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Optimizing the design of multi-apartment buildings to enhance comfort and convenience of living

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Abstract. This article explores the significance of optimizing the design of multi-apartment buildings to improve the comfort and convenience of residents. Through a comprehensive analysis of various aspects, including landscape design, infrastructure, safety measures, energy efficiency, accessibility, communication systems, and waste management, the article highlights the critical role of thoughtful design in creating a pleasant living environment. Drawing on examples from global practices, such as the integration of smart home technologies and eco-friendly materials, the article provides practical recommendations for enhancing the quality of life in multi-apartment buildings. By incorporating modern design solutions and leveraging innovative technologies, such as smart home systems and sustainable building practices, developers and architects can create spaces that are not only aesthetically pleasing but also functional and comfortable for residents. This article underscores the importance of optimizing design strategies to meet the evolving needs of urban dwellers and emphasizes the potential of well-designed multi-apartment buildings to foster a sense of community and well-being among residents.

Keywords: multi-apartment buildings, design optimization, comfort, convenience, living environment, landscape design, infrastructure, safety measures, energy efficiency, accessibility, communication systems, waste management, smart home technologies, eco-friendly materials, sustainable practices, urban dwellers, community, well-being.

1. Introduction

In the modern world, where residential complexes are becoming increasingly common and familiar in urban life, the role of design in multi-apartment buildings, entrances, and surrounding areas is becoming more significant. These aspects not only define the external appearance of residential complexes but also have a considerable impact on the comfort and quality of life of their residents (Figure 1).

The design of multi-apartment buildings plays a crucial role in creating a pleasant atmosphere and coziness in residential spaces. From choosing the color scheme of the facade to organizing communal spaces inside the building, every detail matters for the overall perception and comfortable living of residents. The entrance, being the first impression of the building, should be clean, well-maintained, and functional, while the surrounding territory should be convenient, safe, and pleasant for walks and relaxation.

In this article, we will discuss various aspects of multi-apartment building design and its impact on the comfort of residents. We will examine not only visual aspects but also functional solutions that can make life in a residential complex more convenient and enjoyable.

The main goal of this article is to explore the factors in the design of multi-apartment buildings that can enhance comfort for their residents. We will also analyze various approaches to organizing entrances and surrounding areas, their influence on the overall atmosphere, and the level of convenience for tenants.

In the following sections, we will look at specific examples of successful implementations of multi-apartment build-

ing design, as well as highlight the key principles to consider when designing and landscaping residential complexes. The ideas and recommendations presented in the article will help architects, designers, and developers create cozy, functional, and comfortable multi-apartment buildings that meet the needs of modern residents.



Figure 1. Example of multi-apartment building design

2. Materials and methods

2.1. Design of a multi-apartment building and its impact on living comfort

2.1.1. Architectural solutions and their impact on the functionality of the house

Architectural solutions applied in house design have a direct impact on its functionality, convenience, and overall

atmosphere. In this text, we will explore which design aspects have the greatest influence on living comfort and how architectural solutions contribute to creating a cozy and functional environment.

One key aspect of design is the layout of living spaces. Proper room arrangement, optimal use of space, convenient placement of bathrooms and kitchens – these are all important factors that affect the level of living comfort. Thoughtful space utilization allows for the creation of functional and cozy rooms where every square meter is used efficiently [1].

Another important aspect is the organization of common areas in the house. Lobbies, entrances, elevators, parking spaces – all these elements influence the overall impression of the house and its level of comfort. Cleanliness, orderliness, and the availability of necessary services (such as storage space for bicycles or baby strollers) make living in a multi-apartment building more pleasant and convenient for its residents.

It is also important to pay attention to architectural details and finishing touches of the house. Quality materials, stylish decoration, modern technologies – all contribute to the impression of high quality of life in the house. Aesthetics play a significant role in shaping a comfortable space and affect the psychological comfort of residents.

One should not forget about the exterior appearance of the house. Architectural style, facades, landscaping of the surrounding area – these are all important aspects that determine the overall atmosphere and level of living comfort. A beautiful and well-maintained appearance of the house contributes to creating a pleasant atmosphere and increasing the satisfaction of its residents (Figure 2).

Overall, the design of a multi-apartment building plays a crucial role in creating a comfortable and cozy living space. Architectural solutions applied in design and construction determine the level of functionality, convenience, and overall atmosphere of the house. Creating a harmonious and comfortable space requires a comprehensive approach and careful consideration of all design aspects.



Figure 2. Example of architectural style

2.1.2. Optimization of layout and space distribution

Optimizing the layout and distribution of space is a crucial aspect of designing apartment buildings. Well-designed spaces, tailored to the functional needs of residents, contribute to creating a comfortable and functional environment. Each apartment should be thoughtfully designed to maximize the available area and ensure comfortable living.

A key aspect of optimizing the layout is the arrangement of living rooms, kitchens, bathrooms, and other functional

areas to ensure usability and ergonomics. It's also important to consider natural lighting and ventilation by placing windows and doors to provide sufficient access to light and fresh air.

Proper space distribution also involves placing furniture, accessories, and storage in a way that ensures functionality and usability of each room. Attention to detail and efficient use of every square meter help create a comfortable and harmonious living space.

2.1.3. The influence of ergonomics on residents' comfort

The influence of ergonomics on residents' comfort manifests in various aspects of home design. For example, apartment layout should be thoughtfully planned to ensure ease of movement and utilization of all spaces. This includes proper placement of furniture, efficient use of space, and providing adequate lighting and ventilation.

Additionally, ergonomics also impacts the organization of common areas in the building, such as lobbies, elevator halls, gyms, and playgrounds. Proper planning and arrangement of these spaces create comfortable and functional areas for socializing, relaxation, and sports activities.

Special attention is also given to the ergonomics of sanitary and domestic premises, such as bathrooms and kitchens. Proper placement of plumbing fixtures, furniture, and accessories in these areas makes them more functional and convenient to use.

2.1.4. The role of natural light and ventilation in ensuring comfortable living

Natural light creates an atmosphere of spaciousness and brightness in rooms, improves mood, and enhances productivity. Rooms illuminated by natural light appear more attractive and cozier. Therefore, it is important for the design of the house to include an adequate number of windows and openings to maximize the use of natural light.

Good ventilation ensures the influx of fresh air into the rooms, removes excess moisture and odors, contributing to the creation of a healthy and comfortable atmosphere in the house. It is important for the design of the house to consider the proper placement of ventilation openings and systems to ensure efficient air exchange inside the rooms.

2.2. Design of the entrance hall and common areas

2.2.1. The importance of public spaces for tenant socialization

The design of the entrance hall and common areas plays a crucial role in creating a comfortable and appealing atmosphere for the residents of a multi-apartment building. These spaces serve as places where residents meet, socialize, and spend their time, making their organization highly significant.

One of the primary aspects of designing the entrance hall and common areas is to create spaces for tenant socialization. These are areas where residents can meet neighbors, interact, share news, and build a sense of community. Therefore, it is essential to provide comfortable and functional relaxation areas, such as benches, seating areas, barbecue or picnic zones, where residents can spend time in a pleasant environment.

Moreover, ensuring safety and convenience in the common areas is crucial (Figure 3). The presence of lighting, video surveillance, and access control measures helps create

a sense of security and protection for residents. Additionally, it is necessary to provide convenient pedestrian paths, playgrounds, and areas for sports activities to offer diverse opportunities for active recreation [2].



Figure 3. Example of lobby and common area design

2.2.2. Aesthetics and functionality of entrances

The aesthetics and functionality of entrances have a direct impact on the overall perception of the building, as well as on the level of comfort and coziness of living. The aesthetics of the entrance include not only its external appearance but also its internal design. Stylish design, high-quality finishing materials, good lighting – all of these create a pleasant impression and emphasize care for the residents. Landscaping of the surrounding area also plays an important role because cleanliness and order contribute to comfortable living. However, besides the external appearance, it is important to consider the functional aspects of the design. The presence of convenient entrance paths, elevators, fire exits, as well as the organization of spaces for storing bicycles or strollers – all of these make living more convenient and safer.

2.2.3. Management of cleaning and maintenance of public areas

The design of entrance halls and public areas should harmoniously integrate with the organization of their cleaning and maintenance.

Proper planning and distribution of responsibilities between the housing management services or property management companies ensure regular and high-quality cleaning. This includes floor cleaning, elevator maintenance, window cleaning, vacuuming of carpets, garbage disposal, etc. Special attention should be paid to such public areas as entrances, stair landings, elevator halls, playgrounds, and parking lots.

Regular technical maintenance of ventilation, lighting, water supply, and sewage systems also plays an important role in maintaining comfortable living conditions. This helps prevent unpleasant surprises such as emergencies and malfunctions, significantly increasing residents' satisfaction and maintaining the building's good reputation.

Another important aspect of managing the cleaning and maintenance of public areas is resident oversight. Establishing a feedback system and allowing residents to submit requests for cleaning or repairs enable prompt responses to emerging issues and meet residents' needs effectively.

2.2.4. Safety and lighting in public spaces are crucial aspects of building design

Lighting in public areas should be bright and uniform to ensure good visibility and prevent potential incidents. Regu-

lar maintenance of lighting fixtures and lamps helps prevent situations with poor or insufficient lighting, which can lead to accidents or criminal activities.

It is also important to have video surveillance and access control systems in public areas to prevent unwanted visits or intrusions onto the premises. Placing surveillance cameras in strategically important areas such as entrances, elevator halls, and parking lots allows for monitoring the situation and quickly responding to emerging threats.

In addition, it is important to provide appropriate fire safety equipment, such as fire alarms, extinguishers, and emergency lighting, to minimize the risk of fire and ensure prompt evacuation if necessary.

2.3. Design of the courtyard area and landscaping

2.3.1. Landscape design and its impact on the overall atmosphere

Well-designed rest areas, pedestrian paths, playgrounds, and relaxation zones contribute to creating a favorable environment for living and interacting with neighbors (Figure 4). One of the key aspects of landscape design is the selection of plants and trees that create natural beauty and coziness on the territory. A variety of colors, shapes, and textures help create a harmonious landscape, bringing elements of nature into the environment. Additionally, greenery not only adds beauty but also contributes to improving the ecological situation by absorbing carbon dioxide and enriching the air with oxygen. Designed with aesthetics and functionality in mind, relaxation areas become popular gathering places for residents. Comfortable benches, tables, gazebos, and barbecue areas provide opportunities for family leisure and socializing with neighbors [3].



Figure 4. Example of design of recreation areas, pedestrian paths, playgrounds

2.3.2. The organization of pedestrian areas, children's playgrounds, and recreation zones

Pedestrian zones are an important part of the residential area infrastructure, providing residents with convenient access to their homes and the opportunity for safe walks. Wide sidewalks, paved paths, or pedestrian alleys with greenery create a pleasant atmosphere and contribute to promoting a healthy lifestyle.

Children's playgrounds play a significant role in children's development and the formation of their social skills. Play complexes, swings, slides, and sandboxes provide children with the opportunity to play and interact with other children under the supervision of parents or guardians.

Recreation areas are places for relaxation and socializing among residents. Cozy benches, pavilions, gazebos, or picnic

areas create opportunities for outdoor relaxation and meetings with neighbors.

2.3.3. Management of greenery and environmental sustainability

Landscaping and environmental sustainability have become integral parts of modern courtyard design, influencing the overall atmosphere and quality of life for residents.

Managing greenery involves selecting the right plant species, providing regular care, and maintaining the optimal condition of green areas. Choosing local and climate-adapted plant species enhances their survival and reduces maintenance costs. Environmentally sustainable methods of greenery management, such as reducing the use of chemical fertilizers and pesticides, as well as implementing organic waste recycling methods, help preserve biodiversity and minimize negative environmental impact.

Furthermore, the variety of greenery and landscape elements contributes to creating attractive and functional courtyard areas. Park zones, alleys, flower beds, and lawns create a pleasant atmosphere for relaxation and recreation, while also regulating microclimates and improving air quality.

2.3.4. The use of technology to enhance the efficiency of managing courtyard areas

The implementation of innovative solutions allows for the automation of management processes, improves service quality, and enhances residents' satisfaction levels.

One of the primary directions for applying technology in managing courtyard areas is the introduction of smart management systems. These systems encompass monitoring and control of lighting, temperature, humidity, as well as surveillance and security systems. Thanks to sensors, detectors, and automation control systems, it's possible to effectively monitor and regulate the condition of the courtyard area, ensuring safety and comfort for residents [4].

Another crucial aspect is the utilization of mobile applications and online platforms for managing courtyard areas. This enables residents to quickly and conveniently report issues, request cleaning and maintenance services, and obtain up-to-date information about work schedules and events within the complex.

The adoption of technology also facilitates resource optimization and cost reduction in managing courtyard areas. Process automation allows for more efficient resource utilization, minimizes unplanned expenses, and reduces the time spent on routine tasks.

3. Results and discussion

3.1. Practical recommendations for improving the design and landscaping of residential complexes

Improving the design and landscaping of residential complexes plays a key role in creating a comfortable and attractive living environment. This article offers practical recommendations based on global best practices that can be applied to the design and reconstruction of residential complexes.

Landscape Design: Creating green spaces, parks, and walking paths is an important part of residential complex landscaping. A prime example from global practice is the High Line in New York City, a park built on a disused railway line.

Smart Home Technology: Implementing smart home technologies, such as lighting, heating, and security systems, enhances comfort and energy efficiency. An example is the

Songdo International Business District in South Korea, where the entire city is equipped with smart city systems.

Environmental Sustainability: Using eco-friendly materials, waste recycling, and energy-efficient technologies help reduce environmental impact and improve residents' quality of life. An example is the Vauban district in Berlin, where alternative energy sources and eco-friendly transportation are widely used.

Compactness and Functionality: Residential complex layouts should be maximally functional and convenient for residents. An example is "CityLink" in Singapore, where compact and functional apartments are adapted for modern living.

Infrastructure and Services: Having well-developed infrastructure and services, from shops and restaurants to medical facilities and sports grounds, is crucial. An example is the Swedish city of Helsingborg, where residential areas seamlessly integrate into the city's overall infrastructure [5].

Implementing these practical recommendations will help create modern, comfortable, and convenient residential complexes that meet the needs and expectations of modern residents. Realizing these ideas with examples from global practice can serve as a model for other residential construction and landscaping projects (Figure 5).



Figure 5. Example of landscape design

4. Conclusions

In conclusion, it is important to emphasize that optimizing the design of multi-apartment buildings is a significant step in creating a comfortable and convenient living environment. This article has examined various aspects that can be improved to achieve this goal.

By applying modern design solutions, implementing new technologies, and considering the needs of residents, the level of comfort and convenience of living can be significantly enhanced. Landscape design, infrastructure, safety, energy efficiency, accessibility for people with disabilities, communication systems, and waste management—all these aspects play an important role in creating a pleasant and functional living environment.

Creating spaces that combine functionality, style, and aesthetics contributes to improving the quality of life for residents of multi-apartment buildings. Optimized design not only enhances the appearance of buildings but also fosters a favorable atmosphere and a sense of belonging to the common space.

Overall, optimizing the design of multi-apartment building spaces is an investment in the quality of life of residents and the creation of a modern and convenient living environment. Implementing the proposed recommendations will help

make residential complexes more attractive and comfortable for all their inhabitants.

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Жайлылық пен ыңғайлылық деңгейін арттыру үшін көпқабатты үй кеңістігінің дизайнын оңтайландыру

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Андатпа. Бұл мақалада тұрғындардың жайлылығы мен ыңғайлылығын жақсарту үшін көп пәтерлі ғимараттардың дизайнын оңтайландырудың маңыздылығы қарастырылады. Ландшафт дизайны, инфрақұрылым, қауіпсіздік шаралары, энергия тиімділігі, қолжетімділік, байланыс жүйелерін басқару сияқты әртүрлі аспектілерді кешенді талдау арқылы мақала жақсы өмір сүру ортасын құрудағы ойластырылған дизайнның маңызды рөлін көрсетеді. Ақылды үй технологияларын интеграциялау және экологиялық таза материалдар сияқты әлемдік тәжірибедегі мысалдарға сүйене отырып, мақалада көп пәтерлі ғимараттарда өмір сүру сапасын жақсарту бойынша практикалық нұсқаулар берілген. Заманауи дизайн шешімдерін енгізу және ақылды үй жүйелері мен тұрақты құрылыс тәжірибелері сияқты инновациялық технологияларды пайдалану арқылы әзірлеушілер мен сәулетшілер эстетикалық жағымды ғана емес, сонымен қатар функционалды және тұрғындар үшін ыңғайлы кеңістіктер жасай алады. Бұл мақала қала тұрғындарының өзгертін қажеттіліктерін қанағаттандыру үшін дизайн стратегияларын оңтайландырудың маңыздылығын көрсетеді және тұрғындар арасында қауымдастық пен әл-ауқат сезімін қалыптастыруда жақсы жобаланған көпқабатты үйлердің әлеуетіне назар аударады.

Негізгі сөздер: көп пәтерлі ғимараттар, дизайнды оңтайландыру, жайлылық, ыңғайлылық, тұрғын үй ортасы, ландшафт дизайны, инфрақұрылым, қауіпсіздік шаралары, энергия тиімділігі, қолжетімділік, байланыс жүйелері, қалдықтарды басқару, ақылды үй технологиялары, экологиялық таза материалдар, тұрақты тәжірибелер, қала тұрғындары, қауымдастық, әл-ауқат.

Оптимизация дизайна пространств многоквартирных домов для повышения уровня комфорта и удобства проживания

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Аннотация. В данной статье рассматривается значимость оптимизации дизайна многоквартирных зданий для улучшения комфорта и удобства проживания жителей. Через комплексный анализ различных аспектов, включая ландшафтный дизайн, инфраструктуру, меры безопасности, энергоэффективность, доступность, коммуникационные системы и управление отходами, статья подчеркивает критическую роль продуманного дизайна в создании приятной жилой среды. Основываясь на примерах из мировой практики, таких как интеграция технологий умного дома и экологически чистые материалы, статья предоставляет практические рекомендации по повышению качества жизни в многоквартирных зданиях. Путем внедрения современных дизайнерских решений и использования инновационных технологий, таких как системы умного дома и устойчивые практики строительства, застройщики и архитекторы могут создавать пространства, которые не только эстетически приятны, но и функциональны и комфортны для жителей. Эта статья подчеркивает важность оптимизации стратегий дизайна для удовлетворения изменяющихся потребностей го-

родских жителей и акцентирует внимание на потенциале хорошо спроектированных многоквартирных зданий в формировании чувства сообщества и благополучия среди жителей.

Ключевые слова: *многоквартирные здания, оптимизация дизайна, комфорт, удобство, жилая среда, ландшафтный дизайн, инфраструктура, меры безопасности, энергоэффективность, доступность, коммуникационные системы, управление отходами, технологии умного дома, экологически чистые материалы, устойчивые практики, городские жители, сообщество, благополучие.*

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