

# CHARACTERISTICS OF UNDERGROUND SEISMIC MOTIONS AT FOUR SITES AROUND TOKYO BAY

by

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## ABSTRACT

This paper discusses dynamic behavior of subsurface soil and rock layers on the basis of acceleration records triggered during actual moderate earthquakes. Borehole accelerometers are installed at four sites around the Bay of Tokyo. These were equipped in 1970-74, in connection with the Tokyo Bay Loop Highway Project proposed by the Ministry of Construction.

At the site of Futtsu Cape, where a comparatively uniform sand layer exists, 3-component borehole accelerometers are set up at three levels, the surface, -70m, and -110m. At Ukishima Park, consisting of reclaimed soils, silts, clays, and sands, four pickups are installed at the surface, -27m, -67m, and -127m. At Kannonzaki, indicating a rocky layer (siltstone) with a shallow topsoil, three accelerometers are set up at the surface, -80m, and -120m. Furthermore, at Ohgishima, a newly reclaimed island consisting of deep reclaimed sands and stiff clays, four acceleration transducers are installed at the surface, -15m, -38m, and -150m.

Important acceleration records were obtained during sixteen moderate earthquakes (Magnitude = 4.8 - 7.2) which occurred near the area from September, 1970 to February, 1975.

From vertical distributions of maximum accelerations at the four stations, it seems that the surface magnification factors (ratio of surface acceleration to base acceleration) are large (2.5 to 3.5) at the soft soil site (Ukishima Park), small (about 1.5) at the rocky site (Kannonzaki), and medium (1.5 to 3) at sandy or clayey soil sites (Futtsu Cape and Ohgishima).

Response spectrum curves from typical acceleration records are obtained. Comparison of the spectral curves from records obtained at three (or four) levels of one station during an earthquake suggests that frequency characteristics at the several depths are comparatively similar. Also it seems that frequency characteristics of earthquake ground motions are influenced by seismic conditions (such as magnitudes, epicentral distances, etc.) as well as soil conditions at the sites.

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