CyBe: 3D Concrete Printing meets Grasshopper

In an interview, ShapeDiver talks with CyBe, a Dutch technology company revolutionizing the construction industry with its state-of-the-art 3D concrete printing technology. Shape Diver explores how they use this technology to create affordable housing while reducing the carbon footprint of their projects.

CyBe is a technology company for the construction industry mainly selling 3D concrete printers worldwide and are the leading 3D printing contractor in the Netherlands.

Printing layers with the CyBe RC (Robot Crawler)

Costs of homes are rising. Rents are rising. The number of low-income housing units is decreasing. Around the world, around four billion people lack access to decent housing, including 150 million in developed countries, and more than 800 million live in slums. To meet this requirement, CyBe is focusing on innovation to offer 3D concrete printing as an innovative, affordable housing solution. This enables cheaper, faster, and more sustainable construction.

CyBe is receiving a wide variety of inquiries, from furniture to planters to 4-story apartment buildings. Sometimes clients will approach them with a design they need to engineer to make it printable, while others will ask them to design from scratch.

They have used Rhino and Grasshopper since 2013. Their “Design & Engineering” team uses Grasshopper to develop several tools and projects. Parametric Design was introduced during the technical/operational phase of projects since it is important to automate several procedures regarding designing for printing and printability checks.

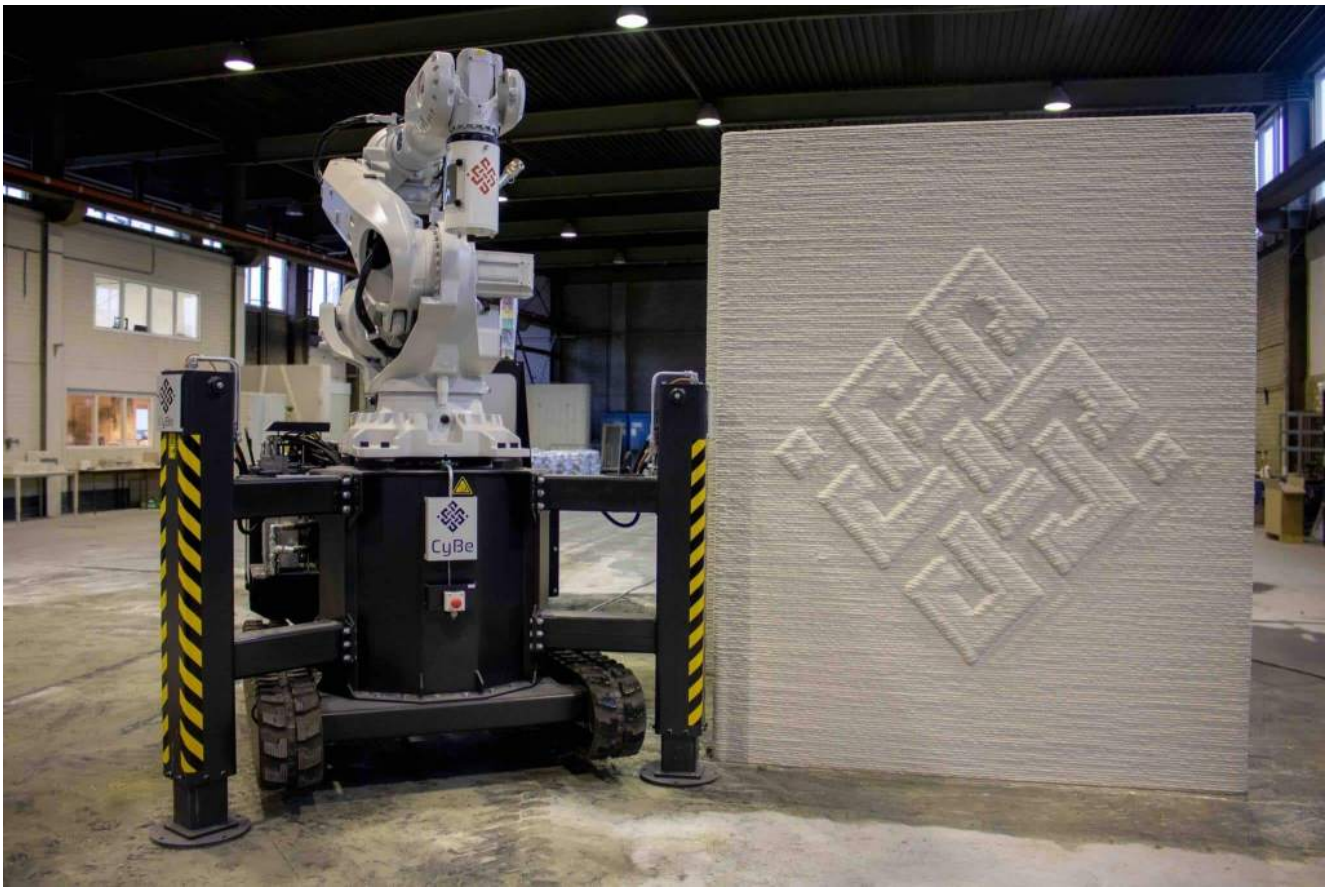
Grasshopper is also a powerful tool during the conceptual phase when the team needs to design more complex geometries with repetitive structures or develop wall textures that can be applied to multiple surfaces. Later, they came up with the idea of letting their clients adjust their designs according to their preferences. Therefore, creating a layout that could be easily used by any person, relevant to Grasshopper or not, was crucial for the company.

PARAMETRIC DESIGN

There are many advantages to using parametric design when constructing a building. One major reason to use parametric design is to save time in the design process in which changes or adjustments are inevitable. Unlike traditional design methods, parametric design uses algorithms to implement the impact of one adjusted component on an entire design.

Existing designs can be easily altered or customized for new client projects using parametric design. This means less time is spent on the

initial design phase, and customization can be fast and easy. This is particularly useful in housing development projects where a standard template can be adjusted to serve different client needs and create varied aesthetics.



Every new project is unique and different. Nonetheless, some general variables such as room functions, construction principles, codes, and 3D printing guidelines have to be always met.

Instead of going through this rationalization phase with every new project, they can create dynamic housing concepts where their feasibility is already considered. Then, they can allow their partners and customers to explore their ideas and make decisions through their input while generating realizable and efficient designs that meet their unique needs.

SHAPEDIVER

ShapeDiver has become a very powerful tool, especially for creating online configurators that can be reached and used by any possible client. CyBe has already implemented ShapeDiver on both their websites, Lybrary and Lyve. The simplicity of the grasshopper implementation, the minimal layout, the control they can have on the

parameters, and the adaptability with many plugins are only a few characteristics that benefit their time and improve their workflow.

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THE FUTURE OF 3D CONCRETE PRINTING

Several limitations still need to be overcome in 3D concrete printing construction. CyBe makes significant steps to address those, develop new concepts in terms of printers and printable elements, and constantly increase capabilities. They are currently achieving the first 3D-printed 4-story building, and they anticipate reaching even higher goals in the upcoming years!