

The Bond Characteristics of Deformed Bar Embedded in Biaxial Hollow Slabs according to the Hollow shapes.

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Summary

This study investigated the bond characteristics of embedded deformed bar in biaxial hollow slabs with donut type hollow shapes. The hollow shapes consist of the radius of curvature and the hole diameter. In biaxial hollow slabs, bond capacity is different from general RC slab because the void of slab might reduce the area of the deformed bar surrounding concrete. Therefore, FEM analysis was performed to find out the effect of hollow shape on the bond characteristics of deformed bar. Bond characteristics of biaxial hollow slabs were investigated according to the bond region of hollow shape using the nonlinear finite element program LUSAS. The main parameter was the distance between void and deformed bar. To investigate the bond characteristics, hollow slab was divided into 3 sections according to the distance between void and deformed bar such as sufficient region, transition region and insufficient region.

Keywords: biaxial hollow slabs; inner cover thickness; bond stress distribution;

1. Introduction

Recently, the biaxial hollow slabs with donut types hollow sphere system which can reduce self-weight of slabs have been studied as the height and span of building structures rapidly increase. Many researchers have been studied about the structural capacities of hollow slab such as bending, shear, punching shear but studies of a bonding of this system are lacking yet. However, the bond characteristics were very important for the structural capacities because it may influence on the crack width, interval and tensile stiffness effect.

The biaxial hollow slab with donut type hollow shape consists of the radius of curvature and the hole diameter (Fig.1). The bond characteristics of hollow slab might be different from general RC slab because of region which has insufficient cover thickness of the deformed bar surrounding concrete by the void. Therefore, the bond characteristics of hollow slab should be determined to provide the development/splice length of hollow slab adequately according to hollow shape.

In this case of biaxial hollow slabs, inner concrete cover thickness occurs due to hollow shape that the concrete thickness between void with deformed bar. Also, inner concrete cover thickness was relatively thin rather than outer concrete cover thickness. Therefore, this paper will find out the effect of inner concrete cover thickness which was decided by hollow shape on bond performance of biaxial hollow slab.

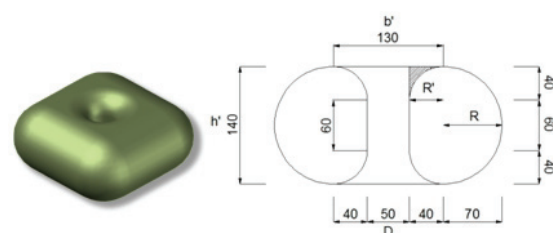


Fig. 1: Donut type hollow sphere shape