Research news and notes

D.S.I.R. MICROZONING PROGRAMME

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It has long been known that variations in soil type can produce differences of several steps of intensity on the Modified Mercalli scale in different parts of an area experiencing the same basic earthquake vibration. Some magnification of the amplitude of earthquake vibration is caused by the lower acoustic impedance of poor soil, and further effects can arise from resonances in layers of differing composition.

The mapping of various areas of New Zealand from this point of view, or "microzoning", has long been advocated, and since April 1968 four divisions of DSIR have been collaborating in working out techniques to enable useful microzoning maps to be prepared. Two of the divisions concerned, the Geological Survey and the Soil Bureau, are engaged in mapping and classifying the various types of near-surface soil, and delineating the boundaries between areas of different soil types. The Geophysical Survey of the Geophysics Division is carrying out gravity surveys to find the thickness and extent of low-density surface layers and is using its drilling-rig to look in more detail at samples of deep rock, and to test directly structures inferred by other methods. The Seismological Observatory of the Geophysics Division has been measuring the relative amplitude of natural ground noise, or microseisms, at various sites, and will later look at the variation of the predominant frequency of this noise. Finally, the Physics and Engineering Laboratory is placing strong-motion accelerometers at sites with various types of foundation, to give direct comparisons of earthquake waves recorded in the same locality but on different types of soil.

For convenience, Wellington has been chosen as the first area to be studied, and the results found so far have been very

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encouraging, particularly in the agreement among the various methods of discriminating different microzones. For example, spectacular agreement has been found between areas of high microseismic noise and areas of negative gravity anomalies. This means that in areas of easy access a simple microseismic noise survey, which is very easily interpreted, may be used as a basis for microzoning, but that in industrial areas already established, where artificial noise from machinery and traffic prevents measurement of natural ground noise, gravity measurements may be used with equal confidence. Already in Wellington, variations in levels of ground noise by factors of up to 20 have been found in different parts of the city. By 1970 a detailed map of Wellington divided into different zones should be available, giving expected amplification of earthquake waves due to ground conditions, and the predominant frequency to be expected.

Other main centres are to be investigated as techniques improve, and work has already begun in the Pauatahanui area, which is scheduled for urban development within the next few years. This may well be the first urban area of New Zealand planned to take account of variation in earthquake risk due to ground type. Although this work is being carried out by the DSIR, Ministry of Works representatives are attending meetings at which the work is planned and discussed, and the Departments of Civil Engineering at Auckland and Canterbury Universities are also being kept informed of progress.