

The analytical study on Influence factors to evaluates The thermal properties of donut type biaxial hollow slab

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Summary

The objective of this paper is to find the influence factor on the thermal properties of biaxial hollow slab by finite element results using ANSYS program. The parametric analysis which includes existence of hollow shape, type of hollow shape, internal covering thickness between hollow shape and steel was carried out. As a result of this study, the existence of hollow shape has effect of resisting heat transfer within concrete slab and increasing temperature of bottom bars. Also, distance between hollow shape and steel may influence on the concentration effective of temperature for bottom of biaxial hollow slab.

Keywords: Biaxial hollow slab; Thermal properties; Influence factors.

1. Introduction

In recent years, by developing structure technology and social tendency, the building structures are becoming larger and higher and noise-vibration problems of building structures have come to the fore as a major issue. According to this circumstance, the thickness and area of slab have a tendency to increase. So, the changes of the building structure are causing problem to increasing self-weight of building structure. In order to solving these problems, the studies on development and application of biaxial hollow slab are being carried out vibrantly.

The biaxial hollow slab system is widely known as one of the effective slab system which can reduce self-weight of slabs by voids within slab using hollow shapes. Also, the structure performances and safety of this system was evaluated through various studies. But, to actual application of biaxial hollow slab, the fire resistances like the structural safety during fire are important as well as structure performances under fire. However, the studies on evaluation of fire resistance performance for the biaxial hollow slab are insufficient.

For building fire, it is known that the reinforced concrete slabs have excellent fire resistance performance by characteristics of thermal conductivity and thermal diffusivity for concrete. On the other hand, biaxial hollow slab have a feature forming air-layer by existing hollow part in concrete performance of concrete structures changed by air-layer in concrete slab. For this reason, the biaxial hollow slab is expected to have other fire resistance unlike reinforced concrete slab.

Therefore, it is indicated that detailed studies on evaluation of fire resistant performance for biaxial hollow slab are necessary. In this paper, the specific influence variables on the thermal properties for the donut type biaxial hollow slab are identified and the influence of this is verified though nonlinear finite element analysis.