

## Realization and Analysis of Visual Management System for Oilfield Ground Engineering Based on Information Technology

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**Abstract:** With the rapid development of China's economy, people's demand for oil and gas resources is also increasing. In order to ensure the construction quality of Oilfield Surface Engineering and the smooth operation of enterprises in the future, the author analyzed the visual management system of oilfield surface engineering. The method and function of the construction of the oilfield ground engineering management information system are proposed. Studies have shown that the use of new technologies in the information age can achieve scientific management of oilfield engineering surveys, generate huge economic benefits, and ensure the ability of oilfields to continue production.

### 1. Introduction

In recent years, with the rapid development of computer technology, information technology has been increasingly used in the construction of water conservancy and hydropower [1]. The professional division of oilfield surface engineering mainly includes 8 majors such as crude oil gathering and transportation, oil and gas gathering and transportation, water injection, water supply and drainage, sewage treatment, electric power, communication and roads [2]. In order to ensure the construction quality of oilfield ground engineering and the economic benefits of oilfield enterprises, in the construction of oilfield engineering, it is necessary to fully consider the various influencing factors in the near and long term, and strengthen the quality management of the entire construction process. Such as oil well location distribution, oil pipeline direction, power supply system, underground sewage pipelines and roads [3]. In addition, the oil field is also a capital-intensive and technology-intensive enterprise. Therefore, equipment management is also very important for the production and operation management of oil fields [4]. In recent years, with the deepening of oil exploration and exploitation in China, a large amount of data has been accumulated. Traditional information and data management methods can not update and process these dynamic data in time, and can not realize the unified management and visual dynamic display of all kinds of databases. With the increasing demand for oil and gas resources, oil field enterprises in China are paying more and more attention to the construction of oil field surface engineering [5].

The construction and management of oil and gas field surface engineering system is a very important part of development and production. Geographic Information System (GIS) has powerful functions of data storage, management and spatial analysis. It can centralize data management based on spatial database technology [6]. Information is the basis and basis for the management of Oilfield Surface Engineering Construction projects. In the implementation of Oilfield Surface Construction projects, it is necessary to do a good job in the information management of the project and obtain all kinds of necessary information in time [7]. On this basis, managers can do a good job in cost management, progress management, quality and safety management, contract management and other management work. Only in the end can we accomplish the task of project construction with high quality, low price and high speed [8]. In order to effectively analyze and make decisions on oilfield ground production, oilfields in many areas of China have developed information systems to manage production information and data in oil and gas field ground engineering. However, from the current situation of the construction and construction of oilfield ground engineering in China, due to various factors such as strong professional construction and complex construction content, some problems in the construction process of oilfield ground engineering are also present [9].

Therefore, in the oilfield ground engineering construction project management, the construction project information management software such as construction schedule management, engineering data management and other professional software has been widely used and played a considerable role [10].

## 2. Methodology

With the development of computer technology and geographic information system technology, the application field is expanding, and a multi-level and multi-scale application pattern has been formed, which has become an important part of the information industry. With the rapid development of science and technology, the application of various new materials, new technologies and new technologies in oilfield surface engineering construction also makes the construction of engineering projects more reasonable, effective and practical. According to the overall analysis of Oilfield Surface Engineering Construction in China, the existing problems are mainly reflected in the following aspects: problems in the early stage of construction, problems in the construction personnel and problems in the construction system. The construction personnel are of low quality, unskilled in the operation of various construction machinery, and the construction safety protection measures are not heavy, which may lead to construction accidents, which in turn affects the smooth construction of the oilfield ground engineering. In the early stage of oilfield ground engineering construction, if the design personnel of the project lacks understanding of the specific conditions of the oilfield construction site, it cannot design according to the actual situation of the oilfield enterprise. It will lead to the lack of rationality and pertinence of the designed scheme, and the feasibility is low, which will bring great difficulties to the later construction.

The main goal of oilfield ground engineering management construction is to obtain various production information in a timely manner and strengthen the unified command of dispatching. The logical structure of the oilfield ground engineering management system is shown in Figure 1.

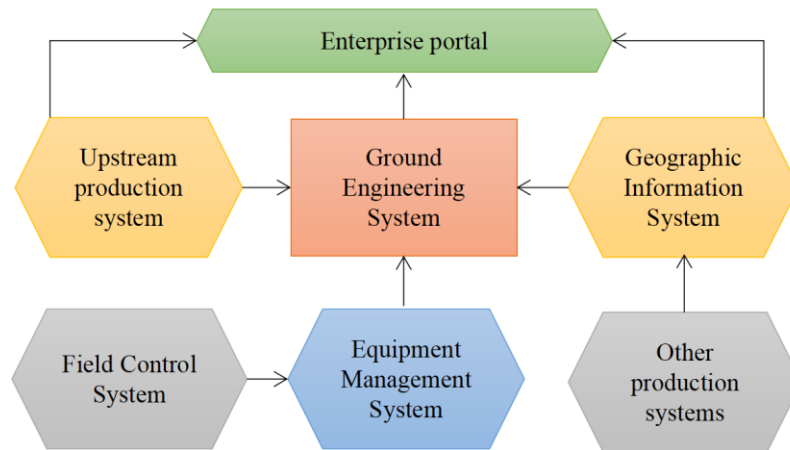


Fig.1. Logical Structure of Oilfield Surface Engineering Management System

In view of the main problems existing in the construction and construction of oilfield ground engineering in China, adopting scientific, reasonable and effective measures to strengthen management will promote the quality and progress of the overall project and the economic benefits of oilfield enterprises. effect. However, due to the diversity and complexity of the oilfield surface engineering construction management mode, and considering the particularity of each specific project itself, the existing general construction project management system is not satisfactory in meeting the needs of specific projects. Most of the subordinate enterprises in China's petroleum industry are asset-intensive production enterprises. The company itself is not responsible for product sales and customer relationship management. The production department itself only needs to ensure the safe production and transportation of oil and gas. At the same time, it is necessary to analyze the current situation of the corresponding oilfield enterprises in order to design the

construction scheme of oilfield surface engineering more scientifically and rationally, and then avoid the emergence of various problems in the later construction. Construction enterprise management system is based on the characteristics of production and management of construction enterprises and implementation objectives, to achieve the macro control of the enterprise's various projects, from the micro management and adjustment. In order to improve the overall management level of Oilfield Surface Engineering and provide accurate and timely information necessary for decision-making.

At present, some provinces are undertaking centralized construction of provincial bureaus, and Phase III of Gold Tax is considering a higher level. Table 1 shows the details of the survey on the centralized distribution of informatization in China.

Table 1 Information is distributed in several situation questionnaires

Distribution and concentration	Logical Centralization	Data centralization
Urban concentration	47.5	32.9
County Distribution	51.3	54.7
Centralized + Distribution	1.2	12.4

### 3. Result Analysis and Discussion

Engineering survey database is composed of engineering survey project database and control survey database. The control survey database stores and manages all kinds of control points, including triangle points, traverse points, leveling points, astronomical points and GPS points. To form an efficient, unified, standardized and coordinated management and control system for project progress, investment, quality, engineering technology and documents, construction and contract, and to provide an excellent platform for project management. Through the efficient and unified management of information, all kinds of information of design, supervision and construction units are unified to realize the whole process and all-round information management and control of hydropower projects. The quality responsibility system of the whole process of oilfield ground engineering construction shall be implemented, and the responsibilities of each construction department, each stage, each link, each procedure and each personnel shall be clarified during the construction process. Construction supervisors play an important role in the entire construction process of oilfield ground engineering construction. However, the supervision of the supervisors is not enough, the failure to implement the work in place, and the supervision and management are not comprehensive and careful, which may lead to various undesirable phenomena during the construction process. In order to achieve this goal, it can be combined into a whole ground engineering management system through the integration of several information systems.

Based on the development project of oilfield ground engineering industry, the author uses sensitivity analysis to investigate the impact of fixed assets investment, operating costs and discount rate on the financial net present value. Figure 2 is an impact analysis diagram.

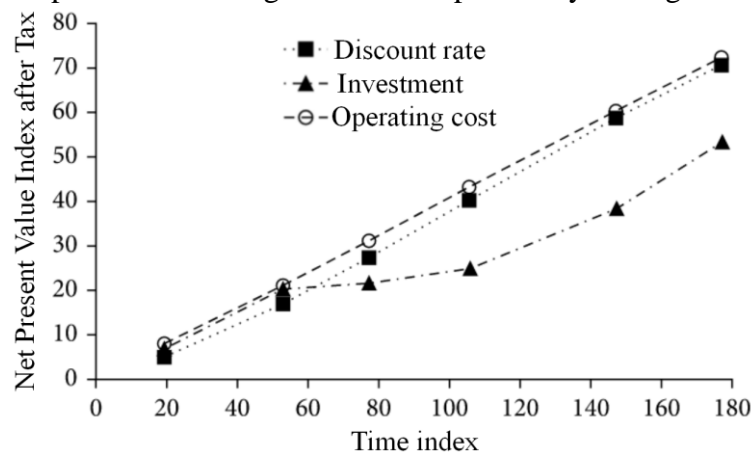


Fig.2. Net Present Value Impact Analysis Chart

The project management software in the general market emphasizes its universality and universality, which has the good characteristics of strong software function and stable system, but at the same time, it also brings high purchase price. At the same time, this kind of software can not play its own value well in practical application because it does not conform to the actual working system, which also brings inconvenience to construction management. Because the specialty of GIS is the filing, analysis and display of geospatial data. Therefore, the static data of equipment can only be managed on the platform of Geographic Information System, which can not reflect the running time, maintenance records, fault information and other data contained in the life cycle of equipment operation. The imperfect construction system is also one of the main problems in the construction of oilfield ground engineering. The oilfield ground construction project is a large and complete system formed by the connection of various construction systems. If there are problems in individual systems, It will affect the problems of the overall construction effect supervisors. The ground construction supervision personnel shall implement and strictly implement the corresponding supervision and supervision measures according to the construction stage, construction link and construction technology, and attach importance to the supervision and inspection of the whole construction process and construction focus. In order to be able to pass the rigorous and comprehensive supervision work, various problems in the implementation process occur in a timely manner.

#### **4. Conclusion**

Under the background of modernization development, the construction quality, progress and economic benefits of China's oilfield ground engineering construction are also more rationalized. The oilfield ground engineering is a complex complex with large amount of data, both spatial data and attribute data. The use of modern management techniques and means, the use of computer project construction information management system can improve the level of oilfield engineering for construction management, providing comprehensive and rapid information support for construction management. In addition, the efficiency of project construction management is improved, thereby promoting the improvement of construction product quality, shortening of construction period and cost reduction. The networking of engineering information greatly improves the timeliness and extensiveness of information transmission, and provides efficient management and decision-making information for engineering construction. Successful application in practical projects has proved the scientificity and effectiveness of the system, but also opened up a broad imagination space for the further improvement and promotion of the system. However, in the actual construction process, there are still some problems. In view of these problems, relevant managers should make early discovery and take effective measures to deal with them so as to promote the overall construction level of oilfield surface engineering.

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