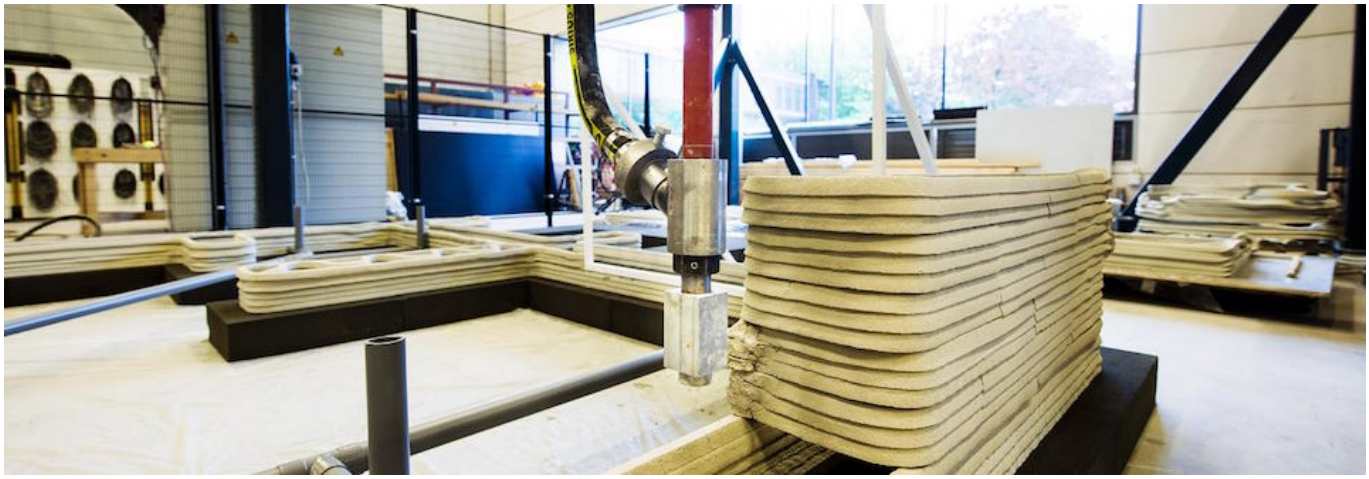

Photo Credit: Eindhoven University of Technology (TU/e) / Rien Meulman

Concrete 3D printing is largely being pushed by small startups, yet the Eindhoven University of Technology (TU/e) is using the technology to create some interesting work. Through a collaboration with Dutch company ROHACO, they developed their own remarkably accurate 11 x 5 x 4m concrete 3D printer, which has been in operation since September 2015. Their 3D printer has not been idle since then, and has it is apparent during a big presentation in the Vertigo building of the Department of the Built Environment in Eindhoven. The unveiling of a remarkable 2m tall 3D printed concrete pavilion, was almost completely designed, 3D printed and assembled by a group of students.

The remarkable structure is the culmination of several months' worth of research and testing, and was unveiled to a crowd of over 70 people in Eindhoven. Aside from the pavilion, several 3D printed objects and research results were also presented during what was called the first of a series of annual demonstration sessions.

And as the presenters revealed, the bulk of the work has been done by a group of PhD students and 4th and 5th year MSc students, though with the aid of partner companies Saint Gobain Weber Beamix, van Wijnen and Witteveen+Bos. Most of the work went into testing the 3D printer setup and researching various production methods and materials – both before and after curing. The students also extensively explored all 3D printing parameters, such as printer head speed, in an attempt to build an optimal concrete 3D printing model that perfectly predicts all behaviour during construction.

All that research is certainly necessary, as the limits of TU Eindhoven's concrete 3D printer have hardly been tested. As readers might recall, this particular 3D printer stood out for its

ability to 3D print a variety of different kinds of concrete, opening the way for varieties in color, quality and even insolation and acoustics. A single wall can even consist of different features, for instance by adding fibers in regions that need to be stronger than others. Adding insolating or dirt-repelling layers is also possible, while pipes and smart components like sensors or lighting fixtures can be added during the printing process. What's more, it's very accurate and the thickness of 3D printed layers is very variable.

But there's no better way to test such an immensely flexible machine than industrial-scale testing, and that's why the pavilion was produced. Showcasing various technical 3D printing possibilities, the final structure is 2 meters tall, and features a floor plan of approximately 3.5 x 2.5 meters.

"The pavilion shows the form-freedom that can be achieved without complex, time-consuming molds," its developers say. *"Simultaneously, it introduces questions: how do we connect printed elements? Is the print surface also the (horizontal) construction surface, or are there other possibilities? How do we guarantee the structural safety?"*

While a lot more research is necessary to capture the full extent of the 3D printer's power, this concrete pavilion certainly underlines its potential.

Source:
http://www.3ders.org/articles/20160627-tu-eindhoven-students-unveil-stylish-2m-tall-3d-printed-concrete-pavilion.html