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**ANALYSIS OF BIM-MODELS IN CONSTRUCTION FROM THE PERSPECTIVE OF INTELLECTUAL PROPERTY**

Authors – **Kostiukova M.O.**, Master of the Department of Metal, Wooden and Plastic Structures

**Haliasovsky V.I.**, Master

Scientific supervisor: **Davydov I.I.**,

Ph. D., Assoc. Prof. of Dep. of Metal, Wooden and Plastic Structures

Language consultant: **Sokolova K.V.**, Ph. D., Assoc. Prof.

*Prydniprovskya State Academy of Civil Engineering and Architecture*

**Problem statement:** The construction sector is currently experiencing two main stages of structural transition: energy and digital. Much has been written about the first, this paper mainly is focused on the second issue, which, to some extent, contributes to the first one. Today, there is a real paradigm shift in the construction sector as there is a tendency from the purchasing and operating a structure to using the structure throughout its life cycle (from the most environmentally friendly construction methods to waste recycling after failure). These factors significantly increase the innovation potential of the industry.

**The aims of the study are:** 1) to consider the problems of intellectual property in creating information models of buildings; 2) to analyze the options for ownership of intellectual property rights with different numbers of project developers; 3) to find solutions to the problems.

**Findings of the research.** Referring to the examples of other sectors (e.g. aeronautics), where the process digitalization among participants of a process was introduced and led to the improvement of many important indicators (improving quality, reducing lead times, reducing investment and operating costs, etc), the construction industry gradually advances to digital technologies.

Based on the idea that the potential of the industry is limitless, many digital construction innovations have appeared on the market in recent years. One of the greatest discoveries was "BIM". This term "BIM" comes from the English language and stands for 'Building Information Modeling', which can be translated into Ukrainian as "Modeling information (or data) about the building." The term "building" here is general and also covers infrastructure. It is difficult to find a definition of BIM that would fit all areas of its application.

It's essential to keep in mind that BIM is:

- 1) 3D parametric digital model that contains intelligent and structured data;
- 2) method of joint work;
- 3) reliable exchange of information throughout the life of the building, from design to demolition.

A digital model is a digital representation of the physical and functional characteristics of this building or these infrastructures.

Creating a building information model or "digital model" is a method of collaboration that allows different participants in a construction project to exchange information, structure, produce, manage and visualize a certain amount of data to create a built model and provide, before construction, a way its repair and even destruction.

BIM technology contains a large set of economic, technological, design and architectural information that applies to the entire construction, including public works, and helps to consider the whole project as a whole. The digital information model contains a technical database and a three-dimensional graphic representation of the object. The three-

dimensional model, in turn, is connected to the database and contains all the information related to the structure, from design to operation.

The main idea of BIM is to reuse information. If the project was developed by only one person, from a legal point of view, he becomes the sole owner, has the right to reuse it, protect his rights and receive money in case of use of this project by other users. Consider a situation where the transfer of ownership is involved and you do not want your project to be used for a any other purpose than you developed it for, or in which it has been modified. Obviously, there is a problem in this case, and this divergence of views can lead to endless battles over intellectual property. The only way to solve this is to clearly define the ownership and use of the digital model in the contract (a very important point of which should be the removal of liability for any misuse, except as provided by the same contract).

When there are several project developers and there is an open exchange of information, there are problems related to the ownership and protection of intellectual property rights to the elements developed in a single information model by different performers.

Working together on a digital model involves establishing the question of its affiliation, and the BIM protocol very rarely addresses the legal issues of intellectual property that this joint work raises.

Consider the options for ownership of intellectual property rights, when the creation of an information model involves several performers (table):

- ✓ If the information model of the building is considered as an original work, and its developer as the author, then the author who performed a new original work has all the rights to it [2]. In the case of BIM, where the authors contribute at different stages of the project, the last person to make a unique contribution (adding to the new model some of the previously created, without involving the authors of previous developments) is likely to receive ownership of the final version of the model.
- ✓ If the completed project qualifies as collective, i.e. as original work performed on the initiative and under the guidance of a natural or legal person, and in which it is impossible to identify the individual contribution of each author, the copyright owner will be a natural or legal person who took the initiative and guide the creation of this very project. For example, such a person may be a BIM manager, whose role is to develop information modeling in compliance with the restrictions and technical standards related to legislation and environmental protection, as well as to ensure communication between all project participants.
- ✓ According to the general provisions on intellectual property rights of the Civil Code of Ukraine, “intellectual property rights that belong to several people may be exercised under an agreement between them. In the absence of such an agreement, it is carried out jointly” [1]. Thus, a large number of participants, as well as their joint work, is likely to lead to joint ownership of works developed under the BIM project. If the developed work qualifies as a joint contribution to which several people have contributed, regardless of whether their contribution is individual or not, the copyrights attached to it belong to each author who has contributed [2].

The participants in the development of the construction site continuously contribute to the digital model, its technical, aesthetic and quantitative solutions, thus making it difficult to track the amount of work they performed and, especially, liability in case of error. But despite BIM's serious copyright problems, it is not still regulated in Ukraine.

The digital model combines a large number of intellectual property rights: know-how, copyrights, patents, designs and utility models, trademark rights, database rights, as well as depositors and, consequently, contributions from them. The exchange of data in one joint

document (digital model) is legally difficult, as it calls into question the contractual obligations that are traditionally practiced in the creation of conventional projects.

Table

**Classification of types of BIM model intellectual property rights**

Number of executors (developers) of the project			
Number of executors (developers) of the project	Several performers are involved in the development		
All rights belong individually to one person.	The last person to make a unique contribution will receive ownership of the final model.	The owner of all rights will be a natural or legal person who took the initiative and management of the creation of this project.	In the presence of a large number of developers, joint ownership of intellectual property rights to the model (project) comes into force.

**Conclusions.** Due to problems related to the ownership of intellectual property rights (in the impossibility of legal regulation of these problems through Ukrainian law), working with information models BIM, it is necessary to agree to ownership legally, agree to permanent and temporary use of elements, parts, or the project as a whole, as well as elements that will be created in the future.

Since ownership of original work rights may depend on the involvement and contributions of each project developer, the BIM contract must be clear and precise in the division of tasks between the parties to ensure that the respective obligations of each person and related parties are identified with their responsibilities.

Summing up, it is necessary to conclude that the construction sector will have a long way to go, in terms of understanding the intellectual property rights to information models. But with successful creation and implementation of the regulatory framework in the field of BIM-technology, this process will be significantly accelerated.

### References

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