A STUDY ON SOME ADMIXTURES AND THEIR EFFECT ON THE PHYSICOCHEMICAL AND MECHANICAL PROPERTIES OF CEMENT COMPOSITES

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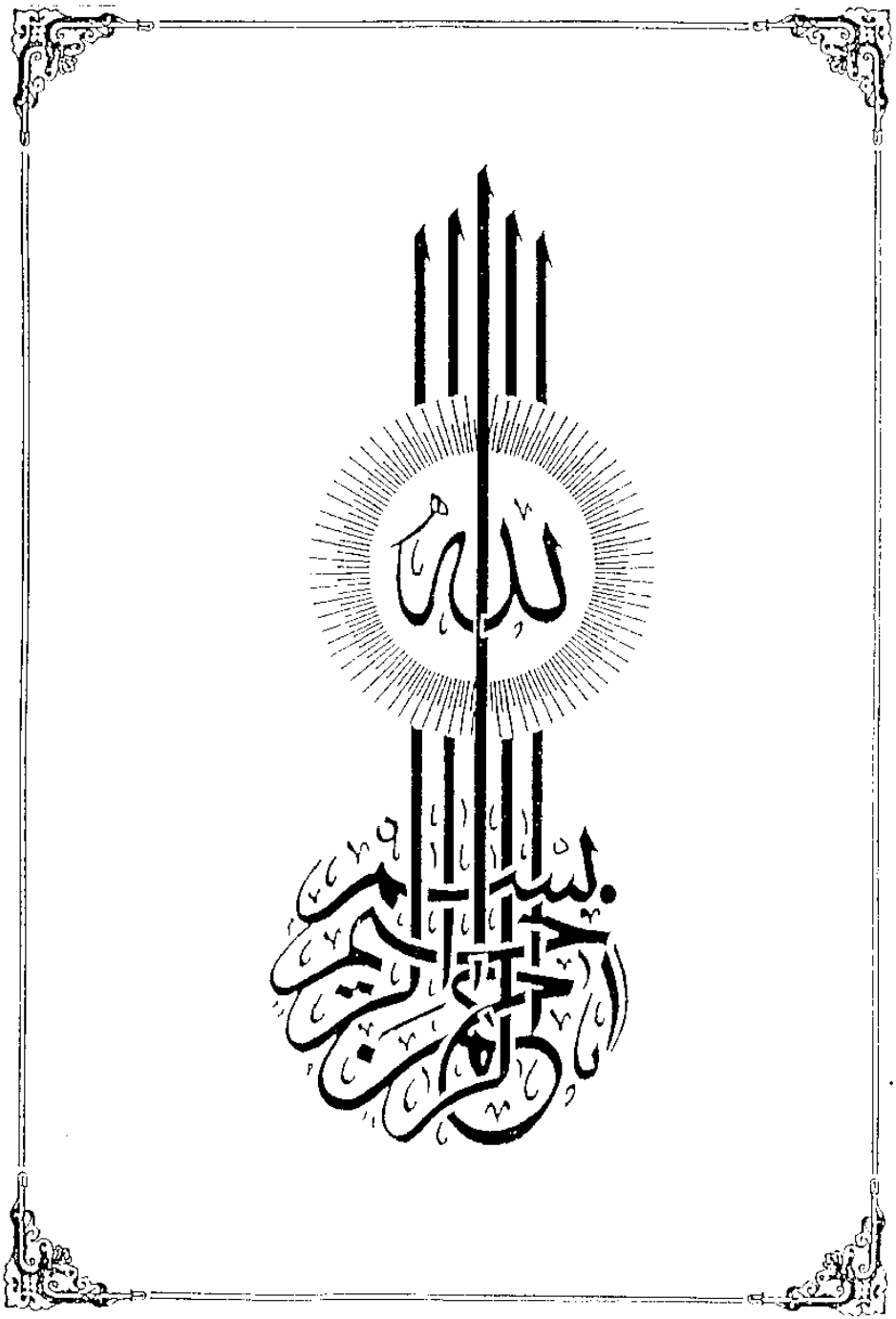

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Introduction & Object Of Investigation

INTRODUCTION

Nowadays, concrete is being used for so many purposes in different conditions. Ordinary concrete may fail to exhibit the required quality or durability. In such cases, admixture is used to modify the properties of ordinary concrete so that to make it more suitable for any required application, often, instead of using a special cement, it is possible to change some of the properties of the cement in hand by the use of suitable additives, known as admixtures.

Admixture is defined as a material, other than cement, water and aggregates, that is used as an ingredient of concrete and is added to the batch immediately before or during mixing. Admixtures may be classified according to the purpose for which they are used in concrete; the approach of both ASTM standard C 494-79 and BS 50 75: Part 1 1974 are substantially similar and contain the following categories :

(1) Accelerating admixture : A material which increases the initial rate of reaction between cement and water and thereby accelerates the setting and early strength development of concrete.

(2) Retarding admixture : A material which decreases the initial

rate of reaction between cement and water and thereby retards the setting of concrete.

(3) Normal - water reducing admixture : A material which increases the fluidity of the cement paste without significantly affecting the air content and thereby increases the workability of concrete at constant water/cement ratio, or permits concrete to be made with decreased amount of water, while maintaining equal workability with consequent increase in strength.

(4) Accelerating - water reducing admixture : A material which combined the function of an accelerating admixture and a normal water reducing admixture.

(5) Retarding - water reducing admixture : A material which combined the function of a retarding admixture and a normal water reducing admixture.

According to the report of the American Concrete Institute (ACI) committee 212, admixtures have been classified into 15 groups according to type of material constituting the admixture or the characteristic effect of the use; these are : (1) Air entraining agents, (2) Pozzolanas, (3) Accelerators, (4) Retarders, (5) Gas foaming agents, (6) Air detraing agents, (7) Alkalis - aggregates expansion inhibitors, (8) Damp - proofing and permeability reducing agents, (9) Grouting agents, (10) Workability agents, (11) Corros-

sion inhibiting agents, (12) Bonding agents, (13) Fungicidal, germicidal and insecticidal agents, (14) Colouring agents, and (15) Miscellaneous agents.

Since 1976, a new title was added in Cement Research Progress 1976. That term was "Superplasticizers". They are considered as a separate category because these admixtures have a distinct ability not only to impart much higher workability to concrete but also to effect larger water reductions than is possible with normal plasticizing admixtures. Those are chemically different from conventional water reducers.

Up to 1976, sulphonated melamine formaldehyde condensate and modified lignosulphonates were used as common active ingredients of superplasticizers. They are used until now as workability agents to produce flowing concrete or as water reducers.

An important report reviewing the performance of superplasticizers appeared in January 1976[1]. The report discussed the use of superplasticizers for both flowing concrete and water reducer-high strength concrete. Davis[2] and Venuat[3] have reviewed properties and handling of concrete mixed with a melamine formaldehyde - condensate polymer. A more practical guide detailing the functions guidlines of mix design, handling, flowing properties and applications of superplasticizers has been prepared by Hewlett[4].