Integrated G-Code Simulations Can Prevent Costly Errors

Manufacturing Engineering: What are some of the most important current developments in CAM?

Marc Bissell: Advances in technology are dynamically changing the landscape in the CAM market. Cutting-edge technologies including seamlessly integrated CAD/CAM, simultaneous four- and five-axis milling, high-performance toolpaths, support for advanced multitasking machines, and integrated true G-code machine simulation formerly available only in expensive high-end systems, are now available to the mainstream CAM market. Continued development of cloud-enabled and cloud-based CAM systems, integrated CAD/CAM applications on mobile platforms and full design through manufacturing automation leveraging application programming interfaces [API] are some of the latest technologies helping companies to dramatically increase production, reduce costs, and improve quality.

ME: How critical is it for CAM software to simulate machining using actual G-code?

Bissell: Using the actual G-code for simulation that will be used to run the CNC machine is extremely critical. No CAM system or postprocessor is perfect; as a result, machine simulations based on internal CL [cutter location] data can provide inaccurate results. Errors in the G-code can still exist and result in scrapped parts, broken tools, damage to workholding devices, and can severely damage a machine, resulting in expensive repairs and extended downtime. The more expensive the machines, tooling, and raw materials used in the machining process, the more critical using the actual G-code for simulation becomes, as any mistake in the G-code can be extremely costly.

In addition, true-G-code simulation offers several benefits including improved safety and higher productivity by reducing setup time and eliminating dry runs. True G-code simulation also builds trust and confidence in both CNC programmers and a machinist, improves part quality, increases tool and machine life, and significantly reduces time-to-market. CAMWorks is the first CAM system to offer integrated true G-code machine simulation to the mainstream CAM market and it continues to be a leader in CAM technology development.

ME: What’s new in the latest release of your CAMWorks software?

Bissell: The CAMWorks 2015 offers several significant enhancements including improved UI for multisurface selection, the ability to apply multiple sets of cutting parameters for various materials, not only to features and operations but now also to specific tools. The latest version also includes CAMWorks VoluMill support for multiple stepped islands and 3D surface machining, the ability to use Solidworks parts and configurations for stock, and many other cutting-edge enhancements. In addition, CAMWorks 2016 is already in development and will include additional ground-breaking CAM technology.

ME: Are there any new CAM modules coming soon from your company?

Bissell: CAMWorks offers a complete set of modules integrated directly inside Solidworks for all of your CNC needs.
CAMWorks for Solid Edge is also the first fully integrated CAM system for Solid Edge and several new modules for Solid Edge have recently been released. Modules are now available for 2.5- and three-axis milling, four- and five-axis milling, two-to-four-axis turning, mill-turn or multitasking machines, and two-to-four axis wire EDM machines for both Solidworks and Solid Edge.

In addition, CAMWorks Costing, the first integrated CAM costing module has now been released and is an ideal tool for job shops and companies looking for a fast, reliable, and consistent way to arrive at accurate cost estimates for machined parts. CAMWorks Costing uses Geometric’s proprietary feature recognition to generate cost estimates for machined parts in minutes or even seconds for solid models from a variety of CAD systems including Solidworks, Solid Edge, CATIA V4.0 and V5.0, Pro/Engineer, and many others. CAMWorks Costing will help job shops and companies to respond quickly and accurately to customers RFQs to win profitable business and gain more market share.

Using technologies developed for the multi-award winning REVO®, the compact PH20 from Renishaw changes CMM touch-trigger probing forever, with fast, infinite, 5-axis positioning. PH20 reduces the effect of CMM dynamic errors by only moving the probe head and eliminating indexing for a 3-fold increase in throughput. See the PH20 in action: Renishaw.com/PH20
ME: How difficult is it to learn and use today’s CAM software?

Bissell: CAMWorks has long been a leader in the CAM industry and ease of use UI development. No other CAM system in the industry combines ease of use along with the power and automation offered by CAMWorks. Many users are able to start productively using the system with little or no training but like any software, some training and assistance can help jump-start users to become immediately productive. In addition to a complete set of tutorials, CAMWorks is one of the few, if not the only, CAM systems to offer a complete suite of SolidProfessor videos to help users get up to speed quickly and easily. In addition, CAMWorks value-added resellers offer industry leading training, setup, and support to insure user satisfaction.

ME: What key developments in CAD/CAM do you see coming in the future?

Bissell: Going forward, advanced technologies including design validation, cost analysis, and model-based design (MBD) will leverage existing automatic feature recognition and knowledge-based machining technology to further improve and automate the design through manufacturing process. Complete solid models including all of the necessary product manufacturing information (PMI) will eliminate the need for mechanical drawings and will allow feature-based machining systems to automate CNC programming even further.

Additive Consortium Adds Members

The 3MF Consortium (Wakefield, MA), an industry association launched earlier this year to promote a new full-fidelity format for 3D printing, has added some key additive and CAM software developers with the addition of 3D Systems, Materialise, Siemens PLM Software and Stratasys to its membership.

The consortium, formed on April 30, aims to close the gap between the capabilities of modern 3D printers and
outdated formats. The specification for 3MF, which stands for 3D Manufacturing Format, is free and now available at http://tinyurl.com/3mfspecs. The consortium contends that it eliminates problems associated with currently available formats and resolves interoperability and functionality issues, enabling companies to focus on innovation.

Other members of the consortium are Autodesk Inc., Dassault Systèmes SA, FIT AG/netfabb GmbH, HP, Microsoft Corp., Shapeways Inc. and SLM Solutions Group AG. The starting point for the Consortium’s development of the 3MF specification was Microsoft’s donation of its 3D file format work-in-progress. For more information about the 3MF Consortium and the 3MF specification, see http://www.3mf.io.

Partnerships

Autodesk Inc. (San Rafael, CA), and the National Institute for Metalworking Skills (NIMS; Fairfax, VA) announced a partnership to develop industry-recognized CAM standards and credentials. These standards and credentials will enhance education and training programs to meet future demands for skilled CAM programmers, designers and engineers, which the companies said will account for almost 100,000 new jobs by 2024.

“Companies in technologically advanced industries are becoming much more reliant on the use of information technology and automation through CAM software to develop high-value-added products and materials. In the next decade, nearly a million jobs will require the technical skills needed to operate CAM software,” said NIMS Executive Director James Wall.

This partnership supports the advancement of CAM training programs by developing industry standards for educating and training CAM programmers, and to develop the standards, Autodesk and NIMS recruited industry leaders to participate in a Technical Work Group held in June at AutoDesk. After development of the skills standards, NIMS will conduct a rigorous national validation process, holding regional reviews of the standards by industrial professionals, before releasing the standards to the public. For more information on CAM standard and credential development, contact NIMS Director of Marketing Christine Hubley at 703-662-4409 or chubley@nims-skills.org.

Deals

Univance Corp. (Kosai, Japan), a global manufacturer of transmission systems, 4WD torque management systems and other automotive parts, has selected the Aras (Andover, MA) Innovator solution suite for enterprise PLM to streamline collaboration for its multiple design and production sites around the world. The company’s implementation includes document management, BOM management, engineering change management and workflow.

The move to Aras PLM will help Univance’s strategy to improve its quality with better global collaboration on product data. The flexible architecture of the Aras PLM platform and associated business

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model provides Univance with modern PLM, improving over legacy systems the company considered in the past.

PLM software developer Dassault Systèmes SA (Paris) at the Paris Air Show announced a partnership with aerospace supplier developer Safran Group (Paris) under which the companies will develop expertise in the virtual validation of the additive manufacturing process using the Dassault 3DEXperience platform.

The partnership combines the Dassault 3DEXperience platform with Safran’s expertise in innovative technologies for the development of a world-class, end-to-end digital solution for additive manufacturing. This new end-to-end process will address upstream material design and downstream manufacturing processes and testing to provide digital continuity for all engineering parameters necessary for the additive manufacturing of an engine part: material science, functional specification, generative design, 3D printing optimization, multirobotic production and certification.

New Releases

Siemens PLM Software (Plano, TX) has released a new version of its Solid Edge modeling software that speeds designs and improves the ability to leverage Siemens’ synchronous technology.

The new Solid Edge ST8 software can be installed in full versions on tablets running Windows 8.1, and Siemens also announced its new Solid Edge App Marketplace mobile app, which allows users to find add-on solutions that will extend Solid Edge functionality. Improvements to synchronous design intent management, complex sketching and 3D feature recognition enable users to focus on designs, rather than the design tools, resulting in an accelerated modeling process.

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