STUDY ON WAYS TO MINIMIZE HONEYCOMBS IN CONCRETE CONSTRUCTION

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During concrete construction, there may be some defects formed due to carelessness of humans. The defects formed include honeycombs, those due to poor formwork installation, shrinkage cracks, segregation, and exposed reinforcement to environment etc. These may have happened due to poor site experience, poor design, and carelessness of workers. One of the main defects is honeycombs. Honeycombs are porous volumes of coarse grain aggregates bonded together by cement. In practice, these defects are formed when the fresh concrete ingredients segregate e.g., due to granular convection effects. The presence of honeycombs causes loss of durability, loss of load bearing capacity and corrosion of reinforcement bars. So, there is a need to minimize the honeycombs in construction site to enhance the durability of concrete structures. Under this study, the causes, remedial measures, how to identify, and how to avoid were studied.

The main objective of the present study is to find methods to identify the location of core honeycombs. Ultrasonic Pulse Velocity (UPV) test and measuring vibration levels using a vibrometer while striking the surface with a rubber mallet are the two approaches attempted in the present study.

A questionnaire survey and an experimental analysis were done as part of research. Questionnaire survey was done among the batchmates on whether they have encountered honeycombs during their Industrial training. Experimental analysis was performed on six beams (600 mm x 250 mm x 150 mm) of Grade 30 concrete (with reinforcement three beams and without reinforcement three beams). The beams were cast with intentionally created honeycombs inside the beam in different depth using Polystyrene. Beams were cast with reinforcement of 4T12 bars and R6 stirrups at spacing 100 mm. On the faces of each beam a grid having lines at 100 mm interval in the horizontal direction and 50 mm interval in the vertical direction was made to carry out the UPV and Vibrometer testing.

The experimental results show that by using UPV equipment it is possible to locate the core honeycombs precisely in the concrete panels with plaster and without plaster. However, accuracy of detecting honeycombs using Vibrometer in beams with or without plaster is less. In the plastered case, surface should be smoothened by Plaster of Paris for better results.

Keywords: honeycombs; concrete defects; non-destructive test; UPV test; vibrometer

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