

Automation Case Study

3D concrete printing technology in India

Inovance high performance servo drives, motion controllers and servo motors are being used by Merlin Automation Solutions in the world's largest 3D concrete printer for construction.

Customer Profile

Headquartered in Chennai, Merlin Automation Solutions operates in over 22 countries worldwide. Comprising mechanical, industrial, software, automation and robotics engineers, its expert team of industrial automation and robotics professionals has a wealth of experience delivering turnkey solutions to a wide range of customers in industries ranging from automotive, oil & gas, and construction equipment, to theme parks and heavy machinery. Merlin Automation Solutions delivers solutions that improve efficiency, quality and productivity, better utilizing manpower by automating mundane tasks.



The Challenge

Merlin Automation Solutions approached Inovance's office in Chennai, India, to provide motion control technology for a groundbreaking new 3D concrete printing machine it was developing for L&T Construction. 3D concrete printing is used to fabricate buildings, houses and construction components in shapes not previously achievable with traditional concrete formwork.

Merlin and L&T needed motion control solutions that would enable the machine to operate in challenging weather conditions, so durability and reliability were key. High performance and accuracy are also critical to the safe construction of 3D printed buildings, and the project was operating within a very tight timeframe, so delivery times and good customer service were essential.

The Solution

With support from Inovance's expert team of industrial automation engineers, Merlin Automation Solutions opted for AC703 motion controllers, SV660N servo drives working with MS1 series servo motors, and Inovance I/O modules.

The CNC function in Inovance's AC703 high performance intelligent controller particularly appealed to Merlin. The motion controller supports up to 32 axes at 1 ms EtherCAT period and a maximum of 128 EtherCAT slaves, including remote I/O modules, with support for multiple communication protocols providing multi-layer networking and IIoT functionality, which allows remote commissioning. Offering EoE support with Inovance SV660N drives, the controller was paired with the Inovance drives and motors for high dynamic performance with a compact footprint. The SV660N has ultra-fast 4.5 kHz current loop, speed loop bandwidth up to 3 kHz, easy set-up and tuning, user-friendly installation, and SIL3 Safe Torque Off.

The Benefits

WEAVER, developed by Merlin for L&T, is currently the largest 3D printer in construction and is already being used on building sites. The user-friendly installation, and easy set-up and tuning of the Inovance SV660N servo drives was important in helping the companies deliver the printer in 3.5 months.

The 3D concrete printer can erect buildings on-site up to three storeys (12m) tall and the world's largest 3D printed accommodation complex is being built in Chandigarh using WEAVER. Commissioned by the Border Roads Organisation (BRO), it will provide transit support facilities for personnel and equipment within six building blocks over 1.98 acres, five of which are being constructed using 3D printing technology.



Key Benefits

- Easy installation, set-up and tuning
- CNC and WebVisu function on motion controller
- Compact design
- High performance
- Fast delivery times and strong customer service
- Local Indian team

Saranya Subramanian, Co-Founder of Merlin Automation Solutions, says, *“The high performance, accuracy, fast delivery times and smooth implementation of Inovance’s solutions appealed to us. This is a landmark project for our company and we found setting up the EtherCAT Communication between the Inovance motion controller, servo drives and IO Modules easy.”*

Anil Kumar, Director of Inovance India, adds, *“We are delighted to have been part of such an exciting project and to provide the high performance and reliable motion control needed to make it a success. The groundbreaking 3D printer produced by Merlin and L&T is already involved in construction projects and it is great to see it in action, using Inovance technology in a new and innovative way.”*