

MICROZONATION OF THE NORTHEASTERN PART OF THE INDIAN
SUBCONTINENT

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Microzonation aims at determining the response of the ground in a particular region due to strong ground motion during a damaging earthquake. This depends upon a number of factors some of which are soil type, seismicity, water table elevation, geology and structure. Various methods have been suggested to take into account the influence of seismicity of the region on microzonation. Since the phenomenon of earthquake occurrence is random in nature, probabilistic techniques involving the determination of earthquake risk at a site is preferred. The earthquake risk can be defined as the probability that peak ground acceleration at a particular site due to an earthquake in its neighbourhood exceeds a given value at least once during a specified time interval. The peak ground acceleration can be calculated from a knowledge of magnitude and focal distance of an earthquake by making use of an empirical magnitude-distance-acceleration relationship. Once the number of times that the peak ground acceleration exceeds a given value is known, the earthquake risk can be calculated by assuming that each exceedance is an independent Poisson distributed event (1).

The region under study lies in the northeastern part of the Indian subcontinent between latitudes 22°N and 30°N and longitudes 90°E and 98°E. For the purpose of calculating earthquake risk, this region has been divided into a 1°x1° grid. At each grid point the peak ground accelerations were calculated due to all past earthquake during the 100 year interval from 1875 to 1974 using a magnitude-distance-acceleration relationship (2). The earthquake risk in terms of the probability of exceeding a given value of peak ground acceleration for a design period (e.g., 50 years) is then calculated at each grid point. For a site A at 25°N and 92°E the earthquake risk values for some levels of peak ground acceleration are: .05g: 95%, 0.1g: 78%, 0.15g: 39% and 0.2g: 0. Similar values for another site B at 25°N and 95°E are: 0.05g: 99%, 0.1g: 78%, 0.15g: 63% and 0.2g: 0. Thus the exceedance probabilities are characteristic for a given site.

The earthquake risk values, calculated at each grid point for an acceleration of 0.1g and a design period of 50 years, are shown in Fig. 1. Such a map is of direct usefulness in choosing a particular value of design acceleration with a known probability of its being exceeded during the design life of a structure. It also helps to visualize the overall effect of seismicity of a large region at a given place in probabilistic terms, and yields a simple method of microzonation based on past seismicity.

REFERENCES

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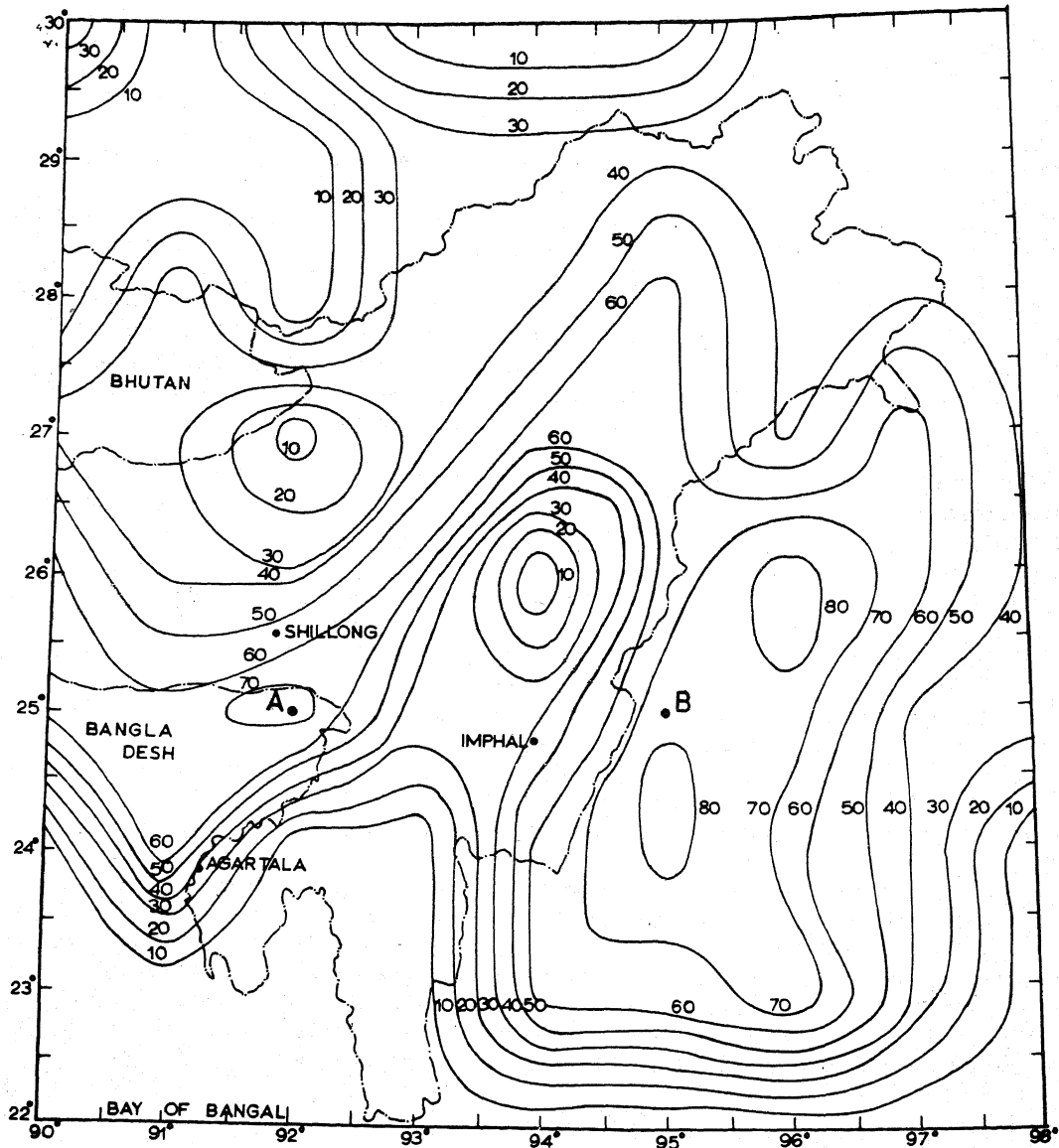


FIG.1 - EARTHQUAKE RISK MAP