GENERAL INFORMATION

MANAGEMENT COMMITTEE ACTIVITIES

The Management Committee of the Society has met three times since the Annual General meeting on 1 June, 1977.

Seminar: The seminar on the social and economic effects of earthquake predictions was well attended. Papers and discussions from the seminar will be published in the Bulletin. The Management Committee intends to review the proceedings to assess whether any further action by the Society on this topic is desirable.

Plumbing Code: Testing of the water cylinder support structure has commenced.

Workshops: The discussion group on ductile reinforced concrete frames has now published 8 papers in the Bulletin. It is planned to hold workshops in the main centres following publication of the draft concrete code in 1978. Discussion groups on bridges and shear walls are being organised at the present time.

Seismic Design Committee: Draft guidelines to be issued by the Committee have been circulated for comment.

Accelographs: Servicing an expanded network of accelographs presents considerable financial difficulties to the D.S.I.R. and the Management Committee continues to seek alternative arrangements. The M.W.D. have recently offered to assist in routine maintenance.

Membership: In an effort to expand Society membership in New Zealand, circulars have recently been distributed to all members of the Association of Consulting Engineers, to local authorities and to final year engineering students.

Reconnaissance Teams: John Hollings continues as team organiser (with Norman Hardie as deputy). A seminar of prospective team leaders and members is to be held in 1978.

Bulletin: Readers are reminded that besides articles and discussions, the Society welcomes correspondence on any aspect of earthquake engineering. These may take the form of Technical Notes, "Briefs" or letters to the Editor.

Finance: The 1978 subscription will be $12.

BOOK REVIEW

"Dams and Earthquakes. Developments in Geotechnical Engineering, 11." Harsh K. Gupta and B. K. Rastogi. Elsevier Scientific Publishing Company, Amsterdam-Oxford-New York, N.Y., 1976, 229pp., 116 figs.

Reservoir-induced seismicity is one of the most rapidly growing aspects of seismology, leading to fuller understanding of the mechanics of earthquake generation. This volume draws heavily on material presented at the UNESCO-sponsored Colloquium on Seismic Effects of Reservoir Impounding held in London in March, 1973, and collects a remarkably comprehensive array of material and references on all aspects of induced seismicity. Following a foreword by Prof. J. P. Rothé, the doyen of workers in this field, the authors give detailed accounts of instances of reservoir-associated seismicity, and then assemble observational and theoretical material on the characteristics of induced earthquakes, stresses due to water load, and the seismogenic effect of increases in pore pressure.

As might be expected, the authors give the fullest discussion to the 1967 Koyna earthquakes in peninsular India, and include some interesting original field observations. One senses the authors' difficulty with this particular earthquake, studies of which have become embroiled with political implications as well as the object of some extraordinary seismological speculation regarding its focal parameters. The UNESCO Committee of Experts, and some Indian government officials, appear loathe to admit any connection between the reservoir and the earthquakes, but most readers will agree with the authors' treatment of this earthquake in the remainder of the book as one of the classic examples of reservoir-induced earthquakes. The suggestion by one group of seismologists that the source of the earthquake extended from near the surface to depths of 60-70 km with a rupture velocity close to that of P waves is treated by the authors with more credibility than it would seem to deserve.

Excellent case histories are also given of other main instances of reservoir-induced seismicity - Kariba, Kremasta, and Lake Mead. Brief mention is made of the case of the Hsinfengkiang Reservoir, but the book was too early to report the excellent detailed studies presented by Chinese scientists at the International Symposium on Induced Seismicity at Banff in 1975. This section includes studies of earthquakes induced by fluid injection with those of reservoirs - perhaps a separate subsection for these important controlled experiments would have been more appropriate. There is also some confusion about the status of earthquakes near some reservoirs. The authors correctly report, for instance, that earthquakes recorded near Mangla Dam are probably unrelated to the reservoir, yet in later sections of the book include these in studies of the distribution and characteristics of reservoir-associated earthquakes.

After describing the reservoirs and the associated seismicity, a detailed study is

made to find common characteristics, and to relate these with physical conditions of rock properties and stress. The conclusion is reached that the artificial lakes must change the mechanical properties of the rock, to allow a large magnitude shock to occur. Details of how this can happen follow in the next two chapters. The methods of stress calculation devised by Gough and Gough for the study of the Kariba Reservoir are given in detail, and the conclusion reiterated that in general incremental stress due to water loading is not a prime factor in generating reservoir-associated earthquakes.

The discussion of the role of pore pressure follows that given by Snow, and vindicates the theory of Hubbert and Rubey. The discussion on the effect of increased pore pressure in areas of differing tectonic regime is particularly useful, indicating that areas of normal or strike-slip faulting should be more prone to induced seismicity than those of reverse faulting.

In a book such as this some mistakes and defects will occur. Figs. 79 and 80 are interchanged, for example, confusing maps of pre- and post-impounding earthquakes near Lake Benmore. It is also hard to believe, as reported on p. 73, that an 87,000 km^2 area of Greece experienced 28 earthquakes of magnitude 7.1 or more from 1953 to 1965. Such errors, although regrettable, will be noticed only by the most careful reader, to whom they will be immediately obvious.

This book is timely as its topic is well related to current interest in earthquake prediction and control. It is the first book to have been devoted exclusively to the subject, and doubtless will be followed by others as the subject develops. Although it suffers from some deficiencies, it will remain a very useful summary of both case histories and theory, and will give practical leads in helping to decide which factors determine whether or not a given reservoir is likely to be associated with an increase in seismicity.

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EARTHQUAKE NOTES

GAZLI, MAY 1976 EARTHQUAKE

The last issue of the Bulletin contained a brief note on the strong-motion record obtained during the 17 May, 1976 earthquake at Gazli, U.S.S.R. Additional information on the earthquake appeared in a recent U.S. Geological Survey Circular and is reproduced here in a somewhat abbreviated form.

"Two days after the April 8, 1976 earthquake (M_S = 7.0) in the western Kysulkum Desert (40.5°N., 63.8°E.), the Institute of the Physics of the Earth (U.S.S.R. Academy of Sciences, Moscow) began operating portable seismic stations in the epicentral area. Initially, a station was established at Gazli, a small town 30 km south of the epicenter, and later at Karakyr Point, located very close to the epicenter of the April 8 event.

The subsurface geology at Karakyr Point consists of clay and sandstone, 1420 m thick, underlain by highly resistant metamorphic schist. During the weeks after the April 8 earthquake, other portable stations were installed in the epicentral area by the Seismological Institute of the Uzbek Academy of Sciences (Tashkent) and other institutions.

From April 10 to May 16 more than 100 aftershocks of the strong April 8 foreshock were recorded, some of them with felt intensities up to VI (M.M. Intensity Scale). The main shock of the sequence occurred on May 17 at 0258:32 GMT with co-ordinates 40.26°N., 63.30°E.; focal depth about 25-30 km; and magnitude M_S = 7.2. The preliminary fault plane solution for the main shock gives a dip-slip mechanism. More than 100 aftershocks were recorded during the next few months; the strongest had a felt intensity of about M.M. VII at the epicenter.

The main shock of May 17 was felt in Gazli with an intensity of about IX. All brick buildings were substantially destroyed, all panel buildings were seriously damaged and cracks appeared in asphalt roads and concrete pavements. Fortunately, the entire population of Gazli had been evacuated after the first shock of April 8 and was living in nearby temporary wooden buildings and tents. Consequently, casualties related to the main shock were held to a minimum. At Karakyr Point the only adobe building collapsed, and cracks up to 10 m long and approximately 1 cm wide were observed in the ground.

The strong-motion record from the main shock of May 17 has some defects: the film supply was depleted while the earthquake was in progress (record is therefore limited to the first 15 sec of strong motion); some parts of the film were slightly spoiled (the record was restored by copying the record using a more suitable exposure time); and irregular film movement took place during a short interval of about one sec^2 (it is probable that the acceleration related to the film transport system was constant during this time interval and thus corresponding corrections were introduced in the record).

The May 17 accelerogram shows the unusual nature of the strong motion, particularly the gradual increase of trace amplitude (the maximum amplitude for each component is indicated approximately 8 sec after the instrument triggered). The maximum recorded acceleration is 1.3 g (one-half of peak-to-peak acceleration) at a period of 0.063 sec. The duration of strong-motion acceleration $\geq$0.5 g is about 6 sec, and the amplitudes of horizontal motion are approximately one-half those of the vertical motion. The aftershock accelerograms are typical of strong-motion records from nearby earthquakes."

The original article in the U.S. Geological Survey Circular describes the recording instruments in detail, and also contains two photographs of damaged buildings