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THE CONTENT AND SPECIFIC FEATURES OF RECONSTRUCTING THE RESIDENTIAL HOUSES OF VARIOUS CONFIGURATIONS

Introduction. *After the World War II in the countries of Western and Eastern Europe, as a result of war devastations and population growth, a housing crisis arose, because of which, in the 1950's, there was a boom in the construction of small cheap apartments.*

Problem Statement. *Because of massive development, the issues of consumer quality of apartments, their comfort, durability, and energy efficiency were in the focus of public attention and, as early as in the early 1980s, these houses had not met the norms and technical requirements and required reconstruction works. In many European countries, this problem has been successfully solved, while in Ukraine it has been relevant so far.*

Purpose. *To introduce unified design schemes for the reconstruction of the first series of mass houses on the territory of Ukraine by establishing the possibility of re-planning and rearrangement of apartments to improve the quality of residential facilities for future inhabitants.*

Materials and Methods. *Analysis of events and publications on the status and possibilities of reconstruction of the first series mass houses.*

Results. *The content and features of reconstruction of the first series mass residential houses (FSMRH) of the mentioned period are considered in view of their structure and configuration, taking into account the experience of the countries of Western and Eastern Europe. The document that is part of verification of the reconstruction strategy has been developed. It is divided into the two additional tests: 1) a test complement to the three thematic studies in Belgium, France, and Switzerland; 2) test of the prospects of interaction with stakeholders (investors, housing owners, and public administration).*

Conclusions. *Structural systems and configurations for the reconstruction of the first mass series houses in Ukraine have been considered. The unified scheme of re-planning and rearrangement of the first mass series houses with different structural systems and configurations has been presented. The reconstruction of the first mass series houses for which resettlement of inhabitants is not required has been analyzed.*

Keywords: first series mass houses, renovation, reconstruction, redevelopment, and attachment to house.

After the Second World War, in Western and Eastern Europe countries, as a result of destructions caused by military actions and population growth, there was a housing crisis that manifested itself in especially severe manner in large cities. Consequently, in the 1950s, they started mass housing construction of cheap and small-sized apartments [1] neglecting the issues of quality, comfort, durability, and energy efficiency of these houses.

a *b*

Fig. 1. Reconstruction of low-storey large-panel houses in the city of Erfurt (Germany): *a* — an added mansard; *b* — upper-floor balcony conversion into loggia

While Soviet military units were staying in the Warsaw Pact countries, a significant number of residential houses were built on the territories of the military towns of these countries according to the typical design used in the Soviet Union. For the time being, these countries have accumulated a significant experience in the reconstruction of residential buildings of this type [2].

At the same time, micro-districts with four-storey and five-storey large-panel houses appeared in France, Germany (Fig. 1), Denmark, Sweden, and Finland (Fig. 2). Governments were stimulating the construction of such houses through subsidies. In the late 1960s, the share of large-panel construction in the residential sector amounted to 50%, in France, 64%, in Germany, 70%, in Finland, and 60—70%, in Sweden [3].

Studies have shown that population's requirements for the quality of housing change every 8 years [4]. As early as at the beginning of the 1980s, the panel houses had not met the regulatory and technical requirements and needed to be reconstructed. These houses were reconstructed by:

- Adding extra floors;
- Attaching loggias, balconies, and terraces;
- Modifying the house configuration (with partial disassembly, construction of new fragments);
- Modifying the architectural solution by renovating the facades, attaching balconies and loggias [4].

At the same time, the reconstruction of residential buildings was accompanied by switching to new heating systems with the replacement of engineering equipment, which required a huge money. In this regard, the governments of European countries developed programs for the reconstruction of residential buildings to implement which they allocated government subsidies and preferential loans. In particular, in Germany, in the 1990s, a program for the reconstruction of large-panel houses was developed and implemented, for which the government issued a loan of DM 70 billion at low interest rates (4.6% per annum). As a result of the program implementation, over 90000 large-panel houses have been reconstructed [5].

In France, today, there are four government programs for the reconstruction of urban housing system:

1) housing improvement program: subsiding up to 35% of the cost of works and benefits (for a period of up to 3 years), subject to certain conditions to homeowners;

2) targeted social programs: subsiding of up to 70% of the cost of works for the reconstruction of small residential buildings to low-income homeowners;

3) building renovation program: granting significant tax privileges to homeowners during the reconstruction period. In the case of their refusal

to renovate the building, local authorities have the right to sell the object to an investor for the purpose of reconstruction;

4) Demolition of buildings with unsatisfactory living conditions: subsidies to homeowners for the demolition and reconstruction of old buildings. In the case of refusal, the state has the right to make the necessary works at the expense of homeowner [6].

In France, the advanced technology for the reconstruction of residential buildings with the use of new resource and energy saving technologies and efficient materials has enabled to reconstruct a residential building in 3—6 months, depending on the amount of required works. Usually, these works are done without resettlement of inhabitants, keeping their living conditions as much as possible [7].

In 2010, 11 panel houses were repaired in Vilnius (Lithuania). According to the proposed methodology, all experience and methods of reconstruction are recorded in a single database to be used for future projects. The selection of design solutions for the reconstruction of standard five-storey panel houses built after 1965 to be used for the reconstruction of other multistorey buildings [8] has been analyzed.

In the United States, there are federal programs for the reconstruction of residential houses at the level of the micro-districts. A prerequisite for the budget financing of these works is the analysis of the cost of 25-year cycle of residential building maintenance.

In the Netherlands, one of the main components of government expenditure for housing is subsidy programs for the reconstruction of old-fashioned areas, which are financed from the Fund for the reconstruction of cities, to which the government contributes about USD 500 million annually. Within the framework of the program for the reconstruction of old districts, municipalities receive subsidies for additional insulation of exterior walls, roofs, and window openings. In addition, in this country, there are various subsidy programs for the reconstruction of residential buildings. At the same time, the government incurs the costs for installing elevators in multistorey buildings and modifying houses to suit people with disabilities (ramps, bathroom and kitchen refurbishment).

In Sweden, the cost of reconstruction, maintenance, and operation of residential houses is fully reimbursed at the expense of house rent. It includes renovation, maintenance, and operation cost depreciation that make up from 15 to 50% of family income [9].

In Switzerland (Geneva), a scientific model for the renovation of standard housing has been proposed, the key idea of which is to use experience of previously implemented standard projects for the future reconstruction projects. The approach is based on the selection of the best alternative

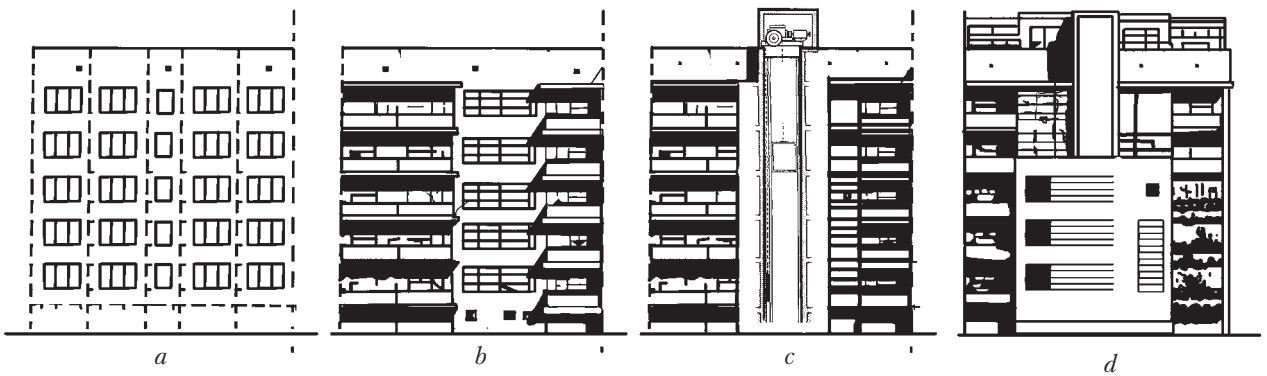

Fig. 2. Reconstruction of large-panel residential houses in Finland: *a* — appearance of building; *b* — added loggias; *c* — elevator shaft; *d* — added solarium

a *b*

Fig. 3. Reconstruction of residential houses built before 1917 in St. Petersburg (Russia): *a* — 4 Shamshev Street, 4; *b* — Fontanka River Embankment, 34

projects as framework for the development and implementation of new variants of reconstruction. While modeling the status of power balance of the city, the buildings classification methodology has been combined with clusterization and predictive modeling. Firstly, it is necessary to collect data about the status of buildings, and then to apply the classification methods and clustering algorithms for the identification of buildings clusters. After that, individual buildings in each cluster are identified. This methodology can be used for multifunctional objects. Within the established clusters, 89% of the building fund has been classified. In total, 67 houses have been surveyed in this way [10].

This research deals with the tactics for the restoration of available housing based on sustainable development strategy. So, to achieve the goals of sustainable development associated with high world standards for quality, environmental, social, and economic indicators, these indicators shall be subject to continuous monitoring. Based on these considerations, an operational instrument for monitoring the status of residential buildings has been created, which facilitates the transformation of urban useful spaces into sustainable residential areas.

In market economies, a significant share of investments is directed towards the reconstruction of residential buildings. According to expert estimates, the share of investments in the reconstruction of residential facilities in Germany is 70% of the amount allocated for new construction and about 50% in Canada and Denmark. In the United States, this share exceeds 40%, a similar trend has been reported for the Netherlands [11]. It should be noted that western specialists have been already developing methods for the reconstruction of modern dwelling houses.

In Russia, a significant differentiation of consumer requirements for the quality of housing and various sources of funding for the reconstruction of available housing have resulted in different approaches to choosing methods of preserving and restoring the housing stock. For instance, the housing stock of St. Petersburg can be divided into three categories related to the construction period: from 1918 to 1940, from 1941 to 1955, and from 1956 to 1984. The residential buildings built before 1917 are reconstructed as well (Fig. 5), but they can be referred to a separate period of construction [10]. This classification enables developing individual strategic directions for the reconstruction of houses of each construction period. For example, the houses built before 1917 are reconstructed in the three ways:

- the first way is transformation of residential buildings into administrative buildings. As of today, in St. Petersburg, about one-third of these houses has been transferred to the non-

residential fund. There, there are operating banks and corporations;

- the second way is the reconstruction of residential houses with the creation of elite dwellings. These houses are especially attractive for rich consumers due to their location in the central part of the city, high ceilings, spacious staircases, large multiroom apartments, and expressive architecture of the facades;
- the third way is selective reconstruction of individual floors or apartments by private investors for residential premises or offices.

In addition to the above mentioned three way of reconstructing the houses built before 1917, there is the method of a modern design multifunctional insert building made using advanced technologies (Fig. 4).

Comprehensive reconstruction of residential houses built in the period of mass housebuilding requires significant investments and is unlikely to be implementable without government support. In this regard, programs for fund raising from all possible sources can be an alternative to government support, for comprehensive reconstruction of residential buildings. Structurally, the all residential houses of the first mass series are configured as longitudinal and transverse bearing walls, with solid hollow core or raised concrete floor slabs, with external walls of monolithic brickwork, brick blocks, vibrated brick, slag concrete or haydite concrete panels. This structure is conditioned by the need for prefabricated structures and products, their high manufacturability and speed of construction of buildings, as a result of increasing floor space of residential dwellings.

Often, Khrushchev-era apartment blocks have had no major repairs over the entire period (up to 50 years or longer) of operation that resulted in cracks, leakages, malfunctions, clogged ventilation, damaged under roof elements above the entrances, and so on, which gives impression of neglect, unsuitability, and dangerous living conditions. However, the inspection of structures has shown that these buildings are reconstructable.

Fig. 4. Insert building between FMSRH on Uralska Street, Ekaterinburg (Russia)

In the authors' opinion, from the point of view of reconfiguration, the most suitable are buildings of the 1-438 and 1-480 series, which make up 58% of the total amount of FMSRH.

They are based on the design with three longitudinal bearing walls. The rest houses of the 1-464, 5-70, and other series have transverse bearing walls. The calculations show that buildings with transverse walls have a greater spatial rigidity as compared with houses having longitudinal bearing walls, and therefore their designs are more suitable for complex environments (mines, places with a high risk of subsidence, landslides and seismic activity). Over time, the joints of external wall panels, wall and floor panels, and, in particular, the angle joints of the outer walls undergo climatic effects. As a result of moisture effect, their embedded parts have been corroded and, therefore, in the future these joints have to be additionally reinforced. However, remedying these defects is complicated for the buildings with transverse bearing walls, and, consequently, "the buildings of the 1-464 series cannot be substantially reconfigured because of a high complexity of creating additional openings in the transverse bearing walls" [10].

The analysis of the condition of first series mass residential buildings has shown that in those se-

ries of buildings, the anchors fastening the structural system of the house have been rusted, and this defect is difficult to eliminate, therefore, living therein is really dangerous. It is advisable to demolish them and to use the cleared territory for constructing new buildings; for the series where the anchors are well protected by a mortar and have not been corroded or are easily accessible, all the main structural framework is quite durable and can serve 80—100 years longer. Insignificant damages in the form of cracks with a width of no more than 1 mm, which are estimated as 20% of physical depreciation, according to experts, are easily repairable. However, attaching any superstructure to such buildings should be treated very cautiously, given the condition of the building's structures. So, it is not recommended to add more than one store with a mansard and, moreover, it is inappropriate to use the "flamingo" method that envisages adding several stores with following removal of the "old" part of the house.

The type of structures used in the FSMRH and their configuration significantly affect the typological capabilities of houses to be reconstructed, while materials and structures used for reconstruction influence the appearance of buildings, the configuration of premises in the zone of interface with new exterior walls, and also the configuration of summer annexes (balconies, loggias, terraces, and sun lounges).

Configuration of buildings with three longitudinal bearing walls (series 1-438, 1-437, and 1-480). The majority of buildings in these series is in a satisfactory condition. The internal space can be easily modified by shifting the partitions and reconfiguring the premises. Removing the window breast while preserving the pillars and beams of the external bearing walls enables to extend the apartment space over narrow (up to 10 m) existing building, while a small number of crosswalls makes it possible to widen the rooms. Some limitation of the reconfiguration options is fixed position of the former windows, now the openings, in the existing external walls, as well as the presence of raised concrete slabs having a size of the room with a curb along the perimeter.

Building extensions with a mixed step of transverse bearing walls outside the existing exterior walls makes it possible:

a) to increase the width of the building;

b) to reconfigure and to widen apartments;

c) to increase the area of apartments;

d) to increase the area and to diversify the types of annexes;

e) to modify the frontal design of residential houses.

Configuration with transverse bearing walls (series 1-464 and 5-70). In the houses of these series, the narrow step size is so small (for example, 2.60 m in the axes of the bearing walls in the 1-464 series) that forms the parameters suitable for some service spaces only.

For example, in a 2.40 m wide premise, it is possible to arrange either a minimum dining area having awidth of 2.30—2.40 m, but in this case, there is no space for a passage of at least 50 cm width; or a cooking zone with equipment placed in two rows; or an individual studying place equipped with 2.15 m wide book shelves; or a storage closet with shelves placed in two rows; or a sleeping area for one adult person or for two children with beds arranged along the walls; it is not suitable for a family rest corner; a sleeping area for a married couple; a TV watching area, etc. The rigidly fixed transverse walls do not make it possible to reconfigure the apartments within the existing perimeter, but there is a possibility of reconfiguration by reducing the number of apartments on the floor.

Building annexes to apartments on the basis of hybrid or wide step of transverse bearing walls makes it possible to improve configuration of apartments. This is achieved by combining the main core of the apartment with the attached part and adding service areas at the expense of "old" building space (Fig. 5).

The considered approach to the reconstruction is possible, but is not the most efficient one. The annex creates an additional space to the existing

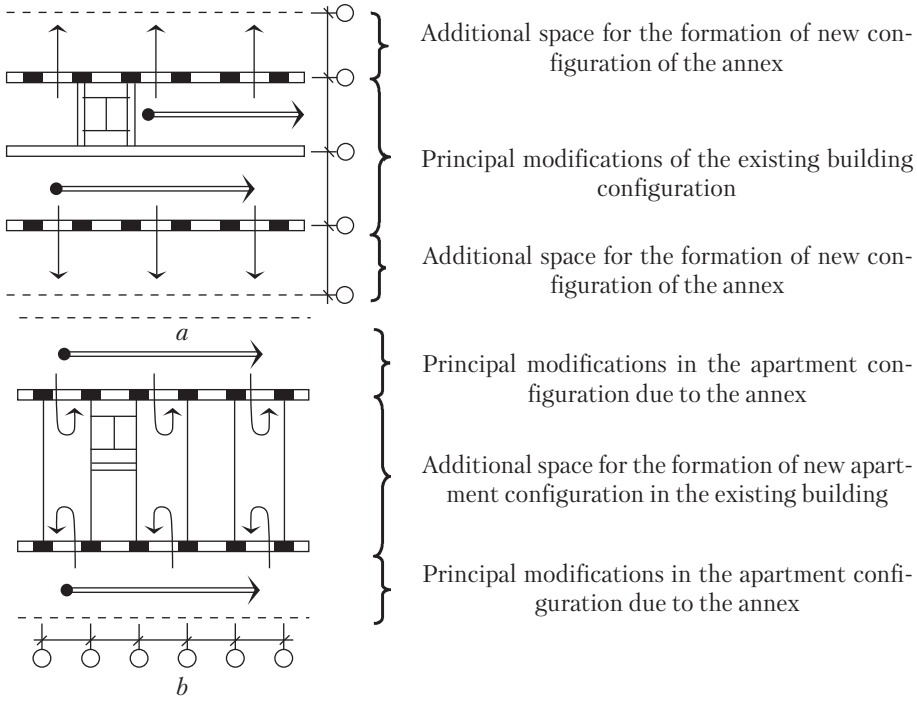

Fig. 5. Options and limitations on reconfiguration of FMSRH apartments, depending on the type of framing scheme: *a* — with three longitudinal bearing walls; *b* — with transversal bearing walls

building rather than enlarges the area of the apartment located inside the existing building or modifies its configuration solution. In the case of this approach, the design constraints are window openings and transverse bearing walls of the main framework (piers and beams of exterior self-bearing walls are preserved).

SERIES WITH LONGITUDINAL BEARING WALLS

A. *The option without resettlement of inhabitants.*

In the pilot projects in Ukraine (Kharkiv), the buildings of this type have been upgraded as follows: a mansard (or one more floor with a mansard) is attached and the exterior walls are heated (Fig. 6). At the same time, existing functionality problems are not eliminated: minimal area of premises, no functional zoning, walk-through rooms, etc. Thus, despite generating additional revenues from sale of mansard apartments and improving the appearance of the house, designers do not solve the social problem, as these modifications do not lead to improvement of living conditions in the Khrushchev-era residential houses.

In the case of reconstruction without resettlement, at a distance of up to 3 m from the existing building it is possible to construct new walls of different configurations based on the design with a wide or hybrid step of transverse bearing walls, which are attached to the house with the use of slab fragments. In this case, if one removes the window breast and converts the former window into the opening, each room gets an additional area of 9—10 m^2 that can be used as a loggia or a terrace or combined with the room in order to enlarge it (for example, a 6 m^2 kitchen can be converted into a kitchen combined with a dining room with an area of up to 15 m^2). The annex can be divided into two parts, the outer one can be used as a loggia with a depth of 1.2—1.5 m, and the inner one adjoining to the room can be added to the room to increase its area. For this configuration, there may be a need to install new parti-

a *b*

Fig. 6. Pilot project of residential house reconstruction without resettlement of inhabitants in Kharkiv (Ukraine): *a* — building's façade; *b* — added mansard

tions for the extension of the corridor, the arrangement of storage closet at the corridor's end, and so on.

All works related to the removal of the window breast, insulation of floors and walls, dismantling of existing partitions, installation of new walls and partitions, obviously, shall be centrally coordinated, based on respective design solutions, and performed at the expense of residents.

This method enables to achieve improvements at minimum costs, without resettlement of the inhabitants and modification of the engineering infrastructure in the micro-district, in particular:

a) to create a new expressive insulated facade;

b) to expand a residential house;

c) to increase the area of apartment and its individual rooms, as well as of summer annexes;

d) to improve the configuration of service part of the apartment and to improve the living comfort.

B. *The option with resettlement.*

The resettlement of inhabitants enables reinforcing the building framework, remedying leakages, reconstructing the roof, replacing sanitary equipment and relocating the utilities in such a way as it is required for optimal solutions. It is also possible to change the number of apartments on the floor, relocating the staircases of general use and, if necessary, the elevators. It enables to significantly (by 5—9 m) expand the building and, consequently, to increase the area of residential premises and service zone, to configure apartments according to the present-day requirements for living comfort (with dining rooms, office, library, gym, etc.), as well as to form a new appearance of residential house, which meets the modern architecture and environment requirements, using advanced materials and design solutions.

Among the promising methods there is the method for a wide (up to 6 m) extension along the whole house with a wide or hybrid step of transverse bearing walls on the side of the best heat insulation of the facade and with the same extension up to 3 m on the side of the stairs and entrances to residential building. The narrow extension enables to increase the room depth, to make loggias and terraces, whereas the wide one is converted into a residential zone of various widths and configurations, and, in fact, forms the basis for a new configuration of apartments, in which it is possible to use spaces with a complex contour, whilethe southern part of the existing building, which adjoins to it is converted into a service zone of the house, which is very necessary for creating comfortable living conditions in the apartments of Khrushchev-era residential houses. The advantages of this reconstruction method are obvious: a new apartment configuration that

can be compared to the elite housing and the use of the existing building framework without creating any additional load on it.

SERIES WITH TRANSVERSE BEARING WALLS

A. *The option without resettlement of inhabitants.*

This option envisages building new exterior walls with a wide or hybrid step of transverse bearing walls, at a distance of up to 3 m from the existing walls, using new, possibly original, profiles to create additional service areas (dining room, gym, work area, multifunctional rooms, loggia, terrace, and veranda). This will help improve the living conditions in such residential houses. Works on shifting partitions, dismantling window sections in the existing external walls, glassing loggias, insulating floors and exterior walls in order to increase the area of rooms can be done at the expense of residents.

Since, as mentioned above, the modernization of the framework in such buildings is complicated, it is not feasible to spend a lot of money on their reconstruction. Obviously, these houses will be the first ones to be demolished.

B. *The option with resettlement.*

In the case of resettlement, it is possible to reconstruct the houses with transverse bearing walls in the same way as without resettlement, by building a narrow extension (up to 3 m wide) along the facade on both sides, but in this case, the number of apartments on the floor shall be reduced. In this case, the room width remains unchanged, therefore, within the space of 2.60 m step of transverse walls, it is advisable to make either a single person bedroom, or a kitchen, or a bathroom, but not a living room or bedroom for spouses.

One of the possible options for the reconstruction of these buildings is attaching island sections or semi-sections having different number of floors, with a small adjoining line or in parallel, at a certain distance from the existing building, and with terrace-, gallery- or section-type passes between the old and the new buildings, thereby making a wide-body house. This approach ensures a semi-autonomous existence of the old and the new parts, and, as soon as the service life of the former expires, it can be removed and replaced with a new one without any significant interference in the latter.

Insofar as the framework of buildings with a narrow step of transversal walls "works" better in complex geological and seismic conditions, this method can be efficient in such conditions.

The options for the reconstruction of buildings with different framing schemes with and without resettlement of inhabitants are summarized in Table.

Variants of reconstruction methods of residential houses of the first mass series with different structural scheme of bearing designs

Framing scheme	Method of reconstruction	
	With resettlement	Without resettlement
With longitudinal bearing walls (series 1-438, 1-437, and 1-480)	Widening of framework with attached parts with a wide and hybrid step of longitudinal bearing walls; relocation of WC Extensions of various configurations with different number of floors along the façade Other methods	Extensions on longitudinal bearing walls with various profiles of exterior walls along the façade
With transversal bearing walls (series 1-464, 5-70, and1-468)	Attachments in the form of parallel island buildings adjoining to the longitudinal wall, etc.	Attachments of various configurations with a wide or hybrid step of the transversal bearing walls and a depth of up to 3 m along the façade

Solving the problems related to the reconstruction of first mass series residential houses on the territory of Ukraine requires using modern building materials and products. Failure to do that can endanger the dwellers. In research [12], the authors have suggested an integrated approach to solving the problem of "environment friendly" materials, services, and goods from the extraction of raw materials to their use or operation.

CONCLUSIONS

The design solutions for the FMSRH reconstruction in Ukraine have been considered. The options for reconfiguring the FMSRH with different framing schemes have been designed. The FMSRH reconstruction options without resettlement of inhabitants have been analyzed. The problems to be solved in further researches are as follows:

1) when doing design and survey works, it is necessary to take into account the fact that most of these buildings are located near the main traffic arteries and suffer from harmful noise effects and gas pollution. Estimated pollution and methods for protection from it have been given in [13];

2) in order to choose the most optimal reconstruction option, it is necessary to develop a method for qualitative assessment of economic and environment indicators (factors), as proposed in [14].

REFERENCES

1. Kostetsky, N. F., Gurko, A. I. (2003). Foreign experience of reproduction of housing stock, its preservation and modernization. *Economics of construction,* 5, 33—45 [in Russian].

2. Dmitriev, A. P., Orlovich, R. B., Shafranco, E. (2002). Foreign experience of modernization of large-panel buildings. *Proceedings of the Higher Educational Institutions. Building*, 1—2, 8—12 [in Russian].

3. Shreiber, A. K. (1993). Technical and economic assessment of options for organizational and technological solutions in the design of the reconstruction of residential buildings. *Economy of construction,* 3, 25—27 [in Russian].

4. Lukmanova, I. G., Slobodenyuk, S. V. (1997). Experience in reconstructing panel buildings in Germany. *Economy of construction,* 3, 48—54 [in Russian].

5. Buzirev, V. V., Selyutina, L. G., Berezin, A. O. (2002). Modeling the optimal structure of housing construction in a large city. *Economy of construction,* 9, 29—38 [in Russian].

6. Limarenko, V. I. (2000). Modeling of the system of management of mortgage lending in the conditions of the transitional economy of Russia. *Economy of construction*, 6, 2—13 [in Russian].

7. Housing/Brezhnevk. URL: https://www.globalsecurity.org/military/world/russia/housing-brezhnevki.htm (Last accessed: 30.06.2018).

8. Kartashova, K. K. (2003). Reconstruction of a city dwelling taking into account modern social needs. *Proceedings of the Higher Educational Institutions. Building*, 7, 125—131 [in Russian].

9. Marta Maria Sesana. Energy and Buildings. A review on Building Renovation Passport: Potentialities and barriers on current initiatives. URL: https://www.sciencedirect.com/science/article/pii/S0378778818302937 (Last accessed: 30.06.2018).

10. Giovanni Tardioli. Identification of representative buildings and building groups in urban datasets using a novel pre-processing, classification, clustering and predictive modelling approach. URL: https://www.sciencedirect.com/science/article/pii/S0360132318303019 (Last accessed: 30.06.2018).

11. Martine Laprise. An operational monitoring tool facilitating the transformation of urban brownfields into sustainable neighborhoods. URL: https://www.sciencedirect.com/science/article/pii/S0360132318303482 (Last accessed: 04.07.2018) [in English].

12. Sankov, P., Tkach, N., Trifonov, I., Iliev, I., Blyzniuk, A. (2017). Residential Environmental and Ecological Safety of Person. *IJISET—International Journal of Innovative Science, Engineering & Technology*, 4(4), 278—281 [in English].

13. Sankov, P., Tkach, N., Dikarev, K., Blyzniuk, A., and Hvadzhaia, B. (2018). Effect of motor transport on the working places in the service infrastructure (by noise factor and urban air pollution in the city center of Dnipro). *Sci. innov.*, 14(3), 59—66 [in English].

14. Sankov, P., Trifonov, I., Tkach, N., Hilov, V., Bakharev, V., Tretyakov, O., Nesterenko, S. (2017). Development of the method of evaluation the level of environmental safety of housing accommodation and its approbation. *Eastern-European Journal of Enterprise Technologies,* 4/10(88), 61—69, 79—80. doi: 10.15587/1729-4061.2017.108443. [in English].

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СУТЬ ТА ОСОБЛИВОСТІ РЕКОНСТРУКЦІЇ ЖИТЛОВИХ БУДИНКІВ РІЗНИХ КОНСТРУКТИВНИХ СИСТЕМ

Вступ. Після Другої світової війни в країнах Західної та Східної Європи, внаслідок воєнних руйнувань та зростання населення, виникла житлова криза, для розв'язання якої в 50-і роки XX століття було розпочато будівництво значної кількості низьковартісних малометражних квартир.

Проблематика. Зважаючи на масовість, питанням споживчої якості введених в експлуатацію квартир, їх комфортабельності, довговічності й енергоекономічності приділялася незначна увага. Вже до початку 80-х років XX ст. ці будинки не відповідали нормативно-технічним вимогам і потребували проведення робіт з їх реконструкції. У низці країн Європи цю проблему вдало вирішили, тоді як в Україні вона актуальна й сьогодні.

Мета. Введення єдиних конструктивних схем при реконструкції будинків перших масових серій (ПМС) на території України шляхом встановлення можливості перепланування розташованих в них квартир для підвищення якості проживання майбутніх мешканців.

Матеріали й методи. Аналіз заходів та публікацій щодо стану та можливостей реконструкції будинків ПМС.

Результати. Розглянуто сутність і особливості реконструкції житлових будинків перших масових серій згаданого періоду з огляду на стан їх конструкцій з урахуванням досвіду в країнах Західної та Східної Європи. Розроблено документ, який є етапом верифікації стратегії реконструкції, його розділено на два додаткові тести: 1) тест-додаток трьох тематичних досліджень у Бельгії, Франції та Швейцарії; 2) тест на перспективи взаємодії з зацікавленими сторонами — інвесторами, власниками житла й органами державного управління.

Висновки. Наведені конструктивні системи при реконструкції будинків ПМС на території України. Наведено єдину схему перепланування зазначених будинків з різними конструктивними системами. Проаналізовано можливості реконструкції таких будівель без відселення мешканців.

Ключові слова: будинки перших масових серій, реновація, реконструкція, перепланування, прибудова.

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СУТЬ И ОСОБЕННОСТИ РЕКОНСТРУКЦИИ ЖИЛЫХ ДОМОВ РАЗЛИЧНЫХ КОНСТРУКТИВНЫХ СИСТЕМ

Введение. После Второй мировой войны в странах Западной и Восточной Европы, в результате военных разрушений и роста населения, возник жилищный кризис, для решения которого в пятидесятые годы XX века было начато строительство значительного количества низкостоимостных малометражных квартир.

Проблематика. Несмотря на массовость, вопросам потребительского качества введенных в эксплуатацию квартир, их комфортабельности, долговечности и энергоэкономичности уделялось незначительное внимание. Уже к началу 80-х годов XX в. эти дома не соответствовали нормативно-техническим требованиям и нуждались в проведении работ по их реконструкции. В ряде стран Европы эту проблему удачно решили, тогда как в Украине она актуальна и сегодня.

Цель. Введение единых конструктивных схем при реконструкции домов первых массовых серий (ПМС) на территории Украины путем установления возможности перепланировки расположенных в них квартир для повышения качества проживания будущих жильцов.

Материалы и методы. Анализ мероприятий и публикаций о состоянии и возможностях реконструкции зданий ПМС.

Результаты. Рассмотрены сущность и особенности реконструкции жилых домов первых массовых серий упомянутого периода, учитывая состояние их конструкций с учетом опыта в странах Западной и Восточной Европы. Разработан документ, который является этапом верификации стратегии реконструкции, его разделено на два дополнительные теста: 1) тест-приложение трех тематических исследований в Бельгии, Франции и Швейцарии; 2) тест на перспективы взаимодействия с заинтересованными сторонами — инвесторами, собственниками жилья и органами государственного управления.

Выводы. Рассмотрены конструктивные системы при реконструкции зданий ПМС на территории Украины. Приведена единая схема перепланировки указанных домов с различными конструктивными системами. Проанализированы возможности реконструкции таких зданий без отселения жильцов.

Ключевые слова: дома первых массовых серий, реновация, реконструкция, перепланировка, пристройка.