ABSTRACT

The purpose of this study was to determine the distortion (deformation) and the residual stress due to uneven heat distribution during the welding process until the cooling on pipe and elbow with variation number of tack weld and welding sequence. The research was carried out by numerical methods with ANSYS 11 software and the validation results performed with experiments. Material for testing are ASTM A106 grade B for pipe and A234 grade WPB for elbow with E7018 for filler metal. Planning for welding is done based on WPS. Modelling carried out by varying the number of tack weld and welding sequence, including continuing welding sequence, symmetry, and jump to number four tack weld, continuing welding sequences and jump to number three tack weld, as well as continuous welding sequences and symmetry to the number two tack weld. From variation performed obtained best result by the smallest distortion (deformation) and residual stress is tack weld four with the welding sequence symmetry. While the worst welding that produces distortion (deformation) and residual stress is the biggest by the number of tack weld two with continuing welding sequence.

Keywords: tack weld, distortion, deformation, residual stress