

Этапы развития жилищного строительства города Сумгаит в XX веке

Быстрая индустриализация Сумгаита превратила его из города-спутника в шумный промышленный центр, создав проблемы в городском планировании, воздействии на окружающую среду и архитектурной интеграции. Прирост населения и промышленный рост вызвали обеспокоенность в связи с инфраструктурой, устойчивостью и уровнем жизни. В исследовании проанализирована архитектурная эволюция Сумгаита с уклоном на проблемы жилищного строительства в разные периоды, с 1940-х годов по настоящее время. Рассмотрен переход от малоэтажных структур к высотным под влиянием экономических и политических факторов, а также выявлены как положительные, так и отрицательные аспекты каждого этапа.

Ключевые слова: архитектурное планирование, градостроительство, зеленые зоны, массовая застройка, улица.

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Stages of development of residential construction of Sumgayit city in 20th century

The rapid industrialization of Sumgayit transformed it from a satellite-city to a bustling industrial hub, posing challenges in urban planning, environmental impact, and architectural integration. Population influx and industrial expansion raised concerns about infrastructure, sustainability, and living standards. This research analyzes Sumgayit's architectural evolution, focusing on residential construction challenges across different periods, from the 1940s to present. It examines the transition from low-rise to high-rise structures, influenced by economic and political factors, and identifies both positive and negative aspects of each phase.

Keywords: architectural planning, urban planning, green areas, mass building, street.



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Introduction

The architectural and urban development of the historical cities of Azerbaijan on the eve of the Great Patriotic War was linked to the emergence of new construction types during that period. In subsequent years, alongside societal concerns, the construction of factories and port facilities commenced in the new section of Baku's industrial area, known as the «Black City». Consequently, the establishment of a new industrial city in the northwest of Absheron-Sumgayit provided a significant boost to its economy [19].

The substantial decrease in the construction process during the war years was a result of the city of Sumgayit redirecting its construction and industrial production towards meeting the demands of the war. However, in the initial post-war years, efforts were initiated to implement a comprehensive program of activities in our country. During this period, there was a gradual expansion of mass housing construction in Sumgayit. Specifically, individual residential houses and the construction of small quarters were given preference in Sumgayit [12].

Observing the architectural innovations of this period, understanding the dynamics of development within a new social context, and conducting a comprehensive analysis of residential

construction from both material and practical perspectives are crucial steps. In 1943, the State Architectural Authority was established, and in 1945, a new research center was formed under the Academy of Sciences of Azerbaijan, now known as the Research Institute of Architecture and Art. Within these organizations, critical matters related to architecture and urban planning, which were paramount concerns for Azerbaijani cities, were deliberated, and the primary focus of residential construction was determined [3].

In this context, the relocation of a portion of Baku's industrial capacity to the outskirts, along with the provision of necessities to the population in surrounding settlements, prompted the establishment of a new industrial center in nearby areas [14]. Consequently, the architectural layout of the newly formed major cities of Azerbaijan, such as Sumgayit, began to take shape. It was deemed crucial to give special attention to identifying the developmental challenges arising from the demands of that time.

While the initial master plan for Sumgayit was drafted in 1934, its transformation into a fully functioning city occurred predominantly in the post-war years. Evaluating the development of the construction process in this city is complex, as Sumgayit, initially considered a «satellite» of Baku,



Illustration 1. Residential building in Narimanov Street in Sumgayit. Source: <https://xeberle.com/sumqayit/38578-50-iliin-eyri-binasi-sumqaytdan-vdeoreportaj.html>

swiftly evolved into an independent industrial city due to its industrial potential and rapid population growth [15]. Primary thoroughfares were established, and a range of public, residential, and domestic structures were built to meet the essential needs of the population.

However, the westward expansion of the Industrial Zone, as outlined in the city's master plan, led to the adoption of a predominantly linear urban layout. Simultaneously, the city was bounded by the Caspian Sea to the north and a major urbanization communication corridor to the south, comprising railways, highways, electricity, and pipelines, influencing its overall configuration [8].

The dynamic evolution of Sumgayit's architectural and urban landscape during the 1940s and 50s, particularly its transformation from a designated «satellite city» to an independent industrial center, presents a compelling subject for comprehensive research. Considering this, the primary objectives of this study are:

- Investigate and analyze the architectural innovations that emerged during the post-war years in Sumgayit, focusing on the integration of traditional elements into residential and industrial structures. Explore the impact of these innovations on the city's overall character and development.
- Examine the dynamics of Sumgayit's development within the new social context that emerged after the Great Patriotic War. Evaluate the factors that influenced the city's expansion, including the relocation of industrial capacity, establishment of new residential areas, and the subsequent challenges arising from these developments [9].
- Conduct a comprehensive analysis of residential construction practices in Sumgayit from both material and practical perspectives. Investigate the planning nature, alignment with the industrial profile, and construction types observed during

the city's initial years, highlighting the contributions of notable figures in shaping the residential landscape [16].

- Assess the role of key organizations, such as the State Architectural Authority and the Research Institute of Architecture and Art, in shaping Sumgayit's architectural and urban planning policies. Examine how critical matters related to architecture and urban development were deliberated within these organizations and their impact on the city's structural layout [10].
- Evolution of Residential Construction: Trace the evolution of residential construction in Sumgayit from the initial master plan in 1934 to the developments in the 1950s. Analyze the shift in construction types, building heights, and planning principles, considering factors such as sunlight exposure, green spaces, and the aesthetic appeal of structures [29].

Materials and methods

The planned introduction of new residential buildings in the city defined its initial neighborhoods, and the post-war construction in Sumgayit unfolded in various directions. In addition to the new residential structures, there were already several production-oriented buildings that contributed to the city's overall character. The incorporation of traditional architectural elements into these buildings, and at times the construction of large communal facilities even in smaller quarters, altered its residential landscape. Drawbacks in the subsequent years also began to emerge, with the expansion of residential and industrial zones in the opposite direction within the semi-closed structure of the city adversely affecting its transportation and pedestrian systems (Illustration 1).

Conversely, the depiction of Sumgayit in the 1940s and 50s was characterized more by the vertical and horizontal forms of large-scale industrial enterprises than residential structures [1]. Today, with significant changes in science and production technologies, many of these structures are in dire need of reconstruction, and some are being eliminated.

In response to these challenges, Azerbaijani scientists and businessmen abroad have proposed several solutions to address this issue.

In summary, the examination of the 1940s and 1950s reveals a significant shift in the emergence and development of new industrial cities in Azerbaijan. Sumgayit stands out from others due to its distinctive economic potential,

planning principles, location, and construction form. The construction of extensive industrial complexes in the city necessitated the expansion of new residential areas [5].

From the 1950s onwards, in addition to settlement-type residential groupings, new residential districts emerged with well-developed cultural and domestic facilities, engineering communications, and green spaces. Noteworthy is the comprehensive approach taken in the city's residential construction from the outset. Special emphasis was placed on the typification of public service facilities and the principle of planned location. The construction practices of notable figures such as H.A. Alasgarov, Y.Q. Sadovsky, G.A. Aliyev, G.S.V. Akhundov, V. Dilayev, K.H. Mammadbeyli, and M.X. Nasirli have been studied, showcasing house construction types, grouping characteristics, and their relevance to local climatic conditions.

It has been demonstrated that the planning nature, alignment with the industrial profile, and construction types observed in Sumgayit were characteristic of many industrial cities within the Soviet Union during that period. Sumgayit's initial designation as a purely «satellite city» proved impractical, and despite its production, labor, and cultural ties with Baku, it quickly established itself as an independent industrial city. The city's population primarily comprises individuals from the Khizi and Guba regions of Azerbaijan, as well as surrounding settlements like Saray, Jorat, Novkhani, etc., attracted by employment opportunities.

Initially conceived as a «satellite city» due to the constraints on Baku's expansion, Sumgayit's planning structure for the first residential district was completed soon after (as per the general plan for 1945–54). This marked the formation of a residential zone that functioned as an industrial city, consisting of numerous quarters (1–1.5 ha.) forming a cohesive system.

Results and Discussion

The constructed houses were primarily one to three stories tall, and living conditions were deemed satisfactory due to the incorporation of green spaces and public facilities in the surrounding areas. While the number of storeys in buildings increased gradually in the subsequent years, the inclusion of wide streets ensured ample sunlight exposure. The construction form, executed around the perimeter, safeguarded the greenery within the interior space. Simultaneously, efforts were made to enhance the orderliness

of the street environment, leading to the expansion of urban construction toward the sea [11]. The trend of low-rise construction, characteristic of that period, persisted until the conclusion of 1954.

It is noteworthy that in the subsequent years, the design approach for residential construction in the city of Sumgayit became more tailored to its urban scale and natural climatic conditions. In 1946, M. Huseynov introduced a new 6-storey residential building [27] (Illustration 2). The well-thought-out planning, provision of two entrances in 3–5-room apartments, incorporation of erkera, lodjas on the facades, and the use of «aglay» limestone for facades contributed to its aesthetic appeal. Overall, M. Huseynov's stylistic accomplishments in the buildings can be attributed to their spacious layout and high comfort conditions. This marked a vivid expression of a new architectural direction and creative principles that gradually solidified in the field of architecture during that era.

In these years, the Special Architectural Workshop under Huseynov's leadership produced various interesting projects for residential buildings over several years. Apart from mass housing in Sumgayit, this organization designed a multi-storey private residential complex for employees of «Buzovnanef», «Azneftzavod», and scientists, incorporating two-sided windings and deep lodjas [6]. The stylistic forms of these buildings predominantly encapsulated the creative achievements and principles of that era. The experience gained in creating meticulously planned microenvironments, along with the systematic resolution of internal apartment layouts, still holds relevance in today's residential construction in Sumgayit, especially in its east-expanding borders.

Regrettably, planning the latest microdistricts of the city (13th–17th microdistricts), oriented to the East, encountered significant challenges in achieving the necessary level of improvement and comfort, given the expansive living environment. In this context, the new master plan scheme from the 1960s to the 80s brought residential construction in a completely new direction and introduced a new architectural image, while allowing some degree of style repetition. During this period, similar to elsewhere, the development of Sumgayit was overseen by the coordinating center in the USSR – Moscow. However, without substantial evidence, industrial enterprises of

extremely diverse directions (chemical, synthetic, rubber, oil refining, soda, rubber, lacquer production plants) were established. Consequently, the industrial zone of Sumgayit occupied three times more territory than the residential zone, leading to territorial scarcity, violation of sanitary and hygienic rules, and a decline in living conditions due to a sharp increase in population in later stages.

It is reassuring that at one point in Sumgayit, the wide design of streets, proper orientation of residential buildings to account for wind patterns, and the implementation of green spaces helped bring about a relatively balanced situation. However, constraints on the city's development from the south, along crucial communication lines (railways, roads, high-current power lines, and pipelines), and from the north, along the Caspian Sea, compelled the direction of residential construction exclusively to the east. On the other hand, the placement of Sumgayit's public center and bus station complex in the originally formed residential area disrupted the subsequent general service supply balance of the city.

Since many of the new residential buildings in the city were designed by Russian specialists, the peculiarities of local conditions (such as the regular strong northern winds and the immediate proximity of the Caspian Sea) were underestimated and not adequately considered. Additionally, the development of the city featured residential buildings of the same type along transport routes, with a separation of the residential and industrial zones, contributing to architectural monotony. However, the general plan scheme drawn up in the 1960s allocated sufficient space to the residential sector, incorporated green spaces in the quarter system of Sumgayit, and defined areas for new public centers and the main street network.

From 1964, the residential construction in Sumgayit primarily consisted of a mixed structure, with 66.5% being 5-storey buildings and 33.5% being 9–12-storey structures. Although these constructions, along with service facilities and greenery, formed a unified planning scheme, the construction of two new large-scale waste plants (refinery and chemical) in very close proximity exacerbated the already unsatisfactory ecological situation of the city. It should be noted that without the unjustified economic «aggression» on Sumgayit, the living environment of the city would be considered quite satisfactory for the population today, according to envisaged urban planning norms.



Illustration 2. Buildings in Sumgayit from 1940–50s. Source: <https://az.trend.az/azerbajian/society/3194674.html>

The construction of residential buildings in the eastern zone of the city, as before, predominantly relied on a high-rise frame-panel system. However, this approach allowed for the expansion of service facilities and green areas within their respective microdistricts [21].

It should be noted that the artistic expressiveness of residential architecture during this period, coinciding with the societal development of the time, was manifest to a relatively small extent. In the creative direction of residential building design, there was a gradual shift toward recognizing the factor of «beauty.» Alongside the exterior aesthetics, attention was increasingly given to the comfort of interior planning. For instance, kitchens were deliberately associated with balconies and living rooms, and multi-room apartments were equipped with two sanitary facilities. Achieving such features was challenging within the uniform planning of residential and public buildings dictated by the state's urban planning and architectural principles at that time.

In general terms, dwellings constructed in the 1950s were solely financed by the state, and with relatively low levels of construction technology, mass housing estates did not yet reach a significant scale. During this period, preference was given to the construction of buildings aligned with the needs of industrial enterprises [25]. However, the surge in construction from the 1960s onward brought the construction of several manufacturing plants, such as the «Kamyu» plant in Baku, to the forefront.

As a result, in the early 1960s, architects designed panel-type residential buildings that considered various natural and climatic conditions, showcasing examples of typification. Among them, the 450–451 series of residential buildings became widespread. Although the expansion of new residential construction in Sumgayit was relatively modest, it did have an impact on the regulation of the highway and square system. Planning schemes were devised, and public trade and household facilities were designated to meet the population's

service demands. Notably, there was a newfound emphasis on the aesthetic and compositional aspects of residential buildings protruding into the main squares and highways of the city for the first time.

Regrettably, during this phase, despite the relatively low technical sophistication of the projects, they became the focal points of many new cities in Azerbaijan, alongside the explored historical cities [7]. It is important to note that as early as April 2, 1959, based on a resolution of the Council of Ministers of the USSR focusing on the development of large-panel house construction from 1959 to 1964, it was established that the planned volume of large-panel houses in the Republic was 1250 thousand sq. m., and this target had been achieved. To fulfill this objective, the establishment of large-panel production plants commenced in the Republic, with Sumgayit contributing a volume of 70 thousand sq. m. in deliveries. The predominant feature of residential construction in Sumgayit city was the prevalence of 9–12-storey buildings [4].

In the 1960s to 1980s, residential construction in Sumgayit was primarily executed through microdistrict planning, adapting to local characteristics. Unlike Baku, where microdistricts were mainly situated on the outskirts, in Sumgayit, they constituted the main streets within the city's primary administrative boundaries. From the 1960s onward, the microdistricts, predominantly composed of large-panel residential buildings along the coast, were oriented towards the East and extended to the town of Corat. Despite the Free planning principle, these microdistricts in those years bore a striking resemblance to each other, contributing to a sense of monotony due to the prevalence of single-type residential buildings. The distinct features of the residential building images were primarily expressed through colors or local architectural and environmental elements [17].

As Sumgayit evolved into a major industrial center, the influx of a substantial workforce necessitated widespread development in residential construction. Although the construction of large-panel residential buildings in a short period didn't fully justify itself in many aspects, the urgent demand for rapid construction remained. Given the prevalence of large families in the population of Sumgayit, multi-room apartments with moderate conditions in panel houses fulfilled their requirements [22]. The attraction of people from various regions of Azerbaijan to Sumgayit primarily stemmed from the availability of jobs and housing within a short timeframe. Consequently, the population of Sumgayit increased due to individuals relocating from villages and settlements. Simultaneously, the process of social development enabled residents to pursue education and enlightenment opportunities both in Baku and Sumgayit [20].

While in Sumgayit, during the 1960s, some of the nine-storey multi-section houses were still constructed using large panels, by the 1970s, reinforced concrete gradually became more prevalent in residential construction. Additionally, local limestone materials were incorporated, albeit in small quantities and within the frame system. In such house types, bilateral winding was achieved through the grouping of block-sections and internal planning of apartments.

Studies conducted in residential districts of Sumgayit reveal that, alongside the positive aspects, this construction method has its drawbacks. For instance, the desire of two families from one generation, following Azerbaijani tradition, to reside in the same dwelling (due to the lack of the possibility of double-sided entrance and exit doors of apartments) was impractical in the conventional mass-produced panel construction method. Furthermore, the visual quality of the buildings from an artistic aesthetic perspective was also not at the desired level.

For this, there was a need to conduct experimental design with the possibility of special functional zoning [13]. In the second half of the 1970s and the beginning of the 1980s, the issues related to the internal planning and layout in the settlement of high-rise residential houses in the 14th–17th microdistricts, constructed near the eastern borders of the city, were relatively resolved. Consequently, the architectural approach of the buildings erected in these microdistricts, their number of floors, facade design, and even the principle of location differed from the residential houses previously built in the city center. In some areas, the shift from excess panels to frame-reinforced concrete in high-rise buildings allowed for flexible planning in apartment spaces.

However, it is regrettable to note that uniformity in residential buildings persisted in the floor solution. This hindered significant changes in their appearance, even though the proposed «block-sections» in the projects at that time could have created various interesting visual alterations in the facade design of buildings [24]. To some extent, these features found expression in the construction of the last built 17th residential microdistrict of Sumgayit. Unlike previous microdistricts, new expressiveness was achieved in the volumetric-spatial and artistic architectural images of buildings due to a more convenient structure replacing the mixed-storey construction method (66.5 % – 5 floors, 33.5 % – 9, 12, 16 floors). The semi-closed planning method of this microdistrict allowed for increased greenery, improved the environment, and provided resistance against strong northern winds [2].

By the end of the 1980s, the population of Sumgayit had reached 400 thousand people, necessitating the redesign of the general plan of the city [28]. The simple geometric shapes of quarters and microdistricts (regular rectangular plan structure) and the width of streets and highways allowed for the central streets of the city to bear a considerable load. One distinctive feature of Sumgayit, compared to other cities in the reconstruction process, was the innovation of adding single-block high-rise buildings designed on an individual basis to the inventory of single-block residential houses. The prime example in this regard is the first residential district [18]. Its positive feature, setting it apart from others, lies in residential construction comprising houses of different series, structurally planning based on the principle of favorable spatial composition, and the creation of good opportunities for insolation of residential house groups inside the yard through «anfilad» yard spaces.

Since the second half of the twentieth century, most of the buildings constructed in the western and eastern zones of the city, excluding the central districts of Baku, were built using large walls and covering panels. However, in the initial years of our country's independence, the panel construction method was discontinued. From that point onwards, frame-block-type dwellings based on individual projects experienced broader development, leading to a revitalization of numerous microdistricts that had previously exhibited monotony.

As the houses built based on panels in the microdistricts of Baku and Sumgayit occupy a considerable area (18–25 hectares), they have left an enduring negative impact on the architectural character of the cities even today. Although general urban planning rules regarding services and windiness were adhered to in microdistrict planning, the loss of «neighborhood» communication, a crucial factor in Islamic tradition for the living environment, and the limited provision of greenery in large yards in hot climates have diminished the overall comfort level of living [23].

At the end of the 20th century, both low-rise and high-rise houses in Sumgayit were primarily executed through individual projects, resulting in partial changes to their

architectural appearance and internal spatial solutions for apartments. In the latter years of the 20th century, high-rise constructions of this nature were a minority in Salman. Consequently, the city's image is not characterized by new high-rise buildings, which predominate in the central streets; however, some modifications have been introduced to their appearance (decorative balcony designs, addition of color shades to facades, allocating lower floors to service facilities facing the street, etc.), indicating changes to older residential structures.

Simultaneously, it's worth noting that in Sumgayit since the 1990s, there has been a preference for single-storey residential houses. These point «skyscrapers» in turn, have injected a renewed vibrancy into the existing building lineup. This has been achieved through diverse architectural and planning solutions, proper orientation of staircase-elevator nodes to apartment entrances, and corner block layouts. It's noteworthy that the segmentation of such buildings into sections in multiple directions has proven convenient in many aspects. This practice is widespread in foreign countries, as placing an elevator-stairwell in the inter-sectional space is considered the most rational solution.

On the other hand, such glazing offers excellent opportunities to simplify the structural schemes of apartments, allocate specific areas for floor communications, and position summer rooms in the inter-sectional areas. Additionally, in apartments with different orientations resulting from such designs, it becomes possible to increase the number of rooms and achieve favorable conditions for contact and insolation. The construction of such houses is considered beneficial for the city of Sumgayit. In this case, when implementing reconstruction through a «selective» method in districts with existing dense construction, it is feasible to periodically incorporate such volumes at inter-building distances.

Thus, when categorizing the residential construction of Sumgayit city in terms of volume and space, it becomes evident that their typification has undergone a significant developmental journey, acquiring self-affirming patterns.

The research conducted within the scope of this scientific article highlights the importance of considering the warm yet relatively humid climate of Sumgayit, emphasizing the need for careful selection of materials and structures. These elements play a crucial role in regulating essential procedures such as aeration and insolation. In addition to architectural and planning measures, a range of improvement methods, grounded in scientific and methodological principles within the volumetric-constructive structure of building elements, is required to create optimal comfortable conditions [26].

One of these methods involves addressing the humidity brought by strong winds from the nearby Caspian Sea and moderating the heat flow. To achieve this, heating is implemented, ensuring that load-bearing structures maintain strength. Applying multiple layers to the wall plane is deemed convenient to enhance conductive capacity. This underscores the importance of specific conditions of the building's location.

For instance, to minimize solar radiation in building groupings, the architectural planning of apartments, facade aspects, and window shapes should be addressed differently. To enhance the comfort of residential buildings in Sumgayit, the physical properties of materials, including thermal conductivity and resistance, can be improved to reduce the weight of structural elements. This can be achieved using lightweight, heat-retaining insulation materials (such as foam and air layers) and artificial building materials with a technological basis. Additionally, to reduce the moisture content of the structure, a layer of composite materials can be added to prevent the evaporation of external wall coverings. Furthermore, for strengthening and heat-shielding

purposes, fibrous materials and air-regulating cavities may be incorporated into the construction.

In the constructive solution of building walls, one of the improvement methods involves incorporating gaps that allow for insulation rectification to prevent the passage of moisture into the interior. To enhance temperature control in apartments and regulate illumination, the utilization of special glass packages with high thermal conductivity and screens featuring sun protection in window coverings will yield positive results. In this regard, the suggestion put forth by the American campaign and British specialists to employ a double-sided transparent membrane in glazing based on new technology can be considered innovative.

Conclusion

Considering the progressive aspects in the residential construction of foreign countries mentioned above, we believe that it is advisable to implement the following changes in the renovation of the residential construction of the studied city Sumgayit and the internal-spatial solution of apartments:

- 1 First and foremost, the process of designing residential buildings should consider several basic logical regularities. This includes incorporating the artistic architectural features into the organization of the dwelling house, manifesting itself in the planning of the apartment and the creation of an individual environment based on family composition.
- 2 In the creation of characteristic volumetric-spatial units (microenvironments) corresponding to the function in the residential environment of apartments, the following should be considered: the emergence of new household equipment in the interior of apartments, and the principle of periodic transformation should be expected in connection with the placement.
- 3 More attention should be directed towards zones in the apartment space that meet social needs, focusing specifically on certain functional activities.

Because, along with the functional purpose of individual areas in the living environment, their artistic design is also crucial, the presentation of equipment and devices in the apartment should contribute to creating an aesthetic environment.

Considering the new social requirements of the population in designing a dwelling house, special attention should be devoted to the principle of the location of equipment in the interior to enhance the visual impression. However, in this case, it is essential to initially consider a person's attitude to living as the owner of an apartment and the corresponding social requirements.

Thus, in the functional-household and artistic architectural design of the living environment, the principled deformation of the environment should be emphasized as the main condition, considering new trends in space improvement.

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Статья поступила в редакцию 27.02.2024.

Опубликована 30.06.2024.

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