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Development of measuring systems for contact force and relative velocity in robot-guided centrifugal finishing

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Abstract

Robot-guided centrifugal finishing is capable of reducing the surface roughness and inducing residual compressive stresses into the edge zone of the component to enhance the fatigue strength. Due to an insufficient understanding of robot-guided centrifugal finishing processes, it is not possible to adjust the process result in a knowledge-based manner. In order to understand the mechanisms of action in the process, knowledge of the contact force and the relative velocity between abrasive media and workpiece is necessary. Therefore, in this work measuring systems for the measuring of the contact force and the relative velocity were developed and validated to close this knowledge gap.

Keywords: Robot-guided centrifugal finishing; abrasive media; contact force; relative velocity