Application of Numerical Simulation to Optimize Workpiece Designs and Processes in Industrial Forming

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Abstract: In this study, the filling–die problem in forming without changing volume is considered through the workpiece optimization process. The forming is known as an important production process in a multi–step process to acquire the final product. The workpiece is preformed before it is taken into account the forming process because its shape will definitely affect the final product and the die life. Accordingly, the workpiece issue is resolved to extricate the other inconvenient issues. The formation of flash and semi–finished product (SFP) is simulated by using commercial solver ANSYS Explicit. Also, the optimal shape of workpiece is obtained based on distinct material properties and isotropic hardening theory. The interactive forces between workpiece and die as well as the strength of die are analyzed in details.

$Keywords$: workpiece, large deformation, hardening, ANSYS, forming.

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