Nəticə. Qeyd edilənləri yekunlaşdıraraq aşağıdakı nəticələri çıxarmaq olar:
-Tikinti və istehlak bazarlarının tədqiqatı ümumi metodologiyaya və məntiqə söykənməklə eyni sxem üzrə aparılır;
-Bu zaman tikinti bazarının tədqiqinin özünəməxsus xüsusiyyələri və mürəkkəblikləri olur ki, onları aşağıdakı mərhələlər üzrə lokallaşdırmaq lazımdır:
- Problemin müəyyən edilməsi və məsələnin qoyuluşu mərhələsində tədqiqatçıların əvvəllər qarşılaşmadığı bazarlar üzrə xüsusi informasiya tələb olunur.Bu halda sahə ekspertləri ilə müsahibələr və təkrar istifadə olunan məlumatlar daha mühüm əhəmiyyət kəsb edir;
- Məlumatların toplanması formasının hazırlanması mərhələsində peşəkar terminologiyaya xüsusi diqqət yetirmək lazımdır, çünki çoxvariantlı seçim məsələlərində peşəkar terminlərin istifadə olunması onları respondent üçün anlaşıqlı edir, onun vaxtına qənaət edir və məlumatların emalını və təhlilini asanlaşdırır.
- Seçim quruluşunun müəyyənləşdirmək üşün rəsmi mənbələrdən əldə edilmiş məlumatlardan istifadə olunması ilə əlaqədar olaraq yarana biləcək səhvlərdən qaçmaq vacibdir.Yaxşı olar ki, təşkilatların öz məhsullarını təklif edərkən verdikləri daha səhih informasiyaya malik olan məlumat bazalarından və kommersiya sorğu kitabçalarından istifadə olunsun.
- Məlumatların toplanması mərhələsində bazar ekspertlərini tədqiqatda iştirak etməyə inandırmaq kifayət qədər mürəkkəb məsələ olur. Cavabların çoxalması faizinin artırılmasının pullu və pulsuz metodlarından (ekspertin mükafatlandırılması, əvvəlcədən xəbərdarlıq, yada salma) istifadə etmək məqsədəuyğundur.

Ədəbiyyat

1. Kotler F. 2016. Marketinqin əsasları. Bakı, 43s
2. Xeyirxəbərəov İ.M., 2015. Marketinq tədqiqatları Bakı, s.47
3. Olivier Blanşard. Makroiqtisadiyyat. Qlobal nəşr. VII nəşr. s.487
4. O.N.Aras., E.Süleymanov. 2016. Azərbaycan iqtisadiyyatı. s.412 Bakı
5. Ağayeva K.A., Qənbərov Ə.Ş. 2020. İnşaatda marketinq. s.267. Bakı
6. Ансофф И. 2019. Стратегическое управление. Москва. Экономика
7. Aghayeva, Konul, Sivitska, Svitlana. 2023. Building Information Modeling-As a Way of Increasing Competitiveness of Construction Companies in Azerbaijan. Lecture Notes in Civil Engineering.Volume 299, Pages 623–629. 4th International Conference on Building Innovations, ICBI

References

1. Kotler F. 2016. Fundamentals of Marketing. Baku, 43 p
2. Kheyirkhabaraov I.M., 2015. Marketing studies Baku, p. 47
3. Olivier Blanchard. Macroeconomics. Global edition. VII edition. p. 487
4. O.N. Aras., E. Suleymanov. 2016. Economy of Azerbaijan. p.412 Baku
5. Aghayeva K.A., Ganbarov A.S. 2020. Marketing in construction. p. 267. Baku
6. Ansoff I. 2019. Strategic management. Moscow. Economics
7. Aghayeva, Konul, Sivitska, Svitlana. 2023. Building Information Modeling-As a Way of Increasing Competitiveness of Construction Companies in Azerbaijan. Lecture Notes in Civil Engineering.Volume 299, Pages 623–629. 4th International Conference on Building Innovations, ICBI

Məqaləyə istinad: Ağayeva K.A Tikinti məhsulları bazarının marketinq tədqiqatı üçün informasiya mənbələri. Elmi əsərlər/ Scientific works, AzMİU, s.185-188, N2, 2024
For citation: Aghayeva K.A. Sources of information for marketing research of the construction products market. Scientific works/ Elmi eserler. AzUAC, p.185-188, N2, 2024

Redaksiyaya daxil olma/Received 18.1.2024
Çapa qəbul olunma/Accepted for publication 18.3.2024

http://doi.org/10.58225/sw.2024.2-189-194

SOME FEATURES OF CONSTRUCTION MATERIALS AND STRUCTURES APPLIED IN BAKU

Akbarova Samira Misirkhan- PhD in tech.sc., ass.prof., department Construction of engineering systems and facilities, AzUAC, samira.akbarova@azmiu.edu.az

Abstract. Modern construction materials make it possible to solve the most complex construction problems, simplify the installation process and speed up the construction time of buildings and facilities. In the humid climate of Baku, it is necessary to carefully select building materials and structures. Insufficient consideration of the physical and thermal properties of building materials for the specific climatic conditions of the construction area leads to the creation of uncomfortable living, working and resting conditions for people in buildings. The author examined the main factors influencing the choice of enclosing structures during the construction of multi-storey buildings in Baku, taking into account the characteristics of the local climate,
Keywords: building, construction materials, physical properties, building envelope, outer wall structure

BAKIDA TƏTBİQ EDİLEN İNŞAAT MATERİALLARININ VƏ KONSTRUKSTURLARININ BƏZİ XÜSUSİYYƏTLƏRİ

Əkbərova Samirə Misirxan qızı- t.e.n., dosent, Mühəndislik sistemlərinin və qurğularının tikintisi kafedrası, AzMİU, samira.akbarova@azmiu.edu.az

Xülasə. Müasir tikinti materialları ən mürəkkəb tikinti problemlərini həll etməyə, quraşdırma prosesini sadələşdirməyə və bina və qurğuların tikinti müddətini sürətləndirməyə imkan verir. Bakının rütubətli iqlimində tikinti materiallarını və konstruksiyalarını diqqətlə seçmək lazımdır. Tikinti sahəsinin spesifik iqlim şəraiti üçün tikinti materiallarının fiziki və istilik xüsusiyyətlərinin kifayət qədər nəzərə alınmaması binalarda insanlar üçün narahat yaşayış, iş və istirahət şəraitinin yaradılmasına səbəb olur. Müəllif Bakıda çoxmərtəbəli binaların tikintisi zamanı qapalı konstruksiyaların seçilməsinə təsir edən əsas amilləri yerli iqlimin xüsusiyyətlərini nəzərə alaraq,
Açar sözlər: bina, tikinti materialları, fiziki xassələri, bina zərfi, xarici divar quruluşu

Introduction. Baku is known for its hot climate- up to +42°C in the shade, and strong winds- up to 40 m/se). An important role in discomfort sensations is played by high relative air humidity, which is 70-80%, the norm is 50-60%, and at elevated temperatures - 30-40%. Daily, in Baku in summer 8- 9^{o}C, in winter 4-5^{o}C and annual 21,5-22,9^{o}C amplitude of air temperature fluctuations is of great importance for enclosing structures of buildings and constructions. It is also necessary to take into account the area where the construction object is located, as due to macro- and micro-scale climate-forming factors: radiation conditions, wind regime, meso- and micro-relief form, vegetation, soil, close proximity to the Caspian Sea, surrounding buildings, etc. and their combined effect in different areas of the city the difference in temperature and humidity can be significant [1,2].

According to the conducted field studies, relief modeling scheme, as well as the scheme of insolation and aeration of the Baku amphitheater, zoning scheme by the main types of buildings, According to this scheme, the territories with the highest temperature indices are located in the middle part of the city, as well as on the territory of Binagadi [3,4]. The territories with the lowest temperature are located at high points of the city, as well as on windward shady slopes - these are the south-eastern and eastern slopes of Patamdar, Zikh ridges, Yasamal valley, northern edge of Baku amphitheater [5,6]. As can be seen from the scheme, the western slopes of the amphitheater protect the central zone of the city from overheating by shading it from the scorching rays of the sun. The north wind plays a certain role in cooling summer temperatures, as well as the city's amphitheater location, which allows

the north wind to flow almost unimpeded down the city's slopes.

Humidity on the territory of Baku has a zonal character and is pronounced in the coastal part of the city, on leeward shady slopes, as well as near the lakes of Beyuk-Shor, Haji-Gasan, Zykh and Byul-Byul. On the windward slopes of the city - western slopes of Yasamal valley, Patamdar upland, Zykh ridges- the lowest humidity is observed. The given scheme of zoning by humidity conditions is modeled on the basis of the schemes of relief modeling, wind conditions, as well as the scheme of thermal conditions of Baku and the scheme of landscaping of the territory of Baku.

Methods. Studies of changes in air temperature and humidity, as well as wind conditions are the initial information for the calculation of physical parameters used in the conditions of Baku enclosing materials and structures without their deformation and destruction in the course of the operation. The comfort level of the occupants of these buildings must be taken into account. One of the factors determining the physical parameters of enclosing materials (Fig.1) and structures (Fig.2) is their thermal conductivity. It is known that the denser the material, the more heat conductive it is, which is unacceptable for exterior building envelopes in hot or cold climates. In turn, a thick wall, even of dense material, can slow down the heat transfer process [7,8]. Therefore, to reduce the transfer of high temperatures from one side of the wall to the other, the heat transfer coefficient must be reduced in one of two ways: by increasing the wall thickness or by using materials with lower thermal conductivity and higher resistance. The first method was used in ancient times by almost all peoples of hot regions [9,10]. They built massive walls of mud or raw brick. In modern urban planning, the second method is more commonly used - walls are made up o f several materials to provide desirable thermal and aesthetic characteristics. Insulation with low-density material or an air cavity reduces thermal conductivity.

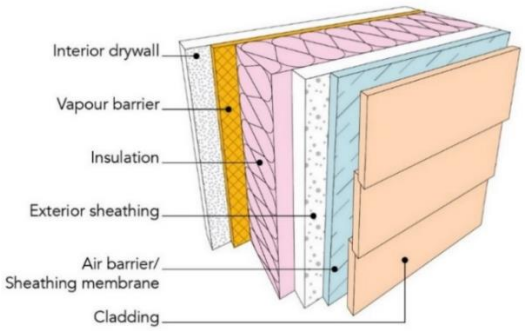

Figure 1. Scheme of outer wall structure of building [9]

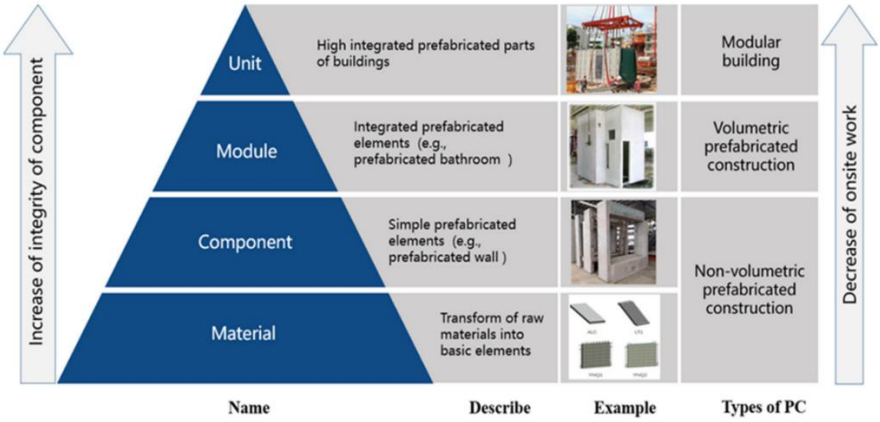

Figure 2. Prefabrication structures [9]

Results and discussion. Scientific research has established that in hot regions, the heat transfer coefficient for an external wall should be approximately 1.27W/ m^2 ^oC in order to achieve an adequate

thermal resistance. Experiments have proven that it is the brick wall that is the most acceptable material to achieve thermal comfort and also the most common. It has a thermal resistance 13 times higher than the thermal equilibrium of a ready-mixed concrete wall [11].

The invention of reinforced concrete opened up a new era in which traditional architectural forms and methods as well as building materials were very soon forgotten. However, along with the ease and speed of construction work, concrete brought many problems in terms of creating comfortable microclimatic conditions. Prefabricated concrete structures in their pure form are unacceptable in both hot and cold climates because they have little thermal resistance [12].

For an external concrete wall to have a heat transfer coefficient of 1.27W/ m^2 ^oC, it must be at least 1.0 m thick. In the construction of low-rise buildings, this is possible, although economically unprofitable. When erecting multi-storey buildings, such masses of buildings will carry additional load on the ground, which is unacceptable in seismically active areas, and uneconomical. It follows from this that in the hot climate of Baku reinforced concrete without insulating cladding or layer is not suitable for construction of residential buildings and structures as external enclosing structures of multi-storey buildings.

However, today in Baku mainly multi-storey buildings (external walls) are constructed of concrete without insulation. When preparing concrete mixture for construction purposes, technological processes are also very often violated, which leads to a decrease in concrete strength, deterioration of pore structure, reduction of durability and flaking of the outer layers of the concrete structure (Fig.3).

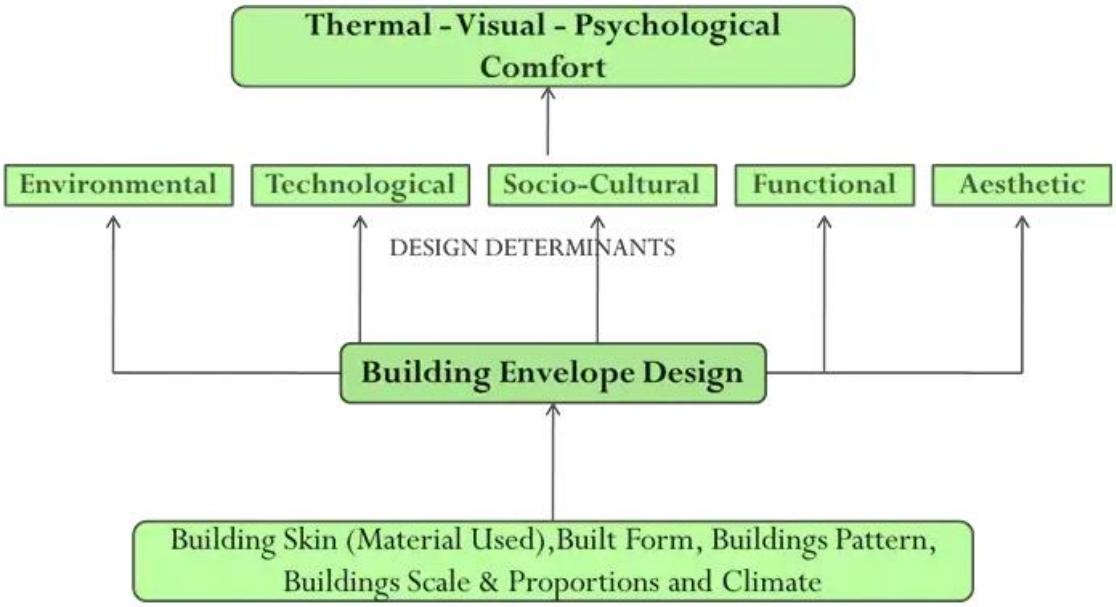

Figure 3. Design determinants for building envelope [11]

In low-rise construction in Baku, the main local building material is limestone-cubic limestone. However, 40-cm walls are not able to effectively resist both summer overheating and winter cold. That is why the width of external walls in old buildings of the central zone of Baku reached 0.8-1 m. Today, to reduce the thermal conductivity of external walls it is necessary to put an insulator (foam, air layer, etc.) between two layers of masonry. In the construction of residential and public buildings, new technologies and building materials are increasingly used. At the same time, the necessary research is not conducted to identify the impact of this know-how on the environment and people's well-being. Nor are new materials tested for endurance in given climatic conditions. For example, in Baku, the envelope structures function in a rather rigid mode, experiencing the influence of significant temperature fluctuations. Therefore, in order to avoid deformations and destruction (as a result of geometric dimensions drift caused by temperature fluctuations) it is very important that materials

combined in a common construction have close coefficients of thermal expansion.

With intensive construction of residential areas of Baku with multi-storey buildings, heat, moisture and vapor barrier materials for external walls are practically not used here, which leads to high energy consumption of the building and formation of unhealthy microclimate in the room. In this case, it is advisable to use composite materials with insulation in layers or apply insulation on the inside of the wall. This will increase the construction costs, but they will pay off very soon during operation [12].

In regions with hot, humid climates, a lot of money is spent every year to eliminate various problems caused by the negative effects of moisture. Moisture in the air inside the building penetrates into the wall structure and condenses as it cools to a temperature below the dew point. The amount of moisture formed is greater the higher the difference between the outdoor and indoor air temperature is, so in winter time moisture accumulates in the material of building envelopes quite intensively and is the cause of fungi growth and spreading, mold formation, rotting of wooden structures, reduction of thermal resistance of building envelopes.

Proper design and construction of exterior walls of residential buildings (Table 1) in Baku reduces the risk and makes them more resistant to moisture, especially in areas with the highest humidity - these are primarily the coastal part of the city, a s well as areas near lakes. In this case, condensation control strategies include limiting air leakage, using adequate types of thermal insulation, reducing cold spots, and minimizing the spread of water vapor.

Table 1. Features of transparent components of buildings [11]

Opaque components *(Walls, roofs, slabs, basements walls and opaque doors)*	Transparent Components *(Fenestration system : windows, ventilators, doors, glass wall, glazing etc)*
Orientation of building, its form and size of external obstacles	Orientation of fenestration components, and external obstacles
Position of building relative to other building.	Dimensions of the transparent component.
Soil cover and nature of ground	Heat transmission coefficient of the glazing.
Thickness, density, specific heat and conduction coefficients of materials.	Absorption, reflection and transmission coefficient of the glazing for solar radiation.
Light absorption and reflection coefficients of the surfaces	Transmission coefficient of the glazing for diffuse sunlight.
Porosity and roughness of the surface.	Transmission coefficient of the glazing for direct sunlight.
Sound transmission and absorption coefficient of the surface.	Transmission coefficient of the glazing for sound.
Depth of the cavity between the layers.	Type of frame used for the transparent component.
Thickness and sound absorption of the insulating material used inside the cavity.	Maintenance factor of the glazing.
Kind of connection between layers of different materials, and their number.	Thermal properties of spacer and cavity in glazing system.

The color of the enclosed surface is of great importance when protecting against high temperature. The method of covering external enclosing structures (walls, roofs) with light-colored paint to protect against summer overheating has been known in the East since ancient times. Such a construction, reflecting a significant part of solar energy back into the outer space, prevented

overheating of rooms, improving the microclimate inside the house. However, reflecting heat back to the urban space (streets, yards, e t c .), such a covering is the cause of increase in air temperature (law of conservation of energy) of the environment. At present, the central zone of Baku is intensively and densely built up with multi-storey buildings and the heat reflected from the buildings, getting into narrow yards, creates a feeling of stuffiness in windless summer days. The situation is aggravated by the lack of green spaces.

To prevent this situation, it is necessary to use layered (with an insulating layer) panels and materials in external structures, to actively use landscaping both in the decoration of buildings (balconies, roofs and terraces) and in the layout of courtyards and urban areas. The use of fountains, artificial reservoirs in the urban structure also contributes to the cooling of adjacent areas.

In recent decades, mankind has been struggling to improve the efficiency of window (Fig. 4) and facade glazing. It is a well-known fact that these enclosing structures are probably the "weakest" point of any residential building. It is through windows and showcases that the maximum heat leakage- up to 60% of the total heat loss, and penetration of noise and harmful components of the sunlight spectrum occurs. Modern architecture uses a wide range of double-glazed windows with sound and heat insulation, etc. and sun protection systems. To increase thermal insulation properties of double-glazed windows are pumped with inert gases. Most often argon is used for these purposes. The use of combined double-glazed units with simultaneous use of both "thermal mirror" and selective glasses allows to achieve a thermal conductivity coefficient of $0.5 m^2°C/W$.

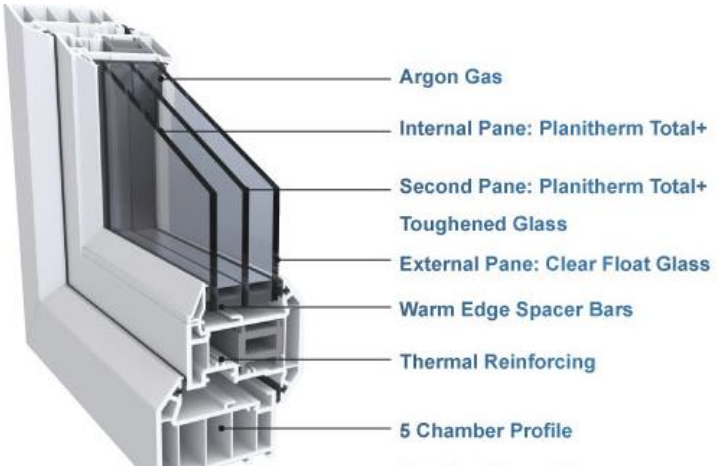

Figure 4. Cut-away diagram of triple-glazing

Several types of membranes designed for different climatic conditions make it possible to choose a "mirror" that filters exactly those parts of the solar spectrum that are undesirable for the microclimate of premises in each particular area. It is now possible to choose double-glazed windows for facades of different exposures. For example, membranes that maximally reflect thermal and ultraviolet components of the solar spectrum are more acceptable for windows of southern orientation. London specialists have gone even further in this area, having developed a new type of glass with the thinnest coating of vanadium dioxide with additives, in particular, tungsten. This coating exhibits dual properties - it behaves like a metal (well reflects infrared radiation), then behaves like a semiconductor (transmits thermal radiation). At the same time, while the surroundings are cold, the glass remains ordinary, but when the temperature rises, it reduces the heating of the room by 50%.

Today, glass forms the basis for a radical renewal of architectural form, regardless of climatic barriers. The use of glazed surfaces as an external building envelope is associated with the spread of energy-saving approaches. Creation of a "living" building envelope that reacts to changes in the degree of its illumination is increasingly used in public and residential buildings. The use of a second, glass building envelope as a structural element with an energy-saving function is becoming no less effective.