EFFECT OF HEAT TREATMENT PROCESSESON MATERIAL

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ABSTRACT

The importance of various heat treatment operations on medium carbon steel in order to avoid problems that may arise from incorrect steel material selection or faulty heat treatment operations, which could result in serious disruption in terms of human safety, higher costs, and premature failure of machine components, is of great concern. Heat treating medium carbon steel can easily change mechanical qualities including ductility, toughness, strength, hardness, and tensile strength to meet a specific design purpose. Tensile specimens were made of medium carbon steel and went through several heat treatment methods such as annealing, normalizing, hardening, and tempering. The stress-strain curve of the heat treated samples revealed their stiffness, ductility, ultimate tensile strength, yield strength, and hardness. The yield strength (σy) of the tempered specimen was found to be higher than that of the hardened, normalized, and annealed specimens, presumably due to grain re-arrangement. The ultimate tensile strength (σu) was found to be in the following order: hardened>tempered>normalized>annealed.

KEYWORDS: *Austenite, Ductility, Medium Carbon Steel, Marten site, Strain Hardening Parameter.*

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