

Discussion on Database Construction in Engineering Equipment Informationization

Dapeng Sun

COSCO Shipping Lines Co., LTD., Qingdao University, China

Abstract: This paper puts forward the importance and urgency of speeding up the informationization of engineering equipment, the concrete measures of the design, planning and operation and maintenance of engineering equipment database system.

Keywords: Engineering equipment, Database, Information

INTRODUCTION

In the late 20th century, with the rapid development of information technology, information technology has become an important feature of engineering equipment in the new era. Information has become an important component of the whole project in addition to hardware equipment. Facing the future information and big data era, the informationization of equipment support has become an inevitable requirement for engineering construction. We not only need to improve the concept, theory and mode innovation of the current hardware based engineering equipment, but also need to carry out revolutionary changes in the guarantee technology and information means to keep up with the pace of industry 4.0.

THE IMPORTANCE AND URGENCY OF ACCELERATING THE INFORMATIONIZATION CONSTRUCTION OF ENGINEERING EQUIPMENT

Firstly, traditional engineering equipment support is developing to information engineering equipment support.

Has become the world industrialization development important trend. An information technology as the core of the industrial revolution has been emerging in the world scope, engineering equipment informationization construction more and more get the attention of the countries, continuously strengthen the research of the theory of information and the information management system optimization, tries to strengthen the construction of information, establish and perfect information network system, including database and random information processing system, Seek the advantage of information resources, optimize the scheme effectively, and realize the informationization and scientization of engineering decision.

Secondly, informatization is an important way to improve the construction and operational capacity of modern engineering. With the rapid development of information technology, the ways and means of obtaining and processing information in engineering construction are increasingly diversified. Highly transparent site information and space, greatly expand the scope of simultaneous construction; With the development of accurate measurement technology, the accuracy of remote construction is greatly improved. The improvement of the perception ability of information space is the expansion of the capacity to break ground to the five-dimensional space. The extensive application of information technology enhances the comprehensive support ability; The integrated application of network, intelligence and system integration technology greatly enhances the ability of integrated command and control. Therefore, informatization has become an inevitable choice for engineering equipment to improve the level of modern operation.

Thirdly, the construction of engineering equipment database system is an important content to accelerate the information construction. The lack of use and maintenance records of engineering equipment will lead to the inability to achieve scientific statistics, mining and analysis information sharing. Without reliable data analysis, it is difficult to do a good job in the reliability of equipment use, maintenance and supportability design. Statistics show that the backward way of data retrieval makes engineering and technical personnel spend 30% to 40% of their working time on searching data on average when completing a scientific research task, and the automated database can provide the required data for hundreds of research projects within half an hour. And because of the huge depth of the database data, the results are also more detailed. It can be seen that the establishment of engineering equipment database can greatly improve the work efficiency, and the rapid search of database information will also make

the information of engineering equipment more detailed and accelerate the progress of engineering work.

ENGINEERING EQUIPMENT DATABASE PLANNING

System requirements analysis

1. System analysis phase. In this stage, in-depth site, repeated investigation and research, determine the system goal, explore the best plan to achieve the goal, the formation of a system analysis manual. The system analysis specification includes the description of the current system, the objective of the proposed system, the data description, the definition of the processing process, the system cost, the research plan of the system design and implementation, and so on. Finally, the system analysis specification is submitted for consideration, and after it is approved, it enters the next stage.

2. System refinement model design stage. According to the system analysis specification, the system prototype was studied, the expert opinion was repeatedly verified, and the system was constantly modified and expanded.

3. Complete the system product phase. Reorganize the function structure, enhance the function of assisting users to use the system, improve the routine procedures of database management, complete the preparation of all kinds of data and manuals.

4. Maintenance and evaluation stage. According to the operation of the system and the use of further requirements, the system is constantly improved, and sit out the evaluation. This system design method is helpful to enhance the adaptability of the system, shorten the development cycle of the system, facilitate system maintenance, and significantly improve the efficiency of the software design stage.

Principles and methods of data system development

Principles of database system development

(1) Innovation principle: cash advanced. The development of computer technology is very rapid, it is necessary to timely understand the new technology, the use of new technology, make the target system than the original system has a qualitative leap.

(2) Overall principle: completeness of withdrawal. The complete realization of information management of engineering projects does not necessarily have to be balanced distribution in all aspects, but must be complete and overall set all aspects of the system.

(3) In order to improve the utilization rate and effectively play the role of MIS(Management Information System), we should pay attention to the

development of technology and the change of environment. In the process of development, attention should be paid to the continuous development of advance consciousness.

(4) Economic principle: practical withdrawal. Big and complete, high and sharp is not the measure of successful MIS. In the process of development, the principle of practicability should be fully considered, and factors such as technical level, management level and personnel quality of the project should be taken into account.

The development method of database system

(1) Top to Down development method: from the whole engineering project equipment management. Physical design, gradually from the abstract to concrete, from the outline design to detailed design, withdrawal structural design ideas.

(2) Bottom to Up development method: design the components of the system and use building blocks to form the whole system. The disadvantage is that it ignores the organic combination and connection of the system components.

(3) The combination of the two is a common method in the actual development process. The logical model of the system is obtained by analyzing the system, and then the optimal physical model is obtained from the logical model. The design pattern of the logic model and the physical model in this spiral cycle optimizes the design idea of the organic combination of top-down and bottom-up.

Database content and functions

1. Database records. In the engineering equipment database, we should not only record the static data of equipment distribution, structure, quality and support force, but also accurately grasp the dynamic information of equipment's technical state, engineering demand and support status and monitor the engineering equipment. In addition, it is necessary to master the quantity, quality and scientific allocation of engineering equipment maintenance support resources.

2. The main functions that the database can achieve

(1) Data entry and modification of the maintenance function: users can easily input and modify data.

(2) Information query function: Enables multiple functions of query, such as query by keyword, time, name, performance, and so on.

(3) Data mining function: Through the user's given goal, according to a certain mathematical model from the original data mining useful data. It can also find potential connections between past data to facilitate the transmission of information.

(4) Comprehensive EVALUATION of results: Random evaluation of a piece of equipment or a group of equipment can provide reliable analysis for decision making.

3. Positioning of the system. Engineering equipment database system should be oriented not only to large engineering projects, but also to small and sharp micro engineering projects. To ensure strong, but also to face the market, do a good job in engineering equipment supply.

SEVERAL ASPECTS SHOULD BE PAID ATTENTION TO IN THE PROCESS OF USING ENGINEERING EQUIPMENT DATABASE SYSTEM.

Improve the system to maintain the continuity and sustainability of data

The maintenance and quality assessment of engineering equipment must be based on quantitative data, rather than relying on individual "assessment". Without the records and accumulation, statistics and analysis of specific data in the process of usual use and maintenance, it is difficult to determine which parts of engineering equipment are suitable for repair and maintenance according to the situation; Without QUANTIFIED use and maintenance records, it is impossible to propose and optimize maintenance and maintenance programs to achieve strong, economical and cost-effective use. Especially in today's advocate equipped with the whole life cycle, the whole process of data processing is particularly important, must be original data accumulated from the practice of different types of different types of engineering equipment for continuous tracking, and then enter a large database, according to the principle of mathematical statistics to their inductive statistics, discover rule, to extract the useful data. Equipment shall be continuous over the whole life cycle of data can be checked, all the reliability and maintainability of parameters database system should be stored values of work, in the new era of organic engineering equipment development, production and use, should guarantee the continuity of the data, should through the clear way to equipment reliability and maintainability of the defect of information feedback to the development and production.

Attach great importance to data mining and analysis

Data mining is a technology to find rules in a large amount of data. It mainly consists of three steps: data preparation, rule finding and rule representation. Data preparation is the selection and integration of data from various data sources for data mining; Pattern seeking is to represent the found pattern in a way that conforms to the user's habits as much as possible. In the process of its own development, data mining has absorbed a large number of technologies from data statistics, databases and artificial intelligence. It CAN HIGHLY AUTOMATICALLY ANALYZE THE

ORIGINAL DATA OF engineering equipment database, carry out inductive reasoning, EXCAVATE potential patterns from it, predict the best use, repair and maintenance plan, and assist in making correct decisions. It is a new method to improve the quality and efficiency of the use and maintenance of engineering equipment. Data mining tools can predict future trends and behaviors to support people's decision making. Some data mining tools can also solve the traditional problem of consuming human time, because they can quickly scan the entire database and find useful information that is not easily detected by human search alone.

Enhance security awareness to ensure data security and reliability

Database technology is based on computer application system, in addition to the computer itself a set of security mechanisms, the database itself also needs to have a security mechanism, especially the security of the data itself, like data correlation technology, concurrent mechanism, the trigger mechanism, backup and restore, when a data is written to, rewriting, or delete, In order to ensure the integrity and reliability of the whole database, the related information and data must be reacted and processed accordingly. Therefore, put a large amount of information into the database, with powerful database support technology as the background, can prevent information from being tampered with easily, can ensure the integrity and reliability of engineering equipment information.

CONCLUSION

The construction of database is the important foundation of equipment information management and the scientific basis of equipment reliability, maintainability and support design. It is an important part of the future engineering equipment database and the basic basis of engineering equipment quality assessment and quantification. The construction of engineering equipment database will play a great role in promoting the digitization and informatization of engineering equipment, and also has a certain guiding role in the research and development of engineering equipment. Make our engineering design and production catch up in the spring tide of industrialization 4.0, accelerate the development.

REFERENCES

Huang S F , Liu X H . Discussion on Archival Informationization and Digital Archives Construction in University[J]. Chinese Geological Education, 2013.

Yun Liu, Exploration on the Construction of Smart Restaurants in Colleges and Universities Based on the Intelligent Age, Research on Educational Development, 4(2022)167-169.(In Chinese)

Liu Zhibin, Bai Yue. Financial Performance Evaluation of Electric Power Listed Companies Based on Principal Component Analysis, *Journal of Applied Science and Engineering Innovation*, 2021, 8(1), 18-23.

Shao Shifen, Zhao Mengdi. Introduction of Energy Saving Technology of Air Conditioning Water Storage, *Journal of Applied Science and Engineering Innovation*, 2021, 8(2), 41-46.

Xu P., Study on moving objects by video monitoring system of recognition and tracing scheme, *Telkomnika*

-*Indonesian Journal of Electrical Engineering*, 11.9(2013): 4847-4854.

Zhai K , Lu S . Discussion on Key Influencing Factors of Construction and Demolition Waste Recovery and Recycling Management in China[J]. *IOP Conference Series: Earth and Environmental Science*, 2021, 719(4):042019 (8pp).

Zhang M L . A Discussion on Construction Equipment Configuration of International Engineering Projects[J]. *China Water Power & Electrification*, 2013.