

AN APPLICATION OF FINITE ELEMENT METHOD TO
SOIL-FOUNDATION INTERACTION ANALYSES
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This paper discusses the soil-foundation interaction of an actual structure. The Kanmon Bridge, completed in November 1973, is a three span suspension bridge with 712m center span crossing over the Kanmon Strait between Shimonoseki in Honshu main island and Moji in Kyushu island. During the construction period dynamic field tests on both of the foundations of two main towers were carried out. The Shimonoseki-side foundation, 40m wide, 20m long and 14m deep, weighs about 25,000t and the Moji-side foundation, 40m wide, 20m long and 30m deep, weighs about 50,000t. Their bottoms reach to sound rock layers. Sinusoidal vibratory horizontal forces, up to 35t at 5.5c/s and 40t at 12c/s, were applied to the tops of the foundations. Several peaks appear in resonance curves. In considering the appearance of these peaks, interaction between the structure and the surrounding ground should be taken into consideration. Some analyses were conducted to estimate elastic moduli of the soils and to obtain dynamic characteristics of the Moji-side foundation. From the tests and the analyses the following may be concluded.

1) Elastic moduli of the soils are considerably greater (about 5 times) than those used in the design, therefore displacement due to seismic excitations during future earthquakes may be smaller than those expected in the design.

2) In discussing dynamic characteristics of huge foundation it is necessitated to consider the effects of geological and topographical features and of adjacent structures. And dynamic characteristics of those structures can be satisfactorily obtained by a response analysis on the basis of the finite element method.

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