National Institute of BUILDING SCIENCES™

The Intersection of Artificial Intelligence and Building Sciences: A New Era of Intelligent Infrastructure
January 25, 2024 | Session Overview

Speakers

Roger Grant, Vice President, Building Technology, National Institute of Building Sciences

Kimon Onuma, FAIA, President, Onuma, Inc.

Jay Kline, Director, Project Management, National Institute of Building Sciences

Moderator

Jennifer Hitzke, Director, Governance & Special Programs, National Institute of Building Sciences

AI and Building Sciences Overview

The integration of artificial intelligence (AI) in facility design, construction, and operation is revolutionizing our industry, fueling both excitement and apprehension as professionals navigate this rapidly evolving landscape. As AI technologies continue to advance, early adopters have experienced a spectrum of outcomes, ranging from groundbreaking successes to unexpected challenges.

On January 25, 2024, NIBS hosted a webinar with subject matter experts and presenters Roger Grant, Vice President, Building Technology, National Institute of Building Sciences; Kimon Onuma, FAIA, President, Onuma, Inc.; and Jay Kline, Director, Project Management, National Institute of Building Sciences. Our panel dove into the world of AI applications in the building sciences, shared lessons learned, and presented outcomes from a series of global webinars that NIBS, the Asset Leadership Network, and American Institute of Architects participated in.

The discussion explored the transformative impact of AI on digital twins, industry standards, building information modeling (BIM), resiliency, sustainability, and more. The presenters also shared recent observations from the BuildingsAI conference about how Owners and the C-Suite are starting to notice the value of their data, how AI can use it, and how AI is driving the need for standards to reduce "building hallucinations."

Jennifer Hitzke, Director, Governance & Special Programs with NIBS, served as moderator.

The Vision: An Interconnected System of Systems

Roger Grant, Vice President, Building Technology, National Institute of Building Sciences, kicked off the webinar, sharing a vision.

"Imagine a world where all assets are part of an intelligent infrastructure – an interconnected system of systems," he said. "Technology supports our industry and world

seamlessly, and building sciences play an important part, improving where we live, work, learn, and play."

This world isn't far-fetched. There are many opportunities to improve today's construction practice and procedures through things like the U.S. National BIM Program (NBP).

"We're the 40 percent industry, we produce 40 percent of the world's waste, we're responsible for 40 percent of the world's carbon emissions, 40 percent of the world's energy consumption, and we use 40 percent of the world's materials – so there's a lot of opportunity."

AI can help achieve many goals. Among the drivers for the NBP:

- 13-21 percent estimated savings via increased efficiencies in design and construction assembly in the next 10 years
- 60 percent in long-term increased construction productivity through design-to-manufacturing processes supported by digital information
- 15 percent potential public construction cost savings
- 100 percent proposed potential increase in profits for AECO players
- 41 percent diminishing workforce – this is the portion of the U.S. labor force that will retire by 2031 and diversify through industrialized construction processes driven by digital automation

AI Use in Our Everyday Lives

AI is all over the news.

Jay Kline, Director, Project Management with NIBS, said that like anything, there are risks involved with the use of this technology, particularly as they relate to security questions and copyright.

So how does it work? AI is more accessible through many means, including language models, data extraction, and image recognition. It can be asked questions, and it learns by example from the things it's taught.

AI is not a magic wand, Kline says.

Kline pointed to a McKinsey study that put the construction industry last, just above agriculture, in terms of digitization.

"We struggle to innovate quickly and there are reasons for that," Kline said. "But we think AI is an opportunity to help exponentiate our progress here … there's a balance to strike. The [construction] industry is complex, but there are real opportunities with us being at the bottom, in terms of innovation."

Making Informed Decisions

Kimon Onuma, FAIA, President, Onuma, Inc., recently penned a blog entitled Moving from AI Hallucinations to Informed Decisions.

In his post, Onuma mentioned that the industry is at a "critical point where embracing advanced technology is not just an option but a necessity."

"We want to move from hallucinations to informed decisions," he said. "The more access we have to good information, we can make good decisions."

For example, AI can assist with building a digital twin – simulating a building before it's physically constructed. This allows for architects to run through hundreds and thousands of configurations with various tools.

"Now you link all these together, and you have an ecosystem – a system of systems that can talk with each other and automate a lot of that process," Onuma said. "The goal is not to do things faster, but to do them more efficiently and more accurately – and move the [construction] industry up."

Some projects that are on NIBS' radar include: a recent effort by the International Code Council to use an AI bot to query the International Building Code and return responses and help people find the right code language to satisfy particular situations.

Additionally, the team is seeing a lot of activity and interest around AI from government. Grant said NIBS is working with several federal agencies to understand the opportunities and help assist in this area.

The next generation of standards helps, particularly with the U.S. National BIM Program and soon-to-be-released hard launch of the National BIM Standard – United States version 4.

Building Innovation Webinar Series

As part of our mission to continue conference education, NIBS launched a webinar series to reach even more professionals on new technology, trends, groundbreaking tools, best practices, and workforce solutions.

It's our way of extending the Building Innovation annual conference beyond the in-person meeting.

The next webinar soon will be announced on nibs.org.