A Statistical Approach in the FEM Simulation Analysis of Geometrical Product Specification during the Cold Tube Drawing Process

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Cold tube drawing provides higher accuracy compared to hot approaches. The process can be used to reduce the dimensions of tubes, and depending on the reduction size, the wall thickness of these may be subject to changes. In the process, any form of variability provoked by external factors is highly sensitive, given that the resulting tubes are often the final step in tube production. This paper focused on the evaluation of the influence of pre-tube factors on key variables after the FEM simulation of drawing process, i.e., the outer diameter, and wall thickness of the tubes. For these purposes, a factorial design with fixed factors was implemented. It was also a goal to investigate if the single-pass type of drawing would guarantee good statistical results potentially leading to significant time and financial reductions. The FEM simulation were executed using DEFORM software of Scientific Forming Technologies Corporation with Design of Experiment application module of this software. The results prove that most factors, and their interactions, significantly impacted the response variables.

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