

# Process Simulate Human

## Creating effective ergonomic studies for your plant's manufacturing systems

### Benefits

- Address manual material handling issues early in the design phase
- Improve communication between your ergonomics and process planning teams
- Include standards-based ergonomics compliance in your planning process
- Increase the efficiency of your manually operated workspaces
- Reduce launch cost and expedite launch schedules by finding human factor issues early
- Visually and quantitatively record best practices

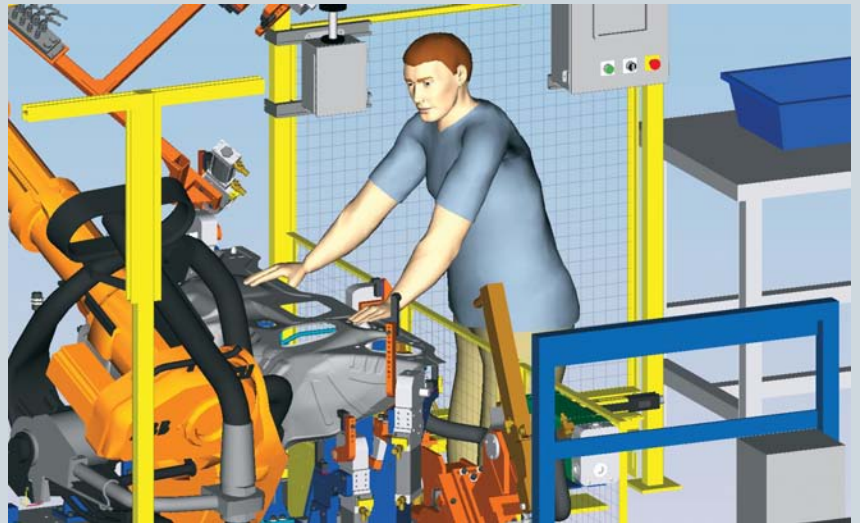
### Features

Modeling and simulation capabilities

- Realistic male and female human figures
- Broad set of international anthropometric databases for accurately representing your design populations
- Automatic stair and ramp climbing
- Posture prediction that considers force exertion requirements
- Automatic grasp and reach tools

### Summary

Tecnomatix® software's Process Simulate is the digital manufacturing simulation tool for developing and verifying process plans for your plant's manufacturing systems. Process Simulate Human is an add-on application that extends this functionality by enabling you to realistically simulate human tasks, assess human performance (e.g. to avoid injury) and create effective ergonomic studies. You can use Process Simulate Human to optimize the layout of your plant's work areas and validate the feasibility of manual assembly.



Process Simulate enables manufacturers to virtually develop and verify process plans for their plant's manufacturing systems in a 3D collaborative environment that can be shared by multiple engineering and manufacturing disciplines. Process Simulate is a major component in two Tecnomatix solutions:

- Assembly planning and validation
- Robotics and automation planning

# TECNOMATIX

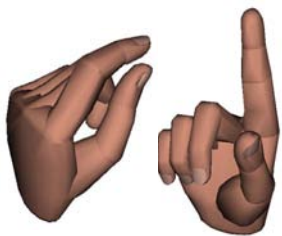
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# SIEMENS

# Process Simulate Human

## Features *continued*

- Extensive motion tracking and virtual reality support
- Full integration with Process Simulate functionality
- Human performance tools and capabilities
- Comprehensive set of in-depth human performance tools to evaluate strength, injury risk and timing
- Ergonomic analysis tools for NIOSH, OWAS, 3D Static Strength Prediction, low back analysis and RULA
- Ability to generate custom ergonomic reports
- Vision envelope creation
- Reach envelope creation
- Reach and grasp posture prediction
- Hand clearance and interference study capabilities



Process Simulate Human is an extension to Process Simulate that enables manufacturing planning teams to create realistic human simulations and conduct ergonomic evaluations. More specifically, your teams can use Process Simulate Human to:

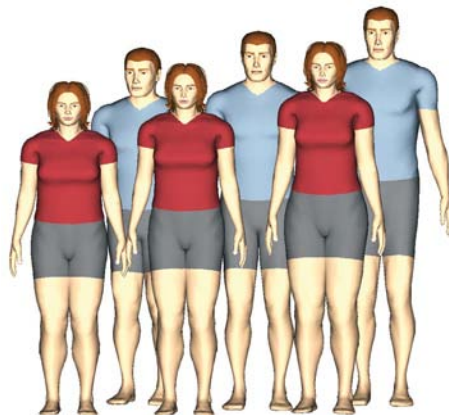
- Realistically simulate a plant's manual material handling tasks
- Predict human performance within the context of avoiding injury, optimizing the work area layout and validating the feasibility of proposed manual assembly tasks

## Using Process Simulate Human in a real-world scenario

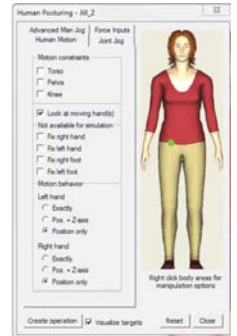
Manufacturing planning teams often use Process Simulate Human in the following way:

**1. Create a digital human** While working in your 3D Tecnomatix environment, you can select the size, shape and gender of your figure. In addition, humans can be represented wearing typical work attire, or exercise shorts/t-shirt for clearer view of anthropometric clearance evaluations.

Then, you can create your virtual human (manikin) by using data from one of many available anthropometric databases.



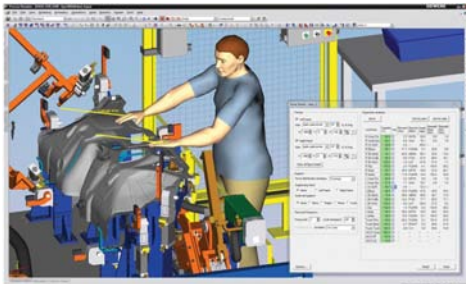
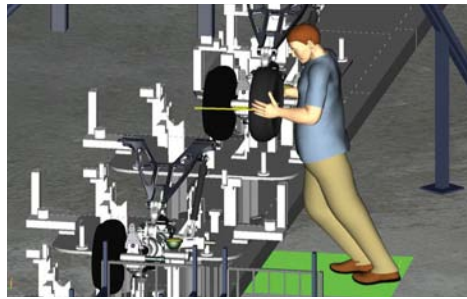
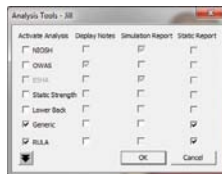
**2. Create human operations** Human operations are used to visualize individual postures or to create full task simulations. You can posture your manikin by leveraging various easy-to-use manipulation options, including the ability to predict whole-body posture and foot placement, automatically taking into account the effect of hand force exertions. Features such as automatic grasping, walk path planning and the ability to automatically climb stairs and ramps allow you to quickly have your human interact with its surroundings.



**3. Analyze human performance** To understand potential human issues associated with a task or workstation design, a broad list of human performance evaluation tools are available. You can assess physical demands with the NIOSH lifting equation, rapid upper limb assessment (RULA) and Ovako working posture analysis (OWAS) tools.

An Advanced Human add-on provides you with powerful tools. You can use a sophisticated low back model, that includes models of the torso musculature, to predict the risk of low back injury. The University of Michigan 3D Static Strength equations are available to evaluate potential strength issues associated with given tasks. A unique implementation of these equations within the ForceSolver tool allows you to find maximum acceptable task loads and forces, while accounting for task frequency, duration and population strength capability.

In addition to the human performance tools, Process Simulate Human allows you to analyze the time requirements of an operation using methods time measurement standards.



What if you have your own analysis tools? No problem! You can generate custom ergonomic reports in Process Simulate. Using this capability, you can access a wide variety of data involving the virtual human, including posture angles, joint loads and performance tool outputs. You can use all of these data to generate your own analyses, as well as format your own reports.

**4. Virtual reality** With the Motion Capture add-on module, you can use the movements of a real human to animate

the digital avatar within your Process Simulate environment. This capability enables you to experience your design first hand, quickly identify human factor issues and find alternative, improved processes and designs. Motion Capture provides interface drivers to a wide range of motion-capture hardware devices, including real-time whole body trackers and data gloves. You can save motions and re-use them for design or review purposes.

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