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Contribution to the mineral addition on the characteristics physiquo-mechanics of the paste of cement and mortar

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Abstract

This work aims to study the evolution of the resistance of Portland cement pastes and mortars containing two mineral additions such as calcareous filler and finely crushed slag.

The effects of the addition of two mineral additions to Portland cement pastes are mortars, has been carried to evaluate the evolution of the mechanical resistance as function of the age and the mode of the treatment .This study is a simplified approach to show the contribution of the mineral addition on the development of the mechanical resistance, and the porosity obtained using methanol exchange method. In addition, to confirm this study and based on laboratory test resorts approximate equations were obtained.

Key words: *Porosities, Cement paste, Mortar, Mechanical resistance, Exchange by methanol*

1. Introduction

It is widely recognized that the porosity of a material exerts an enormous influences on its physical proprieties. For hardened cement paste a large volume of pores is inherent in the set structure. This porosity is derived mainly from excess water required to ensure cement

hydration and provide workability of cement paste, but can also be present due to inadequate compaction. The residue of water filled space in fresh cement paste becomes voids in hardened cement paste. These voids are divided in two classes, capillary pores and gel pores .the former represent the volume of the capillary pores and it depends mainly on both water/ cement ratio of the mix and the degree of hydration. The latter represents the gel pores. As hydration progresses, the amount and distribution of porosity between capillary and gel pores will change. Initially all the pores are capillary pores. As hydration precedes the capillary pore volume is reduced because the capillary space becomes filled with hydration products, and the gel porosity increases. There is a net reduction in total porosity.

During the last fifteen years Mercury intrusion proximity which involve forcing mercury into pores of a body by application of pressure and assuming that all pores have a simple shape, Has been used for determining the pore structures sizes of hydrated cement paste. This method enables a wide range of pore-size distribution to be measured between 1000μm and 30A° depending on

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