

Design of Process Parameters in Electromagnetic Forming Apparatus by FEM

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Abstract : Electromagnetic forming (EMF) process is one of a high-speed forming process, which uses an electromagnetic body (Lorentz) force to deform work-piece. Advantages of EMF are summarized as improvement of formability, reduction in wrinkling, non-contact forming. In this study, the spiral coil is considered to evaluate formability in terms of pressure distribution of the forming process. It also is represented forming results of numerical analysis using ANSYS code. In the numerical simulation, RLC circuit coupled with spiral coil was made to consider the design parameters such as system input current and electromagnetic force. The simulation results show that even though input peak currents level are same level in each case, forming condition is certainly different because of frequency of input current and magnitude of current density and magnetic flux density. Finally, the simulation results appear that electromagnetic forming force apparently affected by input current frequency which determines magnitude of current density and magnetic flux density.

Keywords : electromagnetic forming, high-speed forming, RLC circuit, Lorentz force

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