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Organizational-Technological Modeling and Energy Consumption in the Construction of Low-Rise Residential Buildings

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Abstract: This article examines the relationship between organizational-technological modeling and energy consumption in the construction of low-rise residential buildings. The study focuses on how different organizational and technological approaches can impact energy efficiency and overall sustainability in the construction process. Various factors such as building materials, construction methods, and energy systems are analyzed to determine their contribution to energy consumption in low-rise residential buildings. The findings suggest that implementing sustainable practices and technologies can significantly reduce energy consumption and environmental impact during the construction phase.

Keywords: Organizational-technological modeling, energy consumption, low-rise residential buildings, sustainability, construction.

Introduction. The construction industry is one of the major consumers of energy resources, contributing to a significant amount of carbon emissions globally. In recent years, there has been a growing interest in developing sustainable and energy-efficient buildings to reduce environmental impact. Low-rise residential buildings are among the most common types of constructions, making them an important focus for energy conservation efforts. This article explores the organizational-technological modeling taking into account the consumption of energy resources in the construction of low-rise residential buildings.

Methodology. In this study, we conducted a comprehensive literature review to analyze the existing organizational-technological models and their impact on energy consumption in the construction of low-rise residential buildings. We focused on studies that evaluated different construction methods, materials, and technologies used in building low-rise residential structures. We also considered the energy performance of these buildings, including their insulation, heating, cooling, and lighting systems.

A comprehensive review of literature on organizational-technological modeling and energy consumption in construction was conducted to gather relevant data and insights. Various case studies and examples of sustainable construction practices were also analyzed to understand the impact of different organizational and technological approaches on energy consumption. Statistical analysis was used to quantify the correlations and trends between organizational-technological modeling and energy efficiency in low-rise residential buildings.

Further research and development in organizational-technological modeling can lead to even more significant advancements in energy efficiency within the construction industry. By continuously improving and innovating construction practices, builders can further reduce energy consumption and contribute to a more sustainable built environment. Additionally,

collaborative efforts between industry stakeholders, policymakers, and researchers are essential to drive the adoption of sustainable construction practices on a larger scale.

Further research and development in organizational-technological modeling can pave the way for the implementation of more advanced technologies and methodologies in the construction industry. By leveraging data-driven insights and predictive modeling, construction companies can optimize their processes to minimize waste and increase efficiency. This can result in cost savings for builders and clients, as well as a reduced environmental impact from construction activities.

In addition, the integration of organizational-technological modeling in construction projects can also improve safety outcomes for workers and occupants. By accurately simulating and analyzing different scenarios, potential risks can be identified and mitigated before they become a reality. This proactive approach to safety can help prevent accidents and injuries on construction sites, ultimately creating a safer working environment for all stakeholders involved.

Furthermore, the adoption of sustainable construction practices through organizational-technological modeling can also have a positive impact on the overall quality of buildings. By optimizing design and construction processes, builders can ensure that structures are not only energy-efficient but also durable and resilient in the face of changing environmental conditions. This can lead to improved building performance and longevity, ultimately providing long-term benefits for owners and occupants alike.

In conclusion, the continued advancement of organizational-technological modeling in the construction industry has the potential to revolutionize how buildings are designed, constructed, and maintained. By embracing sustainable practices and leveraging technological innovations, builders can create a more sustainable built environment that meets the needs of today without compromising the needs of future generations. Collaboration and knowledge sharing among industry stakeholders will be key to driving this transformation and ensuring that sustainable construction practices become the new norm in the industry.

One of the key benefits of further research and development in organizational-technological modeling is the potential for greater collaboration and coordination among various stakeholders in the construction industry. By using advanced modeling techniques, project teams can better communicate and align their goals, leading to improved decision-making and project outcomes. This can result in more efficient project delivery, reduced delays, and ultimately, enhanced overall project success.

Moreover, the integration of organizational-technological modeling can also lead to improved project management practices in the construction industry. By analyzing data and trends in real time, project managers can make more informed decisions and adjust project plans accordingly. This can help to streamline workflows, allocate resources more effectively, and ultimately enhance project efficiency and productivity.

Lastly, the implementation of organizational-technological modeling can also support the transition towards more sustainable construction practices. By optimizing resource utilization, reducing waste, and implementing green building techniques, construction projects can minimize their environmental footprint and contribute to a more sustainable built environment. This can help to address pressing global challenges such as climate change and resource scarcity, while also meeting the growing demand for environmentally friendly buildings.

Results. Our analysis revealed that the choice of construction materials and technologies significantly influences the energy consumption of low-rise residential buildings. For instance, buildings constructed with energy-efficient materials such as double-glazed windows and high-quality insulation can reduce heating and cooling energy requirements. Additionally, the use of renewable energy sources, such as solar panels, can further minimize the energy consumption of these buildings.

Furthermore, the organizational aspect of construction projects also plays a crucial role in energy efficiency. Effective project management, coordination among stakeholders, and proper planning can optimize the construction process, leading to reduced energy consumption. For example, prefabrication of building elements off-site can minimize on-site energy consumption and construction waste.

The findings of the study suggest that organizational-technological modeling can significantly influence energy consumption in the construction of low-rise residential buildings. Sustainable practices such as using energy-efficient building materials, implementing green construction methods, and incorporating renewable energy systems can all contribute to reducing energy usage during the construction phase. By optimizing organizational and technological processes, builders can achieve higher levels of energy efficiency and environmental sustainability in their projects.

Critical Analysis. While the adoption of energy-efficient technologies and materials is essential for sustainable construction, there are some challenges that need to be addressed. One of the main obstacles is the higher upfront cost of energy-efficient solutions, which may deter some developers from implementing them. However, it is important to consider the long-term benefits of reduced energy bills and improved environmental performance.

Moreover, the lack of standardized organizational-technological models in the construction industry hinders the widespread adoption of energy-efficient practices. There is a need for better collaboration among stakeholders, including designers, contractors, and suppliers, to develop integrated solutions that minimize energy consumption and environmental impact.

Discussion. The findings of the study suggest that organizational-technological modeling can significantly influence energy consumption in the construction of low-rise residential buildings. Sustainable practices such as using energy-efficient building materials, implementing green construction methods, and incorporating renewable energy systems can all contribute to reducing energy usage during the construction phase. By optimizing organizational and technological processes, builders can achieve higher levels of energy efficiency and environmental sustainability in their projects.

It is evident that organizational-technological modeling plays a crucial role in shaping energy consumption in the construction of low-rise residential buildings. While the implementation of sustainable practices may require initial investments, the long-term benefits in terms of reduced energy costs and environmental impact make it a worthwhile endeavor. Builders and developers should consider incorporating sustainable technologies and practices in their construction projects to promote energy efficiency and environmental stewardship.

Conclusion. In conclusion, organizational-technological modeling plays a crucial role in reducing energy consumption in the construction of low-rise residential buildings. By considering the choice of materials, technologies, and project management strategies, developers can create sustainable and energy-efficient structures that benefit both the environment and occupants. It is imperative for the construction industry to prioritize energy efficiency and embrace innovative solutions to build a more sustainable future.

Organizational-technological modeling is a valuable tool for optimizing energy consumption in the construction of low-rise residential buildings. By adopting sustainable practices and technologies, builders can significantly reduce energy usage and promote environmental sustainability in their projects. Moving forward, it is essential for the construction industry to prioritize energy efficiency and embrace sustainable construction practices to mitigate the environmental impact of building activities.

In conclusion, the role of organizational-technological modeling in energy-efficient construction cannot be understated. As the demand for sustainable buildings continues to grow, it is imperative for the construction industry to embrace and implement sustainable practices to

address environmental challenges. By prioritizing energy efficiency and sustainability in construction projects, builders can not only reduce energy consumption but also create healthier, more resilient communities for future generations. The integration of organizational-technological modeling principles will play a key role in achieving these goals and shaping the future of construction.

References:

1. Egamberdieva, T. (2024). Individuality of Production and Work Organization in Low-Room Residential Construction. *Excellencia: International Multi-disciplinary Journal of Education (2994-9521)*, *2*(5), 289-294.
2. Kondratiev, V., Yusupov, H., Egorova, V., & Kurtametov, S. (2021). Methods and technologies of seismic strengthening of buildings with brick walls. In *E3S Web of Conferences* (Vol. 258, p. 09055). EDP Sciences.
3. Abdurahmonov, A., Madamiovna, K. D., & Egamberdiyeva, T. (2023). Technology of Manufacturing Technology of Pre-Tensioned Intermediate Plate by Continuous Molding Method. *Best Journal of Innovation in Science, Research and Development*, *2*(3), 34-40.
4. Sayfiddinov, S., & Akhmadiyorov, U. (2020). Ways of enhancing energy efficiency within renovation of apartment houses in the republic of Uzbekistan. *International Journal of Scientific and Technology Research*, *9*(2), 2292-2294.
5. Egamberdiyeva, T. (2023). ARCHITECTURAL AND CONSTRUCTION REQUIREMENTS IN THE DESIGN OF LOW-RISE RESIDENTIAL BUILDINGS. *GOLDEN BRAIN*, *1*(35), 201-205.
6. Razzakov, S., Juraev, B., & Akhmadiyorov, U. (2023). MODELING OF ONE-STORY BRICK BUILDINGS AND TESTING WITH SEISMIC PLATFORM. *GOLDEN BRAIN*, *1*(1), 172-180.
7. Egamberdiyeva, T. (2023). DESIGNING ENERGY EFFICIENT AND PASSIVE HOUSES. *GOLDEN BRAIN*, *1*(35), 153-158.
8. Axmadiyorov, U. S., & Sayfiddinov, S. (2023, January). O ‘ZBEKISTON SHAROITI UCHUN BINOLARNING ICHKI MIKROIQLIM MUHITINI YAXSHILASH MUAMMOLARI. In *INTERNATIONAL CONFERENCES* (Vol. 1, No. 1, pp. 1004-1010).
9. Xatamovich, Q. D. (2023). MAMLAKATIMIZDA ARXITEKTURA-SHAHARSOZLIK SOHA MUTAXASSISLARI TAYYORLASHNI TAKOMILLASHTIRISH CHORALARI. *JOURNAL OF ENGINEERING, MECHANICS AND MODERN ARCHITECTURE*, (2), 179-181.
10. CALCULATION, O. P. D. B. R. LOCATED GUIDES FOR STRENGTH AND DEFORMABILITY. *TAKING INTO ACCOUNT CHANGE IN MATERIAL PROPERTIES US Akhmadiyorov ME' MORCHILIK va QURILISH MUAMMOLARI*, *70*.