SIEMENS

Industrial machinery and heavy equipment

Ergo-Design industrial engineering

Designing and delivering optimal factories using digital manufacturing

Product

Tecnomatix

Business challenges

Increase delivery reliability

Improve quality

Reduce costs

Keys to success

Installation of digital manufacturing for the design and simulation of production facilities

Elimination of bottlenecks in the early design stage

Simulation model as scheduling tool to limit waste

Results

Reorganized factories belong to the top "lean production" facilities

Complex daily scheduling tasks handled efficiently

Optimum results through iteration between layout, flow and dynamic behavior

Ergo-Design industrial engineering BV supports top "lean factories" with Tecnomatix FactoryCAD, FactoryFLOW and Plant Simulation

A manufacturing consultancy

Production facilities must contribute to the success of an enterprise. They must guarantee both reliable delivery and quality while keeping costs as low as possible. For those reasons numerous leading companies request the help of Enschede-based Ergo-Design industrial engineering BV, a consulting firm specializing in designing and optimizing production facilities for the manufacturing sector. Covering the whole of northwestern Europe, the company was set up in 1991 as a spin-off of the University of Twente.

Expressing results in double digits

"Our core activity is to create the production plans for customers, thus spanning the bridge between management and the shop floor, and vice-versa," says Douwe Bonnema, manager and joint-owner of Ergo-Design industrial engineering BV.

Bonnema notes, "We speak the language of production; it comes naturally to us. Our customers include companies such as Nefit, Scania, DAF Trucks, Auping, VDT, Impress, Aerotor, Shell and Enrichment Technologies (formerly UCN). We enjoy long-standing relationships with customers on a number of important projects. Such strong relationships enable our

experts to operate at all levels within the client site, allowing us to best define the necessary steps to improve the production process."

Bonnema notes, "Improvements are carried out in close cooperation with our clients. We generally express results in double digits: shortening of lead time by at least 50 percent, efficiency improvement by a minimum of 15 percent, reduction of stock by a minimum 30 percent, etc. And all this preferably in half the space. The customer is satisfied and as far as we are concerned: a well-executed project with perceptible successes is the best acquisition."

Digital manufacturing extends value

Ergo-Design's impressive project successes typically create expectations on the customer's side. With plans to significantly improve responsiveness, Ergo-Design

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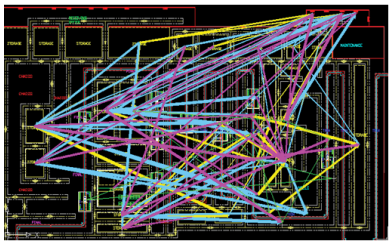
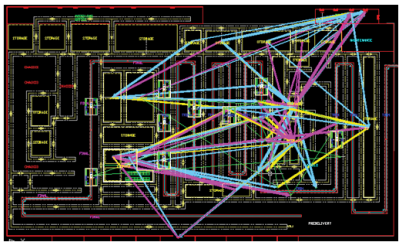
Manager and joint-owner
Ergo-Design industrial engineering BV





“At the end of the day, what really counts is the customer’s success. For years we have been able to support the various customer factories, which now belong to the best performing ‘lean companies’ worldwide.”

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invested in digital manufacturing solutions from Siemens PLM Software, including Tecnomatix® FactoryCAD™, FactoryFLOW™ and Plant Simulation software. “For us it is important that the level of our service is constantly improving,” says Bonnema. “We achieve that by further developing our knowledge and by investing in modern tools: digital manufacturing is the course that we are following. ‘Lean production’ principles require optimum flow through the factory and hence an optimum factory layout and planning, as well as clear-cut analysis of waste relative to capacity and raw materials during production. Digital manufacturing tools provide us with strong support in this respect.”

Lean, quality, output volumes (delivery reliability) often is the starting point to assess production facilities at a high level, or design and build completely new facilities. The prerequisite is thus the production master plan. On that basis Ergo-Design develops its value-stream map, which clearly shows where the added value can be optimized and where waste flows must be removed.

FactoryCAD and FactoryFLOW – optimizing facilities

Ergo-Design now uses FactoryCAD to model factories. Bonnema explains, “We use FactoryCAD both in the optimization of existing facilities and for new factory designs. The design stipulates for the main lines how efficient a line works in practice. The details define the ergonomic quality of the different workplaces.”

The buildings are entered into FactoryCAD on the basis of the floor plans. However, floor plans are not always kept up-to-date. To make sure that unpleasant surprises do not arise during the construction of a factory, Ergo-Design can measure the situation onsite, especially if there are doubts as to whether the basic information complies with the existing factory. “We have created a new service to this end: digitizing of complete factories from various positions using a 3D laser scanner,” says Bonnema. These measurements are entered into FactoryCAD where the relevant points are converted into walls, columns and other building characteristics. He notes, “This quickly provides us with an accurate environment where we can

define the 3D factory layout. The speed with which FactoryCAD can place production objects and the intelligence that we can grant these gives us a huge advantage. The system gives nearly all the production components as objects – conveyors, palletizers, robots, etc. And what is not there by default can be made very quickly."

The intelligence that Ergo-Design can confer to the objects consists of parameters such as cycle time, waste ratios and change-over time. Values are determined in close cooperation with the customer. Central to the optimization of the flow of goods is the design of a factory layout.

Bonnema explains, "To that effect, we have acquired FactoryFLOW, which works perfectly with FactoryCAD. In an iterative process the most efficient route and flow is calculated, which results in the detail of the factory layout. In this respect we follow the methodology of Systematic Layout Planning (SLP). Afterwards, with the operators, we draft the functional and technical specification of the production line. We also guide the stage in which the production line is created and installed."

Plant Simulation – what-if scenarios and simulation-based scheduling

The dynamic analysis of the targeted production facility is performed with Plant Simulation. In many cases this happens on the basis of the model that is developed in FactoryCAD and FactoryFLOW. It can be a complete truck factory, but also a part of an assembly line. Ergo-Design uses the three Siemens' applications to obtain the best possible result in an iterative manner. The results of dynamic analysis lead to improvements in the layout of the factory and the flow of goods. This is possible as a result of the SDX interface, which allows all relevant data to be exchanged between the applications.

"We use Plant Simulation in two ways," comments Bonnema. "In advance at the design stage we can study the impact of realistic 'what-if scenarios' such as supply disruptions, machine failures, etc. This shows the robustness of the design for the line or factory. It has a very convincing effect at the management level and removes most of the uncertainty with regards to investments. If the line is in place, then Plant Simulation is used in an alternative way with a number of customers, that is, as a tool to be used daily in production planning."

Bonnema points out, "The simulation model that was used at the design stage is now used in a way that enables the planner to lay down the best production schedule on a daily basis. We call this 'simulation-based scheduling.'" This determines in a fast and flexible way the sequence the orders can be produced, how many people are required, what the

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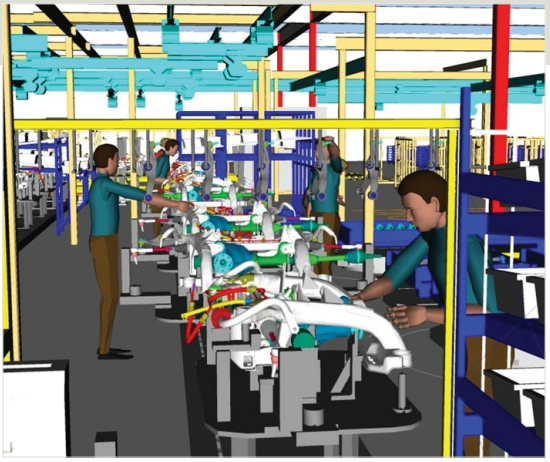

Solutions/Services

Tecnomatix
www.siemens.com/tecnomatix

Customer's primary business

Ergo-Design industrial engineering BV is a consultancy firm that supports manufacturing companies in the design and optimization of their production processes in northwestern Europe. The company creates a bridge between production policy and the shop floor, collaborating with its customers to deliver absolute success in terms of delivery reliability, quality and costs.

Customer location

Enschede
The Netherlands

Partner

cards PLM Solutions
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best change-over time is and all this with a minimum of waste flows. Plant Simulation applications are also used in combination with simulation modules to seek solutions to scheduling problems. These applications are like run-time versions that have already been in production for six years.

Tangible results

Ergo-Design is achieving significant tangible results through the use of the digital manufacturing products from Siemens PLM Software. Bonnema observes that there is a risk that 3D digital manufacturing can appear to be "too much as-ready" with the reaction when presenting interim results being: "It looks so good, it will certainly be good." He emphasizes that his company's role is to keep on asking those concerned if all aspects have been taken into account and request that the customer remain especially critical.

"For us as a company, professional knowledge in combination with the digital manufacturing technology of Siemens PLM Software is a distinctive element in what we stand for on the market," says Bonnema. "However, at the end of the day, what really counts is the customer's success. For years we have been able to support the various customer factories, which now belong to the best performing 'lean companies' worldwide. Our approach with the 3D presentations and simulations ensures a significant added value; it is indispensable in developing production facilities where operations are optimal in every respect, including for the workers. Considering ever-growing complexities – including an increasing variety of products and the pressure to quickly deliver the most reliable factory – I will even say that digital manufacturing is a prerequisite in achieving the necessary flexibility and results."

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