

# SEISMIC RISK MAPS FOR CANADA

by

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## SYNOPSIS

Published data from strong motion seismographs have been used to recalculate acceleration attenuation curves and to develop velocity attenuation curves for seismic risk studies in western Canada. Updated and revised catalogues of Canadian earthquakes are used with the attenuation data to redraw the acceleration contour map and to produce a velocity contour map for the Georgia Strait region of western Canada.

## DATA REDUCTION AND RESULTS

Peak horizontal accelerations and velocities of accelerograms published by the California Institute of Technology have been regressed against magnitude (M), and distance (R) (including focal depth) of the respective earthquakes. About 200 sets of readings with  $3.5 \leq M \leq 7.7$  and  $1 \leq R \leq 380$  km fit the following acceleration and velocity equations.

$$\text{ACC}(g) = 0.04e^{1.00M} \cdot R^{-1.4} \quad ; \quad \text{VEL}(\text{cm/s}) = 0.58e^{1.17M} \cdot R^{-1.2}$$

Ground amplitudes on firm soil (horizontal acceleration or velocity) with an annual probability of exceedance of 0.01 are calculated for a grid of 80 sites in the Georgia Strait region of western Canada from the revised catalogue of Canadian earthquakes. A routine in the program which selected the working data set from the catalogue based upon acceleration amplitudes is used to ensure the same earthquakes are contained in both acceleration and velocity calculations. Preliminary contour maps (shown below) of acceleration and velocity are drawn for the region. The acceleration contour map has the same shape as that used for the NBC 1970 seismic zoning map, but the values for any site are higher because new data have contained higher acceleration levels. The validity of using peak ground accelerations and velocities as measures of real seismic risk in the construction of buildings is under continuing study.

