

Adverse Curing Conditions and Performance of Concrete: Bangladesh Perspective

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Abstract : Concrete is the predominant construction material in Bangladesh. In large projects, stringent quality control procedures are usually followed under the supervision of experienced engineers and skilled labors. However, in the case of small projects and particularly at distant locations from major cities, proper quality control is often an issue. It has been found from experience that such quality related issues mainly arise from inappropriate proportioning of concrete mixes and improper curing conditions. In most cases external curing method is followed which requires supply of adequate quantity of water along with proper protection against evaporation. Often these conditions are found missing in the general construction sites and eventually lead to production of weaker concrete both in terms of strength and durability. In this study, an attempt has been made to investigate the performance of general concreting works of the country when subjected to several adverse curing conditions that are quite common in various small to medium construction sites. A total of six different types of adverse curing conditions were simulated in the laboratory and samples were kept under those conditions for several days. A set of samples was also submerged in normal curing condition having proper supply of curing water. Performance of concrete was evaluated in terms of compressive strength, tensile strength, chloride permeability and drying shrinkage. About 37% and 25% reduction in 28-day compressive and tensile strength were observed respectively, for samples subjected to most adverse curing condition as compared to the samples under normal curing conditions. Normal curing concrete exhibited moderate permeability (close to low permeability) whereas concrete under adverse curing conditions showed very high permeability values. Similar results were also obtained for shrinkage tests. This study, thus, will assist concerned engineers and supervisors to understand the importance of quality assurance during the curing period of concrete.

Keywords : adverse, concrete, curing, compressive strength, drying shrinkage, permeability, tensile strength

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