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# 中国先进研究堆ATWS事故缓解系统设计改进安全分析

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摘要 以中国先进研究堆(CARR)最严重的失控提棒ATWS为例,对CARR事故缓解系统设计改进造成的影响进行分析。分别就不同的失控棒最大速度和不同的落棒模式(自由落体和1.5s掉落)进行分析计算,找出CARR对失控提棒ATWS所能承受的最大棒速,确定了4mm/s的控制棒最大提升速度。对失控提棒ATWS事故采用保守分析模型进行了敏感性分析。分析结果表明,这种设置和棒速是合理的、安全的。

关键词 中国先进研究堆 ATWS 事故缓解系统

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## Safety Analysis of ATWS Accident Mitigating System Improving Design for China Advanced Research Reactor

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**Abstract** The safety analysis of ATWS accident mitigating system improving design, based on the most serious case--ATWS induced by uncontrolled control rod withdrawal is performed for China Advanced Research Reactor(CARR). Many calculations are done at different maximum withdrawal velocity and with different modes of dropping velocity of control rod(dropping by gravity or dropping within 1.5 seconds). The maximum withdrawal velocity admitted by CARR is found. It is confirmed that the withdrawal velocity of 4 mm/s is selected as the design limit of maximum velocity of control rod in any case. In addition, sensitivity analysis is carried out between realistic analysis and conservative analysis modes. The results show that this setting and the maximum velocity are reasonable and safe for CARR.

**Key words** China Advanced Research Reactor ATWS accident mitigating system

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