



Gallagher

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The Transformative Role of Artificial Intelligence in the Construction Industry and ENR General Contractors



Introduction

Artificial intelligence (AI) is revolutionizing the construction industry, particularly among ENR general contractors (GCs). As the construction sector faces challenges such as labor shortages, rising costs and increasing project complexity, AI has emerged as a transformative tool to drive efficiency, enhance safety and optimize resource allocation. By automating repetitive tasks, enabling predictive analytics and improving decision-making, AI is reshaping how contractors approach project management, risk mitigation and workforce strategies. This whitepaper explores the key transformations, trends, challenges and strategies associated with AI adoption in the construction industry, with a focus on ENR general contractors.

AI Transformations in the Construction Industry

AI is driving significant advancements in the operations of ENR general contractors, enabling them to reduce project costs by up to 15%, optimize resource allocation and automate administrative tasks such as processing change orders. Key areas of transformation include:

1 Safety and Site Monitoring

AI-powered tools, such as Intenseye, utilize camera-based systems to monitor live video feeds, ensuring compliance with personal protective equipment (PPE) requirements and identifying hazards in real-time. This proactive approach allows for remote safety management and reduces on-site risks.

2 Document and Risk Management

AI automates the processing and classification of drawing revisions, minimizing errors and saving significant time on administrative tasks. This streamlines workflows and reduces project delays, enabling contractors to focus on high-value activities.

3 Predictive Analytics

By analyzing vast amounts of historical data and live jobsite information, AI forecasts project risks, potential delays and cost overruns. This predictive capability allows contractors to take preventive measures and optimize project outcomes.

4 Business Development

AI platforms, such as Building Radar, scan building permits and planning applications to identify high-margin projects early. This gives contractors a competitive edge in securing lucrative opportunities and expanding their portfolios.

5 Talent Attraction

AI-enabled workflows appeal to younger, tech-savvy workers, particularly Gen Z, who expect advanced, digital-first tools in their workplace. This helps contractors address labor shortages and attract top talent.

These technologies, often described as "copilots" rather than replacements, enable project teams to spend less time on manual, repetitive tasks and more on high-value, complex problem-solving.



Key Trends and Challenges in AI Adoption

Trends (2025-2026)

- 1. Pre-construction and Design:** AI is being utilized for accurate cost estimation, feasibility studies and generative design, reducing manual takeoff time by up to 40%.
- 2. Real-Time Site Monitoring:** AI-powered cameras and drones track site progress and identify risks, enhancing transparency and safety.
- 3. Robotics and Automation:** Robotic systems are increasingly used for fabrication and repetitive tasks, improving efficiency and reducing labor dependency.
- 4. Data-Driven Decision Making:** Firms are moving away from reactive approaches by using AI to analyze data silos, optimize schedules and resource allocation.

Challenges

- 1. Data Security and Privacy:** 62% of firms cite concerns about data privacy and the exposure of sensitive project information when using public AI tools.
- 2. Skill Gaps and Workforce Atrophy:** 58% of firms lack the internal expertise to implement AI, and there is concern over the erosion of traditional engineering skills.
- 3. Data Quality and Integration:** Poor-quality data limits the effectiveness of AI models, with only 26% of contractors reporting high-quality data.
- 4. Legal and Ethical Concerns:** Risks include liability for inaccurate AI outputs, "shadow AI" risks and intellectual property challenges.
- 5. Implementation Resistance and Costs:** High costs and internal resistance to changing workflows are significant hurdles.

Strategic Responses to AI Challenges

To address these challenges, contractors are adopting proactive strategies, including:

1

Data Governance and Human Oversight

- Establishing strict protocols for AI usage and ensuring "human-in-the-loop" validation for AI-generated outputs.
- Maintaining a defensible trail of AI-driven decisions to mitigate liability risks.

2

Contractual Risk Allocation

- Reviewing vendor agreements to ensure accountability for AI errors.
- Updating contracts to allocate risks related to AI failures and ensure compliance with insurance requirements.

3

Cybersecurity Enhancements

- Implementing AI-driven security operations to detect anomalies and protect sensitive data.
- Adopting zero-trust principles, multi-factor authentication and role-based access controls.

4

Workforce Training and Engagement

- Reskilling employees to work alongside AI and robotics.
- Involving field teams and safety committees in the adoption of new technologies to build trust and transparency.





AI's Impact on Workforce Strategies

AI is transforming workforce strategies by shifting roles from manual tasks to high-value decision-making. Key impacts include:

Role Evolution: Project managers are focusing on strategic oversight rather than administrative tasks, leveraging AI for scheduling, document control and project analysis.

Safety and Risk Mitigation: AI-enabled wearables and computer vision enhance on-site safety by detecting PPE compliance, fall risks and worker fatigue in real time.

Productivity Optimization: AI tools improve resource allocation, match crews to tasks and provide insights that allow smaller firms to compete with larger ones.

Addressing Labor Shortages: Automation of repetitive tasks allows workers to focus on complex, human-centric issues, helping to bridge labor gaps.

Despite these advancements, human oversight remains critical to ensure the accuracy and reliability of AI outputs.

AI in Construction Verticals

AI adoption varies across construction verticals, driven by data availability, project complexity and safety requirements:

Industrial and Heavy Civil: AI is used for remote project management, robotics, and predictive maintenance to reduce downtime and manage complex infrastructure.

Commercial and Residential: AI focuses on progress tracking, quality control, and material optimization, ensuring that work on-site matches digital models (BIM).

Specialty Trades: AI streamlines administrative tasks like RFIs and change orders, particularly for high-complexity projects.

Design-Build: Generative design tools analyze structural options for cost, efficiency, and sustainability, accelerating the design process.

AI-Driven Parametrics in Data Center Projects

AI-driven parametric design is transforming data center projects by using algorithms to rapidly generate and test thousands of layouts, cooling and structural scenarios. Key benefits include:

Optimized Site Selection: AI analyzes GIS data, flood zones and power connectivity to identify ideal locations.

Generative Design and Layouts: AI generates and tests thousands of cooling strategies and floor plans to identify the most energy-efficient configurations.

Structural Optimization: Algorithms evaluate stress distribution and material usage, enabling sustainable and cost-effective designs.

Automated Compliance: AI assists with code compliance checks, reducing the time required for permitting and regulatory approvals.





AI in Insurance Underwriting for General Contractors

Insurers are leveraging AI to transform underwriting processes for ENR general contractors. By analyzing massive datasets, AI enables faster, more accurate risk assessments. Key applications include:

Advanced Document Analysis: AI tools analyze contracts and certificates of insurance (COIs) to flag missing coverage or high-risk clauses.

Enhanced Risk Selection: Predictive models assess contractor performance, site hazards and financial exposures to predict potential losses.

Proactive Risk Monitoring: AI uses computer vision and predictive analytics to identify unsafe conditions and recommend preventive measures.

These advancements reduce underwriting times, improve accuracy and foster stronger partnerships between insurers and contractors.

Conclusion

AI is fundamentally transforming the construction industry, particularly for ENR general contractors, by automating processes, enhancing safety and enabling data-driven decision-making. While challenges such as data security, skill gaps and legal risks persist, proactive strategies such as robust data governance, workforce training and cybersecurity enhancements are helping contractors navigate these obstacles. As AI adoption continues to grow, the focus will remain on integrating these technologies to support, rather than replace, the human workforce. By leveraging AI responsibly and strategically, ENR general contractors can unlock its full potential to drive innovation, efficiency and growth in the construction industry.

Managing AI Risk Alongside AI Opportunity

As construction firms expand their use of artificial intelligence across estimating, scheduling, design review, equipment maintenance and project management, it's important to consider the unique risks that accompany these technologies.

AI models are built on probabilities and are only as effective as the data that supports them. Inaccurate predictions, data quality issues, missed regulatory requirements or intellectual property concerns can create unexpected financial and operational consequences for contractors. Traditional insurance policies may not always address these emerging exposures.

Gallagher's AI Protect solution was developed to help organizations address AI-related risks with dedicated underwriting and insurance capacity designed specifically for advanced analytics and artificial intelligence applications. The solution can help organizations pursue innovation with greater confidence while supporting responsible AI adoption.

Key considerations include:

- AI model performance and prediction errors
- Data integrity and quality concerns
- Regulatory and compliance risks
- Intellectual property and copyright exposures
- Emerging risks associated with rapidly evolving AI technologies

Learn more about AI Protect and how it can support your AI initiatives.





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