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Advantages and Disadvantages of 3D Modeling in Building Design

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A B S T R A C T
This article analyzes the advantages and disadvantages of the technology of modeling buildings in computer programs. Information is also provided on programs related to building modeling (BIM technalogy REVIT, Autodesk 3ds MAX, Autocad, SketchUp).

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In modern architecture and construction, modeling technology in Computer Applications has taken its important place. It helps automate, optimize and improve efficiency of the building design process. This technology not only provides convenience for designers and engineers, but also allows you to foresee the complexities in the construction process and find a timely solution. Creating buildings in the form of a 3D model through computer programs will help not only to design more accurately and faster, but also to take into account the economic and environmental aspects of projects. This article analyzes the achievements and disadvantages of modeling buildings in computer programs.

Today, it is difficult to imagine the field of architecture and construction, design without three-dimensional scenes, interactive renderings and animations, realistic visualizations created in modern computer modeling programs. A new generation of innovative technology-based computer graphics software and technical tools has opened up a wide range of opportunities to use traditional design, modeling and presentation techniques from Computer-Aided Design (ALT), 3D modeling and sculpting, visualization(render), informative modeling (BIM) systems. In architecture and construction, there are many advantages to modeling using computer programs.

The main advantages of computer programs:

Saving time: with computer programs, the design process is much faster. Designers and engineers will be able to automatically carry out complex calculations of several stages. By creating a 3D model, it becomes easier to quickly identify and modify various building elements. This will speed up the project process and significantly save time.

Accuracy and detail: computer programs allow very accurate calculations using complex mathematical models and algorithms. With them, aspects such as structural elements of the building, energy efficiency, level of balance and durability are analyzed in detail. As a result, errors in design and construction processes are significantly reduced.

Cost reduction: simulations and optimizations carried out during the project process make it possible to predict and reduce construction costs in advance. During the design stage, excessive spending can be avoided by detecting and correcting errors, analyzing various construction methods and the effectiveness of materials.

Visualization and team collaboration: computer programs allow you to accurately describe the final result of a project through a 3D model. This further improves collaboration between architects, designers, engineers, and customers. Visualization processes help the customer to understand in advance what the project will look like and create the opportunity to make changes in time.[1]

Each technology has its drawbacks, as well as its advantages. Many such programs require large investments. Licensed applications, such as AutoCAD, Revit, or 3ds Max, are expensive. In addition, strong hardware and technical support will be necessary for the application of such programs, which can be a financial burden for small companies or projects. Computer modeling programs require high technical knowledge and qualifications. It will take a lot of time to learn to work with them, and it will be necessary to undergo special training courses. This can be a challenge for beginners and can temporarily reduce performance.[2]

Programs related to building modeling are often used in the fields of Architecture, Construction, Engineering, and design. They allow the creation, design, analysis and simulation of views of buildings and structures in 2D and 3D formats. Below are some of the widely used applications for building modeling:

Revit

- **Purpose:** Revit is an informed building modeling (BIM) program widely used in the field of architecture and civil engineering.
- **Advantages:** the ability to create projects in 3D and analyze in real time, the feature of automatic component updates.
- **Areas of use:** architecture, construction, engineering, design

AutoCAD

- Purpose: **AutoCAD is a popular application designed for 2D and 3D modeling. It provides convenient tools for drawing, editing and designing various projects.**
- Advantages: **wide availability, strong drawing tools, wide application in the fields of construction and mechanics.**
- Areas of use: **Architecture, Engineering, Design, Electrical Engineering.**

3ds Max

- Purpose: **Autodesk's 3ds Max software is mainly used for 3D modeling, animation and visualization.**
- Advantages: **realistic visualization and animation creation, very convenient for presenting architectural and design projects.**
- Areas of use: **architecture, game production, film and advertising industries.**

SketchUp

- Purpose: SketchUp is an easy – to-use 3D modeling program that is especially popular among designers and architects.
- Advantages: simplicity, fast learning, flexibility with a wide range of tools and plugins.
- Areas of use: Architecture, Interior Design, Landscape Design, 3D printing [3]

[1] https://ru.wikipedia.org/wiki/BIM

[2] https://uzbunyodkor.uz

[3] А. В. Харьковский 3DS MAX 2013 лучший самоучитель. Издание4-е, дополненное и переработанное Москва Астрель

CONCLUSION.

Modeling of buildings in computer programs is considered one of the technologies that led to revolutionary achievements in the field of construction. With it, processes are accelerated, and project accuracy and efficiency are increased. It also serves to reduce costs and improve team cooperation. But it is important to take into account such disadvantages of this technology as its high cost, complexity and dependence on technology. Therefore, when deciding to use modeling technology, each project must be analyzed according to its specific needs and capabilities.

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