3D laser scanning made simple

How to unlock the power of scanning to streamline construction

Introduction

Today, 3D laser scanning technology is more useful than ever, simplifying workflows and making even large-scale data management easy. Scanning technology now allows you to easily capture and share precise, as-built measurements and site conditions, replacing tedious manual processes like tape measures and 2D drawings.

Modern field and cloud software platforms can effortlessly manage scan data, fully supporting BIM and other construction workflows. The ease of use and powerful capabilities of today's scanning tools have made them an essential asset for contractors, putting everyone on the project on the same page with minimal effort.

The global 3D scanner market size was $1.98 billion in 2024 and is expected to be worth around

$7.16 billion by 2034.[1]

1 "3D Scanner Market Size, Share and Trends 2024 to 2034." Precedence Research, August 2024

Scanning data drives contextual construction coordination via the cloud, making it especially useful for:

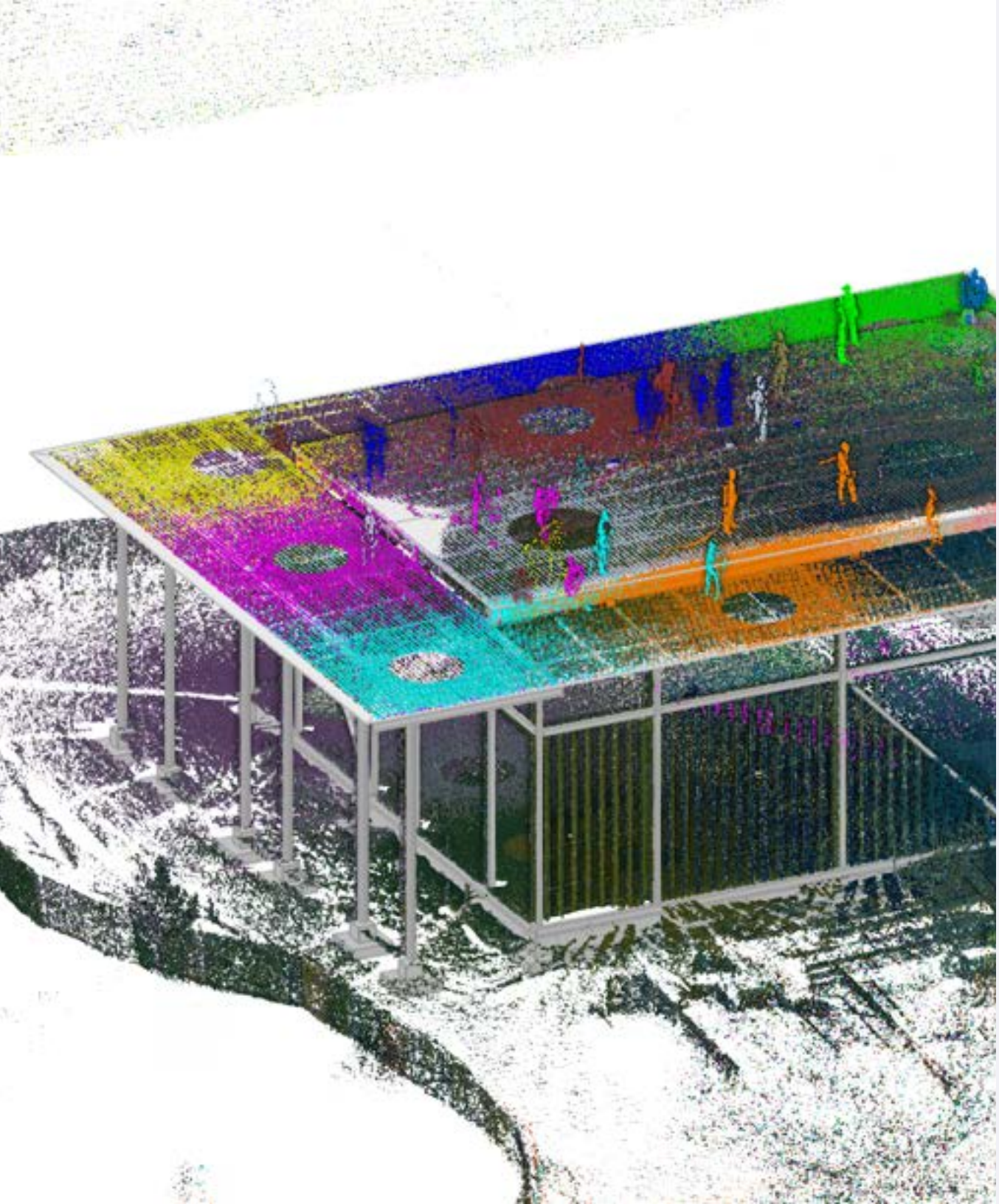
1 **Scan-to-BIM for retrofit:** Capture real site conditions to document existing structures, validate completed work and visually convey job site status to stakeholders.

2 **In-field model comparison and clash detection:** Compare scans to BIM data, identify discrepancies, detect clashes and take immediate action to prevent delays and rework.

3 **Accurate quality control and install verification:** Perform thorough inspections with high-precision point clouds, enhancing communication, decision-making and protecting against changing project scopes.

4 **In-field floor analysis:** Quickly assess flatness and levelness before the floor is even dry, identifying high and low spots on reflective surfaces like wet concrete for immediate field adjustments.

5 **Prefabrication verification:** Easily and reliably confirm the quality of prefabricated components prior to transporting them to the job site to ensure construction can move ahead smoothly, avoiding delays and cost overrun due to rework.



While scanning has introduced important capabilities to the construction industry, there are several prevalent myths that can stop companies from investing or realizing the investment.

Read on to review these misconceptions and challenges and explore solutions that can help improve and expand your current scanning workflows.

Myth #1

It's hard to integrate scanning data into our existing workflows.

The high costs of scanning equipment had been a significant barrier to adoption in the construction industry. However, with new flexible configurations, the up-front cost has less risk, making it easier to invest in the technology. Today’s concern lies mostly with the ability to reliably incorporate scanning data into existing workflows.

Many field and cloud software platforms now efficiently manage and integrate scan data to support BIM and other construction workflows. The ease of use and powerful capabilities of today's scanning tools make them an essential asset for contractors, putting everyone on the project on the same page with minimal effort.

Solution:

Get accurate and complete information the first time.

You need a scanning solution that can help you reduce project timelines by providing more accurate and detailed information about the site condition. This, in turn, optimizes the construction processes and reduces the number of change orders.

When you can rely on the ability to get accurate and complete scan data the first time, you avoid the need to budget additional time for re-measuring to obtain missing project information. Plus, you can reduce the risk of costly change orders after construction has already started. By integrating the scan data with 3D design data to streamline workflows from the beginning, you promote project collaboration, and enable better data sharing. Scan-to-model capabilities help you overcome the complexities of project communication by creating scan data that is aligned to the project coordinate system and is immediately shareable with other applications and project stakeholders.

2 "How Project Management Technology Helped Saunders Construction on One River North," Concrete Contractor Magazine, May 22, 2024

On a recent high-rise project in Denver, CO, USA, the benefit of pre-concrete pour scanning resulted in an approximately 39% reduction in the costs of errors and their associated impacts, together with an approximately 31% reduction in embodied carbon associated with fixing issues just to the cast-in-place floors.

The ROI of the entire virtual design and construction process was estimated at

1,164%

Total project cost savings of

$505,000

and a total CO2 savings of 144,221 kg.[2]

Myth #2

Scanning creates too much data and there's no way to share it.

With scanning technology easier to use but with the datasets bigger than ever, many users scan and then resort to taking screenshots of the point cloud to share via email. But now you can view this data in a web browser, from anywhere, in an easy-to-use format and share it with any stakeholder, regardless of their technical background.

With new, web-based solutions, you can maximize your scanning workflows and democratize access to the insights and value of reality capture data. This allows for seamless visualization of data in context with your models and drawings, overlaying it with layout point data and utilizing construction-focused tools like topics and views to drive collaboration and coordination.

By integrating scanning data into accessible, web-based platforms, you can enhance communication, streamline workflows and ensure that everyone can contribute to and benefit from reality capture data, ultimately leading to more efficient and productive project outcomes.

Due to slow technology uptake, struggles scaling improvements from one project to the entire portfolio, passing along productivity gains without improving margins, and additional challenges, **construction productivity improved by only 10% between 2000 and 2022, compared to 50% for the total economy.**[3]

3 "Delivering on construction productivity is no longer optional." McKinsey & Company, August 9, 2024

Solution:

Find a solution that works as hard as you do.

Scanning should streamline your workflows and empower you to complete work on time and on budget, not require you to budget more time than is needed or create additional delays. Cloud solutions with web-based platforms that allow stakeholders to store, share and collaborate easily, without specialized software, help realize the true productivity value of scanning data.

By sharing data of both 3D models and visualizations of the point cloud collected by the scanner, you can provide a clearer understanding of the project of everyone involved, including clients, architects and subcontractors.

Teams that can make full use of scanning data get the information they need when they need it, creating efficiency and productivity gains across all projects.

Myth #3

Nothing I do now would be improved by using a scanner.

Many professionals delay purchasing a scanner until they have sufficient work, but this creates a self-perpetuating dilemma: without the scanner, the work doesn't come. Investing in a lower-cost scanner allows you to scale your business and start profiting sooner.

Owning your scanning solution lets you scan whenever needed without relying on external schedules. With in-field registration, you can verify your work before leaving the site, ensuring complete data capture and confidence in the process.

4 "Construction Deconstructed," PlanGrid, 2018

5 "Harnessing the Data Advantage in Construction", Autodesk, 2023

The astronomical costs of rework

Construction rework consumes time, resources and profits:

- x Construction professionals spend **5.5 hours a week** looking for project data / information[4]
- x **52% of global rework** is caused by poor data and miscommunication[4]
- x Estimated in 2023 that the construction industry wastes up to **$625 billion per year** on rework[5]

Decisions made using "bad data" are estimated to have cost the industry $89 billion in rework alone, accounting for 14% of all rework performed in 2020.[6]

These findings suggest construction teams and organizations need relevant, accurate and complete data sets to make consistently high-quality data-driven decisions.[6]

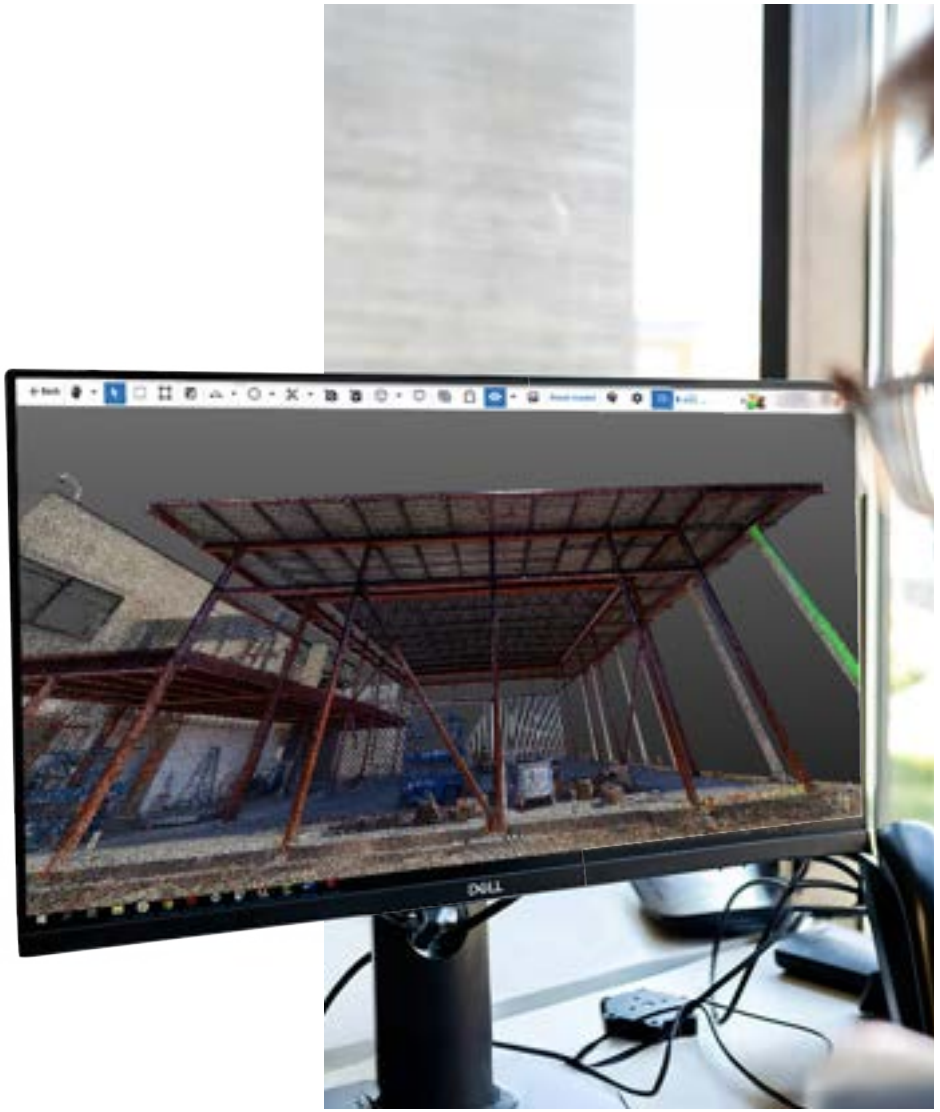
6 "Study from Autodesk and FMI Finds Better Data Strategies Could Save the Global Construction Industry $1.85 Trillion," Autodesk, September 14, 2021

Solution:

Reduce rework to improve what you're doing now.

You need technology that helps avoid costly rework by providing accurate, real-time data. This can prevent unforeseen errors and inefficiencies that arise from relying on existing drawings, which may not accurately represent actual project conditions. Inaccurate construction models can lead to layout inefficiencies, affecting the overall design and requiring rework.

Integrating 3D models and scans with other data from robotic total stations, drones or BIM and CAD software ensures that your teams can seamlessly input data and collaborate effectively. This integration reduces the time spent on data manipulation and enhances cross-functional communication, further minimizing the risk of rework. The ROI from investing in scanning technology is realized as it ultimately helps save time, reduces errors and increases profitability.



Myth #4

I wouldn't be able to meet regulatory and compliance requirements with scanning.

A common misconception is that scanning data is not reliable or accepted for compliance purposes. However, scanning technology is highly accurate and can provide detailed documentation that meets stringent regulatory standards either via the cloud or as non-digital deliverables. The precision and comprehensive nature of scan data ensure that all aspects of a project are well-documented and verifiable.

The challenge lies in demonstrating to regulatory bodies that scanning data is as reliable, if not more so, than traditional methods. This involves understanding how to present the data in a compliant format and ensuring it is easily accessible for audits and inspections. With the right training, your team can learn to use scanning data to meet and exceed compliance requirements, thereby enhancing the reliability and integrity of your projects.

Solution:

Use scanning to enhance compliance.

You need a scanning solution that ensures data accuracy and is easily verifiable, making it suitable for compliance purposes. By using scanning, you can capture precise, high-resolution measurements that provide irrefutable evidence of site conditions and project progress. This not only streamlines compliance reporting but also ensures that you meet all regulatory standards with confidence.

Modern scanning systems are designed to integrate seamlessly with compliance management workflows, requiring minimal training to get started.

This integration facilitates the generation of detailed reports and documentation that can be easily shared with regulatory bodies. Additionally, the use of cloud platforms for data storage and sharing enhances transparency and accessibility, ensuring that compliance data is always at your fingertips.

Myth #5

You need special software and expertise to use the data, so non-technical stakeholders can't see or use the data.

One of the major limitations of scanning data is that it is often accessible only to those with specialized knowledge and software, restricting the scalability and overall value of the investment. While many new scanners are intuitive to set up and user-friendly, the initial learning curve is just the beginning.

The real challenge lies in training users to work with the scanning data and learning how to extract maximum value from it. Understanding how to clean, refine, and inspect the data is crucial for making informed decisions and driving project efficiency. With these advancements, there's no need to rely on specialized scanning technicians. You can now empower your team to work confidently with the data, enhancing in-field efficiency and control.

What's possible

with an intuitive scanning solution?

Scanning has traditionally been the domain of trained technical specialists like surveyors. But there are many roles in construction that benefit from using scanning data for field and office applications, including:

VDC and BIM managers who need accurate and usable data from scanning and other sources to generate and manage digital models.

Field engineers who need ready access to information so they can effectively plan, design and manage construction projects.

QA/QC professionals who need reliable data to ensure quality and compliance throughout the project.

Project managers and superintendents who need reliable, real-world data to verify progress on ongoing work, vet payment requests and resolve disputes.

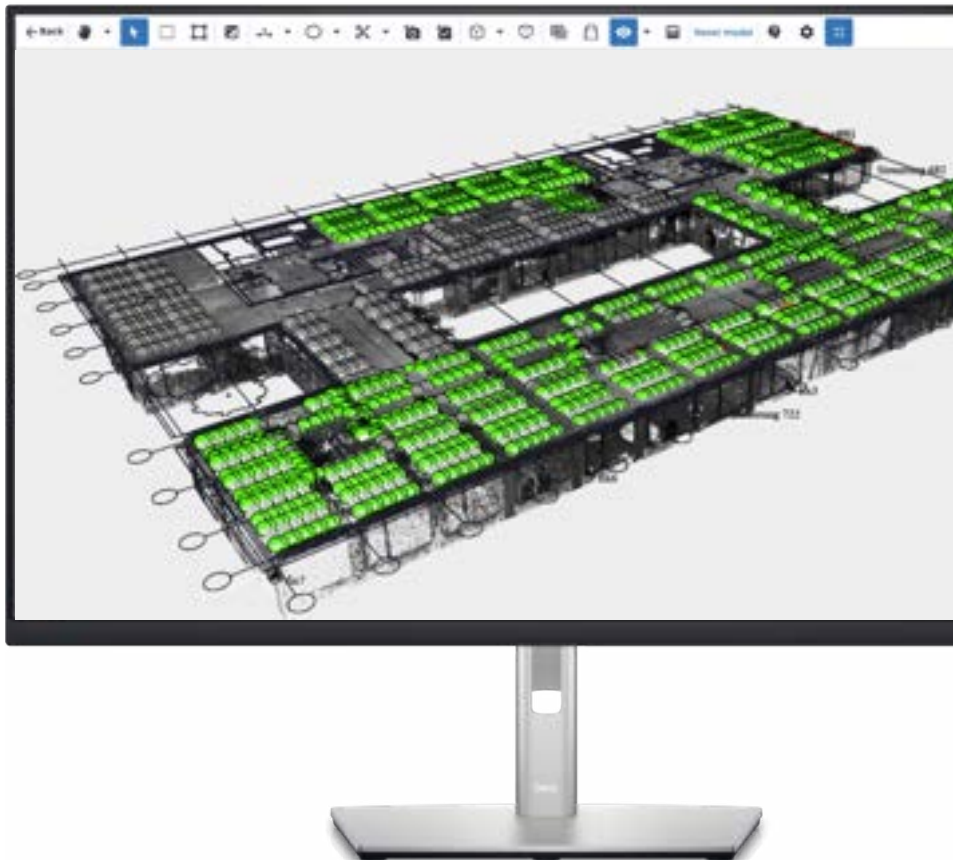
Field layout specialists who need the ability to quickly and easily capture field conditions.

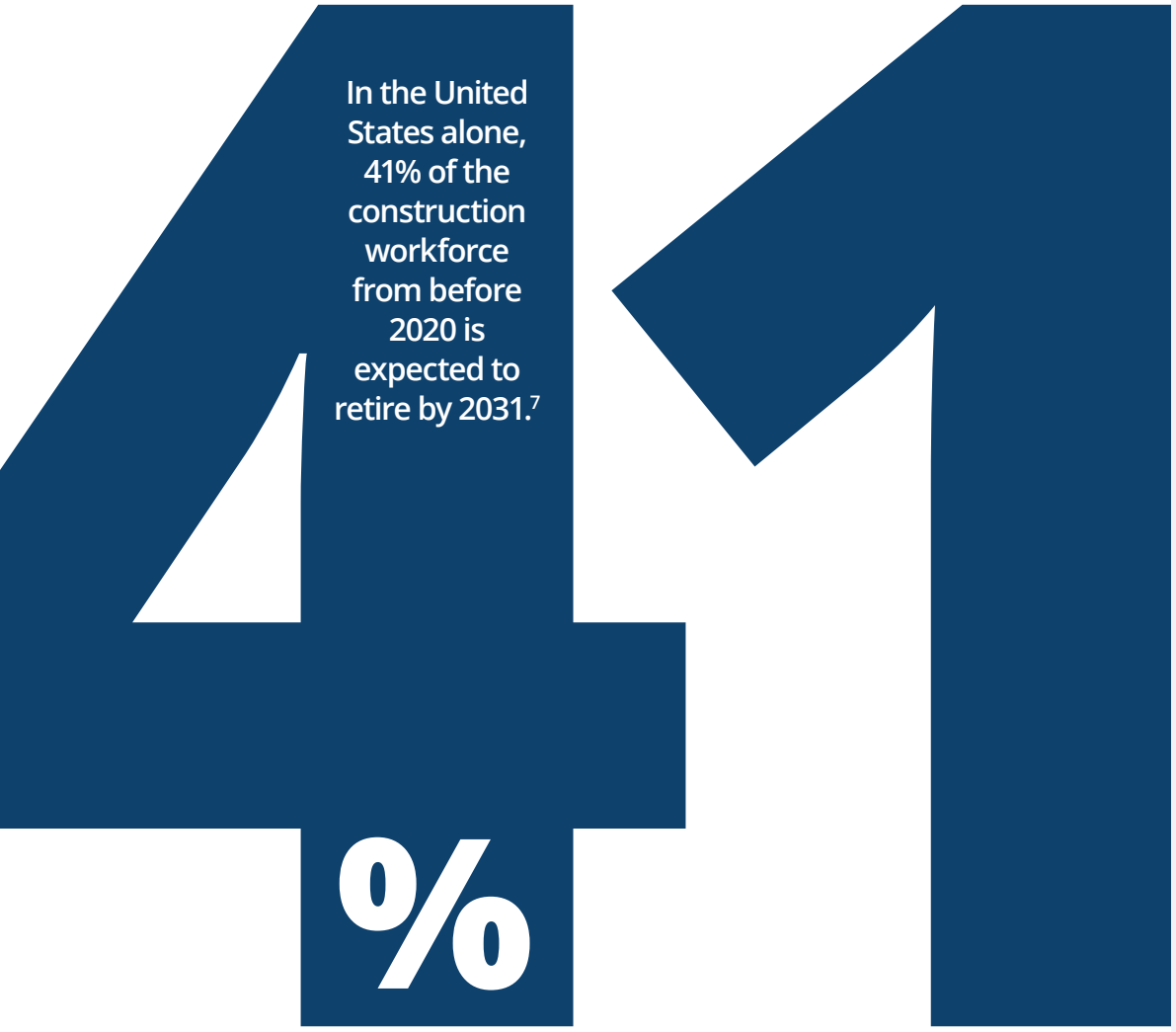
Solution:

Make scanning more accessible.

You need a scanning solution that offers ease of use and ease of sharing, without requiring outside resources or specialized training. By making scanning directly available to those who need the information, such as BIM managers, engineers and layout pros, they can capture precise measurements right in the field. This streamlines the entire workflow, enabling better and faster decision-making.

Modern scanning systems, including connections to cloud platforms for sharing, are designed for ease of use, requiring less training and fewer hours of experience to get started. This integration breaks down barriers between the field and the office, and between design and reality, driving improvements in productivity and efficiency. Additionally, the ease of collaboration facilitated by cloud tools ensures that everyone involved can access, edit and share the data effectively.





By putting the power of 3D data that into the hands of those who need it most, when and where they need it, you begin to solve the productivity problem that pervades the construction business.

58% of workers across the construction industry value career plans to pursue future training, education, or credentialing opportunities, **17 percentage points higher** than the national average.[8]

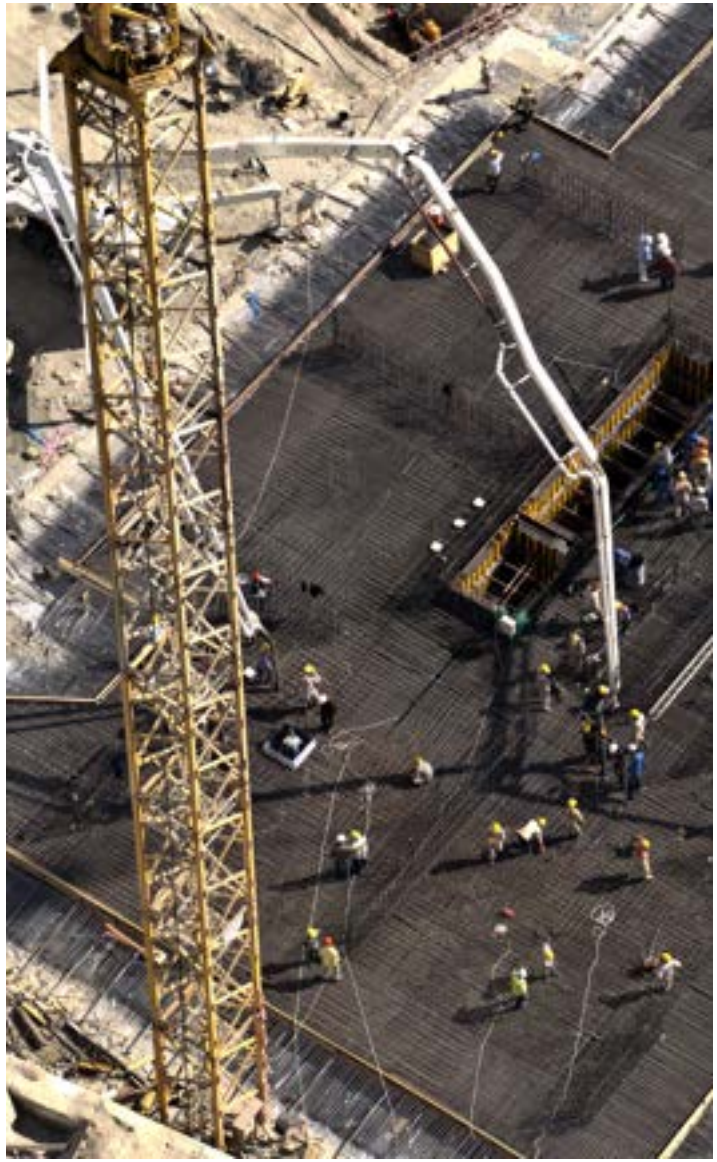
7 "The next normal in construction: How disruption is reshaping the world's largest ecosystem," McKinsey, June 4, 2020
8 "Will a labor crunch derail plans to upgrade US infrastructure?" McKinsey, October 17, 2022

Beyond myths:

Save time and money with scanning

A scanner is a powerful tool that has the potential to dramatically improve construction efficiency and productivity. But when you rely on outsourced services, specialized technicians or overly complex tools, you won't be able to take full advantage of the power that scanning holds.

New scanning options are now accessible to a range of AEC professionals. When you put this potent tool in the hands of those who need it most, you're able to shave unnecessary steps from your workflows and begin to shift the over-budget, over-schedule stereotypes that persist in the construction industry.



The latest

innovations in scanning enable you to:

- Extend scanning capabilities to more members of your team.
- Produce accurate as-built drawings shareable in the cloud via web-based platform.
- Save time early on and throughout the construction process by gathering all the data you need, when you need it.
- Avoid costly rework and change orders.
- Document and demonstrate a project's progress and archive the work performed to review at a later time.
- Increase productivity through minimal maintenance and no downtime.

A mid-range, self-calibrating, self-leveling 3D laser scanner with in-field registration that your whole team can use allows you to streamline construction workflows, ultimately saving you both time and money. By opening up the tool to a wider user base, increasing the accuracy and completeness of your scan data, and improving scanning efficiency and productivity, you can realize the ROI power of 3D laser scanning.

Ready to start using scanning on your projects?

Schedule a no-obligation demo of the Trimble scanning solutions now.
Visit: **trimble.com/building-construction-field-systems**