



Construction Insights

North America Construction | Risk Engineering

The ins and outs of project specific quality plans

Is your company ready to lead the way toward the next big market differentiator in construction?

A decade or so ago, the industry recognized that a sub-par safety culture was resulting in far too many unnecessary injuries and deaths. The response was an industry-wide paradigm shift in safety culture and standards, resulting in best-in-class safety programs that have proven effective in the years since, and any contractor who didn't upgrade their safety practices to meet the standard was left behind. Given this proof that a large-scale collective culture shift is possible, it's conceivable that quality could be the next initiative to raise the bar in the construction industry. Is your company ready to lead the way toward the next big market differentiator in construction?

A contractor's quality-related responsibilities are to meet or exceed contractual and regulatory requirements, as defined by the specifications and manufacturers installations process. The expectation is to deliver a finished product that is free from deficiencies, free from claims and ultimately free from customer dissatisfaction. These expectations are tall orders especially in an industry where the only constant is change. Variations between projects are almost beyond measure. Labor force, skillsets, materials, management, climate, time constraints, cutting edge design elements, codes, and jurisdictions are just a few areas in which one can expect a multitude of expected variations. Consideration of these challenges coupled with the fact that contractors are held beyond the "standard of care" normally afforded to industry

professionals such as doctors, engineers, and design professionals; contractors must embrace quality management techniques to identify potential issues and conflicts and devise mechanisms for remedy throughout the project. All this must occur while balancing the interests of the architect, owner and contractor with aesthetics, functionality and constructability!

A strong Corporate Quality Management program establishes a framework of expectations for the practices to be implemented across the company. Staying true to Dr. Edward Deming's (Deming, W.E 1986, Out of the Crisis) philosophy, quality should be managed from the top down but the real strength of the program comes from the bottom up. Successful implementation and consistent application of the policies and procedures defined by management begins with communication of expectations and continues via feedback from the field. While management sets the overall tone and direction, field personnel are considered the first line of defense; therefore, they should be empowered to execute the plan and halt production if and when the product is non-conforming. In the field, a Project Specific Quality Plan (PSQP) is the mechanism for ensuring that project-specific quality risks have been identified and the team has committed to implementing best practices for effectively managing them.

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Why have a project-specific quality plan?

A PSQP is an opportunity for the project team to thoughtfully consider and plan how to apply quality best practices specifically for that project, with all of its unique features and requirements. An effective PSQP provides a focused review of the project, identifies key quality risks, and addresses these risks by establishing a proactive management plan supported by measureable implementation controls. Quality activities should span from preconstruction through to the warranty period and include a combination of: Design reviews; Water intrusion/building weatherization protocol; Pre-operation planning/meetings; Mockups/Benchmarks; Material procurement and First Delivery inspections; Ongoing documented inspections/testing; Non-compliance tracking/closeout; Punchlist/Commissioning/Turnover procedures; and Warranty management plans.

The PSQP is not the simple regurgitation of the corporate quality manual. While the corporate quality manual can be used as a guide, it is often times too general in nature to be considered as a sufficient document to identify specific risk.

Key items to include in your PSQP

The PSQP should compile specific owner's requirements, regulatory requirements, the contractor's corporate quality standards, and any other relevant requirements and/or standards considered to be of elevated risk into one simple to use document. The PSQP should address quality activities in the preconstruction, construction and post-construction phases of the project and include Definable Features of Work specific to this project. It should outline the requirements, process for achieving conformance and mechanisms for documenting same.

Following are core areas that should be addressed in a PSQP:

Preconstruction Considerations, design reviews, and constructability reviews

In general, the preconstruction phase is the time to set goals and expectations for how the construction will be executed, which includes how quality will be managed during execution. Design and constructability reviews are essential to the early conflict identification and resolution. Building Information Modelling (BIM) has been an invaluable asset to this effort, as it is much easier to identify conflicts and make changes to the drawings in virtual space rather than in the field. The PSQP should outline the expectations of BIM use on the project.

To ensure all areas are covered and all parties are "bought in", preconstruction, design reviews and constructability reviews should include key trade partners, the project team, any quality consultants, and safety professionals. These reviews serve as the perfect opportunity to dissect the project for constructability issues and elevated risks.

Quality activities (such as mockups and inspections) should be included in the project schedule, both to ensure adequate timing and sequencing of the activities, but also to emphasize the importance of quality-related activities in the overall production sequence. Quality considerations in the preconstruction phase should include: design and constructability reviews; identification of long-lead materials; logistics and phasing; identifying high-risk trades (e.g. wood-framing); developing quality training/orientations for subs; identifying safety concerns, etc.

Submittal/RFI Process

Submittals and RFIs ensure that the proper means, methods, and materials are used on the project. Outlining a defined workflow for transmission and approval/feedback of submittals and RFI's, along with a visible and clear mode

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of communication for all involved parties, ensures that the drawings become the reality. This should be outlined in the PSQP and should be consistent with the document controls for the entire project.

Water Intrusion Prevention

Water can enter a building from one of three places: precipitation, groundwater, or building systems and is among the most common causes of construction defect claims. An effective PSQP will address how to manage water intrusion issues for the specific features of work on this project, such as the envelope system, staging processes, building systems, etc.

This may include sequencing protocols (e.g. not installing porous interior materials such as drywall prior to full building enclosure), temporary roofs/dry-in, mitigation protocols should intrusion occur (e.g. “when in doubt, cut it out”), and/or preventative measures (e.g. tenting in the event of an imminent storm prior to permanent building enclosure). The Water Intrusion Prevention Plan needs to be specifically coordinated with the project schedule.

Coordination of key trades

The best laid quality practices can easily be rendered ineffective if the trades and inspections are inadequately sequenced. A good PSQP will identify key trade coordination meetings that must take place prior to the commencement of coordinated definable features of work. It is important to schedule quality inspections in a manner that does not impede production, but ensures the standards of quality are met before the covering contractor “hides” the work. This is specifically crucial in trades such as rebar, framing, MEPS, and building envelope where rework can be especially costly. As previously mentioned, this is best facilitated by including quality activities (with durations) in the project schedule.

Quality Activities Should Include:

- Design Reviews
- Water Intrusion/Building Weatherization Protocol
- Pre-operation Planning Meetings
- Mockups/Benchmarks
- Material Procurement
- First Delivery Inspections
- Ongoing Documented Inspections/Testing
- Non-compliance Tracking
- Punchlist/Commissioning/Turnover Procedures
- Warranty Management Plan

Mockups and benchmark (“first-work”) inspections

The PSQP should delineate which trades and/or building systems require or necessitate mockups to ensure the quality standards are met. It is important to recognize complex building elements that are not contractually obligated to be mocked-up, but would be best served to do so. Many top contractors perform additional quality mock-ups out of prudence rather than requirement. The PSQP should specifically distinguish aesthetic mockups from functional mockups, and require “first-work”

inspections for systemic assemblies such as windows, framing, etc. Assembly and sign-off of the mockup and “first-work” should also be included in the project schedule as a required predecessor to the trade activity.

Pre-planning and pre-installation meetings

The PSQP should delineate which trades and activities require pre-planning meetings, when these meetings are to be held, and who specifically is required to be in attendance from the trade contractor’s team. Engaging the appropriate level of staff on the sub’s team (e.g. requiring the foreman and the project manager) can make all the difference in how quality is adhered to in the field.

Material verification

An effective PSQP will delineate the procedure for verifying on-site and stored materials against the drawings and submittals and the specific persons responsible for doing so. This will likely involve a checklist to be executed upon all major deliveries, and a process should be in place to monitor throughout construction. Sign-off and verification of material compliance should be a requirement for approval of the subcontractor’s payment application.

Inspections (contractor, trade partner and third-party)

Inspections are the primary mechanism to document and verify that the contractor is fulfilling their contractual and regulatory responsibilities, meeting the performance expectations, and delivering a quality product. The PSQP should outline the performance expectations such as drywall texture, paint coatings, etc. per the contract in order to establish the standard of care to which the inspections will be assessed.

Inspections should occur in three phases: installation preparation, first-work, and follow-up and should be performed by the contractor, trade partner and any required or necessary third-party

inspectors. The contractor is ultimately responsible for the collection, validation and use of these inspections to either document acceptable conditions or develop remedies to any identified conflicts or issues. The PSQP should define the standards and frequency for these inspections and provide forms for documentation of both correct work, and non-conformances with the associated remedy, preferably sorted by trade or CSI code.

Non-conformance management

The PSQP should outline the procedure for maintaining a comprehensive non-conformance list tied to the items identified in the various inspections and ad-hoc job walks. This list would be organized by responsible trade contractor, with a defined due date for remedy, and checkbox for completion. Comments should be clear and candid as this document will serve as both a working document and a record. A picture is worth a thousand words: photographs can be an invaluable resource to document both conforming and non-conforming work. An interactive CAD model or other software that provides this capability (e.g. BlueBeam, Procore, BIM 360, etc.) can be a useful mechanism for both managing and documenting these issues. These records should be retained amongst project files, ideally on the project website or other electronic format that is visible and retrievable for future reference.

Close-out: punchlist, commissioning/turnover, and warranty practices

A completion checklist should be included in the PSQP, outlining the punchlist process, commissioning/turnover practices (as applicable) and warranty procedures for this particular project.

Implementing your PSQP

Quality is best verified through oversight NOT associated with the production of the project. Superintendents, Project Managers and Project Engineers are primarily (and duly) focused on production, which can sometimes lead to quality taking a backseat in the hustle and bustle of the everyday construction in the field. Having dedicated quality management staff who report up through a corporate quality team (rather than operations) is a best practice for implementation of a consistent and meaningful quality program, both at the corporate and project-specific levels. Although your trade partners are responsible for their work-in-place, you as the contractor are responsible for managing each of their work and the coordination between trades.

Among many priorities being managed in a construction business, it is often the areas that are visibly managed that receive the focus of the project team. It is therefore suggested that specific checkpoints and/or metrics be established to promote effectiveness of the PSQP. Some common measures include:

- An “off project” Executive and/or Quality Manager review/ approval of the PSQP prior to the start of construction.
- Visible means of managing conformance of implementation (i.e. that the planned activities are taking place as scheduled) and quality of implementation (i.e. the practices are capturing issues before critical).
- Use of the data: What are observations telling you about effectiveness of implementation? How can it be used to drive continuous improvement on the project?

Strong quality practices positively influence many areas of a contractor’s success, as well as prevent and mitigate losses. Consistently producing a quality product is a core value of the industry’s top contractors and one that takes a concerted effort to deliver. Project Specific Quality Plans provide a roadmap for this process and accountability measures for its effectiveness, ensuring that you deliver the quality product to which you’ve committed.

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