입열량이 고변형률 강관 원주 용접부 특성에 미치는 영향

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Effect of Heat Input on Girth welds properties of High strain steel pipe

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ABSTRACT

SBD (Strain-based design) of pipe lines have gained world-wide attention in recent years. The present research aims to evaluate the fracture characteristics of API (America Petroleum Institute) SBD X100 girth weldment that typically applied for cold climate and deep water offshore, with the focus on the influence of heat input changing with 6kJ/cm and 10kJ/cm from GMAW (Gas Metal Arc Welding).

At a low heat input at 6kJ/cm, the weld metal had Multi-phase matrix (Acicular ferrite + Banite + Martensite) that could fill up both fracture toughness and strength as reported previously. Also, the weld metal exhibited 859MPa YS (Yield strength), 108J impact toughness at -40℃ and 0.52mm CTOD (Crack Tip Open Displacement) at -10℃. These results can be satisfied with the requirement of API SBD X100 girth weldment and Alaska pipe line project.

Key word : SBD (Strain Based Design); API (America Petroleum institute), GMAW(Gas Metal Arc Welding) fracture toughness; Girth weldment; CTOD (Crack Tip Open Displacement);