Chloride migration in concrete with superabsorbent polymers

Superabsorbent polymers (SAP) can be used as a means for internal curing of concrete. In the present study, the development of transport properties of concrete with SAP is investigated. The chloride migration coefficient according to NT BUILD 492 is used as a measure of this. Twenty concrete mixtures are tested 7, 14, and 28 days after casting. The development of degree of hydration is followed for 20 corresponding paste mixtures.

Both when SAP is added with extra water to compensate the SAP water absorption in fresh concrete and without extra water, the internal curing water held by SAP may contribute to increase the degree of hydration. No matter if SAP is added with or without extra water, it appears that the so-called gel space ratio can be used as a key parameter to link age and mixture proportions (water-to-cement ratio and SAP dosage) to the resulting chloride migration coefficient; the higher the volume of gel solid relative to the space available for it, the lower the chloride migration coefficient, because the pore system becomes more tortuous and the porosity becomes less.