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Reuse of building materials

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Abstract

Until recently, in Poland, the issue of ecological solutions in building industry was rather neglected by the designers. There were very few 'eccentric' architects who, from time to time, took it into account. When Poland joined the European Union the situation changed rapidly. It turned out that "eco"- attitude was so trendy that it gradually influenced different spheres of life, including the area of architectural design as well. Nowadays, architecture is developing towards fairly modern ecological solutions. The design that is nature- friendly has become fashionable and has taken a significant part in regular architect's schemes of work. In centre-spread articles of the press one can read about the expected reduction of heating costs, alternative energy sources, as well as energy- effective or 'zero- energy' homes. More and more attractive have become modern building materials which guarantee higher maintenance standards and respect the rules of sustainable development. How quickly the changes are being introduced depends vastly on the so- called ecological policy applied by the political authorities, which- with the time passing- impose on investors new duties and demands, such as more and more rigorous limits to energy effectiveness of buildings.

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1. Introduction

20th century in the world was a time of a significant civilization growth which was continuously accompanied by the growing increase in many industrial sectors. The leaders of economic expansion were: the USA, Europe and some countries of Asia. Yet, what drove the development there was an excessive exploitation of resources, as well as a relatively easy access to cheap conventional sources of energy. For decades no one cared about the possible side

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effects of that process, such as degradation of natural environment and a gradual running out of resources. The turning point on that unconscious way to destruction came with the Report by Mr. U Thant, presented at 23rd session of the U.N. General Assembly in 1969. There such problems as the oncoming global crisis as for the relationship between man and nature was signaled, with the possible dangers resulting from crossing the necessary environmental barriers. His warning saying that a global ecological disaster is likely to happen was later confirmed by the report entitled 'Limits to Growth' issued by the Club of Rome in 1972 [1].

2. Sustainable development

The idea of balanced, sustainable development was first defined in 1987, in the report entitled: „Our Common Future”, worked out by the U.N. World Commission for Development and Natural Environment. According to the report, all people would benefit from the development „which guarantees meeting the needs of current generations and does not deprive future generations of having their needs fulfilled” [2]. The document points out three main areas which affect the balance of the world economy. These are:

- Natural environment- it is necessary to use the resources consciously and carefully to prevent the degradation and irreversible changes
- Economy- economic growth and fair distribution of benefits obtained
- The society- social issues, such as: equal chances, higher living standards, etc.

With the time passing it turned out that the building sector could play an important role in all actions taken to realize the idea of sustainable development. In December 2007, the LMI- Lead Market Initiative for Europe qualified the idea of sustainable constructing as one of the six leading sectors of economy in respect of its tendency to be innovative and ready to develop quickly. To put those new solutions in the building practice was a priority task, mainly for its influence on the three areas mentioned: environment, economy and society, which are the key factors in balanced, sustainable development. Modern building objects ought to meet several demands to be regarded as balanced architecture. According to A. Vorbrod- Schurma and R. Schurma they should be [3]:

- Healthy and friendly to the users, as well as to the surrounding, which is an important social aspect
- Harmless to the natural environment, which means that preferably the materials obtained locally and secondary materials are used. The building waste should be processed and must not contaminate the environment. The emission of greenhouse gases must also be taken into account, especially carbon dioxide which provokes the global climate change most- this is an ecological aspect
- Economical, which means: done at a reasonable price, as it would be impractical to apply the strategy designed for public use but affordable only for very few users due to a high price of its realization

The building industry that meets the requirements of balanced development ought to be aimed- in all stages of the investment and maintenance process- at the minimal consumption of energy and resources, with the natural environment only minimally influenced. Innovative engineering solutions should combine beneficial economical effects with the care for the health and comfort of users, with the surrounding nature prevented from the negative impact made by any land and water engineering objects.

Sustainable building is also referred to as ecological architecture. This is strongly connected with creating building constructions through processes and with the use of materials which are environmentally friendly. According to Z. J. Boczek [4] the assumption is made that if traditional architecture combines such elements as economical aspect, utility, durability and comfort, the sustainable architecture includes ecological aspect as well. The main aim of sustainable architecture is the reduction of negative impact made by buildings on the natural environment and human health. There are also some indirect objectives, such as:

- Protection of the users' health- social benefits
- Effective use of energy, water and other commonly accessible resources- financial benefits

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