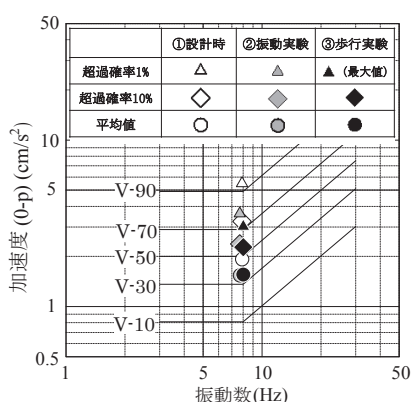# 人の歩行時の床振動に関する信頼性設計法の提案

Proposal of a reliability-based design for limiting floor slab vibrations caused by human walking

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鉛直振動に関する性能評価曲線と応答値

概要

　本研究では、歩行振動に関する信頼性設計法を提案し、実際の床スラブに信頼性設計法を適用し、振動実験、歩行実験によりその妥当性を確認した。得られた結論は次の通りである。1）使用限界状態として振動を不快と感じる加速度を設定し、既報において提案した歩行振動V値応答スペクトルを用いて、1質点系における人の歩行による床振動に関する信頼性設計法の定式化を示した。2）上記設計法を、歩行者の違いによるばらつき、床スラブの振動特性の予測誤差を考慮し、多自由度系に拡張した。3）人の歩行による床振動への信頼性設計法の適用例を示し、実建物での振動実験、歩行実験に基づき、その妥当性を確認した。

　This paper proposes a reliability-based design for limiting floor slab vibration due to human walking. The reliability design method was applied to an actual floor slab design, and its validity was confirmed by hammering tests and by single-person walking tests using the actual building floor slabs. The following conclusions were obtained.

　1) The serviceability limit state was set as an acceleration that results in vibrations causing discomfort, and a formulation of the reliability-based design method for limiting floor slab vibration due to human walking was proposed using the walking vibration V-value response spectrum suggested by the author in a previous report.

　2) This reliability-based design method considered the effects of prediction errors in the vibration characteristics of the floor slab, such as the first natural frequency, damping coefficient, modal mass, and the individuality of walkers. It was also expanded to a system allowing for multiple degrees of freedom.

　3) An application example of the reliability-based design of floor vibration due to human walking was shown, and the validity of the design objectives was verified based on field experiments including hammering tests and single-person walking tests on the designed actual slabs.