

eM-Plant – eMPower for manufacturing process management

Plant, line and process simulation and optimization

fact sheet

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► Summary

eM-Plant enables the simulation and optimization of production systems and processes. Using eM-Plant, you can optimize material flow, resource utilization and logistics for all levels of plant planning from global production facilities, through local plants, to specific lines.

Features:

Simulation of complex production systems and control strategies

Object-oriented, hierarchical models of plants, encompassing business, logistic and production processes

Dedicated application object libraries for fast and efficient modeling of typical scenarios

Graphs and charts for analysis of throughput, resources and bottlenecks

Comprehensive analysis tools, including Automatic Bottleneck Analyzer, Sankey diagrams and Gantt charts

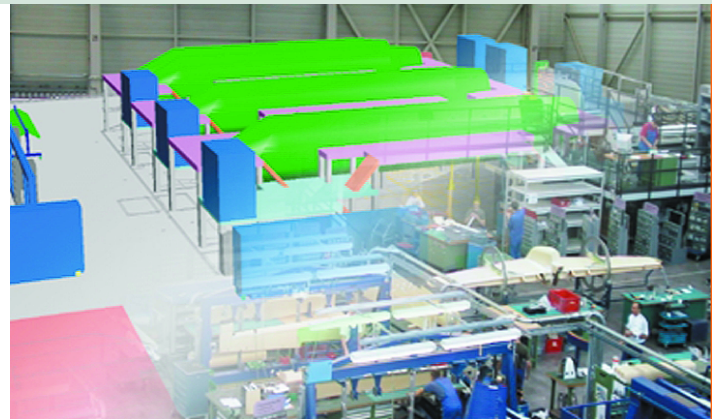
3D online visualization and animation

Integrated neural networks and experiment handling

Genetic algorithms for automated optimization of system parameters

Open system architecture supporting multiple interfaces and integration capacities (ActiveX, CAD, Oracle SQL, ODBC, XML, Socket, etc.)

In times of increasing cost and time pressures in production, along with ongoing globalization, logistics has become a key factor in the success of a company. The need to deliver JIT (just-in-time)/ JIS (just-in-sequence), introduce Kanban, plan and build new production lines and manage global production networks (to name a few) require objective decision criteria to help management evaluate and compare alternative approaches.



eM-Plant helps create digital models of logistic systems (e.g., production) to explore the systems' characteristics and to optimize its performance. The digital model enables users to run experiments and what-if scenarios without disturbing an existing production system or – when used in the planning process – long before the real system is installed. Extensive analysis tools, statistics and charts let users evaluate different manufacturing scenarios and make fast, reliable decisions in the early stages of production planning.

eM-Plant helps users:

- Detect and eliminate problems that otherwise would require cost- and time-consuming correction measures during production ramp-up
- Minimize the investment cost of production lines without jeopardizing required output
- Optimize the performance of existing production systems by taking measures that have been verified in a simulation environment prior to implementation

Benefits:

- Enhance productivity of existing production facilities by as much as 15-20 percent
- Reduce investment in planning new production facilities up to 20 percent
- Cut inventory and throughput time by 20-60 percent
- Optimize system dimensions, including buffer sizes
- Reduce investment risks by early proof of concept
- Maximize use of manufacturing resources
- Improve line design and schedule

Modeling manufacturing processes using libraries of standard and specialized components

eM-Plant enables you to create well-structured, hierarchical models of production facilities, lines and processes. This is achieved through powerful object-oriented architecture and modeling capabilities that enable you to create and maintain even highly complex systems, including advanced control mechanisms.

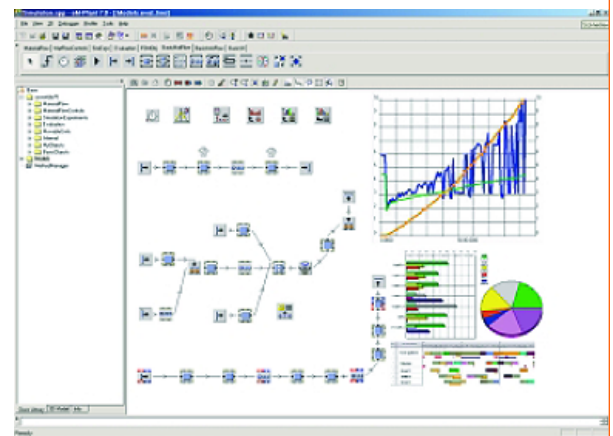
eM-Plant's user interface follows Microsoft Windows standards, making it easy to get familiar and productive quickly. Simulation models can be created quickly by using components from application object libraries dedicated to specific business processes, such as assembly or carbody manufacturing processes. Users can choose from predefined resources, order lists, operation plans and control rules. By extending the library with your own objects you can capture best-practice engineering experiences for further simulation studies.

Complex and detailed simulations can be handled, understood and maintained much better than in conventional simulation tools by using eM-Plant architectural advantages like capsulation, inheritance and hierarchy.

Simulating system performance

eM-Plant simulations are used to optimize throughput, relieve bottlenecks and minimize work-in-process. The simulation models take into consideration internal and external supply chains, production resources and business processes, allowing you to analyze the impact of different production variations. You can evaluate different line production control strategies and verify synchronization of lines and sub-lines. The system lets you define various material flow rules and check their effect on the line's performance. Control rules are chosen from libraries and may be further detailed to model highly sophisticated controls.

The eM-Plant experiment manager allows you to define multiple experiments at one time, providing an efficient way to analyze and optimize your system. Based on user-defined parameters, eM-Plant executes different simulation runs and provides you with the results of these experiments.

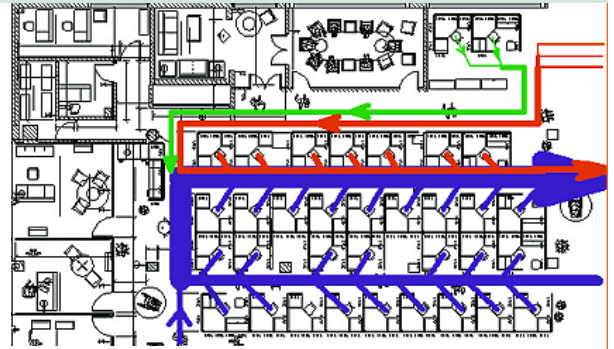


Automatic optimization

Optimization can also be done automatically by using the eM-Plant genetic algorithms module. This is especially useful if a variety of system parameters and constraints make it difficult to find the optimum.

Genetic algorithms optimize system parameters while considering multiple constraints such as throughput, inventory, utilization of resources and delivery dates.

These solutions are further evaluated by using simulations to interactively find the optimal solution according to line balance and various lot sizes.



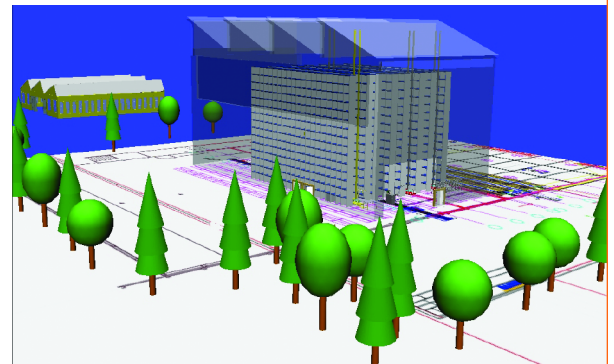
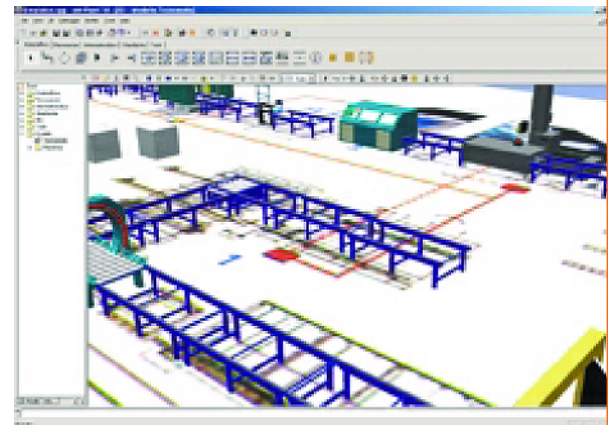
Analyzing simulation results

eM-Plant analysis tools allow for easy interpretation of simulation results. Statistical analysis, graphs and charts display the utilization of buffers, machines and personnel. You can generate extensive statistics and charts to support dynamic analysis of performance parameters including line workload, breakdowns, idle and repair time and proprietary key performance factors.

At the click of a button, eM-Plant's bottleneck analyzer shows the utilization of resources, thus indicating bottlenecks as well as underworked machines.

Material flow may be visualized in a Sankey chart that, at a glance, shows transport volume in the context of the layout.

eM-Plant also generates a Gantt chart of the optimized production plans that can be modified interactively.



3D visualization

In addition to the highly efficient 2D view, simulation may be visualized in a virtual, reality-like 3D environment. Using eM-Plant's libraries or CAD data, impressive 3D models can be built and used in several ways, including:

- Easy-to-understand platform for internal and external discussions
- Management presentations
- Demonstration to customers
- Trade show displays
- Brochures, animations and other sales tools

Tecnomatix solutions for digital manufacturing

The UGS Tecnomatix™ suite is an end-to-end collaborative solution that enables the planning, design, analysis, optimization and operation of manufacturing processes – letting users create and share manufacturing information across the enterprise and throughout the supply chain. Tecnomatix solutions help manufacturers implement effective digital manufacturing strategies – from sharing product and process designs, to joint process planning and engineering by teams in distributed locations – helping planners to make decisions such as where, how and with what resources to manufacture products. Leading manufacturers around the world are adopting UGS Tecnomatix solutions to expand revenue potential by accelerating product introductions, reducing costs, shortening time-to-volume and optimizing production execution.

For more information about UGS solutions, visit www.ugs.com.

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