

Cyber equipping 4.0 – FE-simulation-based setting instructions for a rotary draw-bending machine

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ABSTRACT

The tool setting process of a rotary draw-bending process is very complex. Only experienced machine operators know which settings lead to a good result in relation to the bending task. Up to seven individual tools can be installed, positioned and set in the process independently. A complete set of tools consists of: pressure die, mandrel, wiper die, inner and outer clamp die as well as the bend die and the collet. [2] Furthermore there are the axis settings, which can be adjusted with the parameters distance, force, angle, torque and time. If a defect occurs after the successful set-up process the machine operator has various possibilities to solve the problem. The effects of the different setting parameters and the procedure for the fastest possible elimination of the error are often unclear. The goal is to be able to use an adjustment support for the setting process by means of physical-analytical principles and systematically constructed FE simulations at the bending machine. In order to evaluate the bending result, the condition of the bending component is examined concerning the quality characteristics, cracking, wrinkling, cross-section deformation and elastic recovery. [1] Based on performed and analyzed FE simulations, adjustment recommendations regarding the respective quality characteristics are to be established as well as predictions about possible defects. The simulation and calculation results flow into a database. This is used for the implementation of an electronic expert, who uses a visualization aid to provide the machine operator with information and recommendations on the setup settings. This avoids errors during the equipping process and saves setup time. Machine operators and particularly trained staff are guided and supported in their work.

REFERENCES

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