

Speedy software gets a boost

Tom Shelley reports on enhancements to the leading brand of explicit CAD software.

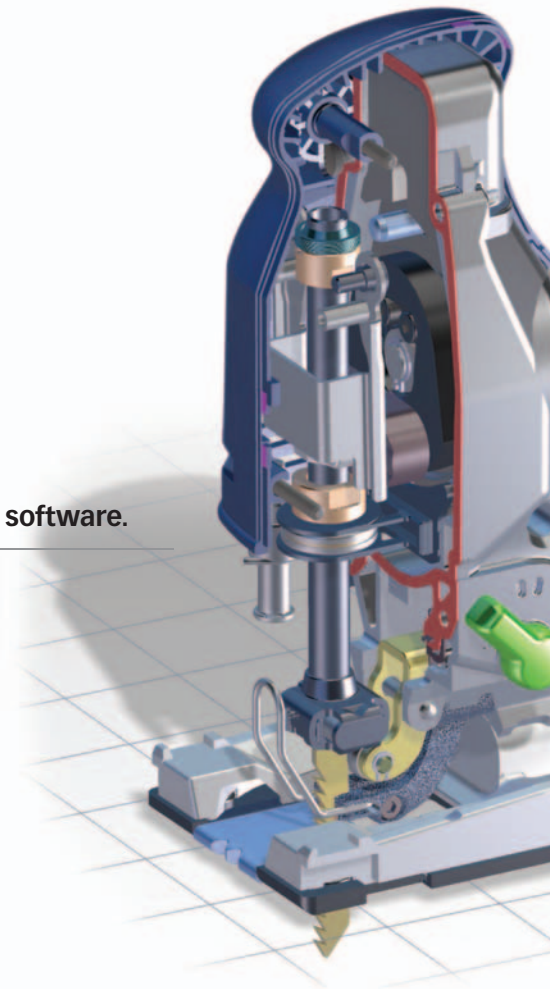
A radically updated version of CoCreate shows the commitment of PTC to this type of explicit CAD, which is still very popular among users who prefer to work with this type of software.

Berthold Hug, CoCreate product manager, told attendees at a recent seminar at PTC reseller CSI that Version 17.0 is about twice as fast as V 16.0. and that there were 'nine million lines of code for each new release, and to achieve the speed up, you touch several million'.

Justin Teague, general manager of PTC's CoCreate business unit, made it clear that PTC sees CoCreate as being particularly appropriate

for the occasional CAD user. However, speaking to four CoCreate users from UK engineering companies at the event, they all said that they were full-time users who just preferred the simplicity and ease of use offered by CoCreate. Indeed, this was even the case for those who had previously used other CAD packages, one of whom said: "If something is not right, you just change the geometry, you don't have to go back and change something earlier, because there isn't a history tree."

This is, of course, the big difference between CoCreate and other major CAD packages. Most of them now offer some kind of direct model



Tradition maintained by full PLM

Tom Shelley reports on how every CAD and robotic aid is employed to maintain competitiveness and quality at Bentley Motors.

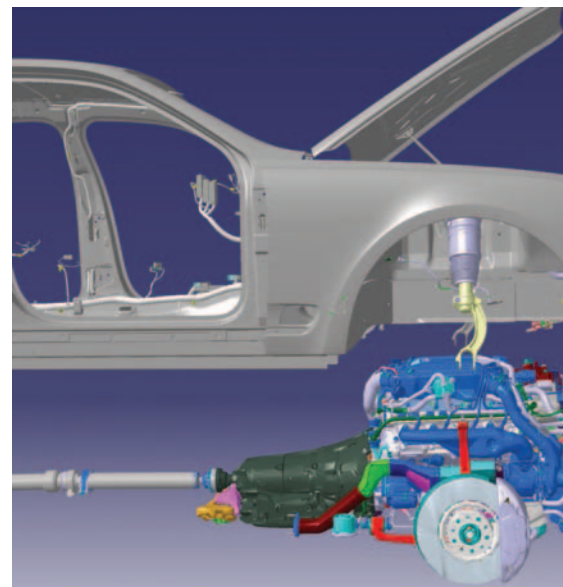
Bentley may be noted for producing what it calls 'hand-crafted' cars, but that should not imply that the company is anything less than technologically sophisticated. Indeed, it implements every possible aspect of CAD, PLM and CAM software in order to produce vehicles with maximum sales appeal and quality.

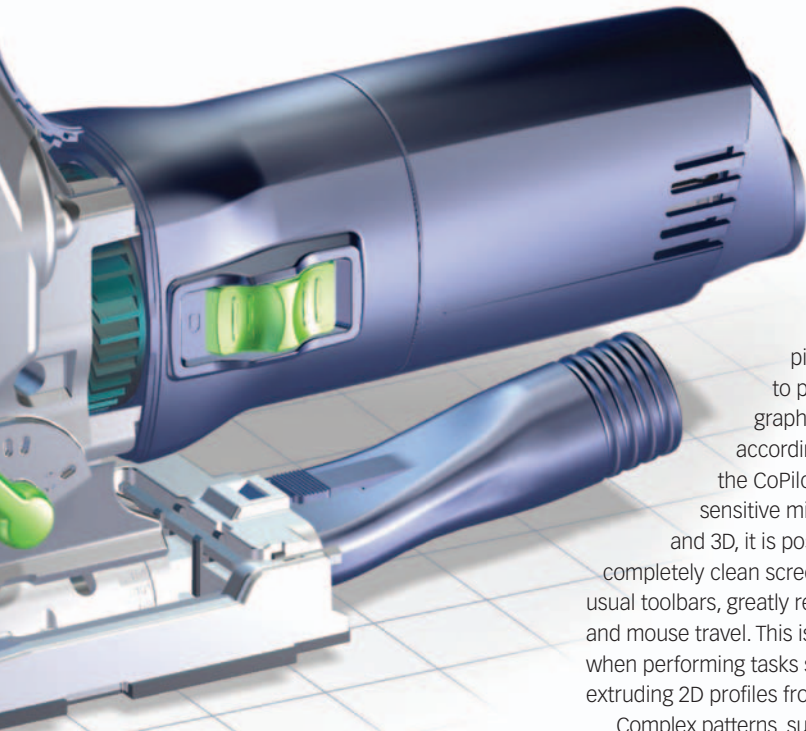
CAD strategy manager John Unsworth says: "In previous projects, a lot of time and energy was wasted from changes at the end of the engineering process." He said that now, even though full PLM has now been applied to the Mulsanne model currently in pre-production: "The process is still not perfect, but it is better than it has ever been."

Because Bentley cars are such premium products – the Mulsanne will have a recommended retail price of £220,000 – purchasers expect perfection. Says Unsworth:

"We are very much a styling-driven organisation." Thus, the design process begins with use of sketches, clay models and use of Alias and ICEM Surf. Engineering design is undertaken in Catia V5, while the company makes extensive use of Delmia virtual assembly modelling with Enovia to manage the PLM, and 3DVIA composer is used to produce technical illustrations.

A walk round the factory reveals automated assembly lines, robots putting 20 coats of lacquer on the veneered wood trim and leather which is examined and marked up by eagle-eyed inspectors, but which is then scanned and cut on large robotic flat beds. There is a lot of hand polishing and finishing and attention to detail, but computer controlled machines are used wherever they give benefits – CNC machines can, after all, work to precisions not





retrace steps in CoCreate as well, by making use of the 'Undo' facility, but this is not the normal way of proceeding, which is to pick on faces and features to produce the CoPilot graphic and modify accordingly. By making use of the CoPilot, and calling up context-sensitive mini toolbars in both 2D and 3D, it is possible to work on a completely clean screen, without any of the usual toolbars, greatly reducing mouse clicks and mouse travel. This is of especial benefit when performing tasks such as creating and extruding 2D profiles from work planes.

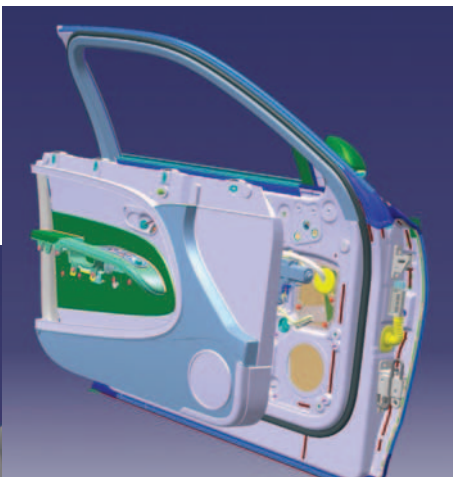
editing, whether they call it, 'Direct Modeling', or 'Synchronous Technology', but there is still a sequence of steps underneath, some of which sometimes have to be retraced in order to be able to go forwards. A user can

Complex patterns, such as steps in a staircase, are fast to create. They are not quite as intelligent as the ones in Autodesk Inventor, which can adjust themselves to fit, but perfectly good enough for most purposes. Because it is not parametric, you cannot set up formulae to

produce different versions of parts, but there is a facility to have stock and finished parts, which can be finished in different ways. In response to a request from users, there is now a facility to import 'Inseparable assemblies', which recognises that, although it may be possible to access components within bought in parts, these cannot be shared and applied to other designs.

Following the acquisition by PTC, CoCreate V17 can directly import files from Pro/Engineer as .prt and .asm files. Since V16.5, it has been possible to exchange files with Pro/Engineer using the company's 'Granite' technology, as well as export them to Advanced Mechanica for simulation, and to Pro/Engineer NC and Tooling, ProductView, and through ProductView or STEP to Arbortext IsoDraw and communicate with Mathcad and Windchill to integrate with company PDM and PLM systems. Sheet metal facilities have been improved in V17, making use of more of the in context mini toolbars, and there have been enhancements to the handling of complex cable harnesses.

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possible for unaided humans.

Bentley's owner Volkswagen has clearly invested significantly in the plant and its processes, so it was perhaps not surprising to hear Unsworth say: "We share our experiences with the other branches of Volkswagen, including Skoda and Seat, often on a daily basis... We have

taken elements of the process further than other members of the group".

Ian Swann, senior virtual assurance engineering manager, lists the advantages of the Delmia-based virtual build studies: "[It] reduces manufacturing assembly issues, improves build quality, supports the delivery of serviceability, contributes to faster products development and delivers enhanced training and visualisation."

Putting a car together requires 831 operations to be undertaken at 30 assembly stations, while servicing issues investigated with the aid of Delmia included the discovery that changing a sensor in the bumper in the original version of the design would have required dropping the underfloor.

One of the big advantages of running an integrated PLM system is said to be to assist collaboration between teams. The Mulsanne project took four years, but Unsworth says he expects other projects to be done more quickly. For instance, placing the dashboard assembly into the body frame could be investigated as soon as a scan was made of the first clay model, meaning any problems with assembly could be ironed out by the stylists before

DESIGN POINTERS

- The Bentley Mulsanne is a £220,000 RRP luxury car with a twin turbocharged 6750cc engine enabling it to accelerate from 0 to 60 mph in 5.1s.
- The cars all include leather seats and veneered wood interiors which are machine produced, but with a lot of human attention to detail
- Design and construction is assisted by full PLM, starting with sketches, clay models, Alias and ICEM Surf, followed by design using Catia V5, assembly modelling using Delmia, Enovia PLM and the production of technical publications using 3DVIA Composer.

undertaking detailed engineering design.

The next major step, according to Unsworth, will be to: "Take the PLM wider than the factory gates and integrate suppliers into the design and review process."

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