

ANALYTICAL AND PRACTICAL ASSESSMENT OF HIGHER STRENGTH HOT-ROLLED PLATE WELDABILITY

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ABSTRACT

The paper aims to evaluate suitability of existing mathematical models for the calculus of mechanical properties of high-temperature areas that appear in heat-affected zone (HAZ) of welded joints, for hot-rolled plates of D36 steel grade (T-orientation) used in shipbuilding. The article shows that analytical methods of calculating mechanical properties of high-temperature areas of HAZ (R_m , R_{eH} and HV) based on chemical composition and with consideration of cooling rate after welding ensure a degree of reliability sufficient for practical application and can be recommended for initial estimation of mechanical properties, referring to high thickness hot rolled plates of D36 steel grade. Impact energy during Charpy test (KV_{T-20}) of high-temperature areas of HAZ cannot be analytically assessed with an accuracy required for manufacturing practices.

KEYWORDS: D36 steel grade, weldability, analytical calculation, mechanical testing, mechanical properties, impact energy, toughness, hardness

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