

## **Durability of Self-Compacting Concrete – From theory to practice**

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### **Abstract**

The mix design of self-compacting concrete (SCC) is quite different from traditional concrete, especially in the case of powder type SCC. This results in a modified microstructure. Furthermore, due to the absence of vibration, a different interfacial transition zone (ITZ) is obtained. As a result, different durability characteristics could be expected for self-compacting concrete. The degradation mechanisms of a cementitious material are greatly influenced by the permeability of the material for potentially aggressive substances. As the pore structure is different for SCC in comparison with traditional vibrated concrete, some changes in durability behaviour can be noticed. This paper is first giving an overview of hydration, microstructure, and transport mechanisms of self-compacting concrete. Afterwards, available durability results are summarized in general. In this way some more general view on durability of self-compacting concrete is obtained. Furthermore, it is investigated whether current code provisions concerning durability, developed for traditional vibrated concrete, are still valid in the case of self-compacting concrete. An extended experimental program was executed, focusing on carbonation and chloride penetration. The experimental results lead to the conclusion that self-compacting concrete meets the durability requirements provided in the European code EN 206-1, combining a maximum W/C ratio and a minimum cement content. However, estimating durability properties of Self-Compacting Concrete by a mere verification of the attained compressive strength level can lead to major durability risks.