

SITUATION

Walmart is always looking for innovative ways to build and leverage technologies. 3D concrete printing was on Walmart's radar and they selected Alquist 3D as their partner for the first project—adding a pickup and delivery space to an existing store in Athens, TN. As a valued member of Walmart's GC team, FMGI brought the construction perspective to this first-time project helping to mitigate and minimize risk just three weeks before the project began. FMGI was tasked with determining the how, when and why so that the concept could be delivered in a structurally sound way.



[SEE THE VIDEO HERE](#)



IN-PROGRESS



IN-PROGRESS



IN-PROGRESS



IN-PROGRESS



IN-PROGRESS



AFTER

PROJECT STATS

- Addition to an existing Walmart for pick-up and delivery (POD) in Athens, TN
- 8,000 square feet
- 20 feet high—tallest commercial 3D built structure
- 12 weeks total build; 45 days of printing
- Built in 2024

CHALLENGES

- Standards did not exist since it was the first build of its kind.
- Hand mixing the material was slowing the process and the mix was inconsistent.
- Maximizing man power.
- Printing at 20 feet high.
- Adjoining the 3D printed structure to the existing structure.
- Additional reinforcements for the height that allowed the build to be structurally sound in a seismic area.



SOLUTIONS

- FMGI and the engineers conducted extensive research to establish standards for structural integrity.
- FMGI worked with Alquist to optimize the mixture for humidity and high summer temperatures. This challenge was mitigated by switching to a nighttime print.
- Changed from hand mixing to machine mixing which improved consistency and expedited the printing process allowing the team to print 325 square feet in one night with just three people.
- Ran two printers simultaneously—one printing while the other is loaded and prepared.
- Produced a longer rail for a continuous pour up to 100 feet in order to speed up production.
- Created a custom-made tool head to equip the printer to extend 10 feet.
- Advised on robot functionality so they could be programmed appropriately.
- Applied programming and construction knowledge when adjoining the 3D printed structure to the existing structure.
- Trained the Alquist team on how to install rebar into the concrete layers for reinforcement.
- Sourced 800 couplers for the project. Only 600 were available in the U.S. and sourced 200 from overseas to arrive within one week.

RESULTS

Walmart, Alquist and FMGI partnered to 3D print the tallest commercial structure in the U.S. and the first of its kind globally. With proof of concept delivered, the process can be refined and a carbon neutral building solution will save time and minimize environmental impact in the future. FMGI adapted the traditional construction procedures to support this new technology.

TEAM:

FMGI Team Members:

Cory Clevenger, Danielle Zinn, Nick Pulley, Anthony Whitson

TECHNOLOGY:

Alquist 3D, Zachary Mannheimer

SPECIALISTS:

Southern Trades
Cut beams and installed brackets and clips

Maven Group
Concrete

