

CONSTRUCTION LAW AND LITIGATION

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IN THIS ISSUE

Danielle M. Waltz and Chelsea A. Creta of Jackson Kelly, PLLC report on the legal ramifications of artificial intelligence in the construction industry and the importance of project contracts while the law continues to develop around the use of artificial intelligence in various industries and disciplines.

AI Field of Dreams—If Machines Build It, Will They Come?

ABOUT THE AUTHORS



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In the construction industry where pen and paper often rule the day, artificial intelligence may get overlooked by a preference for custom and tradition. Artificial intelligence, however, is a tool just like any other and its use is becoming increasingly inevitable. It not only can be used effectively to assist in project design, management, and supervision, but it also has the potential to increase the chance of project success and contribute to the increased efficiency of daily tasks across the construction sector. Indeed, a 2017 McKinsey report states that construction firms could boost productivity by as much as fifty percent through the real-time analysis of data,¹ a benefit that artificial intelligence can provide.

Notably, artificial intelligence is a tool that may be utilized to help minimize legal risks. However, given the recent expansion of this innovative technology, the law is significantly behind in many areas and practically non-existent as it relates to the construction industry. While there are many benefits to using the technology now during the life of the project, there are also drawbacks and potential uncertainty in risk-allocation. Parties working on a project will thus need to be particularly mindful of the governing

provisions of the project contract, and this may require updating standard contract provisions to specifically adapt to the utilization of artificial intelligence software.

I. *What is Artificial Intelligence?*

As a general concept, artificial intelligence (“AI”) is “about machines (computer software) doing things that are normally done by people.”² The aim of AI is to have machines mimic the cognitive functions of humans, such as learning and problem solving, in order for them to conduct small and large tasks.³ AI thus involves an overlapping of the human senses with various fields and disciplines, such as computer science, robotics, psychology, philosophy and linguistics. Note that AI is different from automation—AI can make decisions based on patterns it identifies in data samples, while automation simply executes orders provided in an “if-then” format.⁴ Unlike automation, AI has the capacity to learn and grow.⁵

Regarding the construction industry, AI is generally focused on “machine learning” and

¹Sumana Rao, *The Benefits of AI in Construction*, CONSTRUCTIBLE (Jan. 18, 2019), <https://constructible.trimble.com/construction-industry/the-benefits-of-ai-in-construction>.

² Stacy Sinclair, *AI & Construction Law: An Essential and Inevitable Partnership*, FENWICK ELLIOTT INTERNATIONAL QUARTERLY ISSUE 25, https://www.fenwickelliott.com/research-insight/newsletters/international-quarterly/ai-construction-law-partnership#footnote4_aasxof4 (citing Joanna Goodman, *Robots in Law: How Artificial*

Intelligence is Transforming Legal Services, ARK GROUP (2016)).

³ Dr. Rehana Parveen, *Artificial Intelligence in Construction Industry: Legal Issues and Regulatory Challenges*, INTERNATIONAL JOURNAL OF CIVIL ENGINEERING AND TECHNOLOGY 9(13) 957-62 (2018), available at http://www.iaeme.com/MasterAdmin/UploadFolder/IJCIET_09_13_096/IJCIET_09_13_096.pdf.

⁴ Lisa Angelo, Mark I. Unger, Ronald L. Chichester, *I. What is Artificial Intelligence?*, 2018 TXCLE-AFL 30-I (State Bar of Tex. 2018).

⁵ *Id.*

“deep learning.”⁶ Machine learning is the ability of technology to take on large amounts of data, learn from it as algorithms, and predict something based on what it learned. Deep learning is a specialized form of machine learning that is based on neural networks.⁷ Deep learning methods report higher recognition accuracy, handling a large set of labeled data.⁸ The key for owners, engineers, and construction contractors, therefore, is inputting as much data into the software as possible for every project to allow AI to sufficiently learn from it.

II. *Legal Ramifications of Artificial Intelligence in the Construction Industry*

Owners, engineers, and contractors may utilize AI and the application of machine learning methods to minimize litigation risks. Moreover, such technology can be utilized to provide real-time information and promote productivity. The discussion that follows provides only a few examples of the benefits of AI and its legal implications.

A. AI and the “Scope of the Work” in Construction Contracts

The “scope of the work” is one of the most important parts of the project contract and one of the most heavily litigated issues in civil construction disputes. Simply put, the “scope of the work” defines what duty is owed by one party to the other during the life of the project. In exchange for the contract sum, the contractor is required to perform all, but only, the work that is identified in the contract.⁹ When circumstances change in a manner that changes the scope of the work—i.e. increasing the amount of work that the contractor must perform—the contractor is generally entitled to an increase in the contract price. Typically, this is handled through the submission of a change order.

Without a clear definition of the scope of the work, it is difficult for owners, engineers, and contractors to determine when the work is completed and to calculate associated costs. Owners and contractors want to put themselves in the best financial position they possibly can. Owners generally save money by placing as much of the work as possible within the original scope of work, while the contractor makes money by identifying necessary work as “extras” outside the original scope of the work. Accordingly, if

⁶ Manu Venugopal, *What is AI and Machine Learning in Construction? Our Definitive Answer*, CONNECT & CONSTRUCT (May 31, 2018), <https://connect.bim360.autodesk.com/what-is-machine-learning-in-construction>.

⁷ *Id.*

⁸ Hasmath Farhana Thariq Ahmed & Hafisoh Ahmad, *Device Free Human Gesture Recognition Using Wi-Fi*

CSI: A Survey, ENGINEERING APPLICATIONS OF ARTIFICIAL INTELLIGENCE 87 (Jan. 2020), available at <https://www.sciencedirect.com/science/article/pii/S0952197619302441>.

⁹ Stephen A. Hess, *Construction Contract Pricing*, CONSTRUCTION BRIEFINGS, CONBRIEF No. 2008-7 (July 2008).

there is a dispute during the contract, the owner, engineer or contractor will be in a better position to defend themselves if the scope of the work is clearly defined.

To assist with this issue, AI can automate the extraction and scheduling of data from large volumes of contracts.¹⁰ It can generate a detailed party-specific summary of obligations, liabilities, and other meta-data from the contracts analyzed.¹¹ However, the software may require human input when the contract and obligations are amended or modified by the parties and change orders are submitted, exposing the system to human error. When utilizing systems such as these, it may become important for construction contracts to contain provisions on risk-allocation specific to the program utilized. Standard contract forms may need to be modified or amended to contain provisions specific to the software used, and dictate when, how, and who will input the information for up-to-date summaries.

B. AI and Construction Planning, Design and Management

Tied to the “scope of the work” are the project’s plans and specifications. For instance, an owner may believe it contracted the entire scope of necessary work, only to find out that the design professional’s plans and specifications did not include various

considerations required to get the project completed. AI has the potential to provide real-time analysis and analyze various designs to determine which designs may be better suited for specific projects in the long-run.

In the planning stage of a project, AI can survey a proposed construction site and gather enough information to create 3D maps, blueprints, and construction plans.¹² It can also collect data over time and provide design alternatives. The industry is also utilizing software to identify and mitigate clashes between different models generated by different teams in the planning and design phase. Autonomous construction equipment can continuously update maps and blueprints to reflect changes in terrain or site conditions.

AI can also manage the project and control tasks. For instance, ALICE is a scheduling assistant AI that runs through millions of schedules based on specific criteria and parameters to create an optimal construction schedule in minutes.¹³ Artificial neural networks are used on projects to predict cost overruns based on factors such as project size, contract type and the competence level of project managers.¹⁴ Subcontractors can even be rated based on a risk-score, so construction managers can prioritize working closely with high-risk teams to mitigate risk.

¹⁰ Stacy Sinclair, *Artificial Intelligence and Construction Law: It’s Here, Don’t Be Left Behind*, FENWICK ELLIOTT INTERNATIONAL QUARTERLY ISSUE 23, <https://www.fenwickelliott.com/research-insight/newsletters/international-quarterly/artificial-intelligence-construction-law>.

¹¹ *Id.*

¹² Dr. Parveen, *supra*, at 957-62.

¹³ Kendall Jones, *The Promise of Artificial Intelligence in Construction*, CONSTRUCT CONNECT (June 28, 2019), <https://www.constructconnect.com/blog/promise-artificial-intelligence-construction>.

¹⁴ Rao, *supra*.

In addition, AI can be used in the construction industry to predict when equipment will need maintenance.¹⁵ For example, using IoT (Internet of Things) technology, a subset of AI, users can collect data on machines, equipment, vehicles, and utilities, and IoT can analyze the data to predict when equipment will need maintenance before it occurs.¹⁶ This may assist contractors in avoiding undue delay and staying on schedule, particularly when the project contract expressly indicates that “time is of the essence.” It also could reduce the possibility of injury on a job site due to equipment malfunction.

C. AI, Injury, and Property Damage

AI can be used to learn and spot construction hazards in real-time using AI live video and image detection. Some examples include spotting employees not wearing safety gear on site or providing warnings of gaps in structures or buildings. Algorithms are being developed with the potential to compute risk ratings for projects, so safety briefings can be held when an elevated threat is detected on site.¹⁷

In addition, AI technology may be attractive to those who would consider sending self-driving machinery or equipment into dangerous terrain to reduce the risk of injury or death to

human life. Some companies are even offering self-driving construction machinery to perform tasks such as pouring concrete, bricklaying, welding, and demolition. Autonomous construction equipment may have the potential to improve safety, increase efficiency, and help compensate for the shortage of skilled labor.

On the other hand, what happens when AI *causes* an accident or injury? For instance, Michael J. Keating and Thomas H. Case were quick to point out that, despite reducing the number of accidents that its drivers are involved in by forty percent, Tesla’s first fatal car accident involving its Autopilot function dominated headlines.¹⁸

The liability debate currently centers on whether AI users or machines incorporating AI should be held strictly liable or liable in negligence.¹⁹ In the case of autonomous vehicles, there is an expected shift in liability from the driver to the vehicle.²⁰ Currently, however, there are no national standards governing artificial intelligence technologies.²¹ Canada was the first country to launch a national AI or digital strategies and action plan in 2017, which highlights the need to develop ethical and legal frameworks around the development and use of AI.²² In December 2018, an expert group of the

¹⁵ Debra Oden & Jonah Barnes, *Impact of Artificial Intelligence and Blockchain Technology on the Construction Industry*, CONSTRUCTION ACCOUNTING AND TAXATION, 2001 WL 36648100 (Jan./Feb. 2019).

¹⁶ *Id.*

¹⁷ Rao, *supra*.

¹⁸ Michael J. Keating & Thomas H. Case, § 1:39. *Need for Standards in Industries Using Artificial Intelligence*

Technology, CORPORATE COMPLIANCE SERIES: DESIGNING AN EFFECTIVE PRODUCTS LIABILITY COMPLIANCE PROGRAM, CORPC-PL § 1:39 (Nov. 2018).

¹⁹ *Id.*

²⁰ *Id.*

²¹ *Id.*

²² THE LAW LIBRARY OF CONGRESS, *Regulation of Artificial Intelligence in Selected Jurisdictions*, GLOBAL LEGAL

European Commission released draft AI ethics guidelines for designing trustworthy AI.²³ United States lawmakers and regulators have mainly pursued AI in the area of autonomous vehicles, and several states have adopted legislation and regulations allowing for the testing of autonomous vehicles. According to the National Conference of State Legislatures, roughly sixty percent of states have adopted some form of legislation concerning autonomous vehicles.²⁴ Because the construction industry is often late to emerging technologies, it is unlikely that adjustments to industry standards such as OSHA will be made for quite some time.

Traditional tort law will likely apply to AI, but courts will need to determine fault among product manufacturers and sellers, AI designers and developers, and AI purchasers and users. The question of whether strict liability or negligence will apply may focus on whether the user controlled the product assisted by AI, i.e. a semi-autonomous vehicle, or if AI controlled the product's operation without human intervention.²⁵ Strict liability often applies to flaws in product design, manufacture or warnings that cause personal injury or property damage, while negligence

generally applies to services. Some scholars advocate applying a negligence standard because AI is "stepping into the shoes" of humans, but it may be difficult to assess the "reasonable person" standard under this concept.

The legal interaction between artificial intelligence and tort law is uncertain. However, one thing is certain: the underdeveloped law in this area demonstrates why the construction industry should be particularly mindful of contractual indemnity and other provisions in project contracts to allocate liability. Generally, the contract is the law vis-à-vis the parties, subject to the additional duties that parties may owe to each other in tort outside the contract. Utilizing project contracts mindful of developing technology may reduce legal risks in the near future while the law continues to develop around the use of artificial intelligence in various industries and disciplines.

III. Conclusion

Today, there are estimations that artificial intelligence will be thousands of times more disruptive than the Industrial Revolution.²⁶ In

RESEARCH DIRECTORATE (Jan. 2019), available at <https://www.loc.gov/law/help/artificial-intelligence/regulation-artificial-intelligence.pdf>.

²³ THE EUROPEAN COMMISSION'S HIGH-LEVEL EXPERT GROUP ON ARTIFICIAL INTELLIGENCE, *Draft Ethics Guidelines for Trustworthy AI: Working Document for Stakeholder's Consultation* (Dec. 18, 2018), available at <https://ec.europa.eu/digital-single-market/en/news/draft-ethics-guidelines-trustworthy-ai>.

²⁴ THE LAW LIBRARY OF CONGRESS, *supra*, at 29.

²⁵ JONES DAY, *Mitigating Product Liability for Artificial Intelligence* (Mar. 2018), <https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&ved=2ahUKEwjkt6mN6LLIAhULY6wKHQW1BYwQFjABegQICxAE&url=https%3A%2F%2Fwww.jonesday.com%2F%2Fmedia%2Ffiles%2Fpublications%2F2018%2F03%2Fmitigating-product-liability-for-artificial-intell%2Ffiles%2Fproduct-liability-for-ai.pdf%2Ffileattachment%2Fproduct-liability-for-ai.pdf&usg=AOvVaw1H6-EjKuUOaTVupgCKyVLM>.

²⁶ Keating & Case, *supra*.

2018, the Midwest Economic Policy Institute and the Project for Middle Class Renewal predicted that by 2057, up to 49 percent of skilled construction jobs could be eliminated by AI.²⁷ Marketing research firm Tractica has released a report predicting that more than 7,000 construction robots will be put into place between 2018 and 2025.²⁸ With the increased demand for skilled workers and often the perceived inability to fill these positions, AI may be seen as a potential solution to this problem. As the 2017 McKinsey report aptly observed, the potential impact [of AI] is so large the construction industry can no longer afford to ignore it.²⁹

Owners, design professionals and contractors must prepare accordingly—by understanding AI’s impact on their workforce, their potential liability, and ultimately the life cycle of a project. AI is certainly in line to “build it”—the question is, how quickly will the industry come along?

²⁷ Ashlie Carlson, *Construction Material: The Effect of Tariffs and Employment Growth*, CONSTRUCTION ACCOUNTING AND TAXATION, 2018 WL 1730941 (Mar./Apr. 2018) (citing Laurie Cowin, *Automation's Opportunities and Threats*, CONSTRUCTION DIVE (Jan. 17, 2018), <https://www.constructiondive.com/news/automation-s-opportunities-and-threats/514847/>).

²⁸ Ashlie Carlson, *Construction Material: Recruiting, Restructuring, and Relying on AI: Trends Affecting Construction Industry Employment*, CONSTRUCTION ACCOUNTING AND TAXATION, 2019 WL 36648102 (May/June 2019).

²⁹ *Construction: Emerging Technology*, MORTGAGE & REAL ESTATE EXECUTIVES REPORT 51 (19), 51 No. 19 MORTEXREP-NL 2 (Dec. 1, 2018).

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