

Investigation of Neutral Axis Shifting and Wall Thickness Distribution of Bent Tubes Produced by Rotary Draw Bending

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Abstract : Rotary draw bending is a method used for tube forming. During the tube bending process, the neutral axis moves towards the inner arc and the wall thickness changes in the cross section of the tube. Wall thinning of the tube takes place at the extrados, whereas wall thickening of the tube occurs at the intrados. This paper investigates the tube bending with rotary draw bending process using thick-walled tubes and different material properties (16Mo3 and 10CrMo9-10). The experimental tests and finite element simulations are used to calculate the variable characteristics (wall thickness distribution, neutral axis shifting and longitudinal strain distribution). These results are compared with results of a plasto-mechanical model. Moreover, the cross section distortion is investigated in this study. This study helped to get bends with smaller wall factor for different material properties.

Keywords : rotary draw bending, thick wall tube, material properties, material influence

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