

A large industrial robotic arm, primarily grey and blue, is shown in a factory setting. It has a red section near the top and an orange motor housing at the bottom. The arm is suspended from a ceiling structure. The background shows a large industrial building with a corrugated metal roof and skylights.

CASE STUDY

Reference #11-2

Customer: One COMPOSITES

Segment: Large scale 3D printers

Project: VSF Gantry Printing and
Milling and Robotic Spraying

Design and build of the VSF system for combined 3D
Thermoplastic printing and 5 axis milling for trimming
of fiberglass moulds

CASE STUDY / Reference #11-2

Design and build of the 3D Printing Gantry with a single bridge and a vertical beam with the advanced print nozzle

The Customer

Queensland manufacturer One Composites, a fully owned subsidiary of Zone RV, where their VSF-3D printing system is the largest in the Southern Hemisphere. The 22m x 5m x 1.6m system was initially established for both 3D printing and machining in composite materials for a wide range of off-road caravans that combine lightweight composite bodies with lass-leading components.

Design Overview

The VSF-3D printer uses a large area gantry to carry a patented multi zone extruder for melting and extrusion, providing the ability to rapidly print large structures with reinforced composites up to 150kg/hr. In addition, the printers offer an optional 5-axis machining head can provide smooth surface finishes.

The printers have several other features, including a nozzle rotation unit with a temperature-controlled roller to flatten and compress print bead, a vacuum pellet drying and conveying system with high performance and energy efficiency for continuous printing, axis print speeds up to 20 m/min with axis rapid speeds up to 60 m/min, changeable nozzles, and Siemens SINUMERIK ONE controls, the leading platform for advanced manufacturing.



Why CNC Design?

CNC Design, an established Australian company with core competencies in Machine Tools, Engineered Drives, Robotics, and Additive technologies, has recently commissioned a new range of large-scale additive VSF-3D printers. These thermoplastic composite printers have the potential to revolutionise the manufacturing industry by enabling the production of a wide range of items such as plugs, moulds, fixtures, structural components, formwork, decorative pieces, and architectural parts.

The Equipment

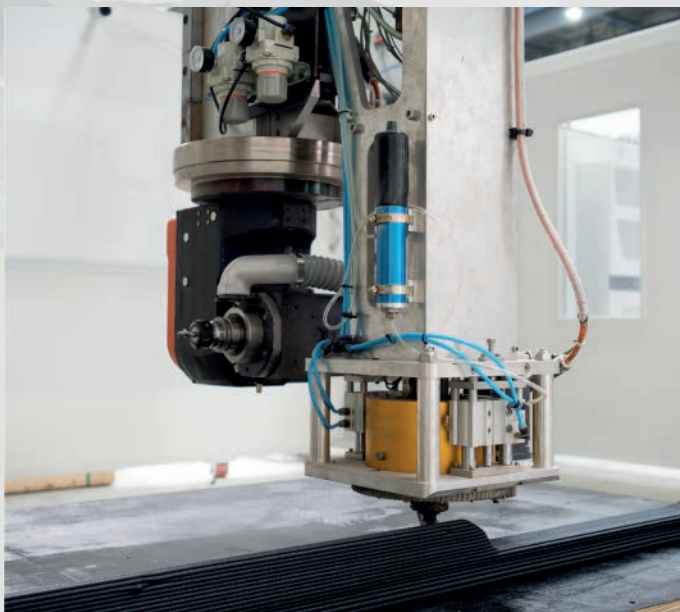
At One Composites CNC Design's Virtual Smart Factory (VSF) platform stands at the forefront of Industry 4.0, representing a digital robotic system that harnesses the power of standard modular and versatile components. Tailored for additive, machining, and handling applications, VSF is a robust solution that redefines manufacturing processes.

At its core, VSF is propelled by the SIEMENS SINUMERIK ONE CNC system, offering distinct advantages over conventional Robot controllers with its exceptional path accuracy and a user-friendly standard CNC G Code programming interface. Adding to its capabilities, the integration of the HSD HS673 2-axis milling head, affixed to the Z-axis vertical beam, ensures precision and efficiency in high-speed 5-axis milling operations for composites, wood, and plastics.



Material Supply and Development

INNOMERIX Pty Ltd, a CNC Design subsidiary business, has been established to supply a wide range of thermoplastic composites and currently supplies One Composites. Equipped with a sophisticated compounding line and advanced dosing systems for powder and fibre incorporation into the polymers. This allows material properties such as strength, pliability, impact resistance to be adapted for each application. Other properties such as UV protection, low flammability, and biocides to avoid marine growth can also be added as part of the manufacturing process.



Application Centre

This new facility is supporting One Composites and other clients in the development and testing of INNOMERIX's new advanced materials that are specifically formulated for large scale printing and machining. The application centre includes highly specified VSF-3D printer, with a print area of 12m x 5m x 1.6m, integrated on the same site as INNOMERIX. Having in-house testing laboratory, ensures that material properties and performance can be tested, logged and retained for customer's and future reference. The centre also supports VSF-3D sales demonstrations, and production of specialty components on a commercial basis.



The Result

One Composites CTO, Dave Biggar, says *"whilst investing in new advanced manufacturing technology may be perceived as a high risk, our experienced team quickly mastered the technology and identified a growing demand for large-scale 3D printed and/or machined components. The implementation of this technology has significantly increased our efficiency and versatility, enabling us to combine external project work with initial lightweight composite body production. As a result, our equipment is now being fully utilised, creating a need for additional production capacity and growth in our One Composites business"*.

