



DIGITAL INDUSTRIES SOFTWARE

# Embrace the power of the digital twin of machinery

Test and tweak your machine before it exists physically with  
Siemens Advanced Machine Engineering

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**SIEMENS**

Trend #1

## Disruptive influences

Geopolitical factors are upending supply chain and labor availability, driving the need for greater connectivity and transparency.



Trend #2

## Smarter machines

Changing customer preferences require adaptable machines, where integrated hardware, software and services rapidly meet demands in the moment.



Trend #3

## Business model changes

Industry 4.0 technologies and the need for self-sufficiency are reshaping businesses from product-centric, to solution-centric, sustainability-driven practices.



# Complexity, customization and connectivity

The complexity of today's markets forces you as machine builders to evolve from traditional "physical" product engineering to simulation-driven, digital product design. Consumers will increasingly demand a packaged system of integrated products and services that is customized to meet their individual needs.

Your customers have to respond to complexity created by consumer demands with extremely flexible, connected and adaptable machines, which in turn requires machinery that supports efficiencies gained through smart and connected machines via the Internet of Things (IoT).

Technology innovation leaders must adopt a mindset around new practices that embraces perpetual change. The change may be incremental or radical, and may be applied to existing or new business models and technologies.

Are you prepared for the challenge?

## Key drivers

- Consumer's increasing customization demands
- Order backlogs and procedural inefficiency
- Automated and integrated quality tools that outshine the competition
- A need for self-reliance, realized through sustainable, energy-efficient practices

# Be successful in the highly complex and dynamic machine engineering market with the digital twin of machinery, a powerful solution that is breeding the leaders in your industry



Siemens offers a complete and holistic framework to help you cope with the challenges of today's machine engineering market.

## The digital twin of machinery, by Siemens Advanced Machine Engineering

Advanced Machine Engineering (AME) is a digitally-enabled approach driving greater certainty in creating next generation machines.

Through this approach, machine builders gain a cloud-based digital twin. This holistic model provides greater design flexibility and improved requirements management in the development of smarter, connected machines.

The digital twin also ensures greater consistency in the design process; it automatically references customer requirements and updates design changes across any systems that are integrated to simulation software. It also reduces time to market via its virtual simulation and commissioning features.

These characteristics are vital for machine builders, who must innovate in a highly competitive global market.

### Early simulation to boost innovation

The trends we outlined above offer huge opportunities, but also serious challenges for machine manufacturers who have to manage changing customer requirements all while building machines every day that are smarter, more connected and more flexible.

As software is driving machines, its complexity is increasing significantly. It is essential to utilize cloud-based solutions and integrated engineering tools to collaborate, simulate and generate substantial dividends in time and resources.

This increasing complexity calls for smarter software solutions, too, and one of these smart solutions is virtual commissioning.

Virtual machine simulation and commissioning allow you to validate and verify your machinery or entire production plant in the virtual world before deploying it on the factory floor.

**50%** Faster time to production

**25%** Shorter commissioning phase

# Capitalize on digitalization and connectivity to thrive in the machine engineering industry with the digital twin of machinery



## Smart software validation with the digital twin of machinery

With the digital twin of machinery, you can source customer and industry requirements, then virtually test and tweak every minor detail or major change you wish to make to a machine. This is because the digital twin provides more than a 3D model – it is a comprehensive overview of a machine, where machine builders can simulate and test parts, components, actuators, materials and other fundamental design decisions.

Furthermore, the digital twin of machinery is powerful because it can eliminate the need for physical prototyping. Specifically, the digital twin's virtual commissioning features can help you validate the software code for programmable logic controllers (PLCs), human-machine interfaces (HMI) and supervisory control and data acquisition (SCADA) equipment, and reconfigure it against

changing customer requirements. It's ideal for testing and turning a machine on before it exists physically; this early validation happens in much less time, uses fewer human/material resources, and integrates all engineering domains in the development process. Thus, it is a holistic approach to developing a machine, and a key part of a modular product development strategy – where data can be reused across projects of a similar scope, helping machine builders scale and customize mass orders.

Siemens' Xcelerator portfolio empowers machine builders and suppliers with the essential tools to thrive in highly competitive markets. Learn how to transition out of outdated tools and create tomorrow's machinery today by demoing our software.

### What our customers say:

“We are very pleased with the discrete event simulation capabilities we have developed in Eisenmann throughout the years, especially our use of Plant Simulation,”

Sebastiano Sardo, senior vice president, Eisenmann Conveyor Systems.

“By working on the design, mechanical components and programming simultaneously, we can drastically reduce the time to market. In another project, this approach allowed us to save about 20% or two months,”

Erik Hjertaas, Tronrud Engineering.

# The digital twin of machinery in a nutshell



## Essentials:

- Upfront automation linked to machine behavior,
- Behavior model drives code generation,
- Closed-loop feedback visualization,
- User experience implementation.

## Benefits:

- Significant increase in speed to market,
- Substantial cost savings compared to physical testing and commissioning,
- Minimized risks as problems can be detected and solved early in the process.

## Challenges:

- Third-party equipment and tools integration,
- Robotic integrations,
- Logistics automation.

## What can you do?

Digitalize your entire design and manufacturing processes with an advanced machine engineering approach.

An advanced machine engineering approach lets you generate a holistic, cloud-based digital twin of machinery, so you can trace a machine from ideation through post-mortem.

Leverage the digital twin to improve machine performance, reduce errors and ensure quality.

All this will considerably reduce the complexity and time-to-market challenge of creating and implementing new machinery, giving you the competitive advantage you need in the market.

**Siemens Digital Industries Software** helps organizations of all sizes digitally transform using software, hardware and services from the Siemens Xcelerator business platform. Siemens' software and the comprehensive digital twin enable companies to optimize their design, engineering and manufacturing processes to turn today's ideas into the sustainable products of the future. From chips to entire systems, from product to process, across all industries, [Siemens Digital Industries Software](#) – Accelerating transformation.

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