曲轴-轴承系统动力学摩擦学和弹性力学耦合分析

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关键词： 曲轴-轴承系统 摩擦学 动力学 弹性力学 耦合分析

摘　要： 以四缸柴油机为研究对象，采用自编程序和IADAMS、ANSYS相结合的办法，耦合分析研究了曲轴-轴承系统的动力学特性、摩擦学特性和弹性力学特性，并将损伤积累理论应用于曲轴疲劳强度计算。分析结果表明：这种耦合分析结果和传统的非耦合分析结果有很大不同；对曲轴-轴承系统同时发生的机械行为进行耦合分析，对于提高内燃机工作可靠性，改善性能是必要的。 Multidisciplinary coupling among dynamics, tribology and elastic mechanics (strength and stiffness of crankshaft) on a crankshaft-bearing system of a diesel engine with four pistons, which was applied on a rated load, was studied by self-designed program as well as the software of ADAMS and ANSYS. The Miner's theory and accumulative damage theory have been applied in calculating on fatigue strength of the crankshaft. It showed that there are obvious differences in calculating results between the coupling analysis and the traditional non-coupling analysis. The coupling analysis is necessary to improve the working reliability and its mechanical performance of a diesel engine because the various mechanical behaviors of a crankshaft-bearing system happened simultaneously with the engine working.

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