



The 2012 version of Delcam's PowerMILL CAM system for high-speed and five-axis machining includes a number of new strategies, together with more general enhancements to make programming faster and machining more efficient with the best-possible surface finish. Full details are on the learning zone, www.delcam.tv/pm2012/lz.

New PowerMILL machining options

The most important new strategy in PowerMILL 2012 is flowline machining

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flowline machining. With this strategy, the toolpath is divided between a pair of drive curves in a constant number of passes, rather than having a varying number of passes with a constant stepover. The toolpath will have its start and end passes based on the drive curves, with the intermediate passes blending between them.

This approach gives smoother results since it ensures that each pass travels over the full length of the area, rather than leaving the part, or making major changes in direction, during the pass. It produces a better surface finish on the part and minimises wear on the cutter and the machine tool.

In PowerMILL, flowline machining can be applied across part of a surface, across a complete single surface or across multiple surfaces. In addition, intermediate curves can be added between the boundaries of the area to give even greater control over the toolpaths. These might be needed for particularly complex fillets or when machining gently-curved surfaces to a smooth finish.

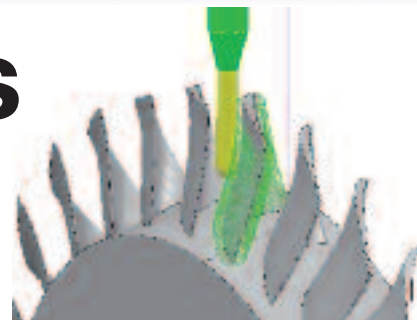
PowerMILL has offered an optional module for automated machining of blades, blisks and impellers for some time. This module has now been enhanced with the addition of a spiral machining strategy. This keeps the cutter on the surface of the part for the complete operation

and so gives more even tool loading and a better surface finish.

Another new option that will help to give better results during five-axis machining is the ability to control the angular point distribution. This option can be used to keep the machine tool moving smoothly when there is rapid angular change in one of its rotary axes. The problem occurs mainly when moving around sharp corners but is also important when the machine is operating near a vertical tool axis. If the machine tool is near the gimbal lock position, small movements in the tool-axis vector can result in large movements in one of the axes.

In both examples, smoother tool-axis changes can be achieved by increasing the density of the points in these areas. The user can specify the maximum angle that the tool axis can move between points. Extra points are inserted automatically to ensure the specified maximum angle is not exceeded. This gives a more even movement of the machine and so gives a better surface finish, with no risk of dwell marks. The smoother motion also reduces wear on the machine.

A more general enhancement is the ability to use Bezier curves rather than polylines when sketching geometry in PowerMILL. Bezier curves give smoother boundaries, patterns



PowerMILL's blade, blisk and impeller module now includes spiral machining

and drive curves, and so enable better quality toolpaths to be produced.

Other enhancements include more control over the clearance distances applied to the cutter and its holder. This is especially desirable when machining vertical faces, as a smaller clearance can be set for the shank, while still allowing a larger clearance for the holder. It allows the shortest safe cutter to be chosen, with no risk of collisions. Using shorter cutters will usually allow faster machining and minimise chatter so giving a better surface finish.

In addition, thread milling options have been added, and workplane editing, and Z-height selection and limiting, have been made easier. It has also been made easier to obtain measurements, including distances, angles and directions, from the part model and enter these values into forms automatically. Finally, the use of the PowerMILL macro language to program repeat operations has been extended to give users more options to customise the system for their particular needs.

Inside...



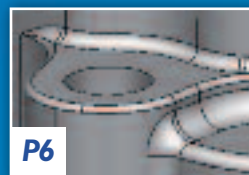
P2

THE BEST FOR FIVE-AXIS
VIKING YACHTS USES
POWERMILL FOR
GIANT MILLS



P5

SUCCESSFUL EXPANSION
£1 MILLION MAZAK
INVESTMENT PAYS OFF



P6

DIRECT MODELLING FOR MANUFACTURE
NEW EDITING OPTIONS
IN POWERSHAPE 2012

For more news, go to www.delcam.com www.delcam.tv

"When it comes to five-axis programming, PowerMILL is hands down the easiest and best I have ever used," states Jason Taylor, five-axis CNC programmer at Viking Yachts. His company first added the Delcam software after it acquired an MR125 gantry milling system able to handle parts fifty feet long by twenty feet wide and ten feet high. This can mill patterns as large as a vessel's bridge and helm, as well as Viking's smaller hulls, in one piece.

The Viking Yacht Company was started

by brothers Bob and Bill Healey in 1964 when they bought Peterson-Viking Builders, a small, struggling New Jersey builder of 37-foot, wooden sport-fishing boats. The renamed Viking Yachts has grown to become a world leader in semi-custom fibreglass yacht production with over 4,000 luxury performance sport-fishing and cruising yachts delivered to happy customers.

Viking prides itself on its in-house manufacturing capabilities, which have been an important part of its highly regarded reputation. From the initial design to the finished product, the company is committed to producing ninety per cent of the boat in house. Except for components such as engines, transmissions, pumps, hoses, air conditioning units, electronics and entertainment systems, virtually everything else is produced in-house by the company's talented workforce.

"I have been programming with PowerMILL for over five years now," said Mr. Taylor. "Here at Viking Yachts, we use cutting-edge software for all our engineering needs. PowerMILL helps us stay on top of the competition."

"When I first started using PowerMILL, we were on version 5," he added. "Now, after at least eight major updates, we are running the 2011 version. With each update, Delcam and the team at our reseller, DM Solutions, make my job easier while saving our company time and money."

"We machine all our parts with two five-axis routers," he explained. "Those parts range in size from a few inches, all the way up to fifty feet in length. We also use some very unique tooling and materials. PowerMILL handles the big files without a hitch, and creating the custom tools is really easy. Even with parts that contain thousands of surfaces, creating boundaries, patterns, work-planes and toolpaths is fast and



PowerMILL is an important part of Viking's in-house manufacturing



Parts up to fifty feet are machined with PowerMILL

very simple. Most of our machined parts have very tight corners and difficult areas that the tools need to get into, so we rely heavily on PowerMILL's collision avoidance and simulation tools prior to running the NC programs."

"The best part of using Delcam software is the support," added Mr. Taylor. "Getting help is quick and easy, unlike other suppliers I've used for programming software. DM Solutions provides everything from basic support to new programming strategies. Jeff Fischer and the rest of the support staff are always there to assist us in our time of need. DM Solutions and Delcam never leave us waiting for an answer, and that is very important to us because downtime can be very costly in our business."

The best for five-axis

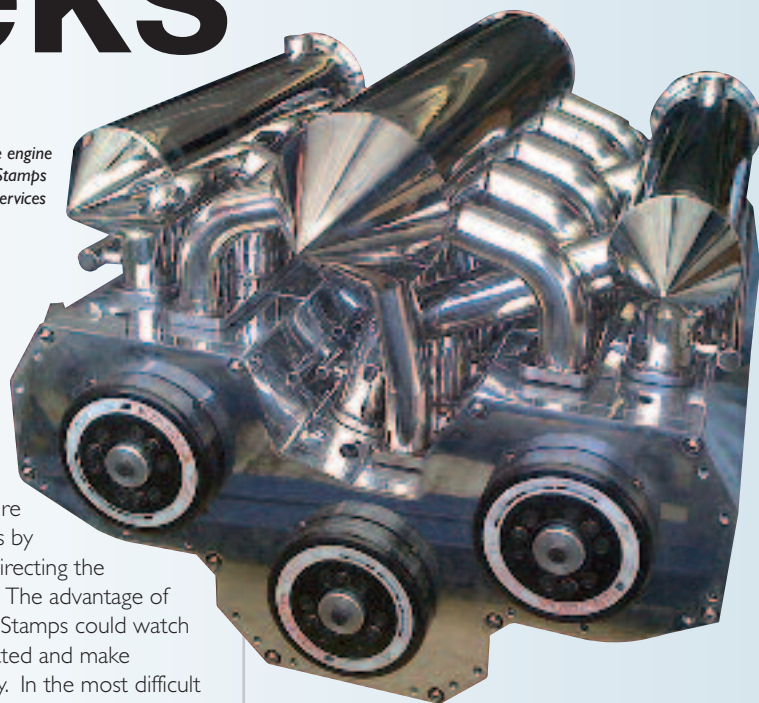


Viking Yachts is a world leader in semi-custom fibreglass yachts

Powerboat engine in five weeks

Delcam for SolidWorks has helped Stamps Engineering Services to program and machine hundreds of components for a 12-rotor Wankel engine in just five weeks. The new engine will provide around 3,000 horsepower to power offshore powerboat racing catamarans at speeds above 200 mph.

The prototype engine produced by Stamps Engineering Services



“The large number of parts and their geometric complexity created a very difficult CNC programming challenge,” Mr. Stamps claimed. “Our original approach was to hire a contract machining firm but we talked to several companies and they told us the job was too difficult for them. Using conventional CNC programming software, it would not have been possible for an organisation of our size and resources to build a prototype of this complexity. However, by using the feature recognition and toolpath algorithms of Delcam for SolidWorks, we were able to write programs for, and build, the hundreds of machined components of the motor in only five weeks.”

Stamps' client's team is looking to overthrow the dominance of the turbine engine in offshore powerboat racing by harnessing the known advantages of the Wankel engine. “Clearly a prototype was needed to prove out this new concept,” Mr. Stamps said.

An opportunity arose to obtain time on a Haas VF4 four-axis machining centre. The challenge then boiled down to producing the CNC programs for all of the motor parts. “The motor presented an enormous programming challenge,” Stamps remembered. “There was a large amount of very complex geometry that needed to be brought over from SolidWorks to the CNC programming environment. A huge number of features had to be converted into toolpaths. Yet we also needed the ability to create our own geometry in areas where the model did not provide the right definition. Delcam for SolidWorks was the only tool that met all these requirements.”

Mr. Stamps used the system's automatic feature recognition to generate toolpaths for most of the parts. On more complex parts,

he used interactive feature recognition, which works by selecting a feature and directing the software to recognise it. The advantage of this approach is that Mr. Stamps could watch the feature being generated and make adjustments as necessary. In the most difficult cases, he added in manually the geometry needed to make the part correctly. After completing the program for each part, the

software's integrated simulation module was used to check the toolpath and dimensions of the finished part.

“I was able to completely program and build each part of the motor in the five weeks that we had allotted in our schedule,” Mr. Stamps concluded. “Delcam for SolidWorks was instrumental not only in getting this job done so fast but in getting it done at all. I don't think we could have done it with any other CNC software that I am familiar with. Delcam for SolidWorks provided every capability that we needed to handle the toughest programming tasks.”

The engine included many complex parts



Stamps programmed and machined hundreds of parts in just five weeks



Using ArtCAM has reduced greatly the amount of time needed by Peter Fogarty of Fire and Ice Creations to create ice carvings, including complete bars cut from ice.

ArtCAM speeds ice bar production

A recent project for La Bodega Tapas

Bar and Grill, in Regina, Saskatchewan, highlighted the savings. Each year, the restaurant has a sculpted ice bar on its patio from the last week in November to the third week in March to raise money for the Transition House, which helps women and children affected by domestic violence. In 2007, Mr. Fogarty spent ten days manually designing, cutting and assembling the ice bar, which contained logos for ten corporate sponsors. In 2010, using ArtCAM computer software and a CNC ice router, he designed and cut logos for a much more complex ice bar, built from forty blocks of ice with twenty logos, in only seven days.

"I saw ice carving for the first time at a demonstration in 1977 and I was hooked," Mr. Fogarty remembered. He started Fire and Ice Creations in his garage while he continued his distinguished culinary career but, in 2007, moved into ice carving full time. The company has built an impressive list of achievements, including sculptures for the 2007 Juno Awards, Canada's main music awards, and a replica of Saskatoon's 25th Street bridge used for a sushi display at the International University Congress.

The following year, Mr. Fogarty began computerising his ice-carving operation and



Fire and Ice produced the CNC-machined bar with over 20 full-colour sponsor logos in just seven days

"I selected ArtCAM because of its ease of use, particularly in converting existing artwork from clients."



Using ArtCAM greatly reduced the amount of time needed to size, position and produce a mirror image of the logos



by 2010 he was producing nearly all of his carvings using ArtCAM and the CNC ice router. "I selected ArtCAM because of its ease of use, particularly in converting existing artwork from clients and sizing, positioning and mirroring logos," he said.

"Another enormous benefit of ArtCAM is that it combines with the CNC ice cutter to cut out the logos faster and more accurately than in the past."

For the 2010 ice bar, Fogarty received electronic versions of the logos from the ice bar sponsors. "ArtCAM made it easy to produce the files needed to drive the ice cutter," Mr. Fogarty claimed. "It greatly reduced the amount of time required to size, position and produce a mirror image of each of the logos, which was required because they were cut out of the back of the ice block."

Another benefit was that the assembly took only six hours, half the time required in the past, because all of the pieces were cut so much more accurately that no additional cutting was required on site.

Lion Engineering invested over £1 million in new Mazak machines but only saw the full benefits when it switched to FeatureCAM

Successful expansion

Changing to FeatureCAM software has helped Lion Engineering to make a success of a major expansion in its machining capacity. The company has invested over £1 million in Mazak machine tools during the past eighteen months but only achieved the increased productivity that the new equipment was expected to deliver when it replaced its previous CAM system with FeatureCAM.

Lion Engineering, which is based in

Great Yarmouth, primarily manufactures components for the onshore/offshore drilling industry; it produces many different types of products for down-hole drilling and production equipment. Lion also specialises in applying hard-facing treatments and welding services to help reduce wear in abrasive conditions.

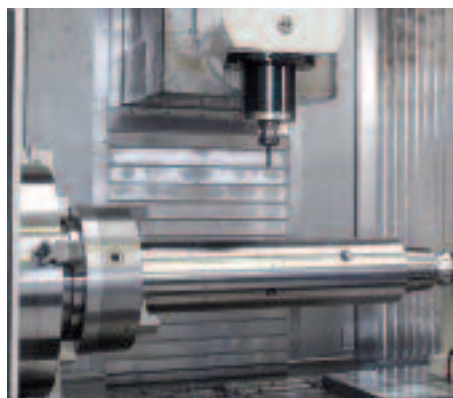
Director Martin Brown, who joined the company in 1972 and took part in a management buy-out from the previous owners in 1985, explained that working for the petrochemical industry could be very demanding with the standards and expectations being extremely high.

"Presently we are as busy now as I have ever known it since joining the company," he claimed. "During the last downturn, stocks of parts were run down and these now need to be replaced; whilst activities in the industry remain at the higher level so shall the demands on our services."

"There has been a dramatic change in the industry over the last ten years," he added. "As new technology and the price of oil have increased, it has become economic to drill deeper wells in more harsh environments. This has both increased the demands on the equipment we supply and made the costs of any failure even higher."

Lion Engineering first moved into CAM four years ago when it increased its milling capacity and acquired a CME four-axis milling centre. The company tried various CAM systems but was never completely satisfied with the software or the support staff. "They never seemed to have the knowledge and experience we needed," said Mr. Brown.

"Problems with the software were affecting our ability to deliver parts as quickly as our customers demanded," he remembered. "Quite rightly, they weren't interested in the shortcomings of our programming system.



Lion Engineering primarily manufactures parts for the onshore/offshore oil industry

They wanted to be using the equipment, not listening to excuses over our delivery times."

The need for a change was highlighted even more after Lion Engineering invested over £1 million in new Mazak machine tools, including an Integrex e-500 mill-turn, a VTC-800 five-axis mill, a VTC-300 four-axis mill and Nexus three-axis lathe with live tooling. The existing CAM system didn't have post-processors for the new equipment. In addition, it couldn't program the helical milling operations needed to produce critical features that keep the components stable in use.

"Once the decision to change had been made, we immediately began to look at other CAM providers, including seeking references from some of our sub-contractors who had experience with Delcam," said Mr. Brown. "We bought FeatureCAM two years ago and have found both the software and the support to be really good."

Machinist and programmer Neil Boags had struggled with the previous CAM system for his first year at Lion Engineering and couldn't believe how much easier and more reliable FeatureCAM was. "It just worked!" he said. "I was new to CAM when I came to Lion as



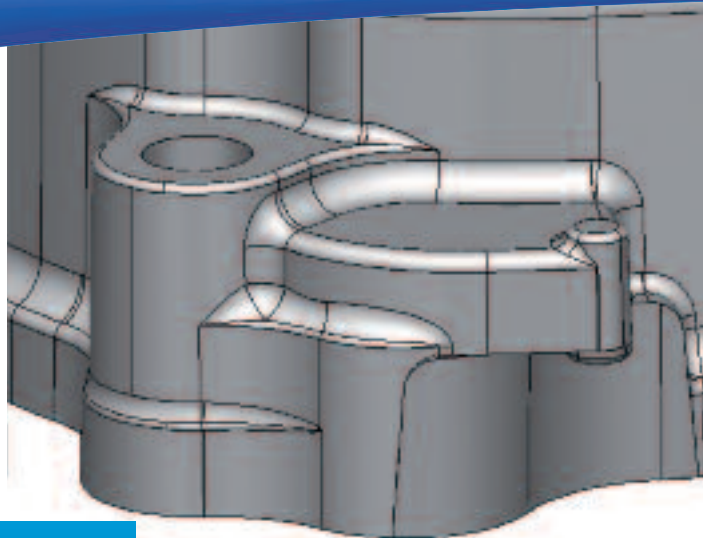
Delcam was able to provide post-processors for all the Mazak machines

I had only used programming on the control at my previous company. The support I received from Delcam was excellent. They helped me work around any problems I had and were able to undertake some minor changes to the post-processors to get the machines running exactly as we wanted."

"FeatureCAM gives us the high-quality surface finish we need for our specialist surface treatments," added Mr. Brown. "Our integrated machining and surface finishing service is one of the most important reasons why our customers prefer to use us. We need to deliver the highest quality at every stage to satisfy some very demanding clients."

The original reason for the major investment was to enable a diversification away from the oil industry. However, high demand from old and new customers in the sector has meant that most of the new capacity was quickly taken up. Mr. Brown still feels that a broader client base will be needed in the long term. He is already looking into a further expansion in capacity and has applied for planning permission to add another new building for the company's next stage of development.

Delcam has added a range of direct modelling options to the 2012 release of PowerSHAPE. Unlike other programs that have incorporated direct modelling as part of a product design system, the PowerSHAPE options are focused on design for manufacture, in particular on preparing product designs for the development of tooling.



Direct modelling in PowerSHAPE makes it easier to modify complex geometry, for example by deleting features and adding draft

Direct modelling for manufacture

“The direct modelling functionality that we have added will enable tooling designers to tackle all the common problems that they find in product designs, such as insufficient draft or inappropriate fillet sizes,” claimed PowerSHAPE Development Manager, Ian Watkins. “It is faster to use direct modelling than surface modelling and so can shorten the overall time needed to produce the tools. In addition, we have made the new options as accessible as possible by incorporating them into the existing command structure rather than grouping them in a separate area of the software.”

“Together with the extensive data translation and data repair options already available in PowerSHAPE, the addition of direct modelling gives a unique range of capabilities to tooling designers, whether they are working with moulds, press tools or die-casting equipment.”

Many product designers still produce designs with insufficient draft, making it impossible to remove the as-designed part from its tooling. The common nature of this problem is expected to make the ability to add draft to solid models one of the most popular of the new options.

Draft can be added either by using a specific value or by modifying the model interactively. The change can be applied to a single surface or to a group of surfaces, such as the sides of a pocket. In the latter case, the software is intelligent enough to maintain the radii of any fillets linking the sides.

Another common problem for the toolmaker is the use of impractical fillet sizes by designers.

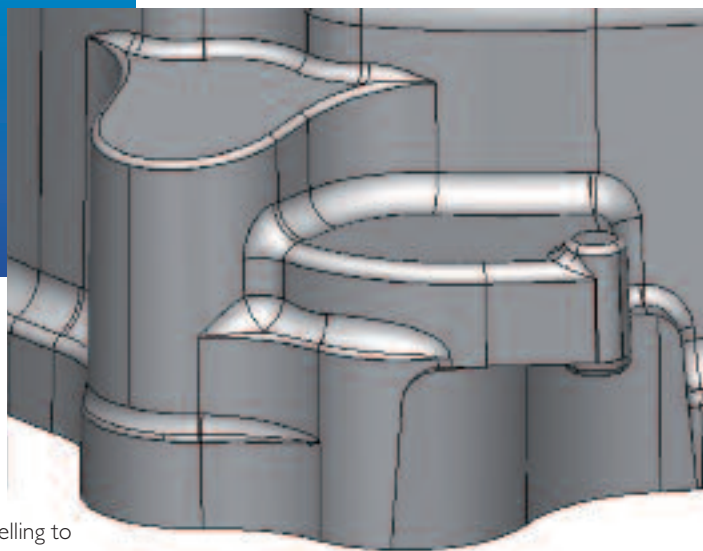
Small fillets require extra machining time so they extend delivery times and increase costs. In addition, they can restrict the flow of material in moulds or dies, so increasing processing times and pressures.

PowerSHAPE can use direct modelling to identify fillets within imported geometry, even when the modelling history has been lost. They can then be replaced with new fillets having more suitable radii.

Material flow problems can also occur when the thickness of items like reinforcing ribs is not sufficiently high. Again, PowerSHAPE can be used to modify the design, either by a specific value or interactively.

The same thickness modification option can be used to add machining allowances before manufacturing, for example when adding material to the split surfaces of a mould or when offsetting surfaces to create electrode designs from tooling designs.

Other features that can be identified within “dumb” geometry include holes, pockets, cuts and bosses. Intelligent manufacturing information can be added to the features and passed to the PowerMILL CAM system. For example, information on the sizes and types of holes can be used for automated generation of drilling programs. These features can be suppressed within the model so that, for example, holes in a surface can be ignored by the machining program until they need to be drilled.



“Together with the extensive data translation and data repair options already available in PowerSHAPE, the addition of direct modelling gives a unique range of capabilities to tooling designers, whether they are working with moulds, press tools or die-casting equipment.”



PowerINSPECT can now be used with the AICON MoveInspect HR optical measuring system

AICON to supply PowerINSPECT

Delcam has entered into an agreement with AICON 3D Systems GmbH, the developer of the MoveInspect HR optical measuring system, to supply PowerINSPECT with its metrology system.

AICON is one of the world's leading providers of optical camera-based 3D-measurement systems. The company, which was founded in 1990 by Dr.-Ing. Carl-Thomas Schneider and Dr.-Ing. Werner Bösemann, was a spin-off of the Braunschweig Technical University and the VW Group's R&D unit. Today, it has 60 employees and a customer base that includes renowned automotive manufacturers and suppliers, plus companies from the aerospace, shipbuilding and renewable-energy industries.

MoveInspect HR is a portable coordinate-measurement machine, consisting of high-resolution digital cameras and the hand-operated MI.Probe. Data are collected by sampling defined measuring points with the probe. MoveInspect HR allows for total freedom of movement around the object being measured as the only requirement is a line of sight between the probe and the camera system. As a result, the system can be used for a wide variety of applications, from the geometric inspection of small components to the measurement of wind-turbine rotor blades.

The ability to use PowerINSPECT with MoveInspect HR offers many advantages.

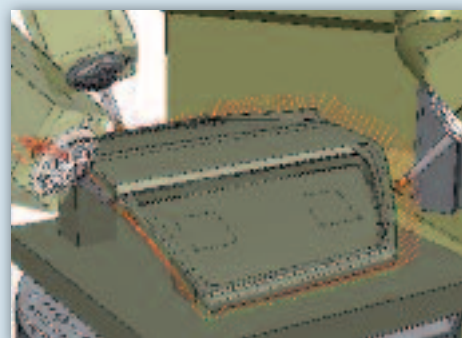
Firstly, before starting to collect any data, an inspection plan can be created in the Delcam software that details the measurements to be taken. Once this has been done, even inexperienced users will be guided smoothly through the measurement process.

During data collection, the MI.Probe acts as a central control unit. By pressing different buttons on the probe, the measuring process can be started, measurements taken or deleted, and the completion of the project signalled to the software. Each measurement is displayed by the software immediately, allowing extra measurements to be taken in any areas of concern.

Once the data collection is completed, various analyses can be run in PowerINSPECT to compare the results with part models from all major CAD formats. PowerINSPECT is able to manage alignment and positioning tasks as well. The software creates user-defined test reports, including graphical presentations of the results and highlighted deviations, that are easy to understand by all engineers, not just metrology specialists.

World's leading CAM specialist

The latest NC Software Market Analysis Report from leading US analysts CIMdata shows that, in 2010, Delcam again had the highest vendor revenues and received the highest end-user payments of all the CAM-centric companies. This means that the company has completed eleven years as the world's leading CAM specialist, having first achieved its global leadership in 2000.



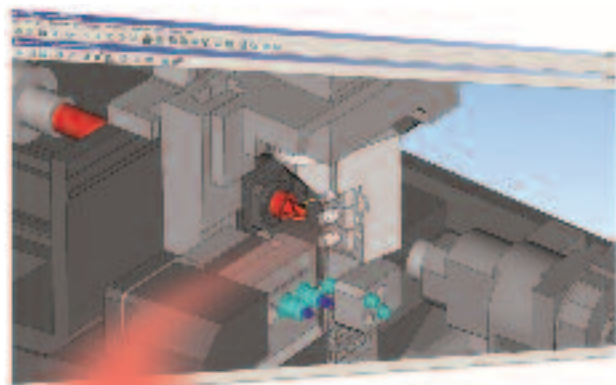
Increased sales of PowerMILL for five-axis machining have helped Delcam to maintain its position as the world's leading CAM specialist

The CIMdata report also confirmed that Delcam continues to employ the largest development team in the industry, with 175 people working on the company's manufacturing software. Only two other companies employ more than 100 CAM developers: Siemens PLM with 130 and Dassault with 110.

Delcam Chief Executive, Clive Martell, highlighted the obvious link between the two sets of statistics. "By employing the industry's largest development team, we are able to produce the world's most comprehensive collection of machining software from any supplier. We can also ensure that each of our programs is the most productive for each of the sectors in which we operate," he claimed. "This gives us an unrivalled ability to provide solutions to all of a company's programming needs. Larger companies can meet all of their CAM needs from a single supplier, while smaller companies can choose exactly the system they need for their particular combination of products and machine tools."

PartMaker simulation enhanced

Greatly improved simulation is the main focus for the 2012 version of Delcam's PartMaker software for programming turn-mill centres and Swiss-type lathes. The release features a new module for the simulation of vertical and horizontal machining centres, plus improved simulation for the latest breed of multi-axis, turn-mill and Swiss-lathe machine architectures.



The 2012 version of PartMaker incorporates improved simulation of complex machine architectures

of the new breed of Swiss-type lathe that supports five-axis milling from a gang-slide type architecture.

These new architectures can provide end users with significantly more machining

capability at less cost as they can avoid the need to purchase angled attachments that are costly and difficult to set up. Such machines will also support more sophisticated five-axis machining operations than were available to users of Swiss-type equipment in the past.

A variety of new, more powerful surface machining strategies for both roughing and finishing have been added to PartMaker 2012. These new strategies are based on the same machining algorithms as those found in PowerMILL and are presented to the user in a manner consistent with PartMaker's industry-leading ease of use.

PartMaker 2012 will also feature improved 3D toolpath visualisation throughout the programming stages, even when a solid model is not available. This improved visualisation will allow users to benefit from 3D graphics at every step of the process, even when working from a 2D drawing.

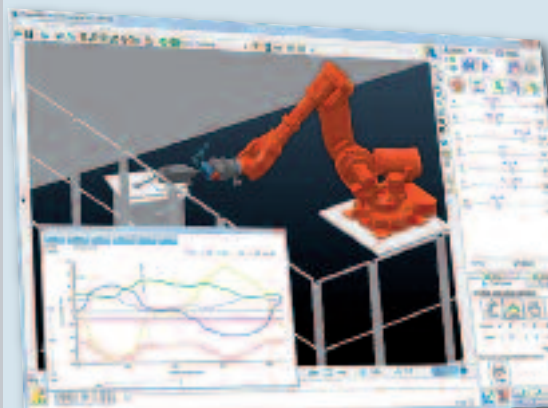
"PartMaker 2012 further demonstrates the accelerated pace of development PartMaker has undergone since its acquisition by Delcam five years ago," stated PartMaker Division President, Hanan Fishman. "Today, the machining algorithms in PartMaker are among the most sophisticated in the industry, offering users a great deal of power alongside the software's hallmark ease of use, a combination simply not found in other CAM systems," claimed Mr. Fishman.

Other enhancements include more

powerful surface machining strategies, and improved visualisation throughout programming, as well as a host of additional productivity enhancements.

The new simulation module for milling, Kinematic Machine Simulation, will provide a completely new level of realism and collision detection for the simulation of parts being manufactured on vertical and horizontal machining centres. This new module will simulate the full architecture of milling machines, including work holding, rotary tables and tombstone fixtures.

Machine tool architectures have evolved greatly in the past 18 months, perhaps faster than they did in the previous five years. New multi-tasking machine tools that have come onto the market, and those that are still being introduced, are being equipped with more powerful and more sophisticated capabilities. PartMaker 2012 supports this increased functionality with improved simulation, including the simulation



The new Robot Interface for PowerMILL

COMET PROGRESS

As reported in News.Delcam in issue 1, 2011, Delcam is leading the eight-million-Euro, thirty-month COMET project funded by the European Commission to develop machining methods for robots.

The project team estimates that

industrial robot technology could give an average of 30% cost-efficiency savings in comparison to machine tools. However, industrial robots lack absolute positional accuracy, are unable to compensate for process forces, and lack reliable programming and simulation tools. These three critical limitations currently prevent the use of robots in most machining applications.

CAM systems like PowerMILL are able to generate toolpaths from imported CAD data, incorporating large amounts of process knowledge. The resulting CNC code can then be translated into a robot code in the native robot language.

What the CAM systems lack is knowledge about the kinematics and dynamics of the robot system; they are developed to calculate the toolpaths for the simpler kinematics of standard machine tools. Within the COMET project, a programming system is being developed specifically to incorporate the robot kinematics and dynamics, and to cope with the aforementioned problems.

The Programming and Simulation environment for Industrial Robots (PSIR) system is a new software platform that is being developed, tested and demonstrated within COMET to give a complete solution for generating

“PowerMILL is able to generate toolpaths from imported CAD data, incorporating large amounts of process knowledge. The resulting CNC code can then be translated into a robot code in the native robot language.”



First machining experiments with the robot at Fraunhofer IPA

machining toolpaths for industrial robots, including simulation, optimisation and post-processing.

Another related innovation is the Kinematic and Dynamic Models for Industrial Robots module (KDMIR), which is a methodology for describing kinematic and dynamic models of industrial robots to define accurately their static and dynamic behaviour. This behaviour is stored in a unique signature that contains mathematical models to optimise and adapt the robot toolpath to improve the accuracy of the robot movement. The models contain measured data on specific robots, making the signature unique for each individual robot. The KDMIR models are then used in the PSIR system to generate optimised toolpaths specific to each robot.

The PSIR module will contain a set of tools to manipulate the robot toolpath to calculate robot positions, to analyse robot behaviour using the kinematic and dynamic models from the KDMIR module, to optimise and adapt the toolpath for specific robots using the unique signature developed in the KDMIR module, and to perform 3D simulations of the robot movements to locate any collisions.

A complete inspection solution

Delcam's Australian Sales Partner, Camplex, has been able to supply a complete inspection solution to Metalsa, a leading supplier of automotive components in the country. The system comprises PowerSHAPE for data translation and repair, PowerINSPECT for inspection and a Baces3D portable measuring arm.

Metalsa is a global manufacturer of chassis, suspension and body structures for both cars and commercial vehicles, with the philosophy “Quality as a way of life.” Originally founded in Mexico, the company now also manufactures in North and South America, Germany and India, as well as in Australia.

The Australian manufacturing is located on a large industrial site in Cheltenham, near Melbourne. It supplies local car manufacturers, including Toyota, GM-Holden and Ford.

For example, the company makes and supplies more than 60 components for the Toyota Camry, including under-body and body-shell components. Each component design must pass from Toyota's design system to the Metalsa data system before manufacturing, prototyping and verification can begin.

Robert Nastasi, Metalsa's quality engineer, has been part of the process of providing these car companies with quality parts since 1998. Toyota, in particular, is renowned worldwide for its exceptional quality standards and processes and it is Mr. Nastasi's job to ensure that Metalsa meets those standards without fail.

Mr. Nastasi has been using PowerINSPECT and PowerSHAPE for seven years and finds the tools very flexible, allowing him to work with the different data formats that the car manufacturers use.

Trialling of parts is done at various stages with targets to be met at every stage. As a component passes through these stages it must be accurate enough to meet Toyota's exacting standards. The last stage is trial fitment by Toyota to a car. If the part meets Toyota's parameters, it moves into the manufacturing phase at Metalsa.

The increased demand for inspecting parts and tools a multiple number of times in multiple places within the manufacturing chain requires software products that can be used on a variety of different inspection hardware platforms, including manual CMMs, CNC CMMs, inspection arms and optical MMs.

PowerINSPECT is Metalsa's first choice because it delivers a complete CAD-based inspection solution. It surpasses traditional 2D inspection methods by offering the capability to inspect against all CAD data. With its on-screen feedback and detailed graphical displays, Mr. Nastasi can gain immediate feedback for each measured point and inspection reports can be generated automatically in a customised format.

Mr. Nastasi says that verification with the software and using the Baces3D arm can take between 30 minutes for simple parts to two hours for components that are complex shapes or are very large.

At Metalsa, PowerINSPECT is used to confirm quality at every stage



Diversification into dental

PowerSHAPE and PowerMILL have enabled French engineering company, SEEM décolletage, to diversify into the manufacture of dental restorations. This is the latest stage in the company's continued progress into more challenging, but more profitable business.

SEEM décolletage is a family business

that was founded in 1951 by Michel Moschietti. Today, the company is based in Chevroux to the north of Lyon. It is managed by the third generation of the family, Georges and Jérôme Moschietti, and employs eleven people.

Historically, SEEM décolletage produced short runs of small- and medium-sized parts for a wide range of applications, including parts for agricultural equipment, plumbing fixtures, and components for building and civil engineering. In 2009, the company began to move towards new applications like aerospace, nuclear and medical. Even though these customers were more demanding, the company's regular investments in new technology, together with the long experience of the family and their commitment to high quality, allowed it to continue successfully in the new areas.

In July 2009, SEEM décolletage acquired its first high-speed five-axis milling machine to develop its capabilities in medical manufacturing, in

Special templates have been developed by Delcam Franc to automate the programming

particular, to be able to produce dental restorations in titanium and cobalt/chrome. As a consequence, Mr. Moschietti started looking for a CAM solution that could deliver the necessary performance and accuracy but still be easy to use. He found it with Delcam.

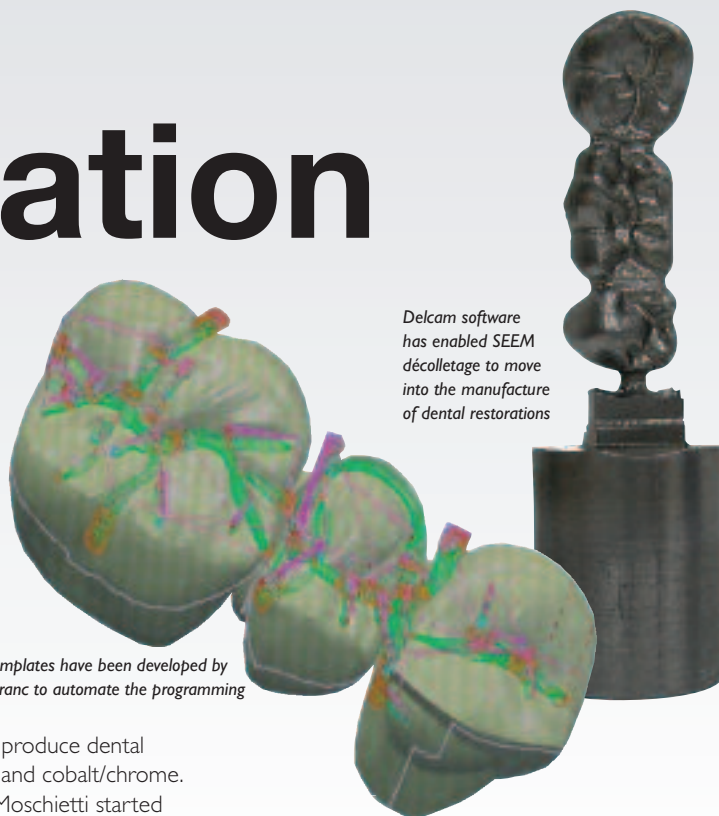
"We had decided that we would focus on dental applications for the new machine," he explained. "We needed a software solution which would allow fast and accurate machining, even for the difficult-to-machine materials used in the dental industry. With PowerMILL, the quality of the surface is excellent, the optimisation of the toolpaths is simple and there are many little tricks within the software that help us meet our customers' demands."

Delcam France set up templates within the program to automate the process and make the engineers' work easier. "We have a good

relationship with the young and motivated team at Delcam France," said Mr. Moschietti. "I recommend Delcam highly to my customers because I believe that the final quality of the parts is better than that from any other similar product. Also, by using the same software, we can be sure our models are perfectly compatible."

"We are always ready to participate in different events with Delcam France, like a users' day when we presented our work to other customers, or the Dental Forum – a dental show held in Paris," he added. "We have a very successful partnership."

Delcam software has enabled SEEM décolletage to move into the manufacture of dental restorations



Orthotics Technology

Following the success of the initial Orthotics Technology Forum in Bath earlier this year, a second Forum will be held on 12th and 13th July, 2012, at the University of Salford in Greater Manchester, UK.

It will again cover new technologies and

processes designed to assist practitioners and laboratories in prescribing, designing and manufacturing custom orthotic insoles. With the Olympic Games due to be held in the UK in 2012, the Forum will include a strong focus on sports podiatry. For more information, please visit www.orthotics-technology-forum.com.

Delcam is currently contacting international speakers that are leading the way in developing

and using different types of technology, including hardware devices to help measure biomechanical features, pressure and anatomical form, and CAD/CAM tools for plasterless manufacture, as well as new ideas for increasing productivity and reducing manufacturing costs. Researchers, laboratories and practitioners interested in speaking at the Forum should contact Hannah Harlock at hlh@delcam.com.

The programme is set to be as varied and educational as this year's event, showing the

latest technology that is currently being used in the design and manufacture of orthotic insoles as well as what may be on the horizon. The aim is to provide another opportunity for delegates to see a wide variety of innovative technologies from a combination of diverse organisations.

The University of Salford is home to Europe's largest School of Podiatry. The recently completed facilities in its School for Health Sciences include a multimillion-pound podiatry clinic, three gait-analysis and biomechanics laboratories, digital analysis rooms and orthotics laboratories. Delegates will be able to take part in hands-on experiences as well as a tour of the University's podiatry facilities.

Delcam has extended its range of software for manufacturers of custom orthotic insoles with the launch of a workflow management solution. The OrderManager system will allow both practitioners and laboratories to track and access all order details and transactions, from the initial placing of the order, through CAD modelling and manufacturing, to delivery to the patient.



Delcam's OrderManager makes it easy to track the progress of orders

OrderManager for orthotics

OrderManager can be used both by practitioners that have digital scanning equipment to capture patient data and those that use traditional casting methods. An orthotics order, containing 3D scan data collected on the Delcam iQube 3D scanner or similar devices, a digital prescription and supporting images, can be transferred to the laboratory electronically at the touch of a button. Email acknowledgement is sent as soon as the data are received. In cases where the practitioner does not have a scanner, the order can still be sent electronically when the foam box impression or cast is mailed to the laboratory. Once it arrives, it can be scanned and the results added into the order.

One of OrderManager's strengths is its ability to allow practitioners to collect all the order details off-line and send them when on-line.

This enables the system to be used when data have to be collected in remote locations where internet access is not possible.

At the laboratory, OrderManager allows staff to immediately see incoming orders, approve them and download the data to begin the design. The system can subsequently manage all manufacturing steps through to eventual dispatch, giving a 'real-time' view of total order status. OrderManager can be used with the full variety of manufacturing processes as it can easily be tailored to manage any laboratory's individual process steps.

Each practitioner has access to view all their orders, from initial order acknowledgement through to eventual dispatch, to check their progress without needing to contact the laboratory, so saving time for both customer and supplier. Practitioners are notified

automatically if any further information is required, and when the order has been dispatched so that they can then arrange an appointment with the patient.

The system has been designed to be extremely easy to use for both the practitioner and the laboratory staff, thus minimising administration time whilst maximising feedback. All transactions are logged, providing complete traceability for every order.

"OrderManager can save time for both practitioners and laboratories," claimed Chris Lawrie, Delcam's Healthcare Business Development Manager. "This can increase productivity and profitability for both parties. Most importantly, it can improve the service to patients by allowing them to receive a better-fitting orthotic more quickly."

Forum 2012

As part of the focus on sport, the Forum Dinner will be held at one of the world's most iconic sports venues – Old Trafford, the home of Manchester United Football Club. Delegates will be able to enjoy pre-dinner drinks in the Club's museum, which houses three floors of history and memorabilia, before enjoying a three-course meal in the Evolution Suite with pitch-side views. There will also be the opportunity for delegates and speakers to network during the evening to share their experiences with colleagues from around the world.

The Forum will be of interest to laboratory managers, podiatrists and orthotists, in fact any

organisation that is looking to improve the efficiency and profitability of its laboratory or clinic, and to provide a better service to its patients. Delcam is currently applying for it to be CPD approved so that attendance will count towards the professional development of UK delegates.

The programme will include a dinner at Manchester United Football Club



Five-axis success in New Zealand

A move to five-axis machining programmed with FeatureCAM has resulted in dramatic productivity and quality improvements at WECAN, a New Zealand company focused on the manufacture of precision components.

WECAN was founded in 1971. Since that time it has gone from strength to strength and is now regarded as one of New Zealand's premier manufacturers. The business focuses on the manufacturing of precision components, critical engineering spares, and complex engineering parts and assemblies in the food and meat processing industries. Canning and packaging equipment is a major part of the business, with the local subsidiary of global food giant Heinz being an important customer. However, it also works with R & D teams on prototyping and low-volume manufacturing.

"We were straight into the five-axis operation in the first few days, which was exactly what we wanted."

With WECAN's continuing success came a need for expansion. The company's directors, Rickie Pike and Ian Jamieson, realised that a move into five-axis machining would soon be required to increase output and productivity. In the past, they had encountered problems when integrating another CNC machine into the business. These problems stemmed primarily from having independent suppliers of machine, cutting tools and CAM system, and the difficulty of coordinating them in a way that provided an acceptable time frame from order to operation.

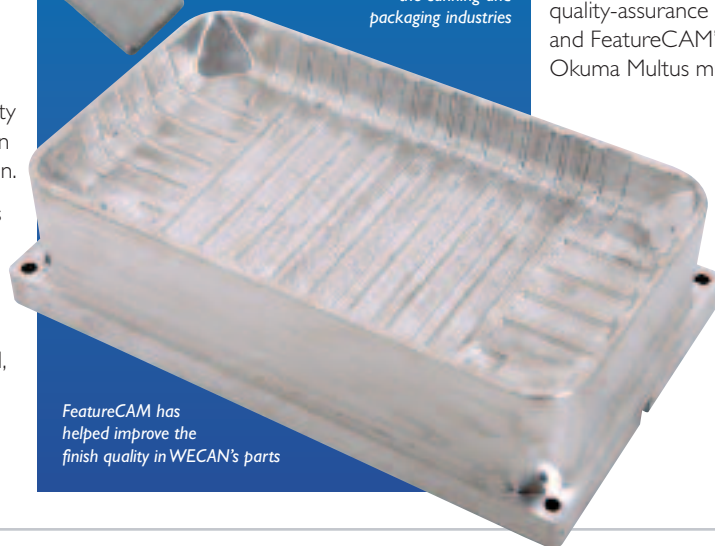
An extensive review of five-axis machine tools resulted in the selection of a Spinner U620 with Siemens 820D controller. However, before WECAN would place the order for the machine, Spinner NZ had to undertake to provide a total package including machine tool, cutting tools and CAM system. Spinner NZ formed a partnership with Iscar Tools and Delcam sales partner Camplex to meet the challenge.



The move to five-axis machining allows complex parts to be produced in fewer set-ups



WECAN specialises in components for the canning and packaging industries



FeatureCAM has helped improve the finish quality in WECAN's parts

"We wanted to ensure that everything was taken care of when we bought this total package," recalled Mr. Jamieson. "We wanted to be sure that the machine would perform directly from commissioning."

He was not disappointed. Training of WECAN staff on the machine and with FeatureCAM was completed prior to the machine installation. In addition, a customised Tool Database was created within FeatureCAM with details of the Iscar tooling. "We were straight into the five-axis operation in the first few days, which was exactly what we wanted," claimed Mr. Jamieson.

Mr. Pike also endorsed FeatureCAM enthusiastically. "Our previous CAM package had never had the tool library set up except in a haphazard way and we just were not getting the productivity that we needed," he reported.

"Now, that has all changed and productivity has increased. In the first two weeks, we ran six jobs that were normally six or seven set-ups in one or two operations. As a result, we were able to run all these jobs within three days rather than around two weeks, and without the errors inherent in multiple set-ups."

Since the success with FeatureCAM five-axis, WECAN has invested in further Delcam solutions, including an On-Machine verification quality-assurance system for the Spinner U620 and FeatureCAM's TurnMILL software for its Okuma Multus multi-tasking machine.

Learning zones

Delcam has added a range of “learning zones” for its manufacturing CAD/CAM systems to its online TV channel, Delcam.tv. Each of the zones, which can be accessed from www.delcam.tv/lz, includes full details on the latest release of the software, including What’s-New videos from expert Application Engineers and customer testimonials.

The learning zones allow existing customers to learn how to use new functionality in the latest releases and so help them to gain full benefit from Delcam’s industry-leading investment in software development.

Prospective users can also use the learning zones to compare the latest Delcam functionality with that available in their existing CAD/CAM system. Each site includes links to Delcam’s international reseller network so that visitors can contact their local representative for further information or to request an evaluation copy.

The introduction of the learning zones is part of a complete update of Delcam’s online presence. New, dedicated websites are being introduced for all the company’s software, while the number of videos on the delcam.tv site is being increased steadily.

The learning zones include videos covering new functionality in the latest software releases



Another sales record

Delcam achieved record sales for a six-month period and increased profits during the first half of 2011. Sales increased by 13% over the same period of last year to £20.1 million. This continues the rising trend in sales, with the company setting new record levels in each of the last three six-month periods. Pre-tax profits have grown significantly to £1.51 million.

Delcam has been able to take advantage of the continuing recovery in global manufacturing to increase both the sales of new software licences and the take-up of maintenance contracts, especially in the automotive and aerospace industries. The strongest overall sales have come from the

USA and Germany, with the fastest growth in sales of new software licences coming from Asia, in particular from China, Korea, Indonesia and India.

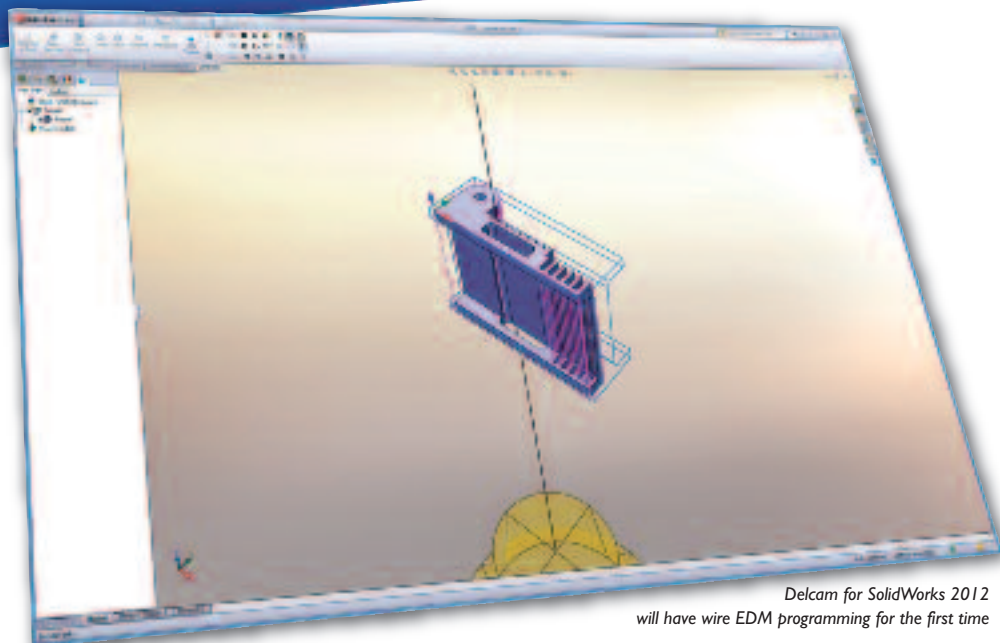
Commenting on the results, Delcam Chairman, Peter Miles, said, “I am pleased to announce

very good first half results, with record interim revenues and an 87% rise in pre-tax profits. Significant investment by the Group in both product development and marketing has been key to these encouraging results, and supports our long-term aim of building our global competitive edge.”



Delcam has added more student posts at its Birmingham headquarters to support further growth of the company

The 2012 version of Delcam for SolidWorks, the integrated CAM system for SolidWorks, includes programming of 2D wire EDM for the first time alongside the comprehensive options for the programming of turning and mill-turn equipment, drilling and two- through five-axis milling. Four-axis wire functionality is planned for the 2012 R2 release, due in January 2012. Find out more at www.delcam.tv/dfs2012/lz.



Delcam for SolidWorks 2012 will have wire EDM programming for the first time

Wire EDM in Delcam for SolidWorks

Other enhancements include target-part comparison, the ability to compare a model of the desired final shape with the shape achieved by the programmed toolpaths, and multiple-instance programming, the programming of multiple SolidWorks components in one operation, either in the same orientation or in different orientations.

Fully automated de-burring and chamfering has also been added to give faster programming of these finishing operations on 2- or 2.5-axis parts. The ability to incorporate chamfers, even when they are not shown in the original SolidWorks model, duplicates functionality previously available in FeatureCAM 2011.

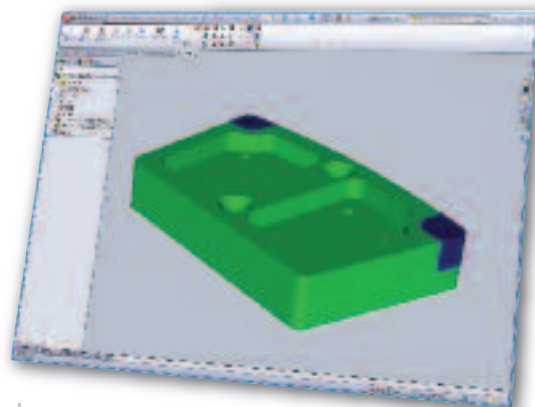
Delcam for SolidWorks 2012 will also incorporate enhancements from the 2012 release of FeatureCAM, including improvements in the use of stock models and new options in the tooling database.

Stock models allow the user to visualise the material remaining after each operation. This makes it easier to eliminate air cutting and so generate more efficient toolpaths with reduced machining times. The models also simplify the selection of the most appropriate tool sizes for rest-roughing and finishing operations.

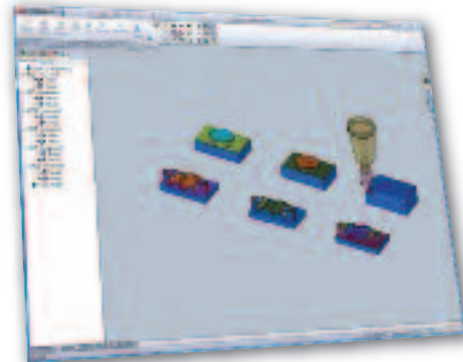
The tooling database is a key part of the automation in Delcam for SolidWorks as it allows the optimum operating conditions to be associated with each tool. In most companies, the database is developed by the most experienced user. It then ensures that even inexperienced operators use safe and efficient cutting parameters.

Delcam for SolidWorks combines the benefits associated with Delcam's PowerMILL and FeatureCAM CAM systems. It is based on Delcam's proven machining algorithms that are already used by more than 35,000 customers around the world. The software offers PowerMILL's exceptional speed of toolpath calculation, plus the advanced strategies for high-speed and five-axis machining, to ensure increased productivity, maximum tool life and immaculate surface finish, even when cutting the hardest, most challenging materials. At the same time, Delcam for SolidWorks has the same strong focus on ease of use as FeatureCAM, including all of the knowledge-based automation that makes that system so consistent and reliable.

Delcam for SolidWorks is fully integrated into the SolidWorks environment so that the



Target part comparison allows the desired final shape to be compared with the shape achieved by the programmed toolpaths



Multiple instances of components can be programmed in a single operation, even when they are in different orientations

program looks and behaves like SolidWorks. It offers full associativity so that any changes in the CAD model are reflected automatically in the toolpaths. However, this associativity is more intelligent than that offered in many other integrated CAM systems. Delcam for SolidWorks doesn't simply modify the existing toolpaths but also reviews the choice of cutting tools and machining strategies, and changes them if necessary.

ArtCAM Pro can produce complex borders for picture frames

64-bit ArtCAM

Delcam has launched the first 64-bit version of its ArtCAM Pro software for artistic applications such as engraving, woodworking and signmaking. 64-bit computers are able to use larger amounts of memory so the new release will enable users to work with much larger and more complex designs. It will also make all calculations faster, with the most significant benefits being seen by customers that need to produce large 3D signs or models, or that want to engrave items containing very high levels of detail to a fine surface finish.

The new release also includes a number of new options to enable higher quality results to be obtained. In particular, the quality of text that can be produced has been improved with the addition of a "contour blend" tool that gives centreline-ridged or smooth-domed shapes ideal for engraved-style text. The improved quality is most apparent at any intersections within letters. The same tool will also help with texture effects that intersect or overlap, and for producing complex borders on items like picture frames.

Another significant improvement is in the quality of vectors generated directly from bitmaps imported from 2D drawing packages such as Corel Draw, or scanned from artwork or photographs. With earlier versions of

ArtCAM Pro, it could take some time to clean up the vectors but the new release gives much better results that require minimal editing.

Once vectors have been created, it has been made much easier to edit them into exactly the shape that is required. The node editing tools have been enhanced with the ability to move points and automatically produce smooth curves around the shape or to maintain any sharp angles. In addition, mid-points can be displayed automatically on any curve to simplify the creation of more complex geometry.

One of ArtCAM Pro's most important benefits has always been the ability to create a library of reliefs for use in different designs. This process has been made easier with the introduction of the "cookie cutter" option. This allows the user

The ability to create complex text has been improved

to define a relief with its vector boundaries, and then cut and paste it between models or into the clip-art library for future use.

The range of standard clip-art supplied with ArtCAM Pro has been extended with an additional 130 reliefs, including architectural, floral, frame and texture examples. For ArtCAM JewelSmith users, an additional 150 components have been added to the component library, with automatic positioning of the collets relative to the shank as they are imported.

Training in the Philippines

A training programme, the Innovative Solutions Technology Center, has been established in the Philippines in a joint project between Rosco Machine Shop and Delcam's local Sales Partner, Partmaker Software Sales & Services.

The programme aims to supplement and further enhance the technical skills and practical knowledge of students from the Technological University of the Philippines, Bulacan State University and Don Bosco Technical School in Tondo Manila. It will help improve the quality of the technical graduates they produce so the students can compete locally and globally in terms of skills and experience.

The idea of creating this centre was conceived by Mr. Augusto Uy and his wife Maria Uy, owners of Rosco Machine Shop. The couple recognised the efforts exerted by their employees in helping them grow from a simple backyard operation into a significant business so they began to offer scholarships to deserving employees' children.

With the company's expansion, many technical schools and universities in Manila and nearby provinces approached Mr. and Mrs. Uy for on-

the-job training of their students. The couple saw the potential in these student trainees, finding them hard-working and willing to learn, so they decided to fulfil another dream by establishing the training centre.

The first training sessions covered different conventional and CNC machines, including manual programming using G-codes. Subsequently, the courses progressed into computer-aided technology and, most recently, into multi-axis machining.

The couple became aware of Delcam's software during the PDMAEC 2009 exhibition in Manila. A simultaneous multi-axis machine that they were planning to buy was on display, machining an impellor programmed using the software. A partnership was established with Partmaker Software Sales & Services and FeatureCAM became a part of the training curriculum.



Augusto Uy of Rosco Machine Shop, Belen de la Pena from Partmaker Software Sales & Services, and Kyle Kershaw from Delcam USA with students from the Innovative Solutions Technology Center

The first FeatureCAM training started in August 2010, with 30 students from the three chosen schools. It coincided with a visit by the FeatureCAM application manager, Kyle Kershaw from Delcam USA, who presented certificates to the students. It is planned to continue with at least two courses each year in the software.

"The success of this programme proves that there are still good people who are willing to help and share what they have with those less fortunate than themselves," commented Belen de la Pena from Partmaker. "It has been a pleasure to work with Mr. and Mrs. Uy on this endeavour."

For more news, go to
www.delcam.com
www.delcam.tv

The 2012 version of Delcam's FeatureCAM feature-based CAM system contains a range of enhancements to give faster and easier programming, and produce more efficient toolpaths to give greater machine productivity. For further information, please go to www.delcam.tv/fc2012/lz.

Faster feature-based machining

A number of the improvements will make FeatureCAM even easier to use. For example, a range of keyboard shortcuts have been added, including isometric view options, that will allow faster programming. It has been made easier to select multiple items from the operations tree and to move all the features in a group, for example a network of similar holes or all the operations on a particular spindle. In addition, warning or error messages can be displayed simply by hovering over the relevant icon in the Operations List.

Toolpath editing has also been made much easier. Toolpaths are displayed more clearly, selection of toolpaths has been simplified and an "undo" option added.

Target part comparison has been extended to cover multi-axis milling operations. This allows the user to compare a model of the desired final shape with the shape achieved by the programmed toolpaths. It provides a quick check of any material remaining on the part, and of any gouges or collisions. Previously, this option was only available for 2- and 3-axis operations.

Two new strategies are now available – back boring and spiral roughing. Back boring allows more parts to be completed in a single set-up, with larger bores able to be produced on the reverse side of the part. Spiral roughing can be used instead of Z-level roughing. It uses a single

continuous toolpath instead of a series of levels and so gives a smoother finish with no dwell marks.

The most important improvement for increasing machine productivity comes from further developments in the use of stock models to cover 2D features, including bosses, sides and slots. The models allow the user to visualise the stock remaining after each operation. This makes it easier to eliminate air cutting and so generate more efficient toolpaths with reduced machining times. The models also simplify the selection of the most appropriate tool sizes for rest-roughing and finishing operations.

A number of extra options have been added to the tooling database. This database is a key part of the automation in FeatureCAM as it allows

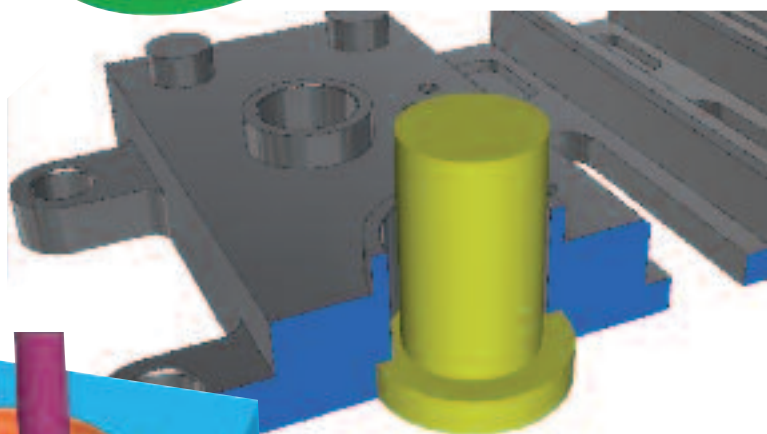
the optimum operating conditions to be associated with each tool. In most companies, the database is developed by the most experienced user. It then ensures that even inexperienced operators use safe and efficient cutting parameters. The new options in FeatureCAM 2012 allow more variables to be specified, including maximum cut depth and the optimum ramp angles.

Fully automated de-burring and chamfering, when programming 2- or 2.5-axis parts, were added in FeatureCAM 2011. Tool selection for these operations has now been improved to avoid unnecessary tool changes.

Other improvements include a new option to automatically counterbore holes before drilling, the ability to have a negative leave allowance (such as a fitting allowance) for turning or wire EDM to produce undersized features without remodelling, and much improved performance on the largest part files with hundreds of thousands of entities.



FeatureCAM's target part comparison can now be used for multi-axis toolpaths



Back boring (above) and spiral roughing (left) have been added to FeatureCAM 2012

