

## Consumer and industrial electronics

# Costan

Costan addresses market opportunities, assesses employee risk and notably reduces costs using Solid Edge and Jack in Tecnomatix

### Products

Solid Edge, Tecnomatix

### Business challenges

Extensive customization and multiple product variants

Analysis of ergonomics for different user categories

Ergonomic optimization of refrigeration systems before design

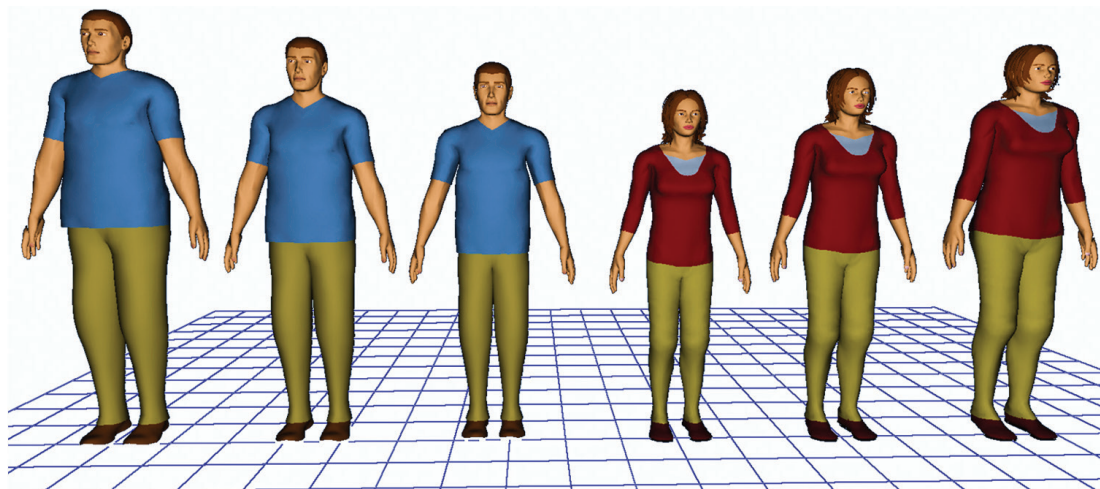
### Keys to success

Use Solid Edge to model families of parameter-driven models

Use Jack to simulate ergonomic user categories and realistic ergonomic performance outcomes

### Results

Introduced ergonomic study of refrigerators before 3D modeling and physical prototyping, fully simulating operating and maintenance conditions during the conceptual design stage



### Commercial refrigerator maker builds more “ergonomically friendly” products using Siemens PLM Software solutions

#### Accurate and reliable information about retail refrigerator ergonomics

Costan SpA is part of the multinational group Epta, a leader in high-quality equipment and services for retail refrigeration. Costan, a long-standing Italian brand, has been a synonym of top quality, excellent service, high technology and highly reliable commercial refrigeration products for more than 60 years. The company’s product portfolio includes display refrigerators, cooler and freezer merchandisers and central refrigeration systems. Costan adopts

different product development procedures, each based on a carefully documented process to handle different kinds of actions and modifications.

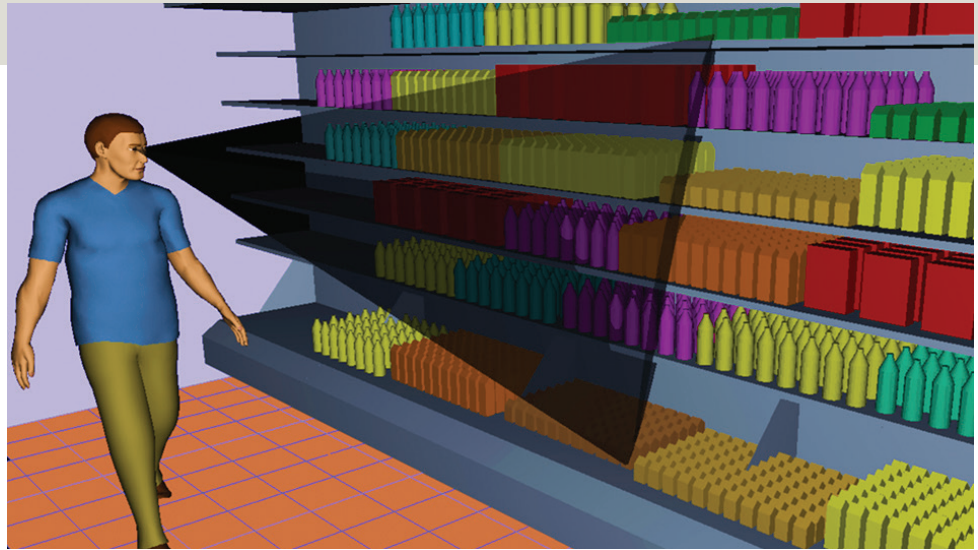
“For retail equipment and bottle coolers, the development process proceeds from specific customer requirements,” says Maurizio Orlandi, innovation center manager at Costan. “We always start from an idea or a request that triggers a sequence of processes, everything from simple design modifications to the renovation of an entire platform.

“Our product is like a big household appliance, characterized by high levels of standardization and a strong focus on engineering. Unlike other household

### Results (continued)

Delivered valuable market assessments, conducting ergonomic analysis based on a significant sample of the real population

Eliminated costly downstream risks and revisions, such as reachability issues



**“For the ergonomic properties of our equipment, even two or three centimeters can make a difference. Using Jack, we can identify the optimal dimensions.”**

Maurizio Orlandi  
Innovation Center Manager  
Costan

appliances, we have to manage a larger number of details,” Orlandi says. “We have a palette of 120 colors in our catalog, including three different types of glossy black.”

Costan has been designing with solid modeling tools since the early 2000s. For 3D mechanical design and industrialization drawings, Costan has always used Solid Edge® software from Siemens PLM Software. This includes the highly productive use of synchronous technology to edit files from external partners.

#### **Ergonomics in the forefront**

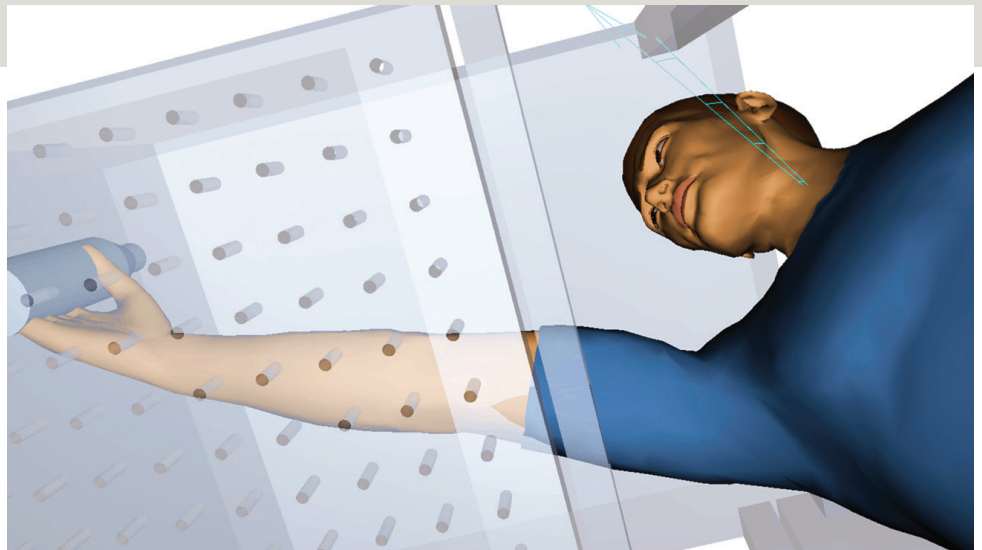
In recent years, the industry has focused on the impact that loading actions have on human muscles and bones due to incorrect posture, injuries caused by repetitive tasks

and general health issues concerning retail staff. Driven by strict new regulations from the French Ministry of Health, the engineering department at Costan launched an ergonomic analysis process. This involved a range of display refrigerators and included examining different cases, situations and conditions, equipment height and width, loading/filling procedures, manipulation of electric panels, and different kinds of interaction.

The ergonomic analysis is carried out in collaboration with University of Bergamo, which relies on Jack™ software in the Tecnomatix® portfolio. Jack is a human process simulation solution from Siemens PLM Software.

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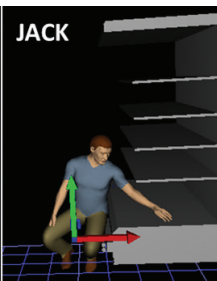
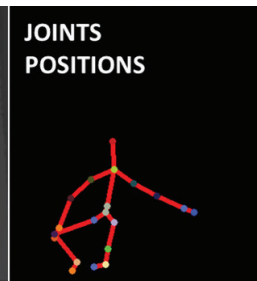
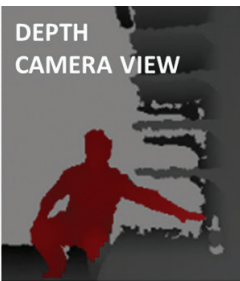
Maurizio Orlandi  
Innovation Center Manager  
Costan



The company and the university have a research agreement to perform ergonomic analysis using Jack during the early design stages, when the refrigerator architecture can be modified without additional costs. "With Jack, we have introduced the ergonomic study of refrigerators before 3D modeling and physical prototyping, working on sketches with few basic lines," explains Giorgio De Ponti, material engineering researcher at Costan.

Daniele Regazzoni, adjunct professor of engineering at the University of Bergamo, is the link between the university and Epta engineers. He leverages the sophisticated features of Jack to provide the company with accurate information that takes into consideration the impact of geometry modifications on the ergonomics of refrigerators for loading/filling, maintenance and standard operation. While relatively simple, refrigerator cases and cabinets have different types of users, including shoppers, maintenance staff and employees. As a result, ergonomics must be analyzed from different points of view for different types of applications.

"Using Jack enables us to calculate all the necessary values to manage workplace health and identify the margins for risk conditions," notes Regazzoni. "To take all options into account, we have investigated daily operations in supermarkets, where



employees may not always interact appropriately with refrigerators and other equipment."

#### Accurate down to the centimeter

Jack enables Costan to evaluate project solutions accurately, from identifying the most suitable shelf height to addressing specific requirements or radical revisions. Using this approach at the beginning of the development cycle, company engineers can make sure that the design meets ergonomic conditions, both from the point of view of staff health as well as for the most effective sales to prospective customer groups. As a result, costly downstream modifications can be avoided.

"You cannot improvise with ergonomics," Regazzoni says. "Without a simulation tool, it is hard to understand whether you are going in the right direction. Jack provides accurate and reliable indications quickly. You draw a simple sketch with Solid Edge and import it into Jack, where a quick test

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"You draw a simple sketch with Solid Edge and import it into Jack, where a quick test using a single humanoid suggests whether working conditions have improved or worsened."

Daniele Regazzoni  
Adjunct Professor  
Engineering Department  
University of Bergamo

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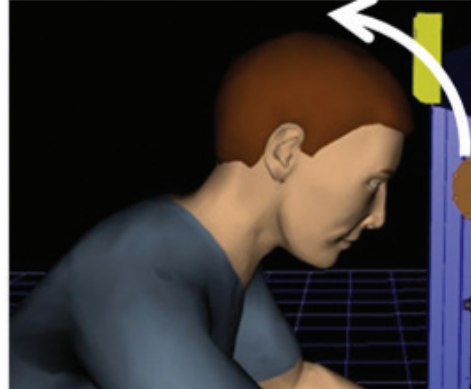
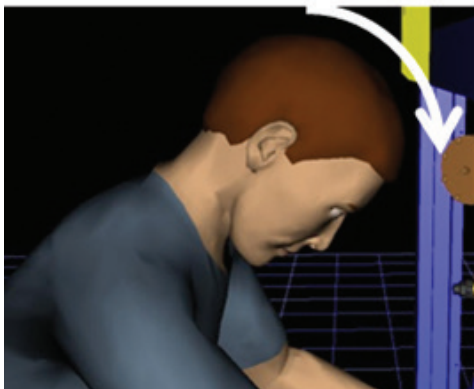
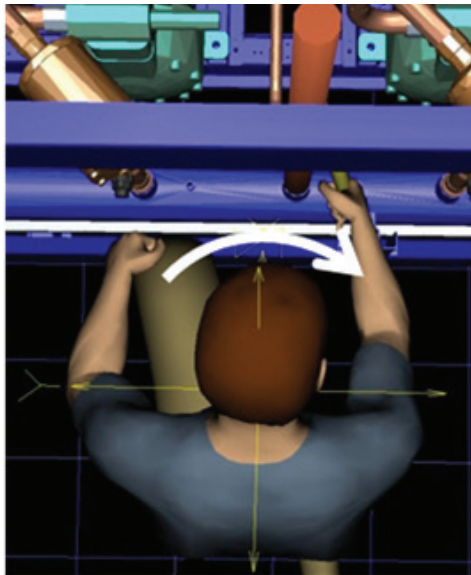
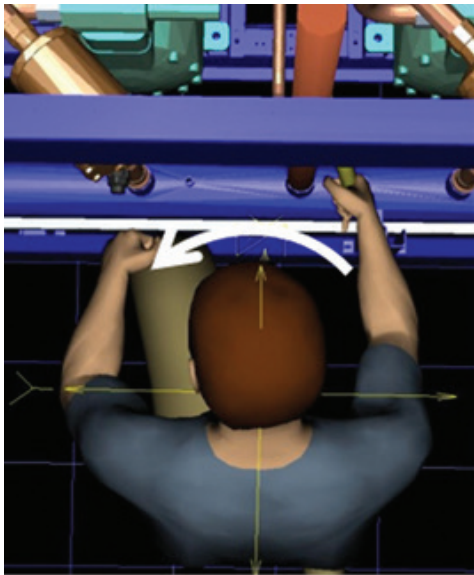
To help check general simulation data, Jack is integrated with Microsoft's Kinect® technology to capture human body movements. "Kinect integration enables us to acquire data to test different ergonomic factors directly from a human subject in real time," says Caterina Rizzi, engineering department professor at the University of Bergamo. "Starting from acquired data, we can analyze ergonomic parameters rapidly and, at the same time, provide

experimental feedback to Siemens PLM Software developers so that they can improve integration between the two tools."

Because its refrigeration systems are sold worldwide, Costan executes ergonomic analysis using different sizes of humanoids from six different percentiles, three males and three females, plus two humanoids to represent disabled users in wheelchairs. The results are processed to obtain an optimized average. "Simulation goals are different for each user category," notes Rizzi. "For shoppers, we analyze product

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Giorgio De Ponti  
Material Engineering  
Researcher  
Costan



### Solutions/Services

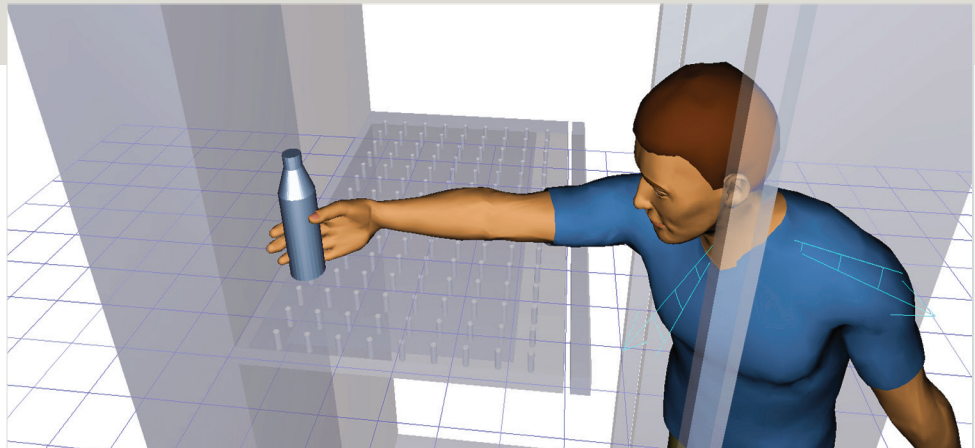
Solid Edge  
[www.siemens.com/solidedge](http://www.siemens.com/solidedge)  
Jack in Tecnomatix  
[www.siemens.com/plm/jack](http://www.siemens.com/plm/jack)

### Customer's primary business

Costan SpA has been developing and producing commercial refrigeration for more than 60 years. The Costan brand is synonymous with top quality, excellent service, high technology and high reliability.  
[www.eptarefrigeration.com](http://www.eptarefrigeration.com)

### Customer location

Limana, Belluno  
Italy



visibility and reachability, while for loading/filling staff we also consider lower back and shoulder strain. We are also analyzing other factors, including visual impairment due to door frames, uprights and other elements of refrigerators.”

“For the ergonomic properties of our equipment, even two or three centimeters can make a difference. Using Jack, we can identify the optimal dimensions,” adds Orlandi. “For instance, we have significantly reduced our range of 220

centimeter-high cabinets, as simulation clearly indicated difficult access and reachability.” Customer orders have corroborated this decision, proving that Jack supports first impressions with objective feedback, delivering standard values such as lower back analysis (LBA), measuring lumbar strain between the L4 and L5 vertebrae), and the working posture analysis system (OWAS) that – without the help of Siemens PLM Software solutions – would require long and complicated calculations.

# Jack enables Costan to evaluate project solutions accurately, from identifying the most suitable shelf height to addressing specific requirements or radical revisions.

### Siemens Industry Software

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