

Research on Construction of Petroleum Pipeline Project

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Abstract: Petroleum pipeline engineering is a comprehensive project, which has the characteristics of high safety requirements, many engineering projects and wide participation units. China is one of the countries that have achieved great success in the construction of oil pipelines, and has achieved extensive coverage of oil pipelines. But there are still many problems in the construction of petroleum pipelines, such as pipeline layout and urban and rural planning, high construction cost and anticorrosion work to be improved, so a lot of funds are still needed for scientific and technological innovation.

1. Overview of Oil Pipeline Engineering

1.1 Basic Characteristics of Construction of Petroleum Pipeline Project

Petroleum pipeline engineering is a comprehensive project, which needs to use a number of disciplinary skills simultaneously in the construction process. Petroleum pipeline system is a pipeline system used to transport petroleum and petroleum products. It mainly consists of pipelines, stations and other auxiliary related equipment. It is an important equipment for oil storage and transportation. Petroleum pipeline engineering is different from ordinary engineering, and has the basic characteristics different from ordinary engineering projects. First, in terms of safety, the requirements of oil pipeline engineering are extremely high. In the construction of the whole petroleum pipeline project, strict construction is required in all links and strict control of the process. Otherwise, once a loophole occurs, it may cause a great safety accident. Secondly, there are many sub-projects involved. The sub-projects include ditch excavation, pipeline purchase and installation, safety inspection and other links. Complete the construction of an oil pipeline, including dozens of sub-projects. Thirdly, there are a wide range of participating units. In the whole process of petroleum pipeline engineering construction, a whole set of processes need to involve many organizations, including construction units, supervision units, government departments, acceptance units and so on. Fourth, the complexity of Engineering construction. For example, in the construction of petroleum pipelines, it is necessary to formulate a complete project plan, specify the front and back links of the project construction, and ensure that all construction work is carried out in accordance with the established plan. In addition, in order to ensure that the related work of oil pipelines can be carried out simultaneously, feasibility analysis reports should be made for each project in the preliminary preparation stage of the project. Only when the feasibility analysis report is adopted can the project be arranged.

1.2 Basic Law and Organization Form of Oil Pipeline Engineering Construction

Although the history of oil pipeline laying has a certain number of years, there are some rules of construction between pipeline construction at different times. From a wide range of observation, we can draw two basic laws: first, the wider the scope of petroleum construction services, the more difficult the construction will be, and the more difficult the corresponding management and inspection and maintenance will be. Secondly, the construction of crude oil pipeline should be distinguished from the construction of finished oil pipeline. For example, the route planning at the time of construction needs to be strictly distinguished, otherwise it will cause the overall situation error.

At present, there are two organizational forms of oil pipeline construction projects, one is the

joint operation organization mode, and each other has the capacity of construction; the other is the general contracting mode of construction projects. Whatever organizational form is adopted, the basic principle lies in the coordination of organizational form and engineering management, which can ensure the normal operation of Engineering management.

1.3 Procedures for Construction of Petroleum Pipeline Engineering

The procedure of petroleum pipeline engineering construction refers to the whole process from project establishment to pipeline trial operation. The whole procedure can be divided into two stages. The first stage: preparation stage. The preparatory stage includes a number of basic preliminary work, such as a speech on the opinions of the leadership during the construction of the oil pipeline project, so as to let everyone know. Next, make a decision about the content of the work, and make clear instructions about what can be done and what can not be done. One of the previous work is to review the feasibility report. On the basis of the adoption of the feasibility report, the relevant departments need to evaluate it, so long as it is passed, it is necessary to enter the second stage. After the feasibility has been approved, the specific implementation company may, according to the feasibility report, urge each unit to put forward the preliminary design plan according to the feasibility report, so as to lay a good foundation for the smooth implementation of the preliminary work of the project. The second stage: construction and acceptance. On the basis of preparations for the previous work, the construction of oil pipelines has entered the construction stage in an all-round way, and the project schedule and project arrangement have been worked out to coordinate with each other in completing all the projects. After the completion of the construction, the acceptance work shall be carried out.

2. Research on Construction of Petroleum Pipeline Project in China

As one of the modes of oil transportation, the long-distance pipeline has spanned more than 100 years in the world's construction history. Up to now, 80% of the total oil pipeline transportation in developed countries has been realized, and the long-distance transportation of finished oil has basically realized pipeline. Current situation of China's oil and gas pipelines:

Compared with the international development, China's oil pipeline technology started relatively late, but by 2008, China has built 17,000 km of crude oil pipeline and 12,000 km of finished oil pipeline. In 2008, the crude oil pipeline in Western China was completed and put into operation, and the product pipeline accelerated the pace of pipeline construction in the north-south and east-west directions. At the same time, China's pipeline engineering technology has made a number of major breakthroughs, such as X80 high-grade pipeline steel began to get industrial applications.

Table.1. Major Construction Projects of China's Petroleum Pipeline in Recent Ten Years

Serial number	Pipe name	Year of completion	Conveying medium	Pipeline Length (KM)
1	Dushanzi-Urumqi Crude Oil Pipeline	2009	crude oil	260
2	Lan-Zheng-Chang Product Oil Pipeline	2009	product oil	2823
3	Lanzhou-Chengdu Crude Oil Pipeline	2011	crude oil	890
4	Fushizheng Product Oil Pipeline (also known as Jinzheng Line)	2011	product oil	1558
5	China-Myanmar Crude Oil Pipeline	2015	crude oil	1423
6	Yunnan Product Oil Pipeline: Anning-Qujing Line	2017	product oil	932
7	Sino-Russian (Mohe-Daqing) Second Line	2018	crude oil	932

By 2015, there were 27 units of long-distance pipeline, large-scale oil storage tank, ground construction, investigation, design and research. There are 14 main long-distance pipeline, large-scale storage tank construction and oilfield engineering construction units. There are 3

professional research institutes, 4 engineering design units and 5 other construction and technical service units. Now, China's fourth oil pipeline construction has entered the forefront. I believe that in the next few years, with the continuous improvement of China's oil pipeline technology and investment, the oil pipeline industry will have greater development.

3. Main Problems in Oil Pipeline Construction

3.1 Contradictions between Urban and Rural Planning

The construction of petroleum pipeline has an important characteristic of long pipeline laying line, which causes many difficulties in the selection of pipeline lines, and also causes many major problems between the construction of petroleum pipeline and urban and rural construction planning. For example, a typical problem: for the sake of pipeline safety, the state stipulates that the use of land for oil pipeline construction is temporary demand, and no land requisition is needed. Therefore, it is strictly prohibited to build large-scale buildings within 50 meters on both sides of the pipeline for the sake of safety management after the completion of the pipeline, so as to prevent the safety accidents from endangering the safety of the surrounding personnel. Under such security problems, oil pipelines can only be constructed smoothly from the land in rural areas, but in urban areas with dense buildings, this has become a problem, because the urban land itself is already very tense. If large-scale buildings are banned on both sides of the road for oil pipeline construction, it will bring further pressure to urban construction planning. However, such contradictions can not be effectively solved at present, which is related to local interests, pipeline construction technology and other factors. We look forward to targeted solutions in the future.

3.2 Construction cost is high and difficult

As far as the current development is concerned, there is still a social phenomenon that the construction cost is too high in the construction of petroleum pipeline. Especially, in the case of high cost, the quality of oil pipeline has not been positively correlated, but the quality has not reached the expected value. Specifically, we can cite a problem caused by the construction of pipeline welding. Due to the lack of high-tech operation ability of the staff, there are not many technicians who can really meet the requirements of oil pipeline welding, resulting in the high repairing rate of welding joints in oil pipeline welding construction. Therefore, repeated inspection and maintenance have to be carried out in the construction process, resulting in repeated costs, which increases the pressure on the cost of the project. For the first time, this phenomenon has also buried a serious hidden danger of safety management and control for pipeline construction projects.

3.3 Pipeline corrosion and unscientific construction

Bedroom is people's living place after busy work. Comfortable furniture design plays an important role in people's relaxation. First, the design of the bed. The design of the bedside can choose simple dragon pattern, which can be carved on it by using the method of color painting to form a simple and distinct pattern style. At the same time, it inherits the auspicious meaning of the dragon pattern itself. Secondly, the design of wardrobe, especially the pattern in the wardrobe door, can adopt the traditional pattern of plum, orchid, bamboo, chrysanthemum related graphics. The use of color painting or other graphic design methods to directly print traditional patterns on it, giving a direct visual impact. These four types of patterns just symbolize the cultural implication of good moral character.

4. Discussion on Solutions to Relevant Problems

In view of the contradiction between oil pipeline construction project and urban planning, it is suggested that the relevant departments should make unified planning to reduce the contradiction and conflict of land use. For example, the relevant departments should make a unified arrangement on how to use the oil pipeline within 50 meters on both sides of the pipeline.

In view of the high cost of petroleum construction, we should consider strengthening scientific

and technological research and development, and specially tackle such common key problems as how to "pipe welding" in order to provide a more scientific and comprehensive technical solution. At the same time, we should strengthen the skill training of the quality of the construction team to reduce the quality problems caused by the problems of manual construction skills. This is a systematic project, which needs to be improved at the same time from many angles in order to reduce the cost of the project.

Aiming at the problem of anti-corrosion of oil pipeline. It is suggested that a variety of more effective anti-corrosion technologies should be adopted. First, coating anti-corrosion technology can be used. In order to improve the anticorrosive ability of pipeline, drag reduction coating and anticorrosive coating are installed on the inner wall and outer wall of pipeline by this technology. But before setting up the anticorrosive coating, degreasing and rust removal must be carried out on the surface of the corresponding oil pipeline, and then coating treatment should be carried out in order to prolong the service life of the anticorrosive coating. Secondly, surface anti-corrosion treatment technology can be used. A good base is undoubtedly very important for anti-corrosion. Therefore, before the coating is set up, the effective adhesion between the coating and the pipeline should be ensured by cleaning the pipeline surface, so as to maximize the anti-corrosion ability of the pipeline. Thirdly, new anticorrosive materials can be used. In order to effectively prevent corrosion of oil pipelines, liquid polyurethane anticorrosive coatings can be used for pipeline anticorrosion. In the actual construction process, the liquid anticorrosive coating is poured, brushed and sprayed to form an anticorrosive protective film, which can give full play to the most effective performance of the anticorrosive coating, and can be applied to various geological conditions, with a relatively wide range of applications.

5. Conclusion

With the continuous development of science and technology, the construction of oil pipelines has achieved relatively successful applications, such as in China, which is one of the countries that have used this technology very successfully. However, based on the complex characteristics of oil pipeline construction project, the contradiction between urban and rural planning always exists, and the construction cost still has the problem of high cost, which requires a lot of manpower and financial resources, and the later anti-corrosion problem is still worth improving. Therefore, in the process of continuous construction and development, the state still needs to invest a lot of money to develop more scientific technical methods and create a more reasonable operation and management team.

References

- [1] Yu Z, Wang X. Myanmar-China Oil and Gas Pipeline Project[J]. 2014.
- [2] Bhugwant C, Cachier H, Bessafi M, et al. Research and Suggestion on the Development of Oil and Gas Pipeline Integrity Management Technology in China[J]. *Oil & Gas Storage & Transportation*, 2006, 34(20):3463–3473.
- [3] Yunxin M . Technology Application and Gap in China' s Long Distance Oil and Gas Pipeline[J]. *Oil & Gas Storage and Transportation*, 2004, 23(3):1-4.
- [4] Wei H J, Bo H U, Zhu S P. Preliminary Analysis on Influence of Oil-Gas Pipeline Project on Eco-environment and Protection of Soil and Water Conservation[J]. *Journal of Yangtze River Scientific Research Institute*, 2010, 27(11):89-93.
- [5] Zhang Q. Study on the integrated risk management mode of distance transmission pipeline construction projects[C]// *IEEE International Conference on Information & Financial Engineering*. 2010.