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METHODOLOGICAL ASPECTS OF THE APPLICATION OF INNOVATION TECHNOLOGIES IN THE CONSTRUCTION INDUSTRY OF AZERBAIJAN

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Introduction. It should be noted that from a technological point of view, the construction field is considered a more conservative and inertial field, and several factors influence the emergence of inertia in the said field.

The first is the historical factor. During the long history of technological development of the construction industry, various construction technologies and materials have been tested.

Secondly, the shortcomings of the technologies used during the operation of buildings and structures for many years can be identified. For this reason, builders are very careful about using new technologies and materials in construction, because they are ultimately responsible.

Third, the excessive number of small service companies, low level of integration in the field, excessive dependence on subcontractors, lack of elementary information about new products, construction materials and technologies can be cited as serious reasons.

Despite the fact that in the years of independence in the Republic of Azerbaijan, development at a fairly high rate was observed, technologically, in particular, the expected level regarding the application of promising technologies has not yet been achieved [2, p. 7–12]. Researchers point to consumer conservatism, the absence of a regulatory framework, the lack of design work executors, the fact that manufacturers of traditional building materials can still maintain their positions and reputations in the market, lack of investments as the main reasons for such a situation in the spread of innovations [1, p. 8–5].

Regardless of how conservative the construction industry is, innovations are bound to penetrate the mentioned field, and the process has already started since the early 90s. It is true that those technological innovations did not cause radical changes in the technological structure of the field, but the changes only led to a partial decrease in the cost of construction works, shortening the duration of construction works, and raising the quality of construction. Innovations in the market of building materials are mainly manifested in the production and marketing of concrete, facade and roofing, chemical building materials. In the republic, construction works with the assembly of monolithic parts were built only in a few new buildings of the city of Baku ("Flame Towers", "Crystal Hall", etc.) with materials produced in foreign countries and with the guidance and direct participation of foreign specialists, and other magnificent buildings such as the "White City" is being implemented in construction projects [3, p. 303–307].

However, it should be noted that the main part of the construction works in the republic is carried out using more traditional materials. Such a picture is especially evident in housing construction [5].

However, the process of modernization in the construction industry enterprises based on innovations in the national economy, as in all areas of the national economy, is inevitable and one of the most important goals.

Formulation of the problem. The main purpose of the research is to examine the methodological aspects of the application of innovative technologies in the construction industry of Azerbaijan. The article draws attention to the importance of solving methodological approaches for the implementation of innovation policy in construction enterprises, and suggestions are made in this direction. At the same time, the article emphasizes the importance of creating equal competition conditions among the construction sector issues, reducing the resource intensity, energy and labor costs in the production of building materials.

Main material and results. Development of the production of "green building materials" can be indicated as one of the main directions in the innovative development of production of construction industry products in modern times. Here we are talking about organizing the production of construction materials that serve to eliminate the damage to the environment and the human body. It should be noted that there are a number of main features that distinguish green building materials from other traditional building materials (Figure 1).

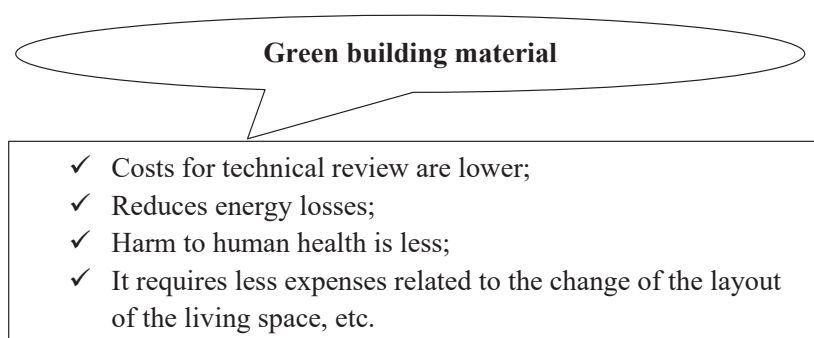


Figure 1. Main characteristics of green building materials

Source: compiled by author

As can be seen from Figure 1, the consumption of green building materials in modern times allows for the protection of human health and the environment, the construction of comfortable and quickly built apartments for people's comfortable living, as well as the construction of buildings that allow saving energy during the operation of apartments. All this is about directing the activity of the construction sector to the solution of very important tasks, the improvement of human well-being and sustainable economic development as a whole.

In general, it should be noted that applying innovations in the construction industry means applying the results of scientific and technical progress to the construction sector:

- in the field of designing – application of modern, promising projects and innovative practice-constructor works;
- in the production of construction products – the use of innovative technologies, new techniques and equipment, products, semi-finished products, various modern construction materials;
- in the field of organization and management of construction works – management of construction with progressive methods, application of new actual methods that have a positive effect on the activity of the construction process;
- increasing the quality level and competitiveness of construction products.

We must note that innovations in the construction industry play an important role in the development of the country's economy and its individual regions. First of all, the development of the construction industry is an important and integral part of innovation activity in the country. It should be stated as an indisputable fact that it is impossible to provide individual sectors of the economy with modern techniques and equipment without the construction of appropriate buildings. For example, innovations in pharmaceutical, biomedicine, space, aviation, electronic and other fields are implemented in buildings and structures. Construction practice shows that innovations in housing construction create conditions for people to live comfortably (for example, radiation-protective building panels, building materials lead to a decrease in oncological diseases). At the same time, the construction of social purpose buildings and construction facilities (schools, museums, kindergartens, theaters, cinemas, stadiums, hospitals, polyclinics, gyms and playgrounds, etc.) leads to an increase in investments in human capital and an increase in its quality.

The process of production of construction products can be accompanied by various types of activities and technological processes. For this reason, construction also has enormous opportunities for innovation:

- innovations used in designing;
- innovativeness of buildings and structures;
- new construction technologies;
- new methods of production organization;
- current methods of production management, etc.

It is important to provide all enterprises (small, medium and large) included in the construction complex with innovations in the processes of designing and implementing strategic plans. We believe that the preparation and implementation of innovations in the development of large construction industry enterprises is one of the priority issues.

In our opinion, the following methodological approaches are required to be implemented for the implementation of innovation policy in construction enterprises:

- 1) Formulation of innovation policy and coordination of activities of individual production units;
- 2) Creation of a purpose-program group for solving innovation problems – from the idea to its realization;
- 3) Preparation of innovation activity plans and programs;
- 4) Provision of financial and material resources for innovation activity programs;
- 5) Review of programs for creating new construction products;
- 6) Provision of innovation activities with qualified personnel;
- 7) Monitoring the progress of the process of development and application of new products.

Experience shows that the increase in innovation activity in the production of construction products leads to the activation of mutual relations of individual economic subjects. It includes specialized scientific-research and design institutes for construction purposes, higher education schools, enterprises producing building materials.

The following features exist in the development of innovation business in construction today:

– Purchase of technologies, materials, machines and equipment produced and prepared in foreign countries; acquisition of foreign and national patents for the production of new products. In addition to what has been said, the services of construction companies of foreign countries are used when new technologies are used in construction works;

– Preparation of innovative architectural projects in the country's construction scientific-research and design institutes. Workers and specialists are taking preparatory courses to be able to work with foreign and domestically developed technologies, innovative mechanisms and construction materials.

It should be noted that in order to stimulate the implementation of innovative economic studies in construction, an integrated information system related to innovations should be created. One of the main reasons why the innovation business in construction is still not at the desired level is the lack of a developed functional information system. For this reason, participants of innovations in the market of innovations, financing of the implemented works, etc. There is a lack of information about such issues. The main goals in the prospective development plans of building materials and the construction industry as a whole are the production of modern high-quality and competitive building materials, devices, engineering devices, equipment and materials that provide strength to the construction. In order to achieve the mentioned goals, it is necessary to carry out a number of measures, first of all, the renewal of the main production funds of the enterprises that produce building materials and the construction industry as a whole.

At the same time, it is necessary to create equal conditions for competition between the subjects of the construction industry, to reduce the resource intensity, energy and labor costs of the production of construction products. All this shortens the duration of innovation cycles in innovation projects. To achieve the above, the following conditions are required:

- conducting marketing research, demand study and advertising of producers of innovative products;
- organization of improvement of the management of construction industry enterprises and implementation of cost reduction in the production of innovative construction materials;
- active recognition of innovative construction materials produced in the Republic in the markets of foreign countries and CIS countries and gaining sales markets will lead to an increase in the volume of foreign exchange reserves in the country, as well as a decrease in the weight of products imported from foreign countries.

The study showed that the long-term progressive development of construction industry enterprises means the intensive development of all components and elements of the organizational structure of the field in question [4, p. 41–47].

Further, it should be noted that in modern times, in Japan and the United States, stable and high volumes of investments are invested in the research and development of construction technologies. Since the 1980s, Japanese construction companies have overtaken US construction companies in the construction of tunnels in soft soils, construction of intelligent bins, deep foundations and construction robotization. On the other hand, from the 1970s to the present day, construction industry investment in Japan has decreased from 20% to 15%, which researchers attribute to cost efficiency and technological development.

As it can be seen, increasing the level of innovativeness in the construction sphere leads to economic and social effects. The introduction of innovations in the construction sector in the Republic of Azerbaijan is accompanied by an increase in the volume of major construction works, the production of materials with high efficiency indicators, the introduction of new techniques and technologies in the construction sector, as well as the introduction of innovations to the management processes of the said field. The application of the achievements of scientific and technical progress in the construction sector leads to social progress and significant changes in the content of labor in material and non-material production areas.

For the development of construction complexes based on innovations, it is of particular importance to expand cooperation with foreign investors, to realize opportunities for obtaining new techniques and technologies, as well as equipment within the framework of cooperation.

It should be noted as another important issue that foreign investments affect the level of specialization and competitiveness of Azerbaijani construction companies. Innovative technologies are actively applied by investors to construction objects.

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Methodological aspects of the application of innovation technologies in the construction industry of Azerbaijan.

Methodological aspects of the application of innovation technologies in the construction industry of Azerbaijan are studied in the article. It is noted that although the construction industry of the Republic of Azerbaijan developed at a fairly high rate during the years of independence, technologically, especially regarding the application of promising technologies, the expected level has not been achieved, and still the main part of the construction works in the republic is carried out using more traditional materials. Such a situation is especially evident in housing construction. From this point of view, it is justified in the article that the production of green building materials is important and important. Here we are talking about organizing the production of construction materials that serve to eliminate the damage to the environment and the human body. In this regard, the article tried to explain the main features that distinguish green building materials from other traditional building materials. The article also shows that the development of the construction industry is an important and integral part of innovation activity in the country, and innovations in this field play an important role in the development of the country's economy and its individual regions. As a continuation of the research, the article explains the importance of solving methodological approaches for the implementation of innovation policy in construction enterprises and offers suggestions in this direction. Thus,

it is noted that in order to implement the innovation policy in construction industry enterprises, an innovation policy should be formulated and the activities of individual production units should be coordinated, a purpose-program group should be created to solve innovation problems, plans and programs of innovation activities should be prepared, innovation activity programs should be financed and material resources should be provided, programs for the creation of new construction products should be reviewed, innovation activities should be provided with qualified personnel, the progress of the process of development and application of new products should be monitored, etc. such methodological approaches should be resolved. At the same time, the article argues that creating equal conditions for competition between subjects during the implementation of innovations in the construction industry will reduce the resource intensity, energy and labor costs of the production of construction products. In general, research was conducted on the problems mentioned in the article in Azerbaijan, results were obtained in this direction and suggestions were made.

Key words: construction, industry, material, production, innovation, technology, methodology, green building material.

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Гасимов Руслан Іскандер огли, докторант, Азербайджанський університет будівництва та архітектури.
Методологічні аспекти застосування інноваційних технологій в будівельній індустрії Азербайджану.

У статті досліджено методологічні аспекти застосування інноваційних технологій у будівельній галузі Азербайджану. Зазначається, що хоча будівельна галузь Азербайджанської Республіки за роки незалежності розвивалася досить високими темпами, технологічно, особливо в частині застосування перспективних технологій, очікуваного рівня не досягнуто, і все ж основна частина будівництва в республіці ведеться з використанням більш традиційних матеріалів. Особливо яскраво така ситуація спостерігається в житловому будівництві. З цієї точки зору в статті обґрунтовується, що виробництво зелених будівельних матеріалів є важливим і важливим. Тут мова йде про організацію виробництва будівельних матеріалів, які служать для усунення шкоди навколишньому середовищу і організму людини. У зв'язку з цим у статті зроблено спробу пояснити основні особливості, які відрізняють зелені будівельні матеріали від інших традиційних будівельних матеріалів. У статті також показано, що розвиток будівельної галузі є важливою та невід'ємною частиною інноваційної діяльності країни, а інновації в цій сфері відіграють важливу роль у розвитку економіки країни та її окремих регіонів. У продовження дослідження в статті пояснюється важливість вирішення методичних підходів для реалізації інноваційної політики будівельних підприємств та пропонуються пропозиції в цьому напрямку. Так, зазначається, що для реалізації інноваційної політики на підприємствах будівельної галузі необхідно сформулювати інноваційну політику та координувати діяльність окремих виробничих підрозділів, створити цільово-програмну групу для вирішення інноваційних завдань, планів та мають бути підготовлені програми інноваційної діяльності, фінансування програм інноваційної діяльності та забезпечення матеріальними ресурсами, перегляд програм створення нових будівельних продуктів, забезпечення інноваційної діяльності кваліфікованими кадрами, хід процесу розвитку та слід контролювати застосування нових продуктів тощо. такі методологічні підходи повинні бути вирішені. Водночас у статті стверджується, що створення рівних умов конкуренції між суб'єктами під час впровадження інновацій у будівельну галузь дозволить знизити ресурсоємність, енерго- та трудовитрати виробництва будівельної продукції. Загалом в Азербайджані проведено дослідження зазначених у статті проблем, отримано результати в цьому напрямку та внесено пропозиції.

Ключові слова: будівництво, промисловість, матеріал, виробництво, інновації, технології, методологія, зелений будівельний матеріал.