Water induced swelling Displacements in core Drilling method

Abstrak

The core drilling method is nondestructive technique to evaluate stresses in concrete. In the method, the displacements in the vicinity of a hole drilled in concrete are measured and related to stresses present in the structure via elasticity theory. Water Introduced during core drilling causes the concrete to swell; these swelling displacements lead to errors in the estimated stresses. This paper characterizes the water - induced swelling displacements and provides a means to correct errors introduced by these displacements. The depth of water penetration and the swelling strain due to water exopsure are estimated based on values reported in the literature. Finite element modeling is used to estimate the apparent stresses due to ranges of these two parameters. The analytical results are applied to an independent previous hole-driling investigation to show the significant improvement in accuracy that is obtained when water induced swelling displacements are accounted for properly.