

STUDIES ON THE VARIATIONS OF CARBONATION DEPTH OF FLY ASH AND SILICA FUME BASED TERNARY BLENDED CONCRETE

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Abstract

This paper presents a detailed experimental investigation on the variations of carbonation depth of ternary blended concrete exposed up to 30 months in an uncontrolled ambient temperature condition. The results are compared with those of the plain cement control concrete and binary blended concrete. ASTM class F fly ash (FA) was considered in order to develop binary blended concrete at the replacement level of cement as 20% by weight. Then silica fume (SF) was considered in an effort to develop ternary blended concrete. The replacement of cement in the ternary system by SF was suggested as 8% of total powder content by weight. The variable factors considered in this study were the concrete grade (M_{20} , M_{30} and M_{40}) and curing period (28 days and 90 days) of the concrete specimens. The parameter investigated was carbonation depth, carbonation coefficient of concrete from the depth of carbonation and the pH value of the concrete at different depth from the surface of the concrete. The relationship between the carbonation coefficients with their compressive strength was investigated. The investigation indicated that the ternary blended concrete prepared by 20% FA and 8% SF showed better carbonation resistance than the ordinary plain concrete and binary blended concrete.

Keywords: carbonation depth, ternary blended concrete, carbonation coefficient, pH value