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### 航空发动机叶片柔性抛光技术

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### Flexible Polishing Technogy for Blade of Aviation Engine

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摘要

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**摘要** 基于发动机叶片结构特点及其抛光工艺要求,为实现叶片型面及阻尼台自动化抛光,满足其型面及进排气边尺寸、粗糙度等质量要求,消除叶片型面波纹对抛光工艺的影响,对砂带柔性抛光工艺装备技术进行研究,提出基于抛光力控制的砂带柔性磨头抛光工艺方法,并对其抛光工艺过程、抛光力控制进行研究,通过对叶片自动化抛光编程及抛光轨迹路径规划技术研究,最终实现发动机叶片高效柔性抛光工艺。抛光试验结果表明,柔性自动化抛光后叶片型面尺寸精度可达±0.06 mm,粗糙度低于 $R_a0.4$ ,与传统手工抛光方法相比,大大提高其抛光效率及表面质量稳定性,降低劳动强度,且减少粉尘污染。

**关键词:** 发动机叶片 柔性 抛光工艺 砂带 自动化

**Abstract:** This paper starts with an analysis of the structural features of blades in aeroengines and their polishing process requirements, and then proposes a technology of flexible abrasive belt grinding head that can remove the impact of the waviness of the blade in order to realize their automatic polishing and satisfy the requirement of accuracy. On the basis of the polishing structure, a flexible polishing process and polishing force control method are discussed. In addition, the technology of automatic programming and path planning are studied so as to achieve automatic and efficient polishing of the blade. The polishing test results show that after automatic polishing the profile error is  $\pm 0.06$  mm and the surface roughness is less than  $R_a0.4$ . Compared with the manual polishing process, the automatic polishing technology not only enhances the polishing efficiency and quality stability, but also reduces considerably labor intensity and dust pollution.

**Keywords:** blade of aeroengine flexibility polishing abrasive belts automation

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