COMET Demonstrator at SIR

The demonstrator cell
The fully automated robot cell consists of an ABB IRB 6640 185/2.8 with IRC 5 controller and has the COMET components KDMIR, PSIR and ATIR installed. In addition automatic part feeding and handling, automatic calibration and automated inspection of the part is included.

The part
One of the most interesting application of robot machining in the Automotive components sector relates to the finishing machining of metal cast parts. Parts of engine and power train system are made by metal cast part. The demonstration part selected by SIR is an Aluminium cast Brake Caliper. Before being assembled on the disk brake, the cast part goes through 15 different machining operations which comprise various drilling, face milling and chamfering. To really get the advantage of using the robot instead classical CNC machining, SIR has developed a fully automated work cycle in which the robot itself:
- Measure the actual tool length and the mechanical devices.
- Identify the pose of parts randomly located on a pallet thanks to a mobile vision system.
- Grasp parts using a customized gripper.
- Re-clamp and align every workpiece with respect to the gripper (calibration), through the use of a touch probe and the vision system itself, in order to correctly orient the part before starting machining.
- Execute machining on two different part poses and tools (manual changed).
- Control dimensional quality through vision system.

SIR performed an initial economic evaluation in order to understand the industrial potential of the COMET solution. For such a reason a CNC supplier was asked to realized the same work cycle realized within the robot cell. Robot machining cost with robot resulted lower than the CNC reference mainly thanks to the complete process automation. This allows to drastically limit operator intervention (especially part loading/unloading and part re-orientation), and so the labour cost. The complete automation also makes possible to run the machining process without human supervision, significantly increasing the total productivity.

More information can be found on www.comet-project.eu, www.sir-mo.com and www.delcam-robotics.com

Automotive brake caliper
- Aluminium (AlSi7Mg0.59)
- 290x155x80 mm - 2.7 Kg
- Geometrical/ dimensional tolerances according to ISO 2768-fH

Full automation of cast part finishing:
- Face milling, contour milling, drilling and chamfering
- 15 operations, 4 sides, 2 part poses
- From part grasp to final quality control (vision system)