

# ASSESSING IMPACT OF ORGANIZATIONAL CHANGE FOR A SYSTEMS APPROACH TO QUALITY

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## ABSTRACT

This paper explains what leaders of a change initiative for a new systems approach to Quality did and how they assessed the impact of their work within a large US construction management and general contracting company. All three of the authors were engaged directly or indirectly in the initiative. The research question is to understand what the organizational change agents did to measure the impact of the work contemporaneously and overall. The ideas of three well-known organizational change thought leaders influenced the work of these agents. This paper describes the iterative development of the change initiative over seven years and how leaders used data in combination with participant feedback to assess the impact of the work. Key findings are: the systems approach to Quality was applicable in all five of the organization's core markets, and one-third of all projects by revenue in the five years of data studied attempted to implement the approach.

## KEYWORDS

Organizational change, quality, capability, data, impact.

## INTRODUCTION

A keyword search of IGLC papers using the keyword "organizational change" finds five, all of which focus on Lean industry transformation. Others are case studies of specific project implementations. This paper follows another published by the IGLC describing the efforts to rethink and implement a new approach to Quality within a large United States (US) Construction Management/General Contractor (CM/GC) organization, characterized as behavior-based (Spencley et al. 2018). This paper focuses on the work and impact of the organizational change efforts to implement that approach, now viewed as a systems approach to Quality (SAQ), from its beginning in 2013 through 2020. The research question is to measure the implementation of this new approach to meeting Quality expectations on the company's projects.

The authors each engaged with the SAQ implementation in one way or another. The first author directly supported the Quality Director and organized dedicated Quality resources and project Quality champions to support project implementations. The second

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author is an Operations Data Business Analyst who uses organizational views of standard work process data to assess and describe organizational behavior and identify organization workflow opportunities for improvement. The third author was a principal advocate and educator for Lean Construction and Integrated Project Delivery.

This paper is limited because it relies on subjective assessments recorded by the first author in notes of meetings and conversations with implementors and presentations made by them. This approach is novel for the industry and the CM/GC, with new language to initiate a change in thinking and behaviors by project sponsors, designers, fabricators and suppliers, construction project managers, and trades-people. The Quality Leadership Team (QLT), those leading the change initiative, and managers have found it challenging to measure project teams' impact and efforts. Although this research incorporates quantitative measurements, the endeavor has only begun using available data not captured for this purpose. This paper's contribution to theory is the design and use of a measurement system using qualitative and quantitative data to understand the implementation maturity of a new systems approach for improving the Quality of built products.

Initially, the QLT based the SAQ launch and implementation on the CM/GC's core values of Integrity, Ever Forward, Uniqueness, and Enjoyment in the pursuit of a Mission, "To build great things" (DPR Construction 2016). The Quality process development team also relied on the Rogers curve for the diffusion of innovations (Rogers 2003). And like many people in the organization, the writings of Jim Collins (Collins 2001) heavily influenced the QLT. Simon Sinek's admonition to first answer the question of, "Why?" rang true to their experience and shaped their work (Sinek 2011). Although the Quality Director and the first author drew respectively on their experiences as Safety Director and Quality Manager, neither had studied W. Edwards Deming, Joseph Juran, or Toyota.

## **CAPABILITY-BUILDING**

### **INITIATING PROJECT IMPLEMENTATION**

Just as this CM/GC recognized their need to approach Quality differently, they entered a multi-billion-dollar joint venture (JV) project, their largest project ever. The Quality Director began testing and integrating this approach to Quality as the project execution strategy. Many conversations with internal and external stakeholder leaders described this Quality vision of creating forums to understand each other's expectations and intentions to identify Distinguishing Features of Work (DFOW) and align on Measurable Acceptance Criteria (MAC) to achieve no surprises (Spencley et al. 2018).

Initially, there was resistance to this type of engagement from many stakeholders. This new way of engaging was different in an industry with long-standing, siloed patterns of common and accepted interactions among fundamental stakeholders: owner, designer, general contractor, and trade partners. To help the team engage differently and execute this shift in behavior, the JV team asked for more tools. The Quality team produced additional tools: a simple checklist of the actions needed before releasing work for bidding, mock-ups, fabrication, and installation; a simple template for documenting conversations about DFOW expectations transparently; workflows for developing MAC; and visual control to track each bid package. Because the Quality team developed these tools and managed the tracking, the cluster teams saw this as additional work, not "the work" to ensure predictable outcomes.

At the same time, the Quality team worked to establish gates in the project workflow, at key hand-offs, when a team member released work to the next phase. These gates prompted stakeholders to have these conversations, identify DFOW, and document their agreements before moving on to the next stage of work. For example, bid packages were not released without an exhibit to determine the initial list of DFOW described by the owner, designer, and CM/GC. This Exhibit forced prompted Project Managers to initiate and document the conversations and provide this information to potential trade partners, also asking for their feedback and plan. What other DFOW did the trade partner see? What was their preliminary plan to achieve this initial list of DFOW?

Just as the benefits of this process were starting to show and this new engagement became routine, the owner dismissed the JV, which dissolved. The pilot project's successes and challenges helped grow the knowledge base and understanding for the leaders who would focus on integrating this approach into the company's DNA. Some of their main takeaways were: focus on building a Quality culture from the beginning; it is never too early to start these conversations; new behaviors take time; putting gates in the system will prompt the team to practice essential behaviors; build upon previous successes.

### **THE QUALITY DIRECTOR'S PHILOSOPHY OF CHANGE**

Following the Mega Project JV pilot, a small Quality Leadership Team (QLT) was formed with three functional leaders from the Risk, Safety, and Quality workgroups who began work to promote the new Quality approach within the company. The time spent planning this change management strategy appeared minimal and informal as the leaders attempted to change the organization. It was not a carefully planned and orchestrated process. Quite the opposite, the Quality Director (QD) had a lot of experience with organizational culture within the company, joining the company within first few years of its founding to leading its safety initiative to build an Injury-Free Environment culture. He believed that engaging those doing the work in the process is more successful, and organic and holistic implementation with simple systems and processes leads to sustainable change because it supports the necessary behavioral change. The QD would often describe the organization as a spider web with strong, flexible connections with which the group could maneuver. He repeatedly cautioned that when someone pushed on one strand of the web, it had unforeseen impacts in other areas.

### **STEPS BEGIN TO TRANSFORM THE CM/GC CULTURE OF QUALITY**

During 2016, *Start with Why* by Simon Sinek (2011) was also a focus at leadership meetings. The QLT spent considerable time refining the message: "Why, How, and What." The leaders consistently engaged with operations leaders and project teams to gain insight and feedback while curating a standard communication flow to support, align, and develop organizational thinking around the initiative. Those innovators formed the organization's change management effort. The "Why" focused on achieving the CM/GC's Purpose of, "We exist to build great things<sup>®</sup>" (DPR Construction 2016).

The "How" was a simple framework or mental model to apply to any situation: 1, How am I building from the collective knowledge and information of the project team, the organization, and the industry to identify DFOW, risks, and key hand-offs? 2, How do I understand intentions and DFOW expectations for the project and the processes needed to deliver the work? How am I being understood? 3, How are we aligning and

documenting MAC? 4, How am I executing and evaluating work? 5, What did I learn? How can I share and apply that learning?

The “What” was defined by the objective of zero defects and rework. The messaging focused on evoking what Project Executives, Superintendents, Project Managers, and Project Engineers experience: the frustrations, the disappointments, the feelings of being overwhelmed, wondering what was possible, and navigating through these things. It highlighted that this typically requires only a shift in behavior, not a complete transformation. Quality coaches and CM/GC operations leaders needed to speak up if they had reasons why any project team could not integrate this into their work. The Quality mindset appeared to be a shift in individual and organizational understanding, language, and behaviors to solve a systemic problem in the industry that this company faced (Spencley et al. 2018).

Concurrently, the group worked on a simple 1-page Quality Implementation Plan (QIP) to support project teams’ experience of “freedom within a framework,” as the QLT described it. Following standard organization workgroup collaborations with Preconstruction Managers, Design Integration Managers, and Operations Leaders, the QIP template published in the 4th quarter of 2016 was 5 pages long. This plan clarified the organization’s Quality objective: “Being so skilled at understanding and aligning expectations through measurable acceptance criteria that our projects experience zero rework” (DPR Construction QLT, unpublished report, 2016).

## **REFINING THE MESSAGE**

In 2017 the QLT introduced the “Point of Release” (POR) language, which a client representative had coined to identify the point when teams release work for prefabrication or purchase (Digby Christian 2012). POR served as a universal point in the process for understanding Quality expectations. This concept helped teams focus on the dimension of time as it intersects with the flow of information.

The QLT embedded this message into the organization’s Design Management Academy (DMA) launch, an organization initiative to grow internal capabilities. This capability growth integrated construction needs into the design process and described actions to frame and focus Quality work during the pre-construction phase of work. The DMA framework was supportive of the effort for a couple of critical reasons: it developed understanding of the importance to begin these conversations at the start of the project and continue during design to prevent rework; and it connected the QLT to other leaders early in the project lifecycle to better understand and strategize how we engage and interact with project stakeholders.

## **CONSISTENCY**

Throughout the first couple of years, the change work was the same: share the vision at all opportunities, find influencers who inspired and aligned their teams, coach teams that needed help, and use project team feedback to guide and inform the initiative. The QLT shared the vision across multiple forums: company-wide network meetings and summits, the 3-day cultural immersion for new hires, local Business Unit (BU) workgroup messaging, and regular open Quality-focused online meetings featuring project teams. In addition, the QLT was consistently meeting with workgroup leaders and project teams as part of their everyday work.

The QLT focused on recruiting those who were inspired and saw value in embracing this new approach. These innovators and early adopters took the vision into daily

operations. As Spencley et al. (2018) described, there were various levels of understanding, integration, and application into the CM/GC's project management methods. Some took the concepts and identified key DFW within specific scopes of work while others focused on architectural feature locations. Some were able to implement this across all project scopes of work. Others internalized the behaviors and recognized this mindset applies to any deliverable and process and developed a "Quality mindset." This approach consistently produced more predictable results. (Spencley et al. 2018).

### **CREATING A SUPPORT SYSTEM FOR PROJECT IMPLEMENTORS**

The weekly online Monday Quality Call began in 2015 and continues to support project implementations. Project teams would relate how they operationalized the shift in behaviors for their project's DFW and Risk. They would describe the successes and the challenges they were having. They would always be celebrated and challenged to think differently. This forum remains a safe place for practitioners to reflect on what they have done and how we could continue to honor the company's Ever Forward core value. The QLT shared these Quality implementation stories through company communications, setting vivid expectations for the company while inspiring and recruiting others. A key takeaway is implementing the feedback loop: always getting input and hearing the message from those doing the work was critical for understanding adoption and integration of SAQ.

Those that shared on these calls became members of the informal Quality network (QN), the group of practitioners who had implemented SAQ and leaders who were proponents of SAQ. The practitioners became resources and coaches for other projects. In the beginning, the coaching model focused on project kick-off meetings and then workshops with experienced implementors in which they shared their strategy, experiences, opportunities to improve and answered approach and scenario-based questions.

In 2018 the QLT organized a Quality summit for selected project implementors, dedicated BU Quality resources, and other corporate services leaders. While this group wanted a clear roadmap of milestones for execution, what emerged was more discussion on what Quality looked like through the project lifecycle. Different perspectives arose, and practitioners and dedicated Quality resources recognized the need to go back and engage the leaders in their Business Units.

### **COMMUNICATING EXPECTATIONS**

The QLT continued to communicate the Quality vision and its expectations at company-wide meetings and discussions with leaders throughout the company. And internal workgroup adoption became a focus with pre-construction tools integrating DFW language. The CM/GC's Risk Network group, which looks at project and business unit risk, reinforced the Quality expectations that teams needed to identify DFW and develop a plan for understanding and aligning measurable expectations. The Contractor-Controlled Insurance Program (CCIP), Corporate Risk Assessments (CRA), and Business Unit Risk Assessments (BURA) all continued to communicate these Quality expectations, and coached teams along the way. Before the CRA, the most senior risk leader would coach the Project Executive on why formalizing the conversation with the stakeholders through the DFW process was necessary. Similar messages during these process

workshops would facilitate connecting project team members with other resources for further coaching.

## **TRANSITION AND EXPANDING THE QUALITY TEAM**

2019 and 2020 marked a time of change for the Quality Initiative. By 2019 the company had experienced tremendous revenue growth, and some of the leadership team transitioned to other roles. The 3-day cultural immersion, a forum to educate and recruit people passionate about the vision and mission, paused in 2019. The QLT piloted an online Quality education program, and this 1-hour per week, 4-week class launched in 2020 in some BUs.

The weekly online Monday Quality Calls became one of the main feedback loops for the group. In 2015 these had the same 5-12 people join regularly. In 2020, 296 different participants attended to listen to stories and ask questions. Many teams had moved beyond sharing how they managed a DFOW list and began describing how the concepts applied to and integrated into how they approached their work. This call engaged all different roles across the company: Regional Leaders, Business Unit Leaders, Corporate Service Leaders, Project Executives, Superintendents, Project Managers, and Project Engineers. As another feedback loop, the organization assigned new members to a parallel support group, increasing Quality focused resources substantially. These leaders worked on providing input into the company's Quality strategy direction.

Throughout these years, the Quality Director challenged the group to measure the results and the initiative's penetration through the organization. In response, the first and second authors began exploring ways to measure the adoption and penetration of these concepts into the organization.

## **ASSESSING CULTURAL CHANGE**

### **MEASURING ORGANIZATIONAL CHANGE**

To understand company-wide implementation, the authors considered ways of assessing organizational adoption. With many incremental iterations along the way, the authors had several different feedback loops: 1, first-hand experience implementing SAQ and coaching project teams; 2, accounts from project teams about their experiences on Monday Quality Calls, accounts from other dedicated Quality resources working with the leaders and project teams; accounts from other leaders within the organization; and 3, through the company data collected about project team performance.

The evidence of implementation seemed rooted in the project team documenting conversations about what was essential to project stakeholders in structured and standard ways to support SAQ implementation. Identifying and documenting DFOW and MAC are key deliverables within SAQ. The first and second author decided to perform keyword searches for the terms "Distinguishing Feature of Work" and "DFOW" in the digital project file repository. Evidence of these documents showed exposure and implementation of SAQ. This methodology collected links to the evidence files to build an organizational knowledge base and identified the quantity of DFOW files generated for each project to explore levels of implementation.

### **FINDINGS FROM QUALITATIVE NETWORKING**

Some influential findings reported through the people participating in the QN include:

- The CRA Manager reported from his sources, at the beginning of 2016, no projects had identified DFOWs before the CRA. By 2018, 30% recognized DFOWs, and by 2020 only a small percentage of teams had not heard about the DFOW process.
- Educating project teams takes many forms, and the impact of project size may influence the data analysis. Onboarding smaller projects may not produce as many files. And as teams learn this new process, efficiency in documentation may occur resulting in fewer files.

### FINDINGS FROM MINING PROJECT TEAM DATA

In Table 1 below, the column “Year Project Mobilized” represents an annualized view of the CM/GC projects by the year that the project mobilized, a POR for onsite preparatory construction activities to commence. The associated DFOW project files are assigned to the year that the project mobilized, using an annualized view of project data. The column “Count of Projects with DFOW Files” shows a unique project count to identify how many projects teams initiated the Quality approach. The column “DFOW Projects Revenue as Percent of Annual Sales” shows the contract value of the projects that generated DFOW Files as a Percentage of Annual Sales for the year. The next column “Count of DFOW Files” is the number of DFOW files in the digital repository that had mobilized that year. DFOW Files as a Percent of DFOW Files Total represents the spread of the DFOW file counts over the respective years.

The tables below use an annualized project view based on the year the project mobilized to compare them to the sales in the same year. Annualizing project data helps simplify and standardize the analysis for contract revenues that actualize across multiple years. This annualized sales comparison assigns the project contract revenues to the year the project mobilized. Table 1 shows the organization’s number of projects with DFOW files and the quantity of those files shown by the year the project mobilized.

Table 1: Projects with and Quantity of DFOW Files by Year the Project Mobilized

Year Project Mobilized	Count of Projects with DFOW Files	DFOW Project Revenues as Percent of Annual Sales	Count of DFOW Files	DFOW Files as a Percent of DFOW Files Total
2016	3	5%	134	3%
2017	17	29%	392	9%
2018	37	31%	1081	26%
2019	66	42%	1686	41%
2020	67	55%	861	21%
<b>5 Year Total</b>	<b>190</b>	<b>34%</b>	<b>4154</b>	<b>100%</b>

Some critical findings seen in this Table 1 data are:

- A steady increase occurs over the five years for implementation as a percentage of annual sales. The QLT and QN efforts resulted in an increased participation rate of 55% of total sales revenue in the five years, after starting with a 5% participation rate in 2016.
- The decrease in the Count of DFOW files in 2020 is consistent with an observation by Quality practitioners, DFOW Files generate over the project lifecycle. The organization data shows that larger projects generate half of their DFOW files in the year of mobilization and half of the files in the year after. Due to the increase

in large projects, this finding shows that more documentation can be expected the following year.

- The decrease in the Count of DFOW Files in 2020 also may reflect impacts from COVID-19 to project lifecycles and project flow with project holds and cancels.

Table 2 below assesses the total five-year period of project revenues as a percentage of Core Market Sales data to evaluate the impact of the organizational change across the portfolio of project types that the CM/GC targets in pursuits.

Table 2: Projects with DFOW Files Sorted by Core Markets

Organization's Core Market Category	Count of Projects with DFOW Files	DFOW Project Revenues as Percent of Core Market Sales
Advanced Technology	34	33%
Commercial	42	41%
Healthcare	37	23%
Higher Education	13	35%
Life Sciences	44	42%
Other	20	24%
<b>5 Year Total</b>	<b>190</b>	<b>34%</b>

Key findings here include:

- Each Core Market in the organization has implemented this Quality approach in 23% to 41% of its sales volumes.
- This Quality approach appears to have application across all core markets, supporting the view that this approach accommodates diverse requirements.
- Target focus on Healthcare and Other Core Markets indicate knowledge gaps in Quality program awareness or specific Core Market peculiarities that result in lower participation rates than other Core Markets.
- In these five years, 34% of projects by revenue attempted to apply this Quality approach to their projects.

Table 3 below assesses the distribution across distinct geographical regions in the organization. This view highlights the variability in adoption across geography as well.

Table 3: Projects with DFOW Files Sorted by Regions

Organization's Geographical Region	Count of Projects with DFOW Files	DFOW Project Revenues as Percent of Regional Sales
Central	17	24%
Northeast	31	44%
Northwest	60	39%
Southeast	49	36%
Southwest	34	28%
<b>5 Year Total</b>	<b>190</b>	<b>34%</b>



Key findings from this Geographical view include:

- Each Region in the organization has implemented this Quality approach in 24% to 44% of its sales volumes.

## CONCLUSION

### NEW INSIGHTS

Both qualitative and quantitative feedback loops were essential to understand the diffusion of SAQ adoption. The DFOW file production counts were not initially collected to measure adoption. This raises the question of whether there may be other quantitative data sources that can be generated or mined to inform the evaluation of SAQ adoption. Also, consistently documenting routine qualitative feedback of Quality implementation accounts was essential to provide context for the quantitative data.

The organizational change efforts experienced to date align in similarities to NUMMI's journey (Shook 2011). Shook describes how NUMMI overcame their Fremont, CA plant's legacy of dysfunction to produce Quality by focusing on 1, what the worker did first instead of starting with focusing on changing what people believe 2, giving workers a means to do their jobs successfully, and 3, changing how problems were experienced as opportunities to improve rather than failures resulting from poor workmanship.

Similarly, this CM/GC's organizational change effort focused on identifying those aligned with the vision and changing the way people worked. The influencers adjusted existing processes and changed the way people interacted, creating new routines and new experiences. These new experiences changed their beliefs:

- From Quality was amorphous, managed by a software program documenting issues after work was put in place that are field operations problems;
- To Quality is how is a result of how builders collaborate with stakeholders.

Without consistent accountability for SAQ, people on projects determine the organizational change. The PORs identified by the project leaders produced the new routines and built capabilities. The templates to do work, without accountability at the project PORs, are not sufficient to create change.

Koskela, Ballard and Howell (2003) do not believe that firms should start with contracts and organization formation to incite change. Instead, the authors believe that change should begin in "the operational processes where the end product is created: design, prefabrication, and site" to learn what should be changed upstream. This CM/GC's change agents also found this to be true. The change in routines at the operational level, where work was done, created new project cultures regardless of project contract type and delivery method.

### INTUITIONS AND QUESTIONS

The quantitative data raised other questions such as, Why do some regions have better adoption in count of projects and revenue of projects than other regions? Focused research in the Central and Southwest Regions may reveal knowledge gaps in awareness or specific regional factors that result in lower participation rates than other locations.

As Shook 2003 describes, changing the way leaders and managers viewed and dealt with problems was fundamental for NUMMI providing consistent Quality results and changing the culture. On projects that implemented SAQ, How did the leaders and

managers approach problems? How did the project leader's approach to problems contribute to the development of their SAQ and their Quality results?

Leading the Quality vision and accountability for SAQ was a common theme shared by projects on the Monday Quality Calls. The authors wonder how the organization and the QLT can create experiences to encourage and grow those who want to lead these efforts on their projects, and in business units, and regions.

## **FURTHER STUDY**

The authors intend to further study Diffusion of Innovation theory and how it applies to this GC's organizational change efforts (Rogers 2003). Specifically, the authors plan to focus their efforts on understanding the social system and map change agents that influenced their projects and others. By mapping the spread of SAQ adoption, the authors hope to define the leaders' network and social networks that create organizational change to suggest replication models for more effective change.

Furthermore, the authors intend to study how the organization can refine its collection of qualitative feedback from project teams and quantitative data to better understand integration and adoption of SAQ. The authors plan to map the workflows of project implementation accounts shared on Monday Quality Calls to find trends. Also, how information is created, transformed, and transferred through the project lifecycle will be studied to understand and describe SAQ implementation more precisely and based on standard project milestones. This knowledge would allow the organization to monitor SAQ implementation and flag when expected outputs are missing. The authors plan on developing a maturity model for the project files to help further assess SAQ integration. This information would help increase the level of SAQ integration and maturity within projects and within the BUs and Region.

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