

单段与多段微差爆破地震的反应谱特征分析

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摘要 利用地震工程中广泛应用反应谱理论对爆破地震效应进行研究。根据单自由度体系反应谱理论, 采用计算量少、精确度高的三角插值解析公式法取代常用的分段线性插值法进行反应谱数值计算。结合大量工程爆破地震监测资料, 对单段与多段微差爆破振动信号进行反应谱分析。分析结果表明, 在单段与多段微差爆破中, 不同结构体对爆破震动的响应显著不同; 多段微差爆破在起到干扰降震的同时, 使结构体对其震动响应出现选择放大的几率增加, 不同结构体对爆破地震波的选择放大作用也不同。该方法对综合研究爆破机理和爆破地震波, 特别是为将来构建爆破振动速度-频率相关安全准则提供了一种实用的分析技术。

关键词 [爆炸力学](#); [爆破地震效应](#); [反应谱](#); [三角插值](#); [单自由度体系](#); [爆炸参量](#)

分类号

RESPONSE SPECTRUM ANALYSIS OF GROUND VIBRATION INDUCED BY SINGLE DECK AND MULTI-DECK BLASTING

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Abstract

The response spectrum that is largely applied in earthquake engineering is employed to study the blast seismic effect. Based on the response spectrum theory of system with single degree of freedom, the response spectrum is calculated by using analytical expression of trigonometric interpolation with great efficiency and high precision instead of piecewise linear interpolation. Response spectrum analysis of blast vibration signals in single and multi-deck blasting is performed with a vast amount of monitoring data from engineering blast. The results show that response characteristics of vibration induced by single deck and multi-deck blasting have marked differences. Multi-deck blasting not only has the good effects of reducing vibration by wave interference, but also increases the probability of selective magnification in the structural response on blasting-induced vibration. The effect of selective magnification varies with the types of structure. It is shown that the method provides an effective tool for

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studying blast seismic effect, especially constituting velocity-frequency safety criteria.

Key words

[explosion mechanics](#); [blast seismic effect](#); [response spectrum](#); [trigonometric interpolation](#); [system with single degree of freedom](#); [explosion parameter](#)

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