Why Does A Project Organization Need Bim Technologies?

Matniyazov Z.E.
PhD in Technical Sciences, Associate Professor, Institute of Architecture and Civil Engineering, Tashkent, Uzbekistan
E-mail: zafar18@mail.ru

Buronov N.S.
Doctoral Student, Institute of Architecture and Civil Engineering, Tashkent, Uzbekistan
E-mail: nbsarch2019@gmail.com

ABSTRACT

The article is devoted to the opportunities that open up BIM technologies as a solution to some of the problems of the modern design and construction industry. Modern design technologies in the Republic of Uzbekistan and existing problems and shortcomings are discussed. Real-life examples of the factors that cause them are given. A specialist who carefully reads the article will draw conclusions about why our economy needs new technologies.

Keywords: Construction site, BIM technology, BIM construction, transition periods, construction industry, design and estimate documentation, semantics

Introduction

The history of design technologies goes back centuries. Along with the revolutionary changes in many industries, the construction and design industries have also followed their own path of development with the development of the industry.

Today, the methods and technologies used in the preparation of architectural and urban planning project documents have gone through these multi-period stages and reached their current appearance. The next stages of the development of design technologies are becoming more interesting and advanced [1-3]. But the main question is, to What extent can change solve our design problems today? To what extent will the proposed new design technologies encompass our lives?

The main part.

The CIS countries have their own characteristics as well as similarities. As it is felt in various fields, it is also felt in design technologies. In particular, the design technologies used in Uzbekistan and the computer programs used in the design are not significantly different from their alternatives in countries such as Russia, Kazakhstan, Belarus, and Kyrgyzstan. Design to-do lists and sequences are also done in a uniform manner.

The purpose of design is to create an object that meets certain requirements and has a certain quality (structure). However, in contrast to the experimental method of producing an object in material and testing it in practice, the design of an object is developed on a "semiotic" plane, the units of which are symbols, schemas, and knowledge [4].

At the same time, the designer must indicate in the project the type, size and construction-assembly technologies of materials used for construction.

The subtle aspect of the matter is also seen here. The accuracy and reliability of the information provided depend on the mental,

physical and professional condition of the designer.

Human intervention in the delicate, complex and "serious" side of project work directly affects the outcome. Most of the problems that arise in construction are due to the above reason.

Let's analyze the existing problem in terms of several factors.

1. Time.

Depending on the complexity, the amount of time spent on design works is regulated based on current normative documents. Taking into account the exact scope of work, the following terms are determined in the design assignment of project-research works:

for capital repair objects - no more than 1.5 months;

for reconstruction objects - no more than 3 months;

objects under construction based on model projects and reusable (basic) projects - no more than 3-4 months;

construction and reconstruction of large objects took no more than 4 months [5].

However, changes introduced in the work process and situations not directly related to the design lead to a 2-3 times overrun of the specified terms.

There are several reasons why project work is not completed on time. These can be improper distribution of work, workloads exceeding the norm, or changes made by the customer in the project-estimate documents.

Among them, the customer's excessive interference in the project works and especially the changes after the end of the project works are considered as the main negative situations.

Because, according to the design technology we are working with today, it is less possible to make all the changes in the project-estimate documents on time and quickly [6].

The validity of the measurements necessary for the correct determination of time standards is also important in determining the exact duration of the project.

2. Quality.

It is known that the project organizations of the CIS countries work on the basis of the normative document GOST 21.501 - 2018, which stipulates the rules for the execution of architectural and structural documents adopted internationally in 2018 [7].

In this standard document, the legal rules, scales, conventional symbols and explanations of some concepts used in the execution of architectural and structural documents are given.

Based on experience, it should be noted that this normative document is not uniformly followed everywhere. General rules are adopted by almost all project organizations and there is no other alternative. However, apart from them, there are rules that specify special conditions, the application of which is not visible in the work of all project organizations. This, in turn, does not correspond to accepted interstate standards and, as a result, does not affect the quality of drawings.

2 factors can be pointed out as the cause of this problem:

- Inadequate qualification of the designer
- Human factor

In both cases, it leads to finding automation solutions for regulatory documents.

3. Clarity.

The most responsible stage or section in the development of project-estimate documents is undoubtedly the compilation of information about the size of construction materials. This section requires extreme precision as it directly affects construction costs. Mistakes - to one degree or another, lead to cost overruns, construction volumes being misrepresented, and as a result, state funds being overspending.

All information at this stage is compiled based on the project drawings and ensures the accuracy of the information on the drawings. The role of the human factor is felt at this stage.

Due to various reasons (fatigue, fatigue, inattention, incompetence, health problems, etc.) there may be errors in the received data, and this is unfortunately often observed. The project specialist is responsible for the accuracy of the information.

This increases the need for an automated information system.

4. Interactions.

Relationships that need to be mutual can be divided into 2 groups:

- Customer-Designer-Builder
- Communication between designers within the project organization

In the first group, the customer involves the Designer and the Builder as the main initiator of the construction. After the client involves the designer and the builder, they all form a triangle with the same influence vertices. After the interaction of the relations in this triangle, the Customer - the Designer - the Builder becomes parties that depend on the success of the entire construction process [8].

The second group of contacts takes place between designers within the project organization. Based on the basic pre-project documents provided by the customer, the design organization develops the project documents. This step is about 80% work and time-consuming.

During the design process, all specialists are required to work on a single object. All information about the object should be open, it should be convenient for all project participants to exchange information and interact [9-11]. This is where the problem arises. If the project organization fails to provide the above communications, inaccuracies and errors will appear in the project-estimate documents. All 4 aspects analyzed above, unfortunately, go back to the human factor. As a solution to the problem, the global design and construction industry is offering updated technology. It is the BIM technologies that have become the focus of attention of the world's experts in recent years.

The distinctive features of BIM from traditional computer models of buildings are:

Accurate geometry - all objects are set reliably (completely, including internally and externally), with geometrically correct and accurate dimensions.

Comprehensive and filled properties of objects - all objects in the model have predefined properties (material properties, manufacturer's code, price, expiration date, etc.), which can be changed, filled, added, and used in subsequent projects.

A large number of semantic links - aspects of communication and interdependence are taken into account during project operation and modification [12].

Integrated data - the model collects all data in one centre, thereby ensuring its consistency, accuracy and availability.

Maintaining the life cycle - the model supports working with data during the entire design, construction, operation and even the final destruction (destruction) of the building.

Conclusion

The experience of developed countries in working with this technology is not much. In total, it includes a maximum of 20 years. Nevertheless, its contribution to the economy and industry is significant. World experience shows that the use of BIM technologies in construction increases the net profit by 25% and the profitability index by 14-15%. Reduces the payback period of investments by 17%, and reduces the cost of the project by 30% due to the reduction of construction costs.

In Uzbekistan, the transition from traditional design technology to BIM technology is taking place rather slowly. In order to speed up the process, project organizations should ask themselves the right question. Why is BIM technology needed and what are its advantages?

We answered these questions based on the analysis in the main part of the article. In addition, we can say that the introduction of new, advanced technologies to the enterprise remains a requirement of the time for the maximum result - to enter the world construction market and the minimum result - to become a competitive organization in our country.

References

1. Sattorov, Z. M., & Mamatov, V. S. (2022). Research on phosphogips waste utilization in the building materials industry. In *Инвестиции, градостроительство, недвижимость как драйверы социально-экономического развития территории и повышения качества жизни населения* (pp. 80-91).
2. Adilov, Z., Matniyozov, Z., Tojiboev, J., Daminova, U., & Saidkhonova, U. (2020).

Improvement of the environmental situation of the aral region through landscape design. *International Journal of Scientific and Technology Research*, *9*(4), 3450-3455.

3. Ugli, E. S. S., Erkinovich, M. Z., Rasul-Ulmasovna, Z. L., & Khamroevich, T. J. (2021). Development trends of non-stationary trade facilities. *ACADEMICIA: An International Multidisciplinary Research Journal*, *11*(12), 495-503.
4. Розин, В. М. (2015). Развитие и особенности проектирования–основной технологии архитектурной и градостроительной деятельности. *Урбанистика*, (3), 65-108. DOI: 10.7256/2310-8673.2015.3.16489.
5. Order of the Ministry of Construction of the Republic of Uzbekistan No. 3180. Concerning the approval of the regulation on the procedure for determining the value of project-research works. September 9, 2019.
6. Rasul-Zade, L. U., Salimugli, E. S., Amriddinovich, A. D., & Khamroevich, T. J. (2021). About scale, proportion and image in architecture on the example of the order system. *ACADEMICIA: An International Multidisciplinary Research Journal*, *11*(11), 284-293.
7. GOST 21.501 — 2018. System of design documents for construction. Rules of implementation of working documentation of architectural and structural solutions. Moscow, Standartinform 2019.
8. Аверина, Ю. В. (2012). Взаимодействие между Заказчиком, Проектировщиком, Строителем в проекте малоэтажного строительства. *Экономика и управление в XXI веке: тенденции развития*, (7), 108-112.
9. Salimovich, E. S., & Jonimqulovna, J. I. (2022). BIM texnologiyasidan foydalanish va rivojlantirish.“renga” dasturi misolida. *Barqarorlik va yetakchi tadqiqotlar onlayn ilmiy jurnali*, *2*(8), 117-120.
10. Erkinovich, M. Z. (2021). The Principles of Formation of a GYM in Modern Multi-Storey Residential Buildings. *International Journal of Innovative Analyses and Emerging Technology*, *1*(7), 115-119.
11. Sobirovich, B. N. (2021). Prospects for development of bim technologies in Uzbekistan. *ACADEMICIA: An International Multidisciplinary Research Journal*, *11*(12), 804-808.
12. Malyukh V. N. (2010). Introduction to modern CAD systems. M.: *ДМК Press*.