

Residential Environmental and Ecological Safety of Person

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Abstract

The article is devoted to the ex of the danger of environmental problems for the modern Ukrainian citizen, arising from the usage of some modern technologies and materials in construction borrowed from abroad. The integrated approach is proposed to solution of the "environmental purity" of materials, services and goods from the stage of extraction of raw materials to the stage of their application or operation. The term "potential environmental hazard" is proposed, the essence of which is to take into account the possible ecologically dangerous consequences from violations of technology, the usage of environmentally non-quality materials or the same technologies. It is established that the refusal to take into account the "potential environmental hazard" of certain technologies and building materials may lead to a sharp decline in the quality and safety of life for a modern person.

Keywords: *Technology, Building Materials, Environmental Hazards.*

1. Introduction

Western technologies and building materials filled our cities and villages, streets and counters, houses and Ukrainian citizens' minds. Everywhere in the conditions of new construction and reconstruction, new types of technologies and materials, that are not typical for our construction, are used. To limit or completely eliminate the danger of environmental problems for modern person, we will consider some qualitatively new, advanced and modern proposals from producers in European developed countries.

2. Relevance

The relevance of the issues raised in this article is defined by the concept of "environmental cleanliness" offered on our market for technology and materials. Nowadays, domestic manufacturers of construction

materials and products include an indicator of "environmental purity" as one of the most important in the description of their products. The issuance of relevant certificates is practiced. However, it would be a profound mistake to consider that the solution of the environmental safety problem in civil construction is reduced only to the implementation by enterprises of the established permissible levels of allocation of harmful substances to the air environment. The concept of "environmental purity" of materials and techniques and the evaluation of this indicator requires serious clarification in the light of existing research and programs in Ukraine [1, 2].

3. Scientific novelty

The scientific novelty of the research is:

- it is established that the usage of certain technologies that smoothly passed into our construction practice often does not fit our construction conditions and causes economic, moral and environmental damage (for example: a) energy-saving enclosing structures, that used in practice in countries with milder climate, lead to a significant reduction in load capacity, durability; b) the usage of insulating materials with a dubious "ecological purity" - mats or plates based on ISOVER, whose mineral particles are able to penetrate at the molecular level through gypsum boards);
- etc.

4. Materials and methods of research

Organoleptic and instrumental control of certain types of new building materials, practical participation in the design and supervision of the construction and operation of modern residential buildings, catering enterprises (bars, cafes, restaurants), industrial enterprises, culture and

leisure centers of modern profile (topless bars, sky cafe, billiard rooms, cinemas and discotheques, etc.).

5. The research results

5.1. The main stages of ensuring environmental safety in construction

Figure 1 presents the aspects, levels and main stages of solving environmental safety problems in the system of production, use and operation of building materials and civil and residential buildings constructed from them.

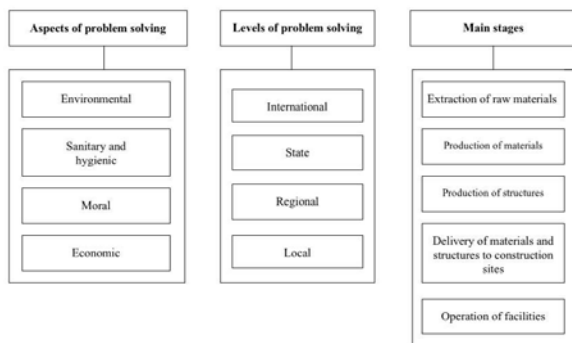


Fig. 1 The goal tree of ensuring environmental safety in the system of production, use and exploitation of building materials

There are no secondary links in each of the three branches. Environmental safety can be violated not only in the process of production of construction materials (the manufacture of reinforced concrete structures using radioactive large aggregates entails an increased background in the premises and an elevated background in the adjacent to the career from which these aggregates are obtained), but also during their use and operation.

5.2. Some examples of violations of environmental safety in construction

The most evocative example is that asbestos-cement products are produced: pipes, flat and wavy slate until now (despite the well-known harm). The usage of gypsum board systems inside buildings often leads to the fact that all rooms and corridors are transformed into music boxes with drum membranes after plasterboard decoration, often without reducing noise levels in adjacent rooms, but, in contrast, contributing to its wider distribution in the construction system.

It is known that minerals (mats or plates based on ISOVER are made of mineral raw materials) do not dissolve and, having got into the human body, one small glass particle can cause oncological diseases.

The so-called "roof boiler" brought serious environmental problems to the cities.

The quality of the flue gases, released into the atmosphere, and the fuel for boilers are strictly regulated in the European Union (for example in Germany [3]).

On our less-quality gas, the boilers "Buderus" create sound levels adjusted on a scale of "A" by 3-8 dBA above the passport characteristics [4]. But an increase of 3 dBA is a doubling of the radiated sound power, and a rise in the value of 8 dBA is the sound power increase by almost 5 times.

Modern double-glazed windows, manufactured in our semi-official production, reduce the traffic noise in the room in 10-15 dBA, while according to the passport characteristic this index is 24-35 dBA. For comparison, a conventional window with separate bindings with an open window leaf reduces noise in 8-10 dBA.

In plastic windows we can find another significant drawback: in case of low ventilation condensate falls out (sometimes in very large quantities) and stagnant zones are formed [5]. To solve these problems, there is a large selection of air conditioners, but the outdoor units create a noise discomfort to the residents of adjacent apartments. When it is hot, condensate drops are becoming into the drum battle for 24 hours a day for the downstream apartments (the drops scatter over long distances, polluting the windows, forming streaks on the walls and drumming over the window ebb). It is indicated the moral aspect of the solution of the problem here.

Another example of the emergence of the moral aspect of solving the problem of environmental safety is so large that it is impossible to ignore it. Nowadays, buildings in a monolithic reinforced concrete frame are being built everywhere on a huge number, reasonable and unreasonable. The authors made the measurements of noise characteristics of walls and ceilings.

Calculations are made for such buildings as the "Western Tower" (Vernadsky street), "Arkadievskaya Tower" (Gogol street, 22/24), the club on Korolenko street, 3, and a residential building on 8 March street (T. Shevchenko park), as well as for many designed buildings in the central part of the city Dnipro (for example, the cinema system in the multifunctional building complex on Europeiskaya, Kharkovskaya, V.Velikogo and Glinka streets).

The same problem is revealed everywhere - a sharp decrease in the noise characteristics of fences due to the transitions of air noise to structural noise. Sound energy is transmitted from the source to any point on the frame of the building. The noise insulation index R_w is below the standard in 20-30 dB at a normal rate of 50-55 dB. The actual sound insulation of the monolithic overlap at calculated levels of 45-55 dBA is 20-25 dBA [6, 7]. And this means that the tenant of any apartment, turning on a

TV or a music center at the level of 60 dBA, (which corresponds to not very loud speech), creates noise levels in adjacent apartments of 35-40 dBA, which is in 5-10 dBA higher than the night norm. There are only two solutions to deal with structural noise: 1) cutting the framework around the parameter with the creation of a damping layer (this is not the real path for our country); 2) making so-called rooms - "glass in a glass". In the volume, provided for any room, another volume is added, isolated by dampers over all planes. This solution is possible, but it is very expensive. But this can be avoided at the design stage - using another constructive solution. The list of problems that appear during the construction process and in during the operation of public and residential buildings cannot be limited by a single scientific publication. The problems solutions may become topics of several dissertations.

6. SWOT of research results

Strengths. The results of the research may help to identify at the design or reconstruction stage a "potential environmental hazard" for both the person and for the process equipment, structures of buildings, etc.

Weaknesses. The weaknesses of this research are related to the fact that the examples of this "potential environmental hazard" presented in the work are only a small part of the whole range of possible dangers and threats, and their full accounting is a very laborious process that requires a huge number of technical, economic and human resources.

Opportunities. The results of this research can be used as a promising direction for further research to outline a program of ecological certification of production technologies and usage of building materials.

Threats. Refusal to take into account the "potential environmental hazard" of certain technologies and building materials can lead to a sharp decline in quality and safety of life for a modern person.

7. Research perspectives

Currently, the reverberation chamber, which passed state certification, operates at the Department of Architecture at Prydniprovs'ka State Academy of Civil Engineering and Architecture, which makes it possible to certify building materials, products and structures for acoustic characteristics: sound insulation and sound absorption. A number of experiments have been carried out, the results of which have been partially published [5, 7] or will be presented in further publications. But acoustic researches and development are just a small part of the problem of "potential environmental hazard".

8. Conclusions

The analysis of the factors influencing on the level of the ecological situation and environmental safety of the residential environment, in the conditions of new construction and the reconstruction of residential areas, makes the following conclusions:

1. The current system of control and management of the construction process in the issue of ensuring the ecological safety of housing and the environment does not match the requirements of nowadays, which increases the significance of the problem.
2. A full and effective solution of the environmental safety problem of housing and other public places can be ensured only with an integrated approach in combination with environment protection measures both at all stages of design and construction, and at the operation stages of existing buildings and structures .
3. The solution of the problem ecological safety of residential and other public areas should become an integral part of the integrated system for managing the process of organization and functioning of industrial structures, including an integral system for managing the quality of building materials, structures and construction projects in general.
4. The development of an accounting program for "potential environmental hazards" for each person, and for technological equipment, structures of buildings and structures, etc. should become an essential part of the proposed measures of the environmental security of residential and other public areas

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