The Effect of Current Variations on GTAW SMAW Double Layer Welding to the Hardness and Tensile Strength Test on SS304 and ASTM A36 Dissimilar Welding Dicky Adi Tyagita, ST, MT as Chief Counselor

Mohamad Sofyan Rian Hidayat Study Program of Automotive Mechanical Majoring of Engineering Politeknik Negeri Jember sofyanrian952@gmail.com

ABSTRACT

Dissimilar metal welding is a welding process performed on two different types of metals or metal alloys. Dissimilar metal welding is a development of modern welding technology due to the need for splicing materials that have different types of metals. With these differences, welding of two different metals requires a good welding procedure in order to obtain maximum welding quality. Electrode selection and proper use of current as well as selection of joint types according to welding standards are needed to produce perfect welding results. This study discusses the effect of dissimilar metal welding on stainless steel 304 and ASTM A36 low carbon steel with the combination welding method of Gas Tungsten Arc Welding (GTAW) and Shielded Metal Arc Welding (SMAW) on micro vickers hardness testing and tensile tests. The types of electrodes used are AWS (American Welding Society) E309 – 16 (2.5 mm) and ER309 (2.5 mm) electrodes. The variations in welding current used are 60 A, 70 A and 80 A with mapping per one variation of GTAW welding current varied by 3 variations of SMAW welding current. Specimens that have been made are then tested in the form of micro vickers hardness testing and tensile tests. With the current variation used get the highest tensile test results of 397.5 N / mm^2 at voltage and 17.5% in strain, while hardness test results obtained the highest result of 331 HV in stainless steel HAZ. So it can be known that the results of welding on stainless steel 304 and low carbon steel ASTM A36 with a combination of GTAW and SMAW on tensile testing the greater the current used, the higher the tensile strength value, but there are still some values that decrease, as well as in hardness testing the greater the current used, the higher the hardness value obtained and there are still some values that decrease.

Keywords: Dissimilar welding, double layer welding, GTAW, SMAW, stainless steel 304, ASTM A36, current variation, hardness test, tensile test.