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反应堆工程

主循环泵惯性飞轮完整性分析

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摘要 核反应堆主循环泵上安装储能飞轮，能够为反应堆在断电事故下提供冷却剂，避免堆芯损坏。储能系统的结构完整性直接关系到反应堆的安全。本文采用非线性接触算法，利用有限元软件对主循环泵飞轮进行完整性分析。考虑过盈、额定转速和超速等载荷工况，从结构强度和断裂力学两方面进行了分析。计算结果表明，飞轮的结构强度及假想缺陷处应力强度因子均满足标准要求，在规定工况下能够保证其结构完整性。

关键词 惯性飞轮 接触 断裂力学 应力强度因子

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Integrity Analysis of Inertial Flywheel of Primary Circulation Pump

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Abstract Energy storage flywheel mounted in primary circulation pump of the reactor could supply coolant to the reactor core under power off accident. The structural integrity of the flywheel has influence on safety of the reactor. Integrity analysis concerned in the structure strength and fracture mechanics of the flywheel was performed using finite element software based on nonlinear contact method. The load cases of interference, rated speed and over-speed were considered. The result shows that stress strength and stress intensity factor at imaginary defect of the flywheel are satisfactory to the requirement of related regulations.

Key words inertial flywheel _ contact _ fracture mechanics _ stress intensity factor

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