Out of one hand

Leading CADCAM developer Delcam highlighted single source provision of complete software solutions for reverse engineering and composites needs at a recent international media briefing. Andrew Allcock reports

Reverse engineering and composite parts design, manufacture and inspection were particular focuses at the event where the company first introduced Tribrid Modelling – the next step on from its existing Hybrid Modelling that combines both surface and solid modelling in PowerSHAPE.

In Tribrid Modelling, Delcam has integrated its CopyCAD reverse engineering and triangle modelling software into hybrid PowerSHAPE so that data captured with reverse engineering can be moved into the design environment more easily and reverse engineered features can be incorporated into a design more quickly.

Major improvements have been made to the sculpting and model repair tools previously available in CopyCAD to edit triangle files, allowing high quality models to be produced from poor quality reverse engineering data, or from scanned damaged or defective physical components – uneven surfaces can be smoothed out, gaps in the data filled and extra points added where sparse data exists.

Most importantly, the combination of functionality from PowerSHAPE and CopyCAD has enabled easier and more accurate creation of CAD surfaces from triangle data, while allowing the user to retain control over the way the complete data set is divided into the component features and surfaces, says Delcam.

At the event, the CADCAM specialist stressed that its introduction of Tribrid Modelling provides the optimum software solution for the mass customisation of designs, an increasing requirement to offer personalised items for reasons of fashion, sporting requirements or to meet health or safety needs. Indeed, the funding behind this development has come from the EU Custom-Fit project due to end next February (see *http://cordis.europa.eu*).

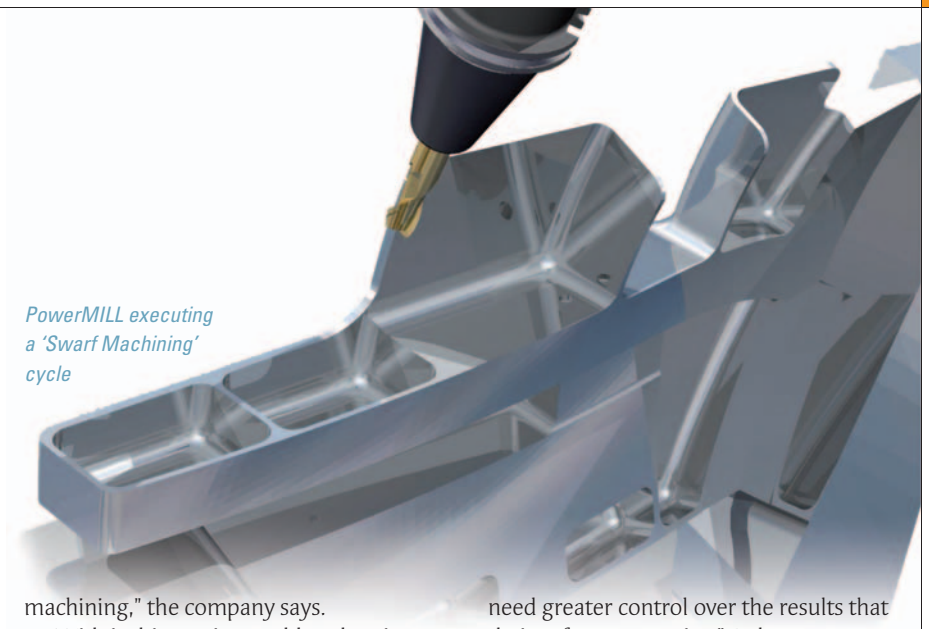
In a related Custom-Fit development, Delcam has expanded its Crispin footwear-focused manufacturing software with the launch of OrthoModel, an automated system for the design and manufacture of orthotic insoles. The software provides a complete solution, from the original import of scanned data from the customer to the machining of the orthotic that will produce insoles intended either for the comfort or medical markets.

COMPOSITES FUNCTIONALITY

But with this annual event taking place at the AMRC, Rotherham, which also houses the Composites and Advanced Technology Centre, CAMTeC (see *Machinery* April 2008, page 75), it was appropriate that the software specialist had something to say about this increasingly interesting area.

The company underlined that it offers a wide range of functionality for the composites industry within its range of CADCAM systems. These options include methods for the generation of 2D patterns for prepregs from 3D models of components, nesting to ensure the most economic use of materials cut from sheet (both found in PowerSHAPE), and a wide range of advanced machining methods, both for the manufacture of patterns and tooling, and also for the trimming and drilling of moulded parts (found in PowerMILL). The company's PowerINSPECT offers inspection capability, too, of course.

Summing up, Delcam says: "These programs can be combined in a variety of ways to give adaptive machining



PowerMILL executing a 'Swarf Machining' cycle

solutions that can overcome the problems often experienced in the manufacture of large, complex patterns and tooling, and in the finish machining of composite panels."

BORROWED CAPABILITY

Interestingly, as is often the case these days, developments in one area draw on other parts of the company's range. So the new methods for the generation of 2D patterns from 3D CAD models within PowerSHAPE are based on unwrapping techniques first developed for the footwear industry to allow the cutting of leather shapes from shoe designs. They provide quick and easy methods for the creation of the composite material prepreg designs needed for the manufacture of complex, curved shapes.

Returning to PowerMILL, and a new release will be launched at Chicago's International Manufacturing Technology Show in September. Version 9 will offer "a more complete solution for complex machining operations, together with more control for experienced machinists who know exactly how they wish to machine a particular part, and will also include a range of enhancements to existing functionality to enable both faster programming and faster machining," the company says.

With its history in mould tool cavity machining, the manufacture of complex shapes has been Delcam's, and hence PowerMILL's, stock in trade. Simple programming tasks, like sizing the starting block of material, and finishing operations, such as cutting off, although possible to tackle in PowerMILL were often prorammed at the machine tool by mould tool makers, leaving the complex part to the CAM software. However, version 9 will make the simpler machining tasks easier, not just possible.

Conversely, while previous software developments have concentrated on making Delcam easier for the casual user, version 9 sees things made easier for the expert. "Very experienced users tend to know exactly how they want to manufacture a particular part, or undertake a particular operation, and so need greater control over the results that their software can give," Delcam says, adding that PowerMILL 9 gives them this control by making it easier for experienced users to generate toolpaths based on any 3D curve. Again, possible before but now made easier.

IMPROVED PERFORMANCE

In addition to these improvements, performance has been addressed, delivering both faster programming and faster machining. Other improvements reduce toolpath calculation times, while some simplification of the user interface makes it easier to select the required command.

Toolpath ordering has also been made more efficient, especially for roughing and rest machining, so ensuring that the cutter spends more time machining and less cutting air.□

FeatureCAM and PartMaker developments in brief

In addition to PowerMILL, Delcam now has a two other CAM packages – FeatureCAM and PartMaker. Taking FeatureCAM first, while PowerMILL is targeted at complex parts with a large amount of detail and correspondingly large toolpaths, FeatureCAM is targeted at parts that are complex not in terms of toolpath length but in terms of the number of features, such as holes or pockets.

The system automatically analyses geometry, breaking it down into features and then applies processes and tools to generate a complete program. In an environment where cycle times are not long and where there are many different parts to program, FeatureCAM is ideal.

FeatureCAM 2008 sees increased support for positional and continuous 5-axis machining, taking in new options for 5-axis trimming, swarf machining, and drilling. This is one area of improvement, there are others related to more efficient turning, improved tool database, plus numerous enhancements and speed-ups, together with more post-processors for turn-mill equipment such as Mazak Integrex, Daewoo Puma, Nakamura-Tome, and Mori Seiki.

PartMaker SwissCam is focused on the programming of Swiss-type, sliding-head CNC autos (PartMaker also supports turn-mill, basic milling and turning). Featuring patented technology covering the feature-based approach to programming and the synchronisation of machine tool/program operations, version 8 is the first release to support Windows Vista. It also has many improvements to the Process Table function – the method applied to control and optimise the synchronisation of operations. Improvements to visualisation and simulation are also key developments.