

Edgecam Simulation Shows True Surface Finish on Medical Instruments



A week's programming with Edgecam CNC software provides the UK's leading manufacturer of orthopaedic instruments with 12 weeks of machining time for their highly complex products.

Sheffield Precision Medical say they could not have physically produced many of last year's 50,000 piece parts without Edgecam. According to Manufacturing Director Steve Lambell, their products are so complex that it would be impossible to write CNC programs for them manually.

"There would be thousands of lines of code. We just couldn't do it. Many of our Edgecam programs are for milling 3D surfaces on Bridgeport and Haas 3-, 4- and 5-axis machines. We carry out all our positional work with 5-axes – previously we'd need to make fixtures to hold the parts in the right orientation...but Edgecam creates perfect tool paths for 5-axis machining, saving us around 60 per cent on setting up time."

Working closely with major medical and surgical companies such as DePuy, Biomet, and MatOrtho, Sheffield Precision Medical's range runs to several hundred different products, including drills, reamers, rasps, guides and cutters, in varying sizes. "We'll get the programs right for one size, and then Edgecam quickly produces toolpaths for the other sizes. This is vital for getting full machine utilisation and optimum floor-to-floor time from when we first pick up the job at the design stage to putting the finished product on the floor."

Managing Director Brian Reece says the company's roots as a cutting tool manufacturer are a great strength. "Many surgical instruments are very similar to an ordinary cutting tool, and when we moved into this sector in 1990 our understanding of cutting tool technology enabled us to redesign new customers' existing instruments to make them more efficient and produce them with fewer components."

Nowadays orders vary from one specific instrument through to complete sets of everything a surgeon needs to carry out operations such as hip, elbow and shoulder joint replacements.

"We often get involved at the prototyping stage," says Brian. "It may be a concept, or may be an actual prototype that a customer has an issue with regarding manufacturing it in the most cost-effective way. That's where our background in cutting tools pays dividends, enabling us to use our technological knowledge for the design itself, to produce the best instruments. And Edgecam is key to the front end design, which actually spearheads our business."

About The Company:

Name: Sheffield Precision Metal

Website:
www.sheffieldpdm.co.uk

Benefits Achieved:

- Saved about 60% on setup time
- Never had a collision due to Edgecam
- Able to see the finished surface texture before machining

Comments :

"We always run a simulation on Edgecam in the office before sending the program to the machine, and, as a result, we've never had a collision."

Brian Reece
Managing Director

Vero Software Limited

45 Boulton Road, Reading, Berkshire, RG2 0NH, UK
Tel : +44 (0) 1189 226633 Web : www.edgecam.com

edgecam

Most customers provide a 3D model, which Sheffield Precision Medical then pulls into Edgcam and extracts features for creating the cutting paths. "The features are mainly profiling, roughing and parallel lace where we run the bullnose over the 3D contour for all the 3D shapes."

And Steve says when the raw billet first goes on the machine Edgcam produces the roughing cycle on its own, before they move on to finishing. "We do it this way because some of our programs have more than 25 tools, each relating to a different profiling operation. Posting the roughing and finishing programs one at a time makes it easier for the operator to understand, and it's a lot smoother to get the machine up and running."

Steve and a colleague program all the jobs, with six setter-operators then setting up the tooling, proving the programs and running the machines.

"We always run a simulation on Edgcam in the office before sending the program to the machine, and, as a result, we've never had a collision."

The simulation function also plays an important part in showing Steve the finished surface texture. "We can actually see what it's going to be like before we start machining. It's all to do with tolerancing on the profiling, roughing or parallel lace. By using the true simulation we can see an extremely accurate replication of the surface finish the machine will give us."

He does not believe they are a "typical" Edgcam user because of the vast range of different shapes and sizes they manufacture and the complexity of the shapes. "Some of the parts we make don't ever have a 90 degree edge to each other. Sometimes when we get an order for a new product we can't see at first how we're going to make it. But running a program through Edgcam to create a profiling operation is done in minutes, making our production process so much easier. I don't work to solid...I extract the information I need off the solid to run the cutters."

The Gulf War was the catalyst that brought the company to the medical sector. Brian Reece says: "We were producing a large number of cutting tools for the commercial aerospace industry, but the world became fearful of flying when the war started and we saw a drop of around £500,000 in cutting tool orders. We were also producing cutting tools for some orthopaedic implant manufacturers, and because many surgical instruments are so similar to cutting tools we picked up £300,000 worth of business in this sector within 12 months." A stand-alone company was formed in 2003, which, through a series of acquisitions, became Sheffield Precision Medical in 2010.

