PREDICTION OF PEAK GROUND ACCELERATION DURING STRONG EARTHQUAKES

V.N. Singh[I] and D.K. Paul[I]

A knowledge of peak ground acceleration is essential for dynamic analysis of structures for earthquake resistant design. It is usually determined from design earthquake parameters i.e. magnitude of the design earthquake and the hypocentral distance for a given site. Various empirically determined magnitude-distance-acceleration relationships have been suggested for the determination of peak ground acceleration. In the present study reported peak ground accelerations on different site conditions have been statistically analysed and following relationships are suggested:

$$a = 0.0135\ R^{-1.4}\ 10^{0.5M} \qquad \text{for rock sites}$$

and $$a = 0.0135\ R^{-1.37}\ 10^{0.5M} \qquad \text{for alluvial sites}$$

where a is peak ground acceleration in units of g (981 cm/s^2) expected at the site due to an earthquake of magnitude M at a hypocentral distance R in km.

The attenuation factors ($R^{-1.4}$ and $R^{-1.37}$) have been derived from the recorded peak ground accelerations during San Fernando earthquake of Feb. 9, 1971 for the respective site conditions. The computed peak ground accelerations for the two site conditions have been compared with those actually recorded. The correlation between the two sets of data is shown in Fig.1. It is observed that despite the uncertainties inherent in the determination of magnitudes and hypocentral distances, the correlation is satisfactory.

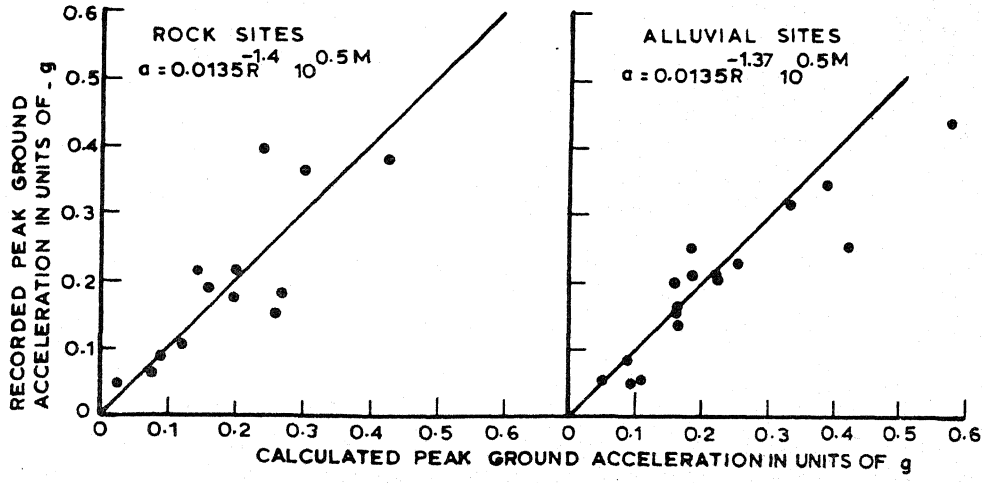

FIG. 1 - COMPARISION OF RECORDED PEAK GROUND ACCELERATION TO THE COMPUTED PEAK GROUND ACCELERATION

[I] School of Research and Training in Earthquake Engineering, University of Roorkee, Roorkee, INDIA