

CONCRETE DURABILITY AS INFLUENCED BY DENSITY AND/OR POROSITY

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ABSTRACT

The presence of capillary pores and air voids influences concrete permeability to a large extent. Concrete density is inversely proportional to its porosity. The ingress of aggressive agents into the pore structure is responsible for various durability problems in concrete structures. Therefore, a durable concrete should have low permeability. Permeability of concrete increases with the increase in porosity of concrete. Various factors such as water to cementitious materials ratio, degree of hydration, air content, consolidation, mineral admixtures, aggregates, reaction between aggregate and cement paste, pozzolanic admixture, etc., affect concrete porosity. The effects of these factors on concrete porosity and density are discussed in this paper. Previous investigations relating concrete porosity to permeability, and other durability-related properties are also briefly addressed. Theoretical and empirical models representing relation between porosity and concrete strength properties are described.