



Optimized with Simulation

3D Plant Simulation in Powder Coating Lines
from Rippert Anlagentechnik & Co. KG



Visualization supporting Complex Planning Tasks

Rippert Anlagentechnik is using Dualis 3D simulation software to optimize the design of complex powder-coating and paint-line automation lines. The effect is to lower the capital cost for their customers and provide plant engineers with a more reliable method for production planning and a view into the future of the scheduled production.

Martin Köster, the senior engineer responsible for new projects at Rippert Anlagentechnik was challenged with the task of designing a new complex chrome coating system with parts running through a cleaning station, a coating booth, and then to ovens for curing and final drying – all on an overhead transport system. As technical lead in the project, he had developed over the course of his career many Paint and Powder-coating lines, however this new mixed batch production system with its many process constraints was proving to be almost too much to efficiently design using a traditional approach.

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A variety of parts needed to be placed on one of 42 carriers to run past a paint-robot to be clear lacquered or primed. The variation in finish, part size and geometry led to different bake times in the oven with the result that some parts needed longer times while others needed less. The interaction of different batches affected the process adversely. “Typically layouts were drawn up on paper and the production processes were represented by wooden building blocks or paper clips bent to shape.” says Martin Köster. „But over time, growing demands from our customers has led to plants becoming increasingly more complex, and with this project, the day came when I realized that these types of facility just couldn't be handled in the traditional way.”

Dualis had the Right Software

Martin Köster decided to evaluate companies offering simulation services and ended his study with DUALIS IT Solution. The Dresden software company received an order for a 3D simulation model of the Chrome plating line, which was completed and delivered within a few days. „I was surprised at how fast and relatively inexpensive the project was. That such good results were achieved in such a short time, thoroughly convinced me about the benefits of simulation.”



Wincor Nixdorf Paint-line

As a logical next step we considered purchasing the software from Dualis so that we could develop our own simulation models. „Before deciding on Visual Components 3DCreate/3DRealize software on offer from Dualis, we wanted to know in addition to the price, how user-friendly the software was, how much training would be required, and how easily it would install and run on existing computers. But even in this respect, Martin Köster was pleasantly surprised.

“The simulation tool was very intuitive, easily installed, and performed well on our existing computers. Once layout components were modeled, such as conveyors, paint booths and curing ovens, they were immediately available to us in a component library that we could re-use in other projects. ..

Cost reductions from Simulation

Rippert Anlagentechnik now uses simulation technology to simulate virtually all installations. Costly redesign and engineering rework is minimized by evaluating alternative strategies and optimizing the system design early in the development phase. Because the systems are tailored to specific requirements from the outset, the investment costs remain low. For the plant operator, planning confidence is significantly higher now that planners can run through a scenario to identify key resource over-loading so that congestion or even a plant shut-down can be avoided.

“3DRealize is our flight simulator. We get together with our clients to make a few test runs in the sky, check the take-off and the landing and certain failure modes. Then we improve our system so that we, as well as our customers, are confident about what we are delivering.”

Thomas Rippert, Managing Director
Rippert Anlagentechnik GmbH & Co. KG

Some of the key benefits we have seen are “Systems planned using simulation have a much faster ramp-up time than traditionally designed layouts, they have less teething problems, full productivity is achieved in approximately a third of the time, and the customer gets a faster and higher return on investment.” says Martin Köster.

The Power of a Picture: Simulation for Sales Support

Simulation is not only a powerful planning tool for Rippert, but also a sales support tool with great persuasive power. It gives the opportunity for customers to view a new facility in working detail, to examine the system behavior and compare alternative layouts, and remove any reservations they may have about the system.

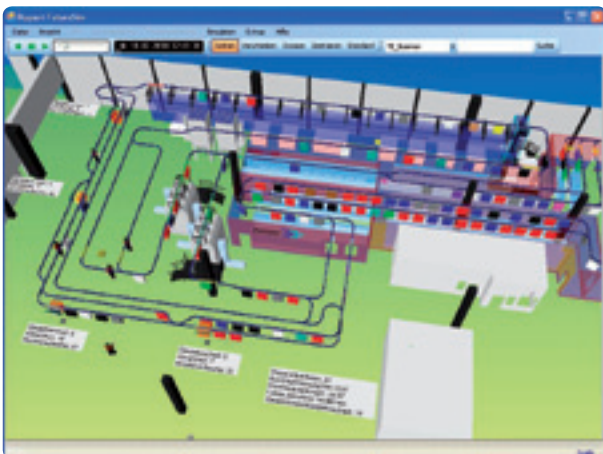
Additionally a free 3DVideo simulation player is available for the customer to share their new system

concept with whom they choose. 3DVideo runs on any computer so they can send a working layout to colleagues or friends – and let the power of the images do the work.

Looking into the Future and Optimizing Operations

The simulation software delivered by DUALIS can also be connected to production control PLCs and used for production planning. The production supervisor can see how long it takes a batch to run through, what the impact of non-scheduled items will be, and when parts coming off the line will need to be handled and prepared for shipment.

Additionally to using the simulation to look ahead in the production plan and prepare for arriving orders, the software can also be coupled to DUALIS’s optimization tool, GANTTPLAN, to start optimizing the future. The production planner can then determine when parts should be fed into the system to achieve optimized throughput, set-up times and labour pool utilization. “In a coating line for large transmission boxes, we were able to demonstrate, that we could use one single painter instead of three painters working three shifts,” is an example given by Mr Köster. “The coating line with the one painter solution saved the client over 400.000 € of accumulated costs”. Examples like these have convinced Mr Köster many times over that the cost of simulation is money well spent. “Having now simulated more than 40 systems, I know that even someone with a lot of experience cannot properly plan a system unaided, unless perhaps you are the world chess champion who can simultaneously keep your eye on several hundreds of interacting parameters. For most of us, the decision to invest in simulation technology should be an obvious one. Simulation of complex systems takes a lot of the headache out of planning, it reduces risk and its efficient use of my time.”



Simulation-based order planning using PLC connectivity



High detail levels make the 3DSimulation of the manufacturing process very realistic



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Rippert Anlagentechnik

For two generations the Rippert Group has been producing modern plants for the coating of surfaces, equipment for air pollution control and reliable industrial fans at its location in Clarholz.

350 highly-qualified employees plan and manufacture made-to-measure high-tech products at these works and at five further locations in Germany, Austria and the Netherlands.

These include surface refinement, which protects against chemical and physical stress, and also extends the

service life. Whether metal, plastics or wood is involved – Rippert Anlagentechnik GmbH applies its extensive know-how for many materials.

In addition to complex coating systems with components such as pretreatment, powder coating and drying plants, the mid-size company also offers standard products such as spray walls, spray booths and paint dryers. In addition, the family-owned company is an expert in air pollution control. Its repertoire in de-dusting

technology extends from dust source analysis, extraction and filtration to air return, pneumatic transport and energy recovery – and thus sets new standards.

Finally, Rippert Anlagentechnik manufactures fans for the most diverse application and performance ranges. Whether these are standard fans, special series or individual custom designs – all products score with energy efficiency, longevity and noise protection.

DUALIS GmbH IT Solution

DUALIS GmbH IT Solution specializes in the development of simulation and planning software. The Dresden-based company was founded in 1990 to deliver services and innovative solutions to companies in the manufacturing sector. The company's steady growth is based on successful projects with well-known European enterprises with resulting technology and service refinements that continue to contribute to today's success and widespread use of the product range.

GANTTPLAN and the ISSOP are used for detailed planning and optimization of manufacturing processes. SPEEDSIM and 3DCreate, deliver 2D and 3D planning and optimization of production and logistics facilities. The



user profits in many ways from the application of these tools. Software based planning optimizes material stocks based on customer orders, and order can be more precisely planned for on-time delivery. A plant design supported by simulation technology cuts costs throughout the system's lifecycle, increases confidence, reduces operational costs, and is a very compelling sales tool.