

FGB SAW 용접부 물성에 미치는 Ni과 Mo의 영향에 관한 연구

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Effect of Ni and Mo on Mechanical Properties of Submerged Arc Welds with Flexible Glasswool Backing

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Abstract

FGB(Flexible Glasswool Backing) Submerged Arc Welding has been one of the main welding processes for one side butt welding in shipbuilding industries, which can efficiently improve the welding productivity by the addition of a supplementary filler metal into the molten weld pool.

As recent ships have become larger in size, the application of high tensile and higher grade of steels has been continuously increased. Single pass FGB SA welding process accompanies such a high heat input when welding thick plates that the mechanical properties of weld metal can be dramatically degraded. This study has been performed in order to obtain high toughness and tensile properties of high heat input FGB SA welds, and to evaluate the effect of alloy elements on their mechanical properties.

To complete welding 25mm-thick EH36 grade steel plate by single pass, 1.2mm diameter and 1.0mm long cut wires has been distributed in the groove before welding, and three different test coupons have been made using C-1.5%Mn, C-1.8%Mn-0.5%Mo, and C-1.4%Mn-1.7%Ni cut wires to investigate the influence of nickel(Ni) and molybdenum(Mo) on the mechanical properties of welds.

Test results showed that the addition of Ni and Mo effectively promotes the formation of Acicular Ferrite(AF), while significantly reducing the amount of Grain Boundary Ferrite(GBF) in weld metal microstructures, which resulted in a beneficial effect on low temperature impact toughness and strength.

Key Words : Submerged arc welding, Flexible glasswool backing, Cut wires