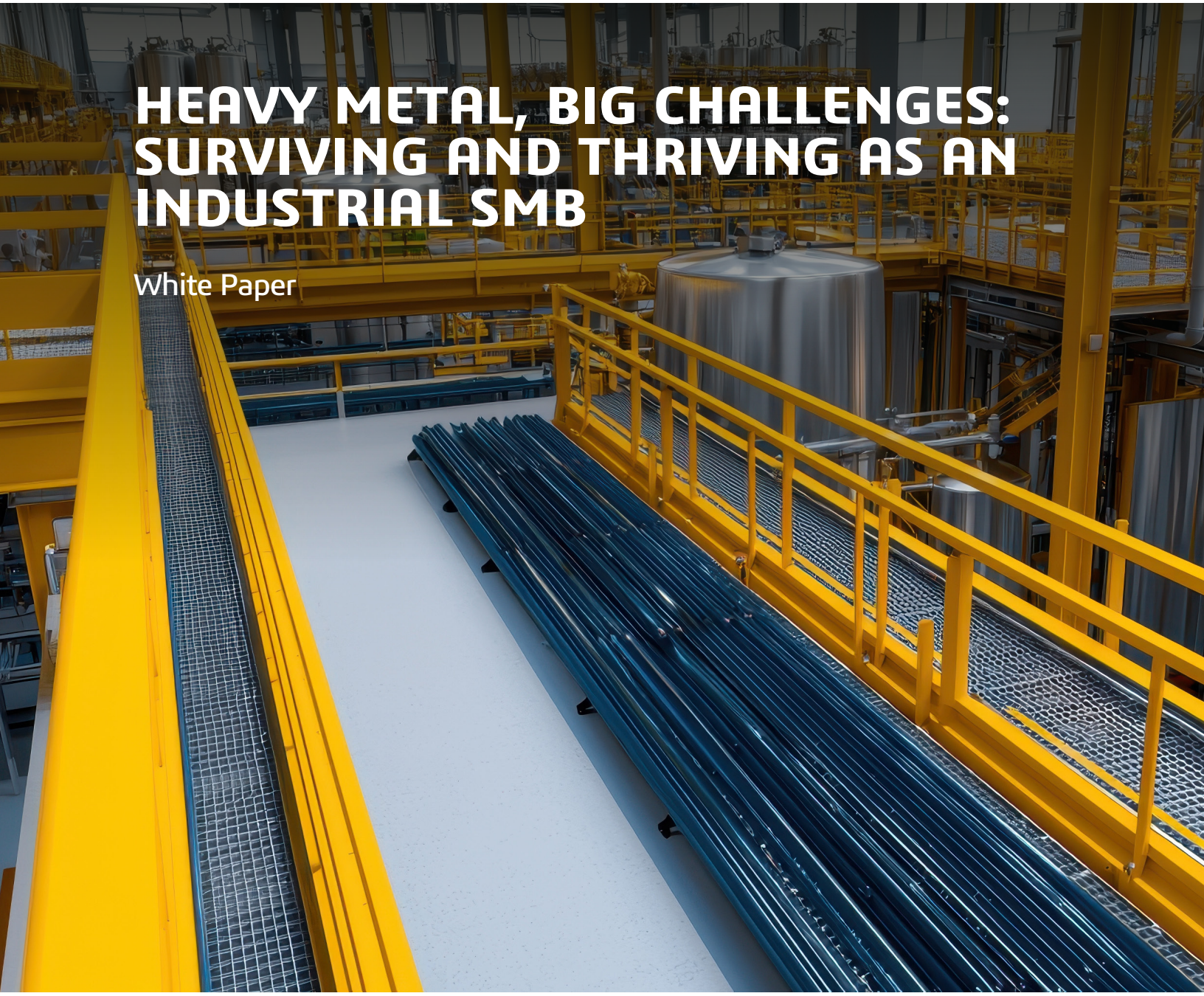
SOLIDWORKS

3DEXPERIENCE®



HEAVY METAL, BIG CHALLENGES: SURVIVING AND THRIVING AS AN INDUSTRIAL SMB

White Paper

DASSAULT SYSTEMES

EXECUTIVE SUMMARY

Small and medium-sized businesses (SMBs) in the industrial equipment sector are facing a complex mix of challenges, including rising operational costs, unpredictable supply chains, and a severe shortage of skilled labor. Reliance on reactive management and costly trial-and-error processes is no longer sustainable. A single misstep in facility layout can lock in up to 70 percent of operational costs, reducing both flexibility and profitability for years.

Labor constraints and volatile material markets further magnify the risks of every decision, increasing the potential for inefficiency and lost return on investment (ROI). To break this cycle, SMBs need advanced digital platforms that let them validate designs, optimize facility throughput, and forecast the true impact of changes before any physical production work begins.

SOLIDWORKS Manufacturing Solutions, deployed from the **3D**EXPERIENCE platform, empower industrial SMBs to move from risky physical trial-and-error to a model of digital certainty. By building accurate digital twins—data-rich, operational models of your workflows and facility—you can simulate proposed layouts, test automation strategies, and assess process changes before spending on physical updates.

This digital-first approach enables you to forecast ROI, identify bottlenecks, and quantify the true impact of every decision—all in advance. With SOLIDWORKS Manufacturing solutions, you don't just plan for change—you validate each step for measurable business value before anything is built.

This white paper explores the most pressing industrial SMB challenges and demonstrates how SOLIDWORKS Manufacturing Solutions enable you to move beyond uncertainty. By adopting a digital-first approach focused on certainty and resilience, you gain the tools to minimize risk, strengthen operational decisions, and guarantee every investment delivers measurable value. SOLIDWORKS Manufacturing Solutions put you firmly in control, equipping your business to adapt, thrive, and build a future based on trust in your data—not chance.

THE CHALLENGES FOR INDUSTRIAL SMBS

Industrial SMBs are contending with a new industrial reality marked by tightening skilled labor markets, unpredictable supply disruptions, and continual cost pressures. An aging workforce is driving retirements faster than new talent can be recruited, while younger workers are drawn by the advantages larger employers offer and by a lack of accessible talent pipelines. Simultaneously, material shortages and global trade uncertainties push many smaller manufacturers into a cycle of overstocking to avoid line shutdowns—an approach that ties up vital cash and storage with no guarantee of supply stability, or leaves them exposed to costly production halts.

In this landscape, the stakes for operational decisions have never been higher, and improvisational strategies or gut instinct are no longer adequate. Digital strategies—especially the adoption of digital twins and virtual factory simulation—are now essential for risk mitigation. By digitally replicating facilities and workflows, SMBs can model dependencies, test production scenarios, and analyze the true impact of process changes—all before making a single expensive move in the real world. Virtual factory simulation provides the operational certainty needed to navigate today's volatility, helping businesses catch layout mistakes, optimize inventory, and build resilient operations that don't rely on chance.

This operational volatility means every decision carries lasting consequences—and there's no room for error. Research consistently shows that up to 70 percent of a facility's operational costs are locked in once the layout is finalized, making early missteps extremely costly to reverse. Relying on patchwork solutions or past experience isn't enough. Digital transformation, especially the adoption of digital twins, is now central to risk mitigation and ongoing improvement.

Digital twins let manufacturers validate changes in a virtual environment, forecasting both risks and benefits before any physical commitment. By shifting critical planning work to the digital space, teams can continuously test, refine, and improve processes, ensuring each operational decision is based on data and operational physics—reducing risk, driving efficiency, and increasing overall business resilience.

The manufacturers leading the way are those leveraging digital twins and advanced simulation tools to build operational certainty into every decision. By creating a digital twin of their facility, manufacturers can virtually model workflows, analyze dependencies, and test changes in a risk-free environment before taking action on the shop floor. Digital twins transform operations from guesswork to science, letting teams apply real-world operational physics to proposed changes, uncover bottlenecks, and accurately quantify the impact of process adjustments.

This data-driven approach supports better decision-making and significantly reduces the risk of costly errors. Visual simulations foster alignment across teams and leadership, making it easier to secure support for improvement initiatives. Today, adopting digital twin technology isn't just an upgrade—it's the new baseline for rigorous risk mitigation, continuous process optimization, and long-term resilience in an industry where every move counts.



THE SKILLED LABOR GAP AND BRAIN DRAIN

The skilled labor shortage represents a critical pressure point for industrial SMBs. As experienced welders, machinists and technicians retire faster than the next generation enters the workforce, shops face widening gaps in their most important roles. Many SMBs can't compete with the compensation and advancement potential at large manufacturers, making it even harder to attract and retain tech-savvy talent. This shortage translates to measurable productivity loss—such as a master welder spending 45 minutes each shift searching for material because of an inefficient shop layout or manual process.

SOLIDWORKS Manufacturing Solutions address this challenge by providing organizations with advanced digital tools to analyze workforce allocation and overall workflows. By building and simulating a data-rich digital twin of your facility, you can pinpoint every manual or repetitive task, identify sources of lost productivity and test new labor strategies virtually before making a real-world change. These digital insights empower you to allocate your team where their skills drive the most value, streamline process handoffs and avoid introducing bottlenecks when making adjustments. By moving workforce decisions out of the guessing phase and into a digitally validated environment, SOLIDWORKS Manufacturing Solutions ensures your existing talent delivers maximum impact—helping you maintain output and shop efficiency as labor constraints intensify.

SOLIDWORKS Manufacturing Solutions address this challenge by providing advanced digital tools that support in-depth analysis of workforce allocation and operational flow. By creating a comprehensive digital twin of your facility, you can map every manual and repetitive task, identify sources of wasted movement, and test different labor allocation strategies before implementing them in the real world.

This digital-first, lean approach reveals inefficiencies that drain productivity—such as non-value-added steps or underused skills—and enables you to redeploy staff to roles where human expertise delivers the greatest return. As a result, SOLIDWORKS Manufacturing Solutions empower your team to optimize throughput and maintain productivity, even as experienced labor becomes scarce.



THE HIGH COST OF AUTOMATION AND TECHNOLOGY ADOPTION

Upgrading with automation and advanced technology is essential for growth, but without detailed, data-driven planning, these investments often miss the mark—sometimes with lasting consequences. For industrial SMBs, the upfront costs of robotics, AI, and smart tools must be offset by a clear strategy that explains how new equipment will fit within existing workflows. Too often, automated assets end up underused or idle because the supporting processes can't deliver materials, parts, or labor at the right pace. The result: a robotic arm waiting for parts, expensive machines running below capacity, or a new oven creating bottlenecks instead of increasing throughput. These scenarios are common when facilities skip rigorous planning or rely on physical trial-and-error methods.

Digital twins solve these challenges by enabling precise, virtual modeling of your facility and processes before any physical investments or changes are made. With a data-rich digital twin, you can simulate how automation will integrate with your entire operation, spot risks of underutilization, and optimize the full production flow in advance. This approach not only safeguards capital investments—it ensures automation is deployed where it drives measurable value and leads to sustainable gains in efficiency and productivity.

With SOLIDWORKS Manufacturing Solutions, you gain an advanced digital twin platform that enables risk-free testing and validation before any changes are implemented on your shop floor. You can build an exact, data-rich model of your facility and workflows, then simulate equipment placement, material flow, and automation scenarios to uncover bottlenecks and optimize system performance. Every process can be adjusted and evaluated virtually, so you identify and resolve issues up front—long before they can disrupt production.



This level of precise modeling and operational simulation ensures that capital investments are justified with clear, physics-based evidence, allowing you to move forward confidently and maximize ROI with every modernization decision. The results are measurable: up to 25 percent improvements in new equipment efficiency for customers using SOLIDWORKS solutions. This approach lets you make informed, confident investments, ensuring every dollar aimed at modernization truly advances your productivity and doesn't inadvertently lock you into costly mistakes.

SUPPLY CHAIN VULNERABILITIES AND COMPONENT SHORTAGES

Global supply chain volatility creates ongoing risk for industrial SMBs—sudden shortages, shifting lead times, and price spikes can disrupt even the most carefully managed operations. Smaller manufacturers lack the scale to buffer against these swings and often find that traditional responses, such as stockpiling inventory, tie up vital cash and facility space without eliminating uncertainty. In practice, overstocking can choke capital flow and create new inefficiencies, while failing to guarantee on-time delivery for customers.

SOLIDWORKS Manufacturing Solutions address this head-on by enabling digital analysis and optimization of material flow throughout your operation. By creating a precise digital twin, teams can model dependencies, simulate disruptions, and determine the real minimum inventory needed to keep lines running smoothly—even when external supply is unpredictable. Virtual factory tools let you test how the system will respond to shortages or sudden demand, empowering you to balance risk and operating cost with scientific accuracy. This targeted, data-driven approach moves you beyond reactive inventory strategies and positions your business to operate lean, agile, and resilient—no matter how volatile the global environment becomes.



SOLIDWORKS Manufacturing Solutions use digital twin technology to give you full visibility into your material flow and inventory strategy. By modeling your process in a virtual environment, you can accurately match inventory levels to real production needs, test the effects of supply disruptions, and identify where to reduce stock without increasing your risk. This lets you avoid overstocking and the cash flow problems that come with it—while ensuring your lines stay productive through supply volatility. SOLIDWORKS Manufacturing Solutions provide the clarity and control to optimize inventory, reduce risk, and confidently keep your operation moving despite external uncertainty.

This shift delivers real outcomes. Customers leveraging SOLIDWORKS solutions have achieved greater inventory turnover and reduced working capital requirements, all while strengthening their capacity to weather supply disruptions. With up to 70 percent of a facility's operational costs fixed at layout finalization, optimizing inventory and material flow up front is critical. SOLIDWORKS provides the clarity and control you need to reduce inventory exposure, minimize risk, and keep production on track despite global uncertainty.

PROFITABLE SUSTAINABILITY AND COMPLIANCE

Mounting sustainability mandates and changing environmental regulations are pushing industrial SMBs to balance profitability with responsibility—often with fewer resources and limited margins. Traditional responses, such as overstocking inventory to guard against production interruptions, only raise costs and undermine compliance efforts. To succeed, manufacturers must improve efficiency across every stage of production while also meeting or exceeding environmental targets.

SOLIDWORKS Manufacturing Solutions make this possible by giving you a data-driven platform to test waste reduction, optimize resource use, and ensure quality before making physical changes. Digital twins allow you to virtually assess material flow, evaluate the impact of greener technologies, and verify your process adjustments meet both economic and regulatory requirements. Every improvement is first measured in a risk-free digital environment, so you can confidently drive sustainability, reduce scrap, and maintain compliance—delivering measurable benefits for both your bottom line and your environmental obligations.

SOLIDWORKS Manufacturing Solutions place digital twins at the center of your sustainability strategy. By creating a detailed virtual replica of your operations, you can rigorously analyze and refine processes to reduce waste, cut energy use, and minimize scrap—long before implementing changes on the shop floor. This approach lets teams test compliance strategies, validate environmental initiatives and quantify resource efficiency within a single, integrated digital environment. Every adjustment can be measured against regulatory needs and operational goals, ensuring improvements deliver both compliance and real bottom-line gains.

SOLIDWORKS Manufacturing Solutions turn sustainability from a regulatory hurdle into a distinct competitive advantage, helping you achieve ambitious targets for efficiency, quality and environmental responsibility while strengthening your position in a demanding market.

The financial case is clear: with up to 70 percent of operational costs fixed at layout finalization, getting sustainability and compliance strategies right the first time protects profits and accelerates your shift toward greener operations. SOLIDWORKS equips manufacturers to meet ambitious environmental targets, unlock efficiency, and maintain full compliance—transforming sustainability from an obligation into a tangible competitive advantage.



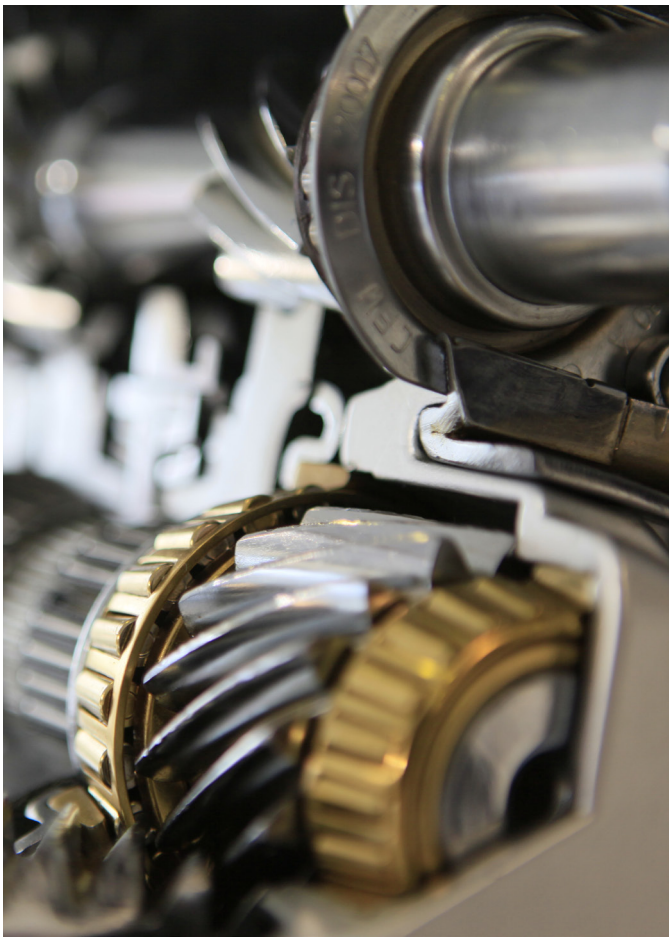
SCALE AND CAPITAL SQUEEZE

Scaling in today's industrial landscape means every investment decision carries more weight than ever. Upward cost pressures on materials, energy and labor, combined with restricted access to expansion capital, leave little room for error. With so much of your operational costs becoming fixed the moment a shop floor layout is locked in, recovering from a poor decision is both difficult and costly. For many industrial SMBs, that might mean living with inefficiencies and missed productivity for years.

SOLIDWORKS Manufacturing Solutions give your team a decisive advantage in this environment. By building and analyzing a highly accurate digital twin of your entire facility, you can rigorously model equipment layouts, material flows and process changes before any physical investment is made. What-if modeling lets you quantify the outcome of every scenario, remove risky guesswork and direct limited capital only where it drives clear, validated returns. With SOLIDWORKS Manufacturing Solutions, you base every scaling and investment move on operational data—not instinct—so your resources deliver enduring value and your business can adapt with confidence.

SOLIDWORKS Manufacturing Solutions give you a powerful digital twin environment that lets you validate every layout and workflow decision before investing a dollar in the field. By building a virtual replica of your facility, you can simulate and optimize layouts, workflow adjustments and process improvements under real operational conditions. This data-driven validation helps you avoid costly trial-and-error, quantify expected efficiency gains and provide clear proof of ROI for each capital investment.

Industrial SMBs using SOLIDWORKS Manufacturing Solutions report up to a 25 percent lift in new equipment efficiency after refining changes virtually—ensuring your resources are always directed where they'll have the most measurable impact. With this level of certainty, you can move from intuition to evidence-based decisions and make every investment with confidence.



SOLIDWORKS SOLUTIONS: ADVANCING THE VIRTUAL FACTORY

SOLIDWORKS Manufacturing Solutions provide a comprehensive platform for digital transformation, allowing industrial SMBs to convert physical operations into a complete, data-rich digital twin. This approach goes beyond basic layouts, enabling you to model the entire facility—including machines, workflows, operator activity, and process dependencies—with scientific precision. You can simulate plant layouts, test automation

and robotics strategies, and run "what-if" scenarios on any production change—all in a virtual space that reflects the true physics and constraints of your shop floor.

Whether validating CNC toolpaths, with Shop Floor Programmer, programming robots offline, or optimizing material flows, SOLIDWORKS Manufacturing Solutions let you analyze and improve every aspect of your manufacturing process in advance. This digital-first methodology ensures every decision is anchored in operational reality, significantly reduces the risk of costly mistakes, and unlocks the speed and confidence needed to thrive in today's rapidly changing industrial environment.

SOLIDWORKS Factory Simulation Engineer gives industrial SMBs the capability to model, simulate, and validate every aspect of shop floor dynamics with scientific accuracy. You can map and analyze operator workflows, identify process bottlenecks, and virtually assess throughput across every department.

SOLIDWORKS Robot Programmer enables Industrial SMBs to optimize and test complex robotic tasks—like arc welding or pick-and-place—entirely in the digital twin, ensuring collision-free operation and ideal cycle times without interrupting production. The suite's additive manufacturing capabilities enable teams to bring 3D printing directly into workflow planning, from model preparation to process integration. By supporting Advanced CNC programming, robot task simulation, and additive workflows within a unified digital environment, SOLIDWORKS Manufacturing Solutions empower you to design, refine, and deploy advanced automation strategies confidently, maximizing efficiency and reducing risk before physical changes are made.

This digital-first approach tackles every major challenge SMBs face:

- **Eliminate wasted labor:** Digital twins highlight non-value-added movement, helping you reclaim productive hours and redeploy staff with intent.
- **De-risk automation:** By running virtual "what-if" scenarios, you make sure new equipment will deliver targeted productivity without introducing fresh bottlenecks.
- **Streamline material flow:** Factory simulation enables you to right-size inventory, balance supply risk, and prevent cash from being tied up on the shelf.

The gains are measurable. Customers leveraging SOLIDWORKS solutions report significant increases in the efficiency of new equipment. Digital twin strategies eliminate layout guesswork. You back every capital investment with operational data, giving leaders and teams the evidence needed to move quickly and confidently.

With SOLIDWORKS, you don't just respond to challenges—you build a resilient, data-driven operation that's ready for the future.

DIGITAL SIMULATION AND FACILITY PLANNING

SOLIDWORKS Manufacturing Solutions support a comprehensive approach to digital twin creation, empowering industrial SMBs to build highly detailed, operational models that encompass 2D layouts, 3D CAD designs, and precise point-cloud scans. This means you can integrate every element of your operation—legacy equipment, new machinery and entire building structures—into a single, unified digital environment.

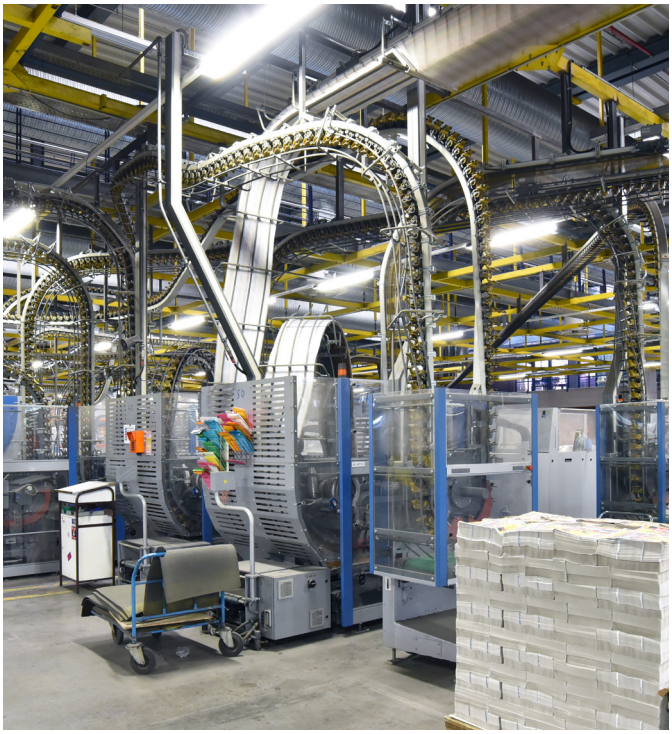
With the capacity to process large files and complex assemblies, SOLIDWORKS Factory Simulation Engineer delivers a true-to-life replica of your facility, regardless of scale or data source. This holistic modeling approach ensures you account for every operational constraint and interdependency, driving more accurate decision-making before you commit resources in the field. By transforming disconnected data and physical assets into a data-rich virtual factory, SOLIDWORKS Factory Simulation Engineer provides the clarity needed to proactively identify bottlenecks, optimize layouts and minimize risk.



THROUGHPUT OPTIMIZATION AND WHAT-IF MODELING

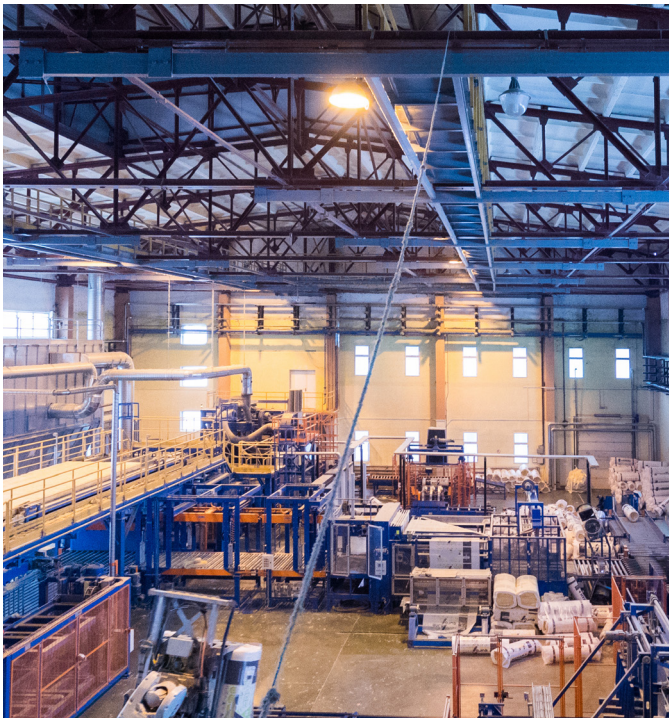
Throughput optimization and "what-if" modeling are central to minimizing risk and maximizing performance on every shop floor. SOLIDWORKS Manufacturing Solutions let you create a true-to-life digital twin, allowing you to dynamically simulate the flow of materials, resources, and personnel throughout your operation. You can quickly test the impact of new workflows, automation changes, or process improvements—adjusting conveyor speeds, adding quality checks, or reallocating labor and immediately seeing the consequences in real time. The software brings operational physics to every simulation, visually highlighting bottlenecks, idle resources, or cycle time constraints so you can resolve them before they impact production. This level of dynamic, visual modeling ensures you make decisions with clarity and confidence—removing the guesswork and compressing the cycle from idea to action.

This virtual approach matters because every layout decision locks in cost. Identifying choke points or inefficiencies after the fact is costly and disruptive. With every simulation, you strip away guesswork, accelerate improvement cycles, and maximize the impact of every dollar spent on process changes.



DECISION SUPPORT ACROSS THE ORGANIZATION

Securing executive buy-in and driving effective decision-making requires clarity and credibility that spreadsheets alone can't deliver. SOLIDWORKS Manufacturing Solutions solve this challenge by transforming complex operational data into clear, interactive visual simulations. Teams use these digital twins to demonstrate exactly how proposed changes—such as layout adjustments, automation investments, or workflow improvements—will play out in real time, under true-to-life production constraints.



Executives gain instant visibility into the projected outcomes of each scenario, seeing the impact on throughput, resource allocation, and cost structures before any physical changes occur. By bridging the gap between detailed engineering analysis and leadership priorities, SOLIDWORKS Manufacturing Solutions facilitates faster consensus, improves organizational alignment, and gives all stakeholders the confidence to move forward. This evidence-based approach accelerates buy-in for capital projects and strategic initiatives, replacing uncertainty with a shared understanding grounded in operational proof.

SOLIDWORKS Manufacturing Solutions transform shop floor complexity into visual evidence, equipping teams with the insight to demonstrate exactly how proposed changes will impact operations. Rather than relying on spreadsheets or speculation, you use intuitive, real-time simulations to show stakeholders the direct effects of shifting lines, automating tasks, or reallocating resources. This approach fosters alignment across teams and leadership by making the outcomes of every scenario clear—whether it's increasing throughput, reducing costs, or resolving hidden bottlenecks. The result is strategic certainty and faster, more confident decision-making, empowering your business to drive informed improvements at every level.

With SOLIDWORKS Manufacturing solutions and the **3D**EXPERIENCE platform, organizations can turn complex physics into visual evidence, making every proposed improvement defensible and clear. This unified, evidence-based approach elevates decision-making from speculation to strategic certainty, supporting faster, smarter growth and resilience throughout the business. It also helps boost new equipment efficiency, reduce time-to-productivity, lower working capital obligations, and increase resilience to operational disruptions.

NEXT STEPS

In today's demanding industrial climate, success requires more than workarounds and experience—you need digital certainty as the backbone of every decision. SOLIDWORKS Manufacturing Solutions, supported by the **3D**EXPERIENCE platform, let you move beyond guesswork by building a precise digital twin of your facility and workflows, empowering your team to predict, test, and validate each change before physical implementation.

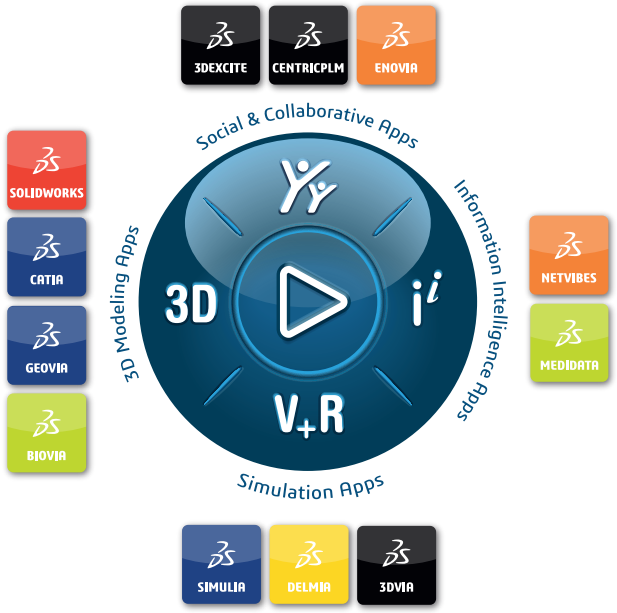
This data-driven approach transforms risk into opportunity, helping you optimize labor, control inventory, and maximize return on automation and capital with confidence. With SOLIDWORKS Manufacturing Solutions, challenges become gateways to growth—so you can drive smarter improvements, stay lean, and position your business for long-term adaptability and success.

Transition from physical trial-and-error to digital certainty. Use SOLIDWORKS Manufacturing Solutions and the **3D**EXPERIENCE platform to build your facility's future, improve throughput, and support smarter decisions at every stage of growth. Your operation becomes flexible, resilient, and ready for what's next in industrial manufacturing. Discover more about the SOLIDWORKS Advantage for Manufacturing here.

Our **3D**EXPERIENCE® platform powers our brand applications, serving 12 industries, and provides a rich portfolio of industry solution experiences.

Dassault Systèmes, the **3D**EXPERIENCE Company, is a catalyst for human progress. We provide business and people with collaborative virtual environments to imagine sustainable innovations. By creating virtual twin experiences of the real world with our **3D**EXPERIENCE platform and applications, our customers can redefine the creation, production and life-cycle-management processes of their offer and thus have a meaningful impact to make the world more sustainable. The beauty of the Experience Economy is that it is a human-centered economy for the benefit of all-consumers, patients and citizens.

Dassault Systèmes brings value to more than 300,000 customers of all sizes, in all industries, in more than 150 countries. For more information, visit **www.3ds.com**.



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