Does Your QA/QC Process Need a Fresh Look? Ours Did!

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It has become a seemingly weekly occurrence that somewhere in the world, an engineering failure has taken one or more lives and led to public distrust of engineered construction. As an industry and as professional engineers, the quality of our engineering work must be done to the best of our ability, and too often this has not been the case. I believe every professional engineer and engineering organization should ask themselves, "Does our quality assurance/quality control (QA/QC) process ensure mistakes are caught before an accident occurs?"

The Florida International University (FIU) pedestrian bridge collapse hit home with us. Although we were not involved in the project, we knew it was time to seriously review our quality control process. We did not want the "next time" to be us or a FINLEY project.

We thought we had a good QA/QC process, but we also knew that our "good" may not be good enough, and so we started a top-down/bottom-up review. This included:

- reviewing our QA/QC manual and documentation,
- reviewing how mistakes are found and the process of correcting them,
- comparing design team reviews with external reviews,
- reviewing staff training and QA/QC performance,
- reviewing training and expectations for quality and checking standards,
- assessing management and staff commitments to a FINLEY quality culture, and
- asking select clients to fill out a QC/QA survey to learn, "What are our clients' impressions of FINLEY's work product?"

From this self-investigation and internal process review, we found that, while we were successful with our QA/QC approach, we could do better. We wanted to have a culture that demands quality across the board—on all of our processes and within the whole organization.

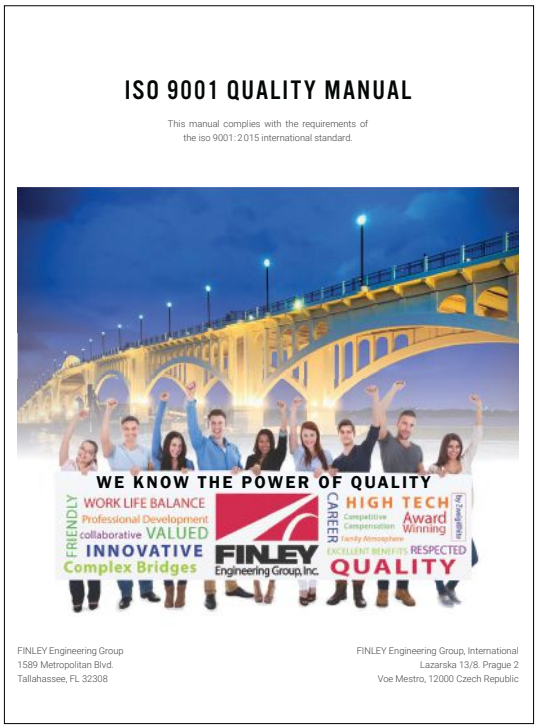
We had been using the tried-and-true industry-standard quality philosophy based on the "check print—red, green, yellow" approach; however, this relies on paper copies and colored markers. We have now moved past a typical computer-aided design and drafting technician/production workflow; our engineers produce everything in three dimensions within a bridge information modeling (BrIM) workflow. While the newer workflow increased quality by eliminating frivolous and repetitive drafting mistakes, the QA/QC process was taking an increasingly larger percentage of production time. The challenge was, how do you verify a BrIM model and ensure the programing is correct?

The foundation of our QA/QC process was outdated, and our workflow had advanced into a BrIM environment. We needed a major update to our QA/QC manual and procedures to match our digital workflow. This also led to improved training for and management of these new processes. If you are considering moving to a BrIM workflow or using automated drafting, we suggest that you put revising QA/QC processes near the top of your implementation plan. There will be more changes than you initially expect, but the improvement in efficiency and quality is huge.

The FIU bridge collapse also informed us how the world has changed and how engineering could be front-page news. Ten minutes after the collapse, we knew about it. Even though we were not involved, the media were calling our office looking for information. Then we received additional calls from others in the industry asking for our opinion and thoughts on the collapse. These inquiries came into several levels of our organization and reinforced to us that perception is reality to our clients. We felt unprepared for this new climate and needed to make some improvements.

We have had a good and effective disaster plan for such things as hurricanes, ransomware/server attacks, violence in the workplace, fire, and COVID-19, but we did not have anything planned should there be an accident on a project we were involved with. We saw this as a QA/QC risk, so we brought in a public relations expert to help us develop a plan and train our staff on how to respond to the media.

We decided to monetarily incentivize our QA/QC process, which quickly got everyone's attention and demonstrated why great quality makes for good business. We use a project incentive program, with project bonuses up to 10% of salary, on all projects with a fee over $100,000. We set metrics for quality, such as delivering an error-free design or a design requiring one revision or rework, and we require a



Cover of the FINLEY Quality Manual that was developed as part of the ISO 9001 certification process. Figure: FINLEY Engineering Group.

reference or recommendation from the client's project manager to confirm achievement of the metrics. A mistake that makes it to construction will cancel the whole project incentive for the whole team, regardless of the source of the mistake. Client feedback is a crucial part of the project incentives because what our clients have to say is very important to us. We have received some good feedback to improve our process and benchmark our performance.

We also decided that certifying to the ISO 9001[1]—the international standard that specifies requirements for a quality management system—would be another step in the right direction. We elected to pursue ISO 9001 certification because it provides a process that generates a 360-degree view of our quality program as a whole. We also needed to add client input into our program. We had already established a solid QA/QC policy and our work products are of the highest caliber, but we needed a better way to communicate that quality to our clients. More importantly, we needed a way for our clients to provide formal feedback so that we can continually improve our products and overall quality.

We worked with a third-party consultant, who provided some advice and helped fine-tune the documentation required for ISO 9001 certification. They guided us through the certification process to help ensure that our end processes are easily managed and maintained, giving us the opportunity to continually improve our internal processes and quality for our clients.

In summary, I think taking a fresh look at our QA/QC process has been very beneficial and has made our firm better. The multifaceted approach worked very well, and before the end of the first year of implementation, we had developed a quality culture that was understood and accepted by everyone on the team.

If you are considering this worthwhile endeavor, we suggest you consider these key points:

- It took several months to put everything in place, and we required the help of outside consultants.
- A "not me/not us/not now" attitude will not lead to a better product.
- We must have a strong sense of professionalism, demand a company quality culture, and realize that quality is good for business.
- The ISO 9001 program is excellent and designed for any organization in any business to achieve the highest level of a quality management system. It definitely has a place in U.S. companies and is recognized internationally as the "gold standard" of quality system certification.

Reference

1. International Organization for Standardization (ISO). 2015. *Quality Management Systems—Requirements*. ISO 9001:2015. Geneva, Switzerland: ISO. https://www.iso.org/standard/62085.html.