

# Challenges in Adopting Sustainable Materials in Malaysian Construction Industry

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## ABSTRACT

This paper probes into the major barriers of adopting sustainable materials for the construction industry that has caused significant impacts to the environment, social, and economic aspects. The results reveal that main barriers resist the construction practitioners in adopting sustainable materials are due to the high initial expenses, which also refer their affordability. To maintain such a balance between environment, social, and economic aspect in construction industry, it requires the cooperation between construction stakeholders and intervention of the government sectors in adopting sustainable materials.

**KEYWORDS:** Construction industry, sustainable materials, barriers and sustainability

## 1. INTRODUCTION

Conventional construction materials have eventually become great contributors to pollute the environment. Availability of materials will fall considerably short of their demands despite improved productivity and in it necessary to develop alternatives for them (Plesis, 2011). Thus, it shows the necessity of the adoption of sustainable materials in construction industry. Sustainable construction is the way that construction industry should move towards in achieving sustainable development which takes into account environmental, economic and social issues (Shafii, Ali, and Othnam, 2006). Moreover, sustainable construction helps to reduce strain on environment by the adoption of sustainable materials which is sustainable to nature. Although sustainable materials can be used throughout the industry without depleting non-renewable resources and disrupting the natural resource system, the application is still very low in Malaysia. Hence, this research addresses the barriers that resist the construction practitioners in Malaysia in adopting the sustainable materials. The result serves as a guideline for the construction industry in moving towards a new level of using materials which leads to more benefits.

## 2. LITERATURE REVIEW

### *2.1 Importance of Sustainable Materials in Construction Industry*

Sustainable materials play an important role in the construction industry. The benefits of sustainable materials in construction industry can generally be categorized into the following which are; environmental benefits, economic benefits, and social benefits. The purpose behind the concept of sustainability in construction is to preserve our environment and avoid the depletion of the earth's

natural resources (Sciences, 2012 ). Sustainable materials improve the economic aspect by creating less waste disposal; hence, it has lowered the need for new waste disposal facilities. In the adoption of sustainable materials, the environment of the workplace can have better indoor air quality, and it will indirectly create more employment opportunities. This is because the better air quality helps to improve the occupants comfort and health (Sciences, 2012 ).

## *2.2 Barriers in Adopting Sustainable Materials*

Sustainable construction seeks to reduce pollution such as waste materials, emissions from vehicles, noise, and release of contaminants into atmosphere, ground and water. Not only does sustainable construction have to incorporate local goals, but also global dimensions that have an impact on material selection (Reddy, 2009).

Due to the growing importance of the use of sustainable materials in construction industry, researchers and also construction practitioners should do their best and initiate actions to reduce the negative impacts of development and sharpen this competitive edge (Abidin and Jaapar, 2008). The adoption of sustainable materials is needed to achieve a win-win situation for both construction sectors and global environment.

Awareness and knowledge are the first stumbling blocks that must be conquered in creating a capable and feasible local construction sector (Abidin, 2010). The readiness of construction practitioners such as developers, and contractors, in adopting sustainable materials in construction sectors is still low. There is still lack of knowledge concerning the usage of sustainable materials and how conventional materials cause significant environmental problems.

The transformation in adopting sustainable construction materials face significant barriers from existing policies and regulations, market forces, and the existing structure of the construction industry.

## **3. RESEARCH METHODOLOGY**

This study employed quantitative method by distributing questionnaire forms to the selected respondents. The questionnaire is designed by using likert scale. According to Real Estate and Housing Developers' Association Malaysia (REHDA), the total number of developer's firms in Johor Bahru consists of about 70 firms. Chua (2006) stated that, for a population of 70, the total number of sample needed to be taken is 59. This means that, the total of 59 developers firm will be chosen randomly as the sample. The target respondents include the project managers, engineers, or architects who are involved in the selection of materials in the construction projects. In carrying out this research, the method adopted is the distribution of questionnaire surveys. A total of 59 sets of questionnaire form were distributed and 23 developers' firms responded.

## **4. RESULT AND DISCUSSIONS**

The results obtained are shown in Table 1 and Table 2 below. The highest mean was recorded by affordability which is 3.91 while the lowest mean was lack of readily available accessible information, which is 3.26. Affordability represents the ability of stakeholders in purchasing sustainable materials that is usually higher compare to conventional materials. According to the respondents affordability has been the major challenge in resisting the adoption of sustainable materials. Given that finance is the most important asset for a company, stakeholders especially the clients will always consider the financial status of the company and also the high cost incurred before making decision of adopting sustainable materials. The initial cost for implementing the sustainable materials is much higher compared to the conventional materials. However, in the long run, the cost for a building will be higher by using conventional materials as compared to the sustainable materials. This situation indirectly caused the respondents to be more resisted for using it for construction

projects. Therefore, most of the developers do not want to take the risk of adopting sustainable materials in their projects.

On the other hand, the lack of readily available accessible information about sustainable materials is the lowest factor affecting the adoption as agreed by the respondents. This is because the information about sustainable materials is still not the main criteria that will be considered by the respondents in making the decision to adopt sustainable materials as compared to other options. Yet, as there's lack of available information, the stakeholders needs to spend more time on acquiring the information before using it. Therefore, it causes the additional construction time needed in a project.

Table 1. Percentage of the Challenges towards the Adoption of Sustainable Materials

No	Key Element	Mean
1	Affordability	3.91
2	Concept of Sustainable Materials	3.87
3	Limited Availability of Sustainable Materials	3.74
4	Code and Regulation	3.61
5	Lack of Readily Available Accessible Information	3.26

Table 2. Challenges in Adoption of Sustainable Materials

Challenges	Description
Affordability	There is always a lack of financial resources. A high initial expenses may caused the stakeholders do not have enough resources to support even though a project can has a high returns after the building constructed (Dahle and Neumayer, 2001). Moreover, cost of sustainable materials are still uncertain as the specifying of sustainable materials will often take place a year or more before the actual purchase and procurement of the materials (Griffin, Knowles, Theodropoulos, and Allen, 2010).
Concept of Sustainable Material	Construction practitioners do not aware the importance in protecting our environment from continuing contaminated by the waste created by the construction industry (Dahle and Neumayer, 2001). Besides, sustainability is still a relatively new concept for construction industry in the developing countries of South-East Asia (Shafii et al., 2006).
Code and Regulation	Public policies and some regulatory frameworks nowadays do not encourage the development of the construction sector (Shafii et al., 2006). Thus, it is directly affect the adoption of sustainable materials by developers for new construction projects. By the provision of code and regulation compliance, it will motivate more developers in the adoption of sustainable materials in their construction project.
Limited Availability of Sustainable Materials	The application of sustainable materials in construction industry is still not very well known due to the very limited and variable availability of sustainable materials. Some examples for this case is the difficulties faced when developers need to find adequate quantities of Forest Stewardship Council (FSC) or other certified sustainably harvested wood for projects larger than small house (Griffin et al., 2010).
Lack of Readily Available Accessible Information	The lack of readily accessible and reliable information comparing alternative structural materials and systems poses a significant barrier during the design and selection process. The lack of information caused stakeholder unable to make proper decision to adopt sustainable materials (Griffin et al., 2010).

The second element with a high mean value is the concept of sustainable materials (Mean: 3.87), which correspond to the understanding of construction practitioners on the sustainable materials in construction industry. Most of the respondents do agree that the sustainable material is still a rather new concept to be understood. They are not familiar with this concept. Hence, they do not take the initiative to adopt it into the construction projects. More training and education is required for construction practitioners in order to have a holistic view on sustainable materials in the construction industry.

It is then followed by limited availability of sustainable materials (Mean: 3.74). Respondents considered that fewer choices of sustainable materials in the current Malaysian construction market are also hindering them to adopt these materials. For example, there are only few types of sustainable material that can easily be found such as fly ash; fiber reinforced polymer; ground granulated blast furnace and effective microorganism in Malaysian Market. This scenario causes the stakeholders to have a hard time in finding suitable sustainable materials, which indirectly hinder its adaptation.

Last but not least, code and regulation has a mean of 3.61. Code and regulation in this context signifies the policy and regulatory set up in Malaysia that may directly or indirectly affect the construction industry in the adoption of sustainable materials. The lack of code and regulation in contributing to sustainable construction has become one of the barriers in the adoption of sustainable materials. When there is no code and regulation that is able to guide the developers or regulatory agencies, especially in terms of incentives as finance, it will become an obstruction for the stakeholders in using sustainable materials in construction projects.

## 5. CONCLUSION

Adoption of sustainable materials is essential for construction industry as alternative of the conventional construction materials. Barriers identified in this paper could play an important role in finding the strategies in implementation of sustainable materials. Recommendations for increased usage of sustainable materials are by encouraging construction practitioners, especially developers to place their investment in long-term view. Furthermore, government intervention such as providing subsidies can be an encouragement for the adoption of sustainable materials. Cooperation from all parties has to be obtained so as to have higher usage of sustainable materials in future Malaysian construction industry.

## ACKNOWLEDGEMENT

The authors express grateful acknowledgment to the industry stakeholders for their valuable contributions towards the success of this research. This research is fully funded by Universiti Tun Hussein Onn Malaysia (UTHM) under Vot: 1106, Multi-Disciplinary Research (MDR) Grant 2012.

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