

# Study of Waterproofing Systems Methodology in Construction Management

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**Abstract-** Water seepage is one of the major sources of common building flaws. Seepage leads to mugginess, erosion of metals, fungus growth and also affects the structural characteristics of concrete as well as damage attractiveness of the structure. It also has hostile effect on human fitness by creating hostile condition. If water seepage can be prevented, almost 90% structure faults can be removed. Thus, choosing the top system for waterproofing plays a dynamic role in the protection of the structure. That's why the study of waterproofing system is very important. This research paper help to study the waterproofing systems with help of construction sites case study.

**Indexed Terms-** adequate, hostile, fungus growth, mugginess, waterproofing system

## I. INTRODUCTION

It should be very clearly understood that 'Waterproofing' is not a work of magic, but a system that provide resistance or defense against the ingress of water into the core of concrete structure. Higher and stronger defense or resistance against the water ingress will result in stopping the water from percolating into the body of structure and this effect is called Waterproofing.

While designing a suitable treatment of waterproofing, it is essential to know and understand the Location, Strata, Type of building (industrial / Residential), Type of structure (i.e. PT or conventional), Grade of concrete, Expansion joint provisions, Seismic joints provision, and many more aspects of the said 'construction which cannot be listed here, but would need a special attention. Once the parameters mentioned above are known from the drawings and related data, it becomes mandatory to visit the project site, and then formulate the correct specification in the

light of design philosophy, product and system selection, accessibility to application in view of safety norms. It requires quite a bit of thinking while formulating the specifications and methodology. Correct selection of products, specifications and methodology is of utmost importance, and, at the same time, the application expertise is the only key to success. Basement area, toilet area, podium, terraces, lift ducts&water tanks these are the main part of building structure which most probably get affected due to leakages problems. Leakages through construction joints due to inappropriate use of vibrator during compaction process is the main reason which leads to seepage problem in future. Less curing, poor supervision, bad quality of material uses this are the causes of leakages through the construction.

## II. OBJECTIVES

- To study the executions of waterproofing treatments on construction sites
- To introduce a prescribed waterproofing system by understanding the cases study work
- Study of waterproofing chemicals and materials which used on the case study site

## III. PROBLEM STATEMENT

The speedy expansion 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 workmanship, improper compaction of concrete, lack in quality supervision, less curing etc. these are the problems which in future leads to several kind of leakage problems. Hence it is essential to stop that kind of leakages because they will start the deterioration of internal steel structure. That's why it is important to waterproof a structure. So, need

of exact waterproofing treatment as per Site conditions is in demand in today's market.

#### IV. LITERATURE REVIEW

According to Saurabh Borle, Ghadge A.N., that the conventional systems are easy for usage; but they are inefficient & can be simply crumbled due to variation in environmental circumstances. as compare to old systems of waterproofing advanced waterproofing methods like epoxy coating, polymer coating, polyurethane coating and APP membrane system gives well results but are expensive and hold an excessive struggle while fitting. Modern coating systems require skilled labors for their installations. As linked to this, crystalline method has better benefit of striking cracks established over a period of time by the reaction of water with crystals. That's why it has a better stability.

According to. Soma Anil Mishra, Ar. Prakool Soni, Dr. R. K. Pandit Water seepage can be a threat to structure.it will leads to various types of issues in structures like roof leakages, concrete damage, fungus in house. They also conclude that correct waterproofing treatment is very important to prevent the entry of water inside the building.

#### V. METHODOLOGY

1. Selection of waterproofing old systems and advanced systems for the research.
2. Procurement of waterproofing chemicals brochures to study the specifications of the chemicals.
3. Selection of waterproofing sites for the case study.
4. Regular visits to construction site to study the daily activities related to work.
5. Communication with labors, waterproofing contractor to collect more data about waterproofing systems.
6. Completion of preliminary work like execution of every system from procurement of materials to selection of waterproofing material.
7. Prepared a sustainable system for research by observing the execution process of waterproofing as per site conditions. Analysis of the developed system by discussing its results after the period of execution.

#### VI. CASE STUDY

Waterproofing Treatment to Toilet Areas at case study site D.K.T.E College, ichalkaranji.

- A. pre-treatment works: - Check the toilet floor slab for
  - a. Cracks in concrete.
  - b. Cold construction joints
  - c. Honeycombed pockets by ponding water (100mm depth) on Toilet floor slab.
- B. cracks in concrete slab & construction/cold joints: -
  1. clean, grind and thoroughly wash the area around and along the length of crack thoroughly.
  2. Cut and open a dove - tail or u -shaped groove along the length of crack to get a 10 mm x 15 mm section of groove. Clean the groove by air under pressure or by blower and then wash thoroughly and allow to dry off.
  3. Now the fill the groove with a non-shrink cementitious polymer modified filler grout wpc 30 and flush the top in level with adjacent slab surface. Cure the system for 3 days.
- C. Chemical Coating of Polymer Based Waterproofing Chemical (BeckProof WAC):-
  1. Clean, wire brush, wash & grind (wherever required) the concrete surface so as to obtain total dust free, virgin concrete surface free from all laitance, slurries, oils and other foreign contaminant.
  2. Prewet the concrete surface so as to make it damp or moist.
  3. Mix 1.25 kg cement for 1-liter acrylic polymer based chemical (Beckproof WAC) to obtain a thick brushable consistency slurry.
  4. Apply 1st coat of brush uniformly on to a prepared clean concrete surface. Allow the coating to dry for 4 to 6 hrs.
  5. Apply 2nd coat at right angles to 1st (dried) coat. Allow the coating to dry for 4 to 6 hours.
  6. Cure the system for 3 days by sprinkling water or by wet hessian cloth or by ponding. Now the concrete surface is ready to receive the subsequent activities
- D. Fixing of Geotextile Sheet Membrane: -

Applying an elastomeric polymer modified cementitious membrane system of acrylic polymer based waterproofing chemical modified sandwiched with Geonet as a reinforcing fiber glass net or Equivalent as per manufacturer's instructions and methodology in following sequence to ensure a high build thickness of 2 mm.

Applications:

1. Prewet the surface and ensure it is damp before application of acrylic Polymer Based Waterproofing Chemical (Beck Proof WAC)
2. Apply well mixed slurry on to a well-prepared surface either by brush or trowel and allow this coat to dry. (This is a self-curing system. No Water curing required)
3. Fix Geonet on Bottom surface and even on the vertical wall upto 400 mm above FFI & then apply immediate 2nd coat of acrylic Polymer Based Waterproofing Chemical so as to sandwich the reinforcement. Allow the system to dry.
4. Apply final coat to ensure high build thickness of 2mm and allow the system to dry for 72 hours.

E. Protection Jacket on Vertical Walls (On Treatment):

Providing & applying a 15mm thick polymer modified waterproof plaster jacket walls 40 mm above FFL in CM 1:4 admixed with

- i. Integral waterproofing plasticizer chemical (Beck Aquaproof) @200 ml/per Bag of cement & finish surface smooth as IPS.
- ii. Cure the area for 7 day by wet hessian cloth/curing compound.

F. Protection Screed (On Horizontal Surface): laying a protection screed of 30 to 40 mm thickness in M20 grade concrete (using 10 mm below aggregates) and admixed with Dr. Beck Aquaproof of concrete and floated for better compaction using power floater including curing for 7 days.

G. Sunk Filling:

Providing and filling in sunk with Brick Bat Coba using full or half well Kilnedbricks in CM 1:4. laid with break/staggered joints with controlled joint width (15 to20 mm) and finished to surface smooth IPS or as directed.

H. Site images of Toilet Waterproofing:

Fig.No.1 Toilet waterproofing



(a) During acrylic polymer-based waterproofing chemical coating (BeckProof WAC)



(b) During sunk filling procedure by using Brick bat coba system.



(c) After completing all above-mentioned waterproofing methodology procedure

## CONCLUSION

By regularly visiting the construction sites I understood the importance of selection of experienced contractor for waterproofing work and the execution of waterproofing work as per prescribed procedure. the chemical selection as per the required site condition play a vital role in minimizing excessive cost. Beckproof WAC has excellent waterproofing and protection properties Due to its outstanding adhesion to construction materials. It should be used as a good waterproofing chemical at Terraces, Toilet, balconies, chajjas, canopies.

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