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Effect of Alloying Elements and Hot Forging/Rolling Reduction Ratio on Hardness and Impact Toughness of Heat Treated Low Alloy Steels

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Abstract : The present study was carried out to investigate the effect of alloying elements and thermo-mechanical treatment (TMT) i.e. hot rolling and forging with different reduction ratios on the hardness (HV) and impact toughness (J) of heat-treated low alloy steels. An understanding of the combined effect of TMT and alloying elements and by measuring hardness, impact toughness, resulting from different heat treatment following TMT of the low alloy steels, it is possible to determine which conditions yielded optimum mechanical properties and high strength to weight ratio. Experimental Correlations between hot work reduction ratio, hardness and impact toughness for thermo-mechanically heat treated low alloy steels are analyzed quantitatively, and both regression and mathematical hardness and impact toughness models are developed.

Keywords : hot forging, hot rolling, heat treatment, hardness (HV), impact toughness (J), microstructure, low alloy steels
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