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The Benefits and Risks of AI in Construction and Design

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Oxford Economics, in its “Global Construction Outlook, Q3 2023 Update,” projects total global construction activity to rise to \$9.9 trillion by 2025, growing at a compound annual growth rate (CAGR) of 3.6% from 2025 to 2027 (as compared to a CAGR of 1.2% and \$9.6 trillion in 2024). Civil engineering will be the main driver of growth in the short term as governments continue to invest in large infrastructure projects to boost growth and offset losses from weaker economic performance elsewhere.

Part of this impressive growth is due to the emerging use of artificial intelligence (AI) tools in construction, which offer a variety of benefits and solutions on projects. Despite this, the construction industry has traditionally been slow to adapt to change, and has been resistant to AI as a tool. In this developing landscape, it is crucial that claims professionals and our clients are competent in understanding the risks and benefits that AI tools

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pose in design and construction as well as the contractual and coverage pitfalls, and necessary protections, when using AI.

Current State of AI in the Construction Industry

What is it?

There is a wide range of AI-powered tools designed specifically for use in the construction industry, including specialized software that uses machine learning algorithms as well as hardware such as advanced industrial robots, which typically require assistance with human intelligence. Some of the common design and construction AI software in use today include ClickUp, OpenSpace.ai, Procore, Fusion 360 by Autodesk, and Fieldwire. The software is geared toward project planning, scheduling, resource allocation, and risk analysis, as these directly impact project timelines and deliverables.

How is it being used?

AI can assist in all stages of construction projects, from design and bidding to procurement, project safety, post-completion performance, and maintenance. At the beginning of a project, AI software such as building information modeling (BIM) can assist with generative design of 3D models, comparing the models designed by different teams to prevent the necessity of redesign and suggesting design alternatives. In addition, drones can map out job sites and create 3D models of buildings under construction. The presumably improved accuracy of the models from various teams and trades on a project (architects, engineers, MEP) minimize inconsistencies between the models and can assist in streamlining the sequencing of activities on a project.

AI also assists in forecasting necessary financing and predicting cost overruns, a particularly useful tool given the growing frequency of “mega-projects” valued at \$35 million or more. Large construction projects can exceed budgets despite employing even the best project teams. AI

can be used to translate historical data such as planned start and end dates, project size, delivery method/contract type, material and manpower data, as well as competence of project managers to predict realistic timelines and project schedules.

During the project, AI can help streamline procurement, manage supply chains, and improve efficiency, productivity, and site safety. Companies are offering self-driving construction machinery to perform repetitive tasks more efficiently than their human counterparts, such as pouring concrete, bricklaying, welding, and demolition. Excavation and prep work are being performed by autonomous or semi-autonomous bulldozers, which can prepare a job site with the help of a human programmer to exact specifications. This frees up human workers for the construction work itself and reduces the overall time required to complete the project. Offsite, companies are increasingly making use of assembly-line robots that can piece together components of buildings, such as walls, to be shipped on location for workers to complete and install. Autonomous technology appears to help bridge the gap in the current labor shortage in the construction industry.

The use of AI to monitor and prioritize risks on a job site has resulted in significant strides to make construction projects safer. According to OSHA, the leading causes of private sector deaths (excluding highway collisions) in the construction industry were falls, followed by struck by an object, electrocution, and caught-in/between. Technology such as surveillance drones, wearable worker technology, 3D printers, and autonomous equipment all can improve safety onsite by tracking and quantifying the most significant risks on a project. In addition, wearable AI technology such as smart watches, smart boots, and smart helmets have been shown to improve worker safety.

AI has provided remote skills training to workers on a project that can enhance on-the-job training with efficient, consistent, and trackable education tools for every trade and design professional on the

job. Mandatory toolbox talks, required recertifications, continuing education and safety training are facilitated with ease and certainty. Construction companies also use software such as myCOI, an AI tool that protects companies against claims and ensures compliance with insurance requirements and applicable laws, codes, and regulations.

Finally, there is a vast amount of information generated after the completion of construction projects that provides insights for overall efficiency and improvement—cost and time savings, specifically—reduction in claims, and safer job sites. Data such as aerial drone scans, 3D imaging, frequency of accidents, and efficacy in meeting deadlines all can be used to improve future project management. The use of AI is crucial in the post-completion phase of a project in order to organize and draw conclusions from the data to improve AI for future application.

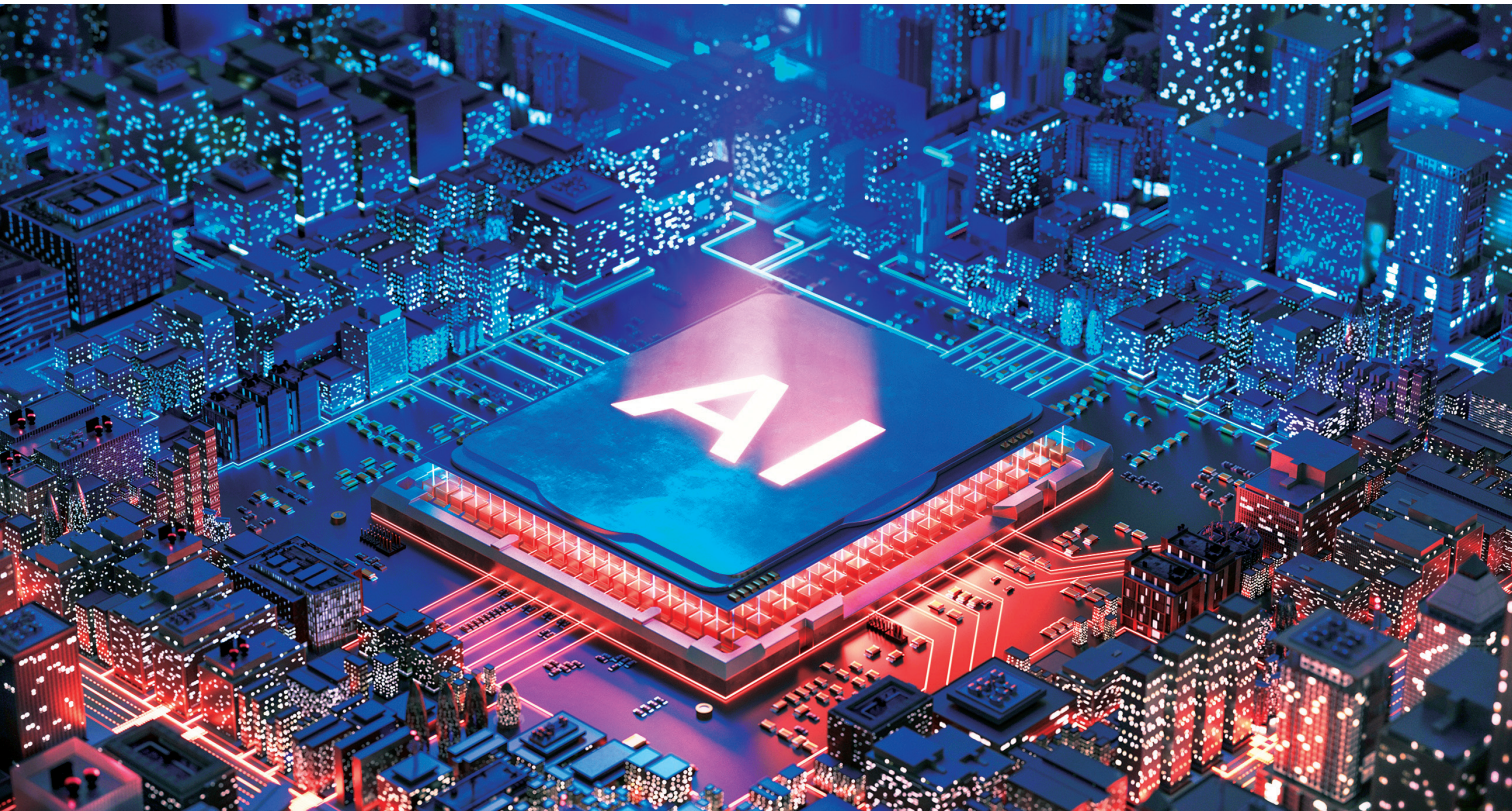
Does AI make a difference in the construction industry?

The short answer is that AI has had a definite impact, but its use is in its infancy and it is premature to assess its potential. If not used properly, AI intended to maximize benefits may fall short as compared to the investment of time and cost associated with it. AI could transform the construction industry as the technology continues to evolve the design and construction of projects in the coming years.

Pros, Cons, and Claims

The good and the bad

Integrating AI into construction projects can expedite the design and procurement processes, improve safety and regulation compliance onsite, and aid in understanding project outcomes. Given the amount of money spent on mega projects and the potential risks that may arise, AI presents another tool that can be used by savvy design and construction professionals to ensure that projects stay on track by automating



compatibility of drawings, ensuring the constructability of designs, accelerating the design to construction phase, and ensuring actual construction is consistent with design. AI automates proactive risk management; the real-time use of AI programs on a project can address safety or design issues early and resolve these issues before they escalate.

Despite some significant benefits, there are definite obstacles to the use of AI in construction. It can be a very costly (and quickly evolving) investment and is not always financially feasible for smaller design and construction firms. Construction has historically lagged behind other industries—such as transportation, energy, and health care—in adopting new and novel technology. Also, the industry is founded on personal relationships, human interaction, and hand-shake deals or “in the field” adaptation among developers, design professionals, and contractors. The use of AI displaces some of that human interaction and creates another source for cybersecurity concerns and

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exposure to cyber incidents. In addition, although AI replaces, in part, the need for humans, it does not eliminate the need for humans, or resulting human error, particularly related to verifying the data input into AI. Finally, there is speculation, as with any new technology, as to whether the impressive possibilities of using it are worth the training and expense required.

Current and anticipated claims

There is no hotbed of current claims related to the use of AI in the construction industry from which to draw reliable conclusions. However, it is anticipated that claims will arise related to liability

and/or responsibility for decisions made by AI systems. Additionally, claims associated with data privacy and security when using AI technology in construction are expected to appear on the litigation horizon. The legal disputes related to the use of AI in the construction industry may be magnified by the lack of established regulations and guidelines for its use. It is essential for design and construction professionals to work with select AI vendors to ensure transparency and accountability in the AI systems they use, as well as to invest in cybersecurity measures to protect sensitive data. Collaboration by construction

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industry leaders, legal professionals, and policymakers can maximize the benefits of AI in construction while minimizing potential risks and resulting claims.

Risk Management, Coverage, and Contracting

To reap the benefits of AI while mitigating the risks of using it, design and construction professionals must prioritize educating themselves on a trusted AI tool. AI vendors seeking to ease technology headaches need to establish themselves as trusted providers and reliable trailblazers in this market. To be frank, AI is just too new to be certain which vendors will prove themselves over time to be reliable, established vendors that adequately service, train and support the AI products available.

When entering a contract with an AI vendor, the terms must specifically define the parties' roles, what protections are available, and the limitation of liability applicable to AI. Lastly, just like any new tool or technology, AI must be continually monitored by humans during the research and development process to ensure that the technology is functioning optimally and appropriately, or the question becomes can we actually rely on AI or do we have to accept that using AI will never completely eliminate human error.

Risk management is key to avoiding the pitfalls that come with using generative AI and machine learning in the design and construction industry. Since AI technology is novel and may not be widely understood, its use will likely result in increased liability exposure to users due to the lack of preventative checks and balances in place. Ultimately, the question is: When AI malfunctions, who is responsible and whose insurance responds to the claim?

The answer will depend on identifying and quantifying the risks associated with the use of AI. Although there is currently a lack of data related to claims generally, to form a conclusion related to the damages and/or costs associated with AI claims, insurance wording and pricing for exposure will need to evolve to address

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AI-related risks. At minimum, architects and engineers (A&E) professional liability coverage should accommodate the technology being insured. This has already emerged with BIM technology, which has been addressed in professional liability policies. Specialized AI insurance policies also are being developed and marketed in response to this need.

However, some of the risks posed by AI may already be covered by existing insurance policies, such as cyber insurance, technology errors and omissions insurance, and general liability insurance. As AI technology and its potential risks continue to develop, contracts and coverage must be carefully reviewed for language tailored to address AI-associated risks. Specifically, contracting parties should pay particular attention to AI-specific warranties, indemnity agreements, ownership and/or licensee obligations, and limitations on liability and coverages as related to use of AI. Terms should always be tailored to the specific context in which the AI system will be used and based on standards that are measurable. Common service standards such as reasonable care and skill may still form the basis of the warranty but it should additionally respond to the fact that AI is being used.

Just as the evolution of project delivery systems required an overhaul of certain construction contract terms and obligations, projects using AI will demand fine tuning

of construction contracts and attention to the insurance coverages being identified as appropriate to protect parties from AI-associated risks on the project. The scope of obligations for a human overseeing AI technology should be clearly identified. Records should be retained related to the solutions that AI is proposing so those overseeing the application of AI are able to review and manage associated risks.

The contract with the AI vendor also must have a specialized approach. The AI vendor must be carefully evaluated to assess their ability to satisfy a claim with their own assets or insurance coverage. Construction or design firms' indemnities should be minimized by adding in vendor indemnities such as indemnification for fraud, negligence, willful misconduct, IP infringement, data loss/theft, and even personal injury and death depending on the AI tool.

The possibilities, both exciting and risky, may seem overwhelming to construction and design firms interested in using AI on future projects. However, AI is just like any new technology and requires proper training and preparation to ensure the construction industry fully reaps the benefits of its use. Some AI is already here, hidden in plain sight, and some products may take more investment before they become commonplace on project sites. One thing is certain: AI is here to stay, and if our construction and design professional clients are hopping on board to reap the perceived benefits, they will need to carefully review their insurance coverages and their contracts and work closely with their insurance, broker and legal partners to plan for the risks associated with this new technological endeavor. ■

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