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Features of the present stage of development of integrated development of areas and practical approaches to real estate management

The development of urban housing is governed by the programme of integrated development of areas (IDA), if new construction, renovation or reconstruction of old buildings are undertaken in the areas of historic urban residential development. Nowadays Construction Rules and Regulations must be updated to meet the needs of housing construction in terms of the high-density development of city centres, surveys needed to find out the hydrogeological parameters, methods of analysis of structural reliability and safety of buildings, periodicity and instrumental accuracy of examination of buildings and structures, regulations of operation and rules of demolition of old and uncomfortable housing. The purpose and intention of the integrated development of areas is the elimination of buildings, if their repair or reconstruction do not encompass any comfortable planning solutions or a comfortable living environment. Methods of analysis of the technical condition of housing and control parameters for software computations, recommendations to strengthen the bearing structures of a building, costs of the necessary work packages were developed to attain the objective.

Keywords: *integrated development of areas, renovation of housing, examination of buildings, hydrogeology, strengthening of foundations, soil stabilization, building demolition procedures, comfortable housing, economic evaluation*

INTRODUCTION

The Programme of integrated development of areas (IDA), developed for the cities of the Russian Federation¹, has identified a number of issues whose solution requires careful consideration. These issues are determined by the objectives of integrated development of built-up areas in the Russian cities, regardless of their geography, dimensions or population. Residents of large urban areas have long felt the effects of a number of factors on their living conditions. In an attempt to briefly formulate the goals of IDA, it is necessary to say that its main goal is to improve the quality of life of Russian citizens, moving into new comfortable homes located in landscaped residential areas that have social amenities, a good convenient system of parking lots and transport accessibility.

GENERALIZATION OF THE MODERN EXPERIENCE

The development of urban housing is implemented in accordance with the Programme of Integrated Development of Built-up Areas (IDBA), if new construction, renovation or reconstruction of old buildings are undertaken in the areas of historic urban residential development. Stages of modern urban construction and processes, associated with the operation of residential real estate, require not so much revision of numerous construction rules and regulations (SNiP, SP, GOST) relating to the design, construction work performance and operation of residential buildings, as the rigorous implementation of long-established norms. The main reason for these changes are

the requirements arising from the analysis of the experience of construction in the large cities and the past emergency situations in old existing buildings, where the new "infill" facilities are built, destructively affecting surrounding homes and buildings. Effective rules and regulations, governing construction works, prohibit deep foundation works, excavation of pits, installation of pile structures, erection of high buildings in the vicinity (less than 30–50 m) of the existing buildings without the preliminary examination and control of the technical condition of these facilities during the work performance. They result in a number of protective construction measures designed to preserve existing facilities and conditions of their operation².

A serious problem that requires ongoing attention and strict observance of the applicable standards and regulations at the stages of survey and design of building foundations is the consideration of changes in the hydrogeological conditions and conditions of soil bases. The existing loads, coming from the foundations of buildings, disturb the balance of the existing hydro-geological pressure in soils, which is associated with the zone of low-rise buildings that have more storeys. And this trend is true for all modern urban construction projects, based on the economic attractiveness of developer's investments. However, data on and parameters of foundation soils, identified in the process of geological surveys, often miss information about the presence or migration of excess moisture, filtration coefficients, aquifers and their pressure gradients. This creates a factor of unexpected watering of foundation soils and changes in their physical and mechanical characteristics, as well as bearing

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¹ On Amendments to the Town Planning Code of the Russian Federation and Certain Legislative Acts of the Russian Federation in order to Ensure the Integrated Development of the Territories : Federal Law No. 494-FZ dated December 30, 2020.

² TSN 50-302-2004. Establishment (design) of foundations for civil buildings and structures. 2004.

► properties. Surveys of the facilities, located close to those under construction, should reflect the hydrogeological situation of their foundation soils, and designs should contain the measures to protect the facilities from possible effects of changes³.

The widespread use of underground spaces in modern projects of residential buildings, that serve as parking areas, is a necessary forward-looking solution to the growing shortage of urban areas, but the experience of their construction, given that the design solutions are far from being perfect, shows that the technology of their construction has a negative impact on the technical condition of the neighbouring buildings. The technological significance of this phenomenon is that during the excavation of deep pits, pressure is eliminated from foundation soils, and its subsequent growth, that accompanies the construction of the superstructure of a new building, compared to the settle-out pressure from the surrounding buildings. Hydrogeology responds to these changes rather quickly and unexpectedly. Only continuously monitored aquifers in foundation soils can capture and record these dangerous changes.

Against the background of intensive urban construction, as well as natural and man-made changes, in recent decades (30–40 years), there has been a trend to reduce the number of examinations of the technical condition of real estate facilities and it affects residential buildings to the greatest extent. Given that a large number of visible factors affect the current situation, and the main of them include the uncertainty in terms of the responsibility for the technical condition of housing in the cities. Owners of apartments in multi-storey buildings, i.e. residents, do not have the knowledge to make decisions; they do not understand their responsibility and the need for the ongoing control over the condition of their building. Management companies do not have enough experts, they cannot and do not want to spend money neither on current, planned repairs, nor on the instrumental examination of the bearing structures of a building, including its foundations inaccessible for examination. Similar policy is implemented by the Fund of Capital Repairs. The number of examinations of the technical condition of residential buildings, expressed as a percentage of the total funding that is subject to major repairs, according to the statistical reporting data of Rosstat (Federal Service of State Statistics) for 2020–2021, does not exceed 0.2–0.5 % a year in a major city with one million residents. During the same period, restoration of foundation structures reached 0.02–0.1 %, which 10 times less than the cost of survey works themselves.

When making conclusions on the basis of the above evaluation, one should assume that the technical condition of foundations can either be assessed as “perfectly perfect”, otherwise the overhaul of the housing stock has no engineering or technical substantiation whatsoever. Obvious facts confirm that the most heavily funded types of capital repairs are the filling and painting of cracks in facades every 2–3 years. The cause of cracking bearing walls is the subsidence of soils below the foundations of buildings, but these causes can be recorded, instrumentally assessed, but their elimination procedures can only be selected by the technical examination specialists. It should be understood that the real cost of capital repairs of residential buildings will soon accrue, since the elimination of more serious destructions will be needed. Such processes are ubiquitous and lengthy; they accelerate the general destruction of housing in the cities, because without the examination of buildings or restoration works, facade painting become meaningless.

PROBLEM SOLVING APPROACHES AND METHODS

One can do away with the current practice of planning capital repairs in respect of urban housing on the basis of visual inspections by the employees of management companies that have no proven professional skills, since this work must be performed by professional licensed organizations, capable of performing instrumental surveys [1].

The results of many years of uncontrolled development and operation of residential buildings determined the composition of urban areas adjacent to the city centre or its historic part, consisting of buildings of the post-war construction period of 1950–1975. The first standard series of 3–5 storey brick houses with small apartments, prefabricated reinforced concrete panel series of 5–9 storey buildings are characterized as high and limited-performance facilities, having the lowest value of the indicator of the comfort of living. They are located in the areas adjacent to the main streets and near the borders of historic centres; therefore, these areas should be included in the IDA plans and are lucrative for modern developers [2–4].

However, the process of developing IDA programmes is very complicated and the pace of work is hampered by the lack of accurate data on the technical condition of residential buildings. The developer, acting as a co-investor, must make a decision about the effectiveness of the development project, based on the ratio of residential, social, cultural, educational and recreational functions, as well as the most important indicator, that is, the area of parking lots. Obviously, the cost of all the above-mentioned types of facilities can only be covered by means of construction of new comfortable and attractive housing to be built in this area. We must understand that it is impossible to create a new and beautiful development surrounded by old and dilapidated housing.

The Programme of Integrated Development of Areas provides a unique opportunity to make proper management solutions and free our beautiful cities from the outdated 80-year-old legacy. Developers can act gradually and systematically to transform all residential areas, remembering that a huge portion of our population continues to reside in the “Khrushchev quarters”, realizing their role in saving the lives of people in the “50s” of the past century [5–7].

A serious problem is the process of resettlement of residential buildings, namely those buildings that are designated for demolition. The mechanism of resettlement is very important, because it triggers violent reactions of the population and can cause a strong negative reaction, and the project implementation can be put to a halt. This issue requires close attention and smart decision in the near future [8–10]. The danger is a simplified approach, when the practice of polling the opinions of tenants of the house chosen for demolition by the staff of management companies, is unacceptable, and their competence in resettlement rules is simply doubtful. The result of such surveys is obvious [11, 12].

A practical approach to IDA programmes is to evaluate the technical condition of the facilities to make a decision about their demolition, reconstruction, or overhaul, as the technical and legal grounds underlying decisions on renovation programmes.

RESULTS

As a result of research, the authors developed the software and control methods, applied to the key parameters of building

3 On approval of the Regulations on recognizing premises as residential, residential premises unfit for habitation, an apartment building as emergency and subject to demolition : Decree of the Government of the Russian Federation No. 47 dated January 28, 2006 (as amended on April 6, 2022).

structures that allow to quickly and reliably identify the ultimate bearing capacity of a building, taking into account factors of its real condition and strength characteristics. The estimated cost of strengthening building elements and improving its consumer functionality determines the inexpediency of its repair or reconstruction and, hence, such facilities are subject to demolition. However, the main reason for such a decision is determined by the impossibility to ensure the indoor comfort, if large financial investments cannot achieve the result and deprive the residents of any prospects for improving their living conditions.

One of important tasks of successful integrated development of urban areas is to facilitate the renovation of the housing stock. Its purpose is to demolish those types of buildings whose repair or reconstruction cannot generate any comfortable planning solutions and a comfortable living environment. It is a chance to have unoccupied spaces for the construction of modern comfortable housing, get residents to move from demolished houses and build new housing.

CONCLUSIONS

The task of rapid and long-term future-oriented examination of all urban housing should be performed by the technical control departments to be established at urban construction departments. The new structures are to be equipped with modern measuring facilities and software to control the structures to be examined and analyze the bearing capacity of frameworks. And most importantly, highly qualified employees who have mastered the methods of such control and are capable of quickly drafting engineering design solutions needed to strengthen defective structures to immediately evaluate the technical condition of the facility and the expediency of its further operation.

The practice of preserving old and dilapidated housing for centuries until its complete destruction does not meet modern requirements. Pursuant to the Decree issued by the RF Government, this type of residential buildings includes standard buildings built in 1945–1965; they have small-sized apartments. Even the visual examination of the area to be renovated makes it possible to assess the condition of such buildings, whose foundations have deformations, and cracks are continuous in the corners of window openings on the facade of buildings.

Financial contributions in the repair and reconstruction of such facilities are large and cannot ensure comfortable living conditions for owners. The renovation of the housing stock is aimed at solving these problems in accordance with the RF Government Decree on the integrated development of the areas of its subjects.

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Особенности современного этапа развития КРТ и практических подходов к управлению недвижимостью

Развитие городского жилищного фонда осуществляется в соответствии с Программой комплексного развития территорий (КРТ), где в зонах исторически сложившейся городской жилой застройки ведется новое строительство, реновация или реконструкция старых зданий. Современное жилищное строительство в процессе своего развития требует корректировки и уточнения Строительных норм и правил, регламентирующих плотную застройку центров городов, изысканий для уточнения параметров гидрогеологических условий, методов расчета конструктивной надежности и безопасности зданий, требований периодичности и инструментальной точности обследований объектов,

требований по регламенту эксплуатации и правилам сноса старого и некомфортного жилья. Целью и смыслом комплексного развития территорий является удаление из сложившегося жилого фонда тех типов зданий, ремонт или реконструкция которых не обеспечат создание удобных планировочных решений и возможности реализации комфортной среды для проживания. Для реализации цели разработаны методы оценки технического состояния жилого фонда и параметры контроля для программного расчетного обеспечения с рекомендациями по усилению несущей части здания и финансовыми показателями стоимости необходимого комплекса работ.

Ключевые слова: комплексное развитие территорий, реновация жилого фонда, обследование зданий, гидрогеология, усиление фундаментов, закрепление грунтов, правила сноса зданий, комфортное жилье, экономическая оценка

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