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Current Role Of CTU In Implementation Of BIM In Czech Republic

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Abstract

The object of this paper is to present current role of Czech Technical University in implementation of BIM in the Czech Republic. One of the biggest problems in implementing BIM are missing BIM standards that correspond with actual Czech legislation and missing certified methodology of implementing BIM into construction projects. Rectorate of CTU established a special team under the Department of Construction and Investment – BIMLab. Its goal is to integrate professional authorities throughout CTU interested in BIM and to develop a certified methodology of using BIM in the preparation and construction phase of the project.

Keywords

BIM, CTU, BIMLab

Introduction

Building information modeling – BIM, is a process where all the data about building are gathered and managed during its whole life cycle. The result is a BIM model that represents information database including data from the preparation phase, construction phase, operational phase, reconstructions or demolition. It is important for all the participants of a construction project to cooperate on creating and using a BIM model. They can add the data into the BIM model, but the greatest advantage is that the data about every part of the project can be shared between all the participants, which makes it easier to coordinate the whole construction process. [[1](#Čer13)]

BIM model represents the building or object including its physical and functional properties. It is possible to track actual position in the schedule of the construction or maintenance and control investment and operating costs. BIM model also allows to make simulations and analysis – operation and optimization of M&E systems and consequently the energy intensity of the building, or dynamic and static behavior of the object. [[1](#Čer13)]

The advantages of using BIM [[1](#Čer13)]:

* Data usage throughout the building's life cycle
* Effective support for analyses
* Real-time data view
* Inventorying of the assets including the location information
* Exact area management
* Reducing the number of failures of the equipment
* Improving work efficiency

The disadvantages and limitations of using BIM [[1](#Čer13)]:

* Higher initial investment than in the case of 2D designing
* High pressure on the low cost of project work from the investors
* Many different platforms and software and their incompatibility
* Missing rules and standards for the creation and content of the BIM model
* Missing standards for a single BIM data format

It is not appropriate to restrict BIM as a unifying segment to construction processes alone. Integrating with other disciplines, synergies will be explored in the future with a wide range of technical disciplines - engineering, chemistry, food or industrial design, etc. wherever a three-dimensional organization of data can be used in a predefined and professionally managed structure.

BIM is commonly used in several countries, such as United Kingdom, USA, Finland or Singapore. In the Czech Republic, BIM is not being used very often. And if so, it is usually only during the construction phase of the project. One of the reasons is that there are no comprehensive BIM standards and that the methodology of implementing BIM into projects following Czech legislation is missing.

Role of Czech Technical University in Prague

Czech Technical University in Prague is one of the most important technical authorities in the Czech Republic. The role of CTU in implementing new technologies, management processes and its interactions is significant. As it follows from the definition of the term, BIM is the field closest to the Faculty of Civil Engineering where BIM is dealt with at the Department of Economics and Management and the Department of Construction Technology. However, it would be a simplicity not to look for further professional sites that could further develop BIM and benefit from the opportunities it offers.

It is not possible to deal with BIM only as a highly professional discipline without the connection to construction practice. That is one of the reasons why the rectorate of CTU decided to establish a professional team that deals with the problematics of implementing BIM in the Czech Republic. The team was named BIMLab and it is organized under the Department of Construction and Investment.

The main goal of BIMLab is to integrate professional authorities throughout CTU interested in BIM and to develop a certified methodology of using BIM in the preparation and construction phase of the project. The certification should set uniform terminology and processes for further development of BIM in practice.

Today, BIMLab is made up by two members. It is led by Ing. arch. Zdeněk Rudovský, Ph.D., who dealt with BIM in his doctoral thesis and is now lecturing at the Department of Construction Technology of Faculty of Civil Engineering. Magdalena Kodetová is the second member of BIMLab. She is also a CTU graduate and her master’s thesis was led by one of the authors of this article. BIMLab closely cooperates with Ing. Petr Matějka, Ph.D. from the Department of Economics and Management of Faculty of Civil Engineering and other experts and professionals from construction practice, who are dealing with BIM at certain positions in construction processes. BIMLab was equipped with modern information technologies and is open to all the initiatives that are considering using BIM technologies. It is precisely the opening up of all the initiatives throughout different fields that is the main purpose of BIMLab.



Figure 1: BIMLab cooperation scheme (source: authors)

BIMLab projects

For successful implementation of BIM into construction project it is needed to involve BIM from the very beginning of the project. That includes the preparation phase, studies, tenders, contractual relationships and managing the construction on both financial and technical perspective. Another step is to have a complete BIM model that can be used in the operational phase by facility managers by implementing the model into CAFM systems. This is the first milestone for BIMLab.

Even though CTU is an institution that should be setting the pace at this field, this milestone is not easy to achieve. The main reason is that the system mentioned above is financially more demanding than the ordinary construction procedures we know today. That is why BIMLab appreciates the investors that want their projects to become the pilot projects at this area.

As a first project, the reconstruction of the B building of the Faculty of Civil Engineering should be mentioned. Already the project documentation is assigned to be created in BIM. BIMLab supposes the cooperation with the experts from the Faculty of Civil Engineering. Without testing and thorough analysis of used BIM methods, including possible problems or mistakes, it is not possible to gain experience needed to develop a methodology of implementing BIM and its certification.

Another part of BIMLab’s work is expert and advisory activity. Investors of important public projects that track new technologies in construction contact CTU. For BIMLab, reconstruction of a Prague State Opera House is one of these projects. At first, Prague State Opera wanted BIMLab to make opponent reviews of submitted bids, but later BIMLab became a systematic BIM advisor, a member of preparation and realization team.

For BIMLab, it is also important to work with private investors too. BIMLab now cooperates on a project of constructing new apartment houses in Prague 6 – Na Malovance. The main goal is to set up a BIM model and BIM processes, such as unified data base, data structure, data exchange etc. The motivation of a private investor to use BIM is to get structured information for financial and organizational managing of the construction, to reduce risks that are connected to the preparation and construction phase and to get a unified information base that can be used in CAFM systems in case the investor decides to rent the apartments. BIMLab plays a role of a BIM coordinator, but it also puts together a team of qualified experts from practice that will participate on this project.

Another area where BIM can be used is technological construction. Interconnection between building and technological constructions is very difficult because of high demands on very detailed project preparation, construction and operational phase. 3D models are quite often used for space coordination, but using fully structured BIM models in not very widespread yet. BIMLab is now discussing a cooperation with multinational company in implementing BIM into their technological procedures.

Conclusion

Developing a methodology of implementation of BIM and its certification on national level is one of the top goals of BIMLab. One of the biggest problems in implementing BIM is that every participant of a construction project has different requirements on BIM model and different ideas about implementing BIM model into their own processes – the structure of the model, sharing the project data etc. It is possible to use international BIM standards, but the usage of these standards in Czech legal environment is very limited, not speaking about conflicts between new BIM processes and standard construction processes used today, including public projects.

Each individual step of the methodology needs to be widely discussed and opponent by the experts from construction practice. Authors of this article are convinced that it is the certified methodology and its inclusion into Czech legislation that would increase the number of construction projects using BIM in the Czech Republic.

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