

ROBOTIC MACHINING BED GETS TECHNICAL IN TEAM EFFORT

Introduction

When it comes to successfully designing, engineering and delivering end to end solutions in any industry, it inevitably requires the combined knowledge and expertise of various companies to achieve a desired result. When the brief is to think outside the box to not only improve productivity and performance, but to increase flexibility and make significant savings on time and money, this is even truer.

So when Technical Plant Services (TPS) based in Melbourne, Victoria were given such a task by a client in the aluminium extrusion industry, they did just that and enlisted the support of NHP, KUKA Robotics, Lemarc Engineering, Bromar and Delcam to deliver.

Specialising in tailored plant solutions, TPS provide process control, electrical/automation engineering and technical support from start to finish.

Project Overview

In 2015, TPS was contracted to provide and design an optimal solution for their client who required a new long length Computer Numerical Control (CNC) Machining system.

After extensive brainstorming, TPS advocated a Robotic CNC system as the most effective and accurate machining solution to ensure all application specific components could be delivered and quality was not compromised.

Whilst this machining solution is not traditionally common, research proved it to be cost effective, have an additional machining reach, a larger envelope, faster idle movements and 3D capabilities. As an integrator, TPS provided value add to the complex Robotic CNC system, teaming with other leading companies to ensure all aspects of this project worked seamlessly and the design was dependable and future-proof.

The robot, base software and spindle were primarily supplied by KUKA Robotics, while higher order custom software was developed in house in conjunction with Delcam. NHP was commissioned to provide not only products, but technical support, selection assistance, and tailored designs. NHP's Automation Application Engineers, David Kenney and Paul Jones, assisted TPS's Senior Systems Engineer, Daniel Orchard, to select the appropriate hardware as well as ensuring they aligned with safety standards, the correct IP ratings and received the necessary support.

This particular project presented specialised velocity control and positional requirements, which set the parameters for the brief given to NHP motion experts. "NHP's calculation software for correct gear ratio, servo, and drive gave us exactly what we wanted and the end result is very good." Mr. Orchard said.

Based on this, the Allen-Bradley® Kinetix® 5500 Servo Drive with the suitable accessories was implemented to optimise space.

A CompactLogix® 5370 was also specified as an integrating standard and motion controller for the robot, acting as a gateway and supervisory control system for all components; robot, spindle, safety and SCADA passing through this one central point.

For blade rotation, NHP engineered a braking cabinet which enabled the installed VSD, Allen-Bradley PowerFlex® 753, to react quickly to stop requests and allow quicker entry into the workcell. To enhance equipment maintenance, NHP also helped prototype finger safe enclosures for inside the control door area to keep products at the correct IP rating with accessibility to some items, while blocking out others.

"Support for multiple communication protocols and the successful implementation of translation gateways was a big part of this project's success and one of the primary reasons we will continue to use NHP in the future. This project had just about every protocol under the sun: EtherNet/IP, ModbusTCP, EtherCAT, ProfiNET and eventually DeviceNET," Mr. Orchard continued.

"It was a mixed bag that unfortunately we could not simplify during our design phase, even though a lot of effort was put in to it. NHP assisted us through every step providing us with solution to trial, and the experience to help us configure some of the more complex devices properly."

The Solution

The advanced technology and engineering of the project not only was an effective solution, but also improved manufacturing flexibility and has the ability to reduce cycle times and costs for the client. By partnering with other local providers like NHP who each brought their expertise to the table, TPS was able to successfully deliver the fully functional and operating Robotic CNC Machining system to the customer within the space of only eleven months. Quality automation and motor control products, alongside solutions and services is crucial to any project and NHP is proud to have contributed to the success of the Robotic CNC development.

"One of the biggest challenges in a project is the communication/integration of the various products used. Since Daniel had experienced the "Drives and Motion Accelerator Toolkit" in the past and was familiar with our VSD and Motion offering, we were able to keep the time to integrate the sawing part to the minimum and give them more time to focus on software development for the CNC part of the application. TPS have engineered a very impressive machine and we are proud we were part of it!" commented NHP's Anatoli Klassen, Application Engineer – OEM.



Project Fact File

Project: Technical Plant Services

Location: Melbourne, Victoria (Australia)

Details: To provide and design an optimal solution for their client who required a new long length Computer Numerical Control Machining

NHP Products/Services:

- Allen-Bradley Kinetix 5500 Servo Drive
- Allen-Bradley PowerFlex 753
- A CompactLogix® 5370
- Technical Support
- Selection Assistance
- Customisation of designs

