Beating the Skilled-Labor Shortage With Technology

Written by: Parth Tikiwala, Head of Government and Academic Affairs, Bluebeam

The construction industry is still facing a workforce crisis. Despite an uptick in hiring, a persistent labor shortage continues to challenge contractors, developers, and business owners. The latest Bureau of Labor Statistics data shows that 13,000 new construction jobs were added in March 2025. Yet, even with steady employment growth, companies are struggling to fill key roles, delaying and driving up costs.

The problem is only expected to intensify. The demand for skilled labor far exceeds supply, particularly as large-scale infrastructure and manufacturing projects ramp up. Taiwan Semiconductor Manufacturing Company, for example, has committed to a $100-billion investment in U.S. chipmaking facilities, which will require 40,000 additional construction workers over the next four years.

This pressure — compounded by an aging workforce and a shrinking pipeline of skilled tradespeople — has left the industry searching for solutions.

Technology is emerging as a crucial tool in helping contractors do more with less. From automation and real-time collaboration to digital project management, construction firms are increasingly turning to AI-powered platforms, cloud-based workflows, and field technology to optimize labor allocation and reduce inefficiencies.

While technology cannot replace human expertise, it is playing an essential role in maximizing productivity and helping businesses navigate the ongoing labor crisis.

A GROWING WORKFORCE CRISIS

While the construction industry has consistently added jobs, demand continues to outpace supply. The sector remains constrained by structural labor challenges that make long-term recovery difficult.

One of the most pressing issues is the aging workforce. According to the National Association of Home Builders, nearly one in five construction workers is aged 55 or older, with many set to retire in the next decade. At the same time, younger generations are not entering the trades in sufficient numbers to fill the gap.

There is also an education and training pipeline disconnect. Many high schools and vocational programs deprioritized trade education in favor of college-degree pathways, limiting access to hands-on construction training. While apprenticeship

programs and technical schools have grown in recent years, they have yet to meet the demand for skilled labor across key construction disciplines, including electrical work, plumbing, and heavy equipment operation.

The workforce shortage has broad financial and operational implications. According to the U.S. Chamber of Commerce, 68% of contractors say they are asking skilled workers to do more work; 56% report a challenge in meeting project schedule requirements; half (50%) of contractors are putting in higher bids; and over a third (35%) of contractors report turning down work due to skilled labor shortages. Without intervention, these workforce gaps will continue to impact project costs, scheduling, and overall productivity.

TECHNOLOGY AS A WORKFORCE MULTIPLIER

As companies face an ongoing talent shortfall, digital transformation is reshaping how construction firms operate. From small businesses to major general contractors, firms are adopting automation, data-driven project tracking and real-time collaboration tools to optimize their existing workforce and mitigate labor constraints.

Automation and AI-powered scheduling are playing a critical role in reducing inefficiencies. Intelligent scheduling software helps project managers optimize labor resources by forecasting workforce demands and ensuring the right personnel are assigned to the right tasks. Similarly, automated workflows reduce time-consuming administrative burdens, allowing skilled workers to focus on higher-value activities.

Real-time collaboration platforms are also transforming workforce efficiency. Cloud-based project management software enables teams to coordinate remotely, reduce paperwork bottlenecks, and centralize communication, minimizing costly delays caused by misalignment. Digital document management tools further streamline permitting and compliance workflows, reducing the manual effort required to keep projects moving forward.

Field technology is another area where digital solutions are enhancing productivity. Mobile applications allow foremen and laborers to access blueprints, submit reports, and document progress from the jobsite, eliminating delays caused by paper-based processes. Meanwhile, the use of drones and robotics in surveying and material handling is reducing reliance on labor-intensive tasks.

REAL-WORLD IMPACT: HOW CONTRACTORS ARE ADAPTING

Many construction firms are already leveraging technology to maintain operational efficiency despite workforce shortages. Companies integrating AI-driven scheduling, digital permitting systems, and real-time collaboration tools have reported fewer project delays and reduced rework costs.

For example, Bluebeam, a provider of digital collaboration tools, has seen contractors use its software to cut review and approval times by up to 50%. By digitizing plan markups and streamlining document management, companies can reduce inefficiencies and maximize existing labor resources.

Similarly, large infrastructure projects have adopted predictive analytics to optimize workforce planning. Some firms are using AI-powered software to forecast labor demand months in advance, allowing them to proactively adjust workforce strategies rather than react to shortages as they arise.

While technology adoption varies across the industry, contractors that embrace digital solutions are seeing measurable gains in efficiency, cost savings, and project delivery speed — all critical factors in an era of persistent labor shortages.

PREPARING FOR THE FUTURE: KEY TAKEAWAYS FOR CONSTRUCTION LEADERS

As labor shortages persist, contractors must prioritize technology adoption to future-proof their operations. Investing in automation, cloud-based collaboration, and workforce optimization tools can help firms remain competitive in a challenging labor market.

Companies should also focus on workforce training and upskilling. Many construction firms are integrating technology training into apprenticeship programs, ensuring that new workers are equipped to operate in a digitally enabled jobsite.

Finally, embracing AI-powered workforce planning can provide construction firms with the foresight needed to mitigate workforce gaps before they become critical issues. Predictive analytics can help companies adjust hiring strategies, optimize

project timelines, and allocate labor resources more effectively.

The construction industry has an opportunity to redefine efficiency through technology while simultaneously addressing the workforce shortage. Contractors that invest in smart, data-driven solutions today will be best positioned to thrive in an increasingly constrained workforce environment.

About the Author

Parth Tikiwala is the head of government and academic affairs at Bluebeam, where he focuses on advancing digital transformation in the architecture, engineering, and construction industry. With a background in economics, public policy, and construction technology, he collaborates with government agencies, academic institutions, and industry leaders to drive innovation and workforce development.

About the Article

Reprinted from Construction Executive, May, 2025, a publication of Associated Builders and Contractors. Copyright 2025. All rights reserved.Associated Builders and Contractors is a national construction industry trade association representing more than 21,000 members. Based on the merit shop philosophy, ABC helps its members develop people, win work, and deliver work safely, ethically, and profitably for the betterment of the communities in which they work.

Any views and opinions expressed in this article may or may not reflect the views and opinions of the Construction Management Association of America (CMAA). By publishing this piece, CMAA is not expressing endorsement of the individual, the article, or their association, organization, or company.