

Pengaruh posisi pengelasan dan ketebalan pelat terhadap besarnya tegangan sisa dan distorsi pada baja JIS S 3101 SS400 dengan metode GMAW = Effect of welding position and plate thickness concerning in welding angular distortion and residual stress on JIS 3101 SS400 steel with GMAW method

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Abstrak

Telah dilakukan penelitian terhadap besarnya distorsi angular (sudut) terhadap posisi pengelasan dan ketebalan pelat serta pengukuran tegangan sisa dengan menggunakan difraksi sinar neutron. Posisi pengelasan yaitu posisi tegak (3G) dan posisi datar (1G) menurut AWS dilakukan dengan parameter ketebalan pelat 10 mm, 16 mm dan 20 mm. Posisi tegak diperoleh nilai distorsi angular yang paling besar dibandingkan dengan posisi datar setiap bertambahnya ketebalan. Berturut-turut nilai perubahan sudut distorsi angular untuk ketebalan 10, 16, 20 mm pada posisi tegak yaitu 1,560, 3,520 dan 4,020 sedangkan pada posisi datar yaitu 0,870, 2,990 dan 3,640. Pengukuran tegangan sisa dilakukan pada pelat 16 mm dengan arah longitudinal, transversal dan normal. Diperoleh nilai tegangan sisa terbesar pada arah longitudinal posisi tegak (3G) yaitu 101,61 MPa. Tegangan sisa berupa tegangan tarik terlihat pada daerah kampuh las dan HAZ kasar dengan rentang -10 mm sampai 10 mm.

Research about welding angular distortion concerning on plate thickness and welding position has been conducted. This research come along with residual stress measurement on 16 mm of plate thickness by using neutron scattered diffraction. The welding position are vertical position (3G) and flat position (1G) according to AWS code which done with 10 mm, 16 mm and 20 mm of plate thickness. Vertical position obtained that angular distortion was happened in rather than flat position which every increasing of plate thickness. As follow as the value of angular distortion for 10, 16 and 20 mm of thickness on vertical position is 0,870, 2,990 and 3,640 whereas flat position is 1,560; 3,520 and 4,020. The measurement for residual stress on 16 mm of thickness with longitudinal, transversal and normal direction. The result obtained that the largest residual stress on vertical position in longitudinal direction is 101.61 MPa. Residual stress which tensile stress is close to weldpool area and coarse HAZ with range -10 mm to 10 mm.