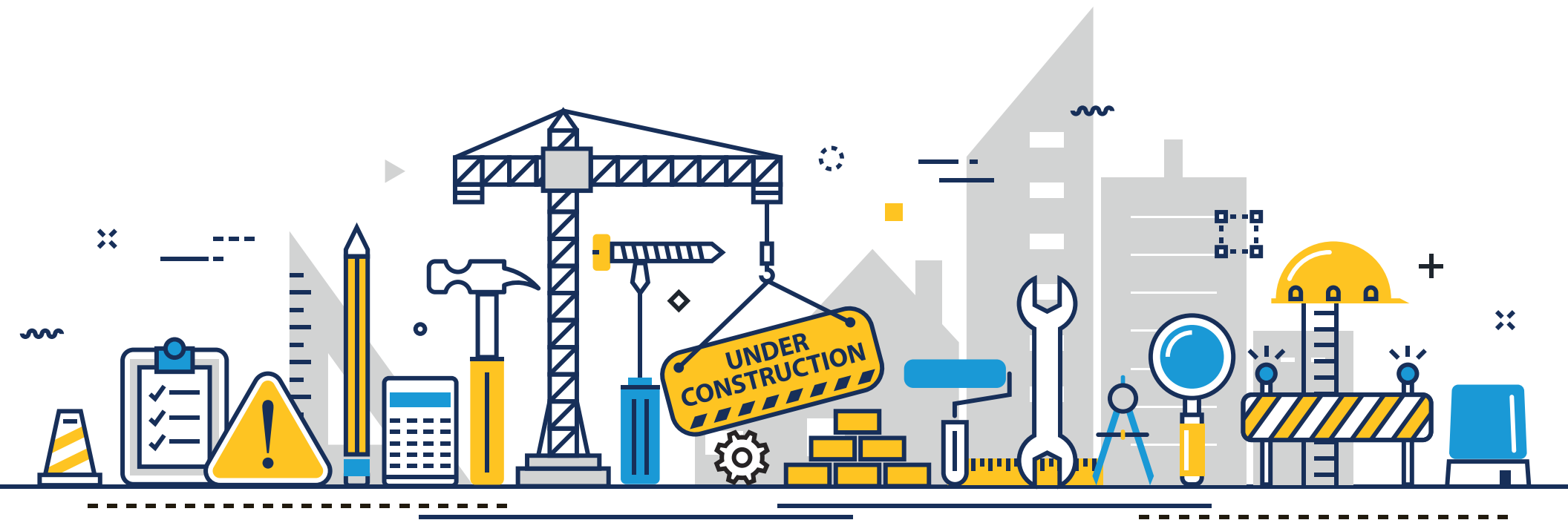


Reveal the Hidden Dangers That Throw Remodeling Projects Off Course



Introduction

Many construction projects involve renovating or retrofitting existing structures. More than \$3 trillion was spent on commercial remodeling in 2017, making it a lucrative opportunity for construction companies.¹

As interest in “green” buildings grows and owners seek new ways to better utilize existing spaces, the renovation market is expected to continue to sustain healthy growth. In North America, the push for greater employee productivity coupled with the desire for **increased energy efficiency**—which can reduce fixed expenses like utilities—will continue to drive the need for commercial renovation. In fact, the North American commercial remodeling market alone is expected to reach \$2.2 trillion by 2024.³

The forecast for the global renovation market also remains strong. Investments in the renovation and maintenance of existing infrastructure are exceeding spending for new projects in many areas of the world. In the U.K., for example, the National Infrastructure Delivery Plan will invest over \$130 billion between 2020-21 to improve social and economic infrastructure.⁴ And in the Asia-Pacific region, commercial property renovations, including updates to offices, retail spaces, and restaurants, are predicted to drive compounded annual growth of more than 5% through 2024.⁵

By all estimations, charting your course to include commercial renovation and retrofit projects is a sound plan. But while the opportunities are big, the risks can be, too. Working on existing structures can feel like sailing in uncharted waters, particularly when the project lacks original or current construction documentation. Without a map to guide you, you could miscalculate what’s ahead or start to lose your way.

But renovation projects don’t have to feel like sailing without a map. There are tools that can help you identify and plan for any potential dangers. Read on to get a better understanding of the obstacles that renovation and retrofit projects present and how you can successfully navigate them.

The global commercial remodeling market exceeded \$3 trillion in 2017.²



The Perils of Renovations & Retrofits

There's an old saying: "What you don't know can't hurt you." But in construction, this saying couldn't be less true. Construction projects already contain more than their fair share of unknowns and risks to manage. When those projects involve renovating or retrofitting, the potential pitfalls are even greater, particularly when you don't have access to as-built conditions for the current structure. Without that visibility, you could be setting yourself up for costly mistakes and rework.

No Map to Guide You

Many existing structures, especially older or [historic buildings](#), lack original or current documentation. This lack of as-builts makes estimating, planning, and construction a risky proposition. Without a clear picture of the current space, it's challenging to know what the project will really entail.

Depending upon the changes you're making, you need to understand structural conditions and limitations. You also need to know the location, condition, and capacity of current mechanical, electrical, and plumbing (MEP) components. For example, if you're changing a previous retail clothing space into a restaurant, you need to be sure that you can support the additional weight of the equipment, change the buildout as desired, and add any necessary MEP components to support the addition of a commercial kitchen.

You also need to make sure the existing structure can comply with today's codes and regulations. A commercial renovation of a historic building may require compliance with the Americans with Disabilities Act (ADA), for example. Or if you're planning to earn "green" building status, you need to adhere to codes like the U.S. Green Building Council's Leadership in Energy and Design (LEED).⁶

Without complete building documentation, it's anyone's guess what obstacles you or the owner might run into—and what the costs of not knowing might be.

More Risks to Manage

Among the risks of construction projects, rework is particularly detrimental to a project's budget and schedule. [Rework](#) is generally defined as any activity that has to be done more than once and isn't the result of a change order or change in scope. In construction, rework typically requires removing and redoing previously installed work due to unanticipated conditions, poor communication, and missing or inaccurate project information.

Rework is already all too common in construction—and expensive, accounting for 12-15% of total costs.⁸ And on remodeling projects, the potential for rework looms even larger. If you're lacking original or current as-built information, the likelihood that you'll end up having to rip and replace already completed work is high.

When you must essentially duplicate your efforts, it doesn't just hurt the cost performance of your renovation projects, it hurts the schedule. The project could be delayed by days or even weeks, putting a strain on your relationship with the owner, not to mention adding to the wave of productivity problems that already plague the construction industry.

But rework doesn't have to be inevitable. You can keep your renovation and remodeling projects on course with the help of 3D scanning.

22% of rework is due to poor project information.⁷



The Ripple Effect of Rework

When you're unable to identify the hidden obstacles of renovation projects and properly account for them in your design, budget, and schedule, you could be looking at costly and time-consuming rework on the horizon.

- The construction industry spends roughly \$178 billion on fixing errors.⁹
- The reported cost of construction rework is estimated at 5% of the overall contract value¹⁰ but the actual figure could be much higher.¹¹
- Rework increases construction costs by more than 16% of the contract price.¹²
- An estimated 30% of the work done by construction companies is rework.¹³
- Construction project team members spend 4 hours per week dealing with rework-related activities, such as managing the mistakes that result in rework, assessing the associated costs, and determining why the mistakes happened.¹⁴

Rework can erode your profit margins and throw your projects off course. While you could argue that rework is simply a reality of the construction world, you have the ability to minimize its ripple effect.

To learn how you can optimize construction layout to reduce costly rework, [read the blog](#).

3D Laser Scanning Reveals the Obstacles...

When it comes to renovation projects, it's hard to know what potential dangers could be lurking. But with 3D scanning, you can bring the obstacles into view.

With the help of a 3D scanning solution, you gain an accurate picture of the current structure and the placement of existing mechanical, electrical, plumbing, and HVAC systems. A detailed [point cloud](#) containing millions of data points helps you visualize the space in amazingly realistic detail, so you can effectively plan the work that will be needed during construction. New laser scanners are even able to provide a point cloud in the field so you can see the data take shape and ensure you've captured all measurements the first time.

With 3D laser scans, the accuracy of measurements and 3D model content in BIM projects reaches new levels.¹⁵

[3D laser scanning](#) is an accessible and valuable solution you can apply to every renovation project to:

- Reliably capture as-built conditions
- Quickly collect large amounts of project data for use in both design and construction
- Use the scan data to provide as-built documentation either as point cloud data or 3D modelled objects
- Share the data across functional roles and teams, including [BIM](#), project engineering, layout, and project management

Armed with detailed data about project conditions, you can produce more accurate budgets and schedules—and effectively avoid the hidden obstacles that can run renovation projects aground.

...and Clears the Way for Smooth Sailing

Once the project is underway, you can use a 3D scanning solution to capture data throughout the project. The 3D scan data can be used for construction verification to:

- Capture project conditions on a daily basis
- Compare the model or drawings to the work that's been completed
- Track and report on progress against the plan
- Quickly discover any mistakes or areas of concern so you can correct your course and avoid costly rework and schedule delays

When you rely on 3D scanning over the entire course of your project, you'll have complete documentation of the new as-built conditions. You'll also be creating an archive of the work performed and major milestones achieved during construction, allowing you to track and improve your overall project performance and productivity.

With the current as-built you've created, you and the owner gain the equivalent of a nautical chart, providing an invaluable map to refer back to for [ongoing maintenance](#) and repairs, as well as future renovations still on the horizon.

The ability to photograph a space simultaneously with data capture provides a complete record of the building that is invaluable when developing a renovation strategy.¹⁶

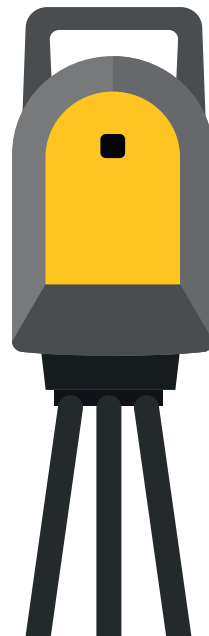


Chart Your Course with 3D Laser Scanning

When you have accurate and detailed as-built documentation at your fingertips, you're able to safely and confidently [navigate renovation and retrofit projects](#). A 3D laser scanner can quickly become one of the most powerful tools in your fleet, giving you the ability to dramatically improve your efficiency and productivity on remodeling projects and new construction alike.

No longer the domain of technical specialists, 3D laser scanning can now be used by a range of AEC professionals, from project managers and engineers to architects and field layout specialists. Imagine everyone on your team having access to a reliable and intuitive 3D scanning solution so they can capture the critical project data they need, when they need it. Plus, they can seamlessly integrate it with other programs and share it across functions to streamline workflows, facilitate better communication, and drive improvements in project performance.

The latest 3D laser scanning technology can help you navigate the hidden dangers of renovations and retrofits—and save time and money on all of your projects.

To learn more, get the 3D Scanning Made Simple eBook.



¹ Global Remodeling Market, Industry Trends. Global Market Insights.

² Ibid.

³ “North America remodeling market trends research and projections for 2018-2024.” MarketWatch. Sept. 25, 2018.

⁴ Global Remodeling Market, Industry Trends. Global Market Insights.

⁵ Ibid.

⁶ Comparison of Green Building Standards. U.S. Environmental Protection Agency.

⁷ Thomas, Eric; Bowman, Jay; Schott, Peter; Snyder, Jay; Spare, Natalie. 2018 Industry Report: Construction Disconnected. FMI/PlanGrid. August 2018.

⁸ Ibid.

⁹ Thomas, Eric; Bowman, Jay; Schott, Peter; Snyder, Jay; Spare, Natalie. 2018 Industry Report: Construction Disconnected. FMI/PlanGrid. August 2018.

¹⁰ Hwang, Bon-Gang; Thomas, Stephen R.; Haas, Carl. “Measuring the Impact of Rework on Construction Cost Performance.” ResearchGate. March 2009.

¹¹ Dougherty, Jason M.; Hughes, Nigel; Zack, James G. Jr. The Impact of Rework on Construction & Some Practical Remedies. Navigant Construction Forum. August 2012.

¹² Ibid.

¹³ Miri, Mohammad; Khaksefidi, Mahsa. “Cost Management in Construction Projects: Rework and Its Effects,” Mediterranean Journal of Social Sciences. December 2015.

¹⁴ Thomas, Eric; Bowman, Jay; Schott, Peter; Snyder, Jay; Spare, Natalie. 2018 Industry Report: Construction Disconnected. FMI/PlanGrid. August 2018.

¹⁵ Dekker, Anne-Mieke. “What is ‘Scan to BIM’?” Constructible Blog. Jan. 29, 2019.

¹⁶ Button, Roxanne. “3D Laser Scanning Can Preserve Your Old Building.” Constructible Blog. May 1, 2018.





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