Creo 5.0: Build better products faster

MechChem Africa talks to productONE principal applications engineer and subject matter expert, Thulani Mazibuko, and the company's MD, Charles Anderson, about the new capability and direction of Creo Parametric 5.0, which was released on March 19, 2018.

Underpinning PTC's Creo Parametric development, according to Anderson, is enabling companies to accelerate product innovation. "This is key for business growth and for long term sustainability. Companies cannot simply design one good product and rely on sales continuing to grow. As soon as a product is on the market, the next version or upgrade must already be in the pipeline. The market is always looking for something better or different to suit changing circumstances," he says.

Hence the need to incorporate software tools that help companies to continuously improve their products.

"Also, designing new products is a costly exercise, in terms of time and money, so the intellectual property and design data accumulated is very valuable. This leads to the need to reuse as much of the product data as possible to make the ongoing process more cost effective," he tells *MechChem Africa*.

New products usually need to be tested, qualified, certified or licensed in some way, to meet national or international safety or quality standards, for example. This can also costs significant amounts of money. "And the last thing any original product manufacturer needs is a product recall, so verification of every aspect of a design or design change becomes essential," adds Mazibuko.

The March 19 release of Creo 5.0 further accommodates several aspects of these needs by incorporating more sophisticated lifecycle management components into the design process itself. "Product development is, itself, a cycle and, ideally, designers like to have real feedback from existing products in the field when working on a next iteration.

"The idea is to use real data to make it easier to understand the exact conditions in which a product is being used: the forces, temperatures or humidity levels, for example, so that continuous improvement can be incorporated based on reality rather than assumptions," continues Anderson.

To achieve this from within Creo 5.0, PTC has turned to its IIoT technology platform, ThingWorx, which "replaces assumptions with facts".

"Online marketing companies have been using the Internet for a long while, measuring people's responses to a company or product via social media platforms and using the data to inform development. Now the concept of the smart connected product enables something similar to be done by collecting data directly from products in use," explains Anderson.

It is already normal to add instrumentation to product prototypes before putting them through rigorous field tests. "But now, sensors can be permanently installed in the product, from the get-go, so that a full understanding of every environment and use/abuse situation can be collected, collated and made 'live' for use in future designs," he adds.

"Creo 5.0 not only gives designers the ability to incorporate sensors and instrumentation into their products, it also enables them to set up and link into the ThingWorx platform to allow IIoT data to be collected very easily and fed directly back into the Creo design suite," explains Mazibuko, adding, "this gives the manufacturer, the owner and the designer a lot more insight into what is happening to their assets in the field."

"PTC is now calling ThingWorx an industrial innovation platform, because it is aimed at long term product design in the industrial sector and goes far beyond the operational efficiency and proactive maintenance aspects of the IIoT," says Anderson.

"ThingWorx can access ERP and CRM system data and use it to track customer statistics; track condition and maintenance information for equipment health management; and automate systems such a building's lighting and HVAC systems. But in the industrial environment, ThingWorx can deal with multiple levels of complexity and it is so much more than another IIoT platform," he explains.
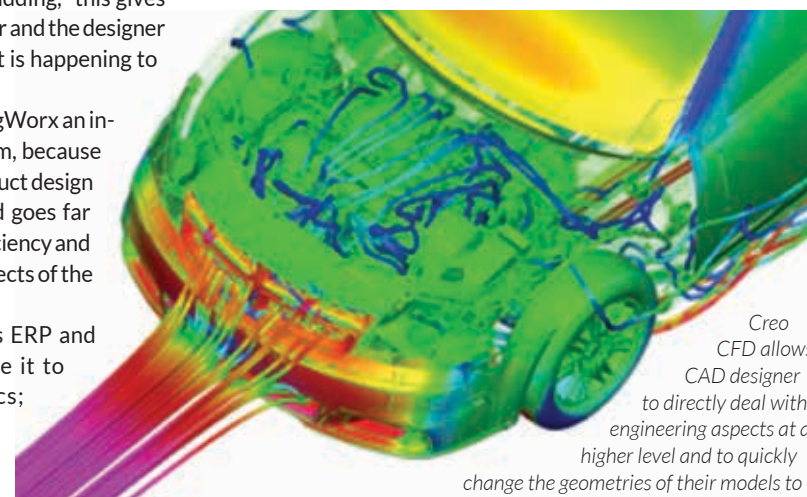

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Feature enhancements in Creo 5.0

Model based definition (MBD): While CAD models are almost all now designed in 3D, for years, engineers have used 2D drawings to deliver product-manufacturing documentation to those taking products to market. "This involves taking a fully specified 3D model and creating a set of 2D drawings annotated with manufacturing data such as dimensions and tolerances, surface finishes and joint details," Mazibuko explains.

"Creating this documentation takes time and it no longer really has as much value as it used to. We can now use built-in manufacturing routines to create cutting paths and G-code lists directly from the 3D model, for example, which completely bypasses the need to use 2D drawings and documentation to develop CNC programs.

"And it is much easier for a machine operator to understand 3D drawings with annotations anyway," he suggests.

The new MBD feature of Creo 5.0 puts all

Powered by Module Works, the new fully integrated Mould Machining Extension in Creo 5.0 allows users to generate optimised toolpaths when low volume, geometry-based NC programming is required.

of the manufacturing information required by ASME Standards onto an annotated 3D model that can be displayed on any laptop, tablet or HMI display. "While people talk about going paperless, MBD now makes this possible," Mazibuko tells *MechChem Africa*, adding that, as well as for the manufacturer, this is ideal way of making information available to product inspectors and quality controllers.

"This enables new products to be launched much faster and it reduces the risk of mistakes due to misunderstandings, transcription errors or using an outdated version of the 2D drawing," he adds.

Surfacing: Higher quality surfacing and the blends and transitions between surfaces can now be optimised more easily because, with Creo 5.0, designers can surface while in perspective mode. "This enables nice cut lines and textures to be incorporated that better represent real surface geometries and finishes.
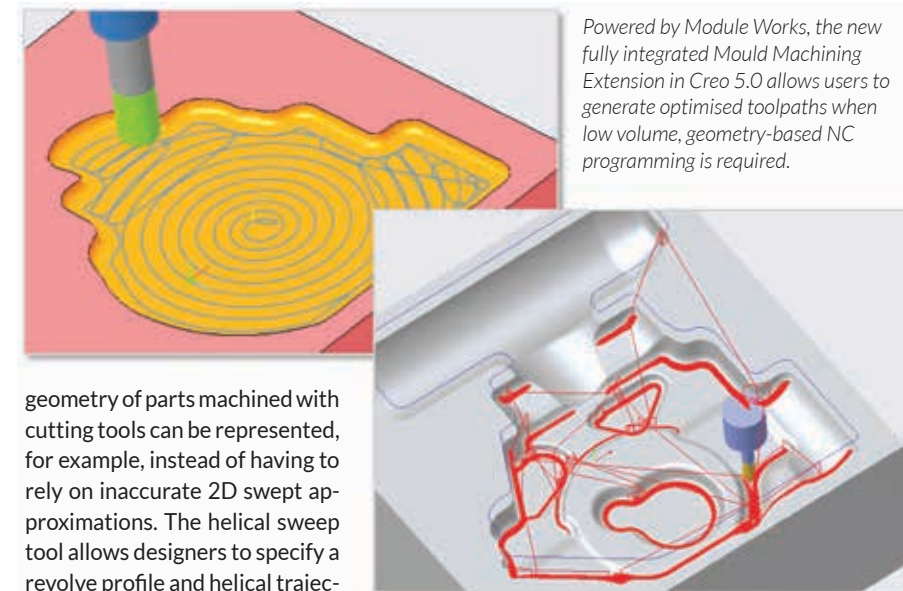
"Using the Helical Sweep Tool, accurate 3D

Creo CFD allows CAD designer to directly deal with engineering aspects at a higher level and to quickly change the geometries of their models to give optimised CFD results.

geometry of parts machined with cutting tools can be represented, for example, instead of having to rely on inaccurate 2D swept approximations. The helical sweep tool allows designers to specify a revolve profile and helical trajectory to sweep along, resulting in accurate geometry of both milling and grinding wheel operations," he explains.

This is typically used for mould machining, where high speed machining is needed for increased productivity and improved quality, particularly for tool and dye manufacturing.

Enhanced CFD package offerings: PTC believes in integrating simulation with geometric design and this philosophy first resulted in the inclusion of structural stress and thermal analysis into Creo Parametric. "With Creo 5.0, CFD (computational flow dynamics) has been fully integrated into Creo to allow geometric issues related to fluid flow to be resolved," Mazibuko continues.

"Working with PTC partners at Simerics, we also now have the ability to analyse how liquid, gas or slurry volumes will flow inside and around a 3D geometry and to evaluate the impact of the design from a thermal or fluid flow perspective. There is no longer a need to bring in external experts to evaluate phenomena such as cavitation and turbulence; multiphase separation; moving, sliding and meshing of suspended solids in slurries; or radiation and heat flow," he says.

"Creo CFD allows CAD designers to directly deal with engineering aspects at a higher level and to quickly change the geometries of their models to give optimised CFD results," he adds.

Creo Collaboration Extension: Creo has been able to open native Solidworks, Catia and NX files in the past without the need for conversion into neutral files. "This feature has now been extended to include Autodesk Inventor. So we can now open, make changes using flexible modelling and then update Inventor files from within Creo 5.0. PTC calls this Creo Unite technology and it allows designers to work with one other regardless of the CAD system each is using.

"Let's say someone is modelling a component in Solidworks or Inventor and this needs to be used for an assembly in Creo. If the original designers change their model, then the whole assembly can be updated to include all of the changes made on the original Inventor or Solidworks component," Mazibuko explains.

"On updating, all changes will be captured and incorporated. This could not have happened using import features," he says.

Performance advisor: Under the PTC licensing agreement, a number of users can logon to Creo until the total number of simultaneous users exceeds the number of licenses. "The performance advisor looks at these usage patterns compared to the number of licenses held and can advise design companies as to whether additional licenses would result in less design downtime," explains Mazibuko. It will also automatically record and report all software crashes.

"Subscription licenses are also associated with eLearning. Not to say that this should replace task-related training, but it is useful for relearning features that have not been used for a while, for example. The licenses also include free home use licenses, which are ideal for eLearning," he explains.

"To further support the faster innovation goal, additional support for artificial reality (AR) and 3D printing – which were first introduced in Creo 4.0 – along with topology optimisation, which in currently in the Beta phase of development, are to become part of Creo 5.0 within the next few months," says Anderson.

"There are some very specific requirements for 3D metal additive manufacturing. To prevent the build from distorting, support structures have to be added to stiffen the parts exactly where needed, for example. This and several other enhanced features are currently undergoing final testing.

"Creo is getting faster and better with every release," Anderson concludes. ❑