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Experimental studies on the effect of quenching media, specimen size and the shape on the hardenability of AISI 4140 steels

Ali and Mahalingam

Abstract

The authors have conducted experiments to study the effect of quenching media, specimen size and the shape on the hardenability of AISI 4140 steels. Their work demonstrated how above parameters can affect the hardness from the surface to the core of the samples. They have established empirical relationship between depth of hardness and geometry of the specimens. They found that high hardening can be obtained in water quenched samples by virtue of the martensitic structure formation and the hardness depth is lowered in the air quenched samples. Further considerable improvement is achieved by increasing velocity of air. They also suggested empirical heat transfer for finding out the hardness at different depths. According to them the factors influencing a hardenability of steel alloys are size and shape of the sample, quenching conditions and chemical composition of the steel.