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Performance-based Durability Indicators of Different Concrete Grades Made by the Local Ready Mixed Company: Preliminary Results

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Abstract

The durability of a material is defined as its ability to withstand environmental deterioration. The ability of a concrete structure is to withstand environmental deterioration is important to be investigated in order to enhance the service life of the reinforced concrete structure without having to incur unforeseen high cost for maintenance or repair. The quality of the concrete on durability aspect has to be evaluated through series of concrete durability experiments before the service life model has taken place rather than relies on the conventional prescriptive deemed-to-satisfy approach. Performance-based durability is thus based on durability transport properties instead of limiting particular ingredients, proportions or construction operations without predicting the service life of structure. In order to fulfill customer satisfaction with lasting and great concrete performance at reasonable grade concrete, it is important to conduct various experiments to identify the durability transport properties parameters on the earlier stage of construction. The experiments performed in this study are water absorption, volumes of permeable void (VPV) and sorptivity. The experiment was investigated using Ready mixed concrete of grades G40, G45 and G50 that has been conducted to determine the properties at different concrete zones using 150mm and 100mm for compressive strength test. The strength of G50 increases 18% in sealed curing and site cured concrete has 8% strength increments from 28-90 day of age. Concrete G40 has the highest water absorption, VPV and sorptivity properties followed by G45 and G50 in all ages of test under both curing conditions. Amongst all the different zones, top zone has highest water absorption, VPV and sorptivity followed by left and right zone for all grade. Meanwhile, the bottom zone has the lowest water absorption, VPV and sorptivity followed by middle and center zone of concrete for all grades. The sealed cured (S1) concrete condition shows relatively lower water absorption, VPV and sorptivity than site cured (S2) concrete condition.

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Keywords: ready mixed concrete; different concrete zones; durability; compressive strength; water absorption; VPV and sorptivity

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