

STUDY ON EFFECTIVENESS OF WATERPROOFING IN BUILDINGS DURING THE DESIGN, CONSTRUCTION, AND MAINTENANCE PHASES OF A STRUCTURE

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Waterproofing is a critical aspect of building construction, ensuring longevity, durability, and structural integrity. There are several waterproofing methods used for buildings around the world. Among these, integral waterproofing, surface coating, and sheet membrane systems are the most commonly used methods in Sri Lankan building projects. The prevalence of water leakage issues in buildings throughout Sri Lanka has become a significant concern. In order to address this problem effectively, it is essential to thoroughly investigate the causes of waterproofing failures occurring during the various phases of a structure's lifecycle, namely design, construction, and maintenance.

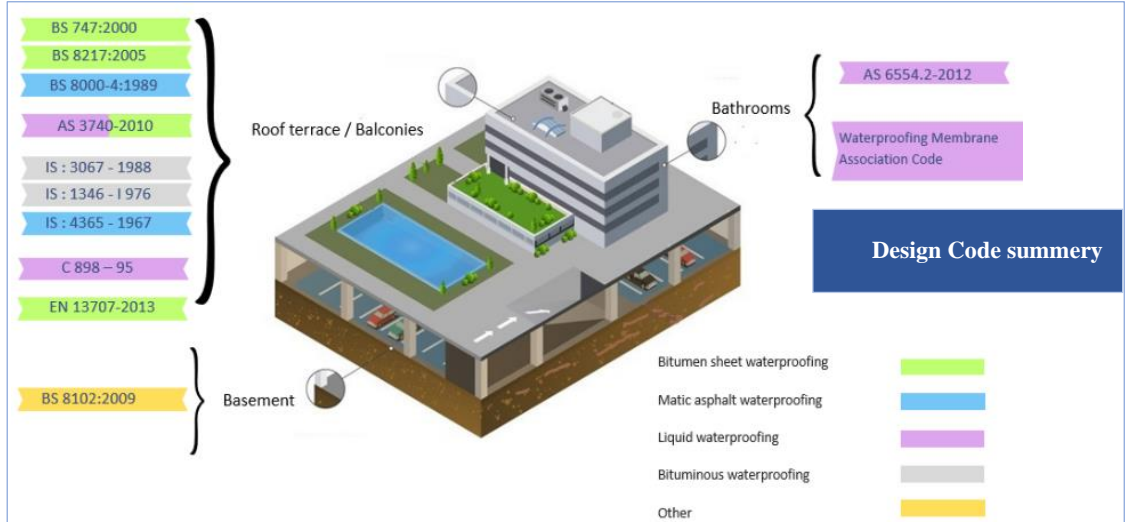
To this end, the research was conducted along three strands. Firstly, the provisions available for waterproofing in the design standards were studied and the findings were summarised, with the intention of promoting these among the practicing engineers and identifying any gaps that require further research. It was found that British, Australian, Indian and European codes provide guidelines on carrying out effective waterproofing for different parts of a structure. Secondly, industrial professionals were interviewed during field surveys and were presented with a questionnaire to identify the issues related to waterproofing when constructing and maintaining the structures. Some of the key issues that were highlighted include using unskilled laborers, not following proper procedures for waterproofing systems, high installation cost, high cost of waterproofing materials and poorly sought joints and can lead to structural related problems in the Sri Lankan building construction sector. As such, this highlighted the prevailing gaps in terms of the specified standards and the existing practices. Thirdly, a laboratory experiment was conducted to assess the performance of some of the existing waterproofing materials available in the Sri Lankan market. A comparison of integral waterproofing materials and surface coating materials was done based on the water absorption test. There were 4 surface coating materials and 2 waterproofing admixtures used as integral waterproofing materials. The water absorption test was done with oven drying procedure and without oven drying procedure. Cementitious waterproofing material gave the best results compared to the control cubes, in terms of the 7-day average water absorption percentage. The bituminous coating material gave the best result after the completion of the oven drying procedure. Overall, recommendations to improve the standards and practices of waterproofing structures in Sri Lanka were concluded based on data collected from the three research strands.

Keywords: Integral waterproofing, Surface coating, Internal and external waterproofing, Waterproofing issues, Water absorption test

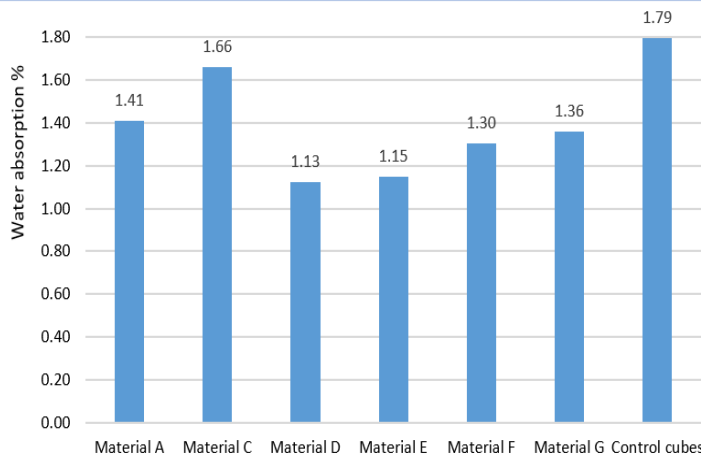
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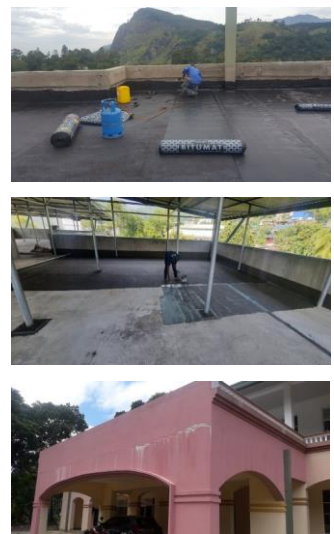
Water leakage problems in Sri Lankan buildings result from inadequate focus on waterproofing during design, construction, and maintenance. Design codes lack detailed waterproofing guidance, construction often neglects waterproofing, and limited data hinders technological advancements in waterproofing systems.



Experiment on effectiveness of commercially available waterproofing materials in Sri Lankan market



Site visits



Conclusion

- Common waterproofing practices may lack adherence to proper procedures, emphasizing the need for design codes and guidelines.
- Varied performance of waterproofing materials highlights the importance of quality and cost, urging improvements in Sri Lanka's offerings.
- Unskilled labour, inadequate supervision, and design deviations impact construction, stressing the significance of following waterproofing guidelines.