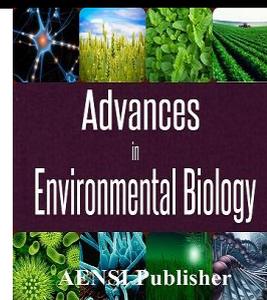




AENSI Journals

Advances in Environmental Biology

ISSN-1995-0756 EISSN-1998-1066

Journal home page: <http://www.aensiweb.com/AEB/>

Choosing Right Waterproofing Materials in Preventing Roof Leaking: Comparing selected Malaysia and UK cases

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ARTICLE INFO

Article history:

Received 12 October 2014

Received in revised form 26 December 2014

Accepted 1 January 2015

Available online 17 February 2015

Keywords:

roofleakage, waterproofing material, defects, building seepage, rectification work

ABSTRACT

The paper highlight on the waterproofing materials used for real project examples involving real problem mainly with roof related leakage mostly happened in Malaysia and some cases in the United Kingdom. The study outlines typical problem facing with the building leakage within the humid warm tropical climate as well as highlighting some obvious leakage scenario found within the opposite northern hemisphere's climate in the UK. It also tabling the list of practical waterproofing solution done for each of the seepage problem from the real life case studies highlighting the technique and suitable best materials and products used. The paper target to help the construction players i.e. the maintenance team, building owner as well as the designer to identify the correct steps especially when choosing the right waterproofing materials in dealing with the building's rectification work typically dealing with the building leakage syndrome problem.

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To Cite This Article: Roslan Talib, David Boyd, Susan Hayhow, A G Ahmad and Mohd Z Sulieman., Choosing Right Waterproofing Materials in Preventing Roof Leaking: Comparing selected Malaysia and UK cases. *Adv. Environ. Biol.*, 9(5), 21-23, 2015

INTRODUCTION

Waterproofing is extremely important to the humid tropical climate region like Malaysia and the selection of the waterproofing material can be based on the level of material exposure to the rainwater as highlighted by Talib and Sulieman[1]. According to the Malaysian Government 2014 Budget allocation presented by the Prime Minister of Malaysia, Dato Seri Mohd Najib Tun Razak, the Malaysian Government had allocated some 4 Billion Ringgit to initiate private developer to build more houses on their high impact projects to ease-up affordable public housing problem. At the same time, the Government had allocated from the budget 100 Million Ringgit for the maintenance budget given to one of the Ministry to maintain the ministry buildings as well as 82 Million Ringgit to refurbish unfinished housing project for about 8,200 houses. It is interesting to note that from the previous Government budget in 2012 and 2013, the Government had allocated 1 Billion Ringgit only for the maintenance and classroom addition of the public schools in Malaysia and allocated another 450 Million Ringgit in 2014 budget for the maintenance and upgrading the interior for the same school buildings.

Findings from MORI (Marketing and Opinion Research Institute) pool; a leading marketing research company in the UK mentioned that despite the small proportion of UK household income spent on housing repairs and maintenance, most people (89%) agree that regular work is needed to help maintaining the value of the properties. Most UK homeowners agree that repairs and maintenance are important, and this is reflected in the high proportion who have had work carried out in the last 5 years. For convenience, the readers can do the cross reference on all the Malaysia and UK building leakage cases detail at <https://usm.academia.edu/RoslanTalib> tabling information like failure causes as well as possible best solution suggestion.

Objectives and Methodology:

The objective of this research paper is to identify the best method and the best waterproofing system and material used to solve that lead to the building leakage that happened to the regular buildings focusing especially for the Malaysia cases as well as for the United Kingdom. Among the objectives is to identify the best

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method used to solve the leakage which is the most important for any waterproofing rectification works. In this paper, the suggestion for the reader to use the right waterproofing material for the right task may save more money if the material being choose with the right one. Finding the source of the leakage and then to suggest the type of waterproofing material used for the rectification works as well as for the new building works are very important to the building owner. Somehow, the research intention is to identify the most occurred leakage so that the solution method can be recommended to ensure the problem will not repeated. At the same time, the objective is to identify typical defects that always cause the water seepage into the interior of the building thus making problem to the occupier as well as its internal valuables.

RESULTS AND DISCUSSION

(i) Selected case studies for Malaysia on waterproofing usage solution.

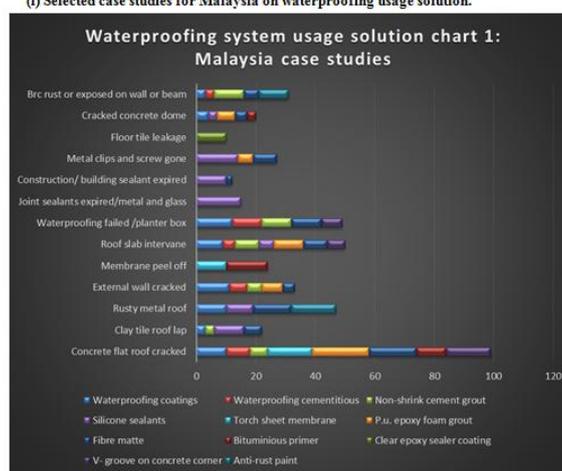


Fig. 1: Waterproofing system usage solution chart 1: Malaysian case studies.

The graph above (Fig. 1.) provide the information on the various waterproofing products being used for specific tasks or on specific waterproofing failure for the typical selected Malaysian case studies. This list shows 13 typical problems building manager facing for the building leakage syndrome scenario to be solved. However, the graph helps by giving the best possible products can be used to solve that specific problem. It seems like most of the products can be used to solve concrete flat roof seepage cracked. For example, p.u. epoxy foam grout is the best short term solution for the cracked concrete slab by injecting the epoxy using high pressure grouting machine into the concrete through the packer head where usually p.u. grout foam-type chemical has been used for this task. According to Addleson, the rectification works must be done based on the actual analysis with accurate diagnosis of the cause of the defect as is reasonably possible. Unless this is done, the remedial work may not only turn out to be quite inappropriate or short-lived but may also lead to other defects [2].

Please note that the longer the bar of the graph; the higher possible usage of the product can be used for that particular task. This evaluation derived from the experience and from the practical knowledge of using the products done to solve the leakage problem from the actual works done. It is hope the list can also be used as a guide for the practitioners to start determine on the selection of the waterproofing products best possible usage for a specific leakage task.

It is interesting to note that the range of the waterproofing products can be selected from the local products as well as from imported products especially from Europe with no indication on local weather effect regardless the location.

The chart above (Fig. 2) shows the recommended leakage solution for selected buildings including heritage building cases in the UK to compare it with the Malaysia case studies. From the author personal observation, most of the buildings in the UK which having concrete flat roofing where most of it need to replace its old roof membrane with hard torch membrane (with granules). This case is shown from the leakage solution graph above where the membrane with granules is on top list in the UK as far as in identifying leakage solution for most buildings as case study in this research. The second most use waterproofing material used to solve the roof leakage problem for UK scenario is by using cementitious liquid normally being applied on top of concrete flat roof as well as on top of zinc or metal roof. Stringer as in Scottish Maintenance Practice Manual[3] mentioned that not only is there an individual authority requirement to ensure that the experience of the maintenance department is fed back to and acted upon by the design department but there is also a general requirement that

the consolidated experience of maintenance departments throughout the country be made more widely known to all those working on similar forms of construction.

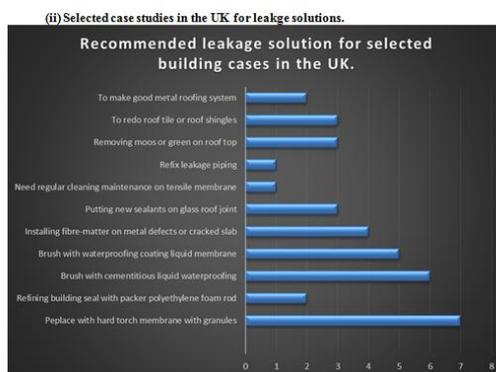


Fig. 2: Recommended leakage solution for selected building cases in the UK.

Summary:

There are not much differences in term of typical causes that leading to building leakage both for the Malaysia cases and the UK cases scenario. Even though both countries enjoying two different types of climate; however the product used for the project cases are about the same using universal products. Anyway, it is very important to the contractor to ensure the quotation mentioned to use correct waterproofing system to be applied for the right leakage job. For the building owner's maintenance team; they also must at least to ensure that knowledge on waterproofing materials with possible leakage solution be at sound situation just to ensure all the contractor proposal to best suit the problem. Most of the contractors work usually come with at least 10 to 15 years warranty thus the rectification works done by the contractor must be at its best performance and using the best possible solution so that no rectification work to be after the initial rectification work done. Thus, this paper is derived based on the contractor experience in handling actual waterproofing works and the findings from the paper is based on the actual works is an asset for the maintenance manager use a framework in solving the waterproofing problem.

Marshall *et al.* wrote the importance of understanding how the building particularly a house being inspected was built, in general and in detail, and the products or materials used to do so, applies not only to older historic heritage buildings [4]. According to Ford, building construction is not just in the sense of the building; not just as a practical necessity, but in the way that we see it, the way we understand it as a manifestation of science, as an object to which we intuitively respond, as part in a history that we know [5]. Thus the art of doing the rectification work from all the 3 graphs be able to signal the maintenance crew as well as the design team from its architectural details to waterproofing material identification as a framework in order to solve the building defects matters. McMorrough indicated that the art of architectural detail is not easily quantified or defined. It is certainly more than the sum of the system and materials that give it shape, though architecture would not exist without the standardized procedures that erect its forms [6].

ACKNOWLEDGEMENT

Highest acknowledgement to Universiti Sains Malaysia (RUI grant account no: 1001/PPBGN/816247) and Birmingham City University (FTEE/HR), fellow researchers and those who are involved directly and indirectly in the completion of this research.

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