

APPLICATION OF THE THEORY OF WAVE PROPAGATION TO THE ANALYSIS OF STRUCTURAL DYNAMIC PARAMETERS

by

L.N. BOBAKOV^I

The wave notions of vibrations at present can already be applied with use to solve some problems of earthquake engineering [1]. This way enables us to define dynamic parameters of structures and buildings, which determine the level of reaction during earthquakes, and also use the wave theory in analysis of dynamic forces excited by different effects.

The wave theory considers any vibration process as a result of imposition of waves entering from outside and already circulating in the system. The wave approach indicates that dynamic parameters of the object and its reaction depend on the character of wave propagation in constructions and wave behavior on its external borders and beyond them. The analysis was made with the model as a system of unlimited horizontal elastic layers which dispose on a semi-space with properties of the foundation. This permitted to elaborate the wave criterion for the choice of calculation model, which determines the fields of the systems with distributed parameters and the systems with concentrated masses, joined with weightless connections [2]. Other dynamic parameters describe joint work of the object and surrounding space [3]. One of the most interesting results is the formula connecting dissipation properties of an approximate model with its mechanical characteristics. This allows to calculate the characteristic of object's damping; and if the characteristic of damping is known then it permits to find parameters describing processes on the external borders [4]. Of interest is also methodic of calculation of seismic forces under influence of nonstationary random process [5].

BIBLIOGRAPHY:

- 1 Kanai K. Some New Problems of Seismic Vibrations of a Structure. Proc of the III WCEE, vol. II.
- 2 L.N. Bobakov. Wave Propagation in the System With Concentrated Masses. The Paper Collection of the TsNJS "Earthquake Engineering", No. 3, 1974, Moscow, p.p. 46-48.
- 3 L.N. Bobakov. Supplementary Characteristics of the Interaction and Works of Constructions in Different Soil Conditions. Works of the TsNJSK, vol. 45, 1975, Moscow, p.p. 90-93.
- 4 L.N. Bobakov. Damping of Vibrations of Building Structures in Consequence of Wave Refractions in Contact Zone with Bordering medium. Works of the TsNJSK, vol. 44, 1975, Moscow, p.p. 30-38.
- 5 L.N. Bobakov. Wave Phenomena in Building During Earthquakes. Structural Mechanics and Structural Design, N3, 1971, Moscow, p.p. 40-43.

Cand. eng. scs., junior scientific worker of the Kucherenko Central Research Institute for Building Structures (TsNJSK), Gosstro of the U.S.S.R.