
Research on the popularization of electric engineering project management based on EIM

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Abstract

With the introduction and improvement of the Power Engineering Information Model (EIM), EIM has also been developed in the field of power engineering project management. This article first introduces the concept of EIM in detail. Secondly, this article analyzes the application status of EIM in the power industry. Finally, taking EIM smart site as an example, the advantages of EIM in power project management are discussed.

Keywords

Electrical engineering project management; EIM technology; Smart Construction Site.

1. Introduction

The arrival of the era of big data has brought new significance to the popularization of BIM application. Research on the standardized system of electrical engineering power engineering information model (EIM) can realize the whole life cycle data sharing and break through the island of information management, effectively promote the intelligent upgrading and transformation of the power industry, and promote the optimization of the whole process engineering consulting. EIM theory system, based on model, data, asset and contract, realizes the collaborative practice, management and application of all participants and elements in the whole life cycle of the model^[1]

Based on this background, the concept of electronic engineering information model (EIM) came into being. In the whole life cycle of the project, including the construction industry and the electric power industry, the establishment, transmission, management and application of the whole process and the engineering information of each participant are realized, and the core database is accumulated continuously to form the support of each participant and support the development of the enterprise and the progress of the industry. EIM is a new concept, technology and method^[2].

2. Application status of EIM in power industry

EIM is the joint efforts of owners, design, consulting, auditing, construction, establishment, operation and maintenance, manufacturers and other subjects to realize the exchange and sharing of information under EIM standard, participate in the construction together, and promote the innovation and development of the industry. In the future, the ecological chain of the industry will be fully integrated to create an all-round high-speed information channel for the power industry.

2.1 Practice of EIM in power engineering

In 2017, the itu development institute launched "e number gather" big data platform has been running, not only to achieve the standard query, also perfected in cost management analysis applications, and to realize the project cost of intelligent proofreading, smart quotation, intelligent analysis, completed the project data and dynamic market price information, and wisdom of the construction of the EIM based

on big data thinking power series application will support dynamic quota system of publishing and construction. "E-number-gathering" platform We smart power and dynamic quota will integrate the "two-oriented" engineering construction of the engine in the future, realize the digital twin of engineering and open a new era of digital power and smart power in the future.

2.2 Application and standard of EIM in power industry

Table 1 Application status of EIM in power industry

Application of EIM	Standard of EIM
Some projects adopt 3d design	Three-dimensional design standards
For collision check	Lack of standards for information transfer between participants
For model visualization	No global structured database standard for enterprises
Isolated application point	No systematic standards

All participants work cooperatively to realize information exchange and sharing under EIM standard; All parties participate in the EIM construction and are committed to promoting the reform, innovation and development of the power industry.

2.3 Application of EIM technology in power engineering cost

In order to control the project cost under the premise of guaranteeing the project quality, EIM technology should be applied to the project information model. By inputting accurate data into the model established by EIM technology, electric power enterprises can significantly reduce the project cost^[3]. Therefore, a scientific and effective engineering calculation scheme should be formulated. In this process, it is mainly divided into three processes:

- ①Using EIM technology to analyze and build the whole project, and through accurate data analysis, build a perfect EIM model. Secondly, the framework of the model can lay a solid foundation for the construction process.
- ②When the data is put into the EIM model, the relevant data need to be accurately screened, and then the correctness of the data can be ensured, so that the data can be put into the EIM model, so that the EIM model will not have data errors in the process of completing the construction.
- ③It is necessary to establish the corresponding EIM model checking department and provide the post of technical inspector, which not only contributes to the safety and accuracy of EIM model, but also can get professional analysis when using EIM technology in engineering construction, so that the whole construction process of electric power project is orderly.

3. Example of EIM-Substation engineering management platform EIM Smart site

'Smart site' mode is one of the latest products of the informatization development of the construction industry and the expansion of the concept of smart city in the field of architectural engineering. At present, the development of China's construction engineering informatization gradually focuses on the application of informatization technology in practical projects. For the construction site, the last short board of the informatization development in the construction field, the construction site can be deeply integrated with the advanced construction technologies such as mobile Internet, cloud computing and BIM with the help of the 'smart site', which is of great significance to promote the industrialization and modernization reform of the construction industry[4-5].

3.1 The advantage of EIM technology progress control

Optimize the construction plan and promote the construction schedule. Through the virtual construction, the simulation of the construction process is realized, and the selection of the material

machine in the construction process is compared with multiple schemes to achieve the optimization of the construction process.

Reduce the loss of change and rework schedule. Through EIM model construction and design deepening, design problems can be intuitively discovered and design changes can be made in time to effectively avoid and reduce changes and rework in the construction process.

Speed up the design process. Adopting EIM forward design, many design problems can be found from the source and design quality can be improved. Design time can be shortened as designers become proficient in design.

It is helpful to design scheme. Through the progress simulation, the requirements of materials and equipment can be accurately obtained, and the requirements plan can be made in advance.

We will speed up the organization of bidding. Through the automatic calculation function of EIM, the bill of quantities can be quickly and accurately generated to speed up the preparation of the bidding stage.

Expedite the review of progress payments. EIM realizes real-time statistics and calculation of engineering quantity, calculates engineering price according to engineering quantity, and speeds up payment review and payment.

3.2 The advantage of EIM technology security management

Using the means of artificial intelligence, intelligent identification of on-site personnel wearing helmets and safety belts and carry out reminders.

In the EIM model, safety hazards are marked in advance, and field personnel can be reminded and warned within the safety range when they enter the area of safety hazards.

Through the establishment of EIM model of temporary facilities, the required resources can be estimated in advance and the safety of temporary facilities can be evaluated.

Through the establishment of fire facilities model, and set up the safety inspection information, regularly push the safety inspection reminder.

Through the correlation between the personnel positioning system and EIM model, the real-time dynamic monitoring of personnel can be realized to ensure the safety of construction personnel.

3.3 The advantage of EIM technology quality control

Regular photography or video recording of hidden works is realized, and the information is connected to the three-dimensional model to provide a basis for quality traceability in the later stage.

The quality inspection standards and specifications are attached to the model, and the inspection requirements can be seen by scanning the qr code on site to improve the inspection efficiency.

3.4 The advantage of the cost control the EIM technology

According to EIM model and calculation rule base, it can automatically make quick statistics and accurate calculation.

Through 5D simulation, the planned funds can be compared with the actual used funds to better control the costs and expenses.

It realizes the connection between contract and model, and can dynamically view the execution of contract in real time.

According to the real-time progress, it can conduct the real-time comparison of budget estimate, budget and process settlement, and analyze the factors affecting the cost.

3.5 The application of EIM in whole life cycle of technical data

Through EIM, data of the whole life cycle of the project can be collected, APP terminal can be established, and dynamic control can be carried out on the construction site through data search, reuse

and retrospective analysis, and APP terminal progress management, safety management, quality management and cost management can be realized.

4. Conclusions and prospects

4.1 Conclusion

In the context of the era of big data, data assets have become the core assets of enterprises, and the core value of engineering information model is more prominent in its comprehensive collection, extraction and analysis of engineering data. In the whole life cycle of a project, each project participant will generate a large amount of data. By defining data interaction standards, EIM establishes an effective information interaction channel between project participants and professionals to maximize the collection of complete and effective information in the project, including structured and unstructured information. On the basis of project data collection, EIM platform and various tools are used to extract and analyze structured data, so as to achieve intelligent management of project schedule quality, safety and cost. For unstructured data, the value of EIM lies in the most original records of engineering information retained, which provides the possibility for further analysis of projects after technological progress.

4.2 The deficiency and prospect of the research

Although the EIM has great advantage in the design optimization, but the project management system based on the technology of EIM is not yet mature, EIM standards has not yet come, many theory is still at the exploratory stage, practice in this paper, the research also belong to the basic, for the EIM technology in the information interaction, data interface also not very strong technical problems, such as depth, but in fact, this part for EIM promotion is extremely important.

In the future, with the continuous deepening of EIM technology and the introduction of relevant national standards, the market demand for EIM will increase day by day, and EIM will achieve better development in the power industry and China.

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