

反应堆工程

LBB在蠕变温度以上核级管道设计中的应用

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收稿日期 修回日期 网络版发布日期:

摘要 LBB (Leak-Before-Break) 技术是保证核反应堆结构安全和可靠的一种重要分析方法。对于在蠕变温度以上高温堆 (如快堆) 的核级管道, 运用LBB分析时应考虑疲劳和蠕变对裂纹扩展的影响。本工作以法国规范RCC-MR的A16为基础、以快堆余热排放系统的一段管道为研究对象进行LBB分析, 总结出一套运用于蠕变温度以上核级管道安全分析的LBB方法。经计算得到, 在蠕变温度以上, 蠕变对裂纹扩展的影响较大。经验证, 该管道符合LBB技术对于裂纹稳定性及泄漏量可探测性的条件, 满足从开始泄漏到裂纹失稳的时间要求。

关键词 [LBB](#) [蠕变温度](#) [疲劳蠕变](#) [核级管道](#)

分类号

Application of LBB Technology for Design of Nuclear Pipes Beyond Creep Temperature

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Abstract LBB (Leak-Before-Break) is an important analysis method for insuring the structure safety and reliability of nuclear reactor. It must consider the affection of fatigue and creep to the crack growth for the nuclear pipes in the high temperature reactors (as fast reactor) beyond the creep temperature. The paper summarizes a set of LBB method applying for the safe analysis of the nuclear pipes beyond the creep temperature, basing on A16 in the France RCC-MR standard and carrying on LBB analysis for a section of pipe in the heat drainage system in fast reactor. By calculation, creep affects the crack growth greatly beyond the creep temperature. It is demonstrated that the pipe meets the conditions that the crack is stable and the leakage is detectable which LBB asks for, and it also satisfies the time request from the beginning of leak to the moment at which the crack is unstable.

Key words [LBB](#) [creep](#) [temperature](#) [fatigue-creep](#) [nuclear](#) [pipes](#)

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