

Comparative Analysis

Why You Should Partner with Autodesk

July 2003

Introduction

“Chief executives of large companies, perhaps the most accurate economic forecasters recently, expect the economy to remain weak over the next six months,” according to David Leonhardt, New York Times News Service.

The economic downturn, along with other business drivers, such as competition, market disruption, and government regulations, has forced many businesses to reassess their objectives. To meet these objectives, whether the need is to increase market share, revenue, profitability, or technology, many companies are turning to partners to aid in the return to business growth.

In today’s market finding partners that provide solutions to address your specific business issues can be overwhelming. The sales messages and product demonstrations from various vendors can look and sound so similar that it is difficult to determine which solutions will meet your business objectives. To help you determine whether Autodesk should be your partner in meeting your business objectives, this paper compares Autodesk and SolidWorks. The information in this document demonstrates that Autodesk provides the best solutions for your business.

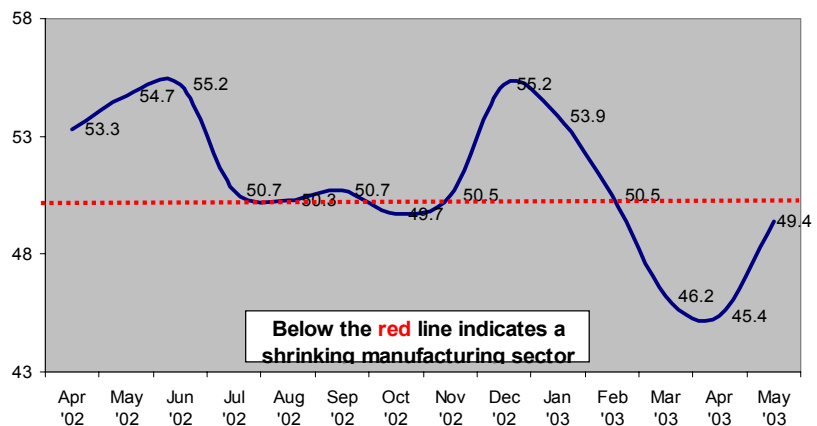


Figure 1. Economic indicators show that the manufacturing sector is still weak.

Feel confident that Autodesk is the partner to help meet your business objectives.

Autodesk: A Partner Ready to Solve Your Business Issues

Autodesk has positioned itself and its technology to provide solutions that solve real world business issues. With more than five million users of Autodesk® products in over 160 countries, Autodesk is recognized as a market leader. In fact, over the past year Autodesk has emerged as the 3D market leader, with the best-selling 3D mechanical design software. Specifically, Autodesk Inventor® Series software has outsold SolidWorks® for six consecutive quarters.

"...5 Million Users of Autodesk Products Worldwide... with the best selling 3D Mechanical Design Software..."

What's more, the Autodesk Manufacturing Solutions Division has been growing even in these tough economic conditions. An eleven percent increase in revenue quarter over quarter is further evidence of Autodesk's market leadership. In contrast, SolidWorks has been declining year over year at a rate of six percent.

Source: 2002 publicly announced unit sales of 3D mechanical design

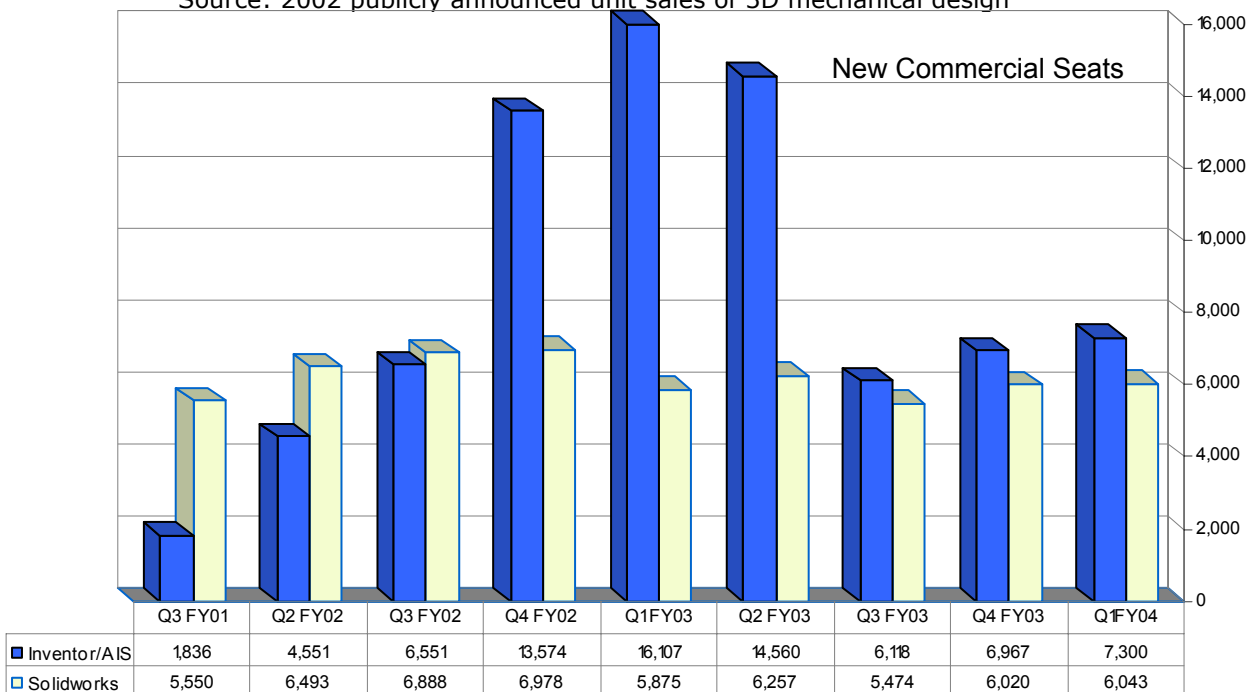


Figure 2: Autodesk Inventor Series and Autodesk Inventor have outsold SolidWorks for six consecutive quarters.

With nearly 3,500 employees and 83 offices worldwide, Autodesk has a global presence to meet the needs of any size company. In fact, 98 percent of Fortune 500 businesses and 100 percent of Fortune

Autodesk: A Strong Business Partner

- **Autodesk Inventor Series and Autodesk Inventor have outsold SolidWorks for six consecutive quarters.**
- **Autodesk Manufacturing Solutions Division revenue has grown 11 percent quarter over quarter.**

100 businesses rely on Autodesk technology to help them increase their competitive advantage. These corporations choose Autodesk because of its stability, reputation, and

experience in the design and engineering domain. And if it's experience that you require, Autodesk is at the top of the list. Of the top 10 PC software companies, only one other company (Microsoft) has been around longer than Autodesk. Autodesk is also

Ninety-eight percent of Fortune 500 businesses and 100 percent of Fortune 100 businesses use Autodesk software.

a leader in education, with more than two million students trained on Autodesk products each year. This means that you have access to an unlimited pool of resources already trained on Autodesk technology.

A Manufacturing Focus to Build Your Solution

Regardless of your design and engineering needs, Autodesk's Manufacturing Solutions Division offers a family of software applications that help you get your products to market faster, with more innovation, and at a lower cost. In fact, Autodesk's manufacturing offerings are unique in the industry. With both 3D and 2D mechanical engineering, electrical engineering, data management, and collaboration software to extend your data beyond the engineering department, Autodesk provides all the tools required to define your full product model and maintain it throughout its lifecycle.

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Tools for Design and Engineering

Take better products to market faster and for less cost with powerful 3D design technology—Autodesk Inventor Series. The cornerstone of the Series, Autodesk Inventor software is high-performance software for mechanical engineering and design that makes your design cycle faster and your product development more affordable. A simplified user interface, an advanced help and support system, and built-in migration tools for AutoCAD®

Autodesk Mechanical Solutions
<ul style="list-style-type: none">• Autodesk Inventor Series—Autodesk's flagship 3D design software• Autodesk Inventor Professional—task-specific applications for electrical and mechanical engineers• AutoCAD Mechanical—2D mechanical design and engineering software• VIA WD—productivity tools for 2D electrical design• AutoCAD—Autodesk's flagship 2D design product

software users make Autodesk Inventor the easiest 3D mechanical design software to learn and use. Also, Autodesk Inventor provides the industry's best DWG compatibility to help bring your existing 2D AutoCAD digital design data forward quickly and easily to 3D. Lastly, with innovative shape description capabilities driven by the ShapeManager kernel, industry-specific tools, and proven large-assembly performance, Autodesk Inventor software offers superior productivity to help turn your product development process into a competitive advantage.

Moving from 2D to 3D can be difficult, especially in times of economic uncertainty. However, Autodesk Inventor Series reduces the risk of that transition. Not only does the Series include Autodesk Inventor software for 3D design and documentation, the Mechanical Desktop® component also includes the functionality of AutoCAD® Mechanical, the purpose-built 2D mechanical software based on the AutoCAD

platform. This helps you make the transition to 3D at your own pace. Whether 3D or 2D design is the best fit for a project, Autodesk Inventor Series provides the software required to get the job done. This is a claim that competitors such as SolidWorks cannot make. Implementation of SolidWorks requires an immediate move to 3D in order to begin to see a positive return on investment (ROI). Such a disruptive move can be risky if not managed properly.

Organizations moving to 3D often invest in a phased implementation. During this implementation, many users continue to work in 2D while others move to 3D. The 2D functionality in the Autodesk Inventor Series

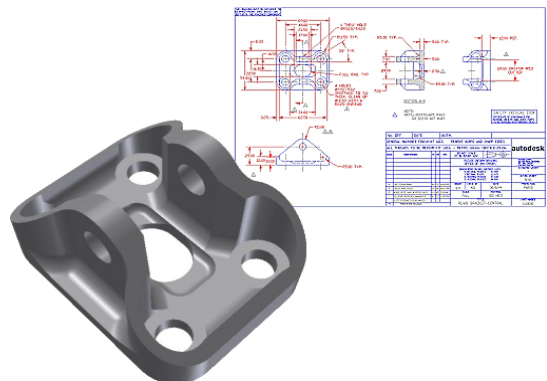
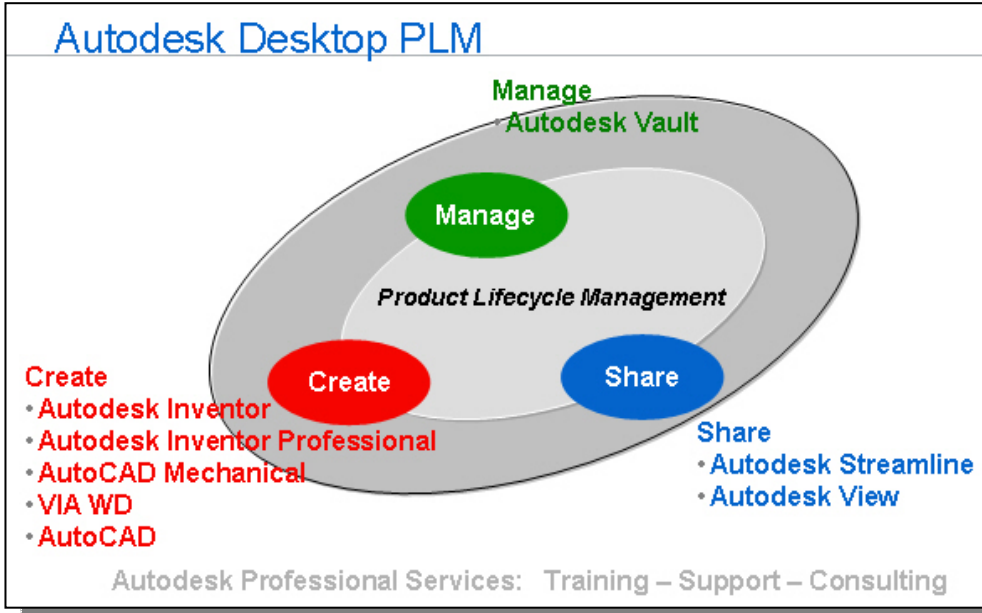


Figure 3: Autodesk Inventor Series offers a risk-free migration path to 3D.

provides productivity gains and reduces errors for the divisions and teams who remain on 2D. Because the software provides 2D users with associative production drawing and detailing functionality, as well as standards-based 2D content, 2D remain productive, reducing time to market. SolidWorks, on the other hand, does not offer anything to increase productivity and reduce errors for 2D users during the phased implementation of 3D. With the Autodesk Manufacturing Solution, you can recognize immediate benefits companywide.



Another solution in the Autodesk portfolio is Autodesk Inventor® Professional. This software is built for mechanical and electro-mechanical engineers who need to increase their productivity when designing, validating, and documenting complex products. This process automation software product is built on Autodesk Inventor Series and includes a collection of process enhancement tools for tubing and piping

Figure 4: Autodesk Manufacturing Solutions Division’s Desktop PLM: create, manage, and share your digital design.

design and Printed Circuit Board (PCB) translation. This helps you rapidly develop a complete 3D model of your product, thereby reducing time to market and increasing product quality. Unlike competitive offerings from Dassault’s SolidWorks, which require a confusing assortment of add-on modules, Autodesk Inventor Professional provides a single integrated, simple-to-deploy solution at a high-value price.

With Autodesk Inventor Professional you can minimize design errors and reduce costs by using a 3D model instead of a prototype to ensure that all parts fit. By using the full product model, you can communicate all aspects of the design, provide downstream users with easy access to a complete data set, and ensure that design changes are reflected throughout the entire process and for all users.

Nearly every machine has some sort of electrical controls and automation to ensure efficient operation. If your designs include PLC I/O, motor control, or discrete electrical control components, then VIA Wire Diagramming (VIA WD), by Autodesk, can save you time and improve drawing accuracy. VIA WD software’s fast schematic generation, automatic wire numbering and component tagging, smart panel layouts, automatic reports, and real-time coil and contact cross-referencing are unmatched in the industry. In fact, the software’s ability to automatically create PLC I/O drawings from spreadsheets is often enough justification for electrical engineers to select Autodesk as their strategic partners.

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SolidWorks, on the other hand, lacks a real electrical schematic and diagramming solution. In fact, SolidWorks turns to Microsoft® Visio for electrical diagramming-like functionality, at additional cost. Visio offers generic, all-purpose diagramming functionality; however, it does not provide the high-impact productivity tools that VIA WD offers for electrical design.

Tools to Manage Data

Autodesk® Vault software, a powerful workgroup data management system integrated with Autodesk Inventor 7, is available at no additional cost to Autodesk® Subscription Program members for Autodesk Inventor Series 7 and Autodesk Inventor Professional 7. Simple to set up, use, and maintain, Autodesk Vault can help you decrease your product development cycle and improve the engineering team experience in several key areas.

First, your data is protected in Autodesk Vault with secured access management for real-time check-in and check-out of project data. With a secured vault, users no longer overwrite each other's work: all data is retained. Users are informed when a team member is working on selected areas of the project, simplifying design collaboration. Second, Autodesk Vault tracks relationships between files in the vault regardless of their type—Autodesk Inventor, Microsoft® Word, Microsoft Excel, AutoCAD, FEA, CAM, and more.

Another benefit of Autodesk Vault is its ability to manage file versions, preserving multiple design states and history. With the Autodesk Vault Explorer, an external vault management tool, you can navigate between earlier versions, comparing changes or reviewing earlier designs. Version management enables users to design conceptually with what-if scenarios, providing the ability to switch between design alternatives. In addition, you can use Autodesk Vault to roll back previous versions, making them active for engineering and manufacturing.

Work efficiently and easily with the entire design chain by publishing your files to the Autodesk Streamline®, a hosted online collaboration service for the manufacturing industry. Once you are ready to collaborate externally on your design, Autodesk Vault can write design information directly to Autodesk Streamline for reuse. Your data structure is published, and your components and assemblies are available for viewing, redlining, and design collaboration with vendors.

Autodesk Vault is simple to install and set up. Whether you want to install a vault on a peer-to-peer network, workgroup, or single workstation, Autodesk Vault is flexible enough to operate on networks of any size. Because the software automatically adapts to your environment, you don't have to spend time configuring it. In addition, the simple architecture of Autodesk Vault does not require a dedicated server or special hardware. And because it is based on Microsoft® SQL Server 2000, Autodesk Vault is scalable and robust.

Tools to Share Data

Share your digital design data instantly, accurately, and for less cost with the Autodesk hosted project collaboration service for the manufacturing industry. The Autodesk Streamline service provides value throughout the product lifecycle by extending the power of collaboration to your vendors, partners, and even your customers. You can publish design content and extend your reach into new environments and

Autodesk Vault

- **Designed to protect and secure your data**
- **Manages all your design files, regardless of file type**
- **Installs easily, no complicated deployment required**
- **Retains previous versions of your design**
- **Collaborate using Autodesk Streamline publishing**

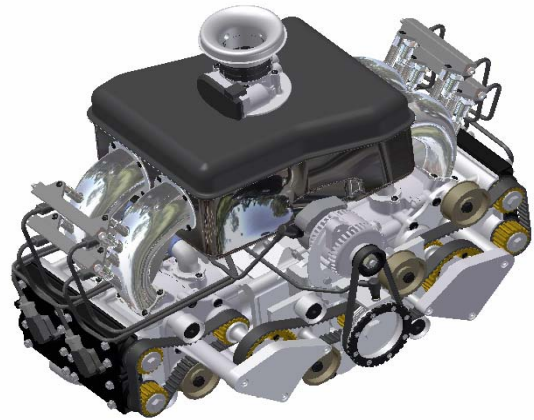
"...Autodesk Streamline helps you share design and project data with anyone who needs it – anytime, anywhere..."

global markets.

Autodesk Streamline helps you share design and project data with anyone who needs it—anytime, anywhere. With access to a secure online project management environment that connects your entire virtual enterprise, you can define and organize projects and groups of projects, invite different project members to each project, define access rights, set up discussion threads, and automate email notifications such as file updates to project members.

The Autodesk Streamline service automates the data publishing process, supporting 3D CAD models and 2D CAD drawings, as well as other data types such as Word and Excel documents. In fact, through its publishing utilities Autodesk Streamline supports data from several CAD platforms, including Autodesk Inventor, Autodesk Mechanical Desktop, AutoCAD, and Pro/ENGINEER® software. Once a model or drawing has been saved to an Autodesk Streamline site, it doesn't need to be saved again unless the original design changes. Because team members receive streaming design data as they need it rather than downloading actual CAD files, the data remains intact. This eliminates worries about data integrity and project members working on inconsistent versions. Autodesk Streamline also provides the ability to integrate with Autodesk Vault—so small workgroups can publish design data to external team members on your Autodesk Streamline site anytime a new version of a part, assembly, or drawing is checked into the vault, ensuring that all data is up-to-date.

Project team members need design information for many different purposes, often placing irreconcilable pressures on the designer. Autodesk Streamline technology doesn't require the designer to do any additional work, no matter how many different uses the team has for the data. Once it's published to the Autodesk Streamline site, design information is displayed in a form that is meaningful to each member of the extended team. For example, a procurement specialist may view a 3D model and parts list, while the assembler on the shop floor might view drawings as well as a 3D assembly view and parts list.



SolidWorks offers no project-hosting solution similar to Autodesk Streamline. In fact, SolidWorks often positions a viewer, eDrawings, against the Autodesk Streamline project hosting service. Although eDrawings appears to be a solution, it is merely a viewer, without any project-hosting functionality found in Autodesk Streamline. First, eDrawings is an email-based application, meaning users must email files to one another. Although this sounds easy, a closer look reveals limitations and project management issues. When data is saved from SolidWorks to an eDrawings format and emailed to someone, the person receiving the data has no way to know if that information is still current. Any changes to the design could cause problems downstream.

SolidWorks does not offer a project hosting solution similar to Autodesk Streamline.

Second, drawings in the eDrawings format do not contain metadata. Metadata is the nongeometric intelligence in a CAD file, such as a bill of materials (BOM), and engineering data, such as the component designer, material, and cost. It is the intellectual property stored in

the CAD file. Because eDrawings is a viewer, it can only view SolidWorks data and AutoCAD data from older releases. In fact, eDrawings does not support viewing of other document types, such

as Word, Excel, and PDF files, making it difficult to communicate and share all the data related to your products.

Autodesk Certified Applications to Complete the Solution

The Autodesk Manufacturing Solutions Division works with select independent developers to provide complete manufacturing solutions. In fact, Autodesk has initiated a new certification program for third-party applications—the Autodesk Inventor® Certified Application program. Partner products bearing the Autodesk Inventor Certified Application logo provide the highest level of interoperability by ensuring that product development is based on the Autodesk Inventor API (application programming interface). Certified products have met the strict guidelines and testing criteria established by Autodesk, which means they are high quality, easy to use and up-to-date.

“The number of partnerships that Autodesk has developed is a direct result of superior products and focused business management.”

Autodesk supplies several different mechanisms for integrating with Autodesk Inventor software and allows for many different types of third-party applications such as computer aided manufacturing (CAM), analysis, and configure-to-order software. Autodesk Inventor Certified Applications use the proper APIs and incorporate the latest updates, service packs, and releases of Autodesk Inventor. Two key strengths of Autodesk Inventor are ease-of-use and its familiar user interface. Autodesk Inventor Certified Applications use the extensible user interface and style guidelines in the Autodesk Inventor application. Independent developers must certify to Autodesk that their applications do not have interoperability problems with the Autodesk Inventor program. All



Autodesk Inventor Certified Application developers provide technical support and training to users.

Today, the Autodesk website lists 52 certified software or hardware applications for Autodesk Inventor. And the number of partner applications continues to grow at a rapid rate. Clearly, the success of this partner program demonstrates Autodesk’s leadership position in the marketplace.

Figure 6: The Autodesk Inventor Certified Applications Program offers many different types of third-party applications.

The number of partnerships that Autodesk has developed is a direct result of superior products and focused business management.

In contrast, SolidWorks’ website lists only 45 Gold Partners in their Gold Partner program, 13 of which are developed by Dassault itself, SolidWorks’ parent company. If you remove these from the list and compare “apples to apples,” SolidWorks’ Gold Partner program begins to look anemic. Further, the Autodesk Inventor Certified Application program is designed for all types of applications, whether they work in-the-window or not. Autodesk tests and evaluates all applications internally and provides better coverage of key areas with more applications. SolidWorks Gold Partner program limits its third-party affiliates to developing applications that must work in-the-window. This means that all of the best-in-class out-of-window applications

cannot offer the same high quality and integration as those in their Gold Partner program, restricting the program's potential.

Services and Training: The Key to Success

Whatever your business, you face constant change, fierce competition, and customers who demand more. Choosing the right products is only part of the story. You need complete solutions that implement those products for maximum competitive advantage. Autodesk Authorized Resellers, Autodesk Authorized Systems Centers, the Autodesk Training Center (ATC®) network, and Autodesk Professional Services can help you get started quickly and effectively with your new Autodesk software by providing assistance and direction so that you can meet your business goals and objectives.

There are over 2,100 Autodesk Authorized Resellers and Autodesk Systems Centers worldwide, as well as more than 1,100 ATC locations. These certified partners have an excellent reputation and many years of experience. Autodesk's network of partners knows how you work today and can provide the consulting and support services you need. These partners and Autodesk consulting professionals can work with you to build custom services, including product configuration, project management, technical solution design, application development, and system integration.

Autodesk partners and consulting professionals can work with you to build custom services to meet your specific consulting needs.

Solutions Case Study: Joy Mining

The underground mining machinery division of Joy Global Inc., a leading worldwide mining machinery and services company, standardized on Autodesk Inventor 3D mechanical software for the design and manufacture of its high-quality mining equipment to achieve faster turnaround and better communication among its internal teams, customers, and external vendors. Joy Global, which purchased two hundred licenses of Autodesk Inventor Series software for use by its Joy Mining Machinery division in the United States, United Kingdom, South Africa, and Australia, had been using five different CAD systems. Moving to a single design system, Joy Mining Machinery turned to Autodesk's manufacturing solutions for significant improvements in

Joy Mining is working with Autodesk Professional Services and its business partners around the world to provide training and support and to solve technical challenges.

productivity and the ability to share design data across the division, as well as a reduction in the high costs associated with maintaining multiple software licenses. Joy selected Autodesk Inventor software to shorten time to market, help ensure design accuracy, reduce costs, and better serve customers. In addition, Joy Mining is working with Autodesk Professional Services and its business partners around the world to provide training and support and to solve technical challenges.

The mining industry is vital to the health of the world economy. For example, more than 50 percent of the electricity generated in the United States comes from coal-fired power plants. A company that prides itself on helping customers deliver mineral and energy resources

that are efficiently and carefully extracted to meet the requirements of the world's economy, Joy Global is turning to Autodesk for its cutting-edge technology that promises to help them accelerate design time, reduce production errors, and speed products to market.

"Autodesk Inventor software's power and simplicity allows engineers to go back to being engineers, not just CAD experts. We're already feeling the benefits of the software's ease of use,

short learning curve, accuracy, and adaptive modeling capabilities,” said Tim Morris, director of Global Engineering Systems at Joy Mining Machinery in Franklin, Pennsylvania.

Autodesk Inventor Software Enables Design Reuse and Collaboration

In the mining industry, much of the design data that goes into building the complex machinery is reused in other designs, instead of starting from scratch for each project. For this reason, Joy Mining Machinery needed a CAD system that would enable it to easily modify and reuse design information. Using Autodesk Inventor software, Joy can use a single machine design, modify parts, and improve the overall design or change it into something altogether different. The software facilitates this process by enabling the Engineering Department to modify designs, test new part movement, and create accurate instructions and AVI files for manufacturing and assembly. Previously, the Engineering Department provided the Manufacturing Department with a packet of 2D drawings for 3D assembly.

In addition to Autodesk Inventor software’s design advantages, Joy is seeing increased collaboration between its internal teams and outside vendors. Because most of the machining, casting, and forging companies that Joy works with also use Autodesk software, Joy can easily exchange designs for faster turnaround and better communication. The company can better communicate with its vendors to help ensure that the right part is created the first time and money is not wasted.

Taking collaboration to the next level, Joy is evaluating the Autodesk Streamline online project collaboration service to facilitate product configuration on-site for customers. This will enable sales representatives to build a model of a mining machine on their laptops with Autodesk Inventor software and provide an immediate price quote for the customer.



Figure 7: Joy Mining Machinery has turned to Autodesk’s Manufacturing Solutions Division to help them reduce costs, improve productivity, and collaborate more effectively.

“As a leading manufacturer of equipment and supplier of aftermarket support for the extraction of coal, copper, iron, gold, and other mineral resources, Joy Global’s products have a worldwide impact,” said Robert Kross, vice president of the Manufacturing Solutions Division at Autodesk. “The company needs a technology-based solution that not only helps them build the best products in the world for their industry, but helps them cut expenses to remain efficient and profitable.”

Consulting Services

To ensure success with the Autodesk Manufacturing Solution, Autodesk reseller INCAT is helping Joy Global create standards and procedures that it can use in all international locations to create work uniformity. When new jobs arise, Joy Global has the flexibility to move the project to another location where more resources are available. Their local Value Added Reseller, INCAT is also teaching best practices, helping with the Autodesk Streamline services, and researching translators to convert Joy Global’s existing files to Autodesk Inventor software.

Why You Should Partner with Autodesk

"We help manufacturers and their suppliers to optimize their product creation process," said Ron Gallentine, senior account manager at INCAT in Atlanta, Georgia. "For Joy Global, we've created standard libraries and procedures so that they can work more efficiently and productively."

Conclusion

Founded in 1982, Autodesk is your best choice in a business partner. We are financially stable; we have over 20 years of experience and are growing our market share in the manufacturing segment while our competitor's business continues to decline. With over 5 million customers we are the world's leading design software and digital content company. More specifically, Autodesk's Manufacturing Solutions Division offers powerful, easy-to-use, and affordable solutions. When coupled with the strength of our partner applications, services, and training, we help our customers get their products to market faster, with more innovation and at a lower cost. By partnering with Autodesk, you can create, manage, and share your digital data throughout the lifecycle of your projects. We can help make your product development process a strategic advantage.

**Autodesk is the best choice
in a business partner.**

**We are financially stable;
we have over 20 years of
experience and growing
our market share.**

For more information about Autodesk, our products and services, visit us at:
www.autodesk.com/inventor.

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