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Calculation and measurement of the welded residual stress for a J type groove joints in pressure vessel structure

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ABSTRACT

According to the J groove welded joints at the center symmetrical position of a pressure vessel, the surface residual stress of welded joints has been measured by section cutting method. The residual tensile stress is obtained near the welded specimen center. It is shown that the residual stress decreases gradually with increasing distance from the welded center. In order to get the inner residual stress distribution, the inherent strain distribution in a T and L type specimens have been measured by using the inherent strain method. It is providing the data for supporting the further calculation of the residual stress in the whole structure. The temperature field and residual stress have been calculated using ABAQUS software. The simulation results and experimental results were compared. The results show that the model calculation results and test results are in good agreement.

KEYWORDS: J type welding joint, residual stress, measurement, numerical analysis