

CASE STUDY

Reference #88

Customer: Witteveen+Bos South-East Asia

Segment: 3D Printing & Additive Manufacturing

Project: Development of Additive Manufacturing Technology for Construction

Summary...

6 Axis CNC Gantry Robot for 3D Concrete Printing System.

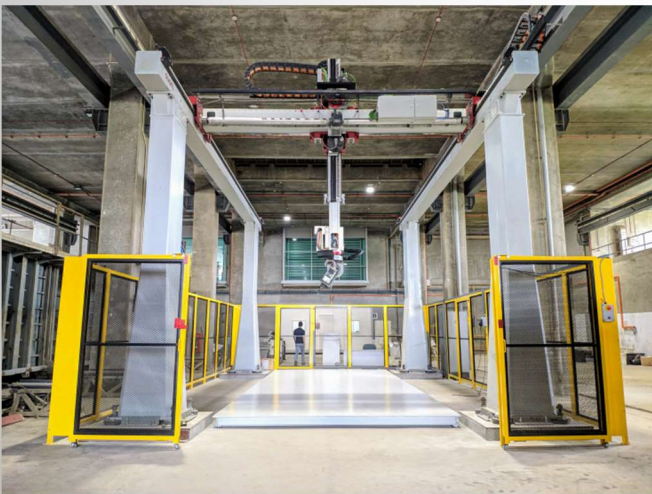
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6 Axis CNC Gantry Robot for 3D Concrete Printing System.

The Customer

Witteveen+Bos is a frontrunner in the implementation of 3D Concrete Printing in the Architecture, Engineering and Construction (AEC) industry and a pioneer in the development, design and engineering of 3D concrete printed structures.

Singapore Housing & Development Board (HDB) is Singapore's public housing authority, and is responsible for the development of 80% of the housing in Singapore. There is a great demand for housing and 3D concrete printing could help to speed up the development task HDB faces.



The Challenge

Currently, the design and fabrication of concrete building elements using the conventional method of precast production is time-consuming and requires high labour content. Besides, the molds used in the construction will be discarded, resulting in material wastage.

Construction using 3D printing, on the other hand, combines digital Building Information Modelling (BIM) technology with additive manufacturing techniques to allow free-form construction without the need for molds or forms, thereby reducing the environmental burden of material waste.

The method also opens up new opportunities for creating geometric forms that would be near impossible to create with traditional methods.

Why CNC Design?

The platform for the 3D Concrete Printing System is CNC Design's VSF. The VSF concept has been applied to machining, handling & additive manufacturing, not only for concrete, but also for wax, foam & high temperature plastics.

The Siemens Sinumerik 840Dsl flagship CNC is the perfect control system with its ability to handle multiple technologies & multiple operations from a single system.

Using Güdel 3 Axis Cartesian gantry modules as the mechanical platform for the VSF allows a machine that can be scaled in X up to 70m, Y up to 6m & Z up to 3.2m.



The Result

For Witteveen+Bos, this milestone proves the viability of their efforts in the field of 3D printing for construction.

The 3D Concrete Printing System enables the Singapore HDB to 3D print unique concrete elements up to 9m long, 3.5m wide and 3.8m tall.