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## **CONSTRUCTION INDUSTRY OF SOUTHERN UKRAINE: CURRENT STATE AND STRATEGIC ROLE IN THE POST-WAR RECONSTRUCTION OF THE REGION**

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### **Abstract**

The article examines the current state of the construction industry of the Southern region of Ukraine (Odesa, Mykolaiv and Kherson regions) and its place in the structure of the regional economy. The scale of destruction of infrastructure, housing stock and industrial facilities as a result of the war is analyzed, and key areas of restoration are identified. Particular attention is paid to the role of the construction complex as a system-forming factor of spatial development, which ensures the reconstruction of cities and towns, the restoration of transport and logistics hubs, hydraulic structures and social infrastructure. It is shown that the construction industry of Southern Ukraine not only performs a restorative function, but also acts as a driver of economic modernization and integration into the European space through the introduction of "green" technologies, innovative materials and digital solutions. Based on the geographical approach, the differentiation of reconstruction tasks for each region is justified, and the prospects for the development of the construction industry in the post-war period are determined.

**Keywords:** Social geography; South Ukraine; construction industry; reconstruction; spatial development; Odesa region; Mykolaiv region; Kherson region; infrastructure; innovative technologies; sustainable development.

## **БУДІВЕЛЬНА ПРОМИСЛОВІСТЬ ПІВДНЯ УКРАЇНИ: СУЧАСНИЙ СТАН ТА СТРАТЕГІЧНА РОЛЬ У ПІСЛЯВОЄННІЙ ВІДБУДОВІ РЕГІОНУ**

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**Анотація.** У статті досліджено сучасний стан будівельної промисловості Південного регіону України (Одеська, Миколаївська та Херсонська області) та її місце у структурі регіональної економіки. Проаналізовано масштаби руйнувань інфраструктури, житлового фонду та промислових об'єктів унаслідок війни, визначено ключові напрями відновлення. Особливу увагу приділено ролі будівельного комплексу як системоутворювального чинника просторового розвитку, що забезпечує реконструкцію міст і селищ, відновлення транспортно-логістичних вузлів, гідротехнічних споруд і соціальної інфраструктури. Показано, що будівельна промисловість Півдня України не лише виконує відновлювальну функцію, а й виступає драйвером економічної модернізації та інтеграції у європейський простір через впровадження «зелених» технологій, інноваційних матеріалів та цифрових рішень. На основі географічного підходу обґрунтовано диференціацію завдань відбудови для кожної області, визначено перспективи розвитку будівельної індустрії у післявоєнний період.

**Ключові слова:** Суспільна географія; Південь України; будівельна промисловість; відбудова; просторовий розвиток; Одеська область; Миколаївська область; Херсонська область; інфраструктура; інноваційні технології; стійкий розвиток.

**Problem statement.** The Southern region of Ukraine (Odesa, Mykolaiv and Kherson regions) is of particular strategic importance in the system of the national economy. Its specifics are determined by the combination of a powerful agricultural potential, developed port and transport and logistics infrastructure, as well as the presence of industrial hubs,

among which the construction industry occupies an important place. The war caused serious losses to the South of Ukraine: destroyed residential areas, industrial enterprises, social and transport infrastructure facilities, damaged energy and hydraulic structures. This creates an unprecedented challenge for the state, while at the same time opening up prospects for the modernization of the regional economy through reconstruction on new principles.

The scientific relevance of the study is due to the need for a deep analysis of the current state of the construction industry in the South of Ukraine, its capacity for large-scale reconstruction and its role in the post-war restoration of territories. The focus is on the production of building materials and the technological base of the region, as well as the spatial and geographical aspects of the location of construction enterprises, the logistics of resource supply and human resources.

Thus, the study of the construction industry of the Southern region has not only an economic, but also a socio-geographical dimension, since it is on its efficiency that the speed of restoration of cities and towns, the return of the population, the stabilization of economic processes and ensuring sustainable development in the post-war period depend.

**Analysis of recent research and publications.** An analysis of modern publications shows that the issues of reconstruction of Ukraine are gradually moving from the plane of economic assessments to complex socio-geographical studies, where the construction industry as a spatially organized system occupies a central place. In the light of conceptual approaches to the spatial organization of society (Topchiev, 2001; 2012), the construction complex should be considered not only as a branch of material production, but as a functional element of the territorial structure of the economy, which forms the conditions for the reproduction of the settlement network and economic ties.

According to estimates by international organizations, primarily the World Bank and the EBRD, Ukraine's reconstruction needs exceed half a trillion US dollars (World Bank, 2024; EBRD, 2024). This causes an extraordinary burden on the construction complex, in particular in the southern regions, where the destruction covers the housing stock, industrial hubs, transport corridors and hydraulic structures.

An important institutional context is the European transport policy. Regulation (EU) 2024/1679 on the development of TEN-T creates a regulatory basis for the modernization of the transport and logistics corridors of the South, integrated with the ports of Odessa, Chornomorsk and Yuzhne. Accordingly, the construction industry performs not only a restorative, but also a structure-forming function, ensuring the formation of new spatial frameworks at the intersection of sea, rail and road flows. The works of foreign authors

(Bachtler, 2021; Rodrigue, 2020) emphasize the role of the construction industry as a basis for the spatial integration of peripheral regions into global economic networks[2].

Special attention in the literature is paid to the issue of the South of Ukraine as a transit hub. The TRACECA initiative and the EU Danube Strategy consider Odessa as a key point of contact between land and sea communications. This reinforces the importance of the construction complex in the restoration of port and port infrastructure, the development of intermodal terminals, and the creation of new logistics centers in the Izmail–Reni nodes. As Ukrainian scientists (Yu. Palekha, I. Pylypenko, D. Malchykova) point out, spatial restoration should be based on the cluster principle, where the construction industry is the “core” of the integration of related sectors – transport, energy, agro-processing.

The issue of technological modernization of the construction industry occupies a significant place in the modern discourse. In works on spatial economics and sustainable development (Efymenko, 2022; UNDP, 2023), the need to transition to “green” construction, energy-efficient standards, and digital management systems (BIM, GIS) is emphasized. For Southern Ukraine, this is of particular importance in the context of the reconstruction of the frontline territories of Kherson and Mykolaiv regions, where the restoration of housing and industrial facilities must be combined with the requirements of security and risk resilience[4].

**Formulation of the article's goals.** The purpose of the article is a comprehensive study of the current state of the construction industry in the Southern region of Ukraine and the determination of its strategic role in the post-war reconstruction of the territories. Based on the goal, it is planned to: clarify the scale of destruction and the need for the restoration of residential, social and industrial infrastructure; characterize the production and resource potential of the construction industry in Odessa, Mykolaiv and Kherson regions; identify spatial differences and priorities for reconstruction; substantiate the possibilities of modernization of the industry based on the introduction of innovative and "green" technologies; determine its significance as a system-forming factor of spatial development and integration of the region into the European economic space.

### **Presentation of the main material.**

The construction industry of the Southern region of Ukraine is one of the leading industries that forms not only the material basis for the restoration of territories, but also the spatial logic of the development of the regional economy. Its strategic importance is determined by a set of factors: geographical location, which combines access to the Black Sea and access to international transport corridors; resource base, which includes enterprises for the production of cement, metal structures, precast concrete; the availability of qualified labor

resources; as well as the functioning of port and logistics systems that ensure the import and export of building materials. In the conditions of post-war reconstruction, it is the construction industry that becomes one of the key spatial organizing elements, the effectiveness of which determines the restoration of cities and towns, the integration of the region into the European economic space and the formation of a new framework for territorial development. The scale of destruction in the South of Ukraine demonstrates the territorial differentiation of reconstruction tasks. In Kherson region, the priority is the restoration of housing stock, critical infrastructure and hydraulic facilities, in particular irrigation systems, damaged as a result of the explosion of the Kakhovka HPP. This creates a special spatial need to combine housing construction with the reconstruction of water management facilities and transport communications across the Dnieper. In Mykolaiv region, the main direction is the restoration of industrial nodes, primarily the shipbuilding industry, as well as the modernization of port and port facilities. At the same time, significant destruction of residential areas creates additional demand for large-scale housing construction and the development of social infrastructure. Odesa region has retained relatively greater stability, but has suffered the destruction of energy and port facilities, which highlights the need to modernize logistics corridors, restore seaports and develop industrial and logistics parks. Housing construction is of particular importance for Odessa and the region due to the increase in the number of internally displaced persons[6].

The production and resource potential of the construction industry of the South is quite powerful, but it needs modernization. The region operates cement plants, reinforced concrete products enterprises, asphalt concrete plants, metalworking and machine-building enterprises, which are able to provide both residential and infrastructure construction. However, the high degree of depreciation of fixed assets, the fragmentation of logistics chains, the shortage of modern technologies and qualified personnel limit the efficiency of the industry. From the point of view of spatial economics, these factors manifest themselves in the form of disproportions between the demand for reconstruction and the capabilities of local production, which actualizes the need for integration into transnational networks of supply of materials and equipment. Analysis of current trends shows that the construction industry is gradually moving from macroeconomic assessments to localized solutions within territorial clusters. For the Kherson region, such clusters are agrarian and construction centers focused on combining the restoration of rural settlements with the revival of irrigated agriculture systems. For the Mykolaiv region, the key is the industrial and construction cluster based on shipbuilding, metallurgy and port infrastructure. For the Odessa region, the key is port and construction

clustering, which integrates seaports, transport corridors and logistics parks. This approach corresponds to the principles of territorial and production systems, when the restoration of each regional segment contributes to the formation of a holistic spatial framework[3].

A special place in scientific discussions is occupied by the introduction of innovative and "green" technologies. For the South of Ukraine, this is not only a pan-European trend, but also a practical necessity. The scale of destruction requires quick and at the same time high-quality solutions. The use of prefabricated structures, low-carbon cements, recycling of construction waste, the introduction of BIM technologies, digital twins, as well as energy-efficient housing systems allow not only to accelerate reconstruction, but also to form new standards of spatial development. An important addition is safety requirements: shelter, emergency response systems, climate change resilience, and the integration of renewable energy sources into residential and industrial construction.

Thus, the construction industry of Southern Ukraine is considered as a strategic factor of regional development and integration into the European space. It performs a dual function: on the one hand, it restores the destroyed infrastructure, housing stock and industrial facilities; on the other hand, it forms a new quality of spatial organization of territories based on innovative approaches, "green" standards and cluster models. The spatial differentiation of reconstruction tasks between Kherson, Mykolaiv and Odessa regions necessitates a regionally oriented policy that takes into account local resources and needs, but at the same time integrates the region into the wider European economic and infrastructure space. The construction industry of the Southern region of Ukraine is a key element of the spatial organization of the economy, because it ensures the reproduction of the housing stock, social infrastructure and industrial facilities that form the basis for sustainable development of territories. The scale of the destruction caused by the war determines the specifics of the reconstruction tasks and necessitates their spatial differentiation. In the Kherson region, damage to critical infrastructure, hydraulic systems, and housing stock dominate, which requires a combination of housing construction with the restoration of water management facilities, transport crossings across the Dnieper, and land reclamation systems. In the Mykolaiv region, the priority is the reconstruction of industrial complexes and shipbuilding facilities in combination with the modernization of port infrastructure and large-scale restoration of residential areas. In the Odessa region, which has retained relatively greater functionality, the main tasks are the restoration of energy and port facilities, the modernization of transport corridors, and the development of housing construction to accommodate

internally displaced persons. Such territorial differentiation indicates the need to apply different reconstruction models within a single regional spatial framework[7].

The production and resource potential of the construction industry in Southern Ukraine is significant and includes cement plants, precast concrete enterprises, asphalt concrete plants, metalworking enterprises and machine-building complexes, which form the basis for the implementation of large reconstruction projects. However, the high degree of equipment wear, limited financial resources and personnel shortage in the industry create additional risks. From the point of view of geographical analysis, these problems have a spatial dimension: in areas with a high concentration of destruction, the local supply of building materials is insufficient, which actualizes the need for imports and the use of transport hubs for the supply of resources. It is the ports of Odessa, Chornomorsk and Pivdenny, as well as the Danube hubs of Izmail and Reni, that play the role of strategic logistics gates, ensuring the stability of reconstruction flows and creating the prerequisites for the development of new construction clusters.

Modern scientific and practical literature emphasizes that restoration should take place not only as a reconstruction of the destroyed, but as a qualitative renewal of territories. For the Kherson region, this means the creation of climate-resistant and safe settlements in the frontline zone, capable of withstanding the risks of floods and military threats. For the Mykolaiv region, it means the formation of industrial and construction clusters that integrate shipbuilding, metallurgy and the production of building materials, as well as providing industrial areas with modern security systems. For the Odessa region, it means the development of port and logistics parks, the modernization of international transport corridors and large-scale housing construction taking into account energy efficiency standards. In each case, the construction industry performs a coordinating function that combines local initiatives with a regional development strategy. A promising direction for the development of the construction industry in the South is the introduction of innovative and "green" technologies that combine the speed and scale of reconstruction with the goals of sustainable development. Among them are the use of low-carbon cements and concretes, construction waste recycling technologies, the introduction of prefabricated structures to accelerate construction, the integration of BIM systems and digital twins for managing objects throughout their entire life cycle, the introduction of nZEB and Passivhaus standards in residential and public construction. Combined with the development of energy autonomy (microgrids, renewable energy, storage) and safety solutions (shelter, emergency systems,

increased explosion resistance and fire resistance of structures), this creates the basis for the formation of a qualitatively new infrastructure[8].

In this context, the construction industry of Southern Ukraine acts as a strategic factor in integration into the European economic space. It determines the spatial logic of reconstruction through the formation of a network of clusters capable of ensuring not only local recovery, but also the development of the region as a holistic system. The combination of port-logistics, industrial-construction and housing and communal services clusters creates the basis for an updated territorial framework that integrates the region into trans-European transport and economic networks. Thus, the construction industry of Southern Ukraine simultaneously performs a restoration and modernization function, ensuring the reconstruction of the destroyed and laying a new quality of spatial development on the principles of innovation, sustainability and European integration.

### **Conclusions.**

The study shows that the construction industry of the Southern region of Ukraine is one of the leading system-forming elements in the process of post-war reconstruction. It determines the spatial logic of territorial restoration, combining the tasks of reconstruction of housing stock, social and critical infrastructure with the modernization of industrial nodes and port and logistics complexes. The scale of destruction demonstrates a clear spatial differentiation: for Kherson region, the key tasks are the restoration of hydraulic structures and life-support systems, for Mykolaiv region - the reconstruction of industrial and shipbuilding facilities in combination with residential development, for Odessa region - the modernization of ports, transport corridors and the development of housing infrastructure for IDPs.

The production and resource potential of the construction industry is significant, but it requires technological renewal, integration into transnational supply chains and strengthening of the human resource base. An important factor of efficiency is the introduction of innovative and "green" technologies that ensure energy efficiency, safety, sustainability and digitalization of construction processes.

The construction industry performs a dual function: a restorative one, which ensures the reconstruction of destroyed objects, and a modernization one, which forms a new quality of the spatial organization of the region. It is thanks to this that it becomes a strategic factor in the integration of Southern Ukraine into the European economic space and a determining prerequisite for sustainable socio-economic development in the post-war period.

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