

QUESTIONNAIRE SURVEY FOR AN ESTIMATION OF SEISMIC INTENSITIES
AND MICROZONING CHARACTERISTICS AT SEVERAL CITIES IN JAPAN

by

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An estimation of seismic microzoning characteristics as well as seismic intensities at several cities in Japan was carried out by means of a questionnaire survey. A questionnaire sheet contains 34 questions; 9 of them are for describing replier's circumstances, 21 questions relate to seismic intensities, and so on. These questions are made to be more responsible to imperceptible difference of the quake than in the past. Soon after a moderate-to-large earthquake occurs, thousands of questionnaire sheets are delivered to shocked areas and at least a 50% of the sheets were collected. Up to date, 10 small-to-middle cities of which populations are from 50,000 to 1,000,000 were surveyed by use of 6 earthquakes.

Analysis was started by confirming the reliability of each response and continued to the refinement of the intensity scale by the data thus obtained. A relation of the new intensity scale to well-known intensities as those by JMA (Japan Meteorological Agency) or MM (Modified Mercalli) is deduced in terms of a least squares method. Averaged and representative intensity values in each surveyed area were obtained by a statistical processing of the collected questionnaire sheets. These were compared with the data of strong motion measurement, degree of damage, and finally with the intensities reported by JMA. This clarified our intensities are superior to those of JMA because of their high-preciseness.

Trials for determining a seismic microzoning map were made at several cities. City areas were divided into subareas with a 500m x 500m square and an intensity representing each segment was evaluated. Then the equi-value lines of intensity difference were drawn. The obtained map is a presentation of seismic microzoning characteristics because of its relative expression of ground shakings. For ascertaining the reproduction capability three independent maps due to different earthquakes were made in one city area, and further comparisons with geological data and the damage distribution were done. A sufficient reliability and stability of the maps and consistency to the other data were clearly achieved. Further, by combining these characteristics with the seismic activity surrounding the concerned area, the expected distribution map of disasters by a future earthquakes was proposed as one of the basic materials for disaster prevention programs.

A few questionnaire surveys were carried out in areas surrounding a seismic source region, which were effective for elucidating a relation of source mechanism to disaster distribution in the shocked area.

The importance of a high-density instrumental observation is well recognized for getting data good for earthquake disaster prevention, but it is next to impossible to perform this. The questionnaire survey here proposed must be a meaningful alternative to the ideal but incapable instrumental observation.

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