

卒業論文

高炉スラグ微粉末と収縮低減剤を用いた
コンクリートの鉄筋拘束下における
収縮特性の把握と解析的検討

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Shrinkage Characteristics of Concrete Using Blast Furnace Slag Fine Powder and Shrinkage Reducing Agent under Restraint of Steel Bars and Its Analytical Investigations

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ABSTRACT

This study presents investigations on the changes of the mechanical properties and shrinkage properties of concrete using a blast furnace slag as a fine powder (the replacement volume fraction of cement was set as 70%) and a shrinkage reducing agent. In the analytical investigation, a sensitivity analysis was performed focusing on the shear mechanism and the crack propagation of RC beams when the mechanical properties and the amount of shrinkage were varied.

In the experiment, at first, the strain of autogenous shrinkage of concrete and the strain of reinforcing bar due to the concrete shrinkage were measured. The test parameters were set as 1) replacement volume fraction of blast furnace slag fine powder, 2) presence/absence of a shrinkage reducing agent and 3) steel rebar ratios. The experimental results show that how the factors mentioned above affect the shrinkage characteristics of concrete within the curing.

As for the parametric analysis, the loading test of RC beams was targeted, and the load-deflection curves and the crack diagram were obtained. In a series of the analysis, models were prepared, where 1) the compressive strength, 2) the elastic modulus, 3) the tensile strength, 4) the fracture energy of concrete, and 5) strain of autogenous shrinkage of concrete were set as parameters. From the parametric analysis, it is found that how the factors mentioned above affect the shear resisting mechanism of RC beams and crack propagation in the beam. Especially, the influence of the strain of autogenous shrinkage of concrete on the shear property of the RC beams is clarified.

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