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ECO-DESIGN – THE PERFECT BALANCE OF ESHETICS, ERGONOMY AND ECO-DESIGN

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Abstract: The paper analyses the eco-design as a means for growth and innovation of a conceptual tool with a great impact upon the environment. The applicability is to study the development of eco-design strongly related to the environment we live in and the balance of aesthetics, economy, ecology and usefulness. As a concept, eco-design is a large topic and a priority for every advanced country. The project in this paper is based upon technical, economic, aesthetic and social criteria.

Keywords: eco, design, environment

1. INTRODUCTION

Everything surrounding us is a form of eco-design a way or another. In time, this science harmoniously developed, combining the multifunctional features of products, services and systems with their aesthetics. Now, the design is able to usefully harness the ecology [6, 11, 14].

The environment is an integrative part of every development process and consists in connections and relationships between people and natural resources. Therefore, the environment changes are not only natural, but also the effect of the practical manifesting of different development patterns, practices and lifestyles. Conversely, any change in the physical environment has important socio-economic consequences that are influencing the quality of life [2, 9, 13, 16].

ECO – composition particle meaning „house”, „environment”, „ambiance” [fr. éco-, it. eco-, cf. gr. oikos].
DESIGN – Domain targeting to harmonize the human environment, from creating common items to urbanism and landscaping. Based on this DEX definition, we could define eco-design as a harmonization and an improvement of the environment we live in.

Eco-design could also mean a balanced approach of art and science, a thorough consideration of the environment in order to enhance our way of living. For a better understanding of these two concepts, we must define first: the eco concept comes from the scientific branch of ecology meaning the environment study in order to enhance our way of living (from the Greek oikos – house, and logos – to study) [3,12, 15, 16].

In other words, the term defines the science that studies the „domestication of nature”, regarding the way individuals, including the human being, are living together. Ecology is a young science, continually evolving. It is based on a system theory (systemic ecology). The environment is a system having subsystems having also subsystems and so on. (e.g.: the wood is a system, the ants in the wood is a system, an ant-hill is a system, and an ant is a system). All systems, subsystems, components and elements of the environment are interconnected and interrelating with each other. Influencing a system means influencing all systems / subsystems [1, 4, 7, 12, 14].

The design is a creative activity with the purpose of creating objects, processes, services and systems with multifunctional features all along the life cycle of a product. Therefore, design is the main factor of innovative humanization of technologies and an important factor of the cultural and economic exchanges. In the 21st century, the worldwide practices of civilized countries have the concept and the study of design as mandatory discipline in the educational system, because the design is the discipline





that introduces us to the concepts of beauty and good in the objective world [5]. The eco-design concept consist in integrating the environment in the design stage of a product, taking into consideration the entire life cycle of that product, from purchasing raw material to dumping the product to the trash [8]. Eco means economy and ecology at the same time. Based on a good design process, eco is a concept that targets reducing the damaging impact of a product upon the environment. Implementing the concept of eco-design is a necessity with the main purpose of designing the entire life cycle of a product based on the ecological needs [2, 6, 10, 14, 16].

Eco-design could also mean a new configuration of products, taking into account the environment, but also the costs. Eco-designed products must meet certain criteria, such as: recycling, low consuming of materials and energy, sustainability, non-toxicity, optimal benefits for the customer, using local resources [2, 6, 8, 15]. With eco-design, the whole development of a product – from manufacturing to the end of the life cycle – is kept under observation in order to find the most suitable and environment-compatible solutions.

2. THE STAGES OF ECO-DESIGN

The designers of products and processes have to make sure that all aspects leading to meeting the customers' needs are highly developed in terms of functional performance, economical profitability, technical viability and also environmental impact [7, 9].

The purpose of eco-design in the frame of sustainable designing is to diminish the impact of the products and processes upon the environment all along the life cycle, plus maximum of profit, performance and quality. Sustainable design means taking into account the economic and environmental aspects, but also the social and ethical consequences [10, 15, 16].

The main stages of the designing process are: analysing / planning / defining the tasks, concept designing, integrated designing, detailed designing, prototype / testing and launching on the market. These are very well defined stages of the classical production algorithm, completed with the ecological aspects, based on specific methodologies and tools [4, 7, 9].

In the first stage of analysing / planning / defining the tasks we assess the actual and future situations, identify the main objective and its specifics, with care for the ecological and social aspects in order to list the requirements of the future product. In that stage the ecological functions must be defined and developed [9, 13].

Eco-design is based on different components synthesized lately as X Complex Design (E – environment, M – manufacturing, A – assembling, D – disassembling, R – recycling, S – service, LC – life cycle etc.) [11, 16]. Eco-design is a process that differs from the traditional designing in the ecological aspects considered in order to preserve and reuse the natural resources, optimize the energy consumption and the use of raw material, minimize the waste and totally remove the damages imposed on environment during the product life cycle [5, 7, 13].

3. MATERIAL AND METHOD

The space we live in and use every day for different activities must be protected. The importance of the public space becomes grater if we take into account the ecological benefits of a healthy environment due to plants and vegetation. A public space could have a number of roles: aesthetic, psychological, symbolic, ecological, and social. Our project is for a very crowded and phonically aggressed space: Coltea Park (figure 1). Renowned for the cultural and musical events that are taking place here, Coltea Park has as a symbol a „broken” violin (figure 2). An ecological approach for the public space design is not a new one, but a very important one for the future of our city. Located in University Square, Coltea Park is a popular place as a concert venue. Coltea Hospital could be seen in the background.



Figure 1 – Front view of Coltea Park



Figure 2 – Present view of the park

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The most important step for accomplishing this project is about materials. The main features of eco-materials outline a longer lifespan of a product, a better use and the diminishing of waste. The main purpose is to apply an eco-process that is profitable and uses the recycled wood as raw material for high quality items of urban furniture.

4. RESULTS

The new concept we present here is a furniture ensemble with two shapes, figure 3. When closed is representing a bench for two, when opened is representing a table for five.

This design meets the public needs as the park is a place where young students gather and that could be used for cultural, social and artistic activities.

The product is made with wood from recyclable ecological resources. It is easy to clean and very resistant. This type of wood is a unique combination of aesthetics and natural but also of sustainability and flexibility. It is highly resistant in a humid or sunny climate, but also to big temperature gaps, figure 4.



Figure 3 – View from above of the public bench concept



Figure 4 – Side view of the ensemble

The profiles have a polished appearance just like the natural wood (figure 5). Because of its structure and composition, the composite wood is not releasing toxic gas or leaching dangerous chemicals in the environment. The composite wood comes from a recycled material and could be 100 percent recycled after use. Having a good resistance, the composite wood is saving natural wood that has a shorter lifespan. Chair / table diameter is 140 cm and each chair is 45 cm long. The backrest is 80 cm and the axis 60 cm. The gliding stands are 70 cm each from the axis to the chair. The table is supported by a metallic structure for gathering the chairs when the ensemble is closed (figure 6). Also, each chair has a gliding stand that connects it to the table. Therefore, the chairs cannot be moved.



Figure 5 – Side view of the ensemble



Figure 6 – View of the opened ensemble



Figure 7 – Closed ensemble – suggestion of presentation



Figure 8 – Open ensemble – suggestion of presentation





The shapes are inspired from the shape of a trumpet in order to respect the theme of the park. In making the ensemble, the priority was meeting the needs of the public space. Near the park are the University building, the National Theatre and Coltea Hospital. Therefore, the park could be a meeting place for the public frequenting the area or passing by, but also a place for artistic events during the summer time (figure 7 and figure 8).

CONCLUSIONS

The paper presents the conceptual process of implementing modern technologies in order to improve the performances of a product and obtain a modern design using eco-materials for aesthetic purposes.

In time, the materials industry has become increasingly interested in environment and product life cycle having the objective to develop an ecological attitude in consumers. Supporting the use of eco-materials in creating different products, the industry is establishing the foundation for an efficient mechanism leading to a recycling attitude and recycled products. Because of the new user experience with eco-design, the industry is increasingly interested in environment issues and toward creating the eco-awareness in consumers.

These are important steps toward a sustainable development creating positive effects for every part involved in the process. Eco-materials are a challenge for designers, executives, techs but also for users.

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