

Krit Soawiang 2009: A Study of Behaviors of Bridge Approach Structures.  
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Department of Civil Engineering. Thesis Advisor: Associate Professor  
Korchoke Chantawarangul, Ph.D. 134 pages.

An excessive differential settlement at a bridge approach causes driver discomfort and reduces driver safety. This problem generally occurs in the central part of Thailand, especially, on the Bangkok subsoil, which has high compressibility. The structure of the bridge approach has continually developed to reduce the differential settlement but this problem still occurs.

The purpose of this research was to study behaviors of 2 types of bridge approach structure, which are approach slab on ground and approach slab on pile. The data used in this research were obtained from bridge structures, including settlement observation, subsoil data and as-built drawing. The settlement analysis was carried out using 1-D Terzaghi consolidation theory, and the behaviors of concrete slab were analysed by the beam on elastic material concept, combined with finite element method to determine shear and moment in the structure. The value of spring stiffness is determined from tangent modulus concept and the oedometer test data.

The results of the settlement calculation show that the maximum differential settlement of the approach slab on ground induces 9% of slope, which causes concrete slab damage. Cracking occurs at the maximum bending moment of the concrete slab about 4 m from the abutment. In the case of the approach slab on pile, the differential settlement is less than the previous one. The maximum differential settlement occurs at the piles tips laid between soft clay and medium stiff clay layer. The maximum bending moment is higher than the allowable bending moment. The cracking of the concrete slab occurs at a distance about 14 – 16 m from abutment which corresponds to the field observation. The results of this study can be used for the design of bridge approach structure and the arrangement of pile lengths in the different subsoil layers.

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