

AN EXTENSION OF THE CONCEPT OF SPECIFIC DESTRUCTION OF
EARTHQUAKES ON THE BASIS OF GROSS NATIONAL PRODUCT OF AFFECTED COUNTRIES

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Natural destructive earthquake hazard is defined as the probability of occurrence of a strong seismic event--mostly above the value of 5.0 on the Richter scale--in a given area and within a given period of time. This probability is expressed chiefly on the basis of seismicity, meaning that a number of seismic events within certain ranges of intensity or magnitude have occurred in a given volume of the earth within an interval of time. Seismicity parameters, seismic activity, and shakeability of a territory have been defined in many ways, and numerous results have been obtained for various regions of the world. The purpose of these definitions has been to develop measures to represent recent neotectonic activity of the region, to define potential hazard and risk at regional, local, or sub-local levels, and to provide a measure to permit making comparisons between the earthquake hazards of various regions or subregions of the world.

However, none of these definitions is able to deal with the complex picture of human loss attributed to earthquakes of a certain magnitude, intensity, or energy with material damage of various kinds, or with temporarily or permanently disabled persons. No attempt has ever been made to estimate the total damage to the landscape in the case of great catastrophic earthquakes simply because of the fact that we have not developed measures for evaluating such types of damage.

An additional concept called "specific destruction" was introduced some years ago by M. Båth [1967] and is defined as a measure of the number of human victims due to an earthquake per unit of seismic energy. In this paper an extension of this definition is developed by representing sums of human losses over a time interval of three decades in various countries versus sums of released seismic energies of events which caused these losses, compared with the gross national product of the affected countries and normalized in relation to the per capita gross national product of the United States in 1978.

The results of calculations from this new definition are surprising: the effects of earthquakes are not necessarily associated with basic seismicity or gross national product of a country alone. The