

Study of Waterproofing Systems Methodology in Construction Management

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ABSTRACT: The rapid development in housing and infrastructure from last one decade continuously takes place in India. Due to this rapid speedy construction there are some huge negative impacts of this speedy construction on quality of construction. Poor supervision during construct area by supervisor, quality engineer also leads to bad quality of construction and in future it leads to further problem like leakage in toilet areas, terrace area, podium leakages, leakages in roof slab. Not only poor supervision by respective authorities but also the poor workmanship by unskilled labours, lack of communication between the workers are some of the management problems on the construction sites which affects adversely on construction quality. Poor curing on constructed area leads to several types of cracks this cracks act as the main source for leakages. Improper compaction of concrete will also affect on construction quality later resulting in the honeycombing structure on the RCC walls and column areas. At that time to hide that kind of small honeycombed pattern normal chipping is done by labour but in future its internal cavity leads to leakage problem in RCC wall. Hence to it is essential to stop that kind of leakages because they will start the deterioration of internal steel structure also. That's why waterproofing is important in construction procedures.

In now days there are various types of waterproofing methods in construction industry some are conventional methods like box type waterproofing, brick bat coba and also there are some modern waterproofing techniques like polymer coating, polyurethane membrane systems, epoxy flooring systems. This study is going to find out the exacts procedure of Basement waterproofing systems.

KEYWORDS:- Housing and infrastructure development, natural resources, Sisal fibres, glass, fly ash, Compressive strength of concrete pavement block, economical aspect.

I. INTRODUCTION

In Basement waterproofing system to create resistance against water percolation / penetration, we require strong-cohesive impervious concrete shell, which is structurally designed to take uplift water pressure and other design parameters of loading etc. During the construction of a water-tight shell (say basement), the construction procedures, however modern they might be, will definitely have weaker areas like i. Construction joints, Vertical and horizontal junctions ii. Honey combed pockets These areas also require a special attention to achieve a waterproofing effect. Many times, after the excavation to desired depth, the strata met with may be total hard rock or may be partially weathered rock or hard murum etc. The excavation, under these circumstances, may be more than required in some area or may be just as desired or may be slightly less than the desired depth. In such cases, though the requirement of bottom levelling is by M-25 or M-30 grade concrete many Contractors might prefer to plum-concrete or even trap-metal or hard murum filling. This is hazardous to structural stability since water establishes access underneath the raft ' and helps uplift.

In many cases, you may not get the desired strata as per soil investigation report. If you meet with- say hard murum, you need to take help of the structural designer, and modify the design in view of the strata met with. In view of the points explained above, waterproofing of an Underground structure or Basement becomes very critical and needs a special attention.

II. OBJECTIVES

- To learn the implementations of Basement waterproofing treatments on construction locations
- To present arranged waterproofing system by understanding the site labours work.

III. PROBLEM STATEMENT

Rapid construction works has some huge adverse impacts on quality of construction. Construction quality is adversely affected due to poor workmanship, bad quality materials, less curing etc. These types of issues will affect directly on building's life span. Leakage problems are observed in large amounts in now days. So, to overcome that problems with exact solution is very important. For minimizing that type of problem waterproofing is important.

IV. LITERATURE REVIEW

Roslan Talib & David Boyd made research on the waterproofing resources used for actual site trials connecting actual problem mostly with rooftop related seepage which occurred in Malaysia and also in the United Kingdom. The study frameworks typical issue dealing with building seepage problem in the humid climate. It also shows seepage situation found in conflicting of season's weather in the United Kingdom. It also tabling the list of real-world waterproofing solution done for the seepage problem showing the waterproofing methods & appropriate finest materials and products used. The motive of this research paper is to support the maintenance team, construction landlord to find the precise steps while selecting the correct waterproofing materials at the time of structure's repair work characteristically dealing with the structure's seepage issue. They find that Even though UK, Malaysia both countries have dissimilar types of weather; but the waterproofing material used for the project is the commonly used worldwide material. So, it is very important for the contractor to quote a quotation with precise leakage job. In a same way it is also important that the site owner also have some knowledge of waterproofing products just to confirm that the contractor is doing is job correctly or not. Thus, the paper concludes that contractors actual site work experience of waterproofing and papers finding will help the house owner to find correct waterproofing products.

Ar. Soma Anil Mishra, Ar. PrakoolSoni, Dr.R.K. Pandit (2014) made research on waterproofing systems in building construction in which they conclude that House construction includes a good balance of workmanship, detailed drawings, regular maintenance and stability with landscape. A project reach to its achievement if it matches above mentioned features. A house is a manmade assembly used for supporting many residences. Residents generate dissimilar types of energies which, in all troubles, damage & usage up the accessible resources of it. The quality of building is depending upon the workmanship it will affect the whole life span of structure. If the quality gets compromised then it degrades the structure. then it will result in seepage problems of buildings.

Dhiren J Panchal, Nehal H Shah, Chirag R Sindhav, Chaitanya Joshi, Awadhesh Chauhan (2015) presents a powerful research on Waterproofing Challenges and Suggested Remedial Measures for High Rise Buildings. They conclude that, Seepage can happen in both ancient & new buildings. Most probably it has been observed in old buildings. This is a main issue tackled by the structures. As it is disturbing both external & internal part of structures & also producing injury to structural members. It also damages paint of the wall. The delinquent includes investigation of not only seepage, but also mugginess and leakage in the housing blocks. This research gives better & additional methodically created understanding of the role of waterproofing constituents to support the anticipation of dampness from piercing walls and slabs. The meaning of the investigation subject is to provide a review of the progress of waterproofing ingredients in executing waterproofing systems in construction industry with some case studies in India. Author concluded that the absorbency of Dr. Fixit damp proof is abridged by 38.88% related to Kembond K-Fix 75. Hence the research concluded that is Dr. Fixit damp proof is the best waterproofing chemical for use on the site. He also concludes that the construction work needs good supervision, skilled labours, good quality chemicals and materials and most important regular maintenance of building.

V. RESEARCH METHODOLOGY

The Basement Waterproofing System Is to Be Chosen Depending upon Site conditions & strata underneath, Accessibility and working space, Water logging in particular area / Dewatering facilities, Uplift consideration, Provision of Expansion joints, Seismic consideration in design.

Recommended System: - a. box type system b. epoxy coating system + box type treatment.

Box Type Treatment from External Side: -

This treatment is done on the floor after PCC before the casting of RCC raft. Clean, wire brush & wash the area thoroughly. Provide and lay underlay mortar bed in CM 1:4 admixed with integral waterproofing plasticizer (e.g. Dr. Beck Aquaproof) @ 200 ml per bag of cement of av. 25 to 30 mm thickness. Provide and lay rough Shahabad ladi of

size 2' x 1 1/2' (Machine cut blue stone) of thickness 25 mm avg. with 25 mm to 35 mm joint laid in staggered fashion on the green underlay. Grout the joints between rough Shahabad with thick cement slurry (cement - sand 1:1) admixed with a non-shrink admixture @ 0.4% of cement weight i.e. 200 ml per bag of cement. Allow the grout to set for a day. Provide and lay an overlay mortar of av. 20 to 25 mm thickness in CM 1:4 admixed with integral waterproofing plasticizer @ 200 ml per bag of cement and provide a smooth IPS finish or as directed.

This treatment is done on RCC retaining walls after retaining walls are cast. (i.e. on RCC concrete surface) Clean, wire brush and wash the area thoroughly. Provide and fix rough Shahabad 2' x 1'1/2' -25 mm thick. (machine cut blue stone) on the RCC wall, using cement paste tabs of approx. 2" dia @ 4 to 5 places, keeping 1/2" clearance from wall (for grouting) with 20 to 25 mm vertical joints, fixed in staggered manner. Next day, grout the 1/2" gap between RCC wall and rough Shahabad with a thick cement slurry admixed with a non-shrink waterproof admixture @ 200 gm per bag of cement. Allow the grout set for a day. Lay and fix only one layer a day. Continue the cladding up to 4 layers to 6 layers. Provide and apply 20 mm thick plaster jacket (over the ladi) in CM 1:4 admixed with Aquaproof which is an integral waterproofing plasticizer @ 200 ml per bag and finish the surface as IP smooth. Continue the process till you are 400 mm above the proposed ground level or hard deck. Junctions between vertical and horizontal surfaces, should be provided with 8" coving (watta) or concrete plug

Epoxy Treatment Externally for wall: -

Clean, Wire brush & Wash area thoroughly. Provide and apply a 15mm thick polymer modified plaster jacket walls in cm 1:4 mixed with Beck Aquaproof 200ml/bag of cement. After that construction joints are grouted using injection grouting technique. Then apply 2 Coats of Epoxy based chemical Do Beck of 505C+ Hardener EH411 in ratio 1:0.500 which is manufactured by Dr. Beck. For floor box type treatment is preferably used.

VI. CONCLUSION

According to sites survey in rural area still contractors are not doing any type of waterproofing treatments for basement areas. Only few contractors from rural regions are implementing old waterproofing techniques like Box type waterproofing. The modern techniques are unable to adopt easily due to its high costing in rural region. But in metro cities due to time limitation there is high demand of these modern waterproofing systems. As per research the epoxy treatment is not possible for floor. It can be applied on external wall only. Again, for floor we have to go with box type. So as per the convenience & durability the old treatment of waterproofing (Box Type Treatment) is more economical than modern waterproofing systems.

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