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Quality and Completion Management in the Digital Age

How Cloud-Based Technology Is Revolutionising Quality Management

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Introduction

In an industry ripe for digital transformation, one area that many construction companies are seeking technology-focused solutions for is the quality management process. According to the International Risk Management Institute, Inc.[1], costs associated with rework were as high as 12% of the total project cost and required up to 11% of the total project working hours.

In this e-book, we'll discuss construction-quality management and share insights into how a digital technology strategy can improve quality management. We'll also outline the benefits of adopting the right digital tools, and carefully consider the adoption process. Finally, we'll explore an example of a company that revolutionised its quality management through a new digital strategy.

What Is Quality Management in Construction?

At the start of any project, the scope of work should be clearly defined. Quality standards should be set and expectations articulated to provide a measure by which achievement can be measured.

What Determines Quality?

In construction, key benchmarks are utilised to determine whether quality levels are as expected. These include:

1. Was the project finished on schedule?
2. Did the project meet the budget requirements?
3. Were job-specific requirements met?
4. Did the project result in a product that performs as expected?

What Is the Importance of Quality in Construction?

There are many ways to measure the success of a construction project, but perhaps none has a bigger impact on the bottom line than quality management. High levels of quality translate to repeat business. They reduce costly mistakes that require rework.

Additionally, high-quality work will play a role in how smoothly the completion process goes. Many main contractors struggle to finalise a job, often due to the late discovery of quality issues that need to be addressed. Poor quality can also translate to serious safety concerns, by putting employees at risk or by leading to an end product that does not meet safety standards.

In the end, quality is directly tied to the profitability of a job and a company's commercial reputation.

What Are Key Issues in Quality Management?

Many factors contribute to issues with quality. The following are all common:

- Damaged or low-quality materials
- Supplier failures
- Vendor failures
- Lack of process documentation
- Last-minute changes
- Scope creep
- Poor communication between teams
- Lack of transparency in the design process
- Lack of a centralised project management system
- Lack of auditing
- Poor quality-assurance processes

Putting the right quality processes in place from the start of a project is crucial. Quality assurance should be an ongoing process, examining activity as it takes place to ensure that requirements are being met throughout the project. Additionally, further quality control should take place at the end of the project, focusing on the final product produced.

Quality management issues require the best in technology to mitigate the risks commonly associated with construction.

Improving Quality in Construction Through Digital Strategy

The right digital strategy can be the key to unlocking improved quality management. A digital strategy begins with an assessment of technology solutions and the selection of a tool that allows for improved real-time collaboration and a centralised approach to quality management. The system should be accessible across job roles, holding every team accountable for their contribution to the project's overall quality.

Improving Workflows

Cloud-based solutions can also improve workflows. Too often, quality is not met because no one took ownership for needed quality workflows. Rather than discovering at the end of a project that major tasks were overlooked, management and other key stakeholders will have ongoing transparency in the process. Assigning workflows with built-in alerts for stakeholders can all be managed from one location.

With easy access to this data from anywhere, project workflows are no longer siloed. This helps ensure quality is being monitored throughout the entire course of a job.

Standardised of Processes

Standardisation is perhaps the number one way a digital strategy can improve quality management. From data collection to documentation, a cloud-based collaborative platform allows everyone to contribute in a standardised way. By comparing one project against another, contractors can learn from previous mistakes and harness past wins and digital tools ensure that everything is kept in one centralised location.

Four Benefits of a Digital Quality Management Programme

The following are four key benefits of a digital quality management program.

Risk Mitigation

A major risk almost any construction project faces is whether or not the entire team is building off the most up-to-date information set. A single, cloud-based storage solution can ensure that project documentation is always up to date and that every team member is working off the same version of plans and models. Updates can be made in real time, and everyone will see these updates as they occur. Key team members can be alerted to any changes, and communication can take place through the same centralised location, ensuring questions are handled promptly.

The result is lowered project risks and increased quality. When every single team member is working from the same documentation, fewer steps are missed, fewer errors occur, and risks are mitigated at every stage of the project.

Improved Quality and Minimised Rework

The right technology will standardise processes, ensuring any quality problems are caught early and dealt with promptly.

This translates to less costly rework later. With digital checklists and the ability to upload observations from the field, team members can instantly identify non-conforming items. This data will be immediately transferred to the entire team, where it can be collaborated on in real time. This leads to intelligent resolution and improved efficiencies.

Win More Business

A digital quality programme allows for improved visibility into inspection and test programs. Key stakeholders can understand the complexity of a project, providing better insight into the work being done. For example, having a dozen unresolved defects might seem like a negative thing to a client if that is the only report they receive. However, a cloud-based solution might paint a bigger picture, demonstrating that 30 areas of work are being inspected with over a thousand quality observations made. Those dozen unresolved defects are seen in a new light.

Transparency is key to improving relationships via clear communication. The result is that construction professionals can win more business and retain long-term clients.

Operational Excellence

Think of harnessing all the experience and knowledge that an entire construction team holds. This collection of information is the most valuable asset any company has. Digital tools that promote collaboration and centralise data allow teams to capture the best knowledge from the most experienced team members, spurring on the entire company to operational excellence. Quality skyrockets as less experienced team members benefit from their knowledgeable counterparts throughout every step of the project.

Taking a Careful Approach to Digital Adoption

When implementing a digital quality management program, take reasonable steps – often one at a time – to give the team time to adjust. A five-stage evolution can guide a team through the adoption process.

Defects electronically documented on-the-fly and tracked through resolution.

Digital checklist inspections performed. Both conforming and nonconforming observations documented.

Checklist inspections scheduled in relation to specific milestones.

Key stakeholders including trades and subs participate in digital checklist program.

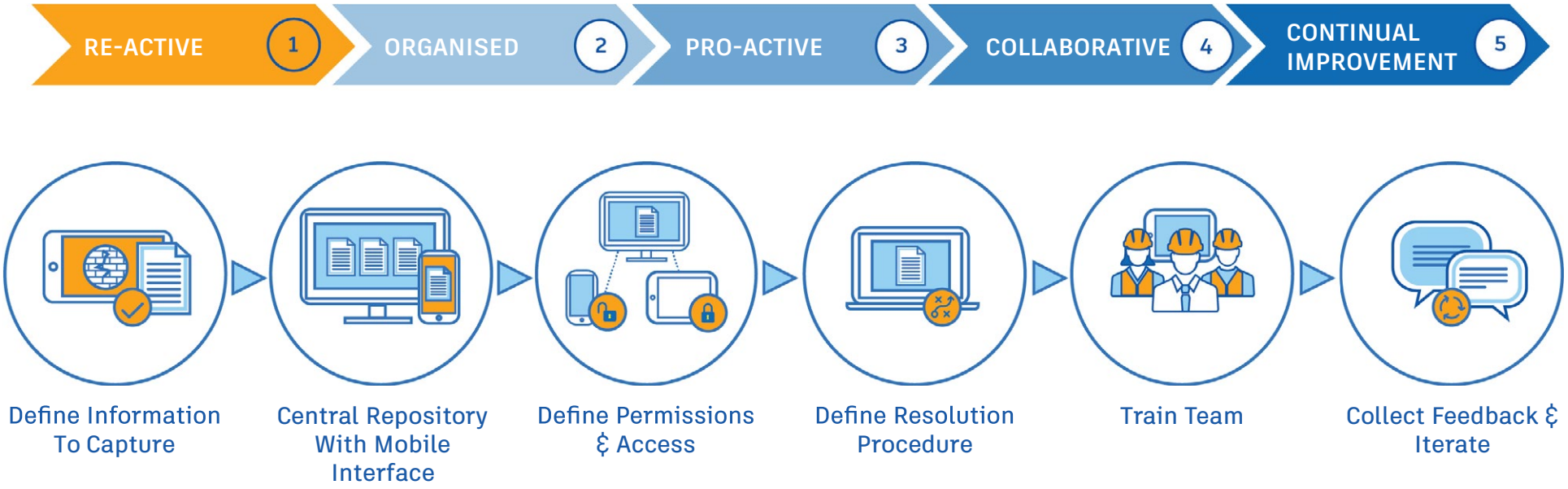
Enable team to feedback learning and process improvement into programme.

Stage 1: Reactivate

A great starting point is to digitise all reactive quality management defects and non-conformances by implementing a centralised digital issue log. This helps drive ownership, ensuring nothing slips through the cracks. Everything is documented, including corrective action and resolution.

The core features of a centralised digital issue log include:

- A single digital repository for stakeholders to access anytime, anywhere.
- Real-time access with the ability for multiple stakeholders to collaborate and make updates without overriding one another.
- Role-based permission enabling privacy and security while helping to manage workflows.



Stage 2: Organised

Next, bolstering inspection and test plans with checklist inspections will increase organisation. This will ensure conforming and non-conforming observations are documented, creating less risk.

The benefits of checklist templates include:

- Ease in documenting all conforming inspection points in addition to non-conforming issues, allowing teams to positively confirm conformance.
- Serving as a guide making sure even the smallest items aren't missed.
- Driving conformance in how teams execute their quality program, regardless of who is doing the inspection.
- Faster documenting of quality observations, allowing a great number of inspection points to be documented and observed, resulting in higher quality.
- Leveraging a digital program allows inspection results to be analyse for better track quality program performance including inspection coverage and conformance rates.

Stage 3: Proactive

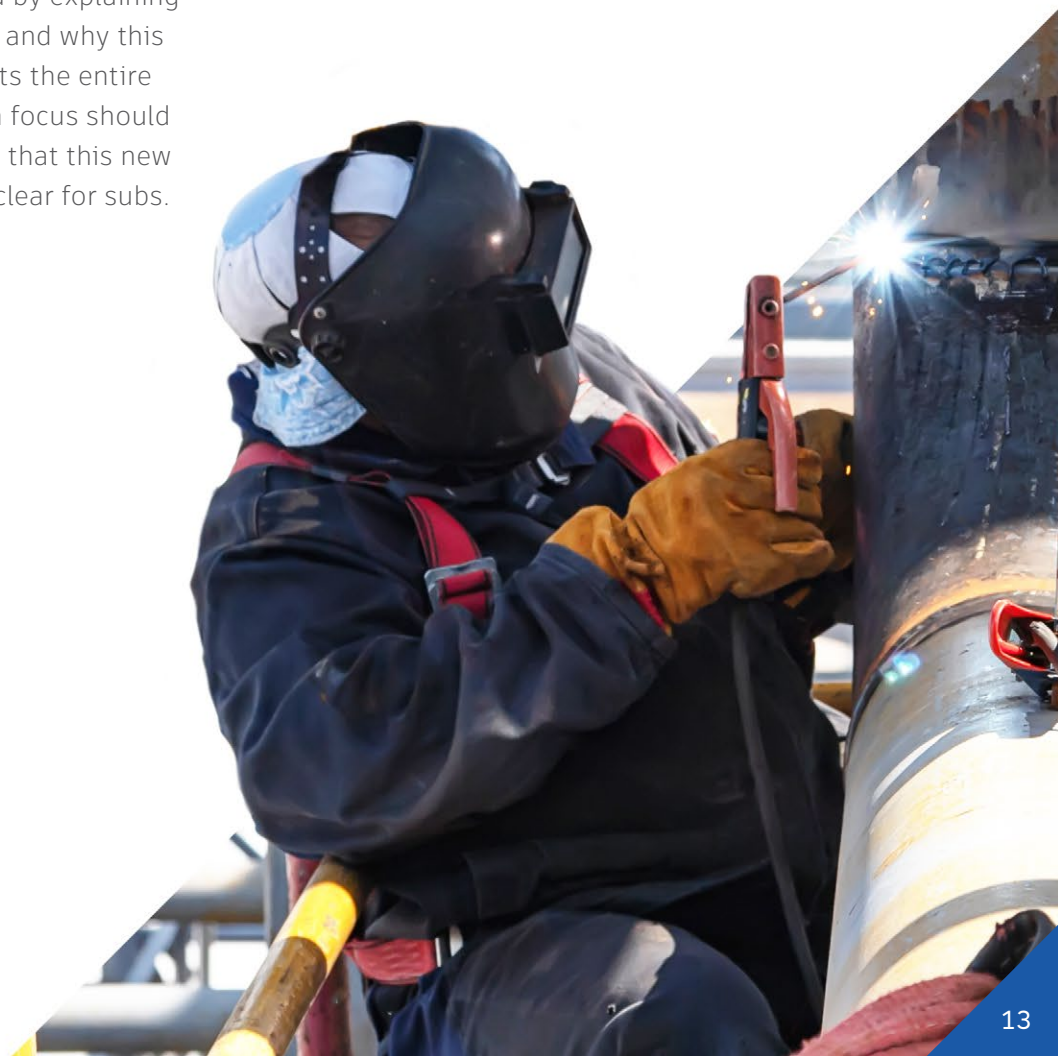
Once the team is comfortable with checklist inspections, it is time to link them to milestones in project schedules and discuss their use in look-ahead planning meetings. This process assures the team is planning for inspections that will occur with specific tasks and work packages, preventing issues farther down the road.

Many teams will conduct two-, four-, or six-week look-ahead planning meetings where relevant stakeholders will talk about what work needs to be performed and in what sequence in the coming weeks. During this meeting, one topic should be what quality measures need to be put in place for specific work, as well as a discussion around WHAT, WHO, and HOW.

Stage 4: Collaborative

Once adoption has reached critical mass and the entire team is on board, it is time to enable subcontractors to participate in the checklist inspection program. In the team's two-, four-, or six-week look-ahead planning meetings, subcontractors should be engaged when building out checklists to improve alignment and set expectations. This will reduce the number of non-conformances and resultant re-inspection efforts required. Enabling subcontractor partners to take ownership of their own quality programme before investing time into quality-assuring their work can lead to massive quality management improvements.

Depending on a team's culture, a top-down approach might be taken, mandating collaboration by including language describing the expectations of a subcontractor's involvement in their contracts. Mandating collaboration will usually only get a team so far, though. It is also necessary to ensure that subs are on board by explaining "what's in it for them," and why this way of working benefits the entire project. Additionally, a focus should be placed on ensuring that this new process's adoption is clear for subs.



Stage 5: Continual Improvement

Finally, long-term digital adoption is successful only when continual improvement is the focus. Once a team has fully adopted new digital quality management solutions, the goal should be to implement a feedback loop that allows for iterations and improvement.

One way of doing this is by developing a central knowledge repository of information on a project or across all projects in a company. This may include best practices, lessons learned, or even checklist templates.

An easy process should be put into place where any project team member can initiate improvement to the checklist templates with lessons learned or from gathering insights from issue defects that continually pop up.

This is not far from how in the original lean manufacturing programs, any member on an assembly line could hold up their hand, stop the assembly line, and offer a process improvement idea to management. Recognition programs should be leveraged to find subject matter experts, providing these key players with a place to share their knowledge with the rest of the organisation.

This can take a couple of forms. One method is via an annual awards programme with a referral programme with multiple categories for awards. Some examples might be awards in excellence for particular project programs like quality or safety, perhaps using project performance metrics like coverage to identify award candidates. Another might be an award for innovation where team members can be identified for improvement in process or their use of technology – maybe even an award for collaboration that spotlights multi-stakeholder project teams.

In conjunction with an awards programme, lunch-and-learn programs or webinar series can be hosted where subject matter experts can be spotlighted. This offers the incentive of more visibility in the company while at the same time helping the rest of the company learn from their knowledge or experience.

How Walsh Construction Reduces Risk with Technology

Walsh Construction, one of North America's largest main contracting, construction management, and design-build firms, harnesses the power of a digital-focused quality management strategy. By utilising a cloud-based solution, they ensure that their entire team is adopting organised document management, which allows the team to find and use the most up-to-date drawings and information. This reduces risk, as teams are always building off the right model.

When rework occurs, the digitally powered snag list and issue systems allow Walsh to track and resolve mistakes promptly.

In their words, "We've done much revision, whether it's looking at ourselves and our practices and procedures, down to training and operations. We're tracking and trending any issue that comes up on our project to understand where we are and what we need to do to improve, as well as where we need to adjust our training,"

Walsh has experienced an array of quality improvements across the organisation – most notably, incredible time savings. Regular maintenance and updating of drawings is usually time-consuming and laborious. New digital systems save this team hours of work each week. Additionally, closing out drawings previously took between three and six months. Now, the team can accomplish this in only a matter of weeks due to their ability to edit models in real time.

Beyond just time savings, Walsh has also reported improvement in client relationships, a vital factor in customer retention. Their ability to improve their quality management process ensures that clients are pleased with the end product, rather than surprised by quality issues previously only caught during completion.

Revolutionising the Closeout Process Digitally

One final critical area where quality management often fails is during the completion process, because key quality issues are overlooked until the last minute. If a customer finds a slew of quality concerns when the project ends, the finalisation of a project is held up and unnecessary extra costs are incurred.

Technology can often mitigate this risk. Utilising a centralised system, work lists can be utilised throughout the entire project life cycle. Throughout each phase of the project, everyone will have a clear understanding of expectations.

A digital cloud-based solution will allow construction teams to frequently meet with owners and other project stakeholders with transparent insights into the project's progress. This makes it easier to catch issues early on, rather than during completion. Closeouts that do not go well can derail a project. Relationships can be damaged and until the final steps of completion take place, teams are stuck on the hook.

So, what does a quality completion look like? It breaks down into a few key steps:

1. Project Closeout: During this stage, the project or site manager ensures work has been completed to meet all requirements. All necessary documentation should be gathered. This is where a centralised technology solution can speed up the process, ensuring that documents are easy to access.
2. Client Closeout: Next, it will be important to handover data and documentation to allow the client to verify their acceptance. Once again, the right cloud-based solution makes this a fast process, allowing for a positive completion.
3. Organisational and Subcontractor Closeout: Next, it is time to formally completion the job site, removing any employees, subcontractors, and equipment.
4. Assess Risk and Create Final Report: Finally, it will be important to identify any project risks or potential liabilities. Create a strategy to ensure the best final handover possible. After this, it is time to officially completion the project through a final report. Creating these reports is easier than ever when documentation is located in one central location in the cloud.

Utilising a digital strategy can help ensure that every piece of data is easily accessible. This will remove the need for last-minute searches for missing pieces of paperwork or change orders. The right digital tools will create a well-documented handover and closeout process. One area where this is most notable is in handing over final as-builts during the completion. These vital documents serve to ensure that everyone has transparency into the full history of any project changes. Owners are able to understand exactly what was built and delivered.

With the right technology, it is much easier to create quality as-builts that can be handed over during completion. Technology that implements real-time record keeping will ensure that teams are working off a single source of truth. All data generated throughout the project will become available digitally, leading to improved clarity in the final stages of handover and closeout process. In turn, this leads to greater customer satisfaction and ultimately more repeat business.

Conclusion

The right digital strategy can greatly improve any construction company's quality management process. The key is to build out an intelligent strategy for adoption up front, while focusing on the array of benefits the change will bring about. Through the use of modern cloud-based solutions, quality management can become streamlined, leading to time and cost savings.

Ultimately, the improvements to quality will lead to better client relationships and repeat business, offering any forward-thinking construction professional the incentive to implement change.

References

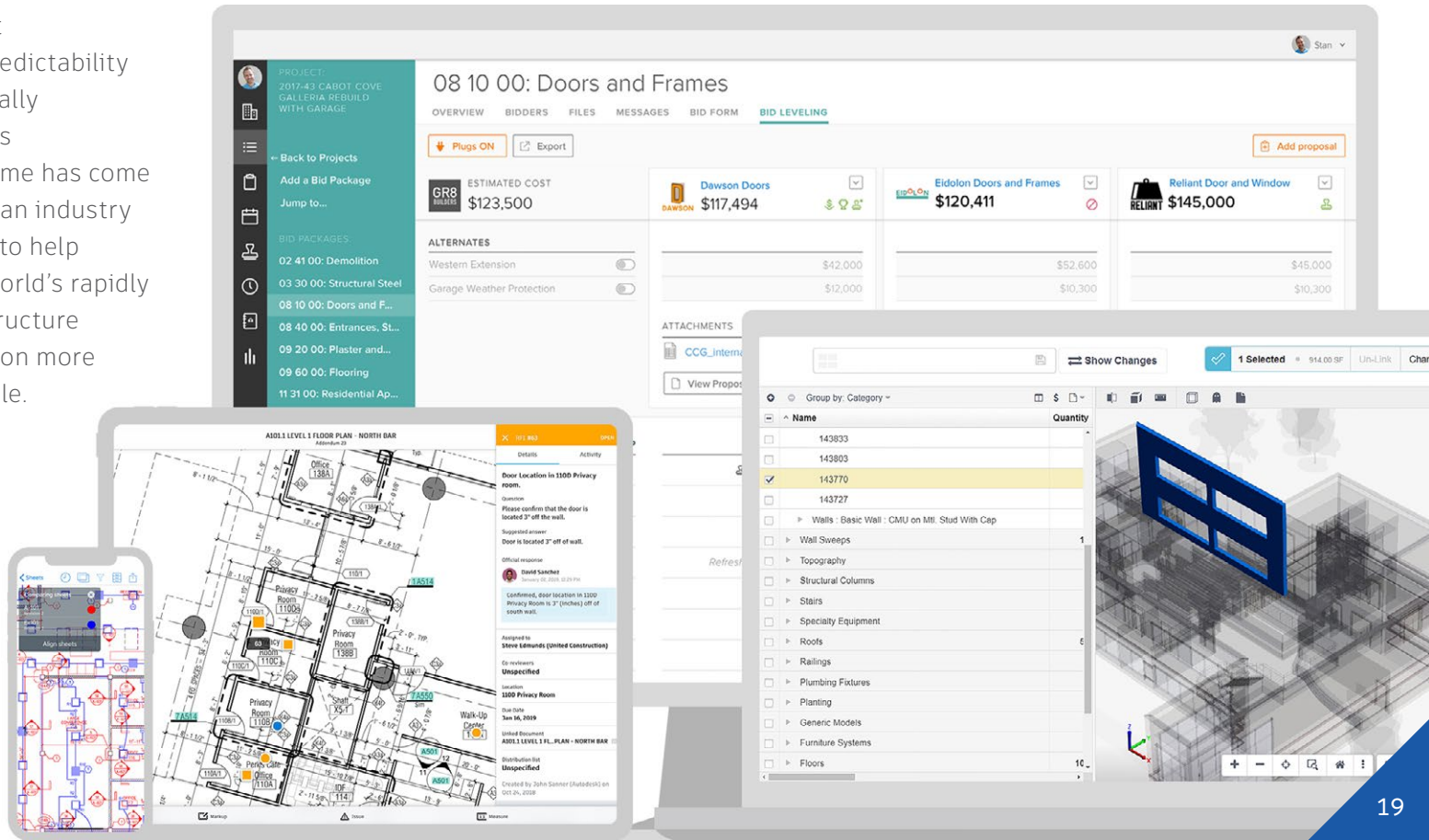
[1] Construction Quality Management
IRMI, October 15

See the Future of Connected Construction

construction.autodesk.com

In 2018, Autodesk announced that construction would be a key focus area to help our customers on their design and make journey. To capitalise on the opportunity, Construction became its own CEO-staff level organisation, Autodesk Construction Solutions. This unique structure is comprised of product development, customer success, marketing, and field operations. The organisation is designed to move at the speed of the market and serve customers on a level playing field with other solution providers. Autodesk Construction Solutions offers products that cover the entire construction lifecycle, from design through plan to build and operate, including the Autodesk Construction Cloud which brings together our cloud-based solutions Assemble, BIM 360, BuildingConnected and PlanGrid.

Our vision is to create a vibrant construction industry where predictability and productivity are exponentially increased, while jobsite waste is proportionately reduced. The time has come for platform that will empower an industry transformation. Our mission is to help construction teams meet the world's rapidly expanding building and infrastructure needs, while making construction more predictable, safe and sustainable.



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