

I-B 385

EXPERIMENTAL STUDY ON DYNAMIC SOIL-PILES INTERACTION PROBLEM (Part 1 Outline of the System and FUT)

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1. INTRODUCTION

Pile foundations are commonly used to support structures, and the mechanism of the behavior during earthquakes is not sufficiently clarified. It depends mainly on the complex relation among piles and soil and on the secondary non-linearity occurred in surrounding soil adjacent to the pile surfaces. We have constructed the idealized five types of model in Funabashi Campus of our college in order to develop some numerical codes being able to simulate the models behaviors under earthquakes. The soil profile to 150 m depth of the campus is shown in Figure 1. Five models as shown in Figure 2 have none - 9 steel piles which diameter and length are 406.4 mm and 26.6 m respectively. In advance of the Earthquake observation, the forced vibration test of the models have been carried out.

2. MODEL

The Model 1 is constructed in order to understand the behavior of single pile interaction problem at interval of 100, in the same way that the Model 2 to behave four piles system, the Model 3 for 9 piles. And strain gauges and accelerometers are arranged in the ground around the Model 3 as shown in Figure 3 to observe the ground behavior. The Model 4 has four piles and embedded foundation. The Model 5 has no pile in case of the Model 4.

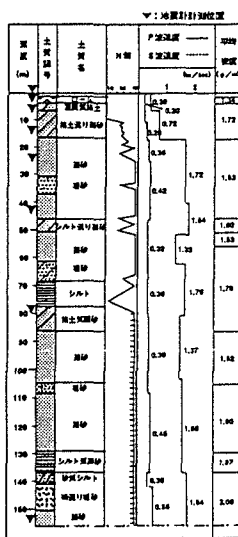


Figure1 soil profile

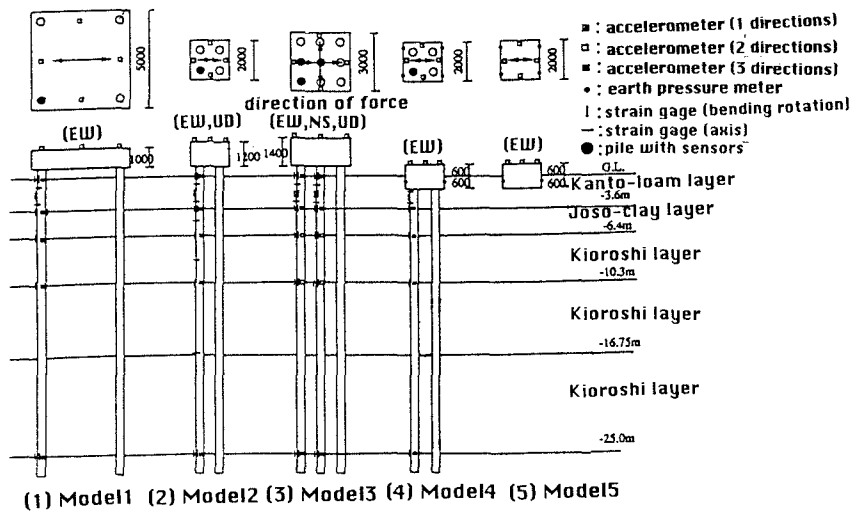
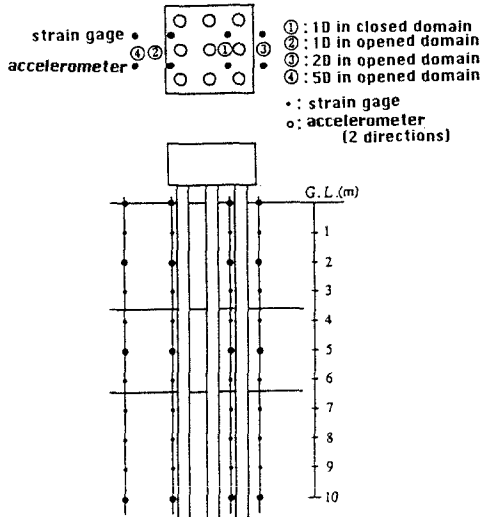


Figure2 models

3. THE BEHAVIORS OF FOOTING UNDER FUT

The forced vibration tests has been carried out as shown in Table 1. As the piles are constructed in the natural ground, the exciting force was limited to restrain the foundation motion in linear range. The force shown in the table are the average ones and swung within 20% range.

Figure 4 shows the motions of foundations in parallel to unit exciting force.



model	direction of force	experiment name	exciting force (kgf)		
			SER1	SER2	SER3
model 1	EW	EXP1E1	1000	2000	3000
model 2	EW	EXP2E1	250	500	375
	UD	EXP2U1	250	500	1000
model 3	UD	EXP3U1	500	1000	750
	EW	EXP3E1	500	1000	750
	NS	EXP3N1	500	1000	750
model 4	EW	EXP4E1	500	1000	—
model 5	EW	EXP5E1	250	500	100

Table1 exciting force

Figure3 adjacent sensors to the Model 3

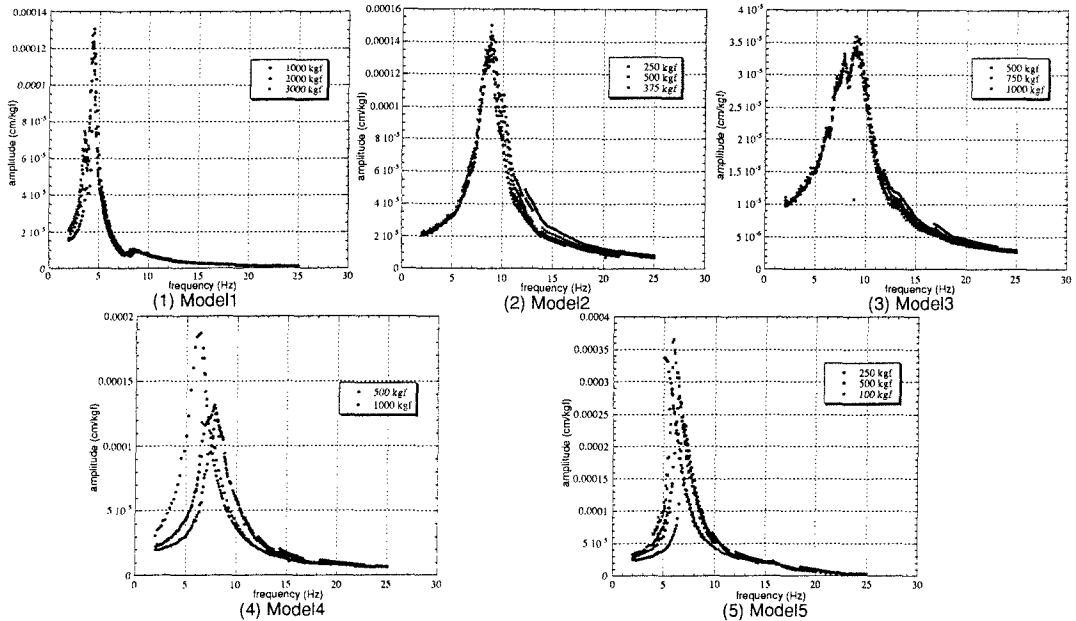


Figure4 transfer function