

# ENGINEERING APPLICATION OF SEISMIC GROUND MOTIONS

COMPUTED BY THE DISLOCATION THEORY

by

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## ABSTRACT

For the aseismic design of large engineering structures such as long-span suspension bridges, buried pipelines, etc., long-period components of seismic motions are sometimes very important. Recently many investigators in the field of seismology and earthquake engineering are studying of analytical seismic motions by means of the elastic dislocation theory. Validity of such computation based on the theory was already confirmed by comparing computed displacements with measured displacement records for several earthquakes experienced.

This paper discusses of application of the theory to the design of long-period engineering structures.

First, the Off Izu Peninsula Earthquake of May 9, 1974 was taken as an example, because many measured seismic records including displacement and acceleration records are available. Comparison of displacements and accelerations was made between computed ones and measured ones at several points with epicentral distances up to 150 Km. Response spectrum curves obtained from the theory and from the measured acceleration records are also compared, for the range of longer periods (2 to 10 seconds).

Next, the Nankaido Earthquake of December 2., 1946 was taken as a second example. Response spectra from computed seismic motions were compared with those based on " the Specifications for Earthquake-Resistant Design of Honshu-Shikoku Bridges, " which were proposed by the Japan Society of Civil Engineers in 1967 and were amended by the Society in 1971.

From the studies described above, the following can be derived.

- 1) Shapes of response spectra for the computed motions by the dislocation theory are approximately similar to those obtained from the measured accelerograms.
- 2) It might be possible from the dislocation theory to estimate long-period components of seismic motions which can be used as the input at the level of bedrocks in the design of long-period structures such as long-span suspension bridges and buried pipelines. etc.

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