Admixtures for concrete - improvement on properties

Chapman and Hall - 19 Types of Admixture used in cement concrete


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Use of Cement Hydration Stabilizer Admixture at Ready Mix Concrete to Avoid Material Waste

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Abstract. Concrete from ready mix plant is the main raw material consumed in construction industry. A significant waste quantity is generated with fresh concrete returned to the production center due to their inadequate allocation or demand preview. To minimize the amount of this material wasted, misused, discarded, could be used the Hydration Stabilizer Admixture (HSA). This product enables stabilization of the concrete setting time until 72 h. Waste generated by the building industry is becoming increasingly focused on discussions and studies, due to great importance that this topic is achieving. Generation of this waste in the construction sector and the large representation of this sector in society is one of the main problems encountered in the reuse of waste from construction. Its characteristic, heterogeneous and unknown, however, a specific part of that waste generated in the central metering concrete, has a high potential for reuse, mainly because they come from a production highly controlled, where the source materials and the final product are physically and chemically known. This work aims to study the environmental benefits and technical feasibility of stabilizing additive hydration as a solution for the reuse of residual concrete from central metering, always under a sustainable vision of the entire process through an experimental program. This work presents results of setting time, slump test, incorporated air, compressive strength at 3days, 7days, 14days, 28days and 45 days and elastic modulus ate 28 days. The reference concrete was compared with concrete stabilized mixtures (0.15%, 0.30%, 0.45% content of HSA), both presenting the same constituent materials. The results indicate the feasibility to the use of the HSA despite the reduction of the mechanical properties of the concrete.

Introduction

In the case of ready mixed concrete, focus of this present study, main sources of residual concrete are: remains of the concrete mixer trucks, washing equipment and from facilities of the center. According to [1], in Brazil the average waste concrete dosed in centrals was around 9%. Despite the lack of data on major research associations and ready-mixed concrete plant present on the national scene, is currently estimated an index of waste average of 7%. Even though one consider the distinctions between companies in the industry, yet among large multinationals. Extrapolating this concept, according to data from [2] this index points to a volume of about 400 million cubic meters of concrete waste a year around the world. Attempts to mitigating the environmental impacts at ready mixes plant has been investigating by several researches [1-7].

According[1-4] waste concrete management in ready-mixed plant generate numerous direct and indirect benefits, such as:

- -Reduction in the consumption of non-renewable natural resources;
- -Reduction of areas destined for landfill;
- -Reduction of energy consumption;
- -Reduction of pollution in cement production, for each ton of clinker produced generates approximately one ton of carbon dioxide (CO^2) in the atmosphere

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Chemical Admixtures — What, why, & how?

Potential explanations are: the presence of low amounts of alkali released by the cement, removal of Ca OH 2 by chemical interaction, lower permeability, and the formation of non-swelling lime-alkali-silica complex. In essence, the iron is attracted to the nitrite more than the chloride. To develop these qualities, the hydration must be prolonged.

Mineral Admixtures

Due to its high fineness, the addition of silica fume causes an increase in. However, cathodic protection systems designed for use after concrete has hardened or been exposed to chloride are more commonly used to extract chlorides or reduce the rate of corrosion for existing structures.

Top 10 Industry

Zinc, magnesium powder and bleaching powder may also be used according to the condition. The effect of superplasticizers lasts only 30 to 60 minutes, depending on the brand and dosage rate, and is followed by a rapid loss in workability. Retarding admixtures delay the end of the dormant period and the start of setting and hardening.

Types of Admixtures of Concrete & Cement

A generally used gas-forming admixture is known as aluminum powder. Fly Ash: The finely divided residue resulting from the combustion of ground or powdered coal.

Admixtures

The commonly known retards are Calcium Ligno-sulphonates and Carbohydrates derivatives used in fraction of percent by weight of cement.

Effects on concrete Corrosion inhibiting admixtures, such as calcium nitrite, can increase the chloride threshold by five times.

Different types of admixture used in concrete and their Function

Retarders are beneficially used in hot weather conditions in order to overcome accelerating effects of higher temperatures and large masses of concrete on concrete setting time.

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