# MWP

JULY 2009

Automotive sector reports

Reducing MWF waste

Developments in grinding

As robots become more popular for tasks which previously required CNC machines, software is appearing which supports the need for increased control and efficiency.

CADCAM for robots

Robotmaster supports 6-axis robots from Fanuc (left), ABB, Kuka (right), Motoman and Staubli, with development continuing on other brands.
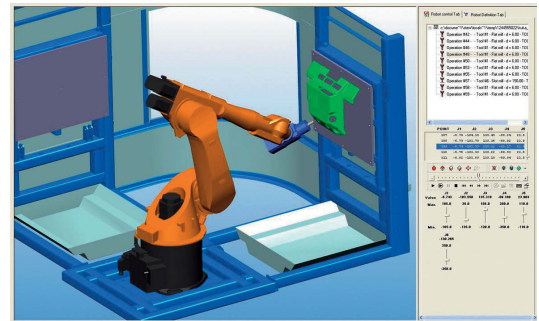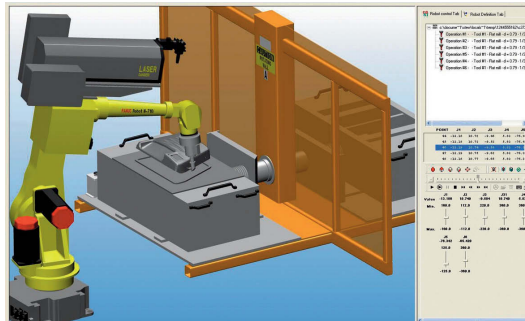
ROBOTS in manufacturing are often regarded as inaccurate, suitable only for welding or pick and place applications. However, with higher underlying accuracy from the equipment, and calibration methods which permit tolerances of 0.02mm (or better), robots are becoming more common in machining applications. In this context 4D Engineering announces the UK release of Mastercam's Robotmaster for 6 axis robotic programming using advanced CAD/CAM techniques.

So, robots are now addressing tasks which previously required CNC machines, and software is being developed to support the need for increased control and efficiency. There are many established software suites for CNC programming, but robot operators have often relied on manual teaching of robot movement through the use of teach pendants – time consuming and often inaccurate. Off-line programming (OLP) is a faster way of defining robot trajectories; robot path programming is done on a computer, while the robot continues to operate with a current program. This is not a new concept; robot simulation and OLP suites have been available for decades. What's new is OLP software with features that can take advantage of better robot tolerances.

Robotmaster is an OLP/simulation module built on Mastercam to create accurate 6-axis robot trajectories from tool path information. As a global leader in CAD/CAM systems, Mastercam provides a familiar CAD/CAM environment for Robotmaster users. Robotmaster removes the dependency on teaching or point creation via pendant by using CAD geometry to create tool paths. Tool path data are processed off-line, as native robot instructions in a file, ready to download onto a robot controller. With a Motoman robot for instance, the post-processing creates a JBI file. The data is transferred to a robot, and the operations in the file can be run through it.

Robotmaster is not a G-code converter; rather, it processes (in one step) the tool path data to accurately create robot trajectories while offering an interface that allows users to intelligently program their robots, and change parameters which govern the operation of the robot; movement operations, robot positioning, and tooling control can all be modified. Furthermore, Robotmaster offers complete robot cell simulation and a variety of error checking features to ensure confident OLP before implementation.

Robot simulation is offered with a number of useful features, along with general zoom, rotate, and play control, for complete observation of simulated processes. Simulated robot joint motion can be dynamically controlled or modified by the user to view the effects of individual manual joint movement. For presentation, or data sharing purposes, the entire simulation routine can be exported and run on systems without Robotmaster installed, while maintaining the core display interface. Collision detection is employed in simulation, with cell-specific collisions indicated on operation move, and graphical indication of any colliding components. Collisions with part geometry, work fixtures, or tooling can be rectified through safe retract moves and simulated to ensure corrective action is successful. Further error checking is included; singularity, out of reach and joint extension errors are calculated from specific robot kinematics, suspending any robot movement in these cases.

For orders comprising components that are similar in design, or where modifications/updates are made, configuration profiles can be saved, to maintain any set parameters and eliminate redundant definitions for similar tool operations or setups. Current applications suited for Robotmaster include trimming, welding, mould machining, spray coating, painting, polishing, grinding, de-burring/de-flashing, and dispensing.

The time savings obtained by OLP software provide new economically feasible robotic solutions. Barriers such as programming and familiarity time are significantly reduced through the use of Robotmaster, and so companies can confidently integrate robotic solutions into their processes, where these time factors were issue. Employees already experienced with programming CNC machines through CAD/CAM software can be trained to operate a robot in similar fashion, especially when familiar with the Mastercam interface.

www.robotmaster.com

New Products and Services

■ Professionals' choice
(Keyword site search on Sescoi)

■ Greater productivity
(Keyword site search on Edgecam)

Case Studies

■ Small is beautiful
(Keyword site search on Sescoi)