

Highlight

Zamudio,
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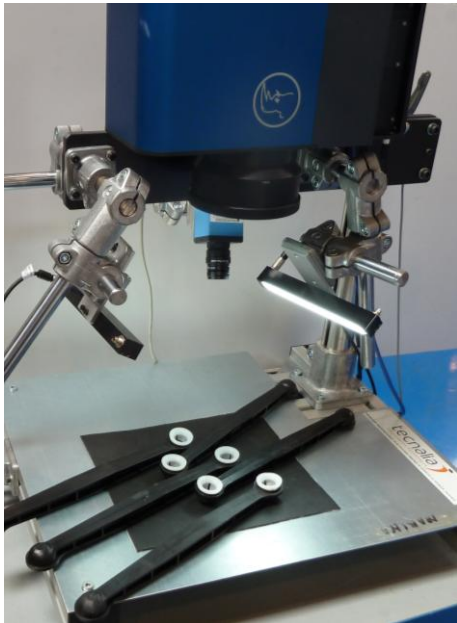


Figure 1: Functional prototype of machine vision system in a scanner-based laser polymer welding setup to weld five arbitrarily arranged white plastic rings

Functional prototype of machine vision system for static machine auto-calibration previous to laser polymer welding process

Laser polymer welding offers significant advances compared to conventional plastic joining means. This technology in conjunction with scanners allows to weld flexible geometries at high speeds. However, precise positioning of a weld contour relative to the entire workpiece is still a challenge. Using cameras, position recognition of workpieces previous to the welding operation can be achieved in a non-intrusive way. Within the frame of the EU-funded "PolyBright" collaborative Project, Tecnia has developed a machine vision functional prototype that faces this challenge by using calibration of a scanner-based laser welding system.

The prototype provides a vision system for automatic detection of workpiece's position and flexible reconfiguration in order to adapt it to different types of workpieces. It allows two possible configurations depending on how the camera interacts with the system. The first configuration makes use of an external camera, with fixed relation between camera view relative to the workspace. The second configuration is based on a camera coaxially mounted relative to the laser beam.

Comparing both two camera configurations, the suitability of either one depends on the cycle time and accuracy needed. While the coaxial configuration accuracy is 10 to 100 times higher than the external one, it requires at least one shot per workpiece in contrast to the single shot required for the external configuration.



Figure 2: Simulating polymer welds at five arbitrarily arranged white rings with a red laser pointer.

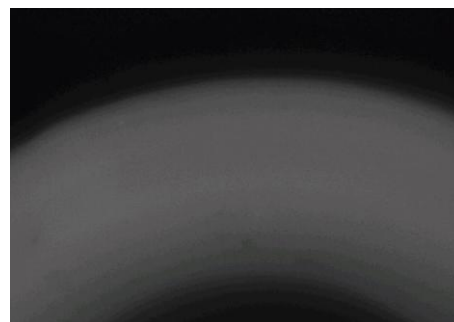


Figure 3: Coaxial camera image of one of the welded polymer rings

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