

Talking Quality: Best Practices for QA/QC in Construction and in Space

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In industries such as construction, there is a strong correlation between quality and end-user safety. Construction project teams leverage quality assurance/quality control (QA/QC) processes to deliver buildings and infrastructure that function as designed and pose no undue safety risk to the people who use them. Quality has a similar connection with safety in space exploration, where spacecraft, spacesuits, and other technology must enable humans to survive in the harsh conditions of outer space. The QA/QC processes in space exploration are accordingly robust.

Because of quality's connection to safety in both space exploration and construction, Hill International Regional Safety Manager Betty Wilson hosted a learning session for Hill's construction and project managers with [Off Planet Research](#) (OPR) owners Melissa Roth and Vince Roux. During the session, Melissa, Vince, and Betty discussed OPR's approach to QA/QC and its applicability to construction project management. Their conversations revealed four best practices for strengthening a QA/QC approach in project-based work.

The Best Practices

Don't Trust the Messenger

Organizations like OPR have to account for a dizzying array of factors in technology development. Radiation, extreme temperature variations, low-gravity environments, and lunar dust are just some of the many alien conditions faced by the technology OPR helps develop. When procuring materials or other products, the OPR team has to know exactly what they're getting to accurately forecast how their technology will hold up in extraterrestrial conditions.



Melissa and Vince's advice? Don't trust the messenger. Suppliers providing materials or other deliverables may intentionally or unintentionally misconstrue the specifications of their product. Project teams should test materials to verify they have received exactly what they need for their work. In space, even seemingly small material defects can cascade and lead to mission failure. In construction too, independent verification of procured materials can prevent project failure and reduce safety risks for end users.

Understand the Project

Every project is unique, with different goals, constraints, and criteria for success. Project teams can vary in size from a handful to thousands – not to mention all the stakeholders who may contribute to a project's development. Projects may also have an element of secrecy, especially those in space exploration. Government agencies and private organizations conducting space exploration often use proprietary knowledge

to deliver truly one-of-a-kind assets. However, Melissa and Vince note that this secrecy can lead to miscommunication or misunderstanding.

To reduce risk, a project team should develop a thorough understanding of their project and implement appropriately stringent QA/QC procedures. The foundation of this, say Melissa and Vince, is communication. In the first place, any party responsible for developing QA/QC procedures should acquire all relevant project information from the client. This is an iterative process. At early stages especially, a client may not know what information will be relevant for the development of a sufficient quality program. Plus, all projects change over time. Keep the conversation going throughout the project and revise your quality approach as your understanding deepens and the project changes.

Become the Expert

While it is common practice to document a project's quality standards and QA/QC procedures and make that information accessible to all team members, misunderstandings or different interpretations of the standards and procedures can lead to errors. Construction is complex, and components, materials, and methods may function differently from project to project. Even if a contractor has worked with a certain concrete mix, for example, the application of that concrete in a different context may require different quality checks. To unify efforts and prevent issues, Melissa and Vince recommend becoming "the expert" on the project's specific quality needs.

In addition to becoming a repository of the project's risks and quality requirements, the expert should proactively communicate their knowledge to the entire project team. Depending on the complexity and size of the project, this may involve anything from a one-time meeting to the establishment of a formal quality training program. Regardless of the form, the expert should tailor their messaging to each member of the team to promote understanding. Betty often works in a similar role on Hill projects. As a safety expert, she not only serves as a repository for the project's safety standards, but also holds safety meetings and trainings, takes regular site walks, asks thoughtful questions, looks out for high-risk situations, and shares her knowledge with contractors in the jobsite.


Great Kid! Don't Get Cocky

Even with an expert and a strong understanding of a project, beware of overconfidence. Wherever humans are involved

in a task, there is risk of error. Double-blind quality control processes reduce the possibility of mistakes caused by human error. Moreover, a project's real conditions can be different from testing conditions – in outer space especially, but also in construction. Frequent testing in multiple conditions can reduce risk. If there's any doubt, test again.

Mission Critical: The Astronomical Importance of Quality to Safety

In every industry, achieving quality goals is a self-evident, ineluctable part of a project's success. Failing to achieve those goals comes with different consequences depending on the project. Quality failure on an unmanned space exploration mission, for example, can mean billions of dollars lost. But when a space mission is manned, failure has a much higher cost. Likewise in construction, quality failure creates a potentially deadly safety hazard for anyone using or in the vicinity of the finished asset.

"Our clients aren't building anything that has to keep people alive in extraterrestrial conditions," says Betty. "But they are working on buildings, bridges, tunnels, railways, and ports, that, if not built correctly, will be dangerous. A must-have for keeping end users safe, in construction and in space exploration, is quality. So, I'm so glad Melissa and Vince could come and share their expertise on this critical topic with Hill. Their best practices will help us continue to protect our clients' interests and keep people safe." 



About the Author

Joseph Pooler is the Content Developer at [Hill International, Inc.](#) He has been working there since 2019, helping the company's experts capture ideas, best practices, and innovations and translate these into articles, papers, and other content.

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