

Research Article

The Building Design of Food Enterprises with the Assistance of BIM-assisted Computer

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Abstract: As information has a profound influence on human being, the development of the building of food enterprises is bound to be affected by Information Society, which will become one of the driving forces of future building of food enterprises. This study intends to explore the building design of food enterprises based on BIM technology through the understanding of BIM technology and the analysis of the function of information model of enterprise building during the process of information transmission.

Keywords: BIM-assisted, building of food enterprises, enterprise building

INTRODUCTION

In recent years, the fixed-asset investment has remained about 1 billion in China, 60% of which was completed through infrastructure. There is a sharp gap of productivity between China and developed countries. If the information technology and management level are improved, China will have a stronger potential for development and a cut in cost. The reason for the low efficiency of engineering construction can be varied (Matthew, 2005). But after comparison with the manufacturing industry that has achieved higher productivity, it can be found that the goal of the improvement of the whole industry and industrial upgrading will only be achieved by advanced production process and technology application. In the development of information technology in manufacturing, there have emerged PLM and PDM technology. Driven by this wave, the application of information in enterprise building emerged as required-BIM technology-which creates new ideas for BLM.

BIM technology for building design of food enterprises in information era.

Information has a strong effect on humans. The development of enterprise building will certainly be influenced by Information Society and the application of information is bound to be one of the driving forces of future architectural design of food enterprises. In information era, in order to transform the traditional 2-dimension building information into a virtual entrepreneurial building that contains all the information of a real enterprise building, so as to realize information sharing and communication that extends to the whole enterprise building on horizontal level and the planning, designing, construction, management and maintenance in life circle of enterprise building on vertical level, the way to improve the productivity of enterprise building has become the inevitable method.

BIM (building information model of food enterprise) - technology is the inevitable product of the application of enterprise construction industry. Over the past years, there has been a constant exploration of building design of food enterprises with the assistance of BIM-assisted computer in the internal academic world and an agreement has been achieved. In enterprise building design, the virtual enterprise building model created by the application system of BIM technology contains all the components that an enterprise building needs. In Fig. 1, the virtual enterprise building model is a comprehensive database that contains all the enterprise building information. It can not only be applied to enterprise building design but also structure design, equipment management, project quantity, cost account and property management. It plays a part in the whole enterprise building industry and controls all the information of the life circle of enterprise building (Jardim-Goncalves and Grilo, 2010).

MATERIALS AND METHODS

The concept of BIM: Building Information Model, abbreviated to BIM, was first come up with by Chuck (1961) Eastman majoring in enterprise building and computer in Georgia Tech College 30 years ago. He said that, "enterprise building information model combines all the geometric model information, function requirement and component property and integrates all the information of enterprise building project in its whole life circle into a separate enterprise building model, including construction process, building procedure and maintenance." In the past decade, the concept of BIM had been referred to as 3D modeling, virtual enterprise building, single enterprise building model and so on and so forth. These concepts are reflected in two aspects:

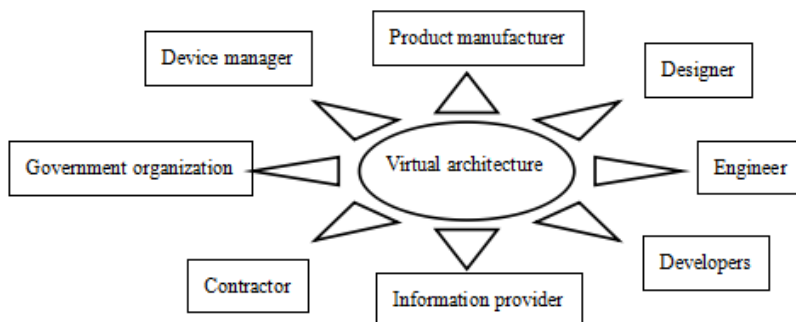


Fig. 1: Information sharing of virtual enterprise building model in its life circle

- Generate or extract 2D graphs in 3D enterprise building model to improve productivity
- Generate progress chart and bill of material by using the objects in the model.

The enterprise building information model based on BIM technology has superiority in light of its coordinating in multi-disciplines as well as using enterprise building information in the life circle of enterprise building (including designing, construction, equipment and management stage). According to particular needs, data can be transformed into 3D model or traditional 2D construction drawing, or into binary information to other software such as energy analysis, structure analysis, budget and project management. BIM can be applied to plan designing, construction drawing, enterprise building analysis and operation.

The function of food enterprise building information model during the process of enterprise building information transmission.

Different enterprises may require different operation methods, but most of them have the following 5 stages: Feasibility analysis, primary design and construction drawing design, construction acceptance check, delivery and usage, management and maintenance and destruction (Fig. 2). In different stage, the involved people and their activities are subject to the different stages. But there is some association between them so that project can be accomplished. Enterprise building information is key to any progress of enterprise building project. Whether a design can be adopted to the final enterprise building or not depends on the accuracy and timelines of enterprise building information. The creation, transmission and usage of enterprise building information are different because of different stages.

As the information in food information enterprise building model should include the entire life circle, model must be elaborate with measurable enterprise building elements. In this way, the needs of all the stages can be met. There are two ways to realize systematic building information mode: one is an extremely complicated comprehensive model. From the perspective of computer, it is a central database which

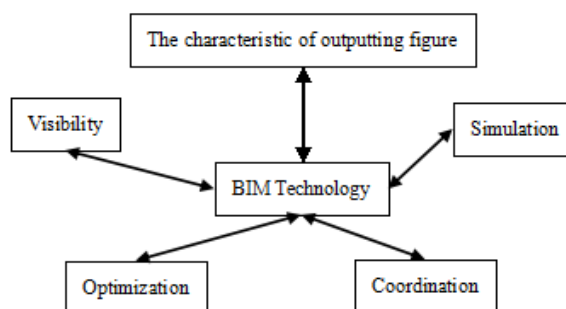


Fig. 2: The data structure in enterprise building information model

only includes enterprise building module but also other modules like structure analysis module, budget module, energy analysis module and assistance decision-making module. Such system provides sharing information for different designers and professional user interface for enterprise engineers, architects and budget makers. This highly intensive system demands a lot of resources to maintain, especially in managing large projects, because of the isolated information, higher management risks and low feasibility.

RESULTS AND DISCUSSION

The food enterprise building design based on BIM technology: The application of BIM technology has brought many benefits to enterprise architects. Through data transformation and the combination of virtual enterprise building and energy analysis soft wares in BIM model, the feedback of enterprise energy consumption information can be timely obtained. Once there is some change in design, BIM model will updates data automatically without the manual operation of enterprise architects or building a new model (Guo *et al.*, 2010). BIM places all the staff on the same platform, which not only improves designing accuracy and efficiency, but also reduces unnecessary resource waste. At present, enterprise architect have a series of application tools to make energy analysis in the whole design process. It is no longer a high-cost process that only professional dominated in the past. By combing

soft wares and virtual enterprise design, food enterprise building can be designed without extra input of energy and cost. The full energy consumption soft wares of most enterprises are composed of 4 parts: Loads, Systems, Plants and Economics, or abbreviated to LSPE. These interwoven parts constitute the enterprise building system model (Bilal, 2009).

BIM and green building studio: Green Building Studio is an analysis tool based on food enterprise building energy consumption, water resource and carbon emission. Users can export Gbxml from BIM soft wares like Revit by using the plug-in and then upload to Green Building Studio. In this way the calculation result will be shown immediately to make it convenient for exportation and comparison. For energy simulation, Green Building Studio uses DOE-2 as calculation engine. In addition, it is able to simulate high-quality information of simulation plan through enterprise building information, so that the cost of green building can be reduced. Such integration technology not only improves energy analysis accuracy and create energy-saving design, but also help users reduce operation cost.

CONCLUSION

BIM and Integrated Environmental Solutions (EES) is a software for enterprise building property simulation and analysis. It can export a unified food

enterprise building physical model under the framework and make simulation analysis of light, heat, sunshine, equipment, price and fluid by using the same integrated data model. This software adopts the molecule designing idea. The integrated software molecule which is flexible can easily be integrated with green enterprise building and then make analysis.

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