Construction project as a tool for forming a comfortable and accessible environment: risks and threats

L A Filimonova¹, Y A Deviatkina (Abusheva)²

¹Chair of economics in construction, Industrial University, 2, Lunacharskogo Str., Tyumen, 625000, Russia
²Architect construction company, 12, Mira Str., Golovin 625547, Russia

E-mail: Filimonova1@tyuiu.ru

Abstract. This article raises the problem of the ambiguity of the use of design documentation for reuse, the superficial attitude of architects to the need for deep processing of documents. When adapting a project to building conditions, important aspects such as insolation, prevailing winds, annual rainfall and temperature conditions, innovative resource-saving and construction technologies are omitted. Unfortunately, many investors, customers and contractors neglect these provisions, and the regulatory and legal framework is not enough to achieve the goals of creating a comfortable and accessible environment. Often, projects that were previously recognized as cost-effective do not correspond to modern realities. The article sets out the basic principles for implementing socially-oriented projects for the construction of a public building, summarizes and systematizes a set of regulatory legal regulation of urban development, formulates the primary tasks of adapting the project to the conditions, substantiates the importance of a creative approach to project development. The authors of the article, using the reuse project as an example, raise the problem of “moral aging” of design decisions and the superficial attitude of architects to the adaptation part. The author’s project of the scientific and educational center is focused on a new reading of the technical and technological parameters that meet the requirements of modern society.

1. Introduction

At the present stage of development of society, the word "enlightenment" is practically not used. The word “education”, “technical education” is mainly used, which implies the acquisition of scientific and technical knowledge and skills, the main purpose of which is to ensure high competitiveness of both individuals and the results of their work. The world needs not only and not so much education in such a universally accepted meaning of the word as education. It is enlightenment that shapes our consciousness, behavior in society, an adequate understanding of what surrounds us and ourselves. The proposed approach in the article to the design solution of the contractor is aimed more at solving problems in the field of education of the graduate in the areas of preparation for architecture and construction. Modern engineering and construction education should be based not only on the axioms, postulates of the technology of construction, reconstruction or liquidation of capital construction facilities, but also on the formation of skills of search and own generation of new ideas. It should also be noted that the training of specialists for the construction sector in modern society should take into account global trends, and primarily in terms of solving problems relating to the principles of “comfortable environment”, “accessible environment”. In this connection, a decision was made on the
need for further development of the methodological foundations of education regarding the formation of matching skills and the selection of the most effective design solutions when refusing design documentation for reuse.

2. Literature Review

The principles of the formation of a “comfortable environment”, an “accessible environment” have been comprehensively covered in the works of domestic and foreign theorists and practitioners [1-7], in official documents [1-7]. One of the objectives of the Accessible Environment Program for the period 2011-2025 is to “ensure equal access for disabled people to priority facilities and services in the priority areas of life of people with disabilities and other low-mobility groups [5].

According to the provisions of Subprogram 1. Ensuring the accessibility of priority facilities and services in the priority areas of vital activity of people with disabilities and other low-mobility groups, we note only those target indicators and program indicators that allow only minimally revealing the priority of a scientific approach with elements of creativity to solve a raised problem at the pre-investment stage development of investment and construction documentation:

- p. 2. The share of priority objects of social, transport, engineering infrastructure available for people with disabilities and other mobility groups in the total number of priority objects, Percent
- p. 5. The proportion of constituent entities of the Russian Federation that have formed a system of comprehensive rehabilitation and adaptation of persons with disabilities, including children with disabilities, corresponding to the standard program of a constituent entity of the Russian Federation, in the total number of constituent entities of the Russian Federation, Percent
- p. 7. Percentage of people with disabilities who positively assess the attitude of the population towards the problems of people with disabilities in the total number of people surveyed with disabilities, Percent [7]

The authors of the article emphasize the relevance of expanding the possibilities of introducing a scientific approach to the process of developing technical documentation for the construction of a public building through meeting the needs of that part of the society for which the public building is being built. For example, taking into account such factors as communication connections, tactile processes of sensation and perception, which are the starting point in a person’s knowledge of the world, which is especially in demand in certain age groups of the population or in low-mobility groups. Sensations are of great importance in the life of a person, which is often taken into account in the urban planning rules and sanitary norms. The investor is more focused on reducing the payback period of the project, which corresponds to the principles of "replication" of public buildings constructed on the basis of cost-effective design documentation for reuse according to [8] in the vastness of our country.

With any deviations or absence of one or more sensory organs, a person’s perception of the external environment changes significantly, in connection with which the architect should, according to the authors of the article, convey to the customer (investor, developer, title holder) innovative technologies, materials and solutions in the construction of modern buildings, focusing on the principles of creating a comfortable urban environment for all categories of the population. As a rule, a meeting with such a person with a mobility group leads people with the usual perception of us into confusion due to the lack of communication skills. A similar situation occurs when applying cost-effective reuse design documentation, or in the traditional approach to developing a project for the construction of a public or residential building without taking into account the characteristics and needs of the low-mobility population.

Domestic experience in the design of a public building oriented towards the scientific and educational sphere of leisure and education for people with limited mobility is limited [9-11], which is also confirmed by an official document [12]. As an example, the experience of Ugra of the Tyumen region, the provisions on the implementation of the principles of a comfortable environment in launched projects and activities [11], which can serve as an incentive in the transposition of experience and skills in the design of buildings for people with limited
mobility everywhere, should be noted. At the same time, the authors of the article draw attention to the fact that the population is not differentiated by their physical and physiological statuses when providing educational and leisure services in modern buildings that meet all international requirements for functionality, ergonomics and safety. The director of the Khanty-Mansi Autonomous Okrug cultural department, Nadezhda Kaznacheeva, said in a report: “Today, over 95 percent of state institutions of the Autonomous Okrug are accessible to a special category of citizens, and it is possible to get acquainted with museum and library collections and collections, taking into account the characteristics of each category of disabled people. To familiarize people with limited mobility with the theater art, the opportunity has been realized to watch theater performances without leaving home, 100.0% of theaters have official sites, all state theaters broadcast live performances online.” [11] This experience of Ugra residents is indicative of the formation of not only an accessible, but also a comfortable environment for the population.

Returning to the historical facts of the creation and launch of construction projects focused on affordable and comfortable conditions for citizens, one should recall the experience of European and American architects and developers of the 80s. This is the period of the emergence of “social and ethical marketing” in countries with market economies and high living standards. The authors of the article draw attention to the definition given by Sandra Lesakova: “The goals of social and ethical marketing are to actualize universal values, to introduce other people to this idea and to find solutions to improve the environment as a matter of priority. Own interests in the form of increasing prestige and making a profit should be in the background” [13]. This definition maximally reveals the modern vision of the trend in the development of technologies “smart city”, “smart home”, which synthesizes innovative ideas and experience of such sectors of the economy as [14-18]: construction industry, IT-technologies, industrial enterprises, providing production of equipment for installation during the construction of buildings, focused on energy efficiency and resource conservation, etc. Here, the authors of the article pay attention to the interactive educational platform launched by the National Open University "INTUIT", Example, lecture: “Smart home as part of Smart city.” [14] Such sites allow a practicing specialist to pay attention to their own education and the formation of new knowledge without interruption in production, which has become particularly relevant in the light of the 2020 pandemic.

A format such as the exchange of experience and ideas at exhibitions and conferences that carry out educational functions also contributes to the development of a creative vision of their appointment in the profession.

3. Results of approbation

According to the information resource of the website sovet.megatuymen.ru, Tyumen is one of the most promising regions of the country both in investment (the city took first place in attracting investments, creating conditions for business development and management efficiency, overtaking Moscow and Kazan), and in migration plan. Over the past 30 years, the population of Tyumen has grown by 60%. In the future, Tyumen is prophesied to become a millionaire city, since the pace of socially-oriented development is two to three times higher than the average level in Russia and the influx of people speaks for itself.

At the same time, as of November 1, 2018, about 90 thousand people were recorded in Russia deaf and dumb, and 103 thousand people completely blind people. In the Tyumen region for the same period, 101 thousand people live with a disability (6.4% of the total population), of which: visually impaired - 5,104 people, including children - 438 people (2% of the total Russian number); hearing impaired - 2,804 people, including children - 299 people. (3.2% of the total Russian number). Data on the number of people deprived of other senses are missing. In the system of bodies of social protection of the population, rehabilitation services for people with disabilities, children with disabilities and their families are provided in 48 organizations of social services. Various medical projects, innovative programs and technologies are being implemented. At the same time, the question of the low level of communication ties in society remains open, which can be closed by the means of erecting a modern...
public building of functional purpose, a scientific and educational center. The "palm" in the construction of modern public buildings with "smart technologies", under the roof of which both a large part of the population and handicapped groups can communicate, is of course given to European and American countries of the world, whose experience, the authors of the article transposed to a standard project, which assigned the status of “cost-effective reuse design documentation”.

As partners in the project, we recommend: the customer - the administration of Tyumen; investor - State Program of the Russian Federation "Accessible Environment"; regional consumer - children from 3 years old, pensioners, schoolchildren, students, LM of the Tyumen region; federal consumer - citizens temporarily residing in the territory of maintenance. When developing a design solution for the construction of a public building in the context of scientific approaches that meet the principles of comfort and accessibility of the environment, we logically come to the need to systematize the current list of requirements for modern buildings through the principles of “smart home”, “smart technologies”. And these principles, as shown by the domestic practice of house building, are so far accessible only to VIP projects with increased comfort and are mainly practiced in residential buildings.

The project for the construction of a scientific and educational center is being developed with the aim of expanding the horizons of various reference groups, including people with limited mobility, due to limited information from the outside world, creating favorable conditions for communication, developing skills and knowledge in the field of the functional purpose of the senses. The authors of the article selected a typical design of a public building (2017) from the register of cost-effective design documentation [17-19], taking into account the technical parameters for people with limited mobility (LM) and the natural and climatic features of the development area. Typical and author's projects presuppose the presence of such premises as: blocks of premises for sensing space through only one of the senses - sight, hearing, smell, touch, taste, respectively; premises for educating people about various problems related to the senses and perception of the world; facilities for training people to interact with people with limited mobility; lecture, laboratory, research facilities; classes for involving children through games in the center problem; facilities designed to prevent dementia and Alzheimer's disease; interactive, information rooms, video projection, museum part; canteen; Bathrooms recreation areas.

Nevertheless, the linking of a typical project to modern conditions of energy and resource conservation, “smart city”, “smart home” technologies at the construction and operation stage, and also taking into account the process of transformation of requirements for creating an accessible environment for LM and comfortable conditions, led to differences projects at the level of the following criteria [3, 20-24]: Premises and their elements: Horizontal communications. Vertical communications. Sanitary facilities. Internal equipment and devices. Audiovisual information systems. Entrances and driving directions: Crossing the roadway. The presence on the site of underground and elevated passages. The width of the pedestrian path. Coverage of walkways, sidewalks and ramps. Stairs. Car parks: At individual car parks on a site near or inside the buildings of service facilities. Built-in and underground car parks. complishment and recreation places: Devices and equipment (shelters of payphones, information boards, etc.).

In terms of content, the author’s project retained similarities only in the fundamental part. At the same time, adjustments were made in the applied building materials (insulation, roofing, building envelopes), in the technology of roof installation, etc. In terms of installed engineering equipment, the standard project (2017) loses significantly according to the criteria of energy efficiency and resource conservation. From the most revealing example that distinguishes the author's version from the standard one, the project provides for recycling in the water supply and sanitation system. According to a summary of the key parameters of the public building, taking into account the particularities for people with limited mobility when using the necessary equipment according to the “accessible environment” program and taking into account the technologies of “smart home” and “comfortable urban environment”, we are going to make the project more expensive. And only according to rough estimates, the project cost, taking into account the installed equipment of the Smart Home technology,
will increase by 772 million rubles. The prices for each type of necessary equipment are accepted as of Q1 2020.

Since the center being designed falls into the category of socially significant objects, its implementation is expected to be carried out at the expense of the state, whose policy, in one of the key priorities, is to improve the quality of life of its citizens, namely, under the State Program of the Russian Federation “Accessible Environment” for 2011 -2025 years. In this connection, the following project risks are possible: increasing the terms of approval and approval of documents due to the expansion of the building’s functionality and the circle of project participants at the expense of persons whose interests will affect the project results; project cost increase; uncoordinated actions of project participants due to different expectations of the results of the project; a decrease in the level of support of regional authorities during the coordination or implementation of the project due to the worsened macroeconomic situation; Significant complexity of the implementation of the established regulatory requirements.

4. Conclusion

In modern construction and design, especially when it comes to targeted financing from state sources, the practice of using the main projects of standard buildings, including those recognized as effective reuse, is widespread. This practice allows you to economically and quickly build new buildings and structures. However, this example is not always useful. For example, in the Far North, this construction option is not acceptable. The special conditions of the northern regions require a more thorough approach at the design stage. It is also necessary to take into account that when designing buildings, the architect must clearly understand the realities of life, carefully study the characteristics of the construction region and draw up such a planning structure that would be not only practical, but also comfortable. The dissimilarity of the northern regions is one of the most important conditions for the design. At the moment, there is a sharp loss of creative connection between architects working not only in the capital centers and in the European part of the country, and architects in Siberia and the Far East, but also among specialists involved in the design and construction process in the Arctic and the Arctic. It must be clearly understood that the regions are distinguished by the nature, way of life and indigenous foundations of local residents, the methods and means of construction, various forms of social and economic conditions, relief and weather conditions. All these provisions must be taken into account by the customer (investor) at the stage of the project.

Based on these features, the authors of the article emphasize the need to develop more detailed documentation that meets not only urban planning and sanitary standards, but also technological and technical innovations in urban planning and trends in the formation of comfortable conditions and an accessible environment.

Based on these features, the authors of the article emphasize the need to develop more detailed documentation that meets not only urban planning and sanitary standards, but also technological and technical innovations in urban planning and trends in the formation of comfortable conditions and an accessible environment. An architect and designer should resort to scientific approaches with elements of creativity and methods of independent study of the region before starting work. Unfortunately, customers neglect these provisions, and since the regulatory framework is not enough for comfortable design, reuse projects often do not correspond to existing realities.

References

[1] Principles for creating a comfortable environment. https://www.minstroyrf.ru/docs/13784/
[2] The priority project "Formation of a comfortable urban environment". https://depjkke.admhmao.ru/upload/iblock/10b/prezentatsiya-prioritetnogo-proekta-gorodskaya-sreda.pdf last accessed 2019/11/12
[3] SR 140.13330.2012 City environment. Design rules for people with limited mobility ATP ConsultantPlus, last accessed 2019/08/02
[4] The state program of the Russian Federation "Accessible environment" for 2011 – 2020. A source: https://base.garant.ru/77673671/ last accessed 2019/11/12
[5] The state program of the Russian Federation "Accessible environment" for 2011 – 2025. https://programs.gov.ru/Portal/programs/passport/04 last accessed 2019/11/12
[6] On amendments to the state program of the Russian Federation “Accessible environment” № 1932, 28/12/2019. https://rosmintrud.ru/docs/government/postan/259 last accessed 2020/02/11
[7] Subprogram 1. https://programs.gov.ru/Portal/programs/subActionsList?gpld=04&pgpld=95b6c28-c161-42a0-b866-04123db92e97 last accessed 2020/02/11
[8] Town Planning Code of the Russian Federation Article 48.2. http://www.consultant.ru/document/LAW_51040/ e28786 fad14 62c72 ef37 c56d41 b2ae7f13 04e47/
[9] The list of basic measures to adapt and increase the availability of facilities. https://tiflocentre.ru/documents/meropriyatiya-po-adaptacii.php
[10] Environmental Center Sevastopol. http://www.ekocentr-sev.ru/#!monitoring/
[11] Report by N.M. Kaznacheeva. https://depcultura.admhmao.ru/-dostupnosti-predostavlyaemykh-uslug-i-obektov-dlya-malomobilnykh-grupp-nas
[12] Problems of creating an accessible environment for people with limited mobility. https://cyberleninka.ru/article/n/problemy-sozdaniya-dostupnoy-sredy-dlya-malomobilnyh-grupp-naseleniya-v-zaseleniya-i-primorskom-kraye/viewer
[13] Social and ethical marketing: the essence, goals, ide. https://fb.ru/article/3751/razvityiy-sotsialno-eticheskii-marketing-indikator-zdorovogo-obshchestva
[14] Smart home as part of Smart City. https://www.intuit.ru/studies/courses/644/500/lecture/11367?page=3 last accessed 2020/02/11
[15] Berval A V, Romanova A I, Dobroserdova E A, Elokhova T A, Voronin A V 2017 The use of “smart” technologies in the field of municipal services Int. J. Econ. Res.
[16] Ozcan O, Ersoz F 2019 Project and cost-based evaluation of solar energy performance in three different geographical regions of Turkey: Investment analysis application Eng. Sci. Technol. an Int. J. https://doi.org/10.1016/j.jestch.2019.04.001. last accessed 2020/02/11
[17] Register of cost-effective design documentation. https://www.minstroyrf.ru/trades/gradostroitelnaya-deyatelnost/17/ , last accessed 2019/08/02
[18] Foreign experience: 6 urban projects for the disabled. https://www.the-village.ru/village/city/abroad/133779-opyt , last accessed 2019/08/02
[19] Tehne. http://tehne.com/event/koncepty-innovacionnye-proekty-detskih-sadov-dlya-rayonov-kraynego-severa-i-dalnego-vostoka , last accessed 2020/02/11
[20] SR 82.13330.2016 Landscaping ATP ConsultantPlus, last accessed 2019/12/02
[21] SR 44.13330.2011 Administrative and domestic buildings ATP ConsultantPlus, last accessed 2019/08/02
[22] SP 118.13330.2012 Public buildings and facilities ATP ConsultantPlus, last accessed 2019/12/02
[23] SR 59.13330.2012 "SNiP 35-01-2001 Accessibility of buildings and structures for people with limited mobility" ATP ConsultantPlus, last accessed 2019/12/02
[24] Federal Law of December 30, 2009 No. 384 Technical Regulations on the Safety of Buildings and Structures