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The main principles of construction and restoration work in emergencies

The article deals with the implementation of construction and restoration work in emergency situations after military actions, the main principles of restoring the urban environment, as well as problems and risks associated with conducting restoration work. Construction and restoration work is an important tool for minimizing the negative consequences of accidents, natural disasters, military actions and ensuring the safety and environmental security of the population. The paper considers questions about organizational and managerial activities when carrying out construction and restoration work in emergencies, principles used during construction, planning, organization, and conducting restoration work. The main principles of urban environment restoration are considered, which include: the creation of a harmonious community is achieved through the establishment of tolerance, a comfortable and competitive environment for social development; cultural and religious diversity is expressed in the formation of multiculturalism in restored cities; this can be achieved through ensuring accessibility of urban infrastructure and public services; balanced urban planning, attracting investments; preserving cultural heritage; complying with environmental norms; promoting sustainable land use; improving living conditions, fostering social integration, and creating opportunities for education and culture; including educational; cultural, and sporting events. Development of transport networks, risk and safety management in the urban environment, respect for human rights, development of long-term strategies for rebuilding cities after military actions, improvement of housing conditions, establishment of cultural ties, and others. The stages of construction and reconstruction work are considered, which include damage assessment and planning work, clearance of sites of military actions, temporary restoration, restoration of infrastructure, and economic recovery.

Keywords: the principles of construction and restoration work aimed at restoring urban infrastructure, restoration of buildings and structures, construction in emergencies, types of emergencies, construction principles, national strategies for urban development, urban legislation and regulatory requirements, urban planning and design, local economy and municipal finances, adaptation of city development programs to local conditions, stages of construction and reconstruction work

Note. The paper contains the information from open sources: the website of The State Duma of the Federal Assembly of the Russian Federation¹; the official legal information website²; the “Rossiyskaya gazeta” website³; reference legal system “Consultant Plus”⁴; legal information website “Garant.ru”⁵, information website “RBC Real Estate”⁶.

During the evolution of human civilization, there have always been emergencies of a negative and destructive nature in the locations where people live. Natural disasters, technological accidents, terror acts, military actions — all of them make comfortable living for people more difficult. One of the most significant directions in light of current events is the reconstruction of cities that have been destroyed as a result of military actions [1]. The directions for carrying out construction and restoration work include not only the beautification of territories and the creation of conditions for comfortable living, but also the design of a concept of the restored territories development [2].

Construction and restoration work is a complex of activities aimed at restoring industrial, commercial, residential infrastructure. The aim of these measures is to restore vital installations as soon as possible to ensure the comfortable living of the population with minimal economic losses. However, carrying out work after emergencies is often associated with risks and difficulties, such as lack of

resources, temporary residence restrictions, safety problems of people in sites of destruction, and the design of concepts of further large population centers (cities) development [3].

Construction and restoration work in the military zone is one of the most challenging tasks since it involves not only the process of restoring damaged objects, but also restoring of life and infrastructure as a whole [4]. Such work can be divided into several stages.

Firstly, damage assessment and work planning are conducted. This stage involves the inspection of damaged buildings, military action areas, and infrastructure to determine the damage and scope of work needed. Additionally, a work plan that takes into account all necessary measures to restore life and infrastructure is created [5].

Typically, the assessment of damage is based on a conventional indicator, where 10–20 % of the damage is considered insignificant and entails major restoration work. The conventional indicator is characterized by visual inspection and project

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4 Consultant Plus. URL: <http://www.consultant.ru>
5 Garant.ru. URL: <http://www.garant.ru>
6 RBC Real Estate. URL: <http://realty.rbc.ru>

► indications of the building, as well as analytical conclusions of specialists. If there is a disputed assessment, additional expert research is carried out by specialists.

Damage associated with 20–35 % can be considered as moderate, requiring specialists to evaluate the possibility of restoring the damaged building structures, taking into account their functionality, social and historical significance, as well as financial costs.

Damage associated with 35–50 % can be considered as severe and requires immediate evaluation by specialists. Restoration is considered only if the object has special historical value or significant social significance.

Damage associated with 50–70 % can be considered as complete, requiring the construction of a new object if the reconstruction of the destroyed object is necessary [2, 6].

Secondly, cleaning up military sites is necessary. This involves removing ammunition and other hazardous materials that may remain on the site, making it safe for restoration or demolition work to be carried out.

Thirdly, temporary restoration. It involves the objects that can be quickly restored to improve the quality of life for people and make it easier for them to live in these conditions.

Fourthly, restoration of infrastructure. This stage involves the complete restoration of real estate and infrastructure. This includes repairing roads, bridges, airports, hospitals, schools, industrial facilities, and other objects that were destroyed during the military actions.

Fifthly, economic recovery begins after the infrastructure has been restored. This transition stage includes supporting small businesses, restoring financial stability, providing loans and other measures that help to recover the economy.

The requirements for construction and restoration work in a war zone are very high as it is necessary to restore all aspects of life in the area and improve the lives of its inhabitants. However, with optimal planning and the use of effective technology, these works can be performed at the highest level [7, 8].

Apart from the stages, there are other important aspects to consider when carrying out construction and restoration work in a war zone.

The first aspect is safety. All work must be carried out with the increased focus on the safety, as unknown dangers may remain in the war zone. Workers must practice extreme caution and use all necessary protective equipment.

The second aspect is the provision of materials and equipment. Access to materials, equipment, and specialized machinery is necessary for carrying out the work. Materials are needed for construction, neutralization of explosives or hazardous waste.

The third aspect is the education of local residents. Local residents can participate in construction and restoration work, which can help them maintain the restored and created objects in proper technical condition based on their own experience. Their training can reduce the need for specialized labor and speed up the recovery process.

It is important to note that the process of restoration in a war zone is a long-term process that can take several years. Control and support must be maintained throughout the entire recovery period. The process of construction and restoration work in a war zone is very complex and requires a lot of time, resources, and labour. However, it is an important step in restoring life and public infrastructure. Proper planning of work, safety, access to materials and equipment, education of local residents, and support throughout the recovery process are key factors for success in this process.

Another important aspect when carrying out construction and restoration work in a war zone is social responsibility. Workers must understand that their work helps to restore normal life for people who have been affected by the conflict. Therefore, the main priority when carrying out work should be to improve people's quality of life and restore infrastructure. When designing the reconstruction, it is important to consider the needs of the local population and create a comfortable and safe environment for them to live in. A key factor is the sustainability of the results achieved, i.e. ensuring the long-term provision of restored objects.

Another major issue when working in a war zone is the disposal and neutralization of explosive objects, hazardous waste, etc. Special equipment and trained staff are necessary for safe and environmentally friendly disposal [9, 10].

In addition, an important aspect when carrying out construction and restoration work in a war zone is cooperation with local authorities, including government and local entities. This allows for the necessary support and resources to be obtained, and also takes into account local customs and culture, and the economy of the restored territories. At the same time, social and economic goals must be logistically aligned.

Another important aspect that should be considered during construction and restoration work in a war zone is access to communal resources (such as water, sewerage, gas, electricity, etc.). The catastrophic reduction and destruction of infrastructure during a war conflict can lead to a decrease in the standard of living for local residents and hinder effective restoration work.

Therefore, in order to ensure the necessary comfort level in life and work within the restoration and construction zone, it is necessary to create new energy and water infrastructure that will restore and facilitate the living conditions of the people. New technologies can be used for this purpose, such as safe and environmentally friendly methods of energy production, more efficient methods of water supply, etc.

The implementation of technological innovations that will speed up the restoration process is also an important aspect. Methods such as using 3D printers for building houses can significantly reduce the time and cost of restoration.

In addition to technological solutions, an important direction is to complete construction and restoration work with consideration for future development in the region. For example, when reconstructing housing, consideration should be given to the fact that residents in areas affected by military conflict may move, so it is necessary to build and restore houses that will be attractive, convenient and functional for the long term.

In addition, as previously mentioned, safety issues should not be forgotten when conducting construction and restoration work in a war zone. The presence of unexploded ordnance, mines and other dangerous items can pose a risk to workers and the population of the region. Therefore, before starting work, a special series of measures should be taken to clear the area of hazards and dispose of dangerous items.

Ensuring the safety of the local population and explaining the rules of behavior in areas of military conflict to them is also important, as well as organizing a system of life support: medical care, nutrition, etc.

The restoration of local markets and enterprises in order to provide local residents with work and income is also significant. For this purpose, it is necessary to assess the region's economic potential and support the creation of local enterprises, as well as the employment creation.

When carrying out construction and restoration work, it is necessary to take into account seasonal and climate conditions when developing restoration plans and strategies. This can significantly influence the success of the project and the level of living for the local population.

When conducting construction and restoration work in a war zone, it is important to take budget planning into account in order to ensure optimal use of resources and funds. The budget may be limited, so it is necessary to determine priorities and choose the most effective and sustainable methods for restoring life and infrastructure.

Cities have always been the main targets of military action — history is full of examples when cities were destructed during various wars. Despite this, cities are able to recover and become centers of life and culture.

When restoring destroyed cities after military action, the main task is to observe the principles of harmonious urban development. The main principles and objectives of urban development are reflected in the New Urban Agenda adopted on October 20, 2016 at the United Nations Conference on Housing and Sustainable Urban Development (Habitat III) held in Quito (hereinafter — the Program). It was also approved at the 68th plenary session of the United Nations General Assembly on December 23, 2016 [11].

It is possible to consider and take into account the main directions of urban development and the urban environment not only under positive conditions, but also under conditions of construction and restoration work carried out as a negative result of emergency situations and military actions [12]. Among the variety of urban development principles in conditions of restoration and construction work, the following directions should be taken into account [2].

In particular, the directions of continuous innovative development are expressed in the basis of urban development as a combination of improving living conditions and maximizing effective employment of the population. This direction implies the potential involvement of the population into intellectual activities, both within the urban environment and within the economic activity of the state.

The principle of harmonious community is implemented through the creation of a tolerant, comfortable, and competitive environment for social development. An important characteristic of this direction is the participation of the city population in municipal management, which reduces social and economic contradictions in the social environment.

The principle of cultural and religious diversity can be expressed in the formation of multiculturalism in restored cities, preserving established cultural and religious traditions while allowing for the formation of new cultures through the creation of new urban spaces.

The principle of allowing for development and economic conjugation of urban and agricultural directions, regulating the relationship between urban and rural territorial entities, creating unhindered connections on a mutually beneficial basis.

The principle of information transparency is based on creating an open society through accessible information exchange and communication between government and municipal bodies and residents. It is important to involve society in the process of restoring cities after armed conflicts. This can be expressed in connections with local residents, holding meetings of public councils, and participating in civil society initiatives aimed at supporting the restoration of cities.

The principle of ensuring accessibility of urban infrastructure and public services. Restoring cities is associated with meeting

the needs of the population based on the accessibility of infrastructure and public services such as roads, water supply, electricity, healthcare, education, etc.

The principle of balanced urban planning assumes a balanced city planning taking into account social, economic, and environmental factors. This may include developing a master plan for the city, which sets zoning requirements, allocating land for various functions, creating recreation areas and green spaces [13].

The principle of attracting investments. Investing in urban infrastructure can accelerate the process of restoring cities and make them more attractive to new investors. Investments can be directed towards employment creation, developing small and medium-sized businesses, building housing, and other goals. Stimulation of the local economy can accelerate the restoration of cities. This may include providing grants and benefits for local entrepreneurs, reducing taxes or exempting from them, creating initiatives to attract investors, and other measures.

The principle of preserving cultural heritage assumes that restoring cities after armed conflicts should be done in a way that preserves and protects cultural heritage. This includes the restoration and renovation of historical monuments, the preservation of cultural practices and traditions, and support for local artists and cultural organizations.

The principle of environmental compliance. When restoring cities, it is necessary to take into account the impact on the environment and make efforts to reduce negative environmental consequences. This may include developing and implementing of programs to reduce pollution and increase the efficiency of natural resource utilization [14, 15].

The principle of sustainable land use. When restoring cities, it is important to consider sustainable land use. This involves using of buildings and engineering structures for other purposes, such as surface finishing that allows for sustainable water drainage, and other measures that help achieve sustainable land use.

The principle of the living environment improvement. Restoring cities after armed conflicts should also aim to improve the living environment of the population. This may include the development of public spaces, the creation of green areas and parks, the installation of sports and leisure equipment, and other measures that enhance the quality of life in the city.

The principle of social integration. Restoring of cities after armed conflicts should also support migrants, residents of marginalized communities, people with disabilities, individuals who have lost their loved ones during the conflict, and other measures that support social integration.

The principle of using technology involves using modern technologies that enhance the sustainability and attractiveness of cities. For example, the use of energy-efficient technologies, alternative energy sources, modern waste management systems, security systems, etc.

The principle of creating opportunities for education and culture, which involves creating opportunities for educational, cultural, and sports activities, is an important aspect of restoring the city. This includes the creation of media centers, cultural centers, access to educational programs, etc.

The principle of developing transportation networks. The direction involves the supply of the restored city with transport and public transport facilities, a pedestrian zone and bicycle paths, as well as preventive infrastructure solutions.

The principle of managing risks and safety in the urban environment involves the creation of measures to prevent natural disasters, engineering safety, physical security, crime prevention, etc. [16].

The principle of respecting human rights which involves the need to respect the rights of women, children, migrants, and other vulnerable groups during the restoration of the city. Restoration of cities can contribute to the protection of human rights, create equal opportunities and lead to improvements in the economic and social well-being of the population.

The principle of developing long-term strategies for cities restoration after armed conflicts. Long-term strategies are aimed at maintaining the achieved results and continuing to improve the quality of the urban environment, which involves updating the city's information base, creating crisis management systems, and accumulating experience in managing the process of restoring the urban environment.

The principle of improving living conditions, which includes improving the living conditions of the urban population, creating conditions for living in a safe and comfortable environment, as well as providing the city with various types of housing.

The principle of establishing cultural connections, which will help to establish cultural connections with other cities, countries, and cultures. This will lead to cultural exchange, exchange of experience, implementation of technologies to create understanding between cultures, peoples, and countries.

The revival of cities after armed conflicts is an important and complex process that requires a variety of measures and actions. At the initial stage of restoration, it is important to determine the main vectors of restoration with respect to fundamental principles, develop a careful plan, and coordinate actions between all participants and stakeholders to ensure effective and sustainable restoration of the urban environment.

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Основные принципы строительно-восстановительных работ в чрезвычайных ситуациях

В статье рассматриваются вопросы осуществления строительно-восстановительных работ в чрезвычайных ситуациях, после военных действий, основные принципы восстановления городской среды, а также проблемы и риски, связанные с проведением восстановительных работ. Строительно-восстановительные работы являются важным инструментом для минимизации негативных последствий катастроф, природных стихийных явлений, военных действий и обеспечения безопасности и экологической безопасности населения. Рассматриваются вопросы организационно-управленческой деятельности при выполнении строительно-восстановительных работ, осуществляемых в чрезвычайных ситуациях, военном положении, принципы, используемые при осуществлении строительства, а также планирования, организации и проведения восстановительных работ. Рассматриваются основные принципы восстановления городской среды, к которым относятся: гармоничное сообщество, реализуемое посредством создания толерантной терпимости, комфортной и конкурентоспособной среды социального развития; культурно-религиозного многообразия, выраженного в формировании мультикультурности восстанавли-

ваемых городов; обеспечения доступности городской инфраструктуры и общественных услуг; сбалансированного городского планирования; привлечения инвестиций; сохранения культурного наследия; соблюдения экологических норм; устойчивого использования земли; улучшения среды обитания; социальной интеграции; создания возможностей для образования и культуры, спортивных мероприятий; развития транспортных сетей; управления рисками и безопасностью в городской среде; соблюдения прав человека; разработки долгосрочных стратегий при восстановлении городов после военных действий; улучшения жилищных условий; установления культурных связей и др. Рассматриваются этапы строительно-восстановительных работ, к которым относятся: оценка ущерба и планирование работ; очистка мест военных действий, временное восстановление; восстановление инфраструктуры; восстановление экономики.

Ключевые слова: принципы строительно-восстановительных работ, направленных на восстановление городской инфраструктуры, восстановление зданий и сооружений, строительство в чрезвычайных ситуациях, виды чрезвычайных ситуаций, принципы, используемые при строительстве, национальные стратегии развития городов, городское законодательство и нормативные требования, городское планирование и проектирование, местная экономика и муниципальные финансы, адаптация программы развития го-

родов к местным условиям, этапы строительно-восстановительных работ

Примечание. При формировании обзора использовалась информация из открытых источников: сайт ГД СФ РФ¹; интернет-портал правовой информации²; интернет-портал «Российская газета»³; справочная правовая система «Консультант Плюс»⁴; информационно-правовой портал «Гарант.ру»⁵; информационный портал «РБК Недвижимость»⁶.

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