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KRUNG ANGKANAPORN : EARTHQUAKE RESPONSE OF BUILDINGS IN NORTHERN AND WESTERN PARTS OF THAILAND THESIS ADVISOR : PROF.PANITAN LUKKUNAPRASIT, Ph.D. 231 PP. ISBN 974-581-325-7

This thesis aims at investigating the responses of structures located in the northern and western parts of Thailand caused by generated earthquakes based on past earthquake records from 1963 to 1989. Results of the study include predicted peak ground accelerations, elastic response spectra, zone factor for computation of equivalent static force and proper ductility requirement for design of reinforced concrete structures.

By using Estava's attenuation model to compute peak ground accelerations at the given site, the peak ground accelerations were analysed by means of probabilistic theory to obtain the cumulative density function. The Monte Carlo simulation technique was then applied to simulate earthquake events. The maximum mean peak ground acceleration amplitude was found to be 75 gals and the mean plus one standard deviation peak amplitude was 116 gals, except for the small areas within radii of 50 kilometers from the previous epicenters in (or close to) Chiangmai and Karnjanaburi provinces for which the corresponding values were 90 and 140 gals, respectively.

By using SIMQKE computer program, the elastic response spectra for the generated earthquakes were computed, which are useful for seismic analyses of structures.

Case studies include three frames (with natural periods analyses 1.5-2.4 sec.) subjected to extreme earthquakes with peak ground acceleration of 116 gals. The DRAIN-2D program was used to perform the dynamic analyses. Columns were assumed to remain elastic while inelastic deformation could occur in beams. The zone factor of the area studied was found to be 0.27, expect for the small areas previously mentioned whose value was 0.31. These values are appropriate for long period buildings. For stiffer structures, they might be somewhat larger depending on the ductility of the members. The ductility ratio for the cases studied was between 4-9. For low rise buildings not designed for wind load effects, premature yielding would occur demanding large rotational ductility ratio.