

A COMMITMENT TO ITS CRAFT

C&A Tool sets a new standard in high quality engineering, manufacturing for the medical device industry by combining cutting edge technology with a commitment to old world craftsmanship.

This is not a story about a medical parts manufacturer. This is a story about a company that started 40 years ago in a garage in rural Indiana, and grew into a 530 employee organization with 750,000ft² of manufacturing space by keeping a singular focus on, in the words of its founder and President, Richard Conrow, just doing the job. As it turns out, by just doing the job every day for the past four decades, C&A has become one of the premier suppliers to the medical industry.

C&A's commitment to reinvestment in its business and the development of its employees have driven its growth, growth which has averaged more than 20% per annum over the course of the past 25 years, in terms of both personnel and company sales.

"When everyone is singing the blues, I see opportunity," Conrow says. "While the competition is running for shelter, we are taking their work."

AN EVOLUTION

At C&A, a portion of the sophisticated manufacturing of medical parts is carried out across a bank of 27 state-of-the-art multi-axis Star CNC Swiss-type lathes. The key to success in manufacturing complex, precise components is to quickly and efficiently develop processes and NC programs for the machines. To this end, C&A adopted PartMaker CAM software to automate the programming



◀ Some of the parts C&A produces on Swiss machines using PartMaker programming.

of its variety of Swiss machines.

"The job is made or broken in the process," says Nathan Esslinger, a manufacturing engineer at C&A Tool who is responsible for Swiss programming. "PartMaker's been the biggest help in assisting us to develop that first process, being able to simulate our part, and having a better idea of what is going on with the process, whether it is going to work or not."

When C&A first took the plunge into making medical parts on their Swiss-type lathes, its personnel were manually programming on the shop floor with the occasional assistance of a PC-FAPT terminal when more complicated geometries arose. The concept of a dedicated CAD/CAM programmer existed only in its milling department,

where the company was programming complex molds and tooling.

"Today, we do not even call them Swiss lathes," Esslinger comments. "We call them Swiss machining centers because some of the parts we make on them do not ever see a turning tool."

The multi-axis Swiss machining centers used by C&A are equipped with upwards of 12 programmable axes, including the ability to machine inclined 5-axis features by employing angled toolholders. The design specifications of their medical parts also require C&A's engineers to perform an extensive amount of 3D surface machining on their Swiss machines, functionality that was not available years ago.

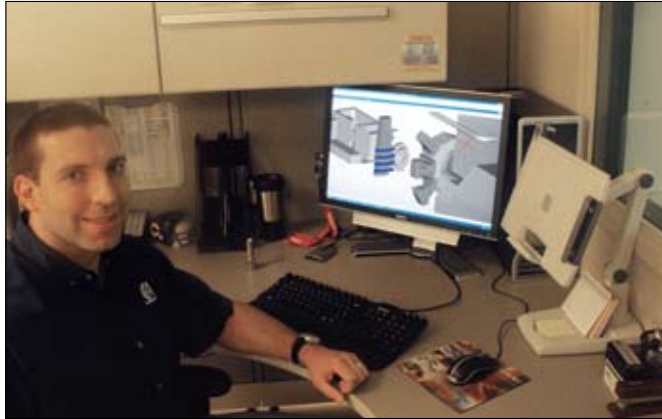
To cope with the increasing complexity, C&A Tool took the unique step of forming a dedicated Swiss-programming department two years ago, a group anchored by Esslinger and colleague Chris Korte.

"That is not really how Swiss machining was done even five years ago," Esslinger states. "Programming was not a defined task.

Programming is the most important time on the job, when you are creating the steps you are going to use on the job."

As the complexity of its parts have grown, and C&A put more emphasis on the process and programming function, PartMaker software has become the central nervous system of its medical parts manufacturing business on the Swiss machines. PartMaker is a computer aided manufacturing (CAM) system that allows the user to automatically generate an NC program for a machine tool from an engineering design.

Once geometry has been imported into the software, machining operations are assigned to the geometry in order to calculate toolpaths. For programming the multi-axis Swiss-type lathes at C&A, PartMaker employs a patented divide and conquer programming approach that breaks a complex part into individual face windows, where each face window contains the features being machined in a particular plane. For example, in one window, all turning operations on the machine's main spindle are graphically programmed. In another window, milling using the machine's C-axis with a horizontally-oriented tool may be programmed, while in another a group



▲ C&A Tool Swiss programmer Nathan Esslinger at his PC with a Full Machine Simulation in PartMaker of a part being made on one of C&A Tool's complex, multi-axis Swiss-type lathes.

of features using the machine's Y-axis may be programmed with a vertically-oriented tool.

MORE WITH LESS

The complexity of the medical parts it makes has driven growth in C&A's Swiss machining. However, this growth has come with the challenge of finding skilled Swiss operators. "The parts are getting more complex. It is hard to find good Swiss operators," says Mark Simpson, the supervisor of C&A Tool's Swiss machining area.

PartMaker's 3D simulation function has helped C&A cope with the tight supply of skilled Swiss machine operators. Once the development of a part process in PartMaker is complete, the software allows the part to be simulated on screen in a 3D simulation. This allows the programmer to see what the part will look like before committing machine resources. It will also detect any tool collisions or machine crashes.

PartMaker's Full Machine Simulation function allows C&A's programmers to simulate the machining of a part in a virtual reality environment on their PC away from the shop floor. This enables them to see exactly how the part will

look on an exact machine model, and to detect any errors on the part or any collisions that may occur in the machine's working envelope before setting up a job.

"With PartMaker, we can do more with less. The more time you take with the software, running the collision detection, the less time you spend in setup," Esslinger comments. "An extra 20 minutes on PartMaker can save eight

hours on third shift in the middle of the night when no one is here to help. The best way to evaluate the improvement is to look at programming time. We have cut programming time in half, easily. Now we are doing parts we would have turned away."

MORE COMPETITIVE

Despite his company's growth, Conrow maintains the same aggressive approach to the machining business as he did when he began. That includes not shying away from any job, no matter how small the volume. As a result of this approach, C&A must not only be ultra-efficient in their programming process, but also very efficient in their quoting process, because as Esslinger points out, "You are not getting paid to quote."

"Especially in this economy, what we are seeing is that a lot of people are throwing parts around to get quotes. When we get a solid model, with PartMaker, instead of taking hours, quoting takes minutes," Esslinger says.

Conrow notes, "With PartMaker staying abreast of the technology, they become an integral part of our operations. PartMaker has gained the respect of the programmers." **tmd**