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Original Article

THE EXPERIMENTAL STUDY ON THE MACHINING CONDITIONS OF HEAT TREATED MEDIUM CARBON STEEL USING CERAMIC CUTTING TOOL

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ABSTRACT

The current study shows the effect of various heat treatments on the cutting force and surface finishing of machining for medium carbon steel (0.522C) with different cutting conditions have been investigated. In this research, samples have been divided into two groups. Samples of the first group were heated to austenitizing temperature and quenched in a polymer solution (Polyethylene glycol M. W.400), followed by tempering. Tempering process is to reduce brittleness and relieve residual stresses. In this treatment, the samples were heated again to 450°C, held for one hour at that temperature (soaking stage), then cooled in still air. Samples of the second group were heated to austenitizing temperature and cooled by air (normalizing process). The cutting force and other properties were evaluated before and after heat treatment. The results showed a direct effect of heat treatments on cutting force and machinability. In other words, a correlation between the machinability and the heat treatment of specimens was established.

KEYWORDS: Cutting Force Heat Treatments, Surface Finishing, Medium Carbon Steel & Polyethylene Glycol M. W 400

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