

## 19. Development of a System for Predicting Vibration in Building by External Vibration

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In order to establish technologies for correctly evaluating environmental vibration, which is caused by disturbance vibration during construction works, road traffic, traveling cranes, press machines, and other causes of vibration of buildings, and its interaction with the ground, a system for predicting vibration was developed. In the system, three-dimensional analysis of the finite element method is combined with the thin layer element method of the ground. The system enables both experts and non-experts of ground environment vibration to consistently assess vibration levels within buildings, which are caused by external vibration transmitted through the ground. The feasibility of the system was verified by comparing with the vibration measurements in a building caused by vibration of road traffic. The system was found to be feasible for predicting major vertical vibration caused by vibrations of road traffic frequencies.

**Key words :** ground environmental vibration, road traffic vibration, thin layer element method, three dimensional FEM