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Evaluation of mechanical properties of medium carbon steel using water and palm oil as quenching media

Odusote and Albert

Abstract

The authors have evaluated mechanical properties of medium carbon steel using water and palm oil as quenching media. Their work was very similar to as reported in, however their specimens were heated up to 900,940 and980^{0}c and soaked for 45 minutes. The specimens were removed from furnace and quenched in water and palm oil separately. Surface properties, mechanical properties and microstructure were examined. The various mechanical properties investigated by them include tensile strength modulus of elasticity and elongation and hardness. They have presented graphs showing variation of mechanical properties with heating temperature for both water and palm oil. Their main conclusions included the following. It has been established that palm oil can also be used as a quenching medium for medium carbon steel, since mechanical strength of some of the samples quenched with palm oil improved when compared with those of the as-received sample. Quenching in water resulted in higher tensile strength and hardness, possibly due to formation of matrenstic structure after quenching. Palm oil cooling improves the ductility of the steel because of its lower cooling rate compared with water. Thus, palm oil will be available quenching medium, where improved elongation of the sample is critical.