

发电

## 汽轮发电机转子径向空气流量分布数值计算

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摘要

为减少大型空冷汽轮发电机转子轴向的温差及其热应力,有必要对沿转子轴向的各径向风道内空气质量流量分布进行研究。该文以150MW空冷汽轮发电机转子为例,应用有限体积法,在实验研究基础上,求解转子半轴向段通风道内空气的紊流流动等三维方程组,在变结构条件下,研究了转子紊流模型、副槽入口风速等物理量变化对轴向各径向风沟空气质量流量分布的影响。研究表明,在不同的副槽入口风速下,沿轴向转子各径向风沟内的空气质量流量偏差随转子风道结构参数变化。结论对更大容量空冷汽轮发电机转子通风均匀性设计具有指导意义。

关键词 [汽轮发电机](#) [转子](#) [空气质量流量](#) [通风冷却](#) [三维数值模拟](#)

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## Numerical Calculation of Air Mass Flow Rate Distribution in Rotor Radial Ducts of Large Turbo Generator

Abstract

To reduce temperature difference and thermal stress along axis direction of large turbo generator with air-coolant, it's very important to research the air mass flow rate distribution in rotor radial ducts. Numerical solution of three dimensional modelling equations of air turbulent flow in cooling duct was carried out by the Finite Volume Method, based on a given example of a 150MW turbo generator with air coolant. The effect of turbulence models and the air relative velocity at sub slot's inlet on mass flow rate distribution was presented, at condition of varying geometry configuration. The results show that the deviation of the air mass flow in radius ducts along the rotor axis varies with geometry configuration parameter, at condition of different inlet velocity. The conclusion is helpful for uniform design of air mass flow rate distribution as to the rotor's cooling ducts of larger capacity turbo generator.

Key words [generator](#) [rotor](#) [air mass flow rate](#) [cooling](#) [three dimensional numerical simulation](#)

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