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Планировочно-технологическая концепция одно- и многоядерных строительных объектов многофункционального назначения на принципах модульности

В статье рассматривается формирование основных положений планировочно-технологической концепции точечной застройки городских земельных участков с учетом понятий жизненного цикла объектов и нестабильной ситуации на рынке коммерческой и жилой недвижимости. Автор предлагает использовать ядровую планировочную схему с возможностью создания модульных сменных частей здания в зависимости от ситуации на рынке недвижимости, целей и задач девелопера строительного проекта.

Ключевые слова: многоядерные строительные объекты, модульное строительство, жизненный цикл строительного объекта.

A. Shpakova

Planning-technological concept of one and multiple-built construction objects of multifunctional appointment on the principles of modularity

The article deals with the formation of the main provisions of the planning and technological concept of point building of urban land plots taking into account the concepts of the life cycle of objects and the unstable situation in the market of commercial and residential real estate. The author proposes to use a sound plan scheme with the possibility of creating modular variable parts of the building, depending on the situation on the real estate market, the goals and objectives of the developer of the construction project.

Key words: multicore building objects, modular construction, life cycle of a building object.

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BUILDING INFORMATION MODELLING: GENERAL OVERVIEW

This article presents a quick review for Building Information Modeling (BIM) in the past and the anticipated benefits in the future and why BIM is considered as an intelligent model and why we have to use BIM as our concept by explaining how BIM goes further

than traditional cad drawings. The selection of suitable Architectural Software is discussed.

Keywords: Building Information Modeling, ASHRAE, HVAC, Renewable Energy.

Introduction: Building Information Modeling (BIM) is defined as the process of generating and dealing building data throughout its life cycle using three dimensional, real time, dynamic building modeling software to decrease wasted time and means in building design and construction. This process creates the building information model (also abbreviated as BIM), which covers building geometry, three-dimensional relationships, geographic information, and quantities as well as properties of building components, including the life cycle procedures of construction and facility operation. Building Information Modeling (BIM, the process) started as a common name for a range of activities in object oriented Computer Aided Design (CAD). CAD supports the representation of building components in terms of their 3D geometric and non-geometric (functional) attributes and relationships, as discussed in [1-6].

The results of developing sustainable architecture are founded on the symbiosis of ecologists and architects. It began with these two professional groups proposing a change in the function of the building, i.e., a transition from a linear approach to a closed circulation plan. Therefore, from an ecological point of view, the plan of the building function has become a paradigm. In a linear pattern, the building is treated as a "place of processing natural resources into waste". For example, energy is "converted" into heat losses, clean water into sewage, fresh air is converted into used air, materials and consumer goods into classical waste. In a closed circulation plan, a building may change from a voracious consumer of energy and all other resources, into a more self-sufficient unit. It will be possible to use much less energy for heating in winter, and cooling and ventilation in the summer. Part of the water can not only be saved, but also re-used. Generally, a large amount of waste can be avoided altogether, or used again. The transition from one plan to another is evolutionarily.

The concept of integrated architectural design was originally evolved from a small demonstration project in Canada where architects with different professional backgrounds are involved in the design of the project, using existing building technologies and taking all aspects of the technical requirements, the concept of integrated architectural design into account. This concept of integrated construction is widely used in architectural design, and it is continuously improved and perfected in practice. The concept of sustainable development needs to take into account a future trend of development, strict design in the form of building, function, etc., can get the maximum economic benefits through less investment, to achieve the sustainable development of architectural design, architectural design in the process, the concept of sustainable development needs to be run through the entire design process and be able to make full use of all effective resources to

Obtain the maximum economic benefit under the premise of sustainable development. The integrated design of a building requires close coordination between different professional designers and follows a green design concept in terms of form, function and cost of the building needs to achieve a sustainable design approach. The integrated building design method belongs to a brand new design method. This design concept runs through the whole process of building design and is a comprehensive database containing building information. The building information model is an important part of the integrated design standard. The Building Information Model (BIM), abbreviated as BIM, combines various geometric information and related functional requirements to bring together all the information in one construction project to form a comprehensive

information management system. BIM is a design software for integrated design, to meet the different design requirements in the integrated design process.

BIM allows rigorous analyses of designs, models, and data which are digitally interlinked allow constant examination of every change made and validated. Sharing of both, data and graphics are converted and made visible to all the project stakeholders alongside architects to see the whole as-built design. Like CDE allows special ease while dealing with sub-contractors and cross-team RFIs are generated. A single repository model ensures greater consistency in design update and information fetching which reduced the errors in construction planning and management.

In an environment of sustainable development of buildings, we should save the design concept throughout the architectural design, we should focus on resource conservation. To protect resources, one must adhere to a new mode of production and management and an intensive mode of production based on low consumption of resources. It is also a picture of the development of integrated buildings, which can effectively design the building space, improve the utilization efficiency of buildings and make efficient use of construction resources, forming a high efficiency, low energy consumption building development model.

The Concept of BIM: BIM is considered as an intelligent model based process that delivers insight to support the engineers to plan, design, construct, and manage buildings as well as infrastructure, as presented in [1]. Therefore, BIM goes further than traditional CAD drawings by providing intelligence to individual building components (e.g windows, walls or chillers, energy resources) as well as providing system and building wide information and awareness (system flows or building loads) in addition to simple three-dimensional relationships. The BIM process comprises participants from the entire project life cycle (architect, engineer, contractor, owner, facilities management, etc.) who all contribute and communicate with BIM designers, who are asked to deliver more accurate energy modelling data. It is significant to not consider and think that BIM is a software; BIM should be considered as the process of creating and using digital models for design, construction and/or operations of building projects as illustrated in Figure 1.

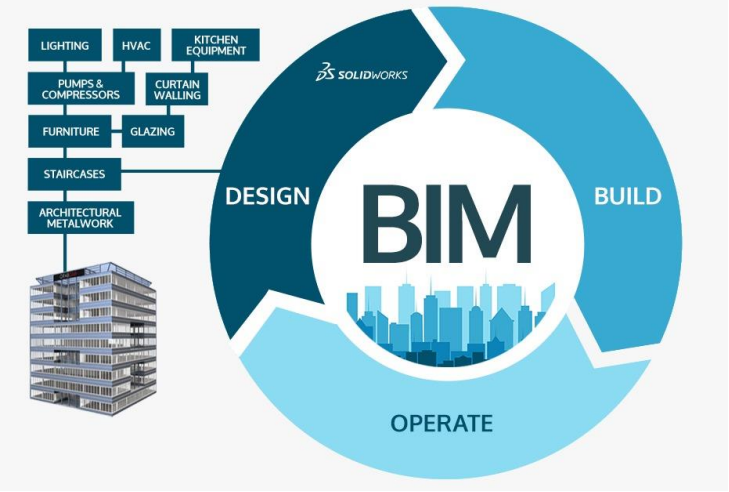

Figure 1: BIM Functions

However, these models combine intelligent 2D and 3D objects used to define a building design, along with external factors, such as geographic location and local conditions, into a essential building database that provides a single, integrated source for all information related with that building's design. The "intelligence" attributed to the objects includes parametrically defined graphical and non-graphical information, giving the architects, engineers, and contractors the ability to represent geometric and functional relationships between building elements. This information feeds an integrated database, which in turn feeds all design documents and schedules as demonstrated in Figure 1.

The used vocabulary and set of definitions for BIM: To clarify the benefits and prospects offered by BIM and integration, it is important to develop a reliable vocabulary and set of definitions as a foundation for the discussion, as presented in [2]. This Reference illustrates the related vocabulary and set of definitions related to BIM. Therefore, implementing Building Information Modelling (BIM) tools and processes on projects on the globe, the Architecture, Engineering and Construction (AEC) industry is quickly moving towards BIM adoption, as displayed in Figure 2.

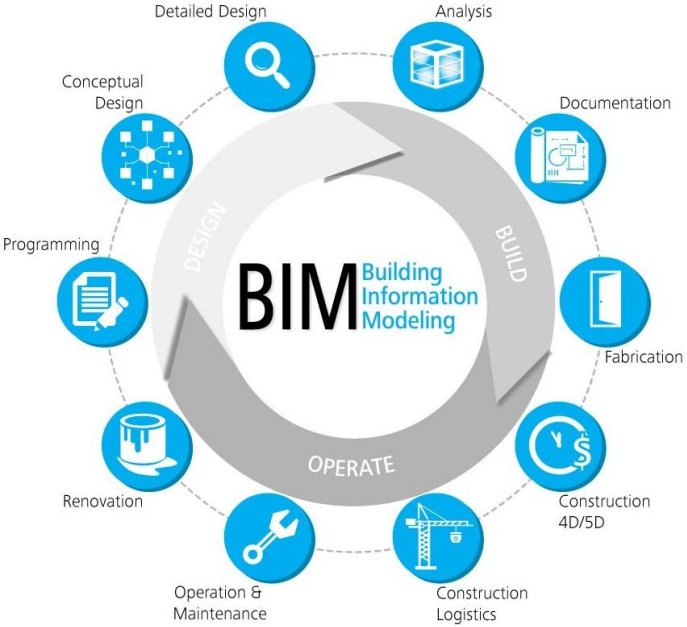

Figure 2: BIM Components

This calls for higher levels of interoperability. BIM is very useful for Economics Sustainability and Climate Protection. Furthermore, there are different benefits of BIM for Specifically the Heat Ventilation Air Conditioning (HVAC) industry and ASHRAE; as presented in [2] and displayed in Figure 1. Many related engineers to this industry can benefit from BIM. So, embracing and adopting BIM processes in many ways as depicted in Figure 3.

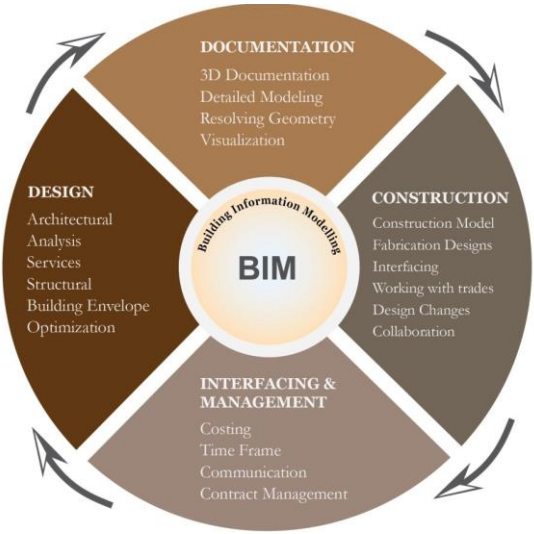

Figure 3: BIM From Design to Construction via Interfacing Management

Benefits of BIM to HVAC Industry: The HVAC industry is wide and expanding. Some of the disciplines and trades that fall under the category of HVAC include, but are not limited to: HVAC engineers; HVAC contractors; Building scientists; Energy modelers;

Building performance modelers; Specification writers; Facility managers; Commissioning agents; Test and balance agents; Building automation integrators; Researchers; Students; Faculty; and Manufacturers of major system components (e.g., from refrigeration to piping, from distribution devices to valves). In this guide [2], these disciplines and trades are broadly described as:

a) The design professional,
b) Construction professional,
c) Manufacturer,
d) Software developer,
e) Academic, and
f) ASHRAE society.

The benefits for each of these broad categories are described in [2].

Realizing the benefits of implementing Building Information Modelling (BIM) tools and processes on projects worldwide, the Architecture, Engineering And Construction (AEC) industry is rapidly moving towards BIM adoption. This calls for higher levels of interoperability amongst existing design and analysis tools used by various project team members. An approach to achieving higher levels of BIM maturity and interoperability is to adopt open, non-proprietary data exchange standards such as the Industry Foundation Classes (IFC).

Efforts are currently underway to establish IFC-compliance in analysis tools.

Establishing interoperability between architectural BIM models and energy analysis tools has been a challenging effort. With the industry chasing renewable energy targets for existing and new building stock, it becomes imperative to incorporate analysis tools for

Renewable Energy Systems (RES) in this effort. A surplus of tools is used by the project team to assess the performance of various RES in existing buildings or in post-design stages of new buildings. A holistic RES simulation tool is required that can assess various RES and their impact on the building's energy consumption, carbon emissions and operational costs. Developing this tool's interoperability with architectural BIM models would lead to higher adoption. The aim of this thesis is to develop a methodology to support renewable energy simulation by using architectural BIM models based on open data exchange standards thereby enhancing their interoperability. Many research studies involved a literature review of the existing RES analysis methods and approaches of developing IFC-compliant analysis tools. A methodology was developed that involved a standardized conceptual framework that can be used to establish compliance in RES analysis tools with open-data exchange schemas. The conceptual framework was implemented in a solar PV simulation model by means of a prototype. The prototype was validated against existing PV analysis tools and presented to industry experts to gain their feedback. It was concluded that the tool supported RES assessment of buildings in early design stages and could be widely adopted as a BIM tool by the AEC industry. The selection of suitable Architectural Software could be based on some analysis and comparison as described in Figure 4, as discussed in [4].

Figure 4: Chart for Selection of the suitable Architectural Software

It is recommended to raise the question: Which CAD or BIM software should one use? It Sounds: that depends. What functionality is needed? What are the priorities with regard to cost, comparability, interoperability? Are a Mac or a PC is used? Therefore, defining which software to use can be a complicated procedure. There are a lot of varieties out there as well as the marketing availability.

The selection of suitable Architectural Software is discussed.

Benefits And Barriers of BIM: However, benefits and barriers of BIM were discussed in [3]. The presented benefits (which are arranged with importance based on replies from distributed questioners) are:

a) Reducing Time,
b) Reducing Cost,
c) Reducing Human Resources,
d) Improving the Quality,
e) Sustainability, and
f) Creativity

Meanwhile, the drawbacks are listed in [3] as:

a) Copy right cost and Training,
b) Waste time and human resources,
c) Unsuitable for Projects,
d) Refusal of People to learn, and
e) Current technology is enough.

Conclusions: The article discusses some concepts related to BIM. Then, it illustrates how to find the related definitions and vocabulary to BIM. Meanwhile, it presents the disciplines and trades related to BIM. BIM also could facilitate the integration of renewable energy like PV modules. Furthermore it illustrates some benefits and drawbacks of BIM. The selection of suitable Architectural Software is discussed.

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Хасан Ахмед, В.І. Доненко

Інформаційне моделювання будівель: загальний огляд

Ця стаття представляє короткий огляд інформаційного моделювання будівлі (BIM) у минулому та очікувані переваги в майбутньому, показує чому BIM розглядається як інтелектуальна модель і чому ми повинні використовувати BIM як концепцію, пояснюючи це тим, що BIM випереджає традиційні програми для креслення. Обговорюється вибір відповідного архітектурного програмного забезпечення.

Ключові слова: інформаційне моделювання будівлі, ASHRAE, HVAC, поновлювані джерела енергії.

Хасан Ахмед, В.И. Доненко

Информационное моделирование зданий: общий обзор

Эта статья представляет краткий обзор информационного моделирования здания (BIM) в прошлом и ожидаемые преимущества в будущем, показывает почему BIM рассматривается как интеллектуальная модель и почему мы должны использовать BIM как концепцию, объясняя это тем, что BIM опережает традиционные программы для черчения. Обсуждается выбор соответствующего архитектурного программного обеспечения.

Ключевые слова: информационное моделирование здания, ASHRAE, HVAC, возобновляемые источники энергии.

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ВПЛИВ ЛЮДСЬКОГО ФАКТОРУ НА ДЕФОРМУВАННЯ БУДІВЕЛЬ, СПОРУД ТА НА УМОВИ ПРОЖИВАННЯ МЕШКАНЦІВ

На реальних прикладах наведені фактори грубого нехтування вимогами та правилами будівельних норм та норм експлуатації , які призвели до аварійного стану багатосекційних будинків та дискомфортного проживання людей. Відновлення аварійного стану будівель здійснено розробленим інноваційним методом управлінням деформаціями основ перфоруванням шару основи бурінням горизонтальних свердловин змінних параметрів.

Ключові слова: теплофізичні умови будівель, деформації будівель, зіткнення будівель, аварійний стан, роз'єднання будинків.

Постановка проблеми. У зв'язку із суттєвим скороченням капітального будівництва в Україні по різним причинам, з яких основною є економічна криза, досить відповідальним питанням є збереження існуючого будівельного фонду. Це питання суттєво ускладняється у зв'язку із наявністю великої кількості деформованих об'єктів. Дана ситуація суттєвим чином пов'язана із фізично-технічним станом будівель, споруд та їх конструкцій, яка впливає також на комфортне приживання людей.

Аналіз досліджень та публікацій. Деформування будівельних об'єктів провокують різні природні, техногенні чинники, а також людські фактори. Безумовно, основними чинниками впливу на безпеку будівель, споруд являються природні та стихійні лиха. [1]. Але немаловажними факторами впливу на стан будівель та споруд є суб'єктивна сторона якості будівництва та експлуатації, де значно відіграє людський фактор [2]. Особливо цей фактор позначився в перехідний період від планового господарювання до ринкових відносин, коли відбувалась передача житла до комунальної власності. Не менш важливу роль впливу людського фактору на стан будівель та споруд відіграла передача житлових будинків від підприємств в комунальну власність, а також приватизація житла, коли