Analysis of Waterproofing inResidential Buildings

Chaitanya Dharmik, Mayur Barewar, Samiksha Hemke, Pranay Mankar, Kunal Nandgaye,
Prajwal Ramteke- Undergraduate students, Dept. of Civil Engg. P.C.E Nagpur
Praful Rode- Assistant Prof. Dept. of civil Engg. P.C.E Nagpur
Rahul Ganorkar- waterproofing consultant

Abstract—Waterproofing is a crucial process for protecting the building and its components from the damaging effects of water. There are various types of waterproofing methods available in the market, each with its advantages and disadvantages. This research paper analyses the rate analysis of different types of waterproofing methods to help builders and contractors select the most cost-effective and efficient waterproofing solution for their projects. The paper examines the cost of materials, labour, and the overall cost of implementation of each method. The research is based on a comparative analysis of the different types of waterproofing methods used in the construction industry.

Keywords –rate analysis, cost effective, waterproofing

I.INTRODUCTION

Waterproofing is a process of making a structure impervious to water. It is essential for buildings to protect them from water damage, which can cause extensive damage and lead to costly repairs. There are several types of waterproofing methods available, including bituminous coating, cementitious coating, liquid membrane, and others. The selection of the right waterproofing method depends on various factors such asthe location of the building, the type of structure, and the budget of the project. In this research paper, we willanalyse the rate analysis of different types ofwaterproofing methods to identify the most cost-effectiveand efficient solution.

II.AIM OF WATERPROOFING

- To protect interiors from water damage
- To prevent onset of health problem
- To save your money in long run.

III.LITERATURE REVIEW

- Study on assessment of waterproofing failures in concrete buildings and structures (JAN 2017):- Mohd Nasrun Mohd Nawi, M. Arkam C. Munaaim- This paper focuses on waterproofing failures in concrete buildings and structures. The objectives of this paper are three folds; (1) to determine the main factors that contribute to waterproofing failures in concrete buildings and structures (2) to discover different types of present waterproofing system applied for concrete buildings and structures (3) to propose remedial waterproofing solutions of concrete buildings and structures.
- Study on Waterproofing of Concrete Foundations (April 2014):- Paula Mendes, Jorge lopes, Jorge De Brito, Joao Feiteira- Successful waterproofing of concrete foundations prevents the degradation of environmental and health conditions and of building materials used in belowground stories and extends the service life of concrete constructions.
- Study of Waterproofing System in Construction Industry (Feb 2018):-Ra.Jaikishan, M.Adiyama- This is about the construction, damage, prevention andwater proofing. Water proofing is a process designed and prevents water from penetratingin to the structure.
- Investigating Effective Waterproofing Materials in Preventing Roof Leaking; Initial Comparative Study (Oct 2015):- Roslan Talib, David Boyd ,Susan Hayhow, Ghafar Ahmad - This paper focuses on the waterproofing materials used for real project samples involving real problem mainly withroof related leakage mostly happened in Malaysia and some cases in the United Kingdom.

IV.METHODOLOGY

Steps involved in methodology
Step1: Locate The Problems And Causes atsite.
Step2: Identify the root cause of the problemsand selection of methods.
Step3: Selection of products according to thesite condition and methods.

Step4: Application of technology with methodand products.
Step5: After finishing the application, recheckthe problems.
Step6: Finish with cement mortar plastering.

V.STUDY ON WATER PROOFING

A. Water proofing

Protection to prevent water entering into internal and external building structures like toilets swimming pools, water tanks, retaining walls, roof, underground structures.

B. Damp proofing

Treatment to a surface to resist the passage of waters in areas like foundations exterior walls metal surfaces metal stairs.

C. Causes of leakages and dampness

- Natural factors
- Rain waters
- Drainage systems
- Plumbing
- Electrical workmanship
- Poor workmanship
- Structural designs
- Construction joints
- Roof joints
- Porous
- Underground waters
- Doors and ventilation points
- Carbonations areas(seashores)
- Corrosions
- Site inspection

D. Conventional

a. Box type water proofing
b. Brick bat-coba

E. Modern Technology

- Admixtures
- Membrane coatings
- PU coating
- Bitumen coating
- Polymer coating
- Elastomeric water proofing
- Protective coatings
- Grouting system (positive and negative)
- Insulted coating with water proofing
- Cementations water proofing

F. Types of water proofing

- Basement of structure
- Walls
- Bathrooms and kitchen
- Balconies, decks
- Terrace or roofs
- Green roofs
- Water tanks
- Swimming pools

G. Benefits of water proofing ¬

- Increased durability of concrete structures
- Reduce chemical attack
- Cost reduction in maintenance
- Prevents growth of dangerous mould

VI.LEAK DETECTION SYSTEM

A. ELECTRONIC LEAK DETECTION:

Electronic leak detection is a quality control proceduredesigned to locate defects (holes, seam voids) inwaterproofing membranes.

B. ULTRASONIC LEAK DETECTION: HOWIT WORKS

An ultrasonic leak detector generates a high frequency, energetic pulse that propagates through materials in the form of waves. When there is discontinuity in the surface(wave path), part of the energy reflects back from the flawed surface. It monitors:

- Compressed air leaks
- Vacuum air leaks
- Valve and trap blow-by-contact
- Monitor slow speed bearing and gear condition-contact.

SITE VISIT

WATER DAMPNESS DEFECTS AT SITE

MATERIALSUSED:-

ACRYLIC POLYMER AND AGGREGATES AND CEMENT

KEY POINTS OF WATERPROOFING AT SITE

- METHOD USED- ACRYLIC POLYMER COATING
- AREA COVERED- 300 SQ. FT
- TYPEOF BUILDING-RESIDENTIAL BUILDING
- STEPS:-
  1. Chipping and Cleaning of the existing IPSflooring.
  2. Application of Acrylic polymer with cement in1:1 Proportion.
  3. Coating is done with the help of fibre mesh.
  4. Levelling and final flooring is done.
  5. Per metre square rate of waterproofing including brick bat flooring- Rs 813/-
- COMPLETE DURATION OF THE PROCESS- 1 WEEK
- REFERRED FLOORING TYPES- BRICK BAT COBA FLOORING AND IPS FLOORING.

RATE ANALYSIS

a) Brick Bat Waterproofing Work for Terrace.

1. Cement 0.25 Bags X Rs. 200:Rs.50
2. Red Bricks: 37 Nos X Rs. 6.00: Rs.222
3. River Sand : 0.015 Brass X Rs. 8500:Rs. 127.50
4. Waterproofing Chemical : 0.25 lit X Rs. 140 : Rs. 35
5. Labour Charges 1 Sqm X Rs. 215.58 : 215.58
6. TOTAL Amount : Rs. 650.08
7. Water Charges 1.5% : Rs.9.75
8. Over Heads 5% : Rs. 32.50
9. Total Amount Rs. 692.3310. Profit 15% : Rs. 103.85

Total Cost/Sq m : Rs. 796.18
Say Rs. 800Sq.m

b) Box Type Waterproofing Work forRetaining Wall & Raft.

1. Cement 0.25 Bags X Rs. 200:Rs.50
2. Shahabad : 1 Sq.m X Rs. 165:Rs. 165
3. River Sand : 0.03 Brass X Rs. 8500:Rs. 255

4. Waterproofing Chemical : 0.25 lit X Rs. 140 : Rs. 35
5. Labour Charges 1 Sqm X Rs. 215.58 : 215.58
6. TOTAL Amount : Rs. 720.58
7. Water Charges 1.5% : Rs.10.80
8. Over Heads 5% : Rs. 36.29
9. Total Amount Rs. 767.6710. Profit 15% : Rs. 115.15

Total Cost/Sq m : Rs. 882.82
Say Rs. 885/Sq m

c) Lift pit Waterproofing

Details of cost for 1 Sqm MATERIAL (For VerticalWall)

1. 12mm dia PVC/ Plastic Nozzles 5 Per Sqm @Rs. 25.00 Per No Sqm :- 125.00/-
2. Chemichal Fosroc Conplast WL @ 300 ml/ Bag of cement -300*0.14 = 42.00/-
3. Cement Slurry 5 Kg Per Sq.m -5*6 = 30.00/-
4. Hire Charges for Grouting Pump Persqm-1*75 = 75.00/-
5. Mason chargesper day -0.5 Nos -0.5*450= 225/-
6. Beldar per day- 1*325 = 325.00/-

Total Amount = 822/- Sq.m
Contractor Profit @10 82.20

Rate per Sqm Rs. 822 + 82.2= 904.2/-
Say Rs. 905/Sq.m

Above Rate Analysis are tentative which may Change as per specification and change in Material and Labour Rateetc.

RESULT

The results of this research indicate that the cost of materials and labor varies significantly between different waterproofing methods. Box type waterproofing compared to Brick Bat Waterproofing and other types of waterproofing methods. However, the cost of materials and labor is not the only factor to consider when selecting a waterproofing method. The longevity of the waterproofing method, the quality of the materials used, and the expertise of the contractor are also crucial factors that affect the overall cost of implementation.

CONCLUSION

In order to retain the durability, life, and functionality of the building, it becomes essential to treat it properly. Issues like seepage and mold growth can cause expensiveand lifelong damage to the building. Moreover, all this also causes health hazards and puts the lives of the occupants at risk.

Also, it becomes even more important to choose the right waterproof chemical and material for the specific area of application. So, if the choice of waterproof material goes wrong, it can hamper the strength, life, and functionality of the entire building. Moreover, you must know the best type of waterproof material for each application. For instance, a Bituminous membrane must not be used on the exposed terrace. On the contrary, PVC membranes, or polyurethane treatmentbecomes more suitable here. Similarly, all types of waterproofing chemicals such as epoxy, EPDM rubber, thermoplastics, rubberized asphalt, etc. have their unique properties and application areas.

Thus, all these minor yet extremely necessary details about waterproofing chemicals for buildings along with price ranges help the professionals make the bestdecisions for their projects and deliver the most flawless results.

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