ABSTRACT

Duplex Stainless Steel (DSS) 2205 is now becoming main choice in heavy industries, including marine industries, due to some benefits of this steel compared to Austenitic Stainless Steel (ASS) which often used before. The steel has yield strength twice of that of the standard ASS and remarkable general corrosion resistance due to balanced composition between ferrite and austenite.

This research examines ferrite content and corrosion rate of DSS 2205 before and after welding process. The variation of specimens to be used are base metal, deposited weld metal, and weld metal. Photo micro, ferrite scope test, corrosion rate tests with electrolyte of FeCl3, and photo macro were conducted.

The result from photo micro test indicated that base metal contained 50.97 % of ferrite, deposited weld metal 52.12 %, and weld metal 35.27 %. These results are comparable to Ferrite Number (FN) from ferrite scope test which indicated that FN in each base metal, deposited weld metal, and weld metal are 51.2, 55.67, 30.3 respectively. According to the test result, the ferrite content (EC) and ferrite number (FN) showed nearly same results in each specimen. Photo micro test showed that the welding process changed the shape of microstructure from intercellular ferrite to acicular ferrite with dendritic area.

The result from corrosion rate test showed that base metal, deposited weld metal, and weld metal have corrosion rates of 0.00215 mmpy, 0.00228 mmpy, 0.00208 mmpy respectively. As conclusion, it was indicated that increasing in ferrite content in DSS 2205 increased its corrosion rate.

Keywords: duplex stainless steel, ferrite, austenite, ferrite scope