

USING THE EFFLORESCENCE MECHANISM OF PORTLAND CEMENT TO OBTAIN A BRIGHT CRYSTALLINE CALCIUM CARBONATE SURFACE.

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Various types of materials are used in the construction industry, one of the most important is the Portland cement, which is used for prefabricated elements or for joining various materials, and sometimes it is hydrated to obtain a paste and use it as an end finish. Unfortunately, when Portland cement is moistened, calcium hydroxide is transported through porosities to the surface, combining with carbon dioxide contained in the air, producing calcium carbonate and water. This forms irregular whitish stains on the surface of the cement paste causing a poor appearance of the Portland cement as well as the adjacent materials. This phenomenon is known as efflorescence and to avoid it, it is necessary to control or maintain the humidity of the hydrated Portland cement. In this work, a methodology is presented to take advantage of the transport of calcium hydroxide to the surface (which occurs in efflorescence) and instead of discoloration, generate a shiny surface based on calcium carbonate. This methodology is in the process of being patented (Mx /a/2016/002861) and allows obtaining a shiny and homogeneous surface after 14 (fourteen) days of setting. According to the characterization carried out by scanning electron microscopy (SEM), X-ray energy dispersive spectroscopy (EDS), and X-ray diffraction (XRD), this surface is homogeneous, has small pores between 14 and 32 μm and is mainly formed by crystals of calcium carbonate as well as tricalcium silicate, dicalcium silicate, and tricalcium aluminate. The compressive strength of this surface is 3.03 MPa which is a value well below that recommended by the ASTM C150 standard for 7 days of setting, which is 19.30 MPa. However, the methodology for obtaining this surface is promising because of its simplicity and offers a coating with a very attractive visual appearance.

Keywords: Efflorescence, Portland cement, Calcium carbonate

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