Bim management: The use of GDL language for effective work in BIM

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Abstract.
Today is already on the market, ample-effective tool for the fulfillment the working principle of BIM (Building Information Model). This method is above all the desire for collaboration, sharing information within a specific project. Cooperation but requires certain rules. They guarantee us success in communication between participants.
The paper demonstrates how it can streamline the work in BIM. The introduction of new functions in design teams. A new procedure for working in BIM

Introduction
Technological advances in the field of technical coordination and simulation provides a new method in construction (BIM, Building Information Modeling), which will improve process safety, quality and ultimately efficiency. [2]

With the new processes must accept new working practices. And you generate new job positions. Among the one of the new positions include the functions BIM manager.
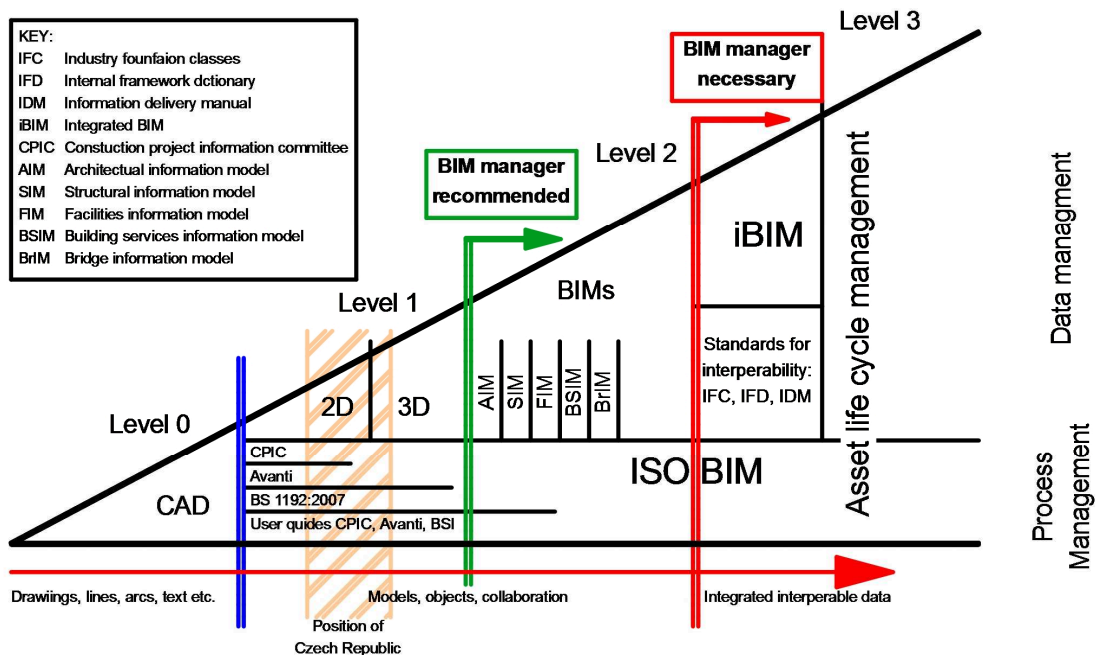

Fig.1 Levels of information management, data sharing and collaborative working [5]

The graph in *Figure 1* shows the expected development of technologies and process in building design. Czech Republic and neighboring countries are in the middle of level 1. This means that some design offices already use BIM. But is created models used for their own use and do not

provide the other components of the process. The graph also shows that the time is approaching when it will be necessary to create a new function BIM Manager. This fact should respond mainly Czech higher education

Bim Management

The task of BIM managment is to persuade internal and external project participants to work in one team model. It is important that the organization has established clear rules and internal system to that all users have an overview of BIM tools, instructions and requirements.

The process of BIM provides extensive possibilities in terms of coordination profession. The level of cooperation is therefore essential measure related to the introduction of information modeling in the construction process. It is through coordination can shorten design time and design while increasing the quality of the final model and the whole project as a whole.
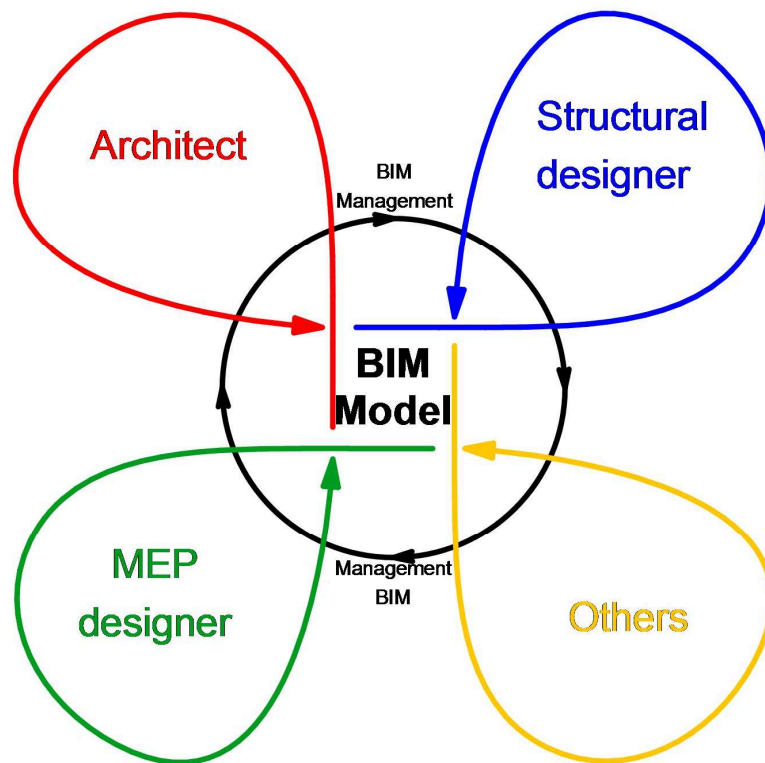

Fig.2 Working team - and the flow of information [1]

Requirements for BIM Manager

BIM manager is the person who is responsible for the integration of BIM into business processes. The principle is to manage the BIM as efficiently as possible. The obligation arises already from the very benefits of BIM, such as coordination, synchronization and unification. They must understand the information flows, to know how BIM affects the team, know the management structures, new technologies, etc.

BIM manager must compared to existing CAD managers, who care about the standard technical issues related to designing CAD (build layers, drawing diagrams, print, etc.) also have good decision making skills. With these skills must correctly identify how the models will be individual members of the design process, coordinated with the main model. How each part of the project

interconnection, which should be checked for collisions and also where and in what ways will all be saved.

Figure 2 shows us the ideal system work in BIM. Individual participants in the process to loaded data from a shared central storage and after adjustment there immediately uploaded to be available to others. BIM management supervises all operations and coordinates them.

GDL - Geometric Description Language

Building Information Model is mostly parametric model of the building and therefore can modify these parameters, change rapidly design methods, that it can also instantly analyze. It is thus possible to create much more variants, with immediate display. For working with BIM I use a program called ArchiCAD. Therefore, we'll describe the procedure to him.

ArchiCAD Program is based on a virtual building and is suitable for creating buildings based on pre-defined tools, such as walls, slabs and window. To create more complex geometries used Interconnection with other programs (such as Cinema 4D). Models from other softwares are then inserted into the ArchiCAD library as its elements - GDL objects. If they are changed, it is necessary to modify an element in a 3D modeler (eg Cinema 4D) and convert it into ArchiCAD.

The shapes of complex geometry can be may create a and directly in ArchiCAD that are programmed from the beginning. The shape must be defined mathematically, which is the beginning of a seemingly difficult, but then allows great flexibility. In this process, creating an object can be assigned to parameters defined on the basis of it can then be edited.[4]

Programming language library elements ArchiCAD's GDL. GDL is a parametric programming language, similar to BASIC. It describes 3D solid objects like doors, windows, furniture, structural elements, stairs, and the 2D symbols representing them on the floor plan. These objects are called library parts.[3]

In ArchiCAD is directly implemented graphical programming environment GDL objects, that corresponds to the structure of library elements. This means, that they are specifically programmed to their various components. The essential parts are 2D view, 3D model and define the parameters. With GDL are therefore making smart library objects. These may not be the only elements, such as furniture, lighting, entourage cell, but also part of the building or the entire building, which can enjoy the benefits, which gives it the parametric design. [4]

Created elements can also be used in other projects. It can therefore create a design environment with the necessary equipment. A user is then inserted into a model. Manufacture of these library elements is carried out usually BIM manager.

Intelligent features or structures can be programmed in the of general 3D modelers, where our tools, which are part of these software allow a simpler way to describe the design of freeform shapes. On the other hand, allows connection ArchiCAD parametric elements with the advantages of the concept of virtual building. [4]

Use of GDL

As written above GDL script serves to create a parameter element. These are then inserted into the model. A parameter is used for the modification of the end user. Usage is really extensive. Starting with standard construction elements or furniture. These elements usually supplied by the manufacturers, to better sell their products are delivered to the construction of priority. Other options are well directed BIM manager. They prove the GDL script programmed the entire corporate standards guaranteeing consistency of output across all project participants. This is

especially the possibility to program the appearance of tables, views of individual elements and labels etc.

Figure 3 shows the creation of a simple parametric label. On the left you see the detached point of view labels, parameter setting is in the middle and on the right is the actual GDL code. In this way a bubble can be read into any model, and users can change the content and parameters.
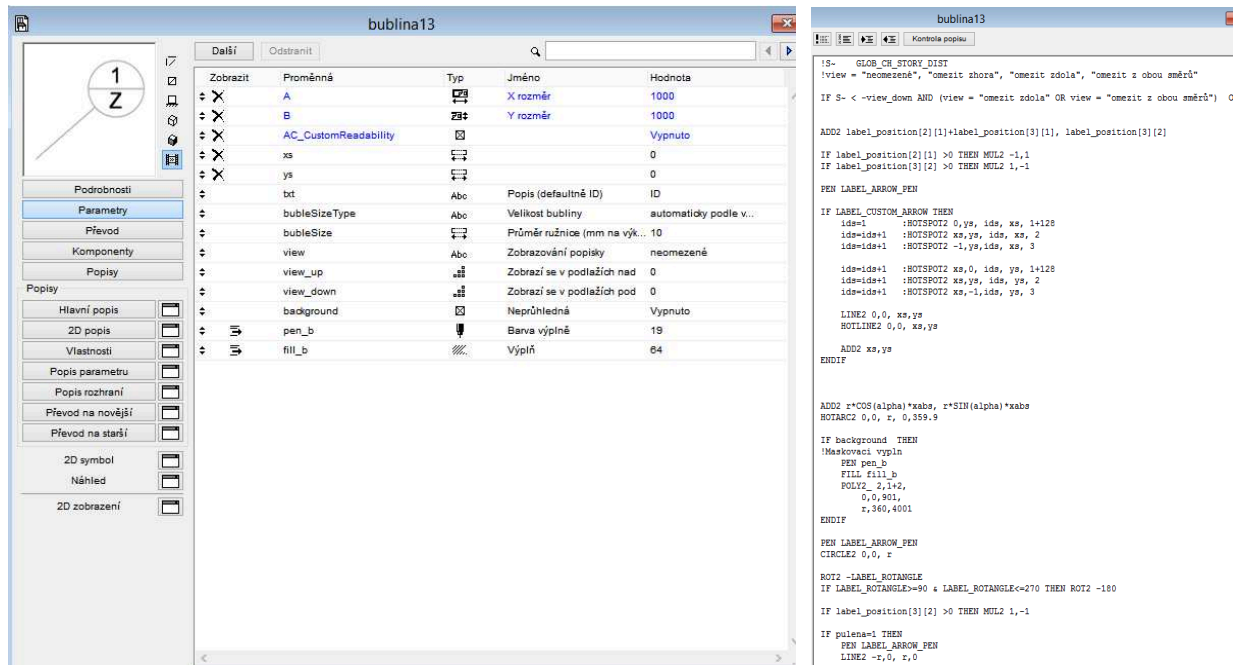

Fig.3 Demonstration of work in GDL - creating a label

Conclusion

Order to achieve the effective use of BIM is necessary to apply the existing as well as new knowledge and especially a different mindset. So called BIM thinking which is non-linear. This thinking should provide a BIM manager.

All production model substantially easier and processing time will fall. In Figure 4 you can see a graph which shows the time needed for each phase of the project. The blue color is formed by standard CAD design methods (level 1 in Figure 1). Green Displays a BIM project, but without coordination BIM Manager (Level 2 in Figure 1). Red is displayed coordinated iBIM (level 3 in Figure 1) Prep time will fall against the CAD method by 50%

As an essential therefore appear to be an initial investment in education. BIM not only to introduce the company buying the software.
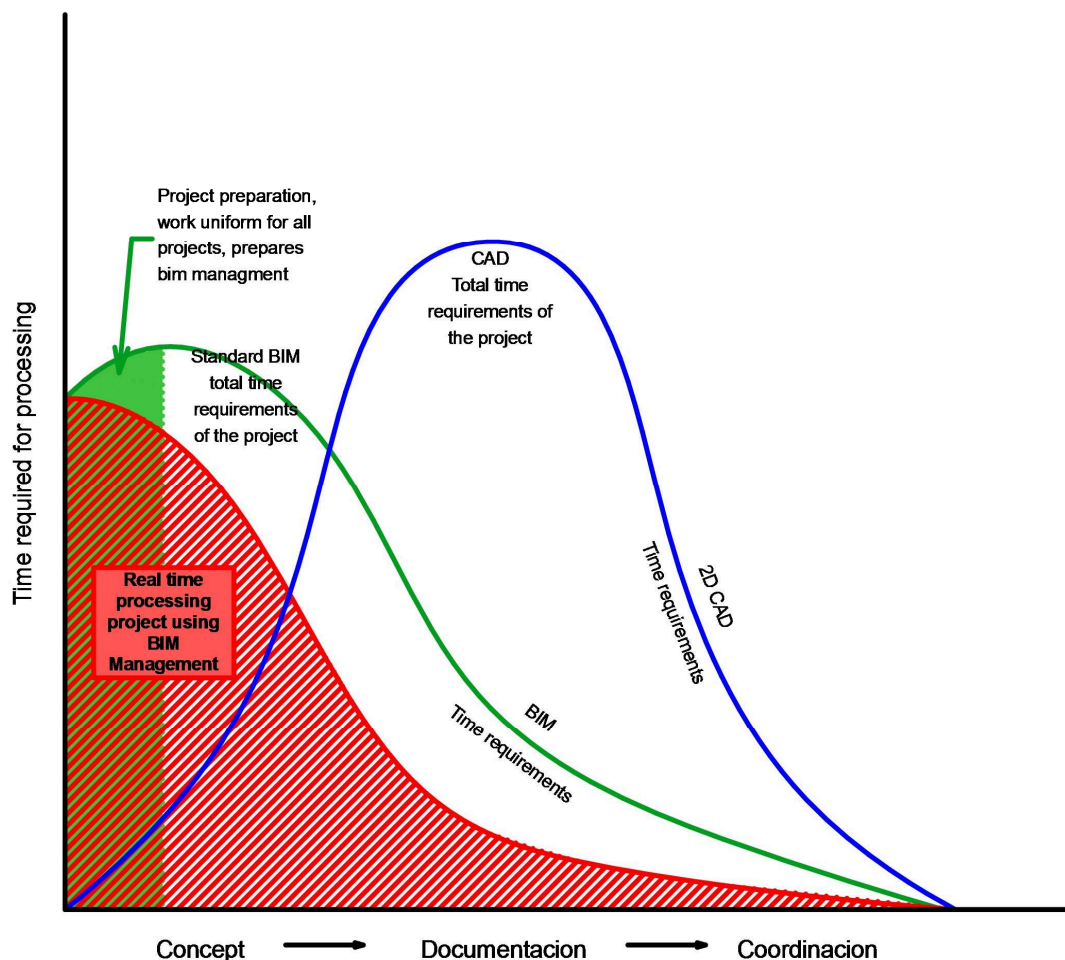
Acknowledgement:

Fig.4 Comparison of time requirements work in CAD vs. BIM [4]

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