

Correlation between initial absorption of the cover concrete, the compressive strength and carbonation depth

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Abstract

This experimental work was aimed to characterize the porosity of the concrete cover zone using the capillary absorption test, and establish the links between open porosity characterized by the initial absorption, the compressive strength and carbonation depth. Eight formulations of workability similar made from ordinary Portland cement (CEM I 42.5) and a compound cement (CEM II/B 42.5) four of each type are studied. The results allow us to highlight the effect of the cement type. Indeed, concretes-based cement CEM II/B 42.5 carbonatent approximately faster than concretes-based cement CEM I 42.5. This effect is attributed in part to the lower content of portlandite Ca(OH)_2 of concretes-based cement CEM II/B 42.5, but also the impact of the cement type on the open porosity of the cover concrete. The open porosity of concretes-based cement CEM I 42.5 is lower than that of concretes-based cement CEM II/B 42.5. The carbonation depth is a decreasing function of the compressive strength at 28 days and increases with the initial absorption. Through the results obtained, correlations between the quantity of water absorbed in 1 h, the carbonation depth at 180 days and the compressive strength at 28 days were performed in an acceptable manner.

Keywords:

Initial absorption

Cover concrete

Compressive strength

Carbonation depth