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A Review Study on Effect of Sea Water to the Concrete

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ABSTRACT

Every year, billions of tonnes of water are needed in the building industry for mixing, curing, and cleaning. As a result, there is a global scarcity of fresh drinkable water, necessitating the need to conserve fresh water. As a result, a study is being conducted to see if sea water may be used to mix and cure concrete. Furthermore, if the use of seawater as a concrete material is approved, it will be very convenient and cost-effective in construction, particularly in coastal projects. The effect of seawater on concrete is particularly important since coastal and offshore constructions are subjected to a variety of physical and chemical deterioration processes at the same time. Furthermore, seawater covers 80 percent of the world, either directly or indirectly (e.g. winds can carry sea water spray up to a few miles in land from the coast). The effect of sea water and fresh water on concrete will be examined in this study project.

Key words: Compressive strength, Durability, salt water, Potable water, mixing

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INTRODUCTION

Many billions of gallons of water are used annually in the concrete industry as mixing, hardening, and cleaning water all over the world. From the standpoint of water conservation, it is felt that the possibility of using water as a mix component in concrete should be thoroughly examined. Furthermore, allowing the use of seawater as a solid material will be highly beneficial and conservative in terms of growth, particularly along the shore. Because of the presence of hazardous salts, IS 456:2000 states that mixing or curing concrete with sea water is not recommended.In an unavoidable scenario, sea water may be used for mixing and curing plain concrete without embedded steel following careful analysis of potential drawbacks and precautions, such as the use of an adequate cement system. When no other source of fresh water is available or transporting it is too expensive, the necessity to use sea water for construction arises. Such circumstances have arisen during the development of the sea coast (12).

MATERIALS

a. Coarse Aggregate: The crushed granite stone aggregate used complied with IS 383-1970 and had a maximum size of 20mm. The coarse aggregate utilised in this study had a specific gravity of 2.75 and was retained on a 4.75 mm filter.
b. Fine Aggregate (sand): Sand passing through a 4.75 mm filter with a specific gravity of 2.71 was employed as the fine aggregate in this study. According to Indian standard specifications, the fine aggregate grading zone was zone III.

c. Cement: Cement is an important component of concrete because it serves as a binding agent, holding particles together. Cement is nearly universally employed in concrete construction projects. The cement used was OPC 53 grade.
d. Fresh Water: For both mixing and curing of concrete cubes cast with fresh water, ordinary clean portable water free of suspended particles and chemical substances was utilised.
e. Salt Water: Water from a sea or ocean is known as seawater. The average salinity of seawater in the world's oceans is roughly 3.5 percent (35 g/L, or 599 mm).

LITERATURE REVIEW

Dr. Amit Vishwakarma, Anubhav Rai, Abhishek Patel, (2020), "Effect of Salt Water on Compressive Strength, Flexural Strength and Durability of a Concrete": The compressive strength, flexural strength, and durability of concrete and cement mortar cast and cured with potable water, as well as cast and cured with salt water, are investigated in this thesis. The current research is divided into two sections. Concrete cubes, concrete beams, and mortar cubes were cast and cured in the first phase using potable water for M30 grade and 1:3 cement mortar. Concrete cubes, concrete beams, and mortar cubes were cast and cured in the second phase with salt water M30 grade and 1:3 cement mortar. The findings of this study revealed that the addition of salt water boosts compressive and flexural strength while decreasing concrete durability.

Abhishek Patel, AnubhavRai, Vedant Shrivastava, (2019), "Effect of Salt Water on Compressive Strength of Cement Mortar": The goal of this study is to see how salt water affects the strength of cement mortar cubes made with fresh and salt water separately, with half of the cubes made with fresh water and the other half made with salt water. A 1:3 (cement: sand) mix ratio was used to make mortar cubes. The mortar cubes were made in accordance with the IS code of practise. The compressive strength of the mortar cubes was measured after 3, 7, and 28 days of curing in fresh water and salt water. The compressive strength of cubes cast and cured with salt water is slightly higher than that of cubes cast and cured with fresh water, according to the test results.

B. Sathishkumar, P. Samuthirapandiyan, K.Sabarirajan, A.Subalakshmi, (2018), "Effect of Sea Water and Strength of Concrete": The effect of sea water and fresh water on concrete will be examined in this study project. A total of 27 specimens (9 cubes, 9 cylinders, and 9 beams) were cast and cured with fresh water, whereas the remaining 27 specimens (9 cubes, 9 cylinders, and 9 beams) were cast and cured with sea water. The concrete cubes were left to cure for 7, 14, and 28 days, respectively. The results of an experimental study on the influence of salt water and fresh water on the compressive strength, split tensile strength, and flexural strength of concrete are presented in this work.

CONCLUSION

In accordance with the applicable IS code of practise, cubes were cast and cured in fresh water and sea water. On water, four different design conditions for concrete mixing and curing are devised. The strength of concrete specimens cast and cured in salt water is higher than those casts and cured in fresh water.

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