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齿轮齿根的淬硬层深度研究

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摘要 研究了齿轮的整体高频淬火工艺,通过不同的淬火时间(12s、17s)获得了不同的硬化层。采用显微硬度计测量了齿轮齿根不同厚度的硬度,绘制了硬度变化规律曲线,并根据经验公式分别测算得到了它们的淬硬层深度。采用扫描电镜(SEM)观察了齿根的淬硬层部分,发现淬火时间不同时在硬化层处可获得不同的淬火组织。淬火时间为12s时组织为马氏体+铁素体+残余奥氏体;淬火时间为17s时组织为马氏体+极少量针状铁素体+残余奥氏体,后者组织更均匀、强度更高,因此工艺更理想。

关键词 高频淬火 齿根 淬硬层深度 显微组织

Study on the Hardened Layer Depth of Tooth Root of Gear

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Abstract The high-frequency quenching process of the whole gear is studied. Different hardened layer depths are obtained at different quenching time including 12s and 17s. Microhardness values that with the different depths of tooth root of gear are tested by microhardness tester and the curves of microhardness values are drawn, and then the hardened layer depths are estimated by empirical formula. On the other hand, microscopic structures of quench-hardened layers are observed by scanning electron microscope (SEM for short), different microscopic structure is found in hardened layers at different quenching time. For 12s, the structure is martensite, ferrite and residual austenite and for 17s it is martensite, an extremely small amount of acicular ferrite and residual austenite by contrast. The microscopic structure of the latter is more uniform, the intensity is much higher, so the process is desired.

Key words high-frequency quenching, tooth root of gear, hardened layer depth, microscopic structure

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