Decoding America's Construction Labor Market Shortage

Potential Implications for National Stability and Security

The U.S. built environment, encompassing construction, infrastructure, real estate, and urban planning, is grappling with a severe labor shortage driven by an aging workforce, inconsistent job site locations, and barriers to technology modernization. Yet, this aspect of the American economy plays an outsize role in the nation's ability to support critical sectors such as housing, transportation, defense, and energy.

Onsite personnel, representing 74% of the workforce in the built environment[1], are particularly crucial, as the need for qualified workers to build and maintain public infrastructure facilities contributes to economic stability, regional functionality, and national security. Consequently, identifying key challenges and proposing actionable solutions in the construction sector could alleviate strains in the built environment as a whole.

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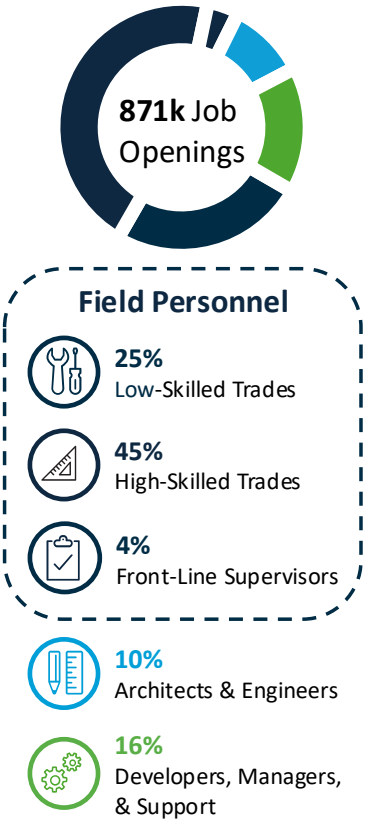
Labor Categories and Entry Points

The construction workforce can be divided into five main categories with a total of 871,000 job openings: 1) low-skilled trades, 2) high-skilled trades, 3) front-line supervisors, 4) architects and engineers, and 5) developers, managers, and support, according to US Bureau of Labor Statistics (BLS) data. Each category has distinct entry requirements and roles, affecting various sectors such as construction, infrastructure, real estate, and urban planning. Field personnel, comprising low- and high-skilled trades, and frontline supervisors, represent 74% of the workforce, underscoring their significance in maintaining economic stability and city functionality.[1]



1. **Low-skilled trades** require no formal education or experience, with training provided on the job. Examples include laborers, helpers, roofers, painters, and drywall installers. Despite the relatively low barrier to entry, this category faces significant shortages, with 217,000 openings, according to April 2025 data, and median salaries ranging from $44,000 to $57,000.[1]
2. **High-skilled trades** necessitate a high school diploma or equivalent, along with on the job training and apprenticeships. This category includes carpenters, electricians, equipment operators, plumbers, HVAC technicians, masons, and sheet metal workers. The shortage in this category is even more pronounced, with 390,000 openings and median salaries between $47,000 and $102,000.[1]
3. **Front-line supervisors** typically rise within the occupation through extensive experience and often possess postsecondary education in construction management. They oversee trades and deliver project efficiency and quality. There were 37,000 openings in April for front-line supervisors, with a median salary of $76,000.[1]
4. **Architects and engineers** require a bachelor's and sometimes advanced degrees, with experienced professionals serving in management roles. State licensure is required for this profession to perform key duties such as stamping drawings. There were 90,900 openings in professional careers, with median salaries ranging from $79,000 to $165,000.[1]
5. **Developers, managers, and support professions**, which includes property managers, support technicians, and related supervisors, require an associate or bachelor's degree depending on the role. There were 136,500 openings in this category, which has a median salary of $49,000 to $105,000.[1]

[1] Bureau of Labor Statistics, U.S. Department of Labor, Employment Projections 2024 (2024), accessed April 1, 2025, https://www.bls.gov/emp/.

Key Challenges Facing the Industry

Key challenges can hinder the attraction of new talent and significantly contribute to the current and forecasted workforce shortages. These challenges are not limited to the construction sector but affect the entire built environment, including infrastructure, real estate, and urban planning. Addressing these challenges is crucial to maintaining the functionality of cities and regions and requires collaboration between the public sector and private industry.

Working conditions are a common issue, with 90% of field workers reporting problems such as occasionally reaching below shoulders, working in low postures, and outdoor exposure. **Workforce representation** could also be improved, as women made up less than 12% of the construction workforce in 2024.[2] BLS data also shows that 57% of women in trades report no paid time off, and 25% face disciplinary action for missing work for personal or family matters.[3] Another potential labor source could be in African American and Asian American workers, who make up only 6% and 2.1% of the construction workforce, respectively.[4] The adoption of training, education, and interventions to address low participation by these groups could be developed.

The **aging workforce** is a looming concern, with labor demand expected to increase by 7% between 2020 and 2030, and the average worker age projected to rise to 42.9 years. The average age of craft professionals has increased from 36.8 years in 1994 to 40.8 years in 2014, and it is projected to reach 42.9 years by 2030, highlighting the need for younger workers to enter the industry.[5] **Location inconsistency** also poses a problem, as frequent job site changes increase travel time and costs, disrupting workers' routines.

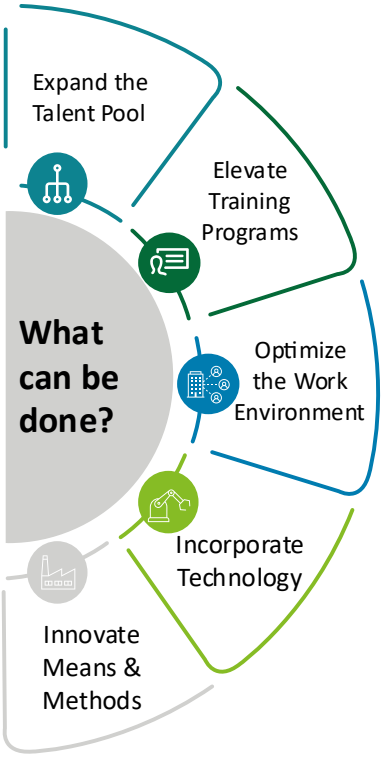
Technology adoption, such as robotics and automation, is hindered by high initial costs, complex implementation, resistance to change, and workers' fears of job loss, despite potential benefits. For instance, the use of robotics in construction may improve work efficiency by 30%, but the high initial investment and complex implementation processes deter many firms from adopting these technologies.[6]

Addressing the construction industry's challenges is essential for fostering a resilient workforce capable of driving industry growth. Overcoming these issues will require collaborative solutions from all stakeholder groups, including expanding the talent pool, optimizing work environments, and incorporating advanced technologies to create a more reliable and innovative labor market.

[2] Bureau of Labor Statistics, U.S. Department of Labor, Labor Force Statistics from the Current Population Survey, accessed June 1, 2025, https://www.bls.gov/cps/cpsaat18.htm.
[3] Bureau of Labor Statistics, U.S. Department of Labor, Employment Projections 2024 (2024), accessed April 1, 2025, https://www.bls.gov/emp/.
[4] Josiane Isingizwe, Ricardo Eiris, and Masoud Gheisari, "Racial Disparities in the Construction Domain: A Systematic Literature Review of the U.S. Educational and Workforce Domain," Sustainability 15, no. 7 (2023): 5646, https://doi.org/10.3390/su15075646.
[5] Rakan Albalawi, Paul M. Goodrum, and Mohammed A. Albattah, "Evolution of Multiskilled Craft Professionals and Their Level of Certification in the US Industrial Construction Sector," Journal of Management in Engineering 40, no. 1 (2024): 04023057, https://doi.org/10.1061/JMENEA.MEENG-5583.
[6] Yuming Liu, Aidi Alias, Nuzul Haron, Nabilah Abu Bakar, and Hao Wang, "Robotics in the Construction Sector: Trends, Advances, and Challenges," Journal of Intelligent & Robotic Systems 110 (2024): 72, https://doi.org/10.1007/s10846-024-02104-4.

Proposed Solutions

Addressing the labor shortage in the built environment requires a comprehensive approach. The following solutions aim to mitigate the challenges and create a more sustainable workforce.



To address these challenges, top industry organizations view the workforce differently with the following levers:

Expanding the talent pool involves implementing programs to attract underrepresented groups, including women. Pipeline shaping involves partnering with high schools and vocational programs to introduce young people to construction careers early. Additionally, engaging employers in apprentice training can help bridge generational gaps and improve retention rates among apprentices.[7]

Elevating training programs is critical. Developing and expanding apprenticeship programs that provide hands-on experience and mentorship, along with investments to recruit and train qualified instructors, will help address the skills gap. Establishing career pathway programs to facilitate the transition from skilled labor roles to front-line supervision will incentivize opportunities for advancement. A 5% increase in training participation can lead to an approximate 4% increase in labor productivity.[8]

Optimizing the work environment by investing in advanced safety equipment and protocols and promoting policies that support work-life balance will make the industry more attractive. Regular safety drills and comprehensive training programs can help workers prepare for potential hazards seen on-site. Offering staggered shifts, compressed workweeks, and remote work options helps employees manage their personal and professional lives, reducing stress and improving job satisfaction. Providing access to employee assistance programs, on-site counseling services, and mental health workshops promotes a supportive work environment. Implementing paid time off, parental leave, and wellness programs enhances employee well-being, productivity, and longevity. By focusing on these areas, the construction industry can create a safer, more supportive, and productive work environment, ultimately helping to address the labor shortage.

Incorporating technology is another key solution. The use of wearable technology like smart helmets and vests, for example, has led to a 14% reduction in workplace injuries on monitored sites in 2023.[9] Using robotics for physically demanding tasks, drones for inspections and monitoring, and training workers to interact effectively with technology like BIM integration and augmented reality will enhance productivity and safety. The adoption of digital technologies for health and safety management can significantly reduce injury rates and improve overall site safety.[10]

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[7] A. S. Howe et al., "Engaging Employers in Apprentice Training: Focus Group Insights from Small-to-Medium-Sized Employers in Ontario, Canada," International Journal of Environmental Research and Public Health 20, no. 3 (2023): 2527, https://doi.org/10.3390/ijerph20032527.

[8] Nariman Ghodrati et al., "Unintended Consequences of Productivity Improvement Strategies on Safety Behaviour of Construction Labourers; A Step toward the Integration of Safety and Productivity," Buildings 12, no. 3 (2022): 317, https://doi.org/10.3390/buildings12030317.

[9] Barry Elad and Kathleen Kinder, "Construction Insurance Industry Statistics," Coinlaw.io, last modified March 27, 2025, accessed April 2, 2025, https://coinlaw.io/construction-insurance-industry-statistics/.

[10] Theo Haupt, Mariam Akinlolu, and Mohlomi Raliile, "Applications of Digital Technologies for Health and Safety Management in Construction," in Proceedings of the World Conference on Safety in Construction (2019): 88-97, https://doi.org/10.31705/WCS.2019.9.

Innovating means and methods, such as through offsite modular fabrication, enhance efficiency and productivity in the construction industry. Multiskilling improves production line efficiency by enabling workers to switch between tasks, reducing the need for specialists and optimizing resource allocation. This flexibility helps manage project timelines, quality, and costs, especially during labor shortages. Advanced technologies like digital twins and construction robotics further boost efficiency by reducing errors, improving distribution, and automating labor-intensive tasks.[11]

Modular construction can also control costs and operational effectiveness by minimizing geometric variability risks. By fabricating components offsite, the value chain is reorganized, leading to operational improvements and reduced work-in-progress levels which can address labor shortages and the need for increased productivity and efficiency.[12] Offsite and modular construction provide workers with a more regular, consistent working location, which can attract labor participation from individuals seeking a stable and predictable environment.

Implementation Path Forward

To effectively incorporate these recommendations, it is necessary to categorize them by stakeholder type and provide specific actions for each group:

Asset Owners

- **Integrate innovative construction methods:** Set requirements for modular construction and other advanced techniques to improve efficiency and reduce costs.
- **Promote work-life balance policies:** Implement flexible work schedules, provide paid time off, and support parental leave to improve worker satisfaction and retention.
- **Support training programs for workers:** Fund and participate in apprenticeship and training programs to develop a skilled workforce and bridge generational gaps, including initiatives to recruit and train qualified instructors.

Industry Organizations

- **Fund workforce development programs:** Allocate resources to support training and apprenticeship programs aimed at developing a skilled labor force to address labor shortages, with a focus on training qualified instructors.
- **Invest in automation technologies:** Provide funding for the adoption of automation and robotics to mitigate the impact of labor shortages by enhancing productivity and reducing reliance on manual labor.
- **Support employee retention initiatives:** Invest in initiatives such as competitive compensation packages, benefits, and retention bonuses to help companies retain their existing workforce and reduce turnover.

Regulatory and Compliance Bodies

- **Set advanced safety equipment requirements and protocols:** Require that job sites are equipped with modern safety technologies to protect workers and reduce accidents.

[11] Tuyet P. A. Mai, Dat T. Doan, and Ali Ghaffarianhoseini, "Utilizing Multiskilled Resources in Addressing Labor Shortage Issues in Off-Site Construction: Benefits, Challenges, and Best Practices," Journal of Construction Engineering and Management 151, no. 4 (2025): 04025014, https://doi.org/10.1061/JCEMD4.COENG-15275.

[12] Adriana Ribeiro, Amílcar Arantes, and Carlos Cruz, "Barriers to the Adoption of Modular Construction in Portugal: An Interpretive Structural Modeling Approach," Buildings 12 (2022): 1509, https://doi.org/10.3390/buildings12101509.

- **Enforce safety and health standards:** Regularly update and enforce regulations to maintain safe working conditions and reduce workplace injuries.
- **Facilitate technological adoption:** Create incentives and provide guidance for the adoption of innovative technologies that can improve efficiency and safety in construction.
- **Streamline regulatory processes:** Simplify and expedite regulatory approval processes to encourage timely project completion, thereby promoting investment.

Design and Engineering Firms

- **Collaborate with stakeholders:** Work closely with asset owners, builders, and other stakeholders for seamless implementation of new technologies and methods.
- **Enhance training programs:** Develop specialized training programs for design and engineering professionals to keep them updated on the latest construction technologies and methods. Partner with technology and strategy companies to train qualified instructors, promoting a skilled and knowledgeable workforce.

Construction Stakeholders

- **Adopt advanced technologies:** Implement robotics, UAVs, and wearable technology to enhance productivity and safety on job sites.
- **Engage in apprenticeship programs:** Partner with educational institutions and vocational programs to provide hands-on training and mentorship for new workers, while also focusing on training instructors.
- **Improve working conditions:** Invest in better safety equipment, provide regular safety drills, and promote policies that support work-life balance.

Conclusion

The construction industry stands at a critical juncture where addressing labor shortages is paramount to helping to ensure its future viability and growth. By implementing these targeted actions, each stakeholder group can contribute to a more sustainable and resilient labor market that not only meets current demands but also adapts to future challenges. These reforms will help attract and retain skilled workers, foster innovation, and enhance productivity. Ultimately, a robust and sustainable labor market will help drive the industry forward, enabling high-quality infrastructure projects, while also contributing to broader economic stability and development.

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