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地震动空间变化效应对大跨度桁架拱反应的影响

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THE INFLUENCE OF GROUND MOTION SPATIAL VARIATION EFFECT ON SEISMIC RESPONSE OF LONG SPAN TRUSSED ARCH

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摘要 研究地震动空间变化效应对实际的大跨度桁架拱结构地震反应的影响，进行了空间变化地震动激励下结构反应的详细数值模拟。考虑了由行波效应、部分相干效应和局部场地效应引起的地震动空间变化。分析了地震动不同行波波速、相干损失和局部场地条件对结构地震反应的影响。在数值计算中，基于经验相干损失函数和《建筑抗震设计规范》定义的反应谱模拟了空间变化地震动。研究结果表明，引起地震动空间变化的每一个因素对桁架拱结构的反应都有重要的影响，在分析中忽略地震动空间变化效应可能低估该类结构的地震反应。为了准确评估结构反应并更好地进行大跨度桁架拱结构的抗震设计，模拟可靠的空间变化地震动十分必要。所获得的结果可为桁架拱结构的实际设计提供参考。

关键词： 桁架拱 空间变化 反应谱 行波效应 场地效应

Abstract： Ground motion spatial variation effects on seismic response of an actual long span trussed arch structure are investigated. Intensive numerical simulations of the responses of the trussed arch subjected to ground motion excitations are carried out. The ground motion spatial variations associated with wave passage effect, coherency loss effect and different local site effect are considered. The effects of non-uniform ground motion wave apparent velocity, coherency loss and local site conditions on structural responses are discussed. In numerical calculations, the simulated spatially varying ground motions are individually compatible with the response spectrum defined in Chinese Seismic Design Code, and are compatible with an empirical coherency loss function between each other. Numerical results indicate that each factor of ground motion spatial variations has a significant effect on the dynamic response of the structure, and neglecting ground motion spatial variations in analysis may lead to the underestimation of structural responses. To obtain an accurate structural response assessment and a better design of long span trussed arch structure, a reliable ground motion spatial variation model is essential. The results obtained could provide useful reference for practical design of trussed arch structures.

Key words： trussed arch spatial variation response spectrum wave passage effect site effect

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[1] 尹家聪;李 浩;陈 璞. 考虑偶然偏心的动力近似抗震分析研究[J]. , 2011, 28(6): 81-087.

[2] 蒋甫玉;高丽坤. 基于余弦变换的地震动反应谱计算方法[J]. , 2011, 28(2): 49-056.

[3] 何浩祥;闫维明;陈彦江. 地震动加加速度反应谱的概念及特性研究[J]. , 2011, 28(11): 124-129.

[4] 陈 亮;李建中. 地震波的反应谱谱形对RC梁桥结构非线性地震反应的影响[J]. , 2011, 28(10): 86-092,.

[5] 陈 逵;刘哲锋;沈蒲生. 结构瞬时输入能量反应持时谱的研究[J]. , 2011, 28(1): 19-025.

[6] 张郁山;赵凤新;. 地震动峰值位移对单自由度体系非线性动力反应的影响[J]. , 2011, 28(1): 55-064.

[7] 杨 成;潘 毅;赵世春;李彤梅;李英民. 烈度指标函数对IDA曲线离散性的影响[J]. , 2010, 27(增刊I): 68-072.

[8] 魏 凯;袁万城;曹新建. 组合结构桥梁抗震潜力及性能研究[J]. , 2010, 27(增刊I): 275-279.

[9] 白凤龙;李宏男. 地震动多点激励下大跨空间网架结构的反应分析[J]. , 2010, 27(7): 67-073,.

[10] 柳春光;李会军. 多维多点地震激励下随机K8单层球面网壳的可靠度分析[J]. , 2010, 27(12): 21-026,.

[11] 李法雄;聂建国;樊健生. 多跨连续钢筋混凝土刚架拱桥的抗震分析[J]. , 2010, 27(12): 179-185.