GROUND-MOTION RESPONSE IN LONG BEACH, CALIFORNIA

by

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SYNOPSIS

The immediate objectives of this study were to compare relative ground response with damage patterns in Long Beach, California, and to compare strong-motion relative response with relative response produced by Nevada nuclear detonations at the same site. Eight sites underlain by alluvium were occupied in Long Beach to record ground motion for two nuclear events at the Nevada Test Site (Δ=430 km). Each shot was recorded at four of these alluvium sites and at a hard rock site in Pasadena.

Peak-particle-velocity amplitude ratios as large as six for alluvium-to-hard rock were observed on the horizontal components at some stations. In the period range of the recorded signal, 0.2 sec to greater than 6 sec, PSRV alluvium-to-hard rock ratios as high as eleven and station-to-station variability as high as four were observed at some periods. Mean PSRV ratios in the period range 0.2-0.6 sec ranged from just under 1 to nearly 6. The highest mean ratios, 4-5, in this period band for the two horizontal components generally were observed in areas of unconsolidated recent alluvium near Compton and along the Los Angeles River, while lower values, 1-2.5, were observed in Long Beach on semi-consolidated marine sediments. This result apparently does not agree with Martel's (1965) observation that damage to type-III buildings in the 1933 Long Beach earthquake was greater for buildings underlain by semi-consolidated marine sediments than by unconsolidated alluvium. However, the large amount of damage in Long Beach might be explained by the fact that the fault trace supposedly responsible for the earthquake passes through Long Beach and through the exposed semi-consolidated marine sediment underlying many of the type-III buildings that Martel studied. Comparison of damage reports for the area as a whole shows that damage in Compton, which is largely underlain by unconsolidated materials, was as great, if not greater, than in Long Beach, in spite of the fact that Compton is farther from the fault trace than Long Beach.

In the long term, we hope to be able to associate mean relative-response levels with the major geologic units in the Los Angeles region. We also hope to determine whether a difference exists between high- and low-strain ground response for geologic units in the Los Angeles region.

BIBLIOGRAPHY

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