

Environmental Sustainability in Interior Design Elements

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Abstract: - Interior design is a profession that serves for the human habitation in the environment. In the context of human needs, there are many different dimensions and levels of satisfaction. The interior space can satisfy the need of security, or it can lead to a satisfaction level from security to self-esteem. Recent global debates focus on to a basic need that is to survive. Need of sustainable environment is an obligation rather than a will, in order to survive. This study aims to discuss the interior design elements in the dimension of sustainability. The practice of interior design is also considered in the context of sustainability.

Key-Words: - Sustainability, Interior Design, Interior Design Elements

1 Introduction

After the industrial revolution, technological developments dominated our daily life. People migrated from villages to industrial sites and cities. In time, the balance between the land and the occupied area has changed. On the way of creating new sites, natural areas are heavily destroyed. Moreover, the number of occupancy per dwelling decreased. “Simultaneous with a decrease in the number of occupants per dwelling, the average size of dwellings has increased” [1]. At the same time, the amount of fuel consumption increased every year.

With all these changes, especially after the oil crisis in 1970, researchers started to focus their studies on the cure to ecological balance in nature. The term became important in political, social, and scientific studies. In these studies, techno-centric approach was dominant starting from 19th century up to the middle of 20th century. Then the antro-centric approach took place, centered to human. Today, the studies focused on the ecological system [2].

Sustainable development became a significant problem in international commissions. Especially, Bruntland Commission in 1987 declared a report about the leading items in sustainable development. The definition of need was redefined with this report as “sustainable development is first and foremost about ensuring that everybody-both in poor and rich countries, and today as well as in future generations- can have their basic needs meet. This must be

obtained without jeopardizing the natural systems on which life on the earth is dependent” [1].

In problem formation, sustainable development has many different dimensions from social to political. Among these, environmental sustainability is the dimension that is in bilateral relation with other dimensions. In this context, humans have a curial responsibility in creating sustainable environments. Interior designers create environment for the occupation of human. That is, interior environment is the first and the closer place to fulfill human needs. This study focuses on the interior design dimension of sustainability within the context of design elements.

2 Sustainability in Built Environment

The term of sustainability is not just a theoretical course, but it is also a very technical term in the face of problem solution. As Sassi defined “Sustainability is not an academic pursuit or even a professional activity: it is a way of life affecting everything an individual does. Knowing what kind of a relationship we want to have with the global and local environment is the first consideration. Then, we should address how to achieve this relationship. To move from theory into practice, it is necessary to understand the impacts associated with our work and life related activities” [3].

In the dimension of environmentally sustainable development, Ness classified the theoretical studies under five topics as:

1. Reduction of the energy and emission in the environment.
2. Minimizing the distraction in the ecological, natural ion areas for food production.
3. Minimizing the consumption of environmentally harmful construction materials.
4. Recycling natural resources.
5. Preventing sound and air pollution in order to protect the inhabited health.

The factors related to the minimization of use of harmful construction materials, recycling and preventing pollution are the most important aspects of sustainability in the context of interior design.

In European Union Countries, total 40% consumption of energy, 30% of CO₂ gas emission, and 40% of synthetic waste are produced in the construction industry [4]. That means, the environmental design has a big role in the course of sustainable development. Moreover, 50% of natural material resources is used in the construction industry. From this perspective, there occurred the need of developing suitable assessment criteria for built environments.

The assessments tools aim to provoke designer and construction industry to serve environmental sustainability. There are many assessments tool such as BREEAM (England), SBTool (International), LEED (USA), EcoProfile (Norway), Promise (Finland), Green Mark of Buildings (Singapore), Green Star (Australia), CASBEE (Japan). Among these, the widely used assessment tools are BREEAM and LEED.

The first example is BREEAM which is establish in 1990 as Building Research Establishment Environmental Assessment Method by Building Research Establishment. This assessment system evaluates the building in the context of sustainability under nine main topics as:

1. Management: in the dimension of policy of site management.
2. Health and wellbeing: Factors affecting the health and wellbeing.
3. Energy: energy consumption and gas emission.
4. Transport: transportation in the context of location and gas emission.
5. Water: efficiency in water consumption.

6. Materials: evaluation from the aspect of material life cycle.

7. Waste: waste products.

8. Land use and Ecology: conservation of ecological sites.

9. Pollution: air and water pollution assessments.

In LEED, the categories of evaluation is under six topics as:

1. Sustainable site development
2. Water efficiency
3. Energy efficiency
4. Material selection
5. Indoor environmental quality
6. Innovation and design process [5].

When these categories are considered from the perspective of interior design, it is obvious that the design elements are the major substances in gaining sustainable interior environments.

3 Sustainability in Interior Design Elements

As a profession, designing interior environments can be defined as “determining the relationship of people to spaces based on psychological and psychical parameters, to improve the quality of life” [6]. In the core of sustainability, these physical parameters gain importance in the means of long term use.

Sustainable interior design is defined as “interior design in which all systems and materials are designed with an emphasis on integration into a whole for the purpose of minimizing negative impacts on the environment and occupants and maximizing positive impacts on environmental, economic and social systems over the life cycle of a building” [7].

Kang and Guerin defined the sustainable interior design practice in three dimensions as: global sustainable interior design, indoor environmental quality, and interior materials. The indoor environmental quality, that is also an assessment category in the LEED, is the most important implication in considering the sustainability of interior environments. Improving indoor air quality which is mainly the activity of reducing indoor pollutants, improves the thermal comfort and quality of interior lighting. Moreover, using materials those can have the possibility of recycling is another

criteria in obtaining sustainability. In considering these aspects, most essential interior design elements are materials, furnishing, and lighting.

3.1. Interior Design Element: Materials

In material selection, the most important criteria is to select the material according to the features of function. Each of every function has specific needs. As an example, materials used in the hospital interior and the shopping mall should be different due to the sterilization aspect. Especially, the selection should aim to long term use. It is very important to use a material in its maximum potential in order to reduce waste of resources.

As, in the process of producing materials, the energy is used. This is called as the embodied energy. Each material has different amount of embodied energy. For example, concrete, steel and the plastics are higher in embodied energy amount in the construction materials. Especially, natural materials such as stone and timber gradually have less embodied energy.

Another important criterion in material selection is the recycling potential of the materials. There are many studies in the field of waste management which aim to innovate new construction materials. A Cierra Recycling can be an example to one of these. Basically, they collect and separate the waste, and then they transform it and remanufacture these waste products [8].

Moreover, the level of emission of toxic gases both used in production process and during the using period of the materials is an essential criterion in achieving sustainability. Especially, most traditional techniques in construction and materials are widely sustainable. As an example, traditional materials like mud brick and adobe are highly sustainable in the means of level of toxic gases emission. They are natural materials. All these criteria are important in maintaining indoor air quality. Finally, materials, as interior design elements, should meet the requirement of sustainability in the potential of long term use, recycling, and less emission of toxic gases.

3.2. Interior Design Element: Furnishing

Furniture is the major element in interior design. They have a wide range of materials and color. In the context of sustainability, materials used in the

production process and the long term use of the furniture are the major criterions.

Wood products are widely used materials in the furniture production. They can be recycled actually. However, some synthetic materials used in the wood production process cannot be recycled. Moreover, the wastes occurred in the production process damages the nature. These waste products contain same toxic polymer based synthetic materials. The rate of the waste to the product is about 30% of the total amount of the product [9].

Rather than the production process, the old furniture also cannot be recycled. These wastes have a big role in increasing the amount of global waste. Achieving sustainable furniture, recycling is one of the important criterion. Recently, some of the furniture companies started producing furniture totally from waste.



Figure 1. Furniture produced from metal barrel. (Ayalp Achieve, 2012)



Figure 2. Wardrobe produced from waste of barrels. (Ayalp Achieve, 2012)

Furniture produced from waste sometimes face with the problem of aesthetics. These type of furniture are sometimes considered as unaesthetic. This is the major problem in selecting these furniture. The aesthetic quality of the furniture should be considered. Then, it will both serve for the purpose of sustainability and widely used.

In recent years, there are also innovative examples in the furniture production. In Cambridge University, design and engineering departments developed a joint project. They created a technology in order to generate electric from the plantation. They conduct this system in a table. There is a light fixture on the table and there is a plantation in the table. The lighting fixture gets its energy from the plantation in the table. It is an example to innovative sustainable design. It should be considered as an example for the essence of interdisciplinary study in achieving sustainable environments.



Figure 3. Table and Lighting Unit Removable Energy

3.3. Interior Design Element: Lighting

Lighting considerations in interior design is mostly concentrate on the reduction of using electric energy. Energy used in interior environment of the building is approximately captures the 40-50% of the total energy used in buildings [10]. It occupies a large amount of energy consumption. Therefore, designers should use the maximum possible natural light in interior environments. Environmental lighting is also one of the physical parameters affecting the indoor environmental quality.

Day light is the main source in natural lighting. It can be explain as “the practice of bringing light into

a building interior and distributing it in a way that provides more desirable and better quality illumination than artificial light sources” [11]. In this context, the building should be located according to gain maximum day light. Also, the size and the depth of the room should be appropriate to use maximum day light. Recently, there developed new technological tools to carry day light to the deep interior space of the building even to the basements. The main principal in these tools are to collect the sun light and reflect the light through the reflective tubes. Laser cut panels, light piping systems, horizontal and vertical light pipes are examples of these systems

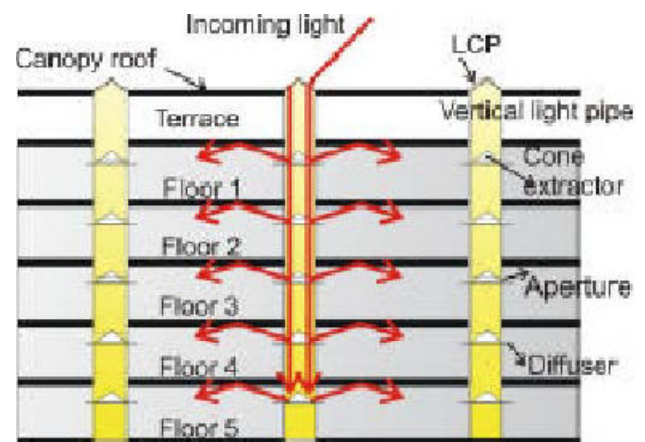


Figure 4. Vertical Light Pipes [12].

Moreover, there are many research studies carried out about the benefits of day light in life quality in interior environments. Especially, these studies demonstrate that day light affect the productivity level in office environments. Yaldiz and Magdi considered the day light in the context of sustainability in three categories as:

1. Resource sustainability (using day light to affect the energy of the building performance).
2. Economical sustainability (in the dimension of financial benefit).
3. Human sustainability (in the dimension of human physical and psychological health) [13].

The lighting is a major interior design element. It is obvious that it has a essential role in developing sustainable interior environments. It is both important in energy reduction and for the sake of human health.

4 Conclusions

Interior environments are the places that meet the human needs. They are the most intimate

environments to its users. The need of willing to create sustainable environments should be first met in the interiors. People should live in sustainable environments with the help of professionals; interior designers. Interior designers have an essential tool in their hands to lead sustainable environments and create consciousness in sustainability. Interior design elements are the major tools in creating long term used sustainable environments. Finally, interior design elements should be natural resources in the process of fabrication, manufacturing, installation, use, reuse, recycle and disposal [4].

<http://www.trhamzahyeang.com/features/img/Light%20pipe%20paper.pdf>

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