

1- Subject of study

Green building refers to the act of developing, constructing, and building structures, and utilizing a procedure that is environmental and resource-efficient in various construction activities (Kamarudin, Mohd Fazli, Md Nor Hayati, Ismi, & Norhana, 2011). “Building owners are starting to do reviews of their portfolios to see how green their buildings are and what they need to do to meet growing market demand,” says Ché Wall, chair of the World Green Building Council. According to Lockwood (2006), Green buildings, as many knows, have a less negative impact on the environment than standard buildings.

According to World Green Building Council, A ‘green’ building is a building that, in its design, construction or operation, reduces or eliminates negative impacts, and can create positive impacts, on our climate and natural environment. Green buildings preserve precious natural resources and improve our quality of life. Material efficiency is about sparing use of natural material resources, effective management of side-streams, reduction of waste, and recycling. This paper presents an overview of the different aspects of resource and material efficiency in building construction presents the results of case studies.

2- Working Title

Material efficiency: A strategy to safeguard the environment

3- Analysis of the Problem

Material efficiency strategies include, for example, products that last longer, remanufacturing and modular manufacturing, reuse, and recycling of product components, using less material in product designs, or redesigning manufacturing processes to use less energy, less water, or less raw materials. It can also include the replacement of scarce and expensive elements, notably those critical for energy applications. According to Mehta, Sharma (2014), integrating green building materials into construction projects can help reduce the environmental impacts associated with the

extraction, transportation, processing, fabrication, installation, reuse, recycling, and disposal of construction industry source materials Srinivas (2015). Some theories and strategies could be used to achieve greater material efficiency which includes Design for Environment, Life-cycle Assessment, Energy and Water Efficiency.

4- Research Method

For this thesis, research methods such as in-depth interviews, observations, and use of questionnaires will be used. Some professionals or/and existing users will be interviewed on certain topics and preferences on existing green materials and how they think they can be incorporated. Also, observations and the use of questionnaires and surveys, and case studies will be carried out to measure and analyze existing buildings and their impacts on the environment.

5- General Structure of the Study

The thesis, based on series of chapters with an introduction that introduces the research by presenting the background and a problem statement concerning material efficiency, followed by the research objective and research questions, then the literature review which will explain talked about the impact of building material, recycling, and reusing, application of material efficiency in buildings followed by Methodology which explains the design of the project.

Theoretical Framework provides a summary of the theoretical base, previous research, and the theoretical findings of this dissertation. Discussions discuss the research results derived from both theoretical and empirical findings presented in previous chapters, which have been analyzed and validated followed by Summary and conclusions which review the research objective fulfillment and summarizing the answers to the research questions and finally followed by References.

6- Academic Contribution of the Study

Material efficiency is an important aspect of green buildings. This entails the pursuit of the technical strategies, business models, consumer preferences, and policy instruments that would lead to a substantial reduction in the production of high-volume energy-intensive materials required to deliver human well-being. Material efficiency would reduce, drastically the cost of construction as well as improve the wellbeing of the inhabitants. Lighting, Insulation technicalities, roofing, recycling, and reusing are part of the processes whereby materials efficiency is achieved. These are all processes and theories of Architecture which would be useful in my field.

7- Literature Review

This section presents the literature review, which answers the research questions of this paper on a general level. It examined Material efficiency in the building process, impacts of material-related harmful emissions

Material efficiency can be achieved in the building process through the following application:

- Lighting
- Insulation Techniques
- Cool roofing etc.

According to Ruuka & Hakkinen (2015), the importance of material efficiency is based on one or more of the following impacts: - the depletion of raw materials and its long-term socio-economic impacts; - land-use change due to the extraction of raw materials and its environmental impacts and impacts on the landscape and future recreational use; - the use of energy in production processes of materials and depletion of non-renewable energy; - harmful emissions from production processes of materials and their local and/or global environmental impacts; - material cost impacts due to the limited availability of raw materials or a higher need for energy and/or labor in the different phases of production processes.

Recycling: Recycling the land-filled waste construction materials reduces the use of virgin materials as these materials already exist and to produce a virgin material huge energy is consumed with a high percentage of emissions.

Reuse: The other way to reduce the consumption of construction material is to reuse virgin materials. Annually million tons of waste material is generated due to construction, demolition, or renovations of buildings. These constructions or renovations of buildings take place because of the shorter lifetime of the buildings and due to some changes in the usage of the buildings. With these kinds of changes in the construction of the buildings, it is always possible to regain most of the useful materials from the wastage of the buildings efficiently and effectively, reuse them before the end of the lifespan of the materials. With this kind of method, the consumption of energy, cost, and emissions are reduced.