

Tecnomatix

Continental Automotive Systems

Continental uses ergonomic software to speed production planning for automotive assembly

Industry

Automotive and transportation

Business challenges

Reduce cycle time for layout and design of two new workplaces

Find solution for material supply process

Optimize safety, workplace flexibility and efficiency

Keys to success

Ongoing consultation with production planners and process operators

Availability of sound human performance tools within Tecnomatix and Jack for the analysis of workplace design

Results

Completed final simulation in two days, saving significant costs and time

Gained concrete values for risk assessment

Avoided otherwise undetectable errors

Determined optimal operator work zones or reach zones

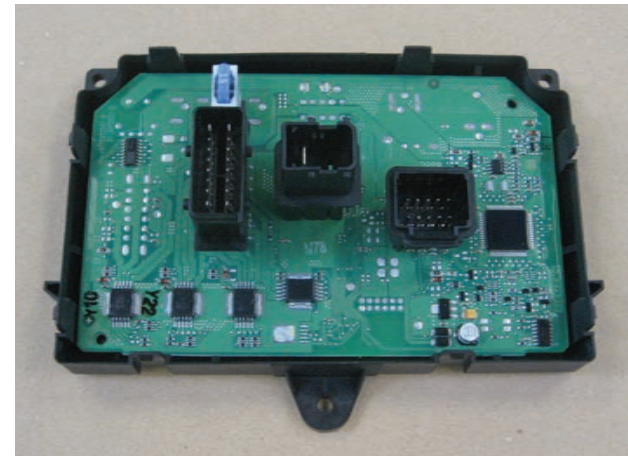
Tecnomatix speeds construction and lowers development cost, assures worker safety and production efficiency

Supplying electronics to a global automotive industry

Continental Automotive Systems started production in 1995 in the Czech Republic s.r.o. in Frenštát p. R. Today the company employs about 2,000 people, developing and producing electronic and mechatronic components for automotive producers around the world.

With rising orders, Continental sought solutions that would improve operating performance and business results while also improving necessary standards like worker safety and workplace ergonomics. The company chose Jack® software, an application within Tecnomatix® software – both from Siemens PLM Software – to help achieve their workspace objectives. Jack is a digital human model that resides within a virtual 3D environment to simulate workplace scenarios and their impact on the human body. Basic analyses include reach distance, grip, visibility and collision detection. More advanced features include biomechanical, ergonomic and working motion analyses.

Rear electronics control project prompts assembly challenge and opportunity
PSA (Peugeot, Citroen) contracted Continental to assemble the rear



Modules of the Peugeot 407 project. Rear electronic control unit is placed under the bodywork in the rear of the car.

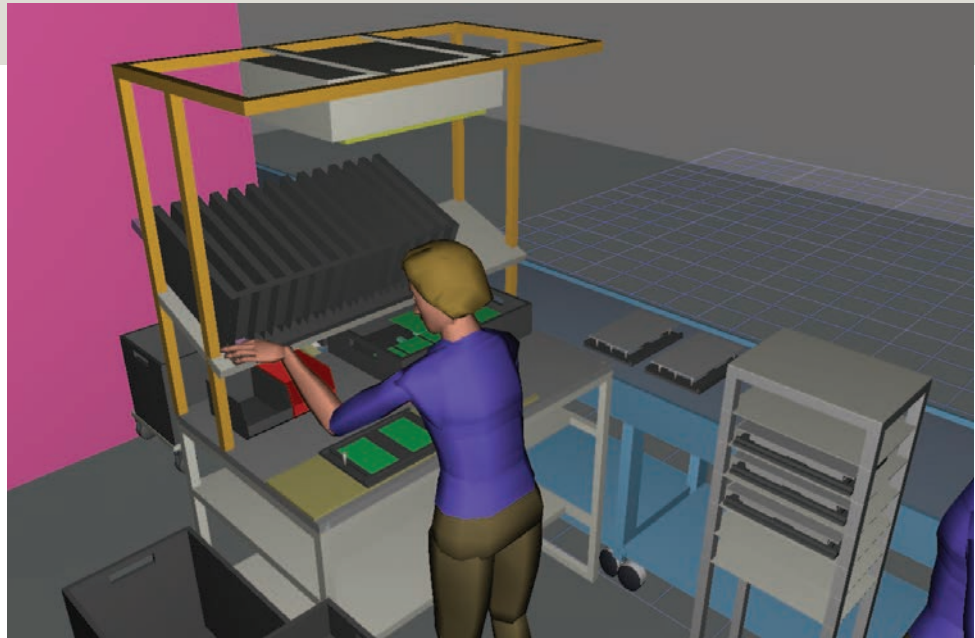
electronics control center for the Peugeot 407 automobile. Controls included all rear lights, rear window wipers and defrost functions, and interior sun shade as well as opening and lighting the electronic-lock trunk.

Results (continued)

Optimized ergonomic placement of worker equipment and tools

Determined simple supply process for material dispatchers

Reduced injury risk and improved productivity for process operators



Jack generating reach distances for both hands.

"We had been using Jack software almost two years, simulating more than 70 workplaces," says Tomáš Baroň, industrial engineering technician at Continental. "I'm responsible for design and simulation of new as well as old workplaces using Jack. The Peugeot project challenged us, but Jack provided the design and simulation solutions we needed, and helped us meet our business objectives."

The Peugeot rear electronics control project required a new plant layout for visual inspection and assembly; implementation of automatic optical inspection to the visual inspection workspace; and a whole new workplace layout and design. Continental had to solve how material would flow to the workplace and how bad parts would be removed. The company also wanted to build flexibility into the workspace to accommodate one or two operators, depending on order volume.

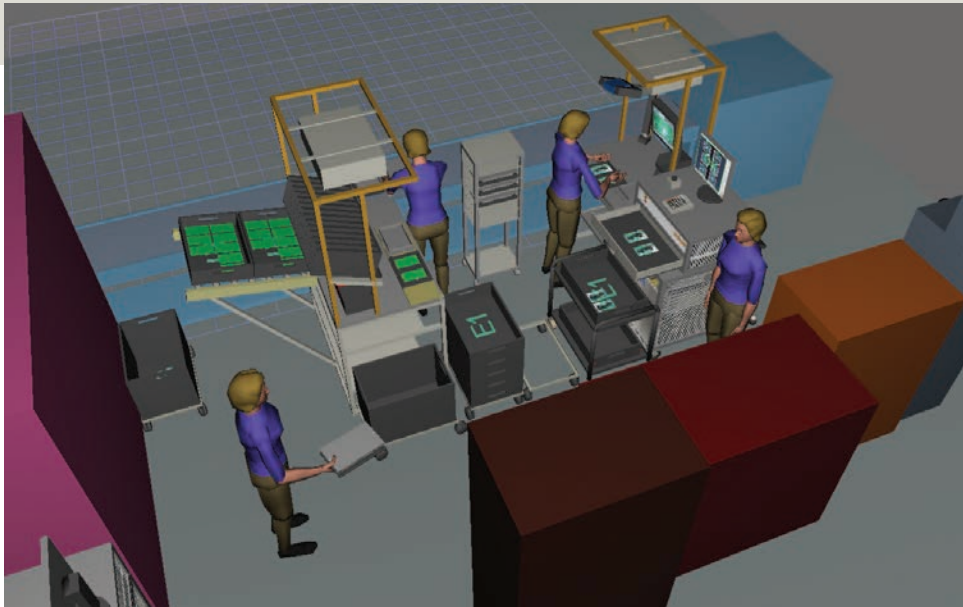
Transferring data, gaining knowledge

"It was absolutely necessary to get accurate measurements for the total layout to be sure how much space would be available for the proposed workplaces," recalls Baroň. "It became evident that production in these workplaces could encounter significant ergonomic and technical compromises. After considerable studying of the processes required and consulting with our production planners and process operators, we transferred information to the Jack software."

Baroň notes, "The visual inspection and assembly functions were dependent on each other, and the workers had to turn toward each other. Jack helped solve this



Jack human simulation model holding the part. Inset shows view from operator eyes.



1. Table for assembly. 2. Table for visual inspection including automatic optical inspection. 3. Trolleys, containers, chamber. 4. Other equipment. 5. Conveyor.

in the layout. Both work tables are mobile so we can adjust the workplace for the needed number of operators depending on work volume. The proposed layout was approved without corrections. We passed the proportions and positions to our designers, who implemented the draft in only a few days.”

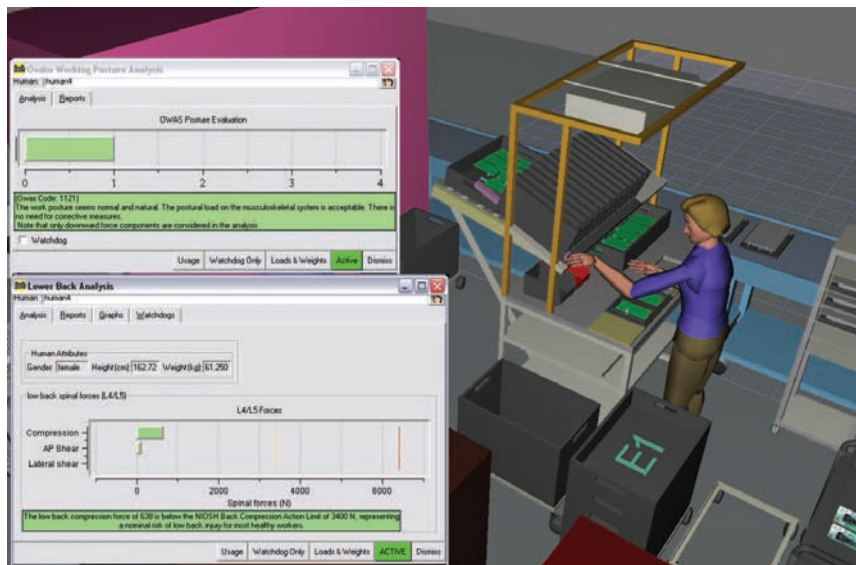
Designing a productive, safe assembly station

The most important factor for the proposed work tables was to determine the height of the work tables. Because only women employees would be working in this workspace, the height of the work tables was set to a mean value of 90 centimeters (35.5 inches), which enabled light, accurate work in a standing position for an average woman.

The Peugeot project comprised several variants. Each required management of a different number of assembled parts. “For this challenge, we designed a new universal container to hold parts for a particular assembly,” says Baroň. “We set this container on a skewed shelf over the work tables and modified its construction for simple hold and withdrawal of parts. With the Jack figure, we could easily simulate the holding and removing parts

motions to suit the space around the fingers. Operators can concurrently view everything in the assembly process.”

Placement of the printed circuit board (PCB) case was solved by a descent conveyor in the right (rear) part of the work table. In fact, all material supply entered from behind the work table to cause no limitations to the operator. The reach zones capabilities of Jack enabled



Jack analysis results verifying worker position and back load.

Solutions/Services

Tecnomatix
www.siemens.com/tecnomatix

Customer's primary business

Continental Automotive Systems develops and produces electronic and mechatronic components for automotive producers around the world.
www.conti-online.com

Customer location

Frenštát p. R.
Czech Republic

"Tecnomatix and Jack allowed us to solve a complex customer assembly while assuring higher comfort, safety and productivity of our operators."

Tomáš Baroň
Industrial Engineering Technician
Continental Automotive Systems

simulating "comfortable reach" to help properly place all materials for easy access. Because existing plant light was insufficient for this assembly, suspended fluorescent tubes with diffusers were added to double the light value throughout the new workspace. Jack was also used to confirm minimal risk of low back injury throughout the assembly process.

Designing a cost-effective, ergonomically acceptable inspection station

The design solution for the inspection station followed a similar path as that for the assembly station. The height of the work plane, lighting and construction were identical to that for the assembly station. "But due to the small space between the conveyor and other equipment, we needed to adjust the height of the inspection work table to 80 centimeters (31.5 inches)," says Baroň. "We used Jack's collision detection analysis to confirm that the operator's movement in this adjusted situation was absolutely sufficient. The only other difference with the inspection table compared to the assembly table is that we replaced the parts feeder container with a touch screen monitor that's necessary to ratify product errors. Again, we used Jack's reach zones analysis to confirm comfortable access to the screen."

Trolleys with good and bad parts were placed beside both workplaces. "We needed a flow of empty masks between both workstations," adds Baroň. "We solved this by placing a container near the conveyor. Our concern though was if there would be enough free manipulation space between both tables. Jack's simulation showed us there was ample space."



Jack simulation of the work area for the Peugeot project.



Real view of the the actual work area.

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