



塑料斜齿轮与钢制蜗杆传动的热力分析

Thermodynamic performance of plastic helical gear and steel worm transmission

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中文关键词: [塑料斜齿轮](#) [本体温度场](#) [啮合方程](#) [有限单元法](#)

英文关键词: [plastic helical gear](#) [Bulk temperature field](#) [gearing transmission equation](#) [FEM](#)

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中文摘要

结合齿轮啮合原理, 推导出塑料斜齿轮与钢制蜗杆传动副的啮合方程式。基于MSC.Patran/Nastran建立塑料斜齿轮和钢制蜗杆传动的本体温度场, 在此基础上对啮合传动副进行有限元结构分析, 得到此传动机构热平衡过程中载荷、本体温度和环境温度之间的内在联系。并通过赫兹接触理论验证了有限元分析的正确性。结果表明: 在该传动过程中, 热源从啮合齿面逐渐扩散到轮齿端面和非工作齿面上, 热平衡时啮合齿面上轮齿中部靠近分度圆处温度最高, 而轮齿端部温度最低。

英文摘要

According to the gear engagement theory, the gearing equation between plastic helical gear and steel worm was carried out. The bulk temperature field of the gear pair was established based on MSC.Patran/Nastran. Use FEM to analyze and gain the inherent relationship between load, buck temperature and environmental temperature in the process of heat balance. By means of Hertz contact theory the correctness was verified on finite element analysis. As was turned out: in the transmission process, heat from the meshing gear tooth surface gradually spread to face and non-working tooth surface, when heat was balanced the highest temperature was around the central pitch circle of the meshing gear tooth and the lowest was on the end gear.

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