

Importance of Pipeline Construction Management to Safe Operation of Pipes

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Abstract: As we all know, water is crucial to our survival and the development of a city. Beijing is a main water consumer and there are concentrated and widespread pipes, so the safe running of pipes has become our priority. We need take measures to safeguard water quality during pipelines' installation and connection, make practical construction schemes and set up perfect construction guarantee mechanisms, thus reducing impact to pipe operation during construction and strengthening the security.

Keywords: safeguard water quality, safe operation of pipes

1. INTRODUCTION

With development of Beijing, the construction of basic municipal facilities, including water supply pipeline construction has accelerated. Along with the continual transformation and improvement of water distribution network system in Beijing, the water supply pipeline projects have accounted for a great proportion of basic municipal facilities. But the reconstructed projects of water distribution network system are mostly in town, where construction sites are narrow, buildings around are dense and all kinds of underground utilities are close. Besides, water supply pipelines are buried deeply and underground water level is high in some places, so safety of projects has become increasingly important and the safe running of pipes has become our priority.

Combined with my own experience of moving current waterlines in Shunyi District, we are meant to analyse the importance of construction management to safe operation of pipes.

2. WORK OUT FEASIBLE CONSTRUCTION SCHEME

In order to cooperate to build municipal roads of ZHANQIAN North Street and its extended line in Shunyi District, ensure waterline safety of Beijing Waterworks Group, No. 8 Water Treatment Plant and satisfy the need of water supply in urban district, we undertook the project of moving current waterlines in Shunyi District by bidding at the end of 2013. As soon as getting the working drawing, we surveyed the scene carefully and tried to get the information about current pipelines in detail with relevant departments. With the purpose of removing hidden danger of pipelines, we need move the waterlines which supply water for No. 8 Water Treatment Plant, so particular attention to the protection of current pipelines must be paid during construction. The construction scheme must be worked out based on the survey result, only then can we carry out construction exactly. So the refined construction scheme plays a decisive role in safe operation of pipe networks.

Combined with site conditions and geophysical survey result, we communicated timely with designers to work out construction scheme. In order not to affect current concrete waterlines, we made strict rules on the determination of builders' residential location and the path of heavy vehicles. In the construction scheme, the process flow should be written clearly. In addition, we need make special plan for important and difficult points and readjust the scheme on the basis of the actual situation of field. For example, there was no underground water, but a fishpond nearby. The soil of place where we downed newly-built tubes has been soaked for a long time, so it became porous and the safety cannot be guaranteed after supplying water. Given this, we readjusted the scheme immediately and worked out treatment schemes. The validity of scheme ensured the safe operation of pipes.

Pipeline jointing, as the most significant step, is difficult. When making scheme, we surveyed the scene carefully, checked sluice gates with GIS, determined the excavation position where jointing pipelines and located indeterminate lines. Besides, the disadvantage and emergency measure must be written in detail. The

accurate calculation of water storage inside pipes and pumpage made sure the successful completion of pipeline jointing, which has played a key role in the stable operation of current pipes and reduced risk and uncertainty during the connection of newly-built pipes and current pipes.

3. ESTABLISH A PERFECT CONSTRUCTION SECURITY SYSTEM

“People” play a decisive role during construction. The decision people make and their subjective initiative will influence construction quality, engineering safety and works programme. So in this project, we broke down tasks according to assignment and responsibility, so as to hold all people accountable. To ensure requirements of engineering quality in this section are met, we established a well-organized and effective quality assurance system according to *GB/T19001-IS09001 : 2008 Quality Management Systems Requirements*. We established a leadership group for quality management, in which project manager worked as group leader, chief engineer as vice-group leader and directors of each operation department, team leaders and engineers in charge were all enrolled. In addition, we organized and carried out activities for quality management to optimize process, improve quality of project and strive for high-quality project. We also set up the team to create excellence and tackle key problems, which was led by the chief engineer in project management department. There were events of the team regularly or erratically to analyse and research work-period, safety, quality and cost, make countermeasures and try to improve project quality continually. The technical engineering department was responsible for making plans and taking detailed measures to create excellence on the basis of the project scale and characteristics. The quality supervision agency was in charge of quality inspection and review. The team set up a leading group to manage quality and create excellence based on the creating excellence plan and characteristics of project. And they organized personnel regularly to receive education about quality, strengthen supervision and inspection and evaluate quality. According to *GB/T19001-IS09001 : 2008 Quality Management Systems Requirements*, we implemented work of project quality system and improved our capability of quality control and assurance to keep construction quality under control.

Establish specialized quality inspections system. Set up inspection department of safety and quality in management department, full-time quality control engineers in team and part-time quality inspectors in working class. So the perfect, fully-functional and accountable quality inspection system has been formed. To every working procedure, working classes checked each other according to technical disclosure, quality inspectors of team and quality control engineers of project management department inspected themselves. And then the application for inspection by supervising engineers should be made. The checking and certificating system of concealed works should be strictly followed. Field testing rooms should be set up and full-time test personnel need be arranged by management department to cooperate with quality control engineers and supervising engineers to control construction quality fully.

To ensure effective operation of quality system and achieve the goal of guaranteeing construction quality, according to the actual situation of this section, an institutional framework has been set up to check and control construction quality. On the basis of bid documents, contract terms, design documents and construction standards, we did our best to control construction quality with advanced management method and construction technology. A team led by chief engineer has been set up. And they entered into scene regularly or erratically to optimize construction scheme, solve problems about construction technology and finally ensure to achieve the goal of guaranteeing construction safety, schedule and quality in this section.

4. IMPROVE THE SECURITY LEVEL OF WATER QUALITY

Along with development of cities and pluralism and rapidity of information, people know more and more about the operating principle of tap water and give more and more attention to water quality problems. Beijing Waterworks Group persists in the principle of “Water Quality Is Life” and puts water quality security first. And safety of water supply has a direct influence on water quality, so protection of water quality during construction is extremely important.

This project is DN2,000 and DN1,400 pipeline project, and the waterlines which supply water for No. 8 Water Treatment Plant will influence water quality directly. So when pipelining, we took the following measures to prevent influencing water quality in process of water supplying.

- (1) All the workers working inside or around the pipes must be dressed in protective clothing during the installation process. After installation, the interior of pipes must be sterilized and scrubbed completely with sodium hypochlorite solution. And there are specially-assigned peoples in charge of inspection.
- (2) Solder both ends of pipes with steel block boards after sterilizing and scrubbing every day to ensure no other sundries get into the pipes.
- (3) Sterilize and scrub the interior of pipes again and inspect by leaders before water supplying to make sure there are no problems.
- (4) In process of water supplying, there should be real-time surveillance of water quality along the line to deal with emergencies and information should be kept fluent.
- (5) In process of pipeline jointing, drill into the current pipes in advance to control water flow and prevent water drained from pipes flow backward.
- (6) Excavate working pits which satisfy the needs of draining off water and there are sump pits in them. Make sure the water draining off is always under current pipe bottom.
- (7) Get information of the previous operation of pipes in this area through relevant water plants and patrol officers from administrative units to reduce uncertainty.
- (8) Test turbidity with turbidimeter. When the upriver turbidity reached water quality standard, open the downstream sluice gates to supply water, which can guarantee quality of water in current pipes.

We ensured safety of water quality effectively and reduced the impact on water quality during construction through these measures.

The safety of pipe network and our life are inseparable. The pipes are connected with all families, and as workers who pave the pipelines, we are the basis of pipeline construction. So we need to guarantee the safety of pipe network in the first step so that people will have safe water and we can contribute our strength to the development of Beijing.

References

- [1] *Standard for Construction and Acceptance Check of Water Supply and Drainage Pipeline Project* (GB50268 – 2008)
- [2] *Standard for Construction and Acceptance Check of Water Supply and Drainage Structure Project* (GB50141-200)
- [3] *Safety Regulation for Operation of Municipal Engineering Construction in Beijing* (DBJ01-56-2001)