Pengaruh ukuran butir ferit hasil canai hangat 650oC multi pass reversible terhadap ketahanan korosi hydrogen induced cracking pada baja karbon rendah = Effect of ferrite grain size of warm rolling deformation process through to multipass reversible on hydrogen induced cracking resistance in low carbon steel

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Abstrak

Grain refinement is known to lead improvements in strength of material. A complete understanding of how refinement, grain size, and processing affect the corrosion resistance of low carbon steel has not yet been fully developed. Determining a definitive „grain size-corrosion resistance relationship, if one exists, in inherently complex as the processing needed to achieve grain refinement also imparts other changes to the microstructure (such as texture, internal stress, and impurities segregation).
This work evaluates how variation in grain size and processing impact the corrosion resistance of SS 400 Low Carbon Steel Structural Steel. SS 400 samples with a range of grain size ~8m to ~10.5m, were produced using Thermomechanically Processing (TMP) with multi pass reversible method in warm rolling. Hardness measurement, tensile testing, electrochemical polarization and hydrogen embrittlement (HE) studies have been carried out to assess the mechanical and corrosion behavior of the low carbon steel.
By applying rolling deformation process in warm working temperature, low carbon steel will have fine ferrite grain structures made its mechanical properties increased, its corrosion rate decreased and also its ability to absorb hydrogen decreased. The applied mechanisms of pass deformation are reversible which are 20%, 20% +20%, 20% +20% +20% and 20% +20% +20% +20% with initial thickness ho 6 mm. By applying this mechanism, it is expected that fine ferrite grains will influence the corrosion rate of low carbon steel SS 400 structural steel.