Robcad

Robotics and automation workcell simulation, validation and off-line programming

Benefits
- Increase manufacturing quality, accuracy and profitability
- Reduce labor hours and process engineering lead time
- Optimize development and capital investment
- Enable better use of production equipment
- Reduce production costs
- Shorten ramp-up time through validated processes
- Accelerate time-to-market

Features
- Interoperability with major MCAD systems
- Robot, machine, tool and equipment libraries
- Component modeling
- Complex kinematics modeling
- 3D workcell layout definition
- Robotic path definition with reachability check, collision detection and cycle time optimization
- Motion simulation and synchronization of multiple robots and devices
- Complete process modeling and optimization
- Download/upload optimized programs to/from the shop floor

Summary
Tecnomatix® Robcad software enables the design, simulation, optimization, analysis and off-line programming of multi-device robotic and automated manufacturing processes in the context of product and production resources. It provides a concurrent engineering platform to optimize processes and calculate cycle times. With Robcad, you can design life-like, full-action mockups of complete manufacturing cells and systems. Robcad enables manufacturers to flawlessly introduce automated processes by allowing manufacturing engineers to virtually validate automation concepts upfront.

The business value of Robcad
Robcad fully integrates core technologies with a powerful set of process-specific applications for a wide range of manufacturing disciplines, including spot welding, arc welding, laser- and water-jet cutting, drilling and riveting, and human operations.
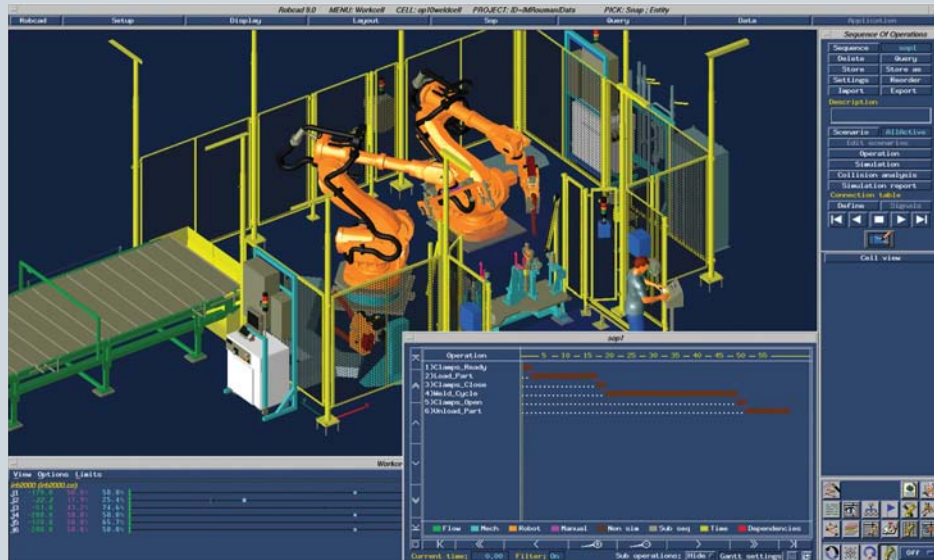
TECNOMATIX

SIEMENS

Robcad

Robcad is an industry standard, with thousands of seats in production use, helping users improve manufacturing processes by cutting costs, increasing quality and accelerating time-to-market.

Robcad serves manufacturing process design teams, including contractors and their supply chain, as well as service companies (system integrators and design houses) within automotive, aerospace, utilities and heavy equipment industries.

Graphic environment for analyzing, optimizing and verifying manufacturing automation

Robcad facilitates smarter decisions upfront, significantly reducing capital investment, planning and assembly times. It allows manufacturing engineers to graphically study and manipulate workcells that can then be analyzed, optimized and verified before investment in costly production equipment.

Robcad simultaneously models all physical characteristics of robots and other automated devices, enabling users to verify accessibility limits while developing a planning concept.

Preliminary setups of automated production can therefore be designed before launching the manufacturing process.

Interoperability with CAD systems
Robcad fully integrates with major industry MCAD systems, including native data from Siemens PLM Software's NX™ solution and supports direct CAD interfaces or neutral formats such as JT™, IGES, DXF, STL and STEP.

Interoperability with MCAD data models enables the verification of the product together with the manufacturing process.

Robcad can handle very large volumes of data, enabling the simultaneous modeling and coordination of many automation tasks.

Workcell layout design and modeling
In addition to providing the most comprehensive library of robots available, Robcad facilitates easy modeling of additional robots and automation.

Robcad layout features enable the design and construction of 3D environments, while its robotics capabilities enable robot reachability checks.

Motion simulation for robots and mechanisms
Robcad generates configurable motion plans based on the controller features. It allows calculation of cycle times, analysis of real-time performance and saves testing time.

The RRS (realistic robot simulation), which is based on using the real controller motion planning software, offers extremely accurate cycle time calculation.

Collision detection
Robcad can dynamically detect collisions during robot simulation and motion, preventing costly damages to equipment.

Sequence of operations (SOP)
Robcad facilitates the description and sequencing of all operations and tasks performed with production resources (e.g., robots, automation, workers). This

capability enables the visualization and optimization of the entire workcell cycle.

Off-line programming (OLP)
Robcad OLP enables accurate simulations of robot motion sequences and the delivery of machine programs to the shop floor. Robcad interfaces to most robots (50+ standard interfaces representing over 200 controller configurations), adjusting the program to all specifications of the controllers. Controller-specific information, including motion and process attributes, can be added to the generated robot paths. Robcad OLP then generates the program, which is downloaded to the real controller.

Programs can also be uploaded for re-use and optimization.

Standard and customized Robcad interfaces enable minimal touchups and more efficient off-line programming.

Robcad can generate the most suitable combination of equipment to meet specific manufacturing requests, allowing faster product introduction and early evaluation of manufacturing times, costs and project investments. Equipment can then be used exclusively for production and not wasted on program development.

Off-line programming.

Robot calibration improves positioning accuracy

Robcad provides calibration functionalities and interfaces to accurately align digital cell models with actual layouts. After downloading the program, the robot will accurately move to defined locations in the cell without need for touchups.
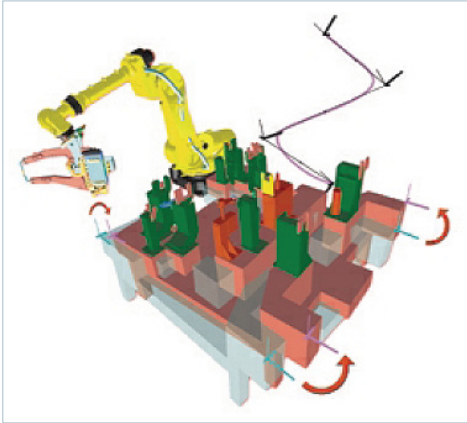
Robot calibration: aligning digital and real worlds.

Open system environment for customized program functions

The Rose Development Kit offers an open system environment for developing customized features, macros and applications. It enables easy, fast and efficient programming and provides high-level access to all Robcad proprietary core technologies and algorithms, including geometry, kinematics, motion planning and graphics.

Automatic path planning

Robcad generates collision-free robot and part assembly paths by using automatic path planning technology.

In a populated environment, the trajectories can be found easily and automatically, helping to increase planning productivity.

Documentation

Editable HTML reports containing images and data extracted from the workcells, with subreports for all included resources

Spot welding.

and manufacturing features graphical views and animations are generated automatically.

Robcad can also generate drawings of cell layouts and output movies.

Spot welding

Robcad Spot addresses the entire spot weld design process, taking into account such critical factors as space constraints, geometric limitations and weld cycle times. Powerful features such as gun search, automatic robot placement, path cycle-time optimizers and weld-point management tools enable users to create virtual cells, simulations and programs that accurately reflect the physical cell and robot behavior. Robcad Spot also enables efficient off-line programming, shortened production ramp-up time and optimized introduction of new products or variants without interrupting current production.

Arc welding

Robcad Arc enables the design, simulation, analysis and off-line programming of arc weld processes. It facilitates creation of workcell layouts based on definitions of robot motions, seams, gantries and welding equipment. Seams are created based on the part geometry and qualified

welding procedures. Tooling can be verified according to torch access. Torch orientation, gantry and positioner settings can be optimized to ensure collision-free access, robot reach and optimized welding conditions. The welding sequence can be defined and optimized to limit part deformations and minimize cycle time. Complete, fully proven programs can be downloaded to equipment on the shop floor, minimizing production downtime. The same welding paths can be easily adjusted and transferred to various equipment available in the factory.
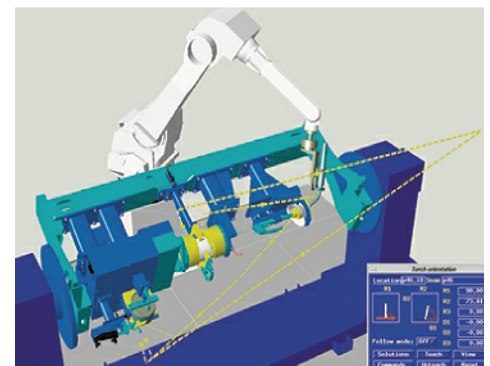
Arc welding.

Painting, sand blasting, shot peening, flaming and thermal spraying

Robcad Paint provides software tools that address the entire spraying process: designing the robot path, verifying access to all areas, determining coverage parameters and thickness, creating and adjusting process triggers, simulating and downloading the optimized program to the shop floor.
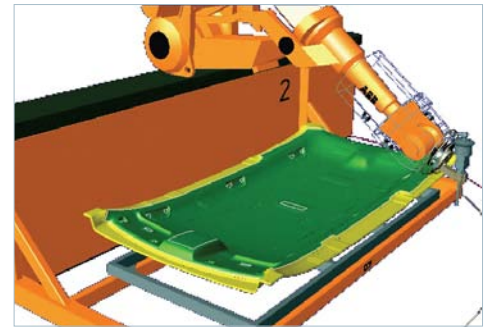
For the painting process, Robcad Paint supports robots and painting machines using conventional or electrostatic spraying. Its comprehensive functionality, combined with the open and configurable thickness calculation function, enable its implementation for other spraying processes, such as sand blasting, thermal plasma spraying, shot peening and flaming.

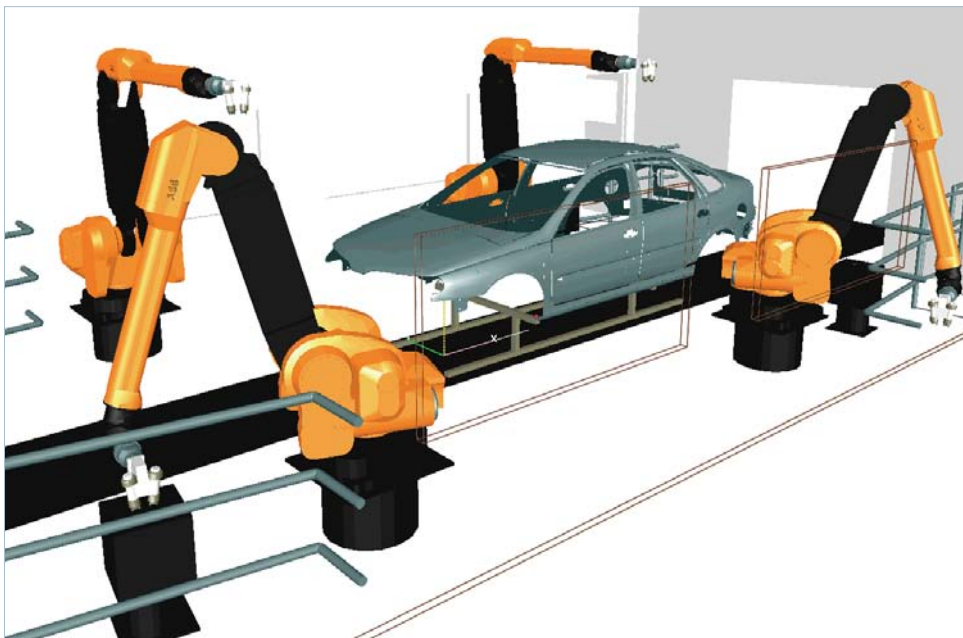**Laser, water jet and plasma cutting, sealing and gluing**

Robcad Cut and Seal provides software tools that enable automatic creation of complete contours by simply selecting a single curve or single surface. Geometric flaws such as gaps can be accommodated. The contour is converted into linear, circular and spline motions. The path orientation is always kept normal to the surface, and the tool compensation feature allows tool diameter to be taken into consideration.

Orientation can be easily manipulated with advanced tools to handle singularities (sharp corners), to manage wrist configuration and optimize motion (offset wrist with 5-axis machines, 6-axis robots) and to automatically avoid collisions with the workpiece. After sequencing the paths, an optimized and fully proven program can be downloaded to the machine or the robot.

Laser cutting.

Painting.