Development of a combination heat sink and clamp method for GMAW welding to reduce distortion

by Heri Wibowo, Slamet Karyono, Tri Adi Prasetya

ABSTRACT

Efforts to reduce the level of welding distortion should be prioritized in welding, considering that distortion can reduce the accuracy of weld dimensions, increase the repair process and increase production costs. This study aims to reduce distortion with a combination method of heat sink and clamp and its effect on its mechanical properties.
The combined treatment of heat sink and clamp is applied in conjunction with the welding process. The heat sink functions as a heat sink which is placed on both sides of the welding line which is 10 mm from the center of the weld. The clamp serves as a holder of the workpiece so that there is no deformation placed at the end of both sides of the weld workpiece. The heat sink is made of steel filled with running water as a heat sink with a temperature variation of 5ºC and 27ºC.
The results showed that the combination of heat sink and clamp was able to reduce the significant distortion value, especially with the treatment of reducing the temperature of the coolant (water) from 27 oC to 5 oC. The results of the visual welding test showed that it was as welded and all treatments combined with heat sink and clamp were declared "accepted" because they met AWS standard criteria. This is supported by dye penetrant testing which displays defects or cracks free on the surface of all specimens. Tensile test results show the tendency of the same value between the welded axles with all the combination treatments of heat sink and clamp, which is around 500 N / mm2 (500 Mpa), so that it reflects that the welding treatment does not reduce the tensile strength of both the weld metal and HAZ areas.

Kata Kunci: *heat sink, clamp, GMAW, distortion*