Flexible Modeling

Circuit de Catalunya

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Eight ways PTC Creo® is changing the way companies work.

DIVERSE INDUSTRIES, COMMON PROBLEMS

Recently, PTC conducted a survey of product developers. Respondents came from a broad sample of businesses such as consumer electronics, aerospace, automotive, medical equipment, and industrial machinery. Despite the diversity of their industries, three out of five product developers encounter the same challenges in their work:

- It's too difficult to leverage existing models. Most new products evolve from older, similar models. By re-using the files from old designs, developers can skip steps and get designs underway fast. Unfortunately, old 3D files, often with forgotten or lost design intent, can prove too difficult to effectively use again.
- Many partners use incompatible CAD formats. Most developers today work in collaboration with other teams and companies, and they need to exchange data to complete a product design. For example, clients may provide a source model for a new design, or a supplier may send over a CAD file for a purchased part. While it would streamline work if these models could be dropped into the product design, usually they arrive in a format that's not compatible with the developer's system. As a result, designers must re-build the models in their preferred format.
- Late changes threaten schedules. Even the most thoroughly planned projects can take unpredictable turns, sometimes very late in the product development cycle. If an engineering change impacts the wrong part or feature, carefully thought out design rules can make the change almost impossible, so it's easier to simply start the design over.

PTC Creo and its flexible modeling approach addresses each of these obstacles all along the design cycle, helping teams meet tight deadlines and deal with changing priorities. Not only that, but some companies are using it to make their businesses more competitive. This eBook features nine ways flexible modeling is revolutionizing the traditional design cycle and business.



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WHAT IS FLEXIBLE MODELING?

Flexible modeling is a modeling approach that complements parametric modeling. It's for design engineers who need the power of a parametric 3D CAD solution, but can also benefit from the flexibility of a direct modeling solution. Users can then make changes to any geometry – regardless its source – without losing any design intent.



How direct modeling solutions work in a parametric environment.

DEFINITIONS

PTC CREO PARAMETRIC™

<u>PTC Creo Parametric</u> is a complete 3D CAD software package generally used by mechanical engineers and designers for product development.

PTC CREO FLEXIBLE MODELING EXTENSION

PTC Creo Flexible Modeling extension is a complementary product for PTC Creo Parametric. It's for design engineers who need the flexibility of a direct modeling solution in a parametric 3D CAD solution. Users can then make changes to any geometry – regardless its source – without losing any design intent.

DESIGN INTENT

In a 3D parametric solid model, <u>design intent</u> defines the relationships between geometry and features.

DIRECT MODELING

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Unlike parametric modeling, <u>direct modeling</u> does not involve design intent, so users can edit geometry without worrying about relationships.

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1 EVOLVING CONCEPT DESIGNS

Designers who create new products often need the power and flexibility to explore and communicate new ideas, especially during concept design. Rarely, however, do they start with a blank screen. In our survey of product developers, we found:



said concept designs at their companies are generated by **directly leveraging existing company designs**.

23%

said that they heavily borrow from previous products.

Altogether, 74% of respondents **use some form of existing design for concept design**.

Build a foundation on older, non-native data. The flexible modeling approach supports the use of existing models as the foundation for new products, and it's not just for designs built in PTC Creo formats. Engineers can import and modify models from popular CAD systems like SolidWorks®, Solid Edge, and Autodesk® Inventor[™] and neutral formats like STEP and IGES—all without losing design intent.

That means that designers can build on models from any source. They can work from models sent from partners, clients, consultants, or suppliers. Flexible modeling means teams can directly evolve a design and don't have to start over again.

Keep the lines of communication open. Because it's so easy to modify geometry with the flexible modeling approach, designers quickly model ideas and adjust to feedback from customers.

MEET IDnA

Based in Antwerp, IDnA (Industrial Design and Assembly) produces concept designs for a diverse collection of clients and products modems, pet carriers, medical equipment, etc.

Read about IDnA's work with work with Flexible Modeling.



Demo: Reuse parametric models for concept design, even when the original design intent is unknown.

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2 SEAMLESS, COLLABORATIVE DETAILED DESIGN

Adding supplier parts: It's not unusual to begin incorporating supplier's products into the model during detailed design. In our surveys, we've seen that importing designs from outsiders can be challenging.



of respondents said **modifying imported models coming** from other CAD systems is difficult using their current 3D CAD software.



Add design intent to imported data.

HAVE YOU FACED RECENT CHALLENGES THAT **PTC CREO COULD HAVE ADDRESSED?**

Working with companies that use other CAD software than mine."

The transition from concept, to final design."

Importing 3rd party CAD models, and manipulate them."

- Responses from PTC Creo users

PTC° Creo® Parametric®

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PTC[®] PRODUCT & SERVICE ADVANTAGE[®]

3 SMOOTHING SIMULATION AND ANALYSIS

When a design is ready for computer-aided engineering, flexible modeling helps make the process smoother in two ways:

Simplification. Before analysis, models are often simplified to speed up intense calculations and simulations. Engineers can use flexible modeling to quickly remove features as needed.

Analyst feedback. Using PTC Creo and flexible modeling, analysts can make suggested changes to the model and test them before they are sent back to the designer—all without having to master the powerful parametric modeling approach. That can save multiple iterations, time, and money.





Features removed from a model to prepare it for analysis.



After running a simulation, an analyst can modify the part

4 ACCELERATING DESIGN REVIEWS

All through product design, developers participate in reviews. These reviews provide opportunities for project managers, downstream participants, clients, and customers to ensure the project is on track. Stakeholders lend guidance, ask for changes, and finally, approve the model. Flexible modeling helps teams safely review designs and changes with stakeholders inside and outside the company, making decisions happen faster.

Reviews with outsiders. One concern when seeking design feedback is the integrity of intellectual property. That is, designers may need reviews from OEMs and suppliers, but they may also need to keep some elements of the model proprietary. This is another role for design simplification, as described on the previous page.

Using flexible modeling, designers remove information before sharing it with external reviewers.

Limited time. One of the biggest challenges in design reviews is unexpected feedback, and the schedule often doesn't include enough time to make all the required changes – especially if those changes have to be reviewed again and again.

With a flexible modeling approach, engineers can accelerate design reviews by making "on-the-fly" changes during the review meeting. This ensures participants can review and approve their changes immediately, without another iteration of meetings or exchanged files

MEET STETTLER KUNSTSTOFFTECHNIK

Stettler Kunststofftechnik is a German company that specializes in polymer injection molding, a manufacturing process that produces parts by pushing hot plastic into a mold. The company develops complex technical plastic parts for its customers in automotive, mechanical engineering, and electrical industries, turning their ideas into viable products.

At Stettler Kunststofftechnik, we use PTC Creo and flexible modeling as we optimize designs for manufacturing. Then we send the design back and make sure the customer understands exactly what engineers plan to deliver."

Read about Stettler Kunststofftechnik and PTC Creo FMX Design.



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5 EXPECTING THE UNEXPECTED

When a product approaches the end of the design cycle, last-minute changes shouldn't be a surprise. In our surveys, nearly 40% of product developers said that "unexpected changes" were common in design, and yet one in three said driving late-stage changes quickly is difficult.

Those are challenges worth addressing. Last-minute changes can lead to shortcuts or missed opportunities. By directly modifying the geometry, engineers can make fast, flexible design changes without reworking the entire design or compromising design intent.



How engineers use flexible modeling to manage last-minute ECOs.



6 EXPANDING THE TEAM

Company: KTM

KTM motorbikes are some of the toughest in the world. They're lighter, better powered, and more durable than any competition. KTM won 20 world championships last year alone, including a win in the grueling Dakar rally race. Overall, the company grew 32% in the first half of 2012.

How KTM Uses PTC Creo and Flexible Modeling

KTM is currently expanding its product range and engineering team. PTC Creo and the flexible modeling approach help make that growth seamless.

In the past, it might have been challenging for a new engineer to update another's model because so much design intelligence isn't quickly apparent. According to Seger, engineers would expect design modifications to cost weeks and months With flexible modeling, at any time during the design cycle, engineers can design, simulate, optimize, and modify every aspect of a complete bike, and this can all be done in just a few hours.



Everyone can take existing designs and make modifications to improve performance. New designers can leverage existing parts [from previous generations of bikes], even when the original designer is unavailable."

— Olaf Seger, KTM Designer



PTC Creo takes KTM from concept design to finish line.

7 CONSOLIDATING SOFTWARE

Company: Britax

Britax has been a leader in mobile safety for more than 70 years. The company's product line includes the best-selling child car seat in Europe. It's also one of the most trusted brands in America.

How Britax Uses PTC Creo and Flexible Modeling

Britax has consolidated its design work on PTC Creo. Company designers no longer need to work on multiple CAD platforms. Instead, they use PTC Creo's flexible modeling approach to leverage and edit models from other systems.

Many companies keep two to three CAD systems in house, but when they stop trying to sustain these multiple systems, they no longer have to keep every seat up to date, maintain more than one support contract, or cross train design staff. By consolidating on a single CAD system, Britax engineers can focus on creativity rather than managing software.





Britax saves lives with PTC Creo.



CAD consolidation with PTC Creo.

8 BUILDING A BETTER PARTNER NETWORK

Company: FSG Design

FSG Design is a multi-disciplinary solution provider for consumer and industrial companies that want good service, superior design, and brand development. FSG Design services and processes are specifically tailored to meet each project's requirements.

How FSG Design Uses PTC Creo and Flexible Modeling

FSG has built a partner network that has the diverse skills of a much larger company, but is responsive like a small company. The CEO, Frank Glogowski, says, "PTC Creo and flexible modeling are invaluable for working with my partner network. I can import any of their diverse design files into PTC Creo and start modeling and surfacing right away. No other vendor offers anything like it."

PTC Creo and flexible modeling reinforces FSG's strengths as a flexible, innovative, and responsive engineering and design firm.

READ MORE ABOUT ESG DESIGN AND PTC CREO:

- Bringing out the best of the partner network
- Improving client relationships by consolidating CAD
- Profiles in flexible modeling: FSG Design

FIND OUT MORE ABOUT FLEXIBLE MODELING AND PTC CREO Explore the PTC Flexible Modeling Resource Center Try a 30-Day Free Trial Learn about Flexible Modeling Using PTC Creo **Contact a PTC Sales Representative**



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