

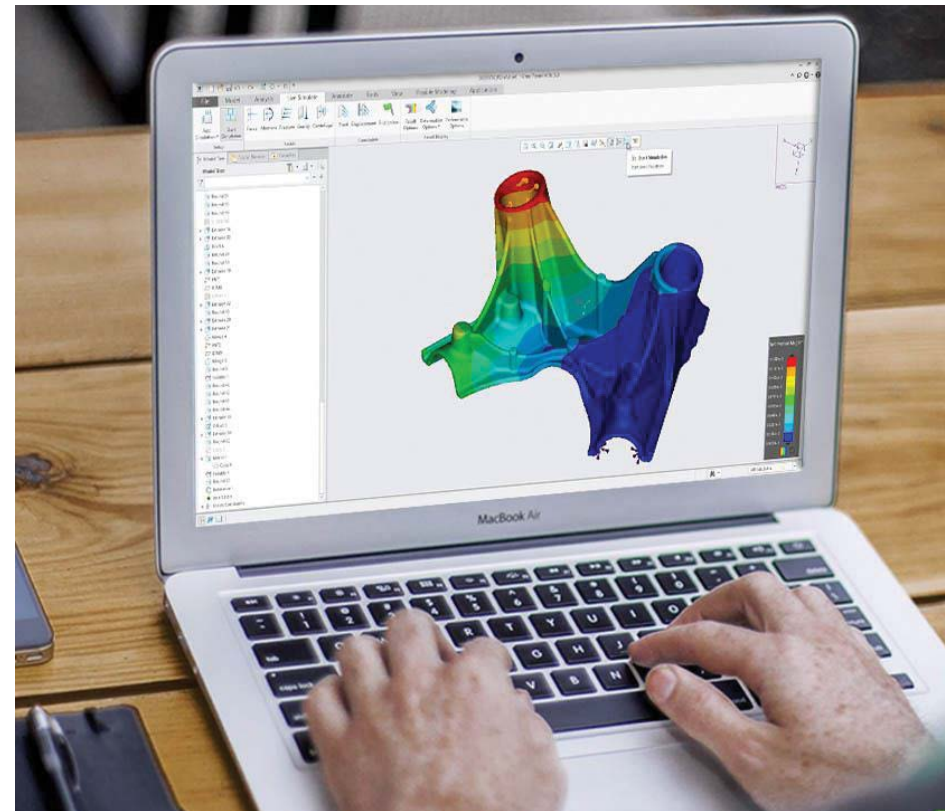
# Reworking Your Workflow for Better Product Design

## Is it Time to Rethink Your Workflow?

Traditionally, design engineers and analysts worked in tandem to produce quality products, but the traditional approach has also meant an increase in time to market and the abandoning of potential solutions that never get tested out.

Rethinking the way we design and incorporating a few work flow changes can enable design engineers to iterate faster and pass on their best work to analysts with greater confidence. But how do we get there?

Dave Martin, an experienced product designer will take you through his approach to design and the new addition to his design workflow that greatly impacts the design process.



## Dave Martin on Better Product Design

Having spent five years as a structural analyst in the aerospace industry and a decade as a user of PTC's products, I've not only curated some best practices around design but have realized the importance of incorporating simulation into the design engineering process.

This incorporation of simulation when designing is less about going into a full range of full fidelity simulation tools to guide your design decisions; and more about using simple studies that operate in real-time as you edit parts of your design to quickly gauge if something will work or not. While this is traditionally not done, new technologies and new approaches to design have now made this possible and that's what I plan on explaining in this e-book.



### About the Author

Dave Martin is a former Creo, Windchill, and Mathcad instructor and consultant. After leaving PTC, he was the Creo specialist for Amazon; and a mechanical engineer, Creo administrator, and Windchill administrator for Amazon Prime Air. He holds a degree in Mechanical Engineering from MIT and currently works for Blue Origin.

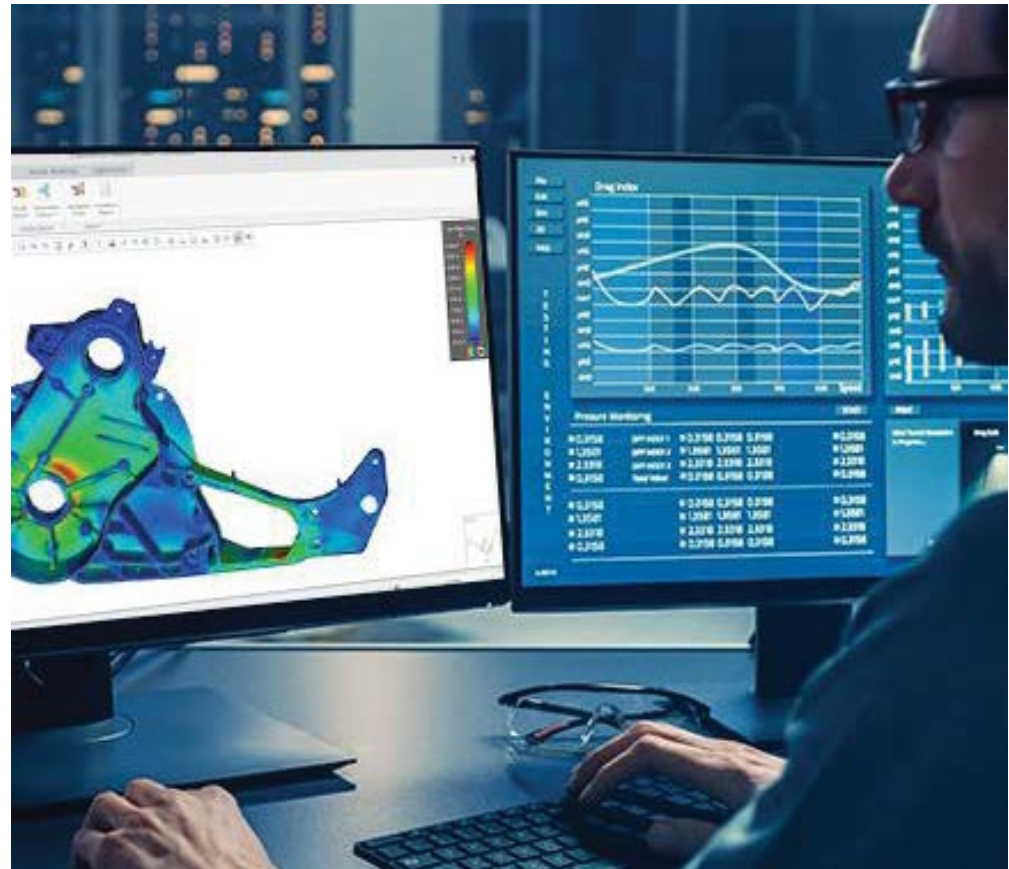
Martin is the author of the books Design Intent in Creo Parametric and Top Down Design in Creo Parametric—both available at [www.amazon.com](http://www.amazon.com). He can be reached at [dmartin@creowindchill.com](mailto:dmartin@creowindchill.com).



## Start with the Design Problem

When designing, think of the expected failure mechanism. Is it going to deform? Overheat? Resonate? Buckle? Fracture? And where do you think that might happen? Apply your engineering judgment in order to understand the problem you're trying to solve.

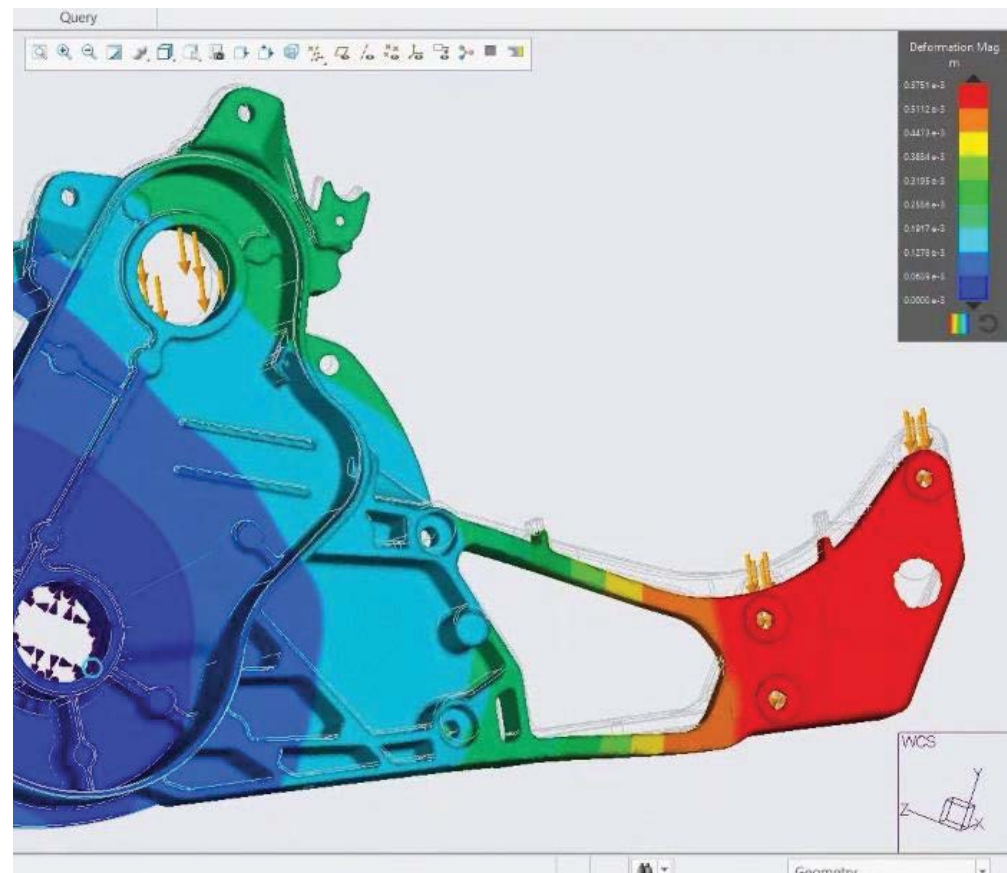
Time is a luxury in the product development process. Framing the problem allows you to focus your efforts where they matter most.



## Loads and Constraints, Not Just for Analysts

Loads and constraints are an integral part of running an analysis on your design and is usually something that happens after a design is submitted to the analyst. It's here that we begin to see the workflow change. By incorporating perceived loads and constraints into your design process you eliminate having to rework your design after an analysis shows a point of failure.

The more thinking you do up front, the better your design will be. Try running the model through simulations. Modify your designs to avoid points of failure. Finding a CAD software solution that lets you design with this sort of guidance is key; but more on that later!



## Focus on What's Critical

Now that we've introduced the idea of incorporating simulation into the design process, determine if your design project needs to involve human-centered design or factor in the safety of the end user. Considerations like that will determine the Level of Effort that needs to be applied to the particular design project.

The type of problem you are trying to solve determines whether you need the 85% answer, 95% answer, or 99% answer. I've worked in human spaceflight and disposable consumer electronics, and you don't apply the same level of effort to both.

If you work in the industry long enough, you will encounter someone who never delivers the answer because they can never finish perfecting the model. To paraphrase Voltaire, "perfect is the enemy of good... or the good enough." In product development, done is better than perfect.

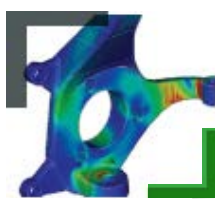




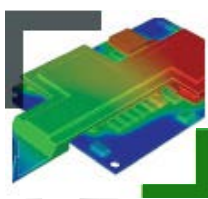
## Iterate, Iterate and Iterate Some More... Quickly

Before, if a design failed it was back to the drawing board. There were also only so many iterations you could try. This meant that many good ideas were abandoned. At Amazon where I worked, simulation as a tool for designers enabled us to gauge the impact of the slightest modification made to our designs and thus we were able to iterate more. Immediate feedback from structural and modal analyses guided our design decisions for improving and optimizing performance.

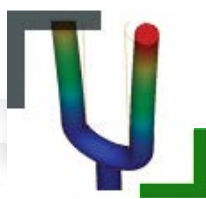
[Creo Simulation Live](#) allows you to speed speed-up the process of design with real-time feedback on your design decisions without leaving your CAD environment. This allows you to iterate more by enabling you to try out every modification that could potentially yield the best result.



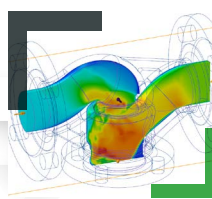
Structural Analysis



Thermal Analysis



Modal Analysis



Fluid Flow Simulation\*

\*Only available in Creo Simulation Live Advanced

### Club Car Democratizes Simulation

*Club Car is a leader in small task-oriented vehicles, focusing on the golf, utility, and consumer market.*

The implementation of Creo Simulation Live (CSL) transformed the handling of quick simulation needs, providing design engineers direct access to conduct early-stage simulations intuitively within Creo. This streamlines the process, freeing analysts to focus on critical high-fidelity analyses. This approach of incorporating early-stage simulation into the Technical Design Review process, combining physical iterations and rapid simulations, not only saved months in the design process but also reduced project risks, minimized costly prototypes, and facilitated the creation of optimized parts or products more efficiently. Discover how Club Car did it [here](#).



## Check Your Answers

Once you start getting values from your design's simulation analysis, take a moment to perform a sanity check. Do the displacements, stresses, temperature, and/or modes make sense to you intuitively? Are they unusually or unexpectedly high or low?

Now, check your simulation results against your Rough Order of Magnitude (ROM) estimates.

How big are those values in the real world? If they're too big, you may also need to consider non linear analysis like Large Deformation.

Incorporating these best practices for integrating design and simulation into your product development process results in fewer design analysis loops and ensures you conduct the right tests later. Simulation can become a design tool similar to a spell checker in word processing, allowing you to get to market at lower cost in less time.





## If you have any questions...

Our team can provide you with insight into how to better manage your design process and provide you with tools on how to design better with PTC solutions.

Ask about Creo Simulation Live or see a live demo.

[CONTACT US >](#)

## The Creo Advantage:

Creo is the 3D CAD solution that helps you accelerate product innovation to build better products faster. Easy-to-learn Creo uses a model-based approach to seamlessly take you from the earliest phases of product design to manufacturing and beyond. Combining powerful, proven functionality with new technologies including generative design, real-time simulation, advanced manufacturing, IIoT and augmented reality, Creo helps you iterate faster, reduce costs and improve product quality. Creo is also available as a SaaS product, providing innovative cloud-based tools for real-time collaboration and streamlined license management and deployment. The world of product development moves quickly, and only Creo delivers the transformative tools you need to build competitive advantage and gain market share.

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