

反应堆工程

断电事故对核主泵安全特性影响的试验研究

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摘要 介绍了国内外反应堆冷却剂泵在发生各种事故情况下的理论及试验研究情况, 针对核主泵断电惰转过程中的瞬态水力特性进行了试验研究, 对试验结果进行了讨论。介绍了用于断电试验的试验设备及试验方法, 着重分析了惰转过程中流量、转速、振动参数, 并用四次多项式拟合的方法模拟惰转过程的流量、转速随时间的变化。试验结果表明: 在断电瞬间, 泵的流量和转速迅速下降, 试验结果符合安全标准规定; 轴承座位移振动在断电瞬间突然加强, 在断电后一段时间转轴振动才发生变化。试验和分析结果有助于认识核主泵发生全厂断电事故时的水力特性, 为核主泵的安全评价提供基础依据。

关键词 [反应堆冷却剂泵](#); [核安全](#); [全厂断电](#); [安全评价](#)

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Test Study on Safety Features of Station Blackout Accident for Nuclear Main Pump

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Abstract The theoretical and experimental studies of reactor coolant pump accidents encountered nation-wide and world-wide were described. To investigate the transient hydrodynamic performance of reactor coolant pump (RCP) during the period of rotational inertia in the station blackout accident, some theoretical and experimental studies were carried out, and the analysis of the test results was presented. The experiment parameters, conditions and test methods were introduced. The flow-rate, rotate speed and vibrations were analyzed emphatically. The quadruplicate polynomial curve equation was used to simulate the flow-rate, rotate speed along with time. The test results indicate that the flow-rate and rotator speed decrease rapidly at the very beginning of cut power and the test results accord with the regulation of safety standard. The vibrant displacement of bearing seat is intensified at the moment of lose power, but after a certain period rotor shaft libration changes. The test and analysis results help to understand the hydrodynamic performance of nuclear primary pump under lost of power accident, and provide the basic reference for safety evaluation.

Key words [reactor](#) [coolant](#) [pump](#) [nuclear](#) [security](#) [station](#) [blackout](#) [safety](#) [evaluation](#)

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