Plant Design and Optimization

Benefits
- Effective communication of design principles
- Enhanced cross-functional team communications
- Globalized workflow and release management
- 50 percent reduction in factory design time when compared with 2D
- 15 percent reduction in tooling and equipment changes
- Optimized re-use of existing capital equipment
- Up to 70 percent reduction in material handling costs
- Optimized resource utilization and material flow
- Reductions in nonvalue-added work and indirect labor costs
- Optimized space utilization at factory and transport level
- 5 to 20 percent reduction in new system costs
- 20 to 60 percent decrease in throughput times
- 20 to 60 percent reduction in inventory level
- 15 to 20 percent increase in productivity of existing systems

Summary
Tecnomatix® software's Plant Design and Optimization solution enables diverse teams to layout and optimize factory designs in a shared environment. You can rapidly develop factory layouts using 3D and parametric smart objects that facilitate the early discovery of design flaws. Material handling, logistics and indirect labor are optimized by comparing part routing information, material storage needs, material handling equipment specifications and packaging information against the factory layout. This approach increases planning accuracy and efficiency, which helps minimize capital investment and maximize ROI.

A comprehensive solution for collaboratively designing and optimizing your factory facilities

Tecnomatix Plant Design and Optimization enables manufacturing companies to create factory models faster and ensure that these virtual plants will operate at peak efficiency before production rampup. By allowing manufacturers to see the outcome of their factory plans in virtual models,

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Features

3D factory design and visualization:
- "Smart" 3D factory objects with built-in design rules
- Ability to build parametric factory equipment with XML toolkit
- Ability to link factory layout with throughput simulation via SDX
- Direct import and tooling and product data from JT™ technology, NX™ software, Solid Edge® software and Parasolid® applications

Factory logistics analysis and optimization:
- Computation and visualization of material flow diagrams
- Analysis and validation of operator walk-paths
- Calculation of material handling equipment needs
- Spatial design of material storage areas

Production throughput simulation:
- Bottleneck analysis
- 3D visualization of the simulation
- Optimization of system parameters based on genetic algorithm
- Hierarchical simulation structure with object inheritance
- Integrated object library management, which also facilitates shared project development within a team environment
- Statistical evaluation and automatic report generation

Collaborative factory design management:
- In-context editing of multiple factory regions, departments and stations
- Concurrent design of factory facilities
- Ability to seamlessly move objects between datasets
- Management of object versioning, effectivity and incremental change

Plant Design and Optimization lets you avoid wasting time and resources fixing problems on the plant floor.

Plant Design and Optimization is a solution comprised of four key capabilities, including:
- *3D factory design and visualization capabilities*, including parametric-based smart objects, that team members can use to develop the factory layout and identify early design issues.
- *Factory logistics analysis and optimization capabilities* that team members use to optimize material handling, logistics and indirect labor by comparing part routing information, material storage needs, material handling equipment specifications and part packaging information against the factory layout.
- *Production throughput simulation capabilities* that provide you with the data necessary to make intelligent business decisions related to the required capabilities, buffer sizing and strategies of the factory and the ability to minimize capital investment while maximizing long term ROI.
- *Collaborative factory design management* that provides diverse teams with the ability to capture and communicate the factory model's design principles and standard resources in a collaborative environment.

Today's factory planning challenges

Producing and selling more products does not necessarily lead to more profit. If your manufacturing operations are running inefficiently, you could end up spending more money than you make by having to compensate for those manufacturing deficiencies.

Inefficiency usually begins in the early stages of factory design, especially during facility and workcell layout, when diverse cross-functional teams fail to communicate effectively. In addition, antiquated tools, such as 2D layout and paper drawings, are unable to properly account for the

impact of equipment placement on the factory floor or material flow throughout the facility.

Throughput of the individual lines is also critical, as is efficient planning and optimization of the rest of the facility. Assembly processes require precise planning of the facility's delivery concepts, storage needs and transport concepts.

Plant Design and Optimization addresses these issues with the following four key capabilities.

3D factory design and visualization

Traditional factory design processes are prone to error. Design teams find it hard to understand the impact of equipment selection and equipment placement on the factory floor when these activities are expressed in 2D layout environments.

With 3D factory design and visualization, Plant Design and Optimization provides factory teams with critical insight into the factory design, layout and installation processes. The use of "smart objects" makes it much easier for teams to understand and represent all of your factory resources (from conveyors, mezzanines and cranes to containers, automatic guided vehicles (AGV's) and operators).

3D layout and planning helps minimize interpretation errors by enabling team members to see how factory smart objects interact with one another inside a virtual facility.

Factory logistics analysis and optimization

Manufacturing operations try to squeeze maximum productivity out of their direct labor investments, including machines on the line, tooling and fixtures, workers at their stations and their production processes. However, many companies find it difficult to quantify and analyze their indirect labor or adopt lean manufacturing initiatives.

Plant Design and Optimization's factory logistics analysis and optimization capabilities enable you to optimize your factory layout on the basis of material flow distances, frequency and cost. You can evaluate the impact of your part routing, material storage, material handling equipment and part packaging needs. As a result, you can create an optimized and productive factory with reduced part travel distances, lot sizes and inventory levels.

Production throughput simulation

Numerous factors impact the operational efficiency and throughput of your manufacturing operations. Companies find it difficult to determine the optimal configuration for their new production systems. They also find it hard to establish proper levels of work-in-process inventory, appropriate production schedules and the right production throughput to resource utilization ratio.

Through production throughput simulation (discrete event simulation), Plant Design and Optimization allows you to make intelligent business decisions about your factory design, buffer sizing, capacities and production strategies. By tying your factory layout with discrete event simulation, this Tecnomatix solution enables you to rapidly develop multiple production scenarios and analyze them for bottlenecks, efficiency and throughput

potential within a 2D or 3D environment. These evaluations can include transport strategies, lot sizes and delivery concepts across the entire factory. Optimizing the characteristics – worker schedules, required number of resources and capacities – of your production systems enables you to make verified business decisions early based on real numbers, which saves you millions of dollars during full production.

Collaborative factory design management

Numerous disciplines participate in the design, layout and installation of a typical factory, including groups responsible for the basic architecture, industrial engineering and layout planning – as well as external suppliers such as line builders and equipment vendors. These disciplines often find it difficult to communicate effectively, properly control design revisions, manage the release process or account for external supply chain activity.

Plant Design and Optimization's collaborative factory design management capabilities provide your diverse teams with a single environment they can use to capture and manage the large volumes of facility data they share. They also can use this environment to work together in a variety of automated layout and facility engineering processes.