

# Use Of Bim Technologies in Designing Construction Structures of Buildings

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**Abstract.** The article discusses the effectiveness of using modern programs in the design of construction structures of buildings and structures. The purpose of this work is to analyze modern software components of BIM technologies. The article presents a mutual comparison of programs for improving the calculation of building structures. These programs allow to reduce the period of development of project documents for the construction of buildings and structures, and also provide a complete set of calculations of various structures that contribute to the efficient work of builder-designers.

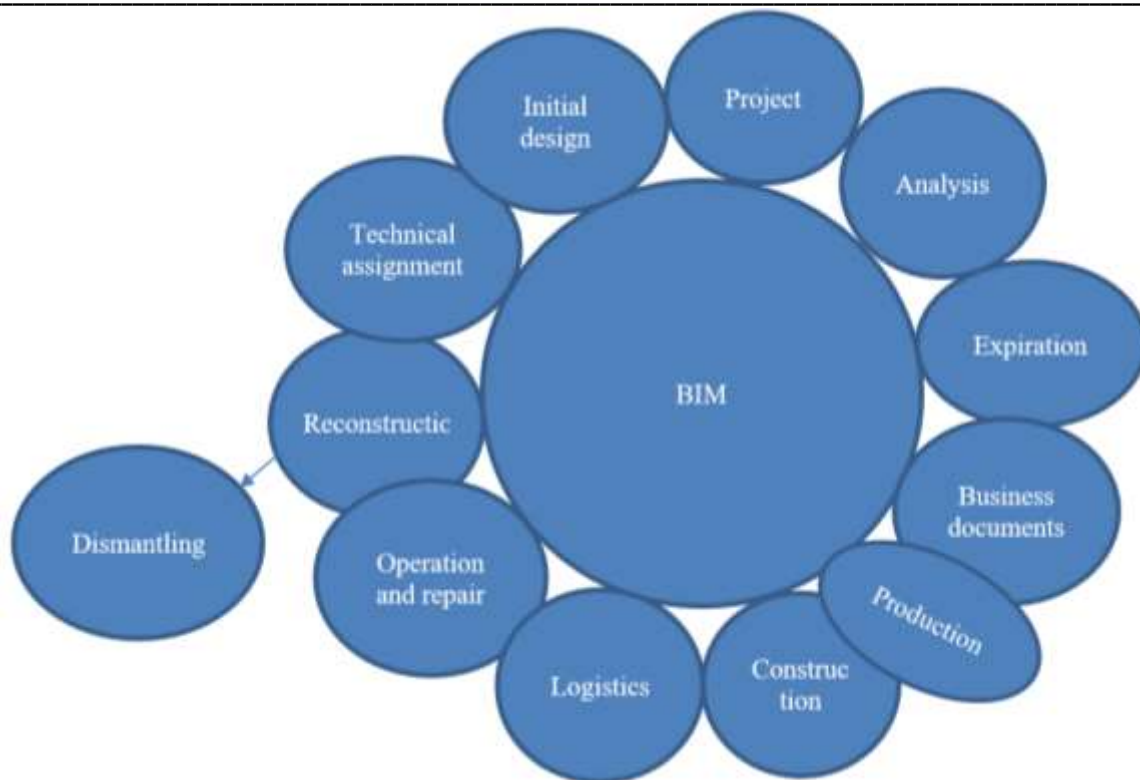
**Key words:** BIM technologies, structures, building modeling, software, design of building structures, project documents, construction

Currently, building and construction modeling, that is, BIM technologies (building information modeling) are very relevant in the design of buildings and structures. Thanks to the use of BIM technologies, information models of buildings that meet the requirements of technical regulations are created, and many problems are solved in the process of building construction and their operation. First, there is the problem of compliance with market requirements, because a comprehensive analysis of buildings and structures is carried out with the help of models built on the basis of BIM technologies. Secondly, the issue of resource and risk assessment is being solved, because the basic requirements for equipment are being formed thanks to BIM technologies and the optimal options for placing the object on the construction site are being determined. In addition, many other problems are being solved, such as consistency in the implementation of works, reduction of construction periods, and financing. BIM is based on a three-dimensional information model, on the basis of which all participants work according to differential calculations. The information model of the building can be used both during the construction of the facility and during its subsequent operation and maintenance, as it is possible to control even the occurrence of emergency situations.

The picture shows the typical process of creating a building object in which BIM technologies are actively used.

There are many BIM modeling tools, FEM-based software for the design of metal structures, in this article we will consider the most popular of them:

For example, Advance Steel is a software for 3D modeling of steel parts, design, fabrication and construction of KM (Metal Structures) and KMD (Metal Structures) parts. The use of Advance Steel software in the design of construction structures allows you to automatically obtain a set of project documents, reduce the design time, and simplify the process.



**Picture.** The usual process of creating a construction object

Comparable program, Autodesk Robot Structural Analysis Professional-Robot Structural Analysis is an integrated graphics program designed for the calculation and design of various types of structures, with advanced capabilities for analyzing structures and checking compliance with design standards. The program allows you to calculate building structures from various core elements to shell and volume elements. This program is capable of producing high-quality documents.

The Nastran/Patran software package is a state-of-the-art SAE (computer-aided engineering) engineering analysis system and is the standard for power calculations in the aerospace industry. This program focuses not only on calculation, but also on structural optimization, and it has a large library of finite elements. Tekla Structures software is designed to work with metal structures in large projects, allowing you to support cars.

Renga is the first domestic BIM system. It has wide possibilities for designing in three dimensions, converting data into various formats, and allows to use design results at any stage of team work on the project. This program is characterized by high performance and reliability of operation.

The LIRA-CAD software package is widely used in the design of buildings and structures. It is designed to study the strength and stability of construction structures, and provides an opportunity to simulate the construction process of buildings and structures.

Thus, BIM is a design technology. Modeling using BIM technologies requires a predictive approach, looking at several actions. To work with this technology, the designer must have a comprehensive understanding of the design process. Another positive quality of BIM technologies is that they bring creative sauce to the design.

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