The Future of Making Will Be Powered by Generative Design and Generative AI
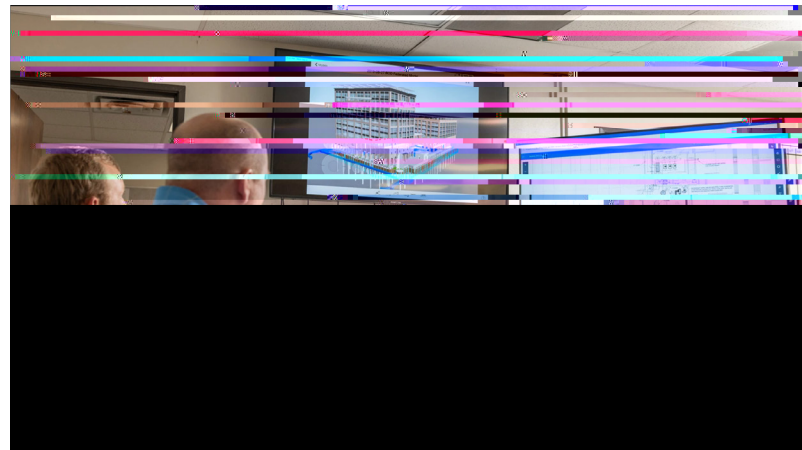
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with solutions has long been a cerebral, human process. Generative design came from a relatively radical idea: "What if people's brains can't think of all the possible solutions to bridges? What if software could help explore that?"

This was around 2009, when people were starting to leverage the cloud for large computations. And the key moment for generative design was inverting the relationship between design and simulation. Software can imagine every crazy bridge formulation and run simulations on all of them. Some come back with a bridge that is going to fall, others that will work, and some that designers want to explore further.

Generative design leverages real-world physics, creating f nal outputs that are incredibly accurate solutions to specif c design parameters. But there are some impediments. Humans must input exact specif cations of their design problem to yield the right results, which is time-consuming. Generative design also

GENERATIVE DESIGN DELIVERS HIGH-POWERED PRECISION

For each design problem, there are hundreds, sometimes thousands, of different ways to approach it, and coming up

uses immense amounts of computing power - it can take a day or more to process complex projects. But it's still far more efficient than humans. For instance, the Mercedes Formula One team used generative design tools for a better rear suspension part. It took significant time and expense to set it up, but the team now has a manufacturing process that takes just 48 hours instead of six weeks.

Generative design is often thought of as a manufacturing tool, but it can be applied to any design and make process. In the media and entertainment industry, production schedules take months to prepare with tens of thousands of tasks that often rely on one another. Now, M&E companies have applied the notion of generative design to generative scheduling. When a timeline is disrupted, generative design can quickly rationalize all the changes. It's proving to be a critical tool as productions grow more complex.

Generative design delivers levels of improvement that were once unheard of, like engineering products that use 40% fewer materials, are 40% lighter, 40% cheaper, and 30% stronger than anything designed before. The system is exhibiting things that are beyond human understanding. But despite what it can do, generative design does not look at all bridges constructed before, then learn from them when formulating a new design. In other words, it's not using data. This is where generative AI comes in.

GENERATIVE AI FOR FASTER DATA-POWERED DESIGN

AI has gone through three different waves and hype cycles. It began to catch on, then became an untouchable technology that nobody believed in, then it came back again. This third wave has likely carried AI past the breaker and cemented it into society for good. ChatGPT played a big role in this, pushing AI into the mainstream almost overnight. For two decades, the world has been making progress in developing artificial intelligence tools, but OpenAI finally demonstrated AI in action.

Trained on incredible amounts of information, generative AI can find data connections that humans cannot. It's easy to use, approachable, and incredibly fast. Type in some basic information and within seconds there are multiple responses. This is important to a creative person iteratively refining a design. They're getting responses that are opening possibilities and shifting their learning. They can input additional prompts

to improve the responses. This cyclical design-user interface resonates with how people in AECO, D&M, and M&E work.

But generative AI is not particularly precise. If it imagines a bridge, it might be inspiring, but it would be a bad idea to make that bridge because generative AI does not run simulations. It's not actually reasoning about every aspect of bridge engineering. Rather, it's pulling from data of other bridges that have beenbe BDS8BDC BTt8.2Ep3ling from data of other

The world is not even 10% into the current AI revolution. Things are going to get far crazier in the next 10 years, especially as generative design and generative AI create workflows that are faster, easier, and more accurate than ever. This will help analyze, automate, and augment design work, leaving humans to do what they do best: create. It will be a future of innovation and impact, with designers and makers at