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## 开槽叶片对大转角扩压叶栅性能的影响

### Effect of slotted blade on performance of high-turning angle compressor cascades

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中文关键词: [高负荷扩压叶栅](#) [开槽叶片](#) [流动控制](#) [大转角](#) [附面层分离](#)英文关键词: [highly loaded compressor cascades](#) [slotted blade](#) [flow control](#) [high-turning angle](#) [boundary layer separation](#)

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中文摘要:

采用从压力面向吸力面开槽的局部流动控制方法,设计了一种收敛转折型的槽道结构.实验对不同冲角下开槽叶栅的进、出口流场进行了测量,利用实验结果对数值模拟结果进行了校核,通过数值计算进一步得到了详细的叶栅通道内流场情况,并进行了结构静力分析.结果表明:在4°进气攻角下,开槽后叶栅尾迹区宽度减小了16.7%,总压损失系数峰值减小了6.07%;在6°进气攻角下,总压损失系数峰值减小了14.7%.叶片开槽从压力面吸入的气流可有效加速吸力面附面层流动,抑制吸力面分离,从而降低总压损失,增大静压比,扩大稳定工作范围.槽道前壁面的转折处存在应力集中,需要进行改进.

英文摘要:

A practical method to control the separation by cutting a slot through the pressure surface and the suction surface was proposed. A converged turning slot configuration was designed. The flow performance with different incidences was investigated. The experimental result was used to check the CFD result, so as to acquire the quantitative flow field structure. The structural static analysis was made. The results show that, in the incidence of 4 degree, the application of slot decreases the wake width of cascades by 16.7%, and decreases the peak of total pressure loss coefficient by 6.07%. In the incidence of 6 degree, the application of slot decreases the peak of total pressure loss coefficient by 14.7%. Fluid can flow from the pressure side to the suction side with slot configuration. The injection air increases the velocity of boundary layer, therefore enhancing its ability to resist the flow separation. Consequently it can decrease the total pressure loss, increase the static pressure ratio, and expand the stability range. It is thus necessary to reduce the stress concentration on fore wall of channel.