

Portfolio Media. Inc. | 111 West 19th Street, 5th floor | New York, NY 10011 | www.law360.com Phone: +1 646 783 7100 | Fax: +1 646 783 7161 | customerservice@law360.com

## Law Lags Behind Tech As 3D Construction Forges Ahead

## By Grace Dixon

Law360 (June 28, 2022, 1:27 PM EDT) -- When the married co-owners of Precision Building & Renovating LLC decided to build Florida's first 3D-printed home just outside Tallahassee city limits in 2019, the pair found themselves embroiled in a painful process that they eventually walked away from altogether.

Leon County slow-walked James and Kyndra Light's permit application, repeatedly coming back to the Lights with requests for additional paperwork. The nine-month slog was "dead in the water" by the time the pandemic hit, James Light told Law360.



Mighty Buildings production manager Yonah Naftaly shows a machine that fills 3D-printed wall panels with insulating foam, last year in Oakland, California. (AP Photo/Terry Chea)

While a handful of 3D-printed homes cropped up across the country in 2021, constructed by Alquist 3D, ICON and SQ4D, the project floated by the couple would have been the first permitted 3D-printed home in the nation, James Light said.

"I went back and forth with them month after month trying to satisfy anything and everything," Light said. "Trying to convince them that this is a legitimate process and something ... we need to figure out how to inspect and figure out how the [building] code applies."

Precision sold the Leon County property soon after the pandemic took hold and the couple turned their attention toward Tallahassee instead, which was "way more receptive" to the project.

Law Lags Behind Tech As 3D Construction Forges Ahead - Law360

"It was an easy slam dunk for them to approve," said Light, adding that the pressure in the housing market and a shortage of skilled labor increased incentives for the Florida city in the meantime.

But even with the support of a municipality eager to be on the cutting edge, Light said, the company had to translate the house to a building code that made no mention of 3D printing.

In the end, the company "overbuilt" the structure, leaning on existing code for cinder blocks that translated best to the type made by the kind of printer the company had leased. According to Light, Precision filled the concrete-printed structure with additional concrete support, effectively treating the 3D-printed structure like a facade.

The walls were completed in nine days and the entire structure, cheaper than stick-built alternatives by 10% to 20%, is set to be completed by the end of July, Light added.

While the nascent 3D-printing technology finds its footing as a cheaper and faster approach amid a housing market weighed down by labor shortages, supply chain congestion and the rising price of materials, attorneys told Law360 that such run-ups against existing code drafted without the technology in mind were to be expected until municipalities take steps to keep pace with the technology.

Hurtado Zimmerman SC shareholder Bryan Kroes noted that the rapidly changing nature of 3D-printing technology had contributed to the lag between the law and 3D projects already underway. Any existing code relating to 3D construction would already have been rendered obsolete, Kroes added, because of the swift pace at which the technology has evolved.

In situations such as the Lights' Tallahassee project, construction companies will often rework existing code into a structure workable for the novel construction techniques, according to Kroes.

"Anytime that we're trying to build something that is outside of those traditional construction methods, you're going to find building inspectors and individual municipalities trying to figure out a way that the municipal building code that exists at that time can then be used for that particular structure," Kroes said.

"And sometimes that means approaching from a unique perspective or essentially trying to shoehorn certain elements of the building into the various code areas that may be applicable to it," he added.

Though the Lights' project is one of a handful underway or completed nationwide, developers have turned their focus to larger residential projects in recent months, including construction firm Alquist 3D's April announcement that it plans to begin work on 200 3D-printed houses in Williamsburg, Virginia, this summer.

But with widespread and larger-scale use on the horizon, tension between existing building standards and the breakneck pace at which the technology is evolving must be resolved to take advantage of the benefits touted by proponents of the technology, according to Keith Poliakoff, a founding partner at Government Law Group PLLC.

"Code throughout the United States constantly has to evolve based on changing technology," Poliakoff said. "All of us in the industry who see what's going on with labor shortages and supply chain issues and the cost of construction — which post-pandemic has escalated ... 30% to 40% — realize that developers are already scrounging the marketplace to look for other viable options."

This reconciliation process will require the industry to confront questions of how utilities and assembly of component parts differ from traditional home construction methods, according to attorneys and experts.

"Where I think many states are still going to have concerns is that it isn't necessarily a licensed plumber who's going to pull a piece of plumbing pipe through a wall or run electrical wire through a conduit," said Kim Hurtado, founding partner of Hurtado Zimmerman. "Regular laborers will do a lot of bulk assembly that would ordinarily be handled by licensed professional trades; mechanical, electrical, plumbing, fire protection."

Louis Archambault, partner in Saul Ewing Arnstein & Lehr LLP's real estate practice, echoed Hurtado, noting that the sheer dearth of real-world trial and error leaves developers and lawmakers with unanswered questions.

"You still have to run electric lines to all of these different homes, you have to run water and sewer

service to each of these different homes," Archambault said. "Is that a process that can be done similarly to what you would do now with a regular 300 single-family home project?"

Poliakoff added that a "massive" education push for building inspectors would also need to be undertaken to ensure that future projects conformed to applicable standards, whatever they may be.

"The building material is so novel that it's doubtful that many building inspectors in this state or across the country have seen it in action," Poliakoff said. "It's impossible for someone who has never seen it before to be able to confirm that it meets the structural integrity and material type [and] viscosity."

Mighty Buildings, a California-based construction technology company, announced plans in March 2021 to construct a 15-home community in Rancho Mirage, California, after constructing three individual houses elsewhere throughout the state.

Mark Aldrich, general counsel at Mighty Buildings, told Law360 that municipalities were naturally cautious when approaching new technology in construction.

"Local jurisdictions are conservative, they're there to protect their citizens and so they're much slower to adopt newer technologies because they are responsible for protecting the people who live in their city," Aldrich said. "It's totally understandable."

Unlike Precision's approach in Tallahassee to building the 3D structure on-site, Mighty Buildings produces 3D-printed modular panels at a factory and later assembles the prefabricated components on-site.

According to Aldrich, the company chose to focus its operations in California because of a state law that allowed companies to seek preapproval for factory-built housing and building components. Under the state's process, companies can submit plans for standardized designs installed in controlled conditions to the California Department of Housing and Community Development for preapproval, shrinking the typical permitting timeline from nine months to as little as two weeks.

Florida also has a similar provision in its building construction standards law allowing inspectors to approve prefabricated components.

Light told Law360 that Precision had originally considered whether the company might be able to obtain a permit for the 3D-printed home under this provision. But because Precision eventually decided to construct the home on-site using a gantry 3D printer, the provision wasn't applicable, he added.

Under the statute for manufactured housing components, a state inspector watches as an entire unit and all subsystems including electrical and plumbing are assembled. If the manufacturing process meets applicable Florida building code requirements, subsequent modules need only be inspected once.

Hurtado said the approach could give 3D construction companies the "substantive equivalent of regular code compliance."

"[The inspector] watches you assemble an entire unit, whatever that unit consists of, whether it's a wall panel, an entire apartment that's going to be slipped into a framework, a steel framework on multi-units, a high rise," Hurtado explained.

Jurisdictions will also need to work with companies pioneering 3D construction technology to ensure the safety of the printing materials used, touted by proponents as capable of withstanding extreme weather conditions better than traditional materials, attorneys added.

According to the companies, Precision used a concrete mixture for the Tallahassee home while Mighty Buildings uses a resin made of 60% post-consumer product.

Global safety certification company UL developed a methodology for evaluating 3D-printed building elements and structures, known as UL 3401. Mighty Buildings became the first company certified under the standard, Aldrich said.

UL 3401 later became the basis for a 3D-printed construction appendix to a 2021 International Residential Code developed by the International Code Council, an international organization that develops global building standards.

Michael Schwartz, a construction attorney at Cohen Seglias Pallas Greenhall & Furman PC, told Law360 that the International Residential Code appendix could feasibly function as a unified building code for 3D construction so long as municipalities adopt it in reference to previous building codes.

"While [the appendix], which incorporates UL 3401, is not a complete and comprehensive list of all applicable codes and standards which are pertinent to a 3D-printed construction process, local building codes can ensure that all applicable requirements are met by incorporating previously adopted building codes," Schwartz said.

Jurisdictions, however, must formally opt to adopt the updates contained in the 2021 code, leading to a piecemeal approach with many municipalities still abiding by the 2018 version. Only three Texas cities — Roman Forest, League City and Austin — have adopted the 2021 code and 3D appendix, according to a representative for the code council.

But while municipalities may be applying a characteristically cautious approach to the new construction technology, Kroes said shifting public opinion is likely to incentivize change as such projects proliferate across the country and become a viable method in the public eye.

"If it's just a one-off thing, it may be very hard for a municipality to see the reason to adopt it," Kroes said. "But if it starts to become more widespread, and also a viable alternative ... well then, that may be the catalyst to get certain municipalities to act."

--Editing by Karin Roberts.

All Content © 2003-2022, Portfolio Media, Inc.