

# Mechatronics Concept Designer

## Reducing the time to go from idea to real machine by up to 30 percent

### Benefits

- Get to market faster by reducing development time up to 30 percent
- Rapidly evaluate machine concepts in a virtual environment
- Enhance collaboration among mechanical, electrical and automation designers
- Build fewer physical prototypes

### Summary

Mechatronics Concept Designer brings teams together by facilitating the integration of engineering departments, including requirements management, concept design, mechanical design, electrical design and software/automation engineering.

### Solution

Mechatronics Concept Designer from Siemens PLM Software is specifically designed to speed up the concept design for machine tools. The software enables 3D modeling and simulation of concepts with multibody physics and automation-related behavior typically found in mechatronics products.

The solution supports a new approach for functional machine design. A functional decomposition serves as a common language between disciplines, enabling them to work in parallel from the earliest stages of product development. It also enables the re-use of existing designs.

Using Mechatronics Concept Designer enables you to accelerate development of products, allowing engineers from different departments to work in parallel, leveraging innovative techniques that help designers meet demands for higher productivity machines, shorter design times and lower costs.

### Challenges

The machine design process encompasses various disciplines and departments that are independent of one another, so sales, mechanical engineering, electrical engineering and automation face an abundance of challenges in trying to work together:

- Collaboration is limited because often the departments only interface with one another at major meetings and at the end of a project, making changes time consuming and costly
- To identify problems early in the conceptual phase, the machine should be simulated in advance. However, this can be quite difficult depending on the complexity of the machine. As a consequence, decisions are frequently made without having access to all of the necessary information
- Validation requires a complete prototype; however, this is costly and frequently one is not available until the very end

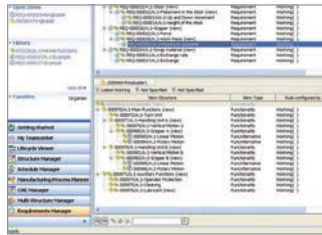
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## System engineering

### Leverage an intelligent function-based architecture

- Define mechatronic modularization
- Improve the configurability
- Trace and manage requirements
- Expand re-use of existing designs
- Organize and manage complexity

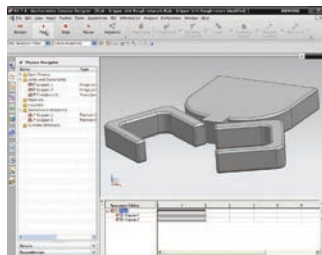


Stamping machine manufacturer: integrated requirements management provides the basis for our modular machine concept that results in the frequent re-use of market optimized components

## Concept design

### Create and validate mechatronic concepts

- Define operating sequences
- Evaluate timing
- Bring motion into computer-aided design (CAD) designs
- Generate a list of sensors and actuators
- Logically link events with signals
- Identify and specify critical details

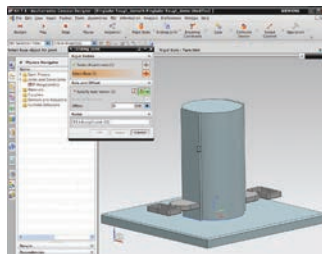


Turning machine original equipment manufacturer (OEM): reduce project risk by up to 40 percent by developing a concept model that supports sales with precise specifications and a live demonstrator for customers before anything has been built. What you simulate is what you will build.

## Detailed design

### Initiate detailed engineering

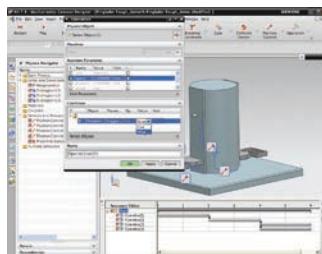
- Replace conceptual geometry by detailed design
- Install motors based on electrical part numbers
- Compare changes in MCAD and ECAD and update them
- Export to commissioning tools



Machine loading equipment manufacturer: consolidate your data by replacing more than 100 spreadsheets and Word documents with an integrated MCAD and ECAD automation workflow.

## Integrate detailed design

- Identify devices and assemblies in electronic computer-aided design (ECAD) and mechanical computer-aided design (MCAD)
- Cross-reference sensors and actuators with electrical devices and assemblies
- Exchange functional structures beyond the boundaries of ECAD and MCAD



Milling machine builder: expect to significantly reduce the number of iteration cycles in development through the implementation of ePlan and Sizer interfaces.

## Virtual commissioning

### Virtual startup without a physical prototype

- Simulate the real machine behavior, including programmable logic controller (PLC), computer numerical control (CNC), actors and sensors
- Re-use your 3D concept model for visualization and CNC program simulation
- Validate your production parameters and test your PLC program



Grinding machine OEM: reduce commissioning time on the shop floor by 80 percent (from three weeks to three days) with only a few days of preparation work in the early design phase.