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Analysis of the effect of tempering temperature on mechanical properties of medium carbon steels

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Abstract

The authors worked on analyzing the effect of tempering temperature on mechanical properties of medium carbon steels. Most mechanical engineering parts require that, the quenched part be tempered to cause some toughness and ductility. The current work of the authors was aimed to arrive an optimum heat treatment strategy to combine hardness and strength. They found that with increasing tempering temperatures: a) hardness first increases to a maximum and then gradually decreases; b) yield strength first decreases, then increases; c) ultimate strength first increases to a maximum and then steadily decreases; and d) ductility (% elongation) increases, and then decreases. The optimum heat treatment strategy was found to be at tempering temperature of 250^oc for well balanced mechanical properties.