

A Study on Manufacturing of Head-Part of Pipes Using a Rotating Manufacturing Process

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Abstract : A large variety of pipe flange is required in marine and construction industry. Pipe flanges are usually welded or screwed to the pipe end and are connected with bolts. This approach is very simple and widely used for a long time, however, it results in high development cost and low productivity, and the productions made by this approach usually have safety problem at the welding area. In this research, a new approach of forming pipe flange based on cold forging and floating die concept is presented. This innovative approach increases the effectiveness of the material usage and save the time cost compared with conventional welding method. To ensure the dimensional accuracy of the final product, the finite element analysis (FEA) was carried out to simulate the process of cold forging, and the orthogonal experiment methods were used to investigate the influence of four manufacturing factors (pin die angle, pipe flange angle, rpm, pin die distance from clamp jig) and predicted the best combination of them. The manufacturing factors were obtained by numerical and experimental studies and it shows that the approach is very useful and effective for the forming of pipe flange, and can be widely used later.

Keywords : cold forging, FEA (finite element analysis), forge-3D, rotating forming, tubes

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