

## MEDICAL DEVICES AND PHARMACEUTICALS

# SHL Medical

Conducting production simulations to improve processes and efficiency, reducing personnel requirements by 60 percent

### Product

Tecnomatix

### Business challenges

Optimize processes to comply with a pharma customer's requirements and combination product regulations

Reduce the number of production trial runs

Improve data quality, productivity and inventory control

### Keys to success

Use Plant Simulation to optimize medical technology manufacturing logistics

Make informed decisions backed up by data

Automatize manual processes

Demonstrate how automation increases productivity and better controls medical device inventory

### Results

Reduced personnel requirements by 60 percent

Reduced excess inventory by 15 to 20 percent

Increased operation efficiency by 25 percent

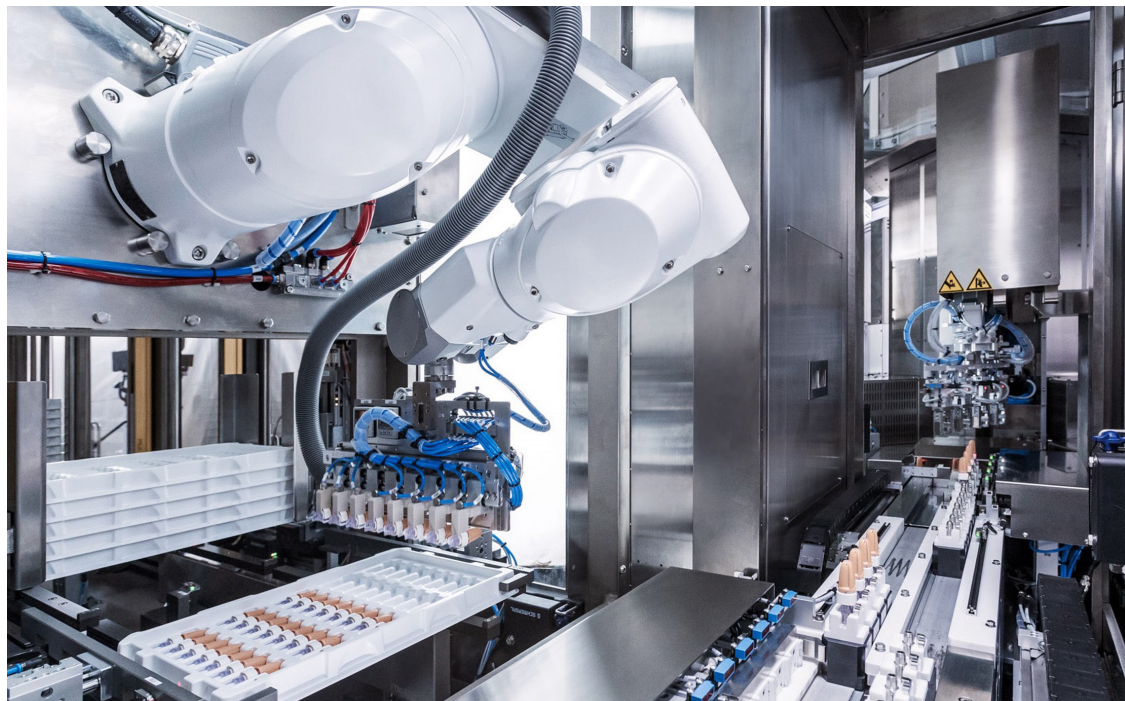
Increased intralogistics performance by 25 to 30 percent

### SHL Medical uses Plant Simulation to optimize manufacturing logistics of self-injection devices by automating processes

#### Improving patients' quality of life and independence

Globally, one in three adults have multiple chronic conditions, which may include obesity, cardiovascular diseases and diabetes. These individuals require continual medical care and support. SHL Medical, a pioneer in the self-injection systems industry and a

global leader in this medical technology segment based in Zug, Switzerland, offers a range of autoinjectors, pen injectors and specialized injection systems for large-volume and high-viscosity formulations. These devices allow patients to self-administer medications safely and effectively. With SHL Medical's self-medication options, patients can significantly improve their quality of life and maintain a degree of independence despite their illnesses. Additionally, controlled self-medication eases the overall burden on the healthcare system.





### Optimizing production capabilities

As a global company in a highly competitive market, SHL Medical is committed to designing, developing and manufacturing high-quality medical products. The demand in the pharmaceutical market is facing constant growth, necessitating optimal use of production capacities. Additionally, device manufacturing for combination products is subject to stringent regulations and entails associated costs.

To this end, SHL Medical's Operations Engineering department, which is responsible for optimizing production processes, uses Plant Simulation in the Tecnomatix® portfolio to conduct production optimization simulations without affecting live production productivity. Plant Simulation is a Siemens Digital Industries Software solution that is part of the Siemens Xcelerator business platform of software, hardware and services.

### Transitioning to automation

At SHL Medical, Luigi Fumagalli, a senior factory simulation engineer, and Yi-Chi Lu, a senior process engineer, were tasked with determining whether manual or automated intralogistics combined with automated storage retrieval system (ASRS) integration was more effective. To answer this, they used Plant Simulation.

"The transition from manual processes to automation brings significant operational changes for autoinjector manufacturing," says Fumagalli. "We conducted an analysis using Plant Simulation to identify potential improvements in production efficiency, inventory control and overall process integration. Our goal was to perform a comparative analysis and provide actionable insights to ensure smooth automation integration. This objective aligns with our



Using Plant Simulation proved to be a powerful tool in transitioning to automation, guiding our strategic decision-making and investments in the right direction."

Luigi Fumagalli  
Senior Factory Simulation Engineer  
Operations Engineering at SHL Medical

general aim to continually enhance our manufacturing performance in all strategic key areas. The focus was on optimizing the current approach to managing operational processes in intralogistics for material transport, storage and control. Relying solely on manual operations in terminal logistics has its limitations, especially with high volumes and short cycle times. For example, the booking process when picking up or storing parts directly affects inventory levels and real-time material shortage detection.”

### Overcoming core challenges in automation analysis

SHL Medical aimed to overcome these limitations by using Plant Simulation to demonstrate how automation increases productivity and better controls inventory within the medical technology industry. The goal was to create a deeply integrated process, seamlessly connecting various autoinjector production areas.

The three core challenges in the automation analysis were data quality, the involvement of the equipment manufacturer and the number of trials needed to reach optimal status.

“New equipment designs often rely on unilateral datasets from existing plants, leading to inaccuracies if parameters like machine throughput differ,” says Fumagalli. “Working with the automation equipment manufacturer requires ensuring they precisely understand and meet the operational requirements of the automated system. Misunderstandings can quickly lead to inefficiencies. It is also desirable to conduct as few trial runs in live production as possible, as interruptions are time-consuming and costly, negatively impacting our return-on-investment.

“Using Plant Simulation helped us address these critical points by simulating various production parameters, thus expanding the data foundation for redesigning a



production facility. Equipment manufacturers receive precise operational requirements to avoid misunderstandings and minimize physical trials in live production using simulation models.”

### Building the simulation model

SHL Medical’s simulation model in Plant Simulation is based on four pillars: detailed data and specifications of the production facility, a precise layout of the facility and production environment and operational processes within and around the production, as well as storage areas and strategies for material flow in production and storage.

“Our expectation for the data model was to reduce space and personnel requirements for intralogistics while increasing efficiency in operations and improving intralogistics,” says Lu. “The more realistic our simulation model, the more reliable our comparative analysis results are as a basis for informed decisions.”

**“With Plant Simulation, we were able to reduce personnel requirements by 60 percent, reduce inventory by 15 to 20 percent, increase operation efficiency by 25 percent and increase intralogistics performance by 25 to 30 percent.”**

Yi-Chi Lu  
Senior Process Engineer  
Operations Engineering  
at SHL Medical



### **Benefiting from automated production models**

After entering all parameters, SHL Medical ran the same production stages as manual and automated production models, considering the interaction between production areas A and B. The manual production stage required numerous buffer areas for boxes and pallets, creating significant material and personnel traffic and occupying a lot of space.

By leveraging the automated model in Plant Simulation, SHL Medical connected machines in production area A to the automation system for material flow, eliminating the need for operators. They also connected production area B to the automation system, though they still required some manual support for the final steps before passing materials to other areas. However, they significantly shortened and reduced travel paths, freeing up substantial space by eliminating numerous buffers.

### **Understanding the positive impacts of automation analysis**

Using the analysis from Plant Simulation positively impacted SHL Medical in various ways. For example, they used the simulation model to extract precise data from existing production processes for the automation equipment manufacturer, enabling customized solutions for current automation system requirements. Before implementation, the automation system's operation could be reliably simulated using existing production data. This provided early-stage data for feasibility, expected performance and stability assessments, forming an excellent basis for decision-makers at SHL Medical. Leveraging Plant Simulation provided reliable data, allowing SHL Medical to make necessary

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Luigi Fumagalli  
Senior Factory Simulation Engineer  
Operations Engineering at SHL Medical



For us, as a company in the highly competitive medical technology industry, leveraging Plant Simulation is an indispensable tool for strategic manufacturing decisions.”

Luigi Fumagalli  
Senior Factory Simulation Engineer  
Operations Engineering at SHL Medical

## Solutions/Services

Plant Simulation  
siemens.com/  
plantsimulation

## Customer's primary business

SHL Medical is a global leading solutions provider in the design, development and manufacturing of advanced delivery devices such as autoinjectors, pen injectors and innovative specialty delivery systems for large-volume and high-viscosity formulations.  
www.shl-medical.com

## Customer location

Zug  
Switzerland

adjustments to the pharmaceutical manufacturing system and the newly integrated automation system, improving overall manufacturing efficiency and effectiveness.

## Using Plant Simulation to achieve successful automation

After using Plant Simulation, Lu and Fumagalli were satisfied with their analysis. "We provided management with reliable figures on the benefits of switching to the planned automation solution for intralogistics combined with ASRS integration," says Fumagalli. "Using Plant Simulation proved to be a powerful tool in transitioning to automation, guiding our strategic decision-making and investments in the right direction."

"The results speak for themselves," says Lu. "With Plant Simulation, we were able to reduce personnel requirements by 60 percent, reduce inventory by 15 to 20 percent, increase operation efficiency by 25 percent and increase intralogistics performance by 25 to 30 percent."

"Optimized automated workflows helped us streamline material handling, reduce delays and increase productivity," says Fumagalli. "Additionally, we were able to optimally use the limited storage space of the ASRS system, maximizing storage capacity. For us, as a company in the highly competitive medical technology industry, leveraging Plant Simulation is an indispensable tool for strategic manufacturing decisions."

By employing Plant Simulation, SHL Medical conducted detailed simulations, allowing for informed decisions and demonstrating the benefits of automation for improving medical device logistics and inventory control. Successfully implementing these simulation models highlights the vital role of advanced tools in optimizing production, showing how effective simulation can drive significant improvements in the medical device manufacturing sector.

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