Session Summary
by
Takeo Mogami*

The papers presented in the Session I are related to soil and foundation conditions in connection with earthquake problems. Among them the following six papers were reported orally at the Conference:

(1) Lateral Earth Pressure and Stability of Quay Walls During Earthquakes, by H. Matsuo and S. Ohara
(2) Soil Strength During Earthquakes, by H. B. Seed
(3) Some Experimental Studies on the Earthquake-proof Design of the Foundation of Bridge, by Y. Tahara, T. Takata and M. Fukuoka
(4) Lateral Earth Pressure in an Earthquake, by Y. Ishii, H. Arai and H. Tsuchida
(5) The Effect of Ground Characteristics on the Aseismic Design of Structures, by V. A. Murphy
(6) Resistance of Foundation Ground against Overturning Forces, by S. Shiraishi

The paper by Matsuo and Ohara deals with the earth pressure on a vertical wall during vibration. Theoretical calculation is based on the theory of elasticity and the comparison of calculated pressure with observed one for model wall on a vibration table was made, which was fairly good. They noticed that the hydrodynamic pressure should be taken into account for stability calculation.

The paper submitted by Seed presented his studies about the soil behaviour subjected to a combination of a sustained stress and a series of pulsive stress. Tests were made on a compacted silty clay and a medium sensitive undisturbed clay. The author emphasized the strong effect on deformation of pulsive force.

Y. Tahara, T. Takata and M. Fukuoka compared the k-values of a soft ground obtained by two ways of determination, one way is by an equipment set up by the authors and the other is based on the measurement of dynamical displacement due to horizontal vibration. The k-values obtained by statical method were a little smaller than those by dynamical observations.

After many model tests on pressure exerted on a fixed or movable wall vibrated on a vibration table, Y. Ishii, H. Arai and H. Tsuchida concluded that Drs. Mononobe-Okabe formula is recommended for design purpose.

V. A. Murphy presented evidence obtained by his damage surveys after earthquakes. A method of estimation of the seismic settlement of structure footing was proposed.

---

*Professor, University of Tokyo, Japan.

S. Shiraishi presented his study on resistance of a caisson against lateral overturning forces. His experiments on prototypes and models of foundation of bridge piers show that friction of side walls and base of the pier is very important.

More four papers listed in the following were presented to the session not-orally, they were introduced as the session summary at the conference, because the time was not so enough:

(7) Bearing Capacity of Sandy Soil for Eccentric and Inclined Load and Lateral Resistance of Single Pile Embedded in Sandy Soil, by T. Shinohara, T. Tateishi and K. Kubo
(8) An Experimental Study of Oscillating Earth Pressures Acting on a Quay Wall, by S. Niwa
(9) On the Dynamic Properties of Clay, by S. Murayama and T. Shibata
(10) Earthquake Damage and Subsoil Conditions as Observed in Certain Districts of Japan, by N. Nasu

The paper submitted by T. Shinohara, T. Tateishi and K. Kubo deals with two problems, one is the ultimate bearing capacity of a plate located on a ground and subjected by an oblique force. They treated this problem by extending the circular sliding surface method and this way of obtaining the failure load was examined by experiments. Comparisons were satisfactorily which shows that such problems can be solved by this simpler method. The second problem is concerned with sheet pile subjected to horizontal force. They performed experiments with model sheet pile these rather long period of time and obtained their conclusions. According to them, the deflection of a sheet pile can be calculated by assuming the so-called soil reaction is some power of the deflection and they discussed the law of similarity to transform the results with model pile to those of prototype pile.

The next paper is submitted by S. Niwa and it presents the earth pressure problem in earthquake. His large scale test quay wall was subjected to vibratory motion of the ground by a huge vibration generator, he calls it as an artificial earthquake.

He reported details of his experiments and shows an example of observed distribution of earth pressure exerted on the back wall of his model. It was revealed that the outer fifth of the height experiences a reduction in earth pressure when vibrated amounting about 50 per cent, that increase in earth pressure was observed when vibrated. And some amount of pressure remains at the foot of the wall after the vibration stopped.

The vibratory motion of wall when it is subjected to the artificial earthquake, is composed of two kinds of motion, that is, transitional and rotational one.

The third paper presented by S. Murayama of the University of Kyoto and T. Shibata is the report of their study on dynamic behaviour of a clay. Experiments were carried on in their laboratory on one kind of clay and the clay was taken out from ground without disturbance.

Flow characteristics of clay under vibrating load was studied with uniaxial dynamic flow tester which was designed for this purpose.

Their conclusions were (1) The upper yield value obtained by the dynamic flow test performed at lower side of the resonance range is equal to the value obtained by the static test, (2) The number of repetitions required to produce the fatigue fracture of clay is determined only by the applied repetitional maximum stress irrespective of the frequency, (3) The decrease of the long-term strength and the shearing strength by vibration, in the case of undisturbed clay, depend on the maximum acceleration of vibration.

The paper presented by N. Nasu reported the results of fairly comprehensive surveys made in four districts by the staffs of the Earthquake Research Institute. The method of investigation involves the comparative observation of earthquake and pulsations(microseisms), observation of microtremors, seismic prospecting, boring, mechanical tests and analysis of the soils. Seismic damages differed for soil conditions.