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**GEOMETRIC
SOLUTIONS**

Plant Simulation for shipyards

Simulation, visualization and optimization of shipbuilding processes

Benefits

- Optimized space and crane utilization
- Advanced assembly sequence scheduling
- Increased planning safety and accuracy
- Higher service reliability
- Improved logistics and material management with clarity of complex processes
- Safer investment decisions
- Ability to better decide upon make versus buy issues
- Ability to more accurately predict delivery times
- Ability to reduce the risk of product failure or delay

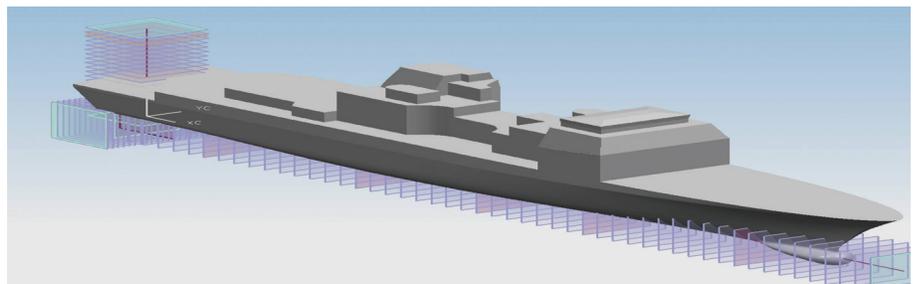
Summary

Tecnomatix® software's Plant Simulation enables the simulation and optimization of complex shipyard production systems and processes. Using Plant Simulation, you can optimize material flow, resource and space utilization as well as the logistics for all levels of the shipyard from scheduling individual welding activities up to the complete ship assembly.

The challenges of today's shipyard industry are complicated by having to deliver increasingly complex products in a highly competitive marketplace. Shipyards now face the need to build more ships in a shorter time and to offer services at competitive prices and with short delivery times. Plant Simulation is an event-driven simulation

tool that helps shipyards handle these needs more easily, providing computer-supported answers to major questions such as when and where to develop what products and with resources limited by availability and restricted materials.

Plant Simulation is a simulation-based and modular toolset with proven benefits for optimizing production and logistics in the shipbuilding industry, allowing the graphical representation of parts and resources and interfacing to database systems. This toolset enables you to model the employment of available shift calendars with customer-specific user-interfaces and interactive model manipulation. Plant Simulation is used to optimize the building of cruise liners, car and passenger ferries, container vessels and gas tankers, aircraft carriers, submarines and naval ships. Plant Simulation supports strategic corporate projects by enabling project managers to identify the best shipyard at which to build new ships. Plant Simulation also can be used to manage internal production and outsourcing strategies, as well as the operational work sequences and schedules that are used to distribute the daily workload.



Plant Simulation for shipyards

Features

- Simulation of complex production systems and control strategies
- Object-oriented, hierarchical models of shipyards, encompassing business, logistic and production processes
- Graphs and charts for analyzing throughput, resources and bottlenecks
- Comprehensive analysis tools, including automatic bottleneck checking
- Sankey diagrams and Gantt charts
- 3D online visualization and animation
- Integrated neural networks and experiment handling
- Automated optimization of system parameters
- Open system architecture supporting multiple interfaces and integration capacities (ActiveX, C, CAD, MS Excel, Oracle SQL, ODBC, XML, Socket, OPC, etc.)

All processes follow easy-to-understand interactive and iterative functions. Users start the scheduling, look at results and, if needed, make changes (for example excluding a special sub-block). Users restart the scheduling to verify that the changes were correct. Plant Simulation is able to predict utilization in each project area, depending on the number and kind of blocks being assembled every day, week and month.

Why traditional planning tools do not work

Static planning tools, such as spreadsheets or flow-charting software, are unable to generate results that account for variability and changing conditions over time. Relevant interdependencies between system components and technological constraints are not usually taken into consideration. Complex rules that control the flow of information and material often cannot be accounted for when traditional planning tools are used. In addition, the visualization does not offer 3D animation capabilities.

Result

Plant Simulation facilitates the simulation of the highly complex shipyard environment. It offers a good basis for deciding the outsourcing and production strategies, while facilitating cross-project resource planning, increasing planning safety and improving the utilization of major resources such as employees, cranes and square footage.

User case

- Decreased throughput time from 60 to 52 days (-14 percent)
- Decreased direct labor on the panel line from 8,280 to 6,600 hours (-20 percent)

Where Plant Simulation applies

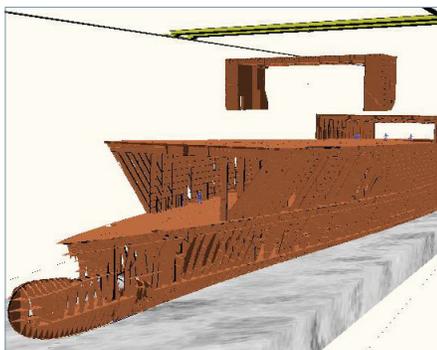
- Predicting schedule problems
- Predicting workplace-efficiency
- Finding concept changes for expanding shipyards
- Sequence-control of assembly lines
- Optimizing warehouse and transport capacities
- Steel planning
- Optimizing availability of needed manpower

References

- Aker Yards, Germany
- Center Of Maritime Technologies, Germany
- Flensburger Schiffbau-Gesellschaft, Germany
- Meyer Werft Papenburg, Germany
- ThyssenKrupp Marine Systems: Blohm + Voss, Germany
Nordseewerke Emden, Germany
Kockums, Sweden
- Volkswerft Stralsund, Germany



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