

*TERRITORIAL ORGANIZATION OF THE CONSTRUCTION MATERIALS INDUSTRY AND PROBLEMS OF
MODERN DEVELOPMENT OF THE BANKING ECONOMIC REGION OF AZERBAIJAN*

Aim. Baku economic region consists in collecting and processing the collected material on the current socio-economic state of the territorial organization of the building materials industry and improvement, assessing the level of potential, identifying opportunities for future development, and preparing appropriate recommendations.

Methods. During the study, comparative, statistical, mathematical analysis, the method of a systematic approach and personal observations of the authors were used.

Results. As a result of the analysis of the territorial organization of the building materials industry and the problems of modern development, the following conclusions were made: For the first time, in modern conditions, on the basis of statistical data and observation materials, an analysis of the territorial organization of the building materials industry and an assessment of the level of development from an economic geographical point of view. It was revealed that the construction industry uses a lot of wood, fittings, glass, faience, sanitary ware and other products that are imported from foreign countries, and such an important industry should be exempt from customs taxes, and or on preferential terms, their importation should be taken under control and guardianship of the state. - A significant part of the stone and sand quarries located in the vicinity of the city of Baku was distributed or sold to the population. Due to population growth and the expansion of the city's neighborhood, it is necessary to pay special attention to the construction of high-rise residential and government buildings in the suburbs of the city. One of the main factors that create the problem of ecological tension in the city of Baku are stone quarries located in the suburban settlements of Garadagh, Guzdek, Turkan, Zire, Mashtaga, etc., which produce sawstone and sand used at the construction sites of the city. The implementation of recycling measures at these sites is beneficial not only for the sources of building materials, but also for the protection of the coastal resort and tourist area.

Key words: Territorial organization, stocks of raw materials, construction industry, reinforced concrete structures, natural and economic factors.

Introduction. In Azerbaijan, a significant part of the demand for raw materials is created in the construction and building materials industry. This is one of the global tasks that covers not only Azerbaijan, but also many countries of the world. The main reason for this is population growth, urbanization, industrial expansion and global economic growth. In the world, about 50% of the total use of raw materials and 36% of energy use is accounted for by the construction industry [8; 11]. Therefore, global climate change requires the inclusion of this sector as the main, leading sector. According to UN forecasts, by 2050 the world's population will amount to 9 billion people and out of 3 people, 2 people will live in the city. In addition, the current population growth rate is expected to increase from 2 billion to 4 billion by 2030 [10,14]. And this, in comparison with previous years, increases the need for construction. The construction industry in the economy of the republic is the largest consumer of natural resources and energy. Construction products, in comparison with other sectors of the economy, have a long technical service life and if they are sent for recycling after destruction, then an economic result is possible. The construction industry products, which consist of construction and fragmentation waste, and the annual need for construction resources in the world is 50%, keeps the environment, its natural resources and ecosystem under high stress. On average, it is estimated that 1.68 kg of construction waste and debris per 1 person per day and they can be used as a construction material of the second category [12].

The construction sector for the implementation of a circular economy strategy with high potential, consisting of three sectors, is known as one. The principle of circular economy (CE) in the construction industry is the use of durable materials, increasing the maximum recovery of materials and preventing the formation of unnecessary waste and their emissions into landfills.

The Baku economic region occupies an advantageous geographical position, being one of the important industrial centers in the South Caucasus, the pace of dynamic development of existing industrial enterprises, complexes of building materials dictates the correctness and efficiency of the territorial organization. It should be noted that the Baku Economic region occupies an important place in the overall balance of mineral reserves, in terms of the diversity of composition and volume of reserves in the industrial production of the country. This region, being the center of the construction sector, is also rich in construction raw materials. No matter how well the region is provided with building materials, imported products still prevail in construction and in stone quarries, when the rock is split, there is no suitable material that is not used. However, the waste collected here at the stone quarries (in the place of non-metallic building materials) can be successfully used in the production of reinforced concrete products and structures. It should be noted that reinforced concrete products made on their basis are inexpensive.

Materials and methods. The theoretical basis of the scientific work consists of a number of directives of the "State Program of Socio-Economic Development of the Regions of the Republic of Azerbaijan", stock

materials of the SCAR, the Institute of Geography, Geology and Geophysics of ANAS, research, leading scientists of foreign countries and the UN, literary materials and practical recommendations. During the study, comparative, statistical, mathematical analysis, the method of a systematic approach and personal observations of the authors were used.

Analysis and discussions. The area of the Baku economic district is 2.14 thousand km², the population is more than 3 million people, it includes 12 districts – Binagadi, Khatai, Khazar, Garadagh, Narimanov, Nasimi, Nizami, Pirallahi, Sabunchu, Sabail, Surakhani and Yasamal. The economic region is located in the east of the country, on the western shore of the Caspian Sea, occupies an advantageous economic and political–geographical position. In the socio–economic development of this region, along with the branches of heavy industry, the leading place is occupied by the production of building materials. The building materials industry, along with providing products to the main divisions of material production, create great opportunities for harmonious reality in capital construction. Enterprises producing construction materials are forced to give preference to innovative mechanisms and strategies in their activities. In Azerbaijan, a conditional factor in the production of building materials in the creation of innovative new products advanced systems based on this technology and to establish a network of enterprises that produces an industry need to develop new machines, technologies, knowledgeable and advanced products. The main goal here in the production of building materials is to identify relevant areas that meet modern requirements and standards, as well as to implement scientific and technological achievements. The organization of innovative production of building materials depends mainly on the modernization of traditional consumer goods that meet international standards. From this point of view, the main responsibilities of enterprises producing building materials include:

- implementation of the production modernization program;
- improvement of the production program;
- increasing the production of energy efficient and resource saving products.

Manufacturing enterprises are interested in reducing costs to a minimum and effectively using resource-saving and low-waste raw materials in the production of building materials to increase profits. The analysis of statistical indicators shows small innovative moves at local manufacturing enterprises. Because there are certain difficulties for the organization of innovative production.

Factors creating difficulties:

- insufficient financial provision of industrial enterprises producing construction materials;
- small innovative potential in enterprises;
- the use of innovative techniques and methods require large expenditures;
- problems with specialists, insufficient communication of similar construction companies and research centers;
- insufficient financial assistance from the state for the implementation of innovative activities;
- limited information on the use of new technologies in the innovative production of building materials, consumer conservatism towards new generation products, lack of a legislative framework for regulating the production of innovative building materials, high risk, innovation costs are long-term returns.

From the demonstration of professional services in construction raw materials and products, building materials and components, project management and design, to physical work on the slab, which covers the entire construction process, it is called economic activity [15]. From this point of view, economic activity divides construction into three economic sectors:

- the first sector provides for the extraction of natural raw materials;
- the production of building materials and components and the use of them in construction provides for the second sector;
- both project management and the provision of engineering and design advice covers the third sector [16].

With this approach, the construction process begins even earlier. Thus, the construction industry, from planning, design, control and management to the main contractor and builders performing work on the sheet, covers all professional employees of the company and organizations in the construction process. In this respect, project management, planning and design, and off-site production of building materials and equipment do not cover all services. Such a definition of a typical sample of “Qualification of economic activities” can be seen in statistical materials [7]. According to this qualification, in addition to construction, architectural and engineering activities and project management for the production of building materials, different types of categories are given. Accordingly, only workers working in the construction industry define them as the labor force of the construction industry [17].

In Soviet times, Azerbaijan was the first in the South Caucasus in terms of the volume of construction materials produced [2]. The share of the Baku Economic District accounts for about 78% of construction works carried out by contracting organizations of the Republic. Of the total cost of 9778.8 million manats of

Azerbaijan's construction work, 78% or 7678.6 million manats falls on the share of the Baku economic region. In the economic region, the volume of total construction works in 2015 amounted to 5823.9 million manats, in 2020 this figure increased by 24.2% to 7678.6 million manats. According to statistics, in 2020, 1901 construction enterprises operate in Azerbaijan, of which 1251 are located in the Baku Economic Region [3]. In the economic region, each enterprise has construction and installation works in the amount of 6.1 thousand manats. This amount includes construction and installation works (new construction, expansion, reconstruction), major repairs, and other works and services.

In the region, the area of commissioned residential buildings in 2019, compared with 2015, increased by 23 times, the number of construction enterprises by 22.1%, fixed assets commissioned by 21.5% and over the past 15 years, the number of jobs has increased 6 times and there is a reduction in investment in fixed assets and construction and installation work [4; 1].

Currently, dry building mixes predominate in the production of construction products, including gypsum products, waterproofing glue for tiles and broom, thermal insulation mixtures for masonry, decorative and simple plaster extinguished lime, dextrin paint, bricks, etc. products. Some of these products are exported outside the republic. In 2020, compared to 2016, exports of salt, sulfur, soil and stone, lime, cement, stone gypsum, asbestos mica, ceramics and glass products increased by 4 times; ceramic products by 21.6%. Azerbaijan cooperates with the Russian Federation, Georgia, Poland, Italy, Belarus, Indonesia and other countries in the export of construction materials [1; 4].

Table 1 shows that in the Baku Economic Region in 2020 compared to 2015, there is an increase in the production of cement by 19%, lime by 40%, prefabricated concrete building structures by 2.5, mixed concrete for masonry by 2 times, and in the production of pebbles, crushed stone, small river stone, limestone, there is a decrease in production [3; 6].

Table 1.

Production of the main types of building materials, products and structures in the Baku Economic Region

<i>Production of the main types of building materials, products and structures. Types of building materials.</i>	<i>2010</i>	<i>2015</i>	<i>2020</i>	<i>2015 compared to 2010 (% %)</i>	<i>2020 compared to 2015 (%%)</i>
Cement, thousand m	1202,0	2484,7	3051	+ 2 times	+19
Lime, thousand m	–	17341,1	28669,7	–	+40
Pebbles, crushed stone, small river stone, thousand m	–	211,1	156,5	–	–26
Limestone, thousand m	–	299,6	233,0	–	–22,2
Assembly of building structures made of concrete m ³	32,3	13,1	32,5	– 3 times	+ 2,5 times
Concrete mix for masonry, thousand m	–	645,1	1510,3	–	+ 2 times
Asphalt, thousand m	653,3	206,9	196,9	– 3 times	+ 4,6

Baku economic region ranks first in the republic in terms of the volume of drifts and exploitation of saw stone. The cube stone is obtained mechanically from the rock, and therefore it is often called a saw stone. The distribution area of wall stone is associated with Tabashir and Biogenic deposits. The breadth of the geographical distribution area of wall stone, proximity to railways and highways, to large settlements, resistance to frost, in comparison with other building stone, create conditions for its widespread use. The thickness of the limestone represented on the Absheron reaches 55 m. There are about 40 quarries in the Baku Economic Region to meet the need for dusty stone: Garagishlaq (total reserves 784 thousand m³), located 2.8 km northeast of the Ghizildash village, Buzovna (total reserves 184 thousand m³) 1.5–2.0 km South-West of the Buzovna village, Kuakli Burun (total reserves 46.7 million m³) 35 km southwest of Baku city, Urunus (total reserves 536 thousand m³) located on Chilov, Chukhur-aghil (total reserves 726 thousand m³) 4–5 km west of the Garadagh stone quarry, Tapdiq (total reserves 301.4 thousand m³) 4 - 5 km northwest of the Ghizildash village of the Garadagh district Western Garadagh (total reserves of 2.4 million m³) 3.0–3.5 km west of the Garadagh stone quarry, Mashtaga (total reserves 4.1 million m³) 2–3 km southwest of the Mashtaga village, Zire (total reserves 611 thousand m³) 40 km west of the city of Baku. We must say that almost 90% of these deposits are exploited [5; 18].

Table 2 [18].

Deposits of limestone (sawstone) of the Baku Economic Region

№	Name of the deposit	Location	a) type and degree of minerals b) the content of useful components c) calculation of the depth of the deposit d) maximum depth of use	Stocks thousand m ³
				A+B+C
1.	Guzdek	12 km west of Baku	a) limestone M-50-100 b) CaCO ₃ – 40-95% c) 12-22 m d) 5-6 m	16845
2.	Shahinbakh	12 km southwest of Baku	a) limestone M-75-100 b) CaCO ₃ – 85-95% c) 10,6-16,6 m d) 14-15 m	
3.	Shuvelan	3 km northwest of the Shuvelan village	a) limestone M b) CaCO ₃ – 90-96% c) 11 m d) 9-10 m	1632
4.	Nardaran	3 km north of the Nardaran village	a) limestone M-50-100 b) CaCO ₃ – 81-96% c) 18 m d) 12-18 m	2448,2
5.	Qaradagh – I	38 km northwest of Baku	a) limestone M-50-100 b) CaCO ₃ – 92-87% c) 8-17 m d) 14 m	
6.	Karvan Saray	49-56 km southwest of Baku	a) limestone b) CaCO ₃ – 94% c) 20 m d) 3-5 m	8140,9
7.	Turkan – I	1-1.2 km to the northeast from the Turkan village	a) limestone M-150 b) CaCO ₃ – 91% c) 7-8 m d) 2 m	1939
8.	Garadagh II	Garadagh district of Baku city	a) limestone b) 87,3-89,72 c) 30 m d) 20 m	23163
9.	Turkan – II	30 km east from Baku	a) limestone b) 2,1 m	9990
10.	Atbulag – I	6-6.5 km southwest of the railway stan. Atbulag	a) limestone	4053
11.	Atbulag – II	6 km southwest of the railway station Atbulag	a) limestone	618
12.	Sangachal	14-15 km east of the railway station Sangachal	a) limestone b) CaCO ₃ – 90%	5069
13.	Chapilmish	18 km northeast from station Sangachal	a) limestone M-50	2471

14.	Ghazanaq	40 km to the east from Baku	a) limestone M-35-100	2781
15.	Vulkan	15 km northwest from the Sahil village	a) limestone M-50-75	1318
16.	Garagishlag	2.8 km northeast from the village Ghizildash	a) limestone M-50	784
17.	Buzovna	1.5-2 km southwest of the Buzovna village	limestone M-50	184
18.	Urunus	Chilov Surakhani district	a) limestone	536
19.	Kulakli Burun	35 km southwest of Baku	a) limestone	4673
20.	Chukhur-aghil	At 4.5-5 km west Garadagh stone quarry	a) limestone M-50-75	726
21.	Plato	15-20 km southwest of Baku	a) limestone M-75	567,1
22.	Tapdiq	4-5 km north-west Ghizildash settlement, Garadagh region	a) limestone M-50-75	301,4
23.	Western Garadagh	3-3.5 km to the west. from the Garadagh stone quarry	a) limestone M-50-75	2356
24.	Zire	40 km west of Baku	a) limestone M-30-50	611
25.	Mashtagha	2-3 km southwest of the Mashtaga village	a) limestone M-35-75 b) 20 m c) 15 m	4071
26.	Hajibeyli	30 km to the north-east Pirsaat station	a) limestone M-100-125 b) 2-12 m	4749

Limestone is widely used as a facing stone in the construction of the city of Baku. However, not all limestone deposits meet this goal. The location of Gulbakht, consisting of gently grained sediments, corresponds to this goal. This deposit contains high-quality limestone that has not lost its natural color for decades. The deposit is located in the Garadagh district, 23 km west of the city of Baku. Facing plates have been produced here for a long time.

Baku Economic Region has a rich raw material base for the creation of a cement industry that produces various types of cement that meet not only the needs of the republic, but are also exported to other countries. Garadagh Cement Plant is one of the largest plants in the Baku Economic Region. Clay, gypsum, pumice stone, limestone, sand, pebbles, etc. are used as raw materials at this plant. This cement plant is provided with limestone from the Garadagh deposit with a total reserve of 156 million meters located 8 km from the plant, and the Shahgaya deposit located 36 km northwest of the Garadagh deposit.

Clay is used in various industries: in construction, in the production of miniature ceramics, heat-resistant materials, cement, bulk materials, purification of petroleum products, etc. goals. There are clay reserves everywhere in the republic. This clay is mined for the production of bricks, tiles, pottery. There are large reserves of clay. 82 clay deposits are being developed out of the total clay reserves of 154.5 million m³ in Azerbaijan. There are enough deposits of sea clay within the Baku Economic Region. The clay of the Zigh deposit and the Ghizildash branch is of high quality and has industrial significance. The Garadagh brick factory, with a total area of 5 hectares with a production capacity (depending on the grade), produces 150-200 m (20-45 thousand pieces) of bricks daily, occupies a leading place in Azerbaijan and produces high-quality bricks. In order to ensure long-term quality and prevent environmental pollution, the extracted clay is delivered to a special site. To increase productivity, systematic preference is given to the use of new technologies. Finished products are sent to all regions of the republic. This plant uses raw materials from the southwestern branch of the Ghizildash clay deposit. Solid buildings built of brick, which is a traditional building material, most regions of the country are a vivid example of the productive use of this type of building materials in many places. In all regions there is a great need for the organization of production of various types of bricks.

Conclusion. The article is devoted to the territorial organization of the building materials industry and the problems of modern development of the Banking economic region. A study of the methodological basis of

the territorial organization of the building materials industry has been conducted and tables have been prepared based on statistical data. The analysis of natural and economic factors affecting the territorial organization of the construction materials industry and stocks of construction raw materials in the economic district is given. Along with the analysis of the current state and prospective development of the construction materials industry of the studied area, the main goals and objectives were achieved.

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