BIM IN CHINA

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ABSTRACT

The definition of BIM and the development process in China from 2002 and the achievement we obtained, in BIM, the activities that is promotion for BIM in China, the comparison between China and U.S.A and introduced the problems of BIM existing in China now. And the solution of BIM that it armed at the problem

KEYWORD: Building Information Mode, Building Lifecycle Management, Beijing Olympic, 3D, Autodesk Revit

1. INTRODUCTION

BIM (Building Information Modeling) is a new concept in recent years in the construction industry. In fact, it is a new technology that is now leading the construction industry towards higher-level information technology. Its comprehensive application will have a great effect upon scientific and technological progress of the construction industry and greatly enhance the integration level of construction. At the same time, it will also bring huge benefits to the construction industry development, which will lead to the improvement of the whole project and the reduction of cost.

BIM, based on three-dimensional digital technology, is an engineering data model integrating all relevant information on construction project, and is an expression in details of the project information related. BIM is a direct application of digital technology in the construction to resolve the description problem of construction project in the software, which can enable the designers and engineers to make the right response for various architectural information and provide a solid foundation for cooperation.

BIM is also a digital method that used in the design, construction, and management. This approach supports the integration environment of construction management, makes construction project improve efficiency and reduces risks in the whole process.

BIM, proposed by Autodesk firstly in 2002, now is widely recognized in the industry worldwide. On a global scale, the concept of BIM is seen as a response to the challenges of sustainable design and realization of the construction of green innovation vane. In 2006, American Institute of Architects had issued a warning that architects who do not know about BIM will lose the opportunity to obtain OFERR. In the United States BIM is promoted quickly as a new technology. In the US, BIM system, in particular to Revit Architecture, has been widely accepted by the construction industry. Japan, our neighbor, is also promoting the application.
2. PROCESS IN CHINA

In China, the current application of BIM is mainly about design, but some developers, who have an international sense, have recognized the concept innovation and technology revolution that BIM can bring. They have begun to introduce the concept of BIM into their own projects. In particular, after 2008, before design companies had the initiative to use BIM to overcome difficulties in project, Afterwards, because the Olympic Games and other international event held in turn, Market demand and the results of development of the industry came out a large number of public construction projects, The high-end owners begin to seek solutions of sustainable design in overall design, management, operations.

In 2003 the developer of software such as Autodesk Revit Autodesk Software Co., Ltd. established the China Chinese Application Development Center (CADC) in Shanghai in early 2008. Autodesk completed the acquisition of Hanna's global and merged Hanna Chinese companies with CADC to set up the largest research and invention center in the world—ACRD. During the past 10 years, Autodesk not only spared no effort to bring the most advanced products, technologies and ideas into China to help the development of domestic software industry of China, but also used the industry-leading insight and complete software solutions to help China's construction, manufacturing, engineering, construction and media and entertainment industries and continue to constant innovation to break the stereotypes.

2008 Annual Report 10 Report 17, the global two-dimensional and three-dimensional digital leader designed software, Autodesk company and Architectural Society of China join together to hold BIM theme-based conference, "sustainable design with experts face to face", in Beijing. Top international experts in sustainable design were invited to the convention and construction industry elite of China shares the building information modeling (BIM) concept of the world leading in the field of application results of sustainable design on how to promote the concept in the domestic construction industry and to achieve application and development, further discussing how to promote construction industry of China, sustainable development and green process and hoping that it can contribute to the further development of the China in Engineering Construction Industry, in particular to popularization and application in China—Autodesk Revit as one of the most complete design solution to BIM.

In June 2009, Qinghai Province of China, Survey and Design Association organizes an advanced training courses (Phase I) about BIM of the industry in survey and design technology, and the experts that attended the courses include President and Chief Engineer from the construction, municipal transportation and chemical industries. China Survey and Design Association had planned to co-find BIM Branch with BIM software vendor. Survey design industry in China provides a platform to learn and exchange for BIM. BIM branch brings about a successful application case of BIM and experience for the industry users, to assist the industry users in practice of BIM, and promote the successful experience of business users and share and exchange, to realize the sustainable design.

On September 9, 2009, in Beijing the world-renowned McGraw - Hill Construction Company and the largest two-dimensional and three-dimensional design, engineering and entertainment software company Autodesk Inc. jointly issued a research report compiled by the McGraw - Hill Construction: “BIM – the improvements in Design and the innovation of construction, production and efficiency”, which indicates that based on concepts and solutions of BIM, the most advanced two-dimensional, three-dimensional design and engineering software, it will become the only way of construction industry of China (covering buildings, bridges, roads, railways, telecommunications, water, basic construction and other fields) to achieve efficient, collaborative and sustainable development.

The latest research report is released by McGraw - Hill Construction Company in China and it is the first research report on the Chinese version of BIM, which covers from planning to operation which lasted for four months. Through rigorous market analysis and detailed case-editing, BIM demonstrated the full range of effects produced and application status in construction industry, and the report also shows the advantages of BIM over achieving green
design and sustainable design. BIM method can be used to analyze the conditions, including lighting affected green condition, energy efficiency, sustainability of the material and building performance, in order to achieve the lowest power consumption and energy-saving environmental protection though ventilation, lighting, air distribution and visual control of human psychological perception and so on. By concept of BIM, the project has completed at the same time as the calculation of sunshine, wind simulation environment, and to be injected into the high-tech force for the "green exploration" of architectural design.

Therefore, based on its leading solutions of BIM, Autodesk helped the Beijing 2008 Olympic Games for building a "System of space planning and materials to the Olympic Village Management Information", which achieved the Olympic Village space planning and digital design of logistics services and management. This system was based on Autodesk Revit and Autodesk Buzz saw and solutions of BIM, it achieved processing of the Olympic Village space planning and facilities at the three-dimensional graphics and data management.

It ensures the asset management of the Olympic Village, logistics services in aspect of intuitive, accurate and efficient. This is the first time in the history of the Olympic Games that used BIM technology, to effective respond and to achieve a "High-tech Olympics" and "Green Olympics". Hong Kong MTR Corporation used BIM in designing stations, succeeded in correctly guiding the flow of people, and daily accurate delivery of 4,000,000 passengers in comfort. In particular, in April this year, China held Architectural Design Competition on the BIM that have emerged the latest achievement of BIM a lot, Including the Tianjin International Cruise Terminal, Shanghai Fengxian GIS converter station, Wenchuan Earthquake Memorial Hall, Shanghai Times Financial Center, the Federal Republic of Germany of World Expo 2010 National Museum, expert apartment of Tsinghua University and so on more than ten pieces of outstanding works.

Two decades ago China helped construction industry of China by a "rejection drawing board" campaign for coming true a leap from a pen and paper 2D. Atpresent, the transition and upgrade in the 2D (two-dimensional) to 3D (three-dimensional) has become the inevitable trend of project and design, BIM is bringing another revolution to construction industry of China based on advanced 3D design software. Although the concept of building information models in the country is still in the promotion stage, However, the development speed is very fast, and have also initial success in practice, it has been participated and vigorously promoted by government, industry associations, software development companies, design institutes, building homes and developers now, BIM will bring greater value to engineering and construction industry of China and related businesses.

3. COMPARION BETWEEN U.S.A AND CHINA

BIM is proposed firstly by Autodesk Company from USA in 2002, from the development of the software to the application of BIM in USA has many time and strength efficiency, but China realized BIM in 2003, and had not any technique about it. After construction industry had realized the profit from it ,USA began to promote it widely and quickly, so in 1.July.2009 Wisconsin Division of State Facilities required all projects with a total budget of $5 million or more and all new construction with a budget of $2.5 million or more to have their designs begin with a Building Information Model and published 《Guidelines and standards》.China is not any policies and standards about BIM.

In the USA marketing 57% of user expressed they got the information about construction from BIM, in which contractor has the highest proportion about 71 %( research report from Autodesk company), in the opposite the user of BIM is lower. China and USA is different in construction industry. In China Design Corporation and Construction Company are separated, and we have not the professional design production team, so the coordination is lower. In USA better comprehensive strength of construction companies and the professional design production team provide a better platform for BIM.
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4. PROBLEM ANALYSIS

BIM, Building Information Model as an important item had been included in Ministry of Science of China "Eleventh Five-Year" period of national research programs. At the same time, in China construction industry government and enterprises has begun to promote the concept of the project full life-cycle management (Building Lifecycle Management, BLM) in project management, BLM is trend of construction project management of China and mainstream technology, The BLM based on information of BIM, it is a digital way to create, manage and share information and is the best mode of construction project management.

However, the implementation of BIM is not a simple problem like upgrade hardware or the set of software, needing to meet a lot of challenges, including awareness of policy-makers for understanding of return on investment (ROI) of BIM, the transformation and training from 2D to 3D and uneven regional development in China and so on.

1) The first grade cities have exchanges with a lot of domestic and foreign companies, the popularization of BIM will be accelerated, but cities in the second and third level, because of fewer opportunities to exchange, the overall application level will be delayed.

2) At the present stage of building information modeling (BIM) software is be used, include the early series, ArchiCAD, Micro stion, Autodesk Revit and so on, Archicad which the application is mainly in schools and a few number of design companies, Micro stion series is mainly used in a number of industrial design and a number of large-scale projects, Autodesk Revit enters the domestic market, at the latest, But the mode of operation of the software that is closer to AutoCAD we used for many years, it is easier to use, and has good compatible with AutoCAD, some information of the previous drawing can be used in seamlessly link, so the popularity of Autodesk Revit Series within a few years is still very fast, but the overall environment in China is different from Europe or the United States, a lot of a professional design company abroad, but the development of construction industry of China is only at a temporary team level. BIM in China is at the beginning of the degree of development, and workers in Software applications is lack, design of China also has its own uniqueness, Software such as Autodesk Revit is a major release for the global market, therefore, China is also under the absorption and run-in. the concept of BIM as the first advocate and most long-term partner with Chinese design and engineering industry, Autodesk is duty-bound to promote the resolution of these issues.
3) Currently the lack of co-design the project is in operation, the information between the professional and the professional, between personal and personal, due to the lack of integrated management often tended to be fragmented. As a result the design and construction plans do not appear peer and errors and omissions, increase the workload of the late change, waste energy. In addition to continuously upgrade and innovate technology of the product, we also relied on research and development and force of technical support of China Research Institute of Autodesk, joined hands with government, universities, customers and other partners, and developers and distributors and other business partners to provide solutions of complete software and services for users, to make real efforts for early application of BIM in China.

5. SOLUTION

1) Government should enact policies about BIM, and in the development of standards add some quantitative results to support the model as the basis of the terms, such as energy consumption analysis and so on. It is important to define measure and express what is sustainable design and how to achieve use of energy efficiently. In Japan, the government has adjusted relevant laws and regulations, and set up the quantitative standards about appraisal and approval of project. Although the government does not require each company to use building information model, but some quantitative indicators will be more easily achieved in an environment after modeling, BIM is able to be adopted on a large scale.

2) Increase communication between the first grade cities and the cities in the second and third level, and the forum open in the small and medium sized cities, so that contractors and owners, design units have the opportunity to contact and understand its potential and advantages, and make large enterprises as the center to push the development of small and medium sized cities in BIM.

3) Software Center with major colleges and universities together will cooperate to promote the new technologies and train technician.

4) Software continues to research and development, and make localization and more suitable for China's architectural style.

5) Set up Management Company about BIM to help customers make model, economic analysis and so on and help small and medium and insufficient strength enterprises to consult management in BIM.
5. CONCLUSIONS

In the construction industry, BIM as a new concept is being developed and promoted in the world, including China. Like all newborn things, with the development of BIM we met many problems in China, under comparison between the foreign countries and China; we recognized deficiencies ourselves and the problems about it, so that in a special conditions and environment of the construction industry, the leadership of the government is important for developing BIM. At the same time architecture design institute, consulting company and the construction company need cooperate to consider and develop BIM so that it will go to further, and it will be a faster development and application.

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