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Investigations on the effectiveness of quenching media to the required hardness and microstructure based on the application

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Abstract

The authors worked on investigating the effectiveness of quenching media to the required hardness and microstructure based on the application. The effectiveness of the quenching media depends on its cooling characteristics and its ability to harden the steel. Normally quenching is done in 3 stages namely vapour stage, nucleate boiling stage and convective stage. The performance of quenching media can be expressed by measuring the hardness of the quenching body. One of the important factors in quench media selection is to identify the quench media which gives optimum mechanical properties with least amount of distortion and internal stresses. The main objectives of the work carried out by the authors was evaluating the quench severity of different quench media based on its hardening power and microstructure developed and evaluate the effect of tempering on the quenched samples. The experimental work carried out by the authors was fabrication of steel specimens of 12.5mm diameter with 0.46 carbon percentage. The length of the specimen was 30mm. The samples were polished etched and SEM images were taken. The hardness number was determined. SAE20W40 engine oil and 10% strength brine solution were the two quenching media selected. The specimens were heated to temperature 850⁰c and held at the same temperature for 15 minutes and then quenched in different quench media.