Kitikorn kummoon 2012: Applied Nonlinear Finite Element Analysis for Simulating the Hot Forging Process of Brass. Master of Engineering (Mechanical Engineering), Major Field: Mechanical Engineering, Department of Mechanical Engineering. Thesis Advisor: Associate Professor Satjarthip Thusneyapan, M.S. 153 pages.

This research applied the Computer-Aided Engineering (CAE) technology to predict the final of the forging product, by the use of available Computer-Aided Design (CAD) and Finite Element Analysis (FEA) software. The size of a Billet for hot forging a brass product is a factor for the production. The optimize size the Billet reduces time and cost of the production. When the Billet size is too large, it leads to higher impact force during the forging which causes to lower lifetime of die and machine; as well as, waste from scrap and retouches time. The material of interested is brass or copper alloy (CuZn40Pb2). A mathematical model of the brass was experimentally obtained by compressing at temperature of 650ºC. The non-linear stress-strain relation of the brass was applied to non-linear FEA software, MSC.Marc. The simulation of the deformation of the Billet during the forging was done by using our developed finite-element model, procedures and the material model. The total of three products was studied and compared with the final deformed shapes of the forging workpieces. The average error in the sizes of the flash thickness is 16.9%. Our procedure proved suitable for the simulation of hot forging process specially for prediction the proper size and shape of the Billet; as we applied the technique and successfully reduce the Billet mass of one product by 5.57%.

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