Dual purpose setup of the TEKS robot cell

The robot cell at TEKS was the first cell to be active within the COMET project. Since the activation of the first cell back in November 2010, TEKS moved to a new and larger facility down the road. Their original layout of the cell had a stationary spindle on a metal frame while the robot handles the part. For small, light parts this is a good solution, but for large or heavy parts it is more practical to let the robot carry the spindle and keep the part stationary on the ground or on a work table. TEKS engineers have designed a spindle mount that allows an easy removal of the spindle and designed a second spindle mount to be attached to the robot arm. With the two spindle mounts and a removable spindle, TEKS is now able to change between the two configurations within half an hour, which makes their cell dual purpose: it can be changed into configuration 1 (part on robot, fixed spindle) or configuration 2 (spindle on robot, fixed part) depending on the job at hand.

Figure 1: two configurations: robot holding the part or robot holding the spindle

Figure 2: the two configurations inside the Delcam PowerMILL Robot Interface
At the end of July an application engineer from Delcam visited TEKS to model the new cell layout in the PSIR Robot Interface and carry-out validation experiments to test the new setup. After the setup an advanced training in the PSIR Robot Interface was given to the engineers of TEKS and neighbouring AMRC Manufacturing Ltd, both project partners in COMET. The advanced Robot Interface training focused on how to use PowerMILL and the Robot Interface to obtain a good toolpath (e.g. strategy, point distribution, tolerances). The Second topic was how to correctly and easily position the part in the robot simulation. The third topic focused on the setup and definitions of the tool and base workplanes. In the latest Robot Interface version 2012 a new workplane calculator is added to allow the user to select and calculate the various positions, Euler angles or quaternion angles of the required workplanes. After the training and setup of the new cell, various machining experiments were carried out to experiment with both layouts, while using the newly learned features in the software.

![Figure 3: application engineers from Delcam and TEKS working on the dual-purpose TEKS cell](image)

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