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## **ESTIMATION OF DEPTH OF EARLY AGE CONCRETE COLUMN MEMBER USING IMPACT ECHO METHOD**

### **Abstract:**

Nondestructive testing methods for concrete structures have been started from the 1930s, and the nondestructive testing methods have been actively developed as a technique for evaluating the condition of concrete structures by the occurrence of defects in fresh concrete in the 1970s.

This study (NRF-2017R1A2B2009743) is to confirm the possibility of quality control by estimating the depth using nondestructive tests at the early age in concrete column members. Concrete specimens were constructed with 2400mm in length, 2400mm in width and 1600mm in height for the design strengths of 24MPa, 30MPa and 40MPa. Impact echo method, which is one of the nondestructive test methods, was conducted in accordance with ASTM C 1384-04 for the depth estimation of concrete column members. Experiments were carried out on the 6th day after removal the forms at 5th day of age using the impact echo technique.

For the specimen with a design strength of 24MPa, the error ratio is 3.5% for the column member size 250mm, 1.1% for the column member size 300mm, 3.1% for the column member size 400mm, 0.6% for the column member size 500mm. The overall average error ratio is 2.1%. For the specimen with a design strength of 30MPa, the error ratio is 1.5% for the column member size of 250mm, 1.8% for the column member size of 300mm, 3.3% for the column member size of 400mm, 7.0% for the column member size 500mm. The overall average error ratio is 3.4%. For the specimen with a design strength of 40MPa, the error ratio is 3.0% for the column member size of 250mm, 1.4% for the column member size of 300mm, 4.0% for the column member size of 400mm, 4.2% for the column member size 500mm. The overall average error ratio is 3.2%.

The overall error rate for the strength and size of the specimen is 2.9%, which resulted in high reliability. The nondestructive test method was used to confirm the possibility of quality control by estimating the depth of early age concrete structures.

### **Keywords:**

Estimation, Depth, Early Age, Concrete Column Member, Impact Echo Method