

EVALUATION OF CRACKING POTENTIAL OF HIGH-STRENGTH CONCRETE INDUCED BY AUTOGENEOUS SHRINKAGE UNDER THE QUASI-COMPLETE RESTRAINT CONDITION

There is concern about cracking in high-strength concrete due to autogenous shrinkage or thermal deformation under severe restraint. In order to evaluate the effect of autogenous shrinkage and tensile creep property on stress of concrete under quasi-complete restraint condition as well as cracking behavior, Variable Restraint Testing Machine (VRTM) was developed. This study investigated a method of evaluating cracking potential or possibility of cracking under restraint, focusing on autogenous shrinkage which is an inherent property of high-strength concrete.

As a result, the method proposed in this study is a quantitative evaluation of cracking risk which uses the ratio of autogenous shrinkage stress under quasi-complete restraint to the direct tensile strength of concrete subjected to stress history to the same age. The results obtained by this method showed quantitatively that cracking potential was low in the concrete containing low heat cement or expansive admixture.

Further investigation revealed that tensile strength properties of concrete might be affected by the creep strain in concrete mortar which was found to vary depending on the presence or absence of restraint or the difference in stress history.