Water Proofing: An Overview of Efficacy and Economics

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Abstract

Water proofing is keeping all water from crossing a material, including soil moisture, water vapors and liquid water that is under hydrostatic pressure. As a porous surface, concrete can quickly soak up water using capillary action between the aggregate if left unreacted. Waterproofing the substance will automatically keep cracks coveredas they develop. It happens due to waterproof compound is a flexible material that will create a seal over top of the concrete. Waterproofing is considered to be better than damp proofing because water proof compound will retain its initial elasticity by sealing the concrete with a waterproofing substance, hence in addition protection to the structure is provided.

Keywords: Water proofing, Porous, Hydrophobicity, Admixture

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1. INTRODUCTION

Concrete is considered best material and widely used as building materials, used on everything from residential basements and foundations to tunnels and water treatment plants [1-5]. It is hard and dense and porous material which makes it highly susceptible to damage and deterioration from water and chemical penetration. That's why nearly all commercial and residential concrete projects specify some type of waterproofing system [6-8]. The waterproofing uses chemical admixtures, usually a dry powder or liquid added to the concrete mix at the batch plant or the jobsite. Some forms of integral waterproofing will even self-heal minor cracking. The situation in the building sector would probably be correlated, requiring hundreds of billions of dollars a year as the repair and maintenance costs [9].

As per recent studies and the definition of water proofing is essentially damp proofing plus a lot more performance. Overall waterproofing provides a higher quality seal against water in foundation waals and keep the structure as a whole more comfortable to occupy. Damp proofing only controls water vapors from soil moisture [10-11]. It won't stop influx of liquid water. If a place have high water tables or severe soil water conditions then damp proofing may not be sufficient. Proper foundation drainage and design elements that reduce hydrostatic pressure will help keep the damp proofed foundation working efficiently [12-13]. In older buildings damp stains on internal waals are usually due to the external factors, such as:

(i) leaking rain water gutters

(ii) Misdirected rain water down pipes

(iii) Insufficient external drainage

(iv) Poor drip details to seal

(v) Bridging of D.P.C.

2. EXPERIMENTAL PROCEDURE

Materials and Methods

2.1 Preparation of waterproofing compound:

Products	Percentage	pH	TS
Pure Acrylic	65.00	9.5	55%
PUD	5.00	7.5-8.0	85%
Defoamer	0.50	-	-
Biocide	0.30	-	-
Coalescing Agent	5.00	-	-
AMP-95	0.20	-	-
DM Water	24.00	-	-
Total	100.00	9.0	

There are several options available for water proofing but they are very expensive. For economical version of water proofing agents then choice is narrow down to oxidized bitumen. This option is not considered good because of its color. Therefore it can be converted to zinc rich color which is widely accepted for the purpose. One needs to pick up the right quantity of oxidised grade bitumen for water proofing job. Therefore it's better to choose 90/15 for optimum performance.

In water proofing front for a slope surface or vertical surface 115/15 or 90/15 or else bitumen would run down on elevated temperature. When applied properly two coat double wrap, there is nothing to beat the performance. In coastal areas needed not applied bitumen to protect from salts and ants. The concern of the studies are price and performance of the water proofing agents here. Therefore no second choice.

3. RESULTS AND DISCUSSION

Waterproofing products are marketed under a dozen or more different brand names. While the chemical composition of each is slightly different, they all are either densifiers, repellants or crystalline admixtures. Densifiers fill the microscopic pores in the concrete matrix to eliminate water infiltration. Water repellants make the concrete hydrophobic. Crystalline admixtures cause microscopic, water-blocking crystals to seal pores and hairline fractures.

In the water proofing application it is necessary to have faster setting time or curing time therefore T_g of the polymer used should be little bit high. The different types of the polymer emulsions are applied like elastomeric emulsions or flexible PUD's, Poly urea formulations there are various options e.g. crystalline admixture and liquid admixture process. When crystalline water proofing is applied to the concrete, a solution of high chemical density is created at the surface, triggering the process of chemical diffusion. When dry crystalline admixture is applied on the waal, allow it to dry 24 hrs it builds very tuff and hard waterproofing coating, to get the best results on top of this liquid elastomeric emulsion coating is also applied to give best results.

Latest powder in dry foam is SBR latex emulsion converted powder foam just like vinyl or styrene RD powder.

The silicone coated matrix is also an option which is a mixture of 100Kg blanck fix and 5 Kg of silicone oil. Sodium aluminium silicate and small amount of calcite gives goodadhesions and permeability.

4. CONCLUSIONS

The technological advancement in the field of building construction necessitated the need for superior product for ever-changing waterproofing agents. In order to meet the Salt damage can affect the service life of numerous building structures, both historical and contemporary, in a significant way. Here, the formulation of waterproofing product and mechanisms to porous building materials induced by salt action are analyzed.

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