What is Simulation Technology?
The word “simulation” is defined as “the imitation of the operation of a real-world process or system over time.” With this definition in mind, it is easy to understand why simulation is ubiquitous in engineering and industrial organizations; imitating a real-world process or system allows experts to study the process or system they are interested in within a controlled, repeatable environment.

Why Simulate in Manufacturing?
While simulation is well-established during product design and verification, industrial organizations typically do not employ this powerful methodology in the next stage of their value chain: the manufacturing of the product. As a result, organizations lose opportunities to study the behavior of their manufacturing processes and systems before they are deployed. Since commissioning of new manufacturing facilities, production lines and processes is often costly and capital-intensive, applying simulation methods to manufacturing can yield enormous benefits.

Benefits of Simulation
» Identifying manufacturing bottlenecks and opportunities to increase throughput
» Identifying cost savings opportunities such as optimization of direct and indirect labor
» Validating the expected performance of new and existing production facilities or value streams
Siemens Tecnomatix Plant Simulation

Tecnomatix Plant Simulation enables companies 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 users to create and maintain highly complex systems, including advanced control mechanisms. The intuitive, context-sensitive ribbon menu user interface of Plant Simulation 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 automotive body manufacturing processes. Users can choose from pre-defined resources, order lists, operation plans and control rules. Extending the library with company-specific objects allows for the capture of best practice engineering experiences for further simulation studies. Complex and detailed simulations can be handled, understood and maintained much better than in conventional tools by using Plant Simulation’s architectural advantages such as encapsulation, inheritance and hierarchy.

Features of Tecnomatix Plant Simulation
» Object-oriented, hierarchical modeling based on dedicated object libraries for fast, efficient modeling of discrete and continuous processes
» Graphical outputs for analysis of throughput, resource utilization, automatic bottleneck detection, Sankey diagrams and Gantt charts
» Energy analysis tools for calculating and optimizing energy usage
» 3D online visualization and animation based on the ISO standard JT format
» Integrated neural networks for experiment handling and automated system optimization via genetic algorithms
» Open system architecture supporting multiple interfaces and integration capacities (ActiveX, CAD, Oracle SQL, ODBC, XML, Socket, OPC, etc.)

Benefits of Tecnomatix Plant Simulation
» Improved productivity of existing facilities
» Reduced investment in planning of new facilities
» Reduced inventory and throughput time
» Optimized system dimensions, such as buffer sizes
» Lowered investment risks through early proof of concept
» Maximized use of manufacturing resources

Source: Siemens Tecnomatix Plant Simulation
Siemens Tecnomatix Process Simulate

Tecnomatix Process Simulate is a digital manufacturing solution for manufacturing process verification in a 3D environment. Process Simulate is a major enabler of speed-to-market by enabling manufacturing organizations to virtually validate manufacturing concepts upfront – throughout the lifecycle of new product introductions. The ability to leverage 3D data of products and resources facilitates virtual validation, optimization and commissioning of complex manufacturing processes, resulting in faster launch and higher production quality.

Features of Tecnomatix Process Simulate

» 3D simulation
» Static and dynamic collision detection
» 2D and 3D sections
» 3D measurements
» Sequencing of operations
» Assembly and robotic path planning
» Resource modeling (3D and kinematics)
» Line and workstations design
» Documentation tools
» Natively supported JT™ visualization standard
» Human task simulation
» Reach envelopes

» Vision window
» Postures
» Auto grasp wizard
» Ergonomics analysis
» Discrete and continuous process simulation
» Projection of welds on parts
» Gun search wizard
» Project arc seam
» Torch alignment
» Weld gun validation
» Design/modify tooling geometry and kinematics
» Robot reach test
» Robot smart placement
» Robotic simulation editing
» Robotic process simulation
» Event-driven simulation
» Detailed robot programming
» Controller-specific command recognition
» Boolean and non-Boolean signals exchange
» Robot logic editing and validation
» Virtual commissioning
» Model resources (sensors and controlled devices)
» Signal definition based on real hardware
» Simulate resource logic (Boolean and analog)
Benefits of Tecnomatix Process Simulate

» Reduce cost of change with early detection and communication of product design issues

» Reduce number of physical prototypes with upfront virtual validation

» Optimize cycle times through simulation

» Ensure ergonomically safe processes

» Reduce cost by re-using standard tools and facilities

» Minimize production risks by simulating several manufacturing scenarios

» Early validation of mechanical and electrical integrated production processes (PLC and robotics)

» Early validation of production commissioning in a virtual environment

» Increase process quality by emulating realistic processes throughout the process lifecycle

Engineering-Siemens Synergy

Our team specializes in applying simulation methods to manufacturing systems and processes. We have also achieved the Smart Expert Partner designation, which differentiates us as a Siemens PLM Software and customer-validated industry expert, specifically in their digital manufacturing software: Teamcenter Manufacturing, Shop Floor Connect, Shop Floor Integrate, Tecnomatix Plant Simulation, Tecnomatix Process Simulate, SIMATIC IT MES and MindSphere. As a certified reseller, solution provider and system integrator with Siemens across many business units, Engineering is the only Siemens partner in the world that has the combined vision, industry experience, resources and technical skillset to deliver integrated solutions across all these different offerings.