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# ECO DESIGN PRINCIPLES, METHODS AND MEANS OF LIVING ENVIRONMENT

*Abstract. The general and local principles of ecodesign of residential environment, as well as the basic techniques and tools and their role in improving the living environment.*

*Key words: ecodesign, living environment, principles of eco-design.*

**Statement of the problem.** Environmental trend in modern design led to the assertion of a new system of values and appropriate consumer needs. The urgency of finding ways greening of residential environments due to a number of economic, social and environmental issues. The improvement in the quality of modern living environment associated with the search strategies and harmonization of trade-offs interests of the person present and the future.

**Analysis of recent research. T**hese problems contributed to the intensification of inter-industry studies of natural and anthropogenic factors, positive and negative living environment and integrated consideration of the results of the design. Environmental problems of the architectural environment and Ecodesign theoretical foundations are devoted V.Vladimirova ,N. Dyomina, I. Dydy , V. Hrihor George A. Hutnova , V.Iovlyeva , V.Kolyasnikova , V. Kucheriavoho., S. Myhal, I. Ogorodnikov , O.Orlovoyi , G. Poltorak , N. Reimers , A.Tetiora , Z.Yarhinoyi , K. Yang , etc. .. Landscape and environmental protection organization in the works investigated : L. Anisimova, P.Blank , O.Henisaretskyy , V.Nefodov , Fomin , D.Saymonds . In scientific studies and publications A.Honchara , P.Kazantseva H.Lavryka , Yu.Lapina , V.Litskevycha , B.Merzhanova highlights some aspects of improving ecological conditions housing environment [ 1-8 ]. Analysis of studies on this subject showed that environmental architecture as a system of knowledge is not fully formed, respectively , a number of concepts and aspects that need clarification.

**The wording of Article goals.** The definition of scientifically based

principles of general and local, as well as expanding the range of methods and tools for the unique conditions of a particular habitat, the use of which would find a decision-symbiotic interaction between humans and the natural environment.

**The main part.** This study is part of a plan research department MCA and M PoltNTU . Solver challenges of living environment with improved environmental characteristics contributed to the development of such areas as designing energy-efficient design , durable design, with the possibility of recycling facilities and Ecodesign . [ 1,6] Orientation Ecodesign for humanizing living environment is to make the stay in such an environment as comfortable , given that man as a species formed in vivo with certain characteristics (climate , the magnitude of the elements of the environment, colors , sound range , etc. ) and above all a psychological need for identity in the natural system. [ 1,6,7,8 ]

The world's leading architects [ 3,5,6,8 ] calls for the modern architectural object as part of the ecosystem , which combines the right balance between organic and inorganic elements.

According to the Malaysian architect Ken Yang [6,8] , the development of theoretical and practical ideas related Ecodesign considering various environmental data and integrating object in the physical environment , system and time aspects.

Russian researchers [2,4 ] propose to recall the principles of the formation and planning of energy efficient forms of ancient peoples and the most flexibility to use the features of the climatic conditions. So , focus on the sun causes the asymmetrical design of buildings, thus fitting that the northern wall must be free of holes and termoinertna , and southern - most glazed . When designing the most used methods of saving electricity, natural light and ventilation.

Urban ecological architecture highly regulated economic use of the land, focused on the development of vertical and development of underground space. Individual housing within the concept of Sustainable Architecture has a wider range of options pryrodointehrovanyh decisions.

Flexibility, variability in habitat use by external conditionality its purpose - an important quality that reflects the fundamental aspirations of the individual and

family to complete and multifaceted manifestations of privacy.

As a result of research carried out and Theoretical experience, the author sets out the general principles of Ecodesign : the principle of compensating for deficits natural environment , the principle of borrowing natural methods of formation , the principle of sustainability and architectural object biopozytyvnoyi informativeness principle .

These principles are interdependent and are used at all hierarchical levels of " living environment".

The principle of compensating for deficits natural environment involves the use of natural remedies to neutralize the negative effects of urbanization and provided these groups using natural methods complement architectural forms:

- inclusion of fragments of nature to all hierarchical levels of living environment;
- use of visual connections with the natural environment;
- use of plant elements as composite accents;
- use of decoration that realistically reproduces or associated natural motifs.

The principle of borrowing natural methods and properties shaping enables the creation of optimal structures of residential environments and is implemented through the following groups of methods :

- reproduction mechanisms nutrient cycle of matter ;
- reproduction of natural mechanisms of mimicry ;
- reproduction of natural mechanisms of symbiosis ;
- curved surfaces using the properties of natural forms.

The principle of self- architectural object aimed at ecological use of energy resources is based on minimization of vehicles and communications and provides for the use of group methods listed below :

- the use of alternative energy sources ;
- shape optimization to improve insulation and aeration ;
- regulation of micro-climatic conditions.

Biopozytyvnoyi informativeness principle reveals the influence of environment on the worldview and values, provides the need for self-identification

in a natural system using groups of methods:

- aesthetic elaboration of national local features ;
- improving the culture of architectural details , information saturation forms and elements;
- preference for natural colors of local materials ;
- use in planting local varieties of plants;
- implementation of information and orientation elements.

The most important local ekodyzaynerskyh principles of habitat included the principle of adaptability residential structures, the principle of social structuring outdoor living spaces, making the principle of targeting residential cell.

The principle of adaptability residential structures can install flexible connections between components and residential environment that will provide adequate opportunities change according to the dynamics of their needs. This principle determines the variety of options of traditional and innovative types of modern living environment . Despite significant differences in architectural planning , design and style decisions , living environment at this stage of evolution is an important trend - the creation of environmentally sound forms.

The principle of social structuring outdoor living space provides a balance of resource area through effective zoning , architectural and installation art communications and coordination at various levels of interaction between architectural and landscape objects of the environment.

Principle of targeting housing solutions ensures that the cell residence scenario is realized in the presence of an individual approach and the use of a wide range of composite solutions. Personalization living environment with the development of modern technology and the use of various means of Ecodesign significantly influenced Designing properties habitat , determined to overcome the schematics of the environment.

The implementation of these principles and techniques associated with the use of a wide range of Ecodesign .

Ecodesign tools are divided into the following groups : natural , man-made , technological and means - relations: composition , color and style.

As natural remedies are the topography , vegetation and water bodies of the man-made tools include architectural objects, hardscape , landscaping elements , technological tools include alternative energy sources , automatic control and waste management.

One of the most important tools of modern recovery habitat is vegetation. Herbal remedies are used in solving tasks such as structuring and zoning environment according to the nature of use. For this purpose methods of creating multilevel framework, visual barriers, emphasizing the ceremonial areas and directions of movement , revealing the depths of space , body size and proportions of functional areas or items.

Search ideas introduction of plant elements in the housing environment led to consider protecting the surface as a reserve for landscaping. The use of "green plastic houses " in the multi-storey building partially offset the imbalance of natural components in the living environment and camouflage imperfections of three- dimensional solutions.

However , herbal elements can perform not only a decorative function . To design solutions used in the technique of weaving fence growing shoots or creating walls of the house with interlocking trunks and branches of trees of different varieties or as a load-bearing structures and flexible vines that form filling walls and roof.

The use of hedges and green walls helps zoning of adjacent spaces to create optimal conditions for the existence and interaction of different categories of people.

Making spatial boundaries transit lines is one of the most effective ways to improve the stability of the surrounding natural landscape components , therefore reducing the likelihood of disordered movement of pedestrians.

Structured optimal placing of plant facilities allows to find compromise solutions for the residential environment in the urban environment , and create a comfortable environment without the barrier of low-rise residential buildings.

The range of man-made tools of modern living environment shaped by the constantly changing socio-economic conditions and needs to find new promising

ways to improve the environmental performance of different structural levels. It should be noted that the living environment as an important part of the architectural environment includes a set of architectural spaces and facilities designed for human habitation : houses or apartments, open spaces of different sizes and levels that are close to home ( adjacent spaces, spaces of houses, communicative spaces ). One of the most important requirements for modern living environment are many variations and individualized environment that would meet a variety of different ways of life of families and groups. An important condition for the aesthetic of this environment is to achieve commensurate with the extent of a person by reducing the number of storeys of residential buildings , optimizing the proportions and sizes of adjacent space differentiation in private, semi-private , and public areas napivsuspilnu and effective architectural and planning of data zones. Individuality of design elements making improvements and equipment functional areas , the use of environmentally friendly materials and manufacturing techniques ensure an appropriate level of comfort using residential environment.

Along with the improvement of the visual environment of residential areas to harmonize habitat at the level of the building , housing the cell. To some extent, this problem can be solved by appropriate choice of parameters plastic figure facade, its detail , the degree of dissection of volume, decoration of , directly quoting folk symbolism and its modern interpretations.

Important role in shaping the living environment of medium and large buildings storeys plays improve living conditions on the first and top floors , introducing both traditional and innovative architectural and artistic solutions.

Reflecting current technological capabilities , technological tools related to the latest engineering developments in the field of energy conservation and energy act as marks living environment . They decide specific functional tasks and actively influence the image of the aesthetic in general and in particular proportions, silhouette, plastic geometric shape elements and so on.

The most important functional problems that are solved by using the group means include the use of resources (energy , land, water), minimize adverse

impacts on the environment and creating a comfortable microclimate for the person in the house.

Integration of renewable energy into the structure of the building requires finding adequate three-dimensional solutions. The architecture of the apartment buildings are the most common carriers using solar or wind energy. The specificity of the relevant engineering equipment can be one of the determining factors of the process of architectural and artistic formation, because the effective functioning of the power system is largely due to optimum shape of the house. Methods to achieve this result depends on the type of alternative energy sources that are used in each case [3, 4, 6, 7].

The most common is the use of media solar or wind energy. The specificity of the relevant engineering equipment can be one of the key factors shaping the process , so that the efficiency of power system operation is largely due to optimum shape building [2,4 ].

Composite structures housing environment determines the nature of relations of natural, man-made and man-made elements , their hierarchical subordination. Man-made and man-made facilities and subordinated bonds are natural , so is the union of scaled levels of protection in compositional integrity.

The tasks of the composition of habitat is the harmonization of space-time , visual orientation and emotional ties. Paying attention to the issue of composite three-dimensional coordination decisions habitat elements , it appears necessary to select the means of adjacent landscape areas, heoplastyky , decorative water features, landscaping tools exterior or interior of the housing , the use of modular compositions.

Modern scholars stress the importance of information technology in the creation of an environment in which a person is a long time. Great pool for orientation and semantic- information content has plastic surface treatment of land and its individual picture elements ( decorative paving with a certain system of signs, symbols and space for relief profiling using heoplastyky to upgrade treatment plants ) [4 ].

How architectural form of the structure characteristics of the visual area is

home matching scale landscape. For example , a graphics line traced under a combination of horizontal, vertical, inclined lines in the form of the building ( roof, walls, windows etc) character lines dominate the landscape , the number of new architectural volumes , preserving the natural size and configuration of the natural space. Thus are important ways to reduce or visual camouflage house ( color, mirror glass, depending on your subject of planning the landscape ) , coordination of architectural forms with the characteristics of the landscape.

Approximate location of water and architectural residential environment allows to solve simultaneously many composite tasks , including the issue of increasing the visual impact of color plastic and features architectural forms and improving certain characteristics of the microclimate near the house.

Natural and man-made elements, modules play in the composition and role of color elements of similarity structures , community and help create a holistic way .

In Environmental Design polychrome habitat integrity is achieved through the establishment of harmonious relations between palettes elements of natural and artificial environment , taking into account the dynamics of color and natural light changes throughout the day, the season. Elements of artificial medium is preferably a group of permanent visual and informative links, while elements of the environment are a group of variable relationships.

Persistent connections provide coloristic create an overall polychrome organization uniting a large number of residential buildings , fix the main focus , maintain or create some rhythmic series.

Given that the environment performs color mainly two functions - protective and attraktyvnu , these functions are transformed to the elements of the living environment as follows: for residential development using neutral colors and nyuansni kolorospoluchennya and for items such as play equipment , small architectural forms and visual aids information - active color and contrast kolorospoluchennya .

As a means of Ecodesign , constant coloristic ties contribute to the organization of biopozytyvnyh spatial orientation that allows residents to easily identify the environment to associate yourself and your mood with a particular

place. An important condition for harmonization polychrome composition contemporary living environment is the use of taking color zoning horizontally and use a limited color palette man-made and man-made elements, including a balanced deficit ( more ) colors in the environment .

However, without diminishing the importance of color and compositional aspects of the interaction of natural , man-made and man-made elements of the living environment , it should be noted that the main conditions associated with the implementation of harmonization stylistic connections.

Ekostyl be seen as a system of criteria by which formed integral structural ties achieved eco -aesthetic environmental dialogic between the various elements of the carrier style. Convert ekostylyu environmentally harmonious way of forming the greatest possible balance of visual components associated with the necessity of improvement varied pieces of modern living environment .

The stylistic language as a sign system , is based on space- informatsinyh stereotypes endowed with a considerable number of functional orientation , cultural and symbolic meanings . It is characterized by stylistic Ecodesign broadcast ecological ideas through imagery characteristics , symbols , signs , additional compositional means of expression.

Stylistic elements are divided into defining and integrating . In ekostyli defining element performs a natural element that focuses figurative sense and demonstrates the uniqueness of a particular fragment habitat . Groups combining stylistic elements have similar compositional characteristics and determine the overall emotional content- living environment . In ekostyli unifying element are the ideological content of natural diversity and natural patterns of subordination, limited largely quantitative and qualitative relationships. The balance of static and dynamic links between defining and unifying element provides a reasonable concentration informational content .

Being in such an environment , a person receives a positive emotional weight and feel an integral part of the world.

Using stylistic language Ecodesign as a means of harmonizing the modern living environment instead of replicating stereotypical technological solutions

could facilitate movement marked a qualitatively new environment.

**Conclusions.** The general ekodyzaynerski principles : the principle of compensating for deficits natural environment , the principle of borrowing natural methods of formation , the principle of self- architectural object and principle biopozytyvnoyi informative, and local principles: the principle of adaptability residential structures, the principle of social structuring outdoor living spaces, making the principle of targeting residential cell . These ekodyzaynerski principles are realized through the techniques of the respective groups and allow targeted approach to address the issues of integrity, relevance, diversity and information content , thus provide a fundamental improvement of the studied environment at all hierarchical levels.

The main group of funds Ecodesign (natural, man-made , technological and means - relations: composition , color, style ) and vzayemobumovlenist their use can be seen as a powerful tool for enhancing the mechanisms of formation of the modern living environment with improved environmental performance .

**Prospects for further research.** It is planned to focus on identifying the features of formation of open space habitat, using techniques and tools Ecodesign.

**Literature**


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*Анотація.*

***Сазонова Ю. Екодизайнерські принципи організації житлового середовища.*** *Розглянуто загальні та локальні екодізайнерскіе принципи організації об'єктів житлового середовища, а також основні прийоми і засоби та їх роль в удосконаленні житлового середовища.*

*Ключові слова:* *екодизайн, житлове середовище , екодизайнерські принципи.*

*Аннотация.*

***Сазонова Ю. Экодизайнерские принципы организации жилой среды.*** *Рассмотрены общие и локальные экодизайнерские принципы организации объектов жилой среды, а также основные приёмы и средства и их роль в усовершенствовании жилой среды.*

*Ключевые слова:* *екодизайн, жилая среда, экодизайнерские принципы.*