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ECO SYSTEM AND A FOOD CHAIN AS A MODEL FOR ECO DESIGN

Annotation. *Environmental problems are becoming the most important issue under consideration in all areas of our lives today. Designers have begun to develop zero-impact products, create “green” projects, and use both energy-efficient materials and innovative technologies in order to solve pollution issues. This article discusses an eco-design model based on an eco-system. The authors make analysis of general requirements for environmental projects. They give interesting solutions to environmental problems, where the main goal is to achieve harmony in the “man-nature” system.*

Key words: *ecology, ecosystem, food chain, human activity, green projects, model, eco-design, innovative technologies, recycling, energy efficiency.*

Introduction. Nowadays, when it comes to the concept of "spirit of the times and the mechanism of progress", such concepts as a set of development and increased requirements are considered for the level of comfort. It is based on the creation, production, acquisition and subsequent disposal of the used objects of consumption themselves. Modern society is increasingly immersed in such a concept as a dispositive of progress. It is viewed as the design of the living environment, life support processes and every-day things, as well as methods of communication and presentation, fashionable life-style and denoting the status of a person as a smart consumer. In this context, the concept of design is not just the design of things to ensure mass demand, but, at the same time, the mechanism of symbolic consumption and these are micro and macro problems of modern globalization.

“Ecology has become the loudest word on the Earth, louder than war and the elements. It characterizes one and the same concept of a universal misfortune that has never existed before humanity”- this is how the Russian writer, publicist and public figure V. G. Rasputin said. As regrettable as it is to realize, it is difficult to disagree with this statement. People influence on nature not only in positive way. Sometimes they create uncomfortable dwellings for living. For example, the essential means of security are not considered in their projects. It can lead to ecological disasters, which were caused by human beings. It means that we destroy our nature by our own hands. For improvement of environmental condition of the Earth, people should make revolutionary reforms in production eco-friendly and low waste technologies. The usage of biological, chemical and nuclear weapons have to be strictly prohibited [1].

Materials and methodology. The field of ecological design is considered in the unity of artistic, aesthetic, methodological and technological problems. The

methodological guideline of the study is the classification and typological approaches that reveal the forms and range of use of environmental techniques in design. When studying the phenomenon of ecological design, the method of comparative analysis of the history of the formation of material culture with the processes taking place in the natural environment was used.

Attention is focused on the period of the revolutionary development of technologies, radical transformations of the objective world, the origin and formation of the theory and practice of design. Investigating modern trends in design, establishing their links with ecology, a systematic approach and a structural method of analysis were used, which made it possible, based on the synthesis of various knowledge, to describe the phenomenon of ecological design as a new phenomenon in the design culture. The specificity of ecological design was revealed on the basis of a comprehensive study in such areas as art history and aesthetics, on the one hand, and ecological technologies, on the other:

The analysis of art reveals the relationship between the symbolic phenomena of the design culture of the 19th and 20th centuries and the stages of society's awareness of the processes of changing the natural environment.

With the anthropological approach, ecological design appears as a means of developing ethno cultural worldview attitudes and the spiritual and value world of a person.

Results and discussion. One of the brilliant examples in creating harmony between human activity and Mother Nature is the great economic country - Japan. The country of the East has officially renounced the right to declare war. However, it has a self-defense force, which is also used in peacekeeping operations. Nuclear weapons have been used against Japan for the first time. It was the only country in the world. It is prone to major earthquakes, typhoons and devastating tsunamis. However, Japan is one of the leading countries in creating eco-friendly technologies. It took the 20th place in 2018 in the environmental sustainability index.

Perhaps, such an attitude and reverence for nature among the Japanese was formed thanks to their ancient and traditional religion "Shintoism", where the main spiritual principle is life in harmony with nature and people.

One of the most striking examples is the level of waste sorting in Japan, perhaps the highest in the whole world. On the streets of cities, you will not see a single ordinary garbage can. Therefore, all waste is collected differentially. Garbage is taken out at a certain time in transparent bags so that the workers of the garbage truck can see what is inside. On a specific day, a specific type of garbage is accepted. Garbage bags come in various sizes and colors, depending on the category. Different municipalities of the country have a different number of categories for sorting. For example, the slag taken from utilization of garbage is pressed after which it can be used in building islands. In the figure №1 you can observe artificial island Odaiba in Tokyo Bay. Nowadays it is developed industrial and economical regions of Japan [2].

It should be remembered that environmental change inevitably entails a reaction that is reflected in all spheres of human activity. Consequently, advanced technologies should be closely related to the ecological culture of a person. This issue was updated during Expo-2015, which was held in Milan under the motto "Feed the Planet" [4].



Figure № 1. Odaiba Island in Tokyo Bay [3]

We do not have a dire need to find a new cutting edge model for the development of sustainable design in general. It is enough to turn to nature, in particular to look in a new way at the ecosystem, where all types of organisms are interconnected with each other and their environment. “It can vary in size: it can be a pond, a field, a piece of dead forest, or a rainforest. In an ecosystem, species are linked by food chains. The food chain begins when the sun's energy is captured by plants and trees (primary producers) through photosynthesis. Then the primary consumers (herbivores) eat the plants, and then the secondary and tertiary consumers (carnivores) eat the primary consumers. The energy they create by digesting food is lost as unnecessary heat. When animals and plants die, very small bacteria destroy their tissues and the chemicals that make up these living organisms are released into the soil and act as fertilizers to help green plants grow. Therefore, the food chain starts over and over again” [5]. This phenomenon can be observed in *Fig. №2*:

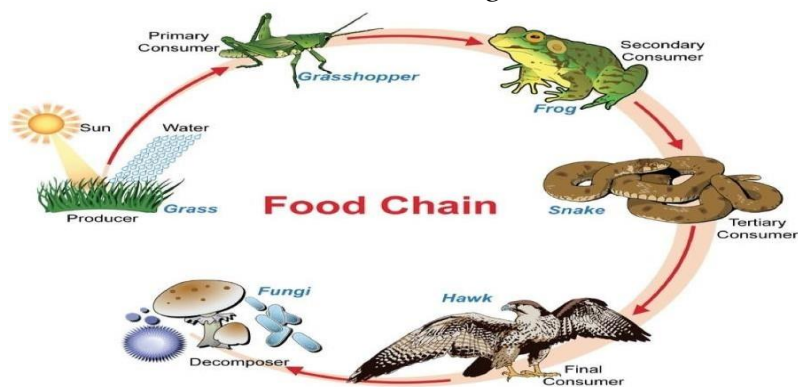


Figure 2. Eco-system and food chain [6]

Any ecological reason entails a consequence - the formation of ecological methods and technologies. Design, as a global project culture, encompasses all spheres of human activity to create wealth. In this regard, the development of eco-design has become a necessity rather than a new trend of our time or trend. A design takes into account not only the beauty and practical sides of the object of design. It also considers environmental impact of its final product. Finally, eco-design cares about the materials used during production, controls phases of manufacture and the utilization process.

The notion of a professional design project includes environmentally friendly architecture and eco-design. Our inner world, physical well-being and our surroundings

play a great role in the harmony between man and nature. It is like a triangle, which sides are bounded all together. Eco-design became a reasonable solution for architects and designers. The urgent need for landscaping, for methods of eco-design and eco-architecture appeared [7].

To make our life easier eco-design follows simple rules of nature. That is why form and function became minor in design project. Undoubtedly, decreasing amount of waste, selective attitude to the material and production technologies used has become an important and vital part of a new design wave. The natural forms are repeated by eco-designers and it is regarded very cozy and comfortable to people because organic forms are effective and attractive.

Careful and ethical attitude to the environment, energy effective and economical approach in consumption is promoted by eco-designers to people. Eco-design projects may seem as an integral part of the nature, its objects easily merges with the surroundings. Eco-designer interprets relationship between man and nature, his aim is to achieve a balance on this “bridge”. For this sake, during the presentation of an eco-project, calculations of ecological impact or environmental analysis have to be shown. However, the requirements of a client according to the size, color, materials and other details of a project are considered at the same time. [7]. Based on the fore-going, the following eco-design model can be proposed in Fig.3:

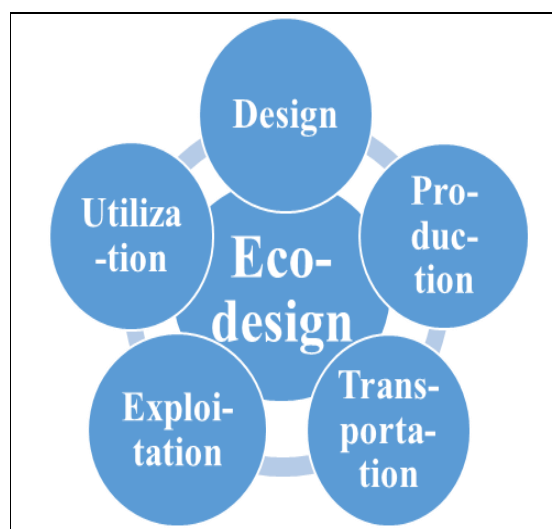


Figure №3. Model of eco-design

In this model of eco-design, you can see its following components - design, production, transportation, exploitation, utilization. At the pre-design stage, the eco-designer will have to plan in advance the entire stage of the life cycle of his future product - from the material used to disposal or recycling. Thus, the initial responsibility for a sustainable project falls on the shoulders of the designer.

Conclusion. A person can perceive environmental changes intuitively or discover them through scientific researches. Fatally it occurs in a man-made world. The goal of ecological design is to stabilize the relationship of a person with the environment. Moreover, the object at which ecological design is aimed can be both nature, indirectly affecting a person, and a person, his social, cultural and psychological needs in their connection with environmental issues. Activities to

recreate lost natural benefits can be both intuitive and conscious. In the first case, a person, not realizing the reasons or even the very fact of environmental changes, but feeling them, forms his objective environment, replacing lost natural values. In the second case, awareness of the threat triggers a response mechanism aimed at preventing threats or eliminating accumulated damage. The eco-design model covers all stages of the production and consumer system, along with economic, social and psychological aspects. This model also unofficially repeats the cycle of the ecosystem and the food chain, following the laws of Mother Nature.

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Аңдатпа. Қоршаған орта мәселелері бүгінгі өміріміздің барлық салаларында қарастырылып отырған маңызды сұрақтарына айналууда. Ластану мәселелерін шешу үшін дизайнерлер табиғатқа нәлдік әсер тигізетін өнімдерді жасай бастады, жасыл проектілер жасап, энергияны үнемдейтін материалдарды да, инновациялық технологияларды да қолдана бастады. Бұл мақалада экологиялық жүйеге негізделген экологиялық дизайн моделі қарастырылған. Авторлар экологиялық жобаларға қойылатын жалпы талаптарды талдап, экологиялық мәселеге қызықты шешімдер береді, мұндағы басты мақсат «адам-табиғат» жүйесіндегі үйлесімділікке жету.

Түйінді сөздер: экология, экожүйе, тамақ тізбегі, адам қызметі, жасыл жобалар, модель, эко-дизайн, инновациялық технологиялар, қайта өңдеу, энергия тиімділігі.

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Аннотация. *Проблемы окружающей среды становятся самым важным рассматриваемым вопросом во всех сферах нашей жизни на сегодняшний день. Для решения проблем с загрязнением окружающей среды дизайнеры стали разрабатывать продукты нулевого воздействия, создавать «зеленые» проекты и использовать как энергоэффективные материалы, так и инновационные технологии. В этой статье рассмотрена модель «эко-дизайна» на основе эко системы. Авторы анализируют общие требования к экологическим проектам и дают интересные решения экологической проблемы, где главной целью является достижение гармонии в системе «человек-природа».*

Ключевые слова: *экология, экосистема, пищевая цепь, человеческая деятельность, «зеленые» проекты, модель, эко-дизайн, инновационные технологии, рециклинг, энергоэффективность.*