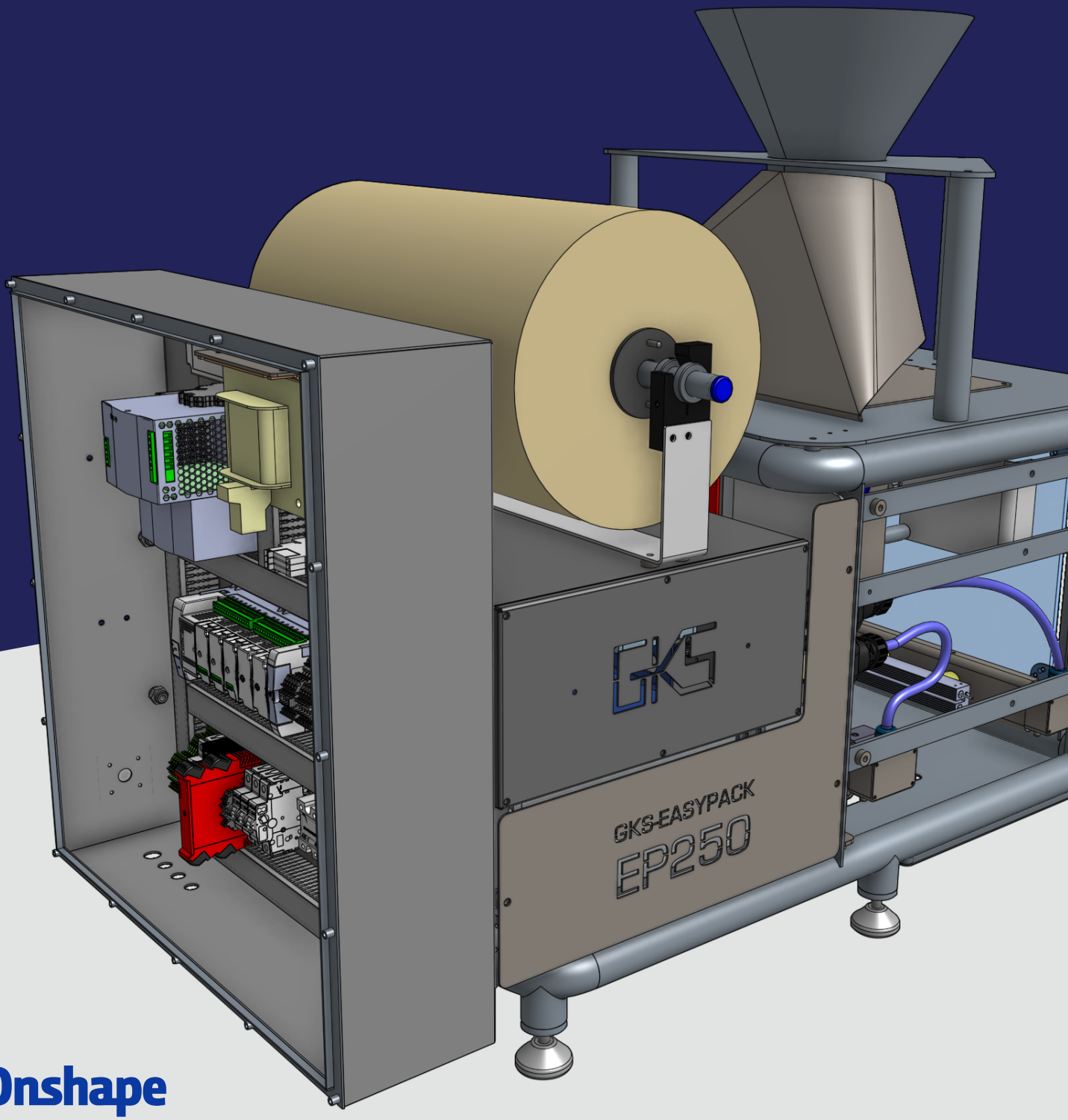
Modern CAD for Machine Design

How Onshape Helps Design & Manufacturing Teams Speed Up Production, Boost Collaboration and Increase Innovation



Onshape

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Introduction

Expect the unexpected.

GKS Packaging, a European company that builds produce-bagging machines for supermarkets, was recently asked to design equipment to pack live sea worms for bait and scientific research. The bags needed to be filled with ocean water and enough oxygen and nutrients for the worms to survive transit for 10-12 days. Needless to say, their regular lettuce-packing machines weren't going to do the trick.

Machinery designers are problem solvers and you just never know what challenges your customers will throw at you next.

Whether you're creating new equipment from scratch, upgrading existing equipment or configuring your machines to fit available factory space, it's not always prudent to keep doing things the way you did them before.

In this eBook, you'll be introduced to five machinery companies that recently modernized their entire design and manufacturing process with one key decision.

You'll read insights from:

- **GKS Packaging** (Vertical Form, Fill and Seal Machines)
- **Universal Logic** (Artificial Intelligence/Robotics)
- **Voxel Innovations** (Pulsed Electrochemical Machining)
- **Hirebotics** (Robotics)
- **Absolute Machinery** (Injection Molding)

The game changer for all these successful companies was switching to a modern, cloud-based CAD system, enabling their design teams to cast aside old software headaches and focus on doing their best work.

What exactly is a "modern" CAD system and how does it speed up production, boost collaboration and increase innovation?

Glad you asked.

What Makes a CAD System "Modern?"

"Sometimes when I use Onshape, I wonder why CAD systems didn't work like this before. It's like when I listen to Spotify, I think, 'Why didn't we have this before instead of collecting CDs that we'd just want to throw away in a few years? I don't know. We simply did it that way because that's the way it was."

– Ivo Geukes, CEO of GKS Packaging

It may surprise you, but the truth is that many engineers are still using file-based CAD technology that's three decades old. Parametric modeling was first introduced in 1988 and hasn't fundamentally changed since the 1990s.

These CAD systems were breakthroughs at the time, but they were never meant for teams. Ironically, they are now slowing companies down by blocking collaboration, creating multiple file versions that result in costly errors, and causing engineers headaches from system crashes and lost work.

Onshape is a modern CAD system that frees engineers to focus on doing their best work. Unlike old CAD technology, Onshape unites advanced modeling tools and design data management in a secure cloud workspace that is accessible on any computer, tablet or phone.

You'll never lose your data or deal with design gridlock ever again.

Modern CAD

Advanced Modeling Tools

Built-In Data Management

A Secure Cloud Workspace

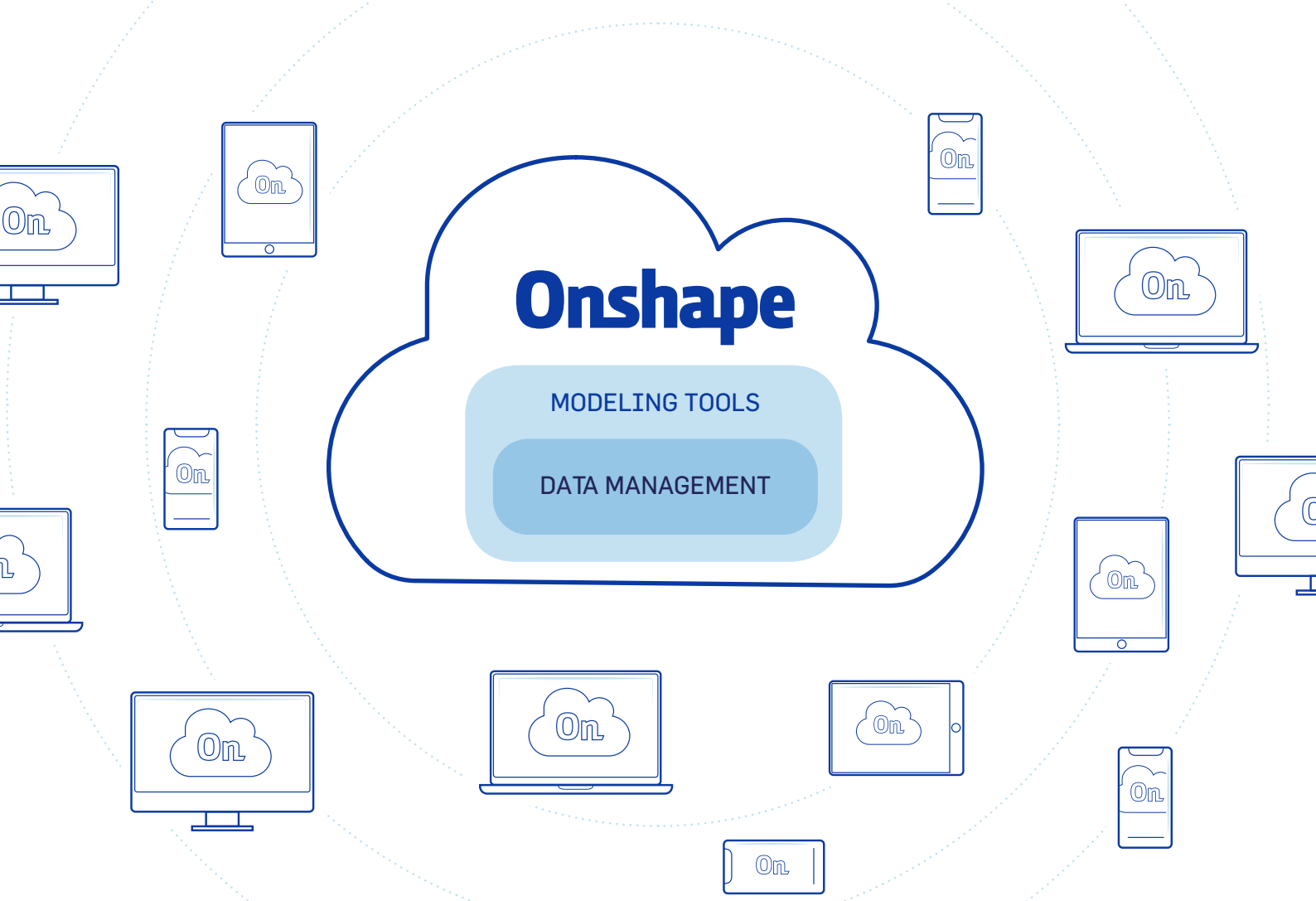
What Makes a CAD System "Modern?"

The founders of Onshape (the same team that founded SOLIDWORKS) were fed up with the hassles of outdated file-based CAD. To prevent engineers from stepping on each other's toes, Onshape first created a real-time data management system – that lets every team member see each other's design changes as they happen – and then built a modern CAD system around it.

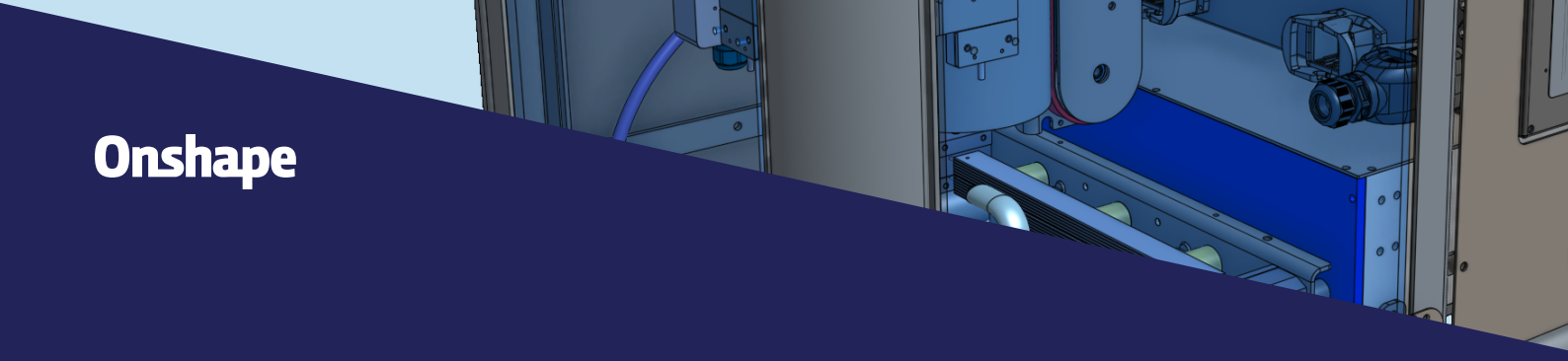
This is the polar opposite of old CAD systems that built their modeling tools first and then introduced their data management solutions as a clunky afterthought.

For a deep dive on how Onshape has fundamentally improved the core 3D modeling tools you depend on every day, see page 25. For an in-depth look at how Onshape's built-in data management works (including Release Management & Approval Workflows), see page 27.

But first, let's examine how Onshape's modern CAD system is especially impactful for meeting the challenges of machine design.



Onshape



Meeting the Challenges of Machine Design

Modern factory automation technology has completely changed the way goods and raw materials are manufactured, packaged and distributed. For the consumer, products that have rolled off an automated production line are generally of greater quality and consistency – traits that are appreciated, foster customer loyalty and go a long way in building reputation and brand awareness. For the manufacturer, automation has enabled products to be mass produced at outstanding speeds while delivering the repeatability and quality their customers demand. Often, a company's ongoing investment in automation technology is a deciding factor in whether or not they can maintain their competitive advantage.

For machine builders, meeting the requirements of these extremely demanding manufacturers is hard, especially when a multitude of other machine design companies, both domestic and international, are competing for the same business. There are challenges to respond to RFQs faster, reduce order-to-delivery time, reduce the number of parts, increase functionality and the rate of production a machine can deliver. Naturally, competition causes price pressure, but initial purchase price and machine speed are not your customer's only considerations. Reliability, flexibility, and lifetime costs are just as important.

Based in North Carolina, Voxel Innovations specializes in Pulsed Electrochemical Machining (PECM), which is often called "controlled corrosion." PECM uses an electric current and an electrolyte solution to dissolve material without the tool ever touching the part.

So how can you differentiate your company and your machines?

Price, of course, is one way. Creating your own niche or focusing on a highly specialized market segment is another, but these have the potential downside of restricting your growth. Building special purpose one-off machines may command a premium, but these introduce their own set of challenges and risks. Ultimately, your customer expects an innovative solution at a reasonable price that delivers their target volume, cost per unit and overall equipment effectiveness.

Every customer has their own idea of what constitutes a good machine design. Each of the main characteristics that define modern machines have their own unique challenges.

Let's take a look.

1

Meeting the Challenges of Machine Design

Design Challenge:

Speed & Accuracy

Machine speed or cycles per minute is a common benchmark many manufacturers use when choosing a machine supplier. Faster machines cost considerably more and some manufacturers assume that investing more up front will give them higher yields and improve their overall productivity, but that is not always the case. Cycle times are meaningless if the quality of the products coming off the production line are substandard or machine reliability is questionable. After all, it's safe to assume that the faster a machine operates, the greater the risk of it breaking down. Unplanned downtime can cost thousands of dollars per minute in missed delivery schedules, unexpected repair and maintenance costs, setup time, damaged stock and startup rejects. These hidden costs can damage a machine builder's reputation and potential future business. Indeed, some machine builders sacrifice speed for greater reliability and gain more customers for it.

Whatever speed you run your machine at, accuracy and attention to detail are the most important factors when designing a new machine. However, even your best engineers can overlook errors in a design, especially if multiple people are working on different parts of the machine in isolation. Design changes may not be propagated to the rest of the team in a timely fashion and mismatched components can easily be missed. Out of date or incorrect parts could then be manufactured and only discovered at final assembly. Delays this late in a project can be costly.

On

How Onshape Improves Speed and Accuracy

In a modern CAD system like Onshape, designs are always up to date. This is all taken care of automatically. Onshape's unique database architecture completely eliminates the hassles of trying to manage distributed CAD files and complicated PDM systems. So when a colleague makes a design change, you'll know about it, without having to jump through hoops to get your hands on the latest and greatest design data. Errors are therefore significantly reduced with every team member working on the latest design data at all times.

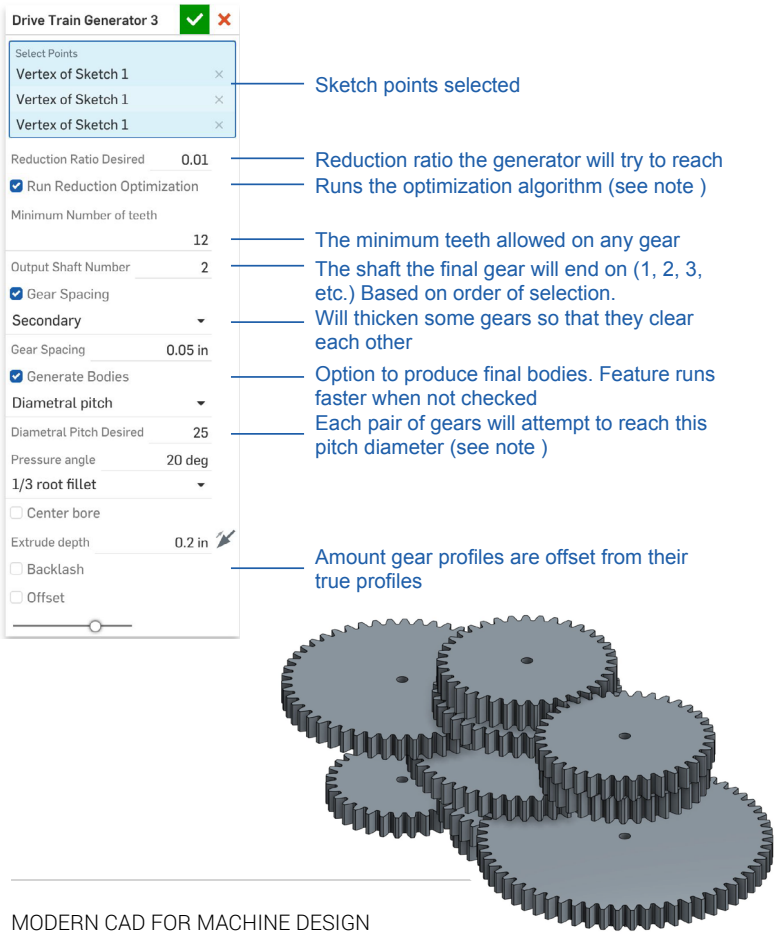
Meeting the Challenges of Machine Design

Design Challenge:

Reliability

Backing up your reliability claims with real data can be a profitable strategy. Overall Equipment Effectiveness (OEE) is a methodology some manufacturers use to measure their productivity and throughput. A score of 100% indicates that they are producing perfect products, as fast as possible, with no unplanned downtime (note that this score has no relation to the speed of the machine).

By measuring OEE and the underlying losses, manufacturers can gain important insights into how they can improve their manufacturing processes and measure the return on investment of the supplied machinery. Obtaining this data from your customers can help you to improve current and future machine designs, improve customer support and loyalty, and gain valuable sales and marketing collateral. Delivering machines that consistently score high on OEE benchmarks (that are not affected by human error, which can be mitigated with special attention to operator ergonomics and training) can be a useful tool when competing for new or repeat business.



Customers have high (and sometimes unrealistic) expectations. Short delivery times are often a driving factor for many when choosing a machine supplier, while at the same time expecting machines of the highest quality and reliability. Engineering quality takes time. If you don't have time, your design may be compromised.

That is simply not acceptable.

On

Meeting the Challenges of Machine Design

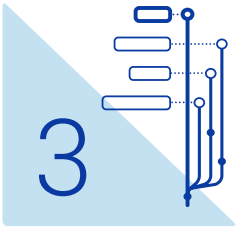
Design Challenge: Reliability

How Onshape Improves Reliability

While Onshape can't make you think faster, it can help you design faster. Related parts and subassemblies can be designed together to ensure that all your design intent is captured and every part updates predictably when changes occur.

Custom features enable you to streamline and optimize repetitive design tasks. Onshape assemblies can be built in a fraction of the time with single-click placement and built-in standard content.

Onshape runs in a secure-cloud workspace and can be accessed instantly via a web browser or mobile device. With no downloads, no installs, no crashes, and no lost or corrupt data, you'll have more time to perfect your designs and spend zero time on the mundane IT tasks that old file-based CAD systems impose.



Meeting the Challenges of Machine Design

Design Challenge:

Flexibility

Another way to develop a real competitive advantage is to reduce the amount of time spent designing each new machine. Less time equals faster delivery and higher margins. Building machines that can operate as multi-purpose or multi-product machines reduces design time and gives manufacturers more flexibility. Many manufacturers require production lines to run different products on different days or at least be able to adapt or upgrade their existing machinery when new products are developed, production needs to scaled up or old products are discontinued.

A simple push-button operation that enables manufacturers to swap out one product for another is the ideal solution, but this is usually highly dependent upon product similarity to enable it to work with the minimum of downtime, setup and startup costs. Different design strategies must also be considered for this to be successful, including switching from mechanical gears and cams to modern control systems and servomotors, and incorporating modular design. While these types of improvements make machines more flexible, they also introduce a significant amount of complexity to the machine and subsequently to the machine design process.

Design is an iterative process with usually more bad ideas than the handful of good ones. As you start to consider different design strategies and rework your existing machines, you'll need to make umpteen copies of your entire machine data set to work on and test out different concepts. Keeping on top of all these copies and deciding which combination of ideas are best can be difficult even with a PDM system. If several designers are working on several copies, the problems are compounded.

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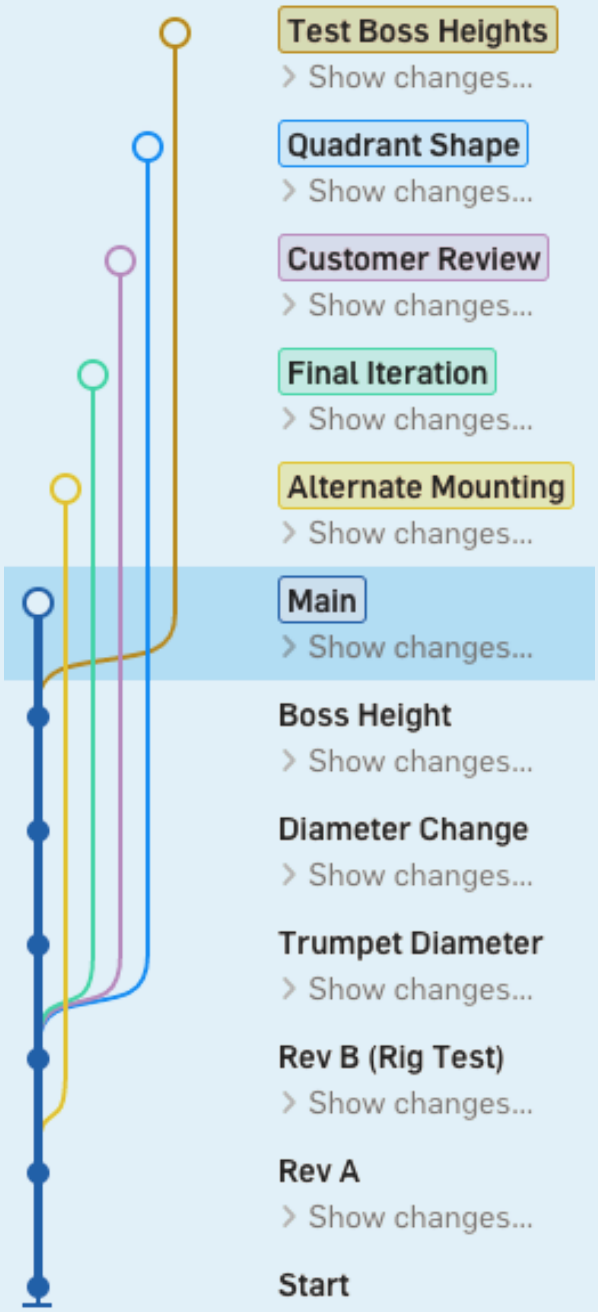
Meeting the Challenges of Machine Design

Design Challenge: Reliability

How Onshape Increases Flexibility

Onshape enables everyone involved in the machine redesign to add all their ideas to the same Document. Each user can create their own individual branch or workspace within that Document, based off a particular version or revision of the machine. These branches are completely isolated from the rest of the Document and the rest of the team (unless more than one person is working in a branch).



This means that each designer can explore new design scenarios without affecting other people's work. If a design idea is no good, it can be deleted or saved for future reference. If it's a great idea, it can be merged back into the main design. If multiple areas of the same machine are being redesigned at the same time, multiple branches can also be merged together.

Since every design change in Onshape is captured and recorded forever, your design team can experiment as much as they like, confident in the fact that any errors or bad decisions can always be undone. In short, Onshape gives you unlimited undo/redo.

With Onshape's built-in data management capabilities you can use branching, merging, versions and history to iterate your designs faster with a minimum of fuss.

Meeting the Challenges of Machine Design

Design Challenge:

Modular Design

A modular machine design is more flexible, faster to change over, and (especially for medical device assembly and packaging machinery) easier to validate and easier to clean. Diagnosing issues is also much easier. When things go wrong, you can isolate the problem and replace the defective module quickly rather than bring down the entire production line. If a certain module is critical to your manufacturing process, keeping spares in case of a sudden problem, production bottleneck, or general wear and tear, can minimize downtime and repair costs.

For the machine builder, a modular approach means less development time, smaller component inventories, and the ability to integrate a wider range of machine functions. More time can be spent focusing on the aspects of the machine that differentiate it from the competition and less time on components that are more generic.

There are several degrees of modularization that can be achieved in machine design -– from simple tooling changes (required to switch from one TV dinner to another, for example) to entire machines using a “plug and play” methodology. These “plug and play” machines offer the highest level of modularity and usually contain programmable units like pick-and-place robots that are easy to spec out in advance of a project.

An entire machine built with modular elements, however, can have significantly larger space requirements. Swapping out or interfacing with a customer’s existing equipment, dealing with unusual or restricted factory footprints, operator safety and other considerations can affect your ability to offer an off-the-shelf solution and may require further engineering. In these cases, the decision must be made whether it is more time and cost effective to re-engineer your modular machine design or build a one-off special purpose machine (which can still be modular, if required).

Modularizing a design is not a simple task. There are many factors to consider such as common mounting points and ease of access. Making a machine modular is no good if half the machine must be disassembled in order to swap out one or two small subassemblies. The push-button product change option is best handled in software, but that too is heavily reliant on innovative mechanical design.

On

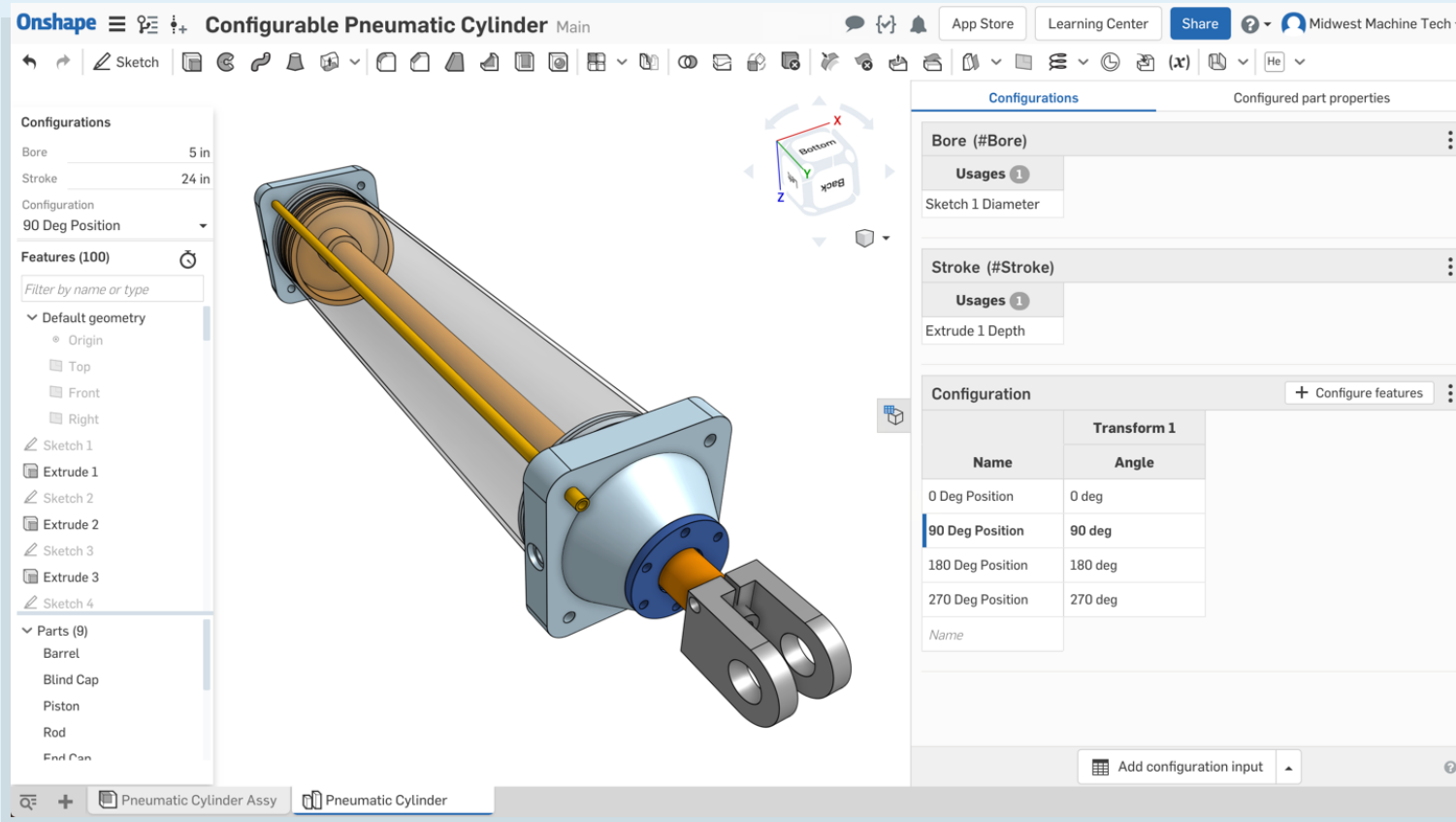
Meeting the Challenges of Machine Design

Design Challenge: Reliability

How Onshape Speeds Up Modular Design.

Onshape offers a number of design technologies that speed up the development of modular designs. Onshape's modern take on part configurations enables families of parts to be created with the minimum amount of effort.

You can configure practically any parametric value, and in combination with powerful multi-part Part Studios, drive entire subassemblies to quickly define and swap out modular systems. Unique, managed in-context design capabilities ensure that common mounting configurations can be easily standardized and verified for accuracy.



Meeting the Challenges of Machine Design

Design Challenge:

Communication

The most critical part of any machine design project is a thorough understanding of your customer's requirements and expectations before, during and after the design of the machine. Defining a clear specification or statement of work up front prevents any problems or misunderstandings in the future and ensures that any defined speed, reliability or modular characteristics of the machine are achievable. A detailed specification enables you to plan and evaluate different machine elements, mechanical assemblies and control systems, calculate any price/performance trade-offs and reduce any risks to your business early in the design process.

The key to all this is understanding your customer's needs inside and out with clear and concise communication at all times. By providing as much detailed design information from the start and delivering frequent design updates, you can help everyone, both customers and suppliers, to fully grasp your proposals and eliminate ambiguity and uncertainty. The more effective you are at explaining your design ideas, the higher the quality of feedback you will receive and the more likely you will be to get the order and any future business.

Supplying detailed design information to customers who don't use the same CAD system as you or don't use CAD at all is frustrating at best. Gathering, organizing and understanding their feedback is just as problematic. Confusion and misinterpretation are the most likely outcome. Copies of files and customer comments buried deep in email threads and scattered across dozens of computers have zero traceability, zero security and no way to determine which is the latest feedback or latest CAD file. The chances of parts being manufactured from incorrect data and incorrect assumptions are high.

On

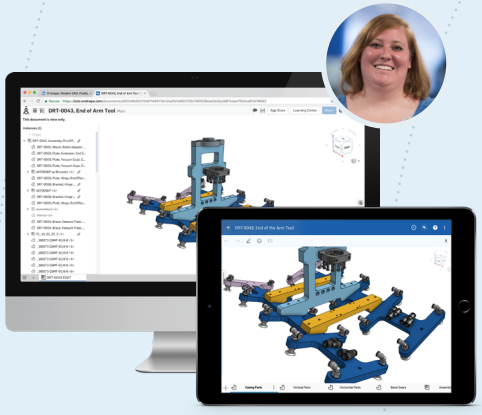
Meeting the Challenges of Machine Design

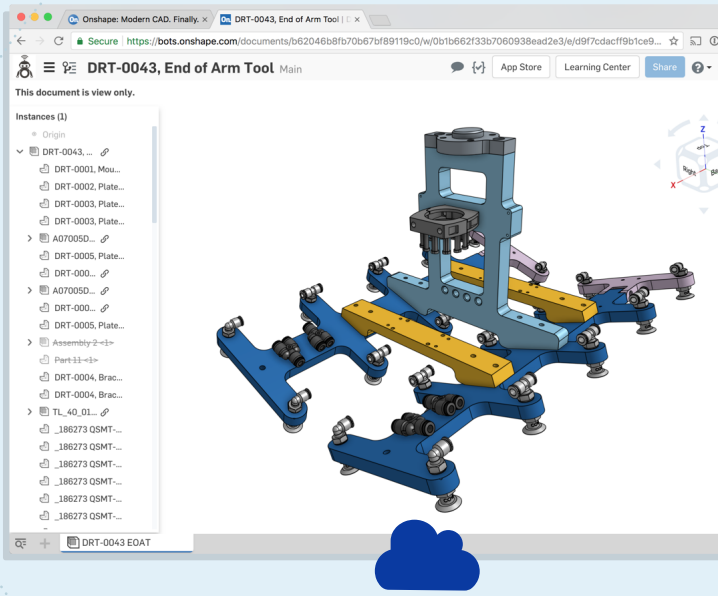
Design Challenge: Reliability

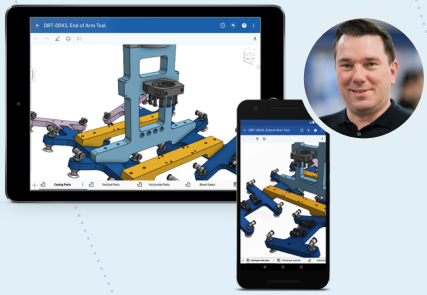
How Onshape Improves Communication.

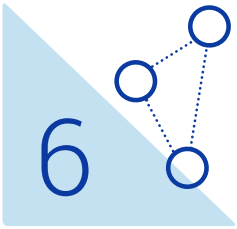
In Onshape, all design data is stored in one secure location in the cloud and sharing your designs with others is as easy as adding their email address and specifying their access permissions. From the very beginning of your project, you can invite your customers to view and add detailed comments to your design.

Comments apply directly to the part or assembly they refer to, so there's no better way to share your point of view. Specifications and data sheets can be stored within the same project workspace and every design decision ever made is recorded for the lifetime of the project providing accountability at all levels.









Meeting the Challenges of Machine Design

Design Challenge:

Collaboration

Every project stakeholder (employee, customer and supplier) has valuable insights into the way a machine is designed and need to know how and why a machine is built in a certain way. Gathering direct customer feedback on a design before it goes into production can slash manufacturing costs and speed up production times. With your customer's input, you can tailor a system that conforms to the demands that are unique to their application.

Working more closely with customers has been made easier by visualization tools that enable everyone to view complex machine designs without having to learn complex CAD software. However, distributing visualization software licenses and 3D machine data while keeping it always up to date does require a certain level of IT infrastructure and discipline. For every significant milestone in the design, files must be exported and saved to a read-only area of your network that is accessible by every stakeholder.

Problems arise when users take copies of files to view on a laptop when they're not connected to the company network. Copies quickly become out of date, so there's no guarantee that everyone has the latest information. Ideally, nobody should have access to the files, but the only other option is to conduct regular design reviews which are not easy to coordinate and don't give each stakeholder the ability to explore the 3D design in detail on their own time.

As machine designs become more complex, multiple users must collaborate using the same 3D CAD data in order to incorporate all the customer requests and to get the job completed faster. Copies of files again cause issues – if one user is editing a file, another cannot, especially if a PDM system is managing the data. If there is no PDM, you could be overwriting another person's work when you copy your copy of the file over the copy on the server. Managing complex CAD data this way can get chaotic very quickly.

On

Meeting the Challenges of Machine Design

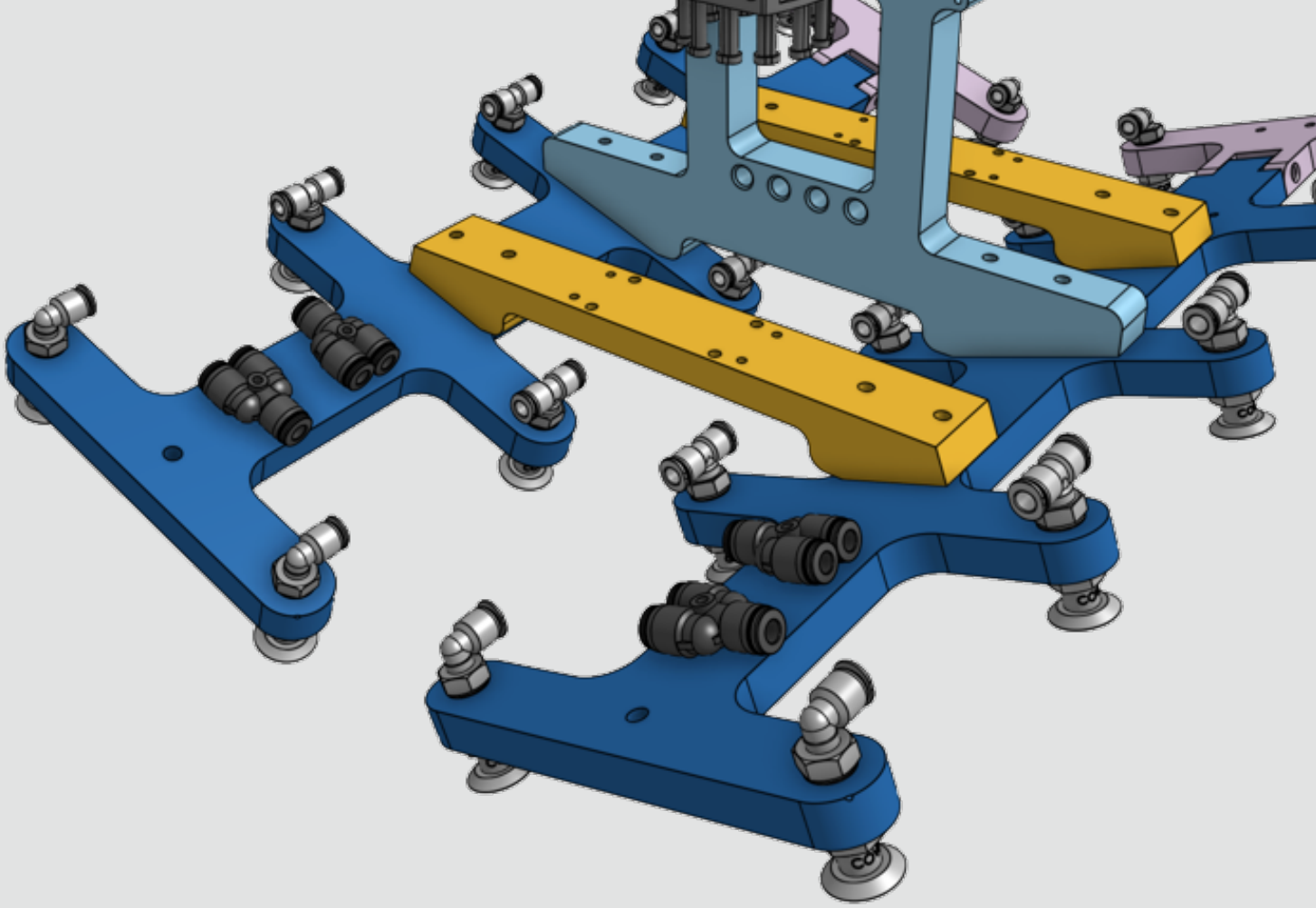
Design Challenge: Reliability

How Onshape Boosts Collaboration.

Onshape stores all your machine design data in one central location, where every stakeholder has instant access to the latest project information and no special viewing software is required. Each user can then interrogate the design, add comments or even edit the design if permissions allow. This enables a true collaborative workflow where every stakeholder's input is captured, recorded and implemented into the final design.

Onshape also allows your entire team, including your customers and suppliers, to work in the same Document, simultaneously editing the same assembly, same part or even the same sketch. This dramatically compresses the design cycle and reduces errors and rework.

With your customers working alongside you, in real-time, there are fewer issues, mistakes or misinterpretations. Your ultimate goal of delivering a machine ahead of time that meets or exceeds your customer's specifications is much easier to achieve when there is just one single source of truth.

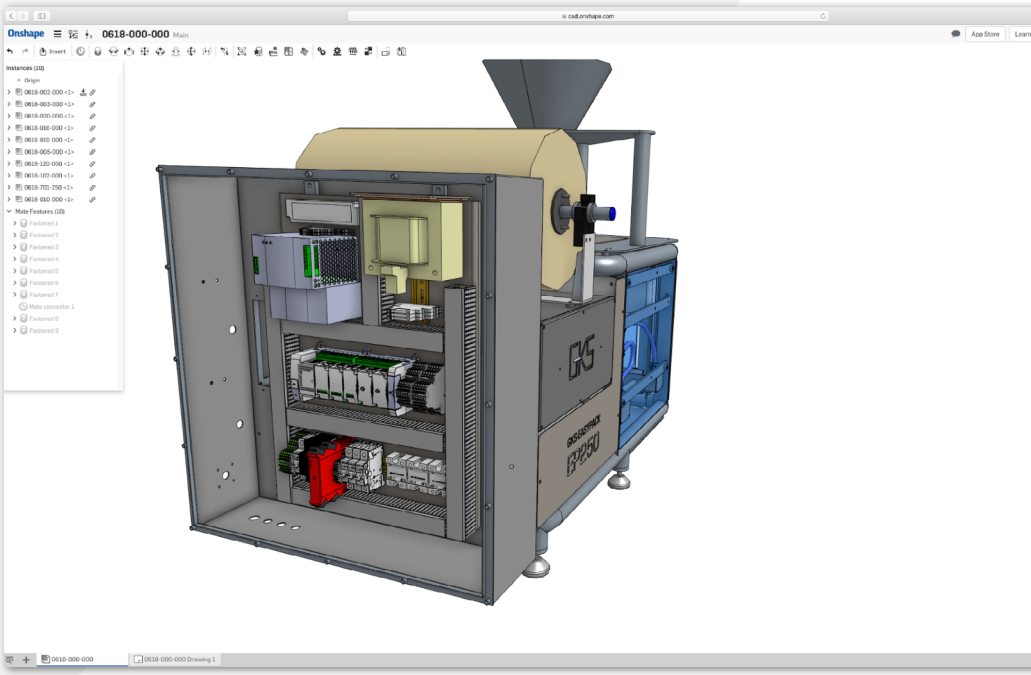


How 5 Machinery Companies Use Modern CAD to Solve Design Challenges

How 5 Machinery Companies Use Modern CAD to Solve Design Challenges

GKS Packaging

Based in the Netherlands, GKS Packaging specializes in "no nonsense" flexible packaging solutions for all businesses, ranging from small companies to large industrial pack houses. GKS offers an extensive line of vertical form, fill and seal machines which are completely developed, designed and built in house. The company also builds weighing systems, dosing systems, conveyor belts, and platforms to customer specifications.



"Each conveyor belt or special weighing system we build is a new design using standard components we've used before," says GKS Packaging CEO Ivo Geukes. "When we were using SOLIDWORKS, it would always end up in a mess, especially when you had more than one person working on it."

"Keeping track of which parts we already had for the assembly and which ones we needed to produce was always difficult. Excuse my French, but using a PDM system was always a bitch," he adds. "If you want to work on a part, but someone else has already opened it, you can only open it as read-only. Data management was always a hassle."

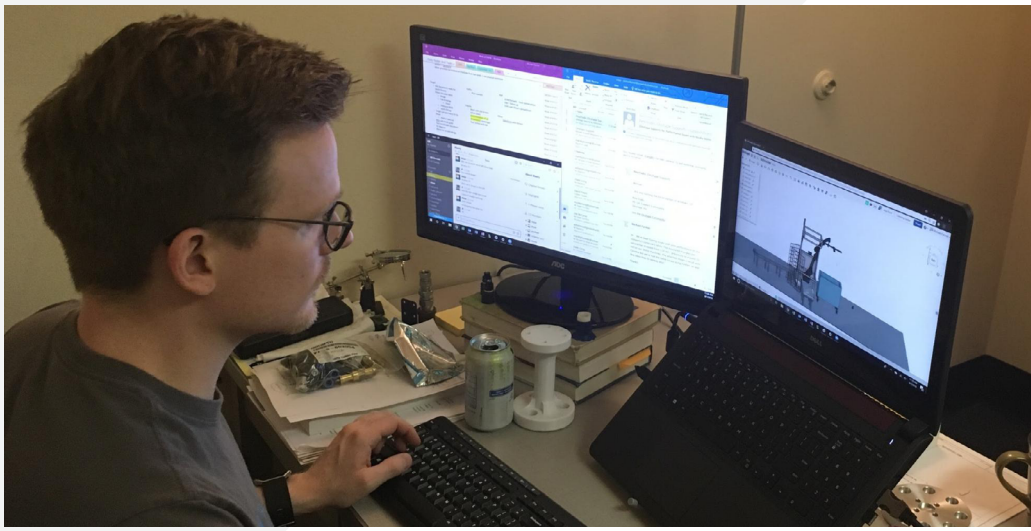
"Also, with SOLIDWORKS, we'd always run into problems with broken assemblies. If you had to make a hole bigger on a part and then open the old assembly, suddenly the whole thing changes and the left side of the screen turns red. It's your own fault, because you were there when you did it, but it's frustrating spending hours redoing your old work."

"With Onshape, I now really appreciate the ability to branch a design and create versions," Geukes says. "You really have to try your best to screw up an assembly."

Geukes notes he especially finds Onshape's simultaneous editing to be valuable when designing new packaging systems. When one member of his design team makes a change, everyone else instantly sees it.

Onshape

How 5 Machinery Companies Use Modern CAD to Solve Design Challenges



Based in Nashville, Tennessee, Universal Logic is an artificial intelligence (AI) software company and robot integrator, providing supply chains with complete automated material-handling systems for high-mix, high-volume applications. Universal Logic systems integrate artificial intelligence with vision, grasping and motion control to give machines human-like flexibility at high speed for half the cost of labor.

"Getting accurate part information to our engineers, designers, management and the manufacturing vendor is crucial," says Owen Long, the Engineering Ops Manager at Universal Logic. "Previously, out-of-sync information had led to incorrect parts being manufactured."

"Onshape now enables us to share information quickly and ensures that everything is as accurate and as up-to-date as possible." he says. "This reduces the risk of human error."

Onshape's Sharing feature enables companies to securely and instantly collaborate with a colleague, vendor, customer or partner by granting them editing, commenting or view-only access rights to a CAD model. Equally valuable is the ability to instantly withdraw outside access to designs when a project is over, reducing the risk of unintentionally leaking your intellectual property.

When using SOLIDWORKS or any other old file-based CAD system, engineers usually have to choose one of these four options to share their work:

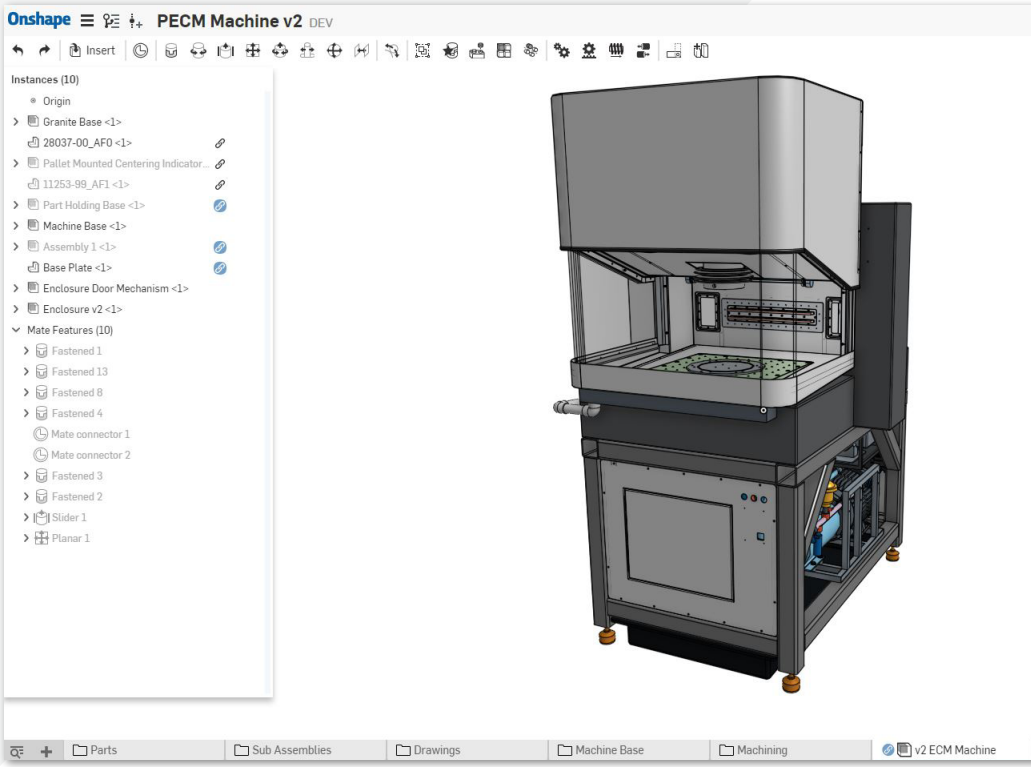
- Email files back and forth.
- Put them in elaborate Product Data Management (PDM) systems, which require CAD users to check out files from "the vault."
- Put them on an FTP site.
- Use a storage service like Dropbox or Google Drive.

"Much of our work in my group requires pulling in other vendors, making sure systems fit together, and working together with the customer to assess their requirements," Long says. "At any one time, we might be working with several dozen key stakeholders who may need to see the design. I'd estimate that Onshape Sharing saves about 10 minutes on each review, so that time savings quickly adds up."

How 5 Machinery Companies Use Modern CAD to Solve Design Challenges

voxel

Based in Raleigh, North Carolina, Voxel Innovations is an innovator in Pulsed Electrochemical Machining (PECM), an advanced manufacturing process unrivaled in its ability to quickly and accurately machine specialty metal alloys found in turbines, medical devices and surgical equipment. The company's mission is to use PECM and related manufacturing technologies to supply critical, high-value parts to aerospace, energy and healthcare customers.



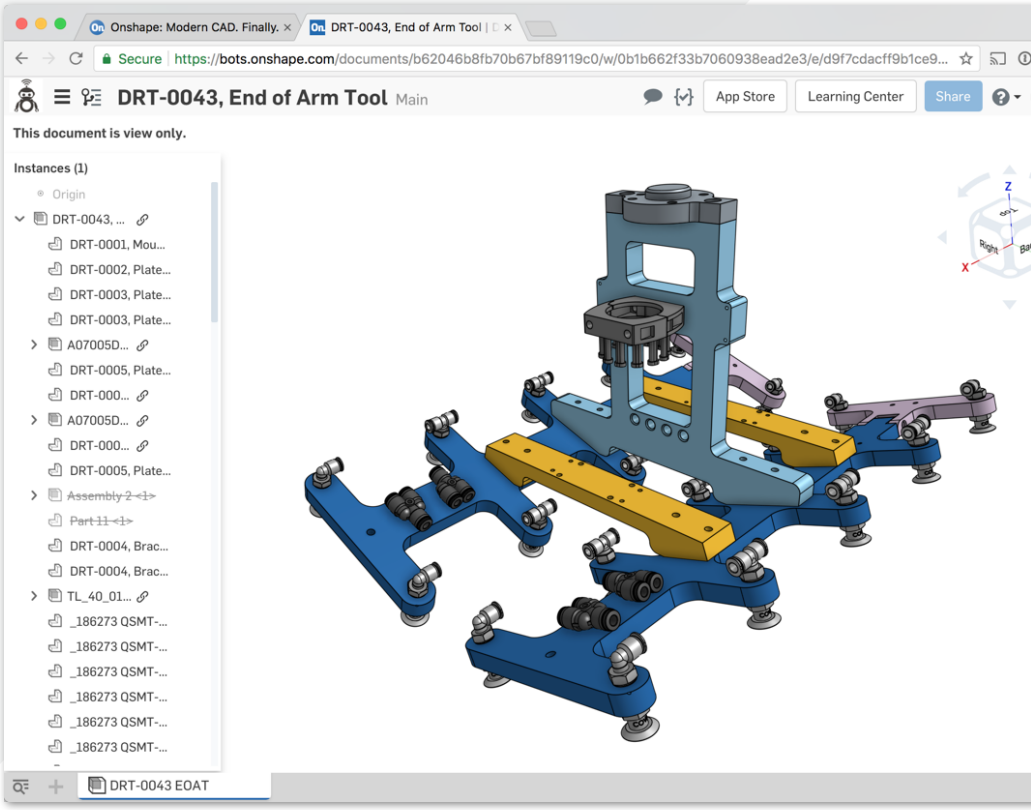
"I haven't used a file-based CAD system yet that hasn't crashed on me," laments Michael Bromley, the lead mechanical engineer for Voxel Innovations.

"It especially happens in the concept-generation stage," he says. "I'd have a lot of interworking components making up a small subassembly and I'd get very involved in changing things around and generating a bunch of new designs before I was ready to release anything. Then, I'd forget to save – because my design was in progress and far from done – and it would crash and I'd have to start over."

"I've never lost work in Onshape," Bromley adds. "And I never have to remember to hit the save button. At this point, it would be a struggle to return to our old CAD system."

How 5 Machinery Companies Use Modern CAD to Solve Design Challenges

Based in Nashville, Tennessee, Hirebotics builds cloud-connected "robots for hire," making automation easy, affordable and within the grasp of manufacturers across all industries and of every size and type.



"One of the really nice things about Onshape is the ability to access and work on a CAD model in the field," says Matthew Bush, Chief Operating Officer and co-founder of Hirebotics. "If we're sitting in the factory trying to figure out how a robot goes together, we can pull up the model on our phone and solve the problem right there."

"Being able to use Onshape in the field is very unique and very new and it's really helped us leverage our time and make us faster," he adds. "We don't have to put big drawings books together and take them with us anymore. We can make changes on the fly to whatever we need without having to go back to a CAD station."

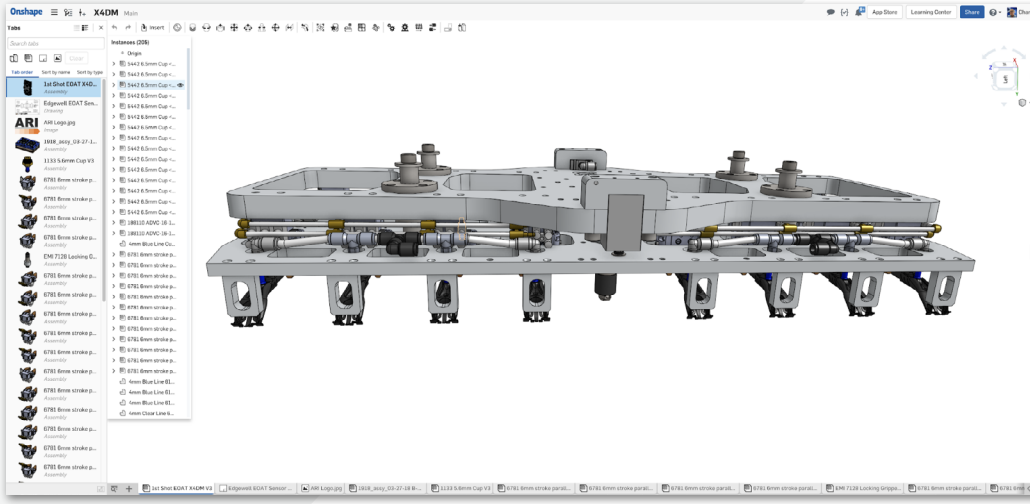
"Most of our customers are just floored when we pull up the model on our phone," Bush says. "Even if it's just for a proof-of-concept review. They're astounded. The experience has actually convinced a couple of our customers to become Onshape customers."

Onshape

How 5 Machinery Companies Use Modern CAD to Solve Design Challenges

ABSOLUTE MACHINERY

Based in Worcester, Massachusetts, Absolute Machinery sells, services and customizes plastic injection molding machinery and auxiliary equipment for manufacturers throughout the United States and Canada. The company also integrates robotic systems with injection molding machines to create flexible production workcells.



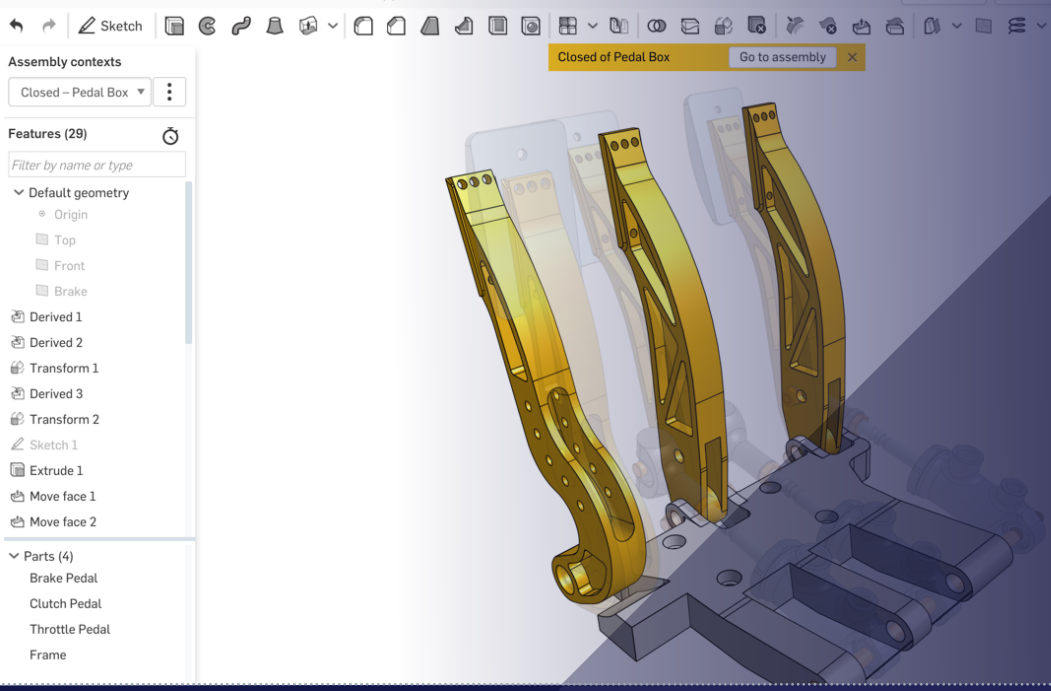
"We used to be primarily a distributor of industrial equipment, but we now provide a lot more value-added engineering functions," says Mike Ortolano, owner of Absolute Machinery. "We use a lot of web-based tools at our company because we have a facility in China, one in Ohio and another one we're building in South Carolina. It's important for us to be all on the same page and for management to have visibility across the business."

"When we were using workstation-based CAD, it was tough for me, the nosey owner, to look at anything. Now with Onshape, I can always see what everybody is working on," he says.

"Having immediate access to CAD models on phones and tablets is especially important for the service team in the field," Ortolano adds. "Whenever a customer adds on an option, we'll purchase the equipment directly from the manufacturer. Of course, they toss it in a box and it comes to us like a Rubik's Cube. How does it all fit together? Where do these valves go? Historically, the guys in the field have been sweating bullets as the customer is in a rush to get up and running. Having the 3D model readily accessible in Onshape makes a huge difference."

Absolute Machinery is finding Onshape valuable to employees beyond its core engineering and installation teams. Ortolano says his team regularly uses Onshape's Configurations feature to quickly generate 3D models for sales prospects.

"It's amazing how many of our customers wake up in the morning and think 'Geez, I need a robot today!'" he says. "When a customer wants a quote, you want to waste as little time as possible. I've heard from colleagues that they sometimes wait a couple of weeks for a quote. If somebody asks us for a proposal and they want a quick concept on a standard work cell, they're getting it fast, often on the same day. Onshape helps us move faster."



Onshape

Peace-of-Mind
Using Onshape's Managed In-Context Design ensures that your CAD models will always update the way you expect them to – even if there is motion (a big troublespot for other systems).

A closer look at...

Onshape's Advanced 3D Modeling Tools

Parametric feature-based CAD was first introduced back in 1988 – and the fundamental ways that engineers model really haven't changed much since. Using an ordered list of parametric features to make a part worked very well back then and many things still work well today. But many things don't.

Onshape's new "Parametric Modeling 2.0" approach improves the best parts of old parametrics and eliminates the weaknesses. Parametrics 2.0 ushers in systematically better ways of modeling in such areas as:

1. **Multi-Part Design** – In Onshape's Multi-part Part Studios, all parts related to one another are designed together in one place – where it most makes sense – instead of modeling them in separate files. Multi-part design is now a much smoother experience.

2. **Configurations** – When creating part configurations, old CAD systems require you to build monstrous tables – sometimes with hundreds or thousands of rows – for each conceivable permutation. Onshape has dramatically reduced the number of required table rows and cells, making sophisticated and complex configurations more manageable. For example a 375-cell configuration table in old CAD can be expressed in Onshape with just 3 tables of only 5 cells each.

A closer look at...

Onshape's Advanced 3D Modeling Tools

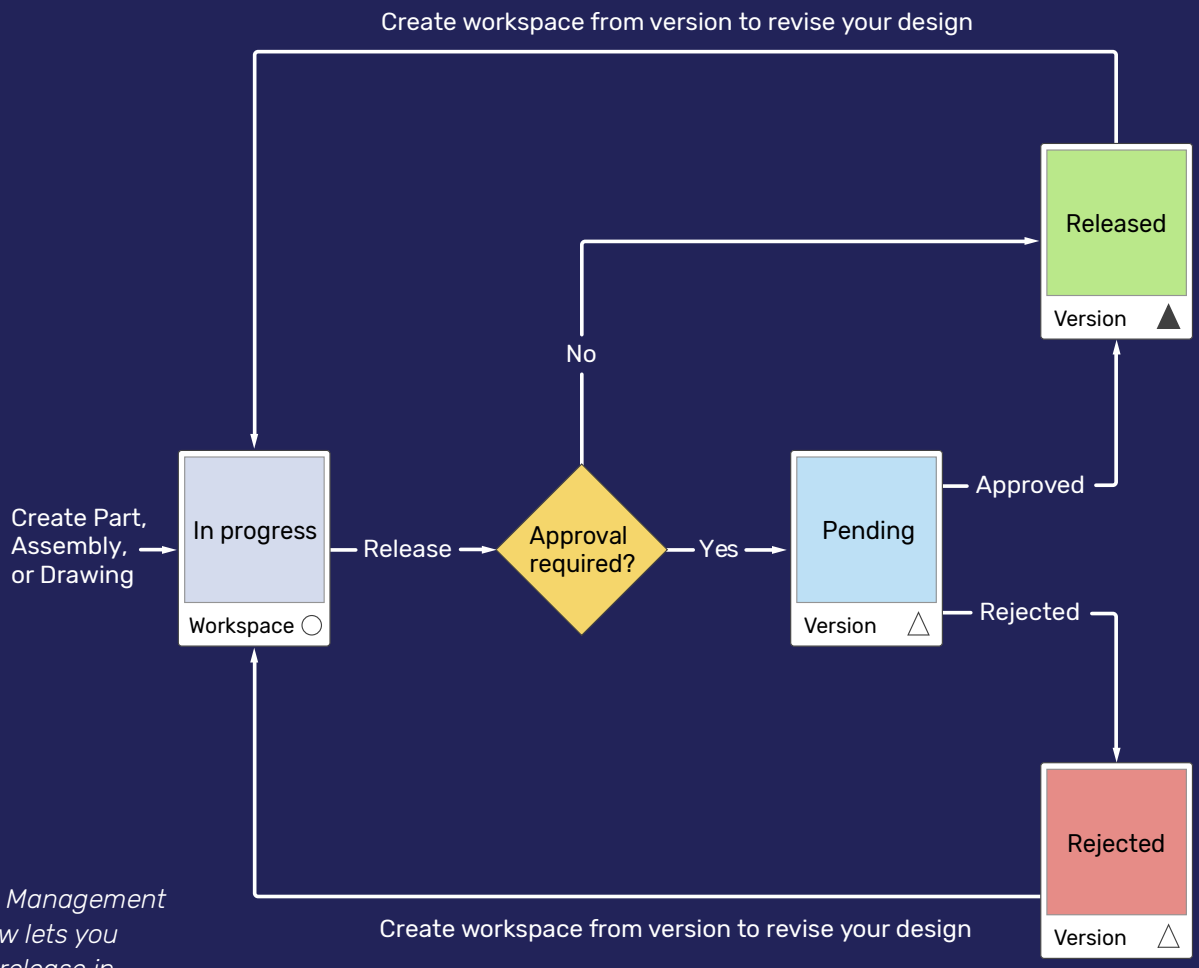
3. Standard Content – In Onshape, fasteners (screws, bolts, washers, nuts, etc.) have built-in mate connectors, making standard content smarter and making positioning in assemblies much easier. Onshape has added the "fit" to "form, fit and function."

4. Managed In-Context Design – Old file-based CAD systems offer users the ability to add in-context relationships between parts in the context of an assembly so modifying one part will affect another. Unfortunately, changing these in-context parts often erroneously changes other parts in unpredictable ways. Onshape's Managed In-Context Design tools have ended this madness. Your CAD models now always update the way you expect them to – even if there is motion (a big troublespot for other systems).

5. Simultaneous Sheet Metal Tools – Seeing flat, folded and tabular sheet metal views side-by-side allows you to visualize errors and interferences immediately. When you edit one view, the other two are synchronized automatically. These simultaneous tools ultimately reduce scrap and wasted time.

6. Custom Features – Ever wish you could change the way your CAD system's features work? Onshape's open programming language, FeatureScript, lets you create custom industry-specific CAD features that eliminate repetitive tasks.

Onshape didn't invent parametric modeling, but it has fundamentally improved it at the core.



Onshape's Release Management & Approval Workflow lets you create a proposed release in minutes instead of hours.

A closer look at...

Onshape's Built-In Data Management

As explored earlier in this book, Old CAD's approach to data management relied on the error-prone process of locating, validating, organizing, and archiving hundreds (if not thousands) of individual design files. This archaic process often led to version control problems – confusion over which version of a design file was really the latest version.

And for those companies using expensive and outdated Product Data Management (PDM) systems, there has been a different set of gridlock problems: Frustrated colleagues waiting for each other to check in and check out files before they can continue their own work.

So what's different about Onshape's "Design Data Management 2.0" approach?

Onshape

A closer look at... Onshape's Built-In Data Management

Here are the key reasons why modern CAD users can stop worrying about organizing their data and focus more on creating innovative designs:

Database Architecture, Not Files – Onshape stores designs in a cloud-hosted database that presents data to users as virtual documents showing all design history. We log all actions by all users at the feature level and allow you to go back to any previous state of your model – forever. It is always clear what is the latest version, who has access to it, and who did what. Onshape users also never lose work due to CAD crashes.

Secure Cloud Workspace, Not Scattered Copies – Onshape stores design data in a secure cloud workspace accessible from anywhere by authorized users. Administrators can prevent users from making local copies or exporting sensitive data. When a user no longer needs access, administrators can revoke it and ensure there are no extra copies floating around.

Parallel, Not Serial – Onshape's unique database architecture allows engineers to explore multiple design directions in separate branches and then later merge desirable changes back into the main branch. This allows engineers the freedom to explore alternative designs in parallel, resulting in faster, better innovation.

Instant Collaboration, Not Meetings – Onshape provides robust tools for sharing designs with other engineers or stakeholders, offering and receiving comments on designs, and comparing and accepting changes – all in a single cloud workspace without having to make copies. This allows teams and extended groups of stakeholders to stay in sync, instantly see what each other is doing, and keep work flowing without the friction, confusion, and time-sucking meetings that plague the old CAD collaboration process.

Design and Data In One Place, Not Many – Onshape puts the data management experience right in the design experience instead of forcing the user to switch between their modeling tool and their PDM system. This theme of deep integration and putting the right interface in front of the right user at the right time is something our UX team has championed since day one, and our production customers absolutely love it.

Zero IT – Onshape set out to deliver a system that would never require dedicated IT, installation of servers, or installation and upgrading of desktop software. For engineers who have been forced to master these tasks, there is a collective deep sigh of relief!

Extending the foundational principles outlined above, Onshape's Release Management & Approval Workflow now lets you create a proposed release in minutes instead of hours, including any combination of parts, assemblies, configurations and other assets. This eliminates the need to buy an expensive PDM system. And once a release is defined, Onshape's built-in approval workflow allows designated supervisors to approve or reject designs without interfering with their team's other current activities.

SEE MODERN CAD IN ACTION WATCH A LIVE CUSTOM DEMONSTRATION

If you'd like to press the reset button and stop feeling blocked by old CAD technology, contact us today and we'll show you what Onshape can do. Request an Onshape Demo!

REQUEST A DEMO

Onshape

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