

Effect of Cryogenic Heat Treatment on Multiple Tempered D-2 Tool Steel

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Abstract: *The present day scenario in the manufacturing sector demands high productivity and the life of cutting tools plays a major role in increasing productivity. The freezing of metals has been acknowledged, for many decades, as an effective method for increasing "wear life" and decreasing residual stress in tool steels. Wear test using pin-on-disc machine was used to investigate the effect of multiple tempering after cryogenic treatment of D-2 tool steel. Conventional quenching (1010°C) and tempering (515°C) treatments were given along with intermediate cryogenic treatment (−196°C). Specimens were subjected to wear tests on pin-on-disc machine in dry sliding condition for sliding distance of 6000 m at 6 kg load and for sliding speed of 3.0 m/s. Hardness data, microstructures, wear loss and Microstructure analysis of worn surface throw light on the underlying metallurgical mechanism responsible in improving wear resistance property of the D-2 tool steel.*

Keywords: Tool steel, Cryogenic treatments, D-2 tool steel, dry sliding test, microstructure, Phase transitions. Multiple tempering