Protection and Repair of Concrete Seasides and Port Structures by Ceramic Pigments

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Abstract

Concrete is one of the most frequently consumed structural materials in the world. The vast variation in properties and applications distinguishes this material from the others. The new idea is to make colored concrete using ceramic pigments with quantity and quality control of properties. In order to protect concrete seaside and portstructures, different parameters should closely be under consideration. Such as durability, compressive and permeability strength. This will be done introducing different ceramic pigments which will produce a new colored concrete in addition to building, bridge, tunnel, dam, blocks, ... application.

In this research, the positive effect of various ceramic pigments on concrete strength and mechanical, physical and chemical properties had been investigated. Better compressive and impermeability strength in comparison to originally colored concrete in the range of application were observed. The experimental results show that these new colored concrete has no reaction with chemical materials and other used metals in seasides and ports.

Key Words

Ceramic Pigment- Colored Concrete- Compressive Strength- Permeability

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1- Introduction

Concrete production has been one of the famous and interesting technology in improved and developed country for several decades. Different industries have different needs to concrete, therefore colored concrete reply to these requirements. In the past, colored concrete has been produced using organic and mineral materials. Although this process gave relatively good results in some aspects, but compressive strength and permeabity were not increased so much.

In this project, it was tried to produce colored concrete using ceramic pigments. Ceramic pigments are the synthesized materials in which their characteristic, particle size, and morphology are under control. So, it is foreseen that this process would give desired results with process control. Fortunately, this project reached to good results. In following the experimental procedure and results are explained in summary.

2- Experimental procedure

Several experiments were carried out using yellow and green ceramic pigments to produce various colored concrete. In order to measure compressive strength and permeability of specimens, several samples with dimensions of 5×5×5 cm and 15×15×15 cm were prepared respectively. The formulation of all samples were fine and coarse sand, cement, water, and ceramic pigments. The following results were obtained in summary.

3- Results

1- The permeability were decreased in most of samples which is a good sign to use these products in ports and seasides.

2- The compressive strength were increased in most of samples which improves concrete application in future.

3- The overall results shows that colored concrete could prepare a new view in processing of concrete technology.