FANUC

BUILDING CUSTOM MACHINE TOOLS WITH FANUC - Excalibur Tool

Excalibur Tool in Grants Pass, Oregon designs and builds custom CNC grinding machines for a variety of industries and applications. Whether it is a particularly difficult workpiece or extremely fast process time, the Excalibur team has the skills, experience and knowledge to design and build high-quality, value-focused grinding solutions that help their customers meet and exceed their goals. Since starting to use FANUC CNCs for their controls, Excalibur has leveraged the power of FANUC development tools to enhance their build process and improve their customer support.

THE BEGINNING

Excalibur Tool began designing their grinding systems from the ground up, with different motors drives and motion controls selected for each project. The motion controls they used were essentially blanks and needed all the logic programmed into them. Motors and drives from multiple vendors were used, based on what was available and what would fit the requirements of the project. This approach gave Excalibur Tool great control over the way their machines functioned and they were able to do this at a very low cost. However, since they wrote all the programming and built all the logic, they were the only ones who could support these machines. There was very little the end user could do on their own to troubleshoot or adapt the machines for their future needs without help from Excalibur.

CHALLENGES OF SERVICE

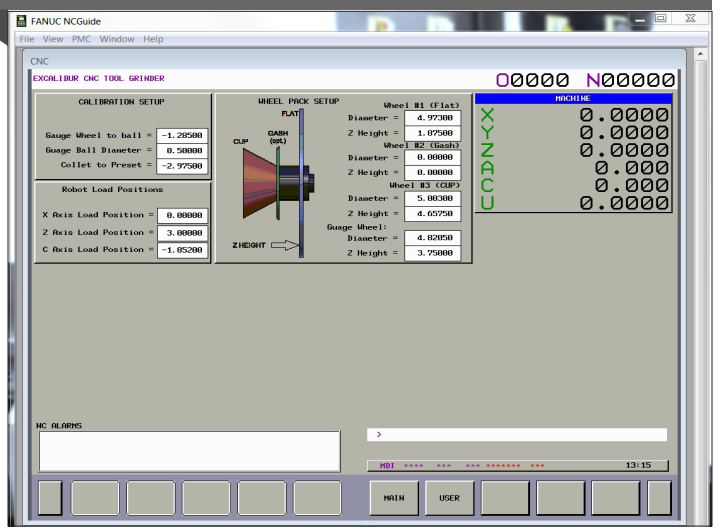
Dan Wayman, President, Excalibur Tool, Inc., takes great pride in the machines his company builds and he takes customer support very personally. As the number of Excalibur Tool grinding centers in the industry grew and aged, Dan found that he was spending a lot more time on service and support. If a motor or drive failed, he would have to track down which parts were used on that machine and find a replacement or reengineer a solution if the part was obsolete. Time spent servicing existing machines took away from time he could spend building and designing new machines to grow the business. Dan started to look at replacing his self-designed motion controllers with FANUC CNC systems. The more he looked into it, the more appealing it became. Having a single source for motors, drives, CNC, software, service and support would free him up from having to research a new solution if a customer had a problem with an older machine. Also, knowing that FANUC provides lifetime support for their products, Dan knew his customers would never be left without a solution. If the FANUC CNC systems were nearly as reliable as the FANUC robots he has been using for over 15 years, he knew service wouldn't even be an issue.

DEVELOPING LOGIC WITH FANUC LADDER-III

When Dan started building systems with FANUC controls, he was pleasantly surprised. Getting everything he needed from a single supplier in a complete 'kit' made ordering and tracking quick and easy. When it came to programming, he was especially impressed with the level of customization that was possible. This was not a cookie-cutter control.

Using FANUC Ladder-III, he can develop and control the CNC's logic. Programming ladders was different than the procedure-based programming languages Dan used in the past. Dan found the FANUC Ladder more logical and easier to manage than other ladder programming systems he used in the past. With FANUC Ladder-III, Dan was not restricted to a defined list of actions or variables, he could customize the control much in the way he did in the past with the systems he built from the ground up, but with less work and less complications.

"All I want on the page is the information that is important to the operator, and with FANUC PICTURE, I can make custom screens that exactly match the parts they are making."



CUSTOM HMIS WITH FANUC PICTURE

Once the ladder is complete, Dan writes the G-code for the customer's part. The G-code tells the machine how and where to move to make the desired part. Next Dan uses FANUC Picture to build custom screens for operators to interact with the control. FANUC controls have a variety of standard screens built in, however sometimes it helps to simplify the screens with only the information required by the operator. FANUC Picture offers an easy way to create customized operator and HMI screens and provides all the functions and features of modern HMI software tools.

It supports objects, animations, data and multi-language options, and features a macro language to run routines and perform tasks. Dan works with his customers to figure out which information and commands are needed on a day-to-day basis, and which can be safely stored in secondary screens. In the end, the operator should have clear, easy access to the information and data inputs they need, without having to shift through multiple screens. Dan's customers are usually very impressed with the speed in which changes and updates can be made, and in the future if they find their needs have changed, the screens can be easily updated.

SIMULATING THE SYSTEM WITH FANUC NCGUIDE

Once all of the pieces are built, Dan uses FANUC NCGuide to put together a complete simulation of the control system. Essentially, he is building the machine before he physically builds the machine. NCGuide is a complete, realistic simulation of a FANUC CNC that runs on a standard PC. This simulation can be used to test the ladder, G-code, and HMI as well as other peripheral equipment that is part of the system. Once Dan finishes all the tests and troubleshooting, he shares the simulated system with the customer for feedback and makes any required changes. All of this can be completed before the actual system arrives in Dan's shop, so the actual build time is much shorter than if he had to design and troubleshoot the system as he was physically building the machine.

"With NCGuide I have a virtual copy of that machine...so I can provide support for a customer's machine from my office. For simple troubleshooting, I can walk them through changing a parameter or making minor changes that I have tried on my end."

Dan also relies on NCGuide when he is supporting his customers. Since he has a virtual copy of his customer's system in his workshop, he can troubleshoot issues and from his office and walk his customers through the process of making changes. Whether they need to fix a problem,

make an upgrade or try something new, with NCGuide it doesn't require an onsite visit or taking a machine down to try out a new procedure.

PREBUILDING THE AUTOMATION WITH ROBOGUIDE

If robotic automation is going to be part of the solution, Dan and his team will use FANUC ROBOGUIDE Simulation Software to simulate the robotic workcell in 3D before building the cell. All of the required movements and boundaries can be define and planned out ahead of time so there are no surprises during the actual build. He can share animated 3D simulations of the workcells with customers to explain the process and detail how and why the system is laid out the way it is. Using the ROBOGUIDE Software, he can experiment with different solutions to ensure he has the more efficient set up before settling on the final design.

CONTINUOUS IMPROVEMENT

With a library of simulated machines at his fingertips, Dan has quick and easy access to his best practices and can use them to make improvements on his next generation of machines. As his customers' needs grow he can be sure that he can offer the best-of-breed solutions with the most cost-effective and efficient system available.

CONTACT: 541 862-2939
fanuc@excalibur-tool.com

CONTACT: (626) 339-9007
www.miponline.com