

Autodesk®

for Industrial Machinery Manufacturers

Digital Prototyping

Experience It Before It's Real



Autodesk®

Design, manufacture & market, quality!

Win more business and drive increased productivity with the Autodesk solution for Digital Prototyping.

Common challenges faced by industrial machinery manufacturers:

- Quickly respond to customers, demonstrate unique abilities & deliver superior results
- Harnessing new technologies to drive innovation and better satisfy customers
- Ensuring product performance and reliability while shortening design times and lowering costs
- Managing collaboration with their supply chain
- Ensuring compliance in a complex environment
- Managing manufacturing processes and facilities with optimal efficiency

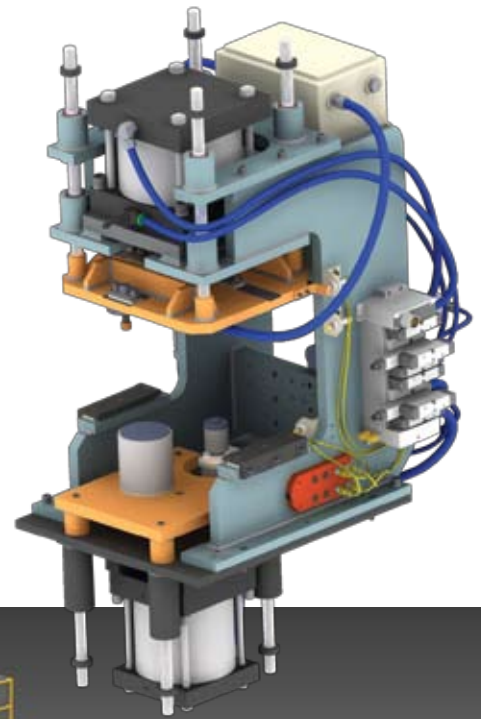
Industry Challenges

Industrial machinery manufacturers operate in a complex and demanding environment and face unprecedented challenges today. They are simultaneously confronted with increasing global competition for new project opportunities and customer requirements becoming more multifaceted and challenging. To meet these specific requirements, industrial machinery manufacturers often engage in engineer-to-order, configure-to-order or assemble-to-order processes and operations. Industrial machinery manufacturers struggle with the increasingly complex product platforms, from which product variants and

configurations are driven and the potential costs and quality-control issues associated with them. At the same time, the need to incorporate innovative designs is essential for market success, while managing quality & costs closely is critical to the bottom line. Successful manufacturers must effectively collaborate with both local and global product development teams and supply chain partners in order to develop and deliver more complex products in less time. The challenges do not end with product development - the ability to introduce products into flexible manufacturing facilities can make or break the success of a project.

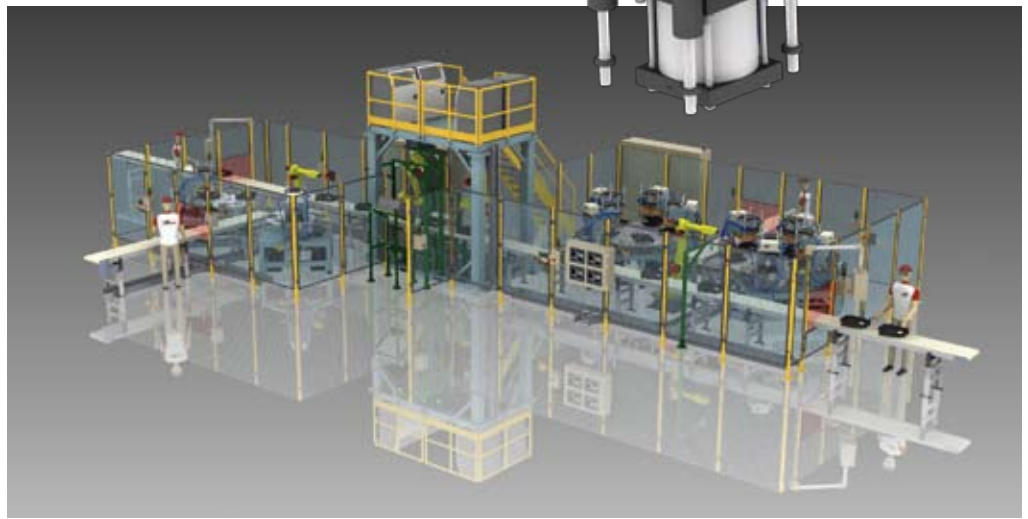


Image courtesy of Alpha Marathon Technologies Inc.



Strategies for Success

Succeeding in this market requires an intense focus on meeting customer needs. Establishing a product development methodology that effectively utilizes a product platform to create a multitude of configurations to adapt to the customer's needs is paramount. Driving new business and rapidly responding to customers requires eliminating inefficiencies throughout the development process. From initial concept development and bid proposal through to project delivery and post-sales support efficiently meeting customer can mean the difference between success and failure. Whether a new product platform or a derivative of an existing one, development teams need the ability to explore a design early in the process and communicate that design with stakeholders and customers. The ability to design, visualize, and simulate a product from the earliest concept phase is a prerequisite to avoiding design errors that may not appear until the physical prototyping stage. Just as important is the ability for multiple disciplines to communicate and collaborate throughout the development process, without recreating data to meet their needs.



Images courtesy of MJ Industries

The Autodesk Solution for Digital Prototyping

The Autodesk solution for Digital Prototyping brings together design data from all phases of the product development process to create a single digital model. This single digital model simulates the complete product and gives engineers the ability to better visualize, optimize, and manage their design before producing a physical prototype.

Digital Prototyping gives industrial machinery manufacturers the ability to virtually explore a complete product before it is built. By using a digital prototype, manufacturers can visualize and simulate real-world performance of the design with less reliance on costly physical prototypes, reducing design and production costs.

The Autodesk solution for Digital Prototyping moves companies beyond 3D modeling. It enables manufacturing workgroups to create a single digital model that can be used in every stage of production, bridging the gaps that usually exist between conceptual design, engineering, mechanical design, electrical controls design, and manufacturing teams.



Image courtesy of Bosch Rexroth Canada Corp.

Conceptual Design

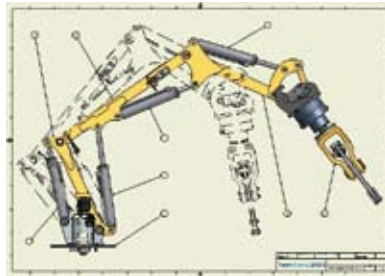
In an increasingly competitive and global market, industrial machinery manufacturers need to be flexible and respond quickly to new opportunities, delivering differentiated products that meet customers' time, cost, and performance requirements.

The Autodesk solution for Digital Prototyping lets you hit the ground running in generating new business—and responding to customer needs. It offers you the tools to virtually explore a product in the conceptual design phase, before it's ever built.

- **Bid process support**—Prepare contract bids faster by using Autodesk® Inventor® software to easily leverage existing design, development, and manufacturing data.
- **System engineering and design**—Create designs of electrical and mechanical systems with AutoCAD® Electrical and AutoCAD® Mechanical software and communicate digital data through the engineering phase.
- **Configuration**—Develop product platforms and easily derive custom product variants with Autodesk Inventor and automatically update downstream engineering bill of materials (BOM) information.
- **Data management**—Accelerate development cycles by organizing and managing key design and development information in Autodesk® Vault software.



Image courtesy of Unifast S.p.A.



Engineering

To rise above the competition, industrial machinery manufacturers must continually innovate to deliver complex machinery products that meet high standards for reliability, quality, and performance.

With the Autodesk solution for Digital Prototyping, you can overcome the unique engineering challenges of designing intricate industrial machinery and test and evaluate the effect of different systems and design configurations—before you physically prototype the product.

By generating engineering and manufacturing documentation directly from the 3D model, you can combine the benefits of associative drawing views with the power and widespread acceptance of the DWG™ format to help reduce errors and deliver the design in less time. With digital models, you can create, validate, optimize, and manage designs in the engineering phase.

- **Detailed design and engineering**—Use a comprehensive, integrated set of 2D and 3D design and development tools, including Autodesk® Inventor®, AutoCAD® Electrical, and AutoCAD® Mechanical software, to create mechanical and electrical designs.
- **Mechatronic integration**—Autodesk Inventor, AutoCAD Electrical, and AutoCAD Mechanical help you synchronize your mechanical and electrical engineering efforts, reducing errors and improving overall design productivity.
- **Simulation and analysis**—Autodesk's tools for Digital Prototyping enable you to validate and optimize designs as you work with a complete digital prototype, minimizing physical prototypes and reducing costly last-minute engineering changes.
- **Data management**—Autodesk® Vault® and Autodesk® Design Review software facilitates you in managing that your designs are complete, accurate, approved, and released to manufacturing efficiently and in a timely manner.



Images courtesy of Brokk AB

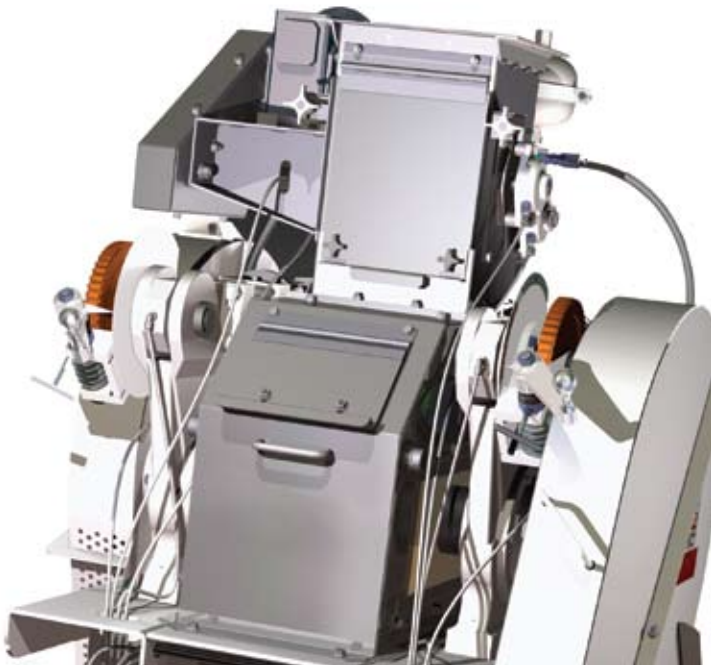


Image courtesy of A.T. Ferrell Company Inc.

Sales & Marketing

Autodesk provides solutions for virtual photography and cinematography that enable marketing teams and creative agencies to market products without the need for costly physical prototypes and photography shoots. These tools effectively repurpose the digital prototype and allow the development of marketing materials in parallel with product development.

- **Visualization** – Utilize stunningly realistic digital prototypes to demonstrate products and produce catalog-ready imagery with Autodesk Showcase™ software. Experience digital prototypes in a way that accurately represents real-world product offerings in their natural environment.
- **Animation** - Autodesk® 3ds Max® Design software leverages Autodesk Inventor engineering data to create advanced visualizations of digital prototypes which can incorporate additional modeling, effects, and animations.

Manufacturing

Getting products to market quickly has become increasingly important for industrial machinery manufacturers. With shrinking market windows and ballooning customer demands, you need to synchronize product design with manufacturing processes so you can deliver high-quality products faster

The Autodesk solution for Digital Prototyping supports the key processes of the manufacturing phase:

- **Release management**—Automate the release management process, including engineering changes and bill of materials (BOMs), while maintaining control over data throughout manufacturing with Autodesk Design Review software.
- **Supply chain collaboration**—Improve communication and collaboration among designers, manufacturing plants, customers, vendors, suppliers, and other extended team members with Autodesk® Vault®, AutodeskStreamline®, and Autodesk Design Review software.
- **Facilities management**—Combine product design and engineering data with manufacturing process information by using Autodesk® Inventor®, Revit® Architecture, and Autodesk® NavisWorks® software to better coordinate and streamline production, assembly, and installation operations.
- **Data management**—Manage data related to your single digital model throughout the product lifecycle—from conceptual design to manufacturing and beyond—with Autodesk Vault, Autodesk Streamline, and Autodesk Design Review for improved collaboration, streamlined processes, and more focused development teams.

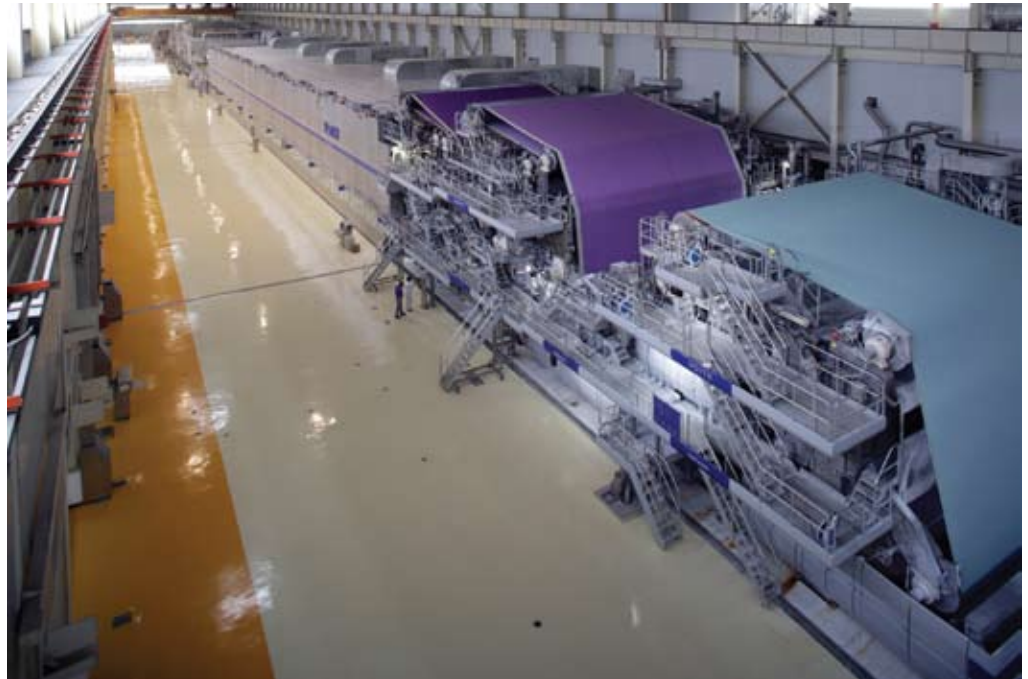


Image courtesy of Voith Paper

Customer References

“Our choice of Autodesk solutions is largely a result of our vision of a complete, digital world within the company’s walls.”

—Karl Thysell
Head of Product Development
HTC Sweden



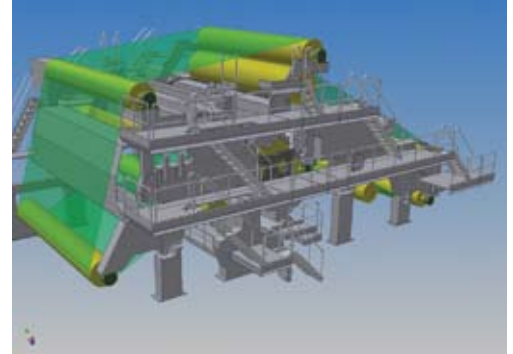
“With Autodesk, we have tools to visualize and adapt to changes, keep our errors down to a minimum, and provide customers with what they are expecting—and more.”

—Ben Gilmore
Project Chief Designer
Bosch Rexroth Canada



“With Autodesk Inventor, we have standard models that we can easily customize to fill specific customer requirements.”

—Olaf Spitzer
Manager CAD/PDM
Voith Paper



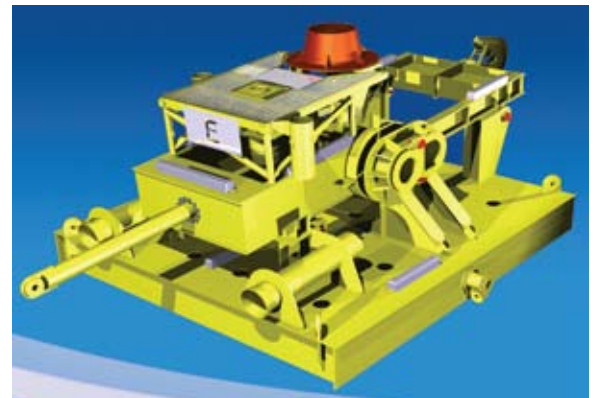
“With the 3D modeling capabilities in Inventor, we can pack in equipment and devices into our machines more tightly. As a result, we’re able to vastly improve the quality of our designs.”

—Alexey Sarapulov,
Chief Designer Deputy
Engineering Center



“With Autodesk Inventor, we study the problems our clients have in the design phase. Because we design and analyze iteratively, we are able to create structures that perform far better than they ever imagined. That’s why we keep getting called back.”

—Gary A. Sidwell
President
GSPE



Autodesk Showcase

Autodesk® Showcase® software enables transportation designers to transform 3D CAD data into visually realistic images for interactive to support design and customer reviews.



Autodesk Design Review

Accelerate automotive reviews with Autodesk® Design Review software, the all-digital way to view, mark up, and track changes to 2D and 3D CAD designs without the original creation software.



Autodesk Vault

Autodesk® Vault, previously known as Autodesk® Productstream®, securely stores and manages engineering information, design data and documents.



Autodesk Navisworks

Autodesk® Navisworks® manufacturing software offers a comprehensive set of 3D digital mockup tools for large-scale assembly visualization and analysis, multi-CAD data aggregation, and collaboration.



Autodesk Moldflow

Autodesk® Moldflow® is a comprehensive suite of injection molding simulation tools used to analyze and optimize the creation of molder parts and their associated molds.



AutoCAD

AutoCAD helps transportation equipment manufacturers speed documentation and share ideas seamlessly with its powerful, flexible features for both 2D and 3D development.



AutoCAD Electrical

AutoCAD® Electrical is AutoCAD® software for controls designers, purpose-built to create and modify electrical control systems.



AutoCAD Mechanical

AutoCAD® Mechanical is AutoCAD for manufacturing, purpose-built to accelerate the mechanical design process while preserving the AutoCAD user experience.



Autodesk Inventor

The foundation for Digital Prototyping, Autodesk® Inventor® software provides a flexible set of software for 3D mechanical design, simulation, tooling creation and design communication for transportation equipment manufacturers



