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Modern trends in architecture. Green architecture as a form of efficient architecture energy

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Abstract. Our planet ecology of is constantly deteriorating, but modern architectural and design solutions can stop this process and even have a positive effect on the ecological situation. The article discusses the current idea of our time - the "green" architecture, its positive impact on man and nature, and also describes the objects relative to this concept.

Introduction

In our developing society in recent decades, the issue of preserving the environment has become serious. Modern architects started to concern their role in the environmental protection process. They began to invent the new ways how to make the already existing urban environment more environmentally friendly, because the city is a "concrete world". The concept of "green architecture" has appeared.

"Green buildings" is a term referring to energy efficient, ecological buildings where renewable energy resources are used to the maximum. In addition to this, the "green" architecture contributes to the designed buildings comfort improvement, restores the natural environment, which makes an unconditional contribution to the ecology protection and improvement on our planet.

Goals, objectives, methods of study

The purpose of this work is to examine the existing trends in the architecture aimed at improving the environmental situation in the world.

To achieve this goal, the following tasks were performed: architectural components that play an important role in the construction of ecological and energy efficient architecture were considered; the difference and positive impact of green architecture on human health and the world as a whole was revealed; the examples of modern green buildings under construction and projects under development are given.

The practical value of the study lies in the possibility of using its results as green architecture positive influence evidence on the environment.

The green building components and the "green" architecture development

The natural environment provides a person peace of mind and soul. The modern city with its high-rise buildings, cars, exhausts and haste does not at all contribute to the maintenance of inner harmony.



The development of “green” architecture began in the 70-80s of the 20th century. The reason for the development was the energy crisis, after which the Western world began to develop the idea of “green” architecture [1].

Let us consider the components playing an important role in ecological construction.

1. Energy efficiency. This is one of the key factors, it is aimed at the use of energy in the construction process, which minimizes the non-environment negative impact. The use of alternative energy sources (solar, wind, tides, etc.) helps to reduce the cost of heating, air conditioning and ventilation.

2. Non-waste production. This component is not new. It is based on the adaptation of the new function old buildings. For example, the conversion of an old factory to a museum, or public space.

3. Organic materials. Use for the organic materials construction, materials suitable for recycling or recycled materials. This mission is constantly being improved and developed.

4. Reasonable and economical use of water. There are various ways to save water. In some European cities, the method of recycling water is used, that is, the use of gray water (unpolluted water from sinks) for watering plants and for draining toilets. Possible option of the intake and use of rainwater for cooling buildings [2,3].

Nowadays, more and more new technologies are being introduced into the construction, and this is not something new. Green architecture is an energy efficient, economically and environmentally well-developed architecture, created with the efforts and interaction of landscape, engineering, and architectural solutions. At the moment, there are already developments of environmentally friendly buildings, as well as ecological cities (eco-cities), structures that minimally pollute the environment, have renewable energy sources and almost no-waste technologies.

There are already fantastic, advanced projects that prove that architecture can solve the environmental problems and keep people connected to nature. Several buildings are the example of the “green” architecture development.

1. The eco-friendliest skyscraper (Figure 1)

In China, a nature-friendly skyscraper was built. Although this country is not a leader in the field of planet protection, the Pearl River Tower office building (Pearl River tower), 300m high, is fully capable of providing itself with energy. The building is designed in such a way that the turbines suck in the maximum amount of air, the generated energy is used to power the heating and cooling building systems. Also, there are reservoirs for collecting rainwater, photovoltaic panels and mechanical facade blinds in the building (they allow to maintain the desired temperature in the rooms, as well as ventilation) [4].

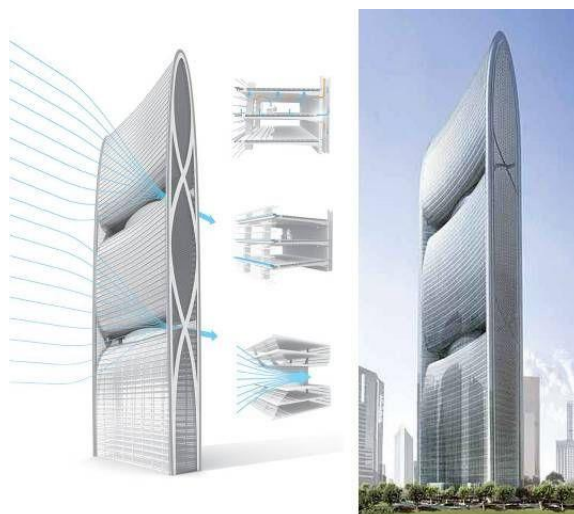


Figure 1. Office building of the Pearl River Tower, China, Guangzhou.

Thus, the building was carefully designed using natural forces to maximize its energy efficiency.

2. Gardening facades tasks.

This landscape design technique has been known since ancient times. The first mention of the vines use as vertical gardening is contained in the description of the “hanging trees of Semiramis” (one of the seven wonders of the world, 9th century BC). Landscaping consisted of stepped terraces with curled climbing roses [5]. In the modern world, vertical gardening is a common phenomenon. In Poland, the walls of the Polish Science Foundation headquarters in Warsaw are decorated with live vegetation (Figure 2). Vertical gardening is an interesting decorative solution changed with the seasons. “Live” fa-gardens regulate the temperature and are thermal insulation; reduce noise levels; provide protection from the wind and retain heat longer. The building of the Foundation of Sciences headquarters is equipped with heat pumps, wind turbines, as well as stores for collecting rainwater.



Figure 2. Headquarters of the Polish Science Foundation, Poland, Warsaw.

3. The building rain “catcher”.

In recent years, human water consumption has increased significantly. Every day, one person consumes an average of 150 liters of water, of which 85 liters can be replaced with rain water (for watering the garden, flushing toilets, washing and cleaning). The architects of the H3AR bureau have created a building project that can independently produce water for its tenants. Rain Collector Skyscraper is a green skyscraper (Figure 3). Its roof and outer shell consist of a system of gutters that collect sediment. Under the roof surface there is a reservoir in the form of large funnels, which serve as a water treatment plant. The device recycles the accumulated rainwater into usable water. Water after cleaning enters the apartment. Excess rainfall is stored in a reservoir under the building.

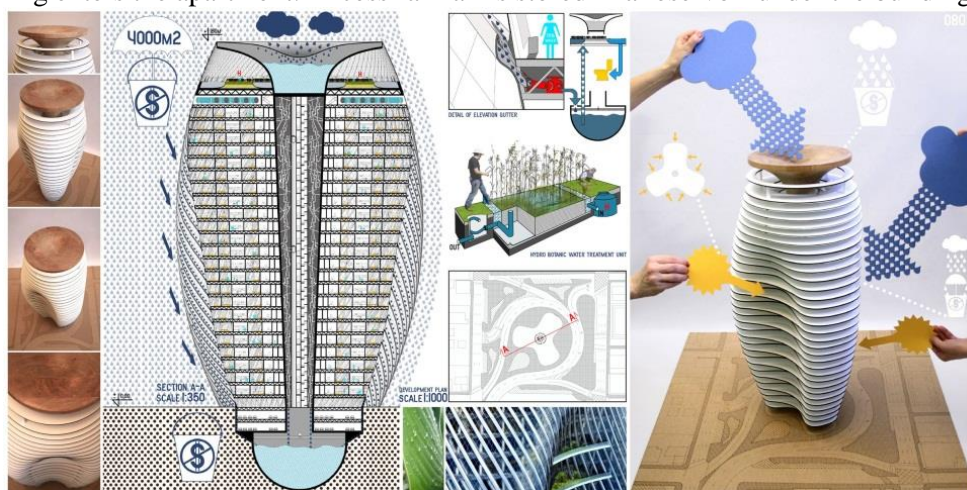


Figure 3. The skyscraper Rain Collector Skyscraper project.

Summary

As we see, humanity can solve the environmental pollution problem, and the “green” architecture aimed at interacting and abandoning the human consumer attitude to nature is definitely the concept of the future life.

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