

The object of the research activity in Kubo laboratory is to investigate behaviors and characteristics of various civil engineering structures. The project consists of the following two subjects, that is, theoretical and experimental studies (a) on the dynamic and static responses of structural systems and (b) on the interactions between the structural system and the soil.

Each research will be listed as follows:

1) Model Test and Analysis of Vibration of Continuous Curved Box Girder:

In this subject, behaviors of horizontal reaction of supports are investigated as the directions of supports are varied.

2) Studies on the Properties of Torsional Vibration of Structure Supported by Many Piles:

When a structure on many piles is forced to vibrate in a horizontal direction, it vibrates also torsionally on account of the eccentricity of the superstructure. The properties of this torsional vibration of such a structure are investigated in this subject.

3) Vibrational Test of a Structure Placed on a Pile-Foundation by the Large Size Shaking Table:

In order to investigate vibrational characteristics of soil structure, foundations in soft ground and underground pipeline and so on, the Large Size Shaking Table was constructed. Bending moments and accelerations of piles and distribution of acceleration in soil are measured. The system which consists of soil and structure is analyzed by the finite element method.

4) Studies on Methods of Numerical Analyses of Structures:

A method of numerical analysis of arbitrary shaped plate in bending was developed. This method can be judged to lie between the finite element method and the finite difference procedure. Many problems with various boundary conditions and shapes were analyzed and the accuracy of this method was confirmed. It is now being tried to extend this procedure to plane stress analysis and to the problems associated with shell structure.

Members

K. Kubo (Professor), Y. Yoshida (Lecturer), N. Sato (Research Assistant), K. Yasuda (Technical Assistant), K. Ito (Technical Assistant), K. Serizawa (Technical Assistant) and two graduate students.

Equipments

Large Size Shaking Table (Photo 1)

The sand box on this shaking table is 10 m long, 2 m wide and 4 m deep. This table can be moved in one horizontal direction by electro-hydraulic servo system. The main properties are as follows:

Period: 0.1 sec ~ 1.0 sec

Maximum amplitude: ± 100 mm

Maximum acceleration: 400 cm/sec²

Slab Testing Machine (Photo 2)

It consists of two movable frames each of which is equipped with 100 t hydraulic testing machine. Since the testing machine can move on each frame, it is possible to test a structure with the maximum 5.5 m x 10 m plane form. A loading point can be chosen within the range of 1.5 m height.

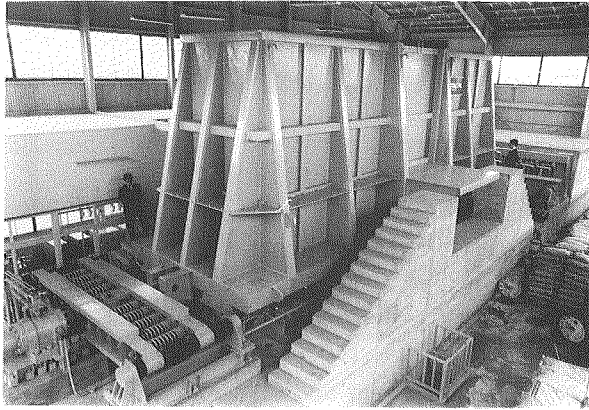


Photo 1. Large Size Shaking Table

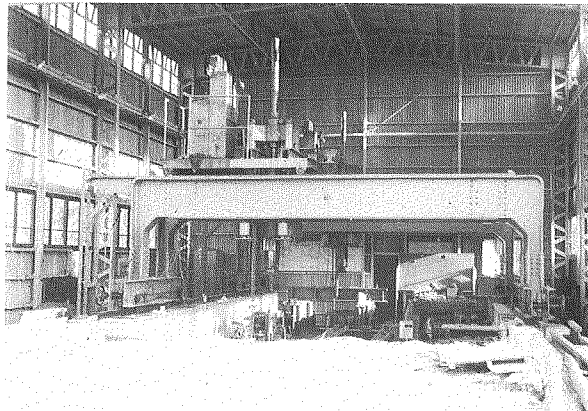


Photo 2. Slab Testing Machine