing to regional issues of concern (such as seismic activity in California or wind loads in the hurricane-prone states of the southeast).

The inspection process, then, is a labor- and knowledge-intensive one. The complexity of the situation can make it challenging for stakeholders within the hierarchy, including owners, to get insight into a project.



# III. What Happens When You Don't Cover Your Ass: The Harmon Tower Story

It's no secret that improving job site QC makes a construction firm more marketable. Small companies are increasingly educating themselves on the importance of QA/QC and adopting relevant work flows. Larger firms now sometimes employ several dedicated QA/ QC personnel. But high-profile problems stemming from inspection errors highlight just how important these job site routines really are.

Consider the highly publicized events surrounding the Harmon Tower, originally planned as part of CityCenter in Las Vegas. A QA firm was pulled into litigation for problems it attributed, according to the Las Vegas Review-Journal, to “breakdowns in communications.” Furthermore, the article reports that “faulty work was not properly inspected and that documentation of special inspections [was] materially incorrect.”

#### **FAULTY QC LEADS TO A \$400 MILLION LOSS.**

Inspection paperwork for the Harmon Tower was kept in binders, and out of the hundreds of pages of material examined before the hearing, 62 daily reports led by the QA inspectors were determined to inaccurately state that “reinforcement work was completed properly and matched the construction plans led with the county,” according to the same Review-Journal article. As it turned out, unreported quality issues existed with the reinforcing steel and, as a result, the Harmon Tower is now in the process of being demolished.

A robust digital inspection tool could have helped project stakeholders identify improperly installed rebar in the Harmon Tower. The transparency afforded by an electronic system (in the form of missing and/or conflicting documents and attachments), would have alerted members of the project management team to the omissions and human errors that eventually resulted in a court case involving more than \$400 million in construction defect damage claims.





## **IV. Reviving Inspections from the Dead**

With so many forms of documentation, management of inspection forms is much more organized and efficient when accomplished with technology in lieu of paper forms and binders. Sets of paper documents are difficult to store and locate, and lack flexibility and standardization across multiple projects. Contractors often mistakenly use outdated forms, causing insufficient documentation.

While software solutions are commonly used to streamline inspection documentation management, until recently, it was difficult to have digitized forms in the location where they were most needed: on the job site. The first wave of computerized job site data capture for construction project management involved uploading files onto a server once they were brought back to the office.

But cloud and mobile technology make it easy to quickly fill out, save, and distribute forms on mobile devices. The forms are always accessible and available to all team members. Superior software platforms also allow documents to be associated with other supporting documentation such as photographs and specs. Prior to this ability to correlate documentation electronically, supporting documentation tended to get separated from the project inspection forms, creating an incomplete or inaccurate portrayal of the inspection.

When it comes to inspections, photographic evidence of as-built work is invaluable. Having all photographs present, organized, and linked to the drawing set at the end of a project greatly streamlines commissioning and closeout.

**Using a common cloud-based platform for all forms, data, and work procedures also makes it easier to have standardization across not only the project at hand, but all projects henceforth.**





## V. The Future of Inspections

With cloud-based technology platforms, the inspection process has become organized, standardized, efficient, and most importantly, a living, breathing document. It's no longer a paper trail with no beginning or end that has become extinct, but an ever-growing, dynamic system of real time documentation.

With cloud-based inspection technology, construction teams can:

- Create standardized inspection checklist templates to use across projects  
Generate and fill out inspection forms with mobile devices
- Take photographs and link them to inspection items
- Add comments and attach files to an item
- Perform safety audits
- Identify “conforming” and “deficient” items
- Work offline on your mobile device and have your data sync automatically when reconnected



### A SIMPLE RESOLUTION.

Digitally-stored inspections offer a central repository for project information. Having quick access to inspection information improves your firm's security and mitigates risk by creating a more inclusive and complete record. All information is exportable, making it easy to create PDF files or other document formats as needed.

Late-stage work is expedited if the documentation from earlier stage tasks is accessible. For example, when it is time for a building inspector to sign off at the end of a project, it is helpful to have ready proof that the construction management team has obtained all necessary fire inspections, utility inspections, etc.

Mobile, cloud-based tools that are easy to use simplify day-to-day tasks while providing insights into project quality and safety trends. All this, combined with other aspects of your project management platform, such as financials and scheduling, makes Procore the holistic, beginning-to-end solution.

**Having consistency and continuity in the audit process from day one leads to a project resolution that is simpler and more thorough than ever before.**



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