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Research on the impact of geometric parameter on the cross-section precision

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ABSTRACT

Tube with rectangular section produces cross-section distortion easily in the process of bending, affecting the forming precision. Taking the rotary draw bending of high-strength steel BR1500HS tube shaped rectangular section for the study object, the article puts forward the description method of cross-section distortion, and tests the rule that cross-sectional position, wall thickness, bend radius, and other geometric parameters influence on cross-section precision after rotary draw bending through experiments. The finite element model of high-strength steel tube with rectangular cross-section about rotary draw bending is established based on ABAQUS software platform, the experiment and simulation results are compared. The results showed that after cross-section distortion, it is approximately trapezoidal, and the maximum of distortion exists in 45–60°C of rotary draw bending direction, the absolute and relative distortion values decrease as the thickness or bending radius increases. The simulation and experimental results agree well. So, the results provide a reference about selecting geometric parameters on high-strength steel tube with rectangular section in rotary draw bending.

KEYWORDS: tubes with rectangular section, high-strength steel, rotary draw bending, cross-section precision