

“To investigate the use and properties of bituminous felt or membrane sheet in modern waterproofing methods.”

Dr. Ashok B. More¹, Vishal Y. Jadhav²

¹H.O.D Civil Engineering Department,

²P.G student, Civil Engineering Department .

D.Y. Patil College of Engineering, Akurdi, Pune, Maharashtra, India.

Abstract

This review paper presents the interpretation and analysis of all the related literature reviews associated with the study of the appliance and properties of bituminous felt within the modern waterproofing method. There are some varieties of felt that act differently under the various application methods. A quick comparative study of varied modern methods versus traditional methods helped to beat the causes leakages or seepage in the waterproofing systems and method selection processes. However, there is no enough comparative study available, which shows that the application of bituminous felt with any traditional method on the physical parameters. If it is there then it will make more awareness of using the modern technique in developing countries, especially in India.

Keywords — Bituminous sheet or felt, rooftop, modern method, tradition method, comparison, brickbat coba.

1. INTRODUCTION

As awareness about the drawbacks of water leakage within the structure. Several waterproofing methods are implemented across the world to stop water from entering the structure. The brickbat coba system of waterproofing has been followed and applied throughout India, except in some industries where the importance of waterproofing is paramount, as their equipment or machinery and high-cost MEP services are installed. The waterproofing contractors are following and applying the typical traditional method because of the low cost and simply available material. They know the drawbacks of this method. It's not only their mistake to follow the tactic but also the engineering practitioner also uses such a system as scarcity of information and awareness.

The literature review presents the modern technique of the waterproofing methods and their application across the globe and tries to explore the properties of bituminous felt and their importance in modern waterproofing methods. it shows how it'll be better enough than the typical method. The results are published within the research paper on the basis of laboratory tests and their sustainability through the life cycle. Get the information about the drawbacks and

deficiencies within the material and precautions during application as well. As a result, the causes can be able to eliminate during the installation process. Many researchers have done amazing studies on the waterproofing structure and their paper content, plenty of knowledge about bitumen felt and properties and it's helpful information about future studies and research.

2. LITERATURE REVIEW

A. “Current flat roof bituminous membranes waterproofing systems-inspection, diagnosis, and pathology classification” Ana Walter, Jorge de Brito , Jorge Grand Lopes,20 July 2004.

- Irregularities in bituminous felt waterproofing systems are listed and classified thorough inspection on site.
- Corrective action on all possible causes due to direct or indirect are mentioned and simplified.

B. “Proposed performance-based laboratory test method for measuring vapour and water permeability of waterproofing membranes under hydrostatic pressure” Nil Sahal , Etna Ozkan . 15 June 2004

- The author proposed a laboratory test method to check the membrane properties of vapour and water permeability against hydrostatic pressure for a basement structure with two types of membrane.
- The test apparatus is useful for measuring parameters and applying them to field conditions.
- To avoid defects in the application of bitumen felt, a minimum of two layers is suggested.

C. “Dimensional stability of waterproofing bituminous sheets used in low slope roofs” Jorge Grandão Lopes, João R. Correia, Miguel X.B. Machado ,1 April 2011.

- Described the dimension stability characteristic of sheet influenced by external, i.e., temperature variation.

- Author explained the dimensional stability of the sheet due to the lap joint at roof level and checked with the various types of membrane and mentioned the result that the felt is made of glass fibre stronger than Polyester reinforcement.
 - This shows that the dimensional stability performance of similar products produced by different manufacturers is similar, both for the isolated reinforcements and for the waterproofing sheets.
- D. "Investigating effective waterproofing materials in preventing roof leaking; initial comparative study: Malaysia, U.K." Roslan Talib , David Boyd, Susan Hayhow, Ghafar Ahmad, Mzailan Suliemana, 21 October 2015.**
- Described how to cope with seepage or leakage problems in two different climatic regions with the following the right appropriate method or solution of waterproofing.
- E. "Analysis of the Execution Deficiencies of Flat Roofs with Bituminous Membranes." Manuel J. Carretero-Ayuso and Jorge de Brito ,(27 June 2016).**
- The study presents intention to solve deficiencies of various parameters while fixing and executing membrane sheets on the flat roof of each different building. Through peer review statistical analysis, the frequency of each parameter haven been mentioned. So researchers will know what will be damaged and anomalies will occur while placing.
- F. "Comparative Study of Conventional and Modern Waterproofing Techniques" Saurabh Borle, Ghadge A.N. 8 & 9 Jan 2016.**
- The study shows the comparison between the traditional (tar felt, brick bat coba) and advanced (coatings, integral) waterproofing techniques through their advantages and disadvantages.
 - The coating method needs special attention during surface preparation, which requires skilled workmanship.
 - The membrane method and surface coating are relatively costly but give better protection from leakage and better durability.
- G. "Performance of different joining techniques used in the repair of bituminous waterproofing membranes" M. Garrido , D. António , J.G. Lopes , J.R. Correia (26 September 2017).**
- The author explained the experimental investigation into the performance of different techniques for executing joints between aged and new bituminous membranes in order to evaluate the performance of waterproofing repair systems.
 - Overlapping and joining by two methods (adhesive bonding and heat welding using a gas blowtorch on three types of membrane (SBC, APP, and OBM) and testing performance against aging by using shear and peeling. Furthermore, they represented their results.
- H. "Optimization and Practice of Energy-saving and Emission-reduction System for Production Process of Modified Asphalt Waterproofing Membrane" Bingwen Zhao, Lijuan Qia, Qiqi Zhaob ,and Xiaoxiao Zhub(22 October 2017).**
- The authors introduced an exhaust gas purification system producing a modified bitumen membrane, and they ensured that through this paper it will help the factory to minimize pollutants.
- I. "Study of Waterproofing System in Construction Industry" Ra. Jaikishan, M.Adiyaman (2- February 2018).**
- The author explained the damage caused by water.
 - Studied the protective coatings and coal tar epoxy coatings for waterproofing.
 - Analysed and implemented the polymer coating waterproofing system.
 - Suggested waterproofing solutions for different reasons.
- J. "Characterization and Optimization of Polyurethane Based Bituminous Waterproofing Membrane" Ashmita Rupal, Sanjay Kumar Sharma, G. D. Tyagi(2021)**
- The experiment shows the varying thicknesses made with different grades of polyurethane and bitumen against the physical properties and mechanical properties and examined with relevant ASTM Codes.

3. INTERPRETATION AND ANALYSIS

After reviewing all the relevant research paper regarding the modern method of waterproofing and traditional method as well. Describes the benefits and downsides of every system and their types along with causes of water leakages. Physical parameters are tested within the laboratory and their results to interpret which kind of bituminous felt or sheet or membrane is better for installation and to prevent entry of water. Some experiments show gas purification systems while developing the felt in a factory, which is important to environmental studies. As per the interpretation of all the papers we analysed, there is no detailed comparative study between the trendy method of bituminous felt and the old traditional method (brickbat coba). Everywhere in India, brickbat coba is commonly used waterproofing system with some modifications, like with additional chemicals and fibre cloth. Despite the actual fact that it appears to be noted that far better than conventional systems.

4. CONCLUSION

The method of application of felt with the standard method of brickbat coba will be compared on the parameters like thickness, maintenance, and duration life, so on. to increase the new technique awareness among the engineers, waterproofing contractors, and researchers about bituminous sheet of the modern method and its effect will promote to reduce the practice of the old system.

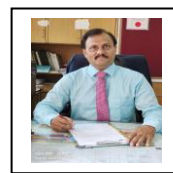
REFERENCE

1. Pre-applied bonded waterproofing membranes: A review of the history and state-of-the-art in Europe and North America Ulli Heinlein, Karl-Christian Thienel, Thomas Freimanna. 2021.
2. Optimization and Practice of Energy-saving and Emission-reduction System for Production Process of Modified Asphalt Waterproofing Membrane Bingwen Zhaoa, Lijuan Qia, Qiqi Zhaob, and Xiaoxiao Zhub School of Civil Engineering and Architecture, Zhejiang Sci-Tech University, Hangzhou, 310018, China 2017.
3. Wind load resistance of heat-welded seams in polymer-modified bituminous roofing membranes 1995.
4. Analysis of the Execution Deficiencies of Flat Roofs with Bituminous Membranes Manuel J. Carretero-Ayuso¹ and Jorge de Brito. 2016
5. Comparison of Modern Construction Techniques with Conventional Construction Techniques Pradip Ajugiya¹, Dr. Jayeshkumar Pitroda, Prof. Jaydev J. Bhavsar Final year M. Tech. Student, Construction Engg. and Mgt., B.V.M. Engg. College, V.V. Nagar, Gujarat, India.

2Assistant Professor,Associate Professor, Civil Engg. Department, B.V.M. Engg. College, V.V. Nagar, Gujarat, India.

6. Study of Waterproofing System in Construction Industry Ra.Jaikishan#1, M.Adiyaman, PG Student,Assistant professor, Department of civil Engineering, Sona College Of Technology, Salem, India.
7. Investigating effective waterproofing materials in preventing roof leaking; initial comparative study: Malaysia, U.K.Roslan Taliba*, David Boydb, Susan Hayhowb, A Ghafar Ahmada, Mzailan Suliemana 2015.
8. Current flat roof bituminous membranes waterproofing systems inspection, diagnosis and pathology classification Ana Walter, Jorge de Brito , Jorge Grandao Lopes 2004.
9. Dimensional stability of waterproofing bituminous sheets used in low slope roofsJorge Grandão Lopes , João R. Correia , Miguel X.B. Machado b 2011.
10. Performance of different joining techniques used in the repair of bituminous waterproofing membranesM. Garrido a, D. António a, J.G. Lopes b, J.R. Correia 2018.
11. Experimental in-lab and in-field analysis of waterproof membranes for cool roof application and urban heat island mitigation A.L. Piselloa, V.L. Castaldoa, G. Pignattaa, F. Cotanaa, M. Santamourisca CIRIAF 2016.
12. Structural Dynamic Study of Roof Waterproofing Materials Alim Feizrakhmanovich Kemalov, Ruslan Alimovich Kemalov, Dinar Zinnurovich Valiev & IlmiraMaratovna Abdrafikova¹ 2014.

BIOGRAPHIES



Dr. Ashok B. More,
H.O.D,
Civil Engineering Department,
D.Y. Patil College of Engineering,
Akurdi, Pune, Maharashtra,
India.



Vishal Y. Jadhav,
P.G student,
Civil Engineering Department,
D.Y. Patil College of Engineering,
Akurdi, Pune, Maharashtra,
India.