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FEATURES OF CONSTRUCTION IN DENSE URBAN AREAS

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Abstract:

This article is devoted to the problem of constructing buildings and structures in dense urban environments. The construction of buildings and structures in dense urban environments has become highly relevant in the modern world, both in terms of the volume of such construction in major cities worldwide and in terms of the most attractive investment opportunities.

Keywords

dense development, construction, construction site.

Introduction

Construction in dense urban environments is a complex and multifaceted issue requiring in-depth analysis and a well-founded approach. It encompasses not only the technical and economic aspects of construction, but also social, environmental, and urban factors.

Given the growing demand for new residential and commercial real estate, the efficient use of existing land within the existing urban infrastructure is of particular importance.

1. Features of construction in densely populated urban areas.

Construction in densely populated urban areas, particularly in densely populated urban settings, is a complex, multi-phase process. The main challenges here relate to both technical aspects (e.g., space constraints or proximity to other buildings) and socioeconomic factors, including the need to minimize potential disturbance to local residents and ensure the effective integration of the new facility into the existing urban context [1]. When designing and constructing new buildings in urban environments, various factors, both physical and socioeconomic, must be considered. Space constraints and proximity to other buildings can create technical and architectural constraints for the new facility. For example, the building's height must be considered to ensure it is not too tall and does not obstruct sunlight or views of existing buildings.

It's also important to consider social and economic factors. Local residents may experience discomfort from the construction of a new building, as it may result in noise, air pollution, or other negative consequences. Therefore, it's important to consider measures to minimize such discomfort, such as using modern noise reduction technologies or conducting regular air quality testing.

Furthermore, a new building must be integrated into the existing urban context. This means that its architectural style, size, and functionality must be consistent with the surrounding

environment. For example, tall buildings may be prohibited in the center of a historic city to preserve its historic character.

In general, when designing and constructing new buildings in urban environments, it is necessary to consider both physical and socioeconomic factors. This will help create a harmonious and sustainable urban space that will meet the needs of the local population and promote its development.

2. Problems and solutions in construction in densely populated areas

In dense urban environments, construction projects face a number of challenges that require specific approaches and solutions. In this section, we will examine these issues and propose methods for overcoming them.

One of the main challenges is limited construction space. This affects the quality of life of people working and living in the construction area and also influences the logistics of the construction process [2]. Various technologies are used to minimize the negative impact, such as vertical construction methods or modular construction. These methods reduce construction time and reduce noise, dust, and vibration, which can have a negative impact on the environment and human health.

Vertical construction, or building upward, is one way to optimize space utilization in urban areas. It allows for construction on a smaller footprint, reducing impact on adjacent areas and shortening construction time. Furthermore, this approach reduces traffic flows and lowers energy consumption for building maintenance.

The use of modular construction also helps minimize the negative environmental impact of construction. These structures are prefabricated in a factory and delivered to the construction site ready for assembly. This reduces construction time and waste and emissions on-site.

However, despite the use of such technologies, the negative impact of construction cannot be completely eliminated. Therefore, it is important to implement additional measures to minimize its impact. These measures include the installation of temporary roads, soundproofing barriers, regular air and water quality monitoring, and informational support and consultations for residents and workers in the construction zone.

Equally important is the task of preserving the city's architectural integrity. In densely populated areas, new buildings should not disrupt the overall style of the surrounding space [3]. A solution is to integrate new buildings into existing structures through the use of similar materials and forms. This approach will preserve the harmony and unity of the city's architectural appearance. However, preserving architectural integrity does not mean a lack of innovation and modern solutions. It is important to find a balance between preservation and development so that the city can continue to develop without losing its unique character.

Thus, the use of various technologies and measures to minimize the negative impact of construction improves the living conditions of people working and living near construction sites, as well as reduces the negative impact on the environment and the logistics of the

construction process. This is an important aspect of sustainable development and the creation of a comfortable urban environment.

3. Innovative approaches to construction in the urban environment

In dense urban environments, new construction faces a number of challenges. However, thanks to innovative approaches and technologies, new opportunities are emerging for the effective development of urban spaces.

One of the most promising concepts in modern construction is the principle of "sustainable construction" (Sustainable The basic principles of this concept are described in the work of S. Kibert [4]. The essence of this principle is the maximum use of available resources without harming the environment and future generations. To achieve this goal, sustainable construction proposes the use of energy-saving technologies, materials with a low carbon footprint, as well as waste and water management methods.

Furthermore, sustainable construction also places a strong emphasis on the use of materials with a low carbon footprint. This means that building materials should be produced with minimal carbon dioxide emissions and other harmful substances. For example, biodegradable materials or materials derived from recycled waste can be used instead of traditional concrete.

Also of interest is the method of "vertical farming" (Vertical Vertical farming (also known as vertical farming) is a method that can be used to create green spaces in the limited space of large cities. This approach was described by Despommier D. [5]. The "vertical farming" method is an innovative concept for growing plants in vertical systems that use minimal amounts of soil and water. Instead of the traditional horizontal arrangement of fields and vegetable gardens, vertical farms are constructed as multi-story structures where plants are grown in vertical beds or modules mounted on special racks.

The basic idea behind vertical farming is that it allows for the utilization of vertical space that is typically unused for agriculture. This is especially relevant for large cities, where land is a scarce resource. Vertical farms can be located inside buildings, on rooftops, or even underground, significantly increasing the productivity of agricultural land.

4. Prospects for the development of construction in dense urban areas

Modern construction requirements in dense urban environments necessitate the search for new architectural and engineering solutions. Compact high-rise development, the use of underground space, and the renovation and modernization of existing buildings are becoming a priority.

Compact high-rise development allows for land conservation and efficient use of space. However, this requires a special approach to design and construction. Specifically, the requirements of [6] must be taken into account. Adherence to green building principles, as outlined in documents of the [7] series, is also important. When designing and constructing buildings in seismically active areas, the requirements of [8] must be taken into account. This standard defines the norms and rules that must be observed to ensure the safety of buildings under potential seismic impacts.

Renovating and modernizing existing buildings is another way to effectively utilize urban space. When renovating, it's important to consider not only architectural and design aspects but also the building's technical specifications.

One of the most important aspects of renovation is the building's energy efficiency . Modern technologies allow for the implementation of innovative heating, ventilation, and air conditioning systems, which reduce energy consumption and environmental impact. Consideration should also be given to the use of renewable energy sources, such as solar panels or geothermal systems.

When renovating a building, it's also important to consider its historical and cultural value. Preserving its architectural heritage and integrating it with modern technologies and requirements is a complex task that requires a professional approach and careful planning.

In general, the development of construction in dense urban areas requires a comprehensive approach, taking into account multiple factors and the use of advanced scientific achievements.

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