Analysis of Water Supply and Drainage Construction Technology for Municipal Engineering

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Abstract: In recent years, with the continuous improvement of construction technology level in China, the construction speed of major projects has been accelerating, especially the construction of municipal projects, both the quantity and quality of municipal projects have been significantly improved. For municipal engineering, the main purpose of the construction is to provide better and more comfortable accommodation for urban residents. The construction of water supply and drainage projects is related to the daily life of residents, so water supply and drainage projects play a major role in the construction of municipal engineering. This paper briefly analyzes the water supply and drainage construction technology in municipal engineering.

1. Introduction
In recent years, with the continuous advancement of urbanization, people's life has been constantly improved, and the requirements for quality of life have also steadily increased. In addition to aesthetics, modern municipal construction has higher requirements for comfort and durability. As an important part of people's life, water supply and drainage engineering occupies a higher position in the construction of municipal engineering. The construction of water supply and drainage projects directly affects the quality of people's life and the normal operation of urban functions. It has different degrees of impact on the city's environmental protection, the integrity of urban roads and urban flood control. Therefore, for the construction of water supply and drainage projects in municipal engineering, it is necessary to be built on the premise of rigorous modern construction technology combined with scientific management process. This paper provides a brief analysis of the water supply and drainage technology in municipal works.

2. Municipal engineering water supply pipeline construction technology
The water supply and drainage projects in municipal engineering are divided into two parts, namely, the construction of water supply pipeline and the construction of drainage pipeline. According to the different water supply and drainage pipeline, there are also some differences in the construction process. The construction technology of the pipeline is divided into three parts in this paper for discussion.
2.1. Pipe trench excavation technology for municipal engineering water supply pipeline

The pipe trench excavation technology of the municipal water supply pipeline is equivalent to the preparation work in the construction of water supply pipeline. The quality of trench excavation will determine whether the installation of water supply pipeline is smooth afterwards. Therefore, the water supply pipeline ditch excavation needs to do a good job of planning, and then combine with scientific and technological means for the specific construction process.

When carrying out trench excavation work, it is first necessary to measure the line of defense, prepare to set up the corresponding control points and leveling pile points, and ensure that the layout of pile points is convenient for the construction of each section of the pipeline. The measurement and control of the pipeline axis and elevation should not be too far away. It should be measured continuously during the excavation process to ensure the accuracy of the elevation and axis. In the process of pipe trench excavation, the construction machinery is usually a backhoe excavator. Before the mechanical operation, the trench depth and excavation slope ratio should be determined. If the local excavation slope is large, the bench method should be used to construct in order to prevent mechanical landslide. In the process of excavation, the soil layer which is close to the bottom of the trench can not be excavated more than about 0.2 m, and the soil layer that has not reached the height should be cleaned by manual labor. Moreover, in the process of construction, it should be ensured that there are no such incidents as collapse at the bottom of the ditch, miscellaneous soil, floating soil, and stagnant water. Once it happens, it should be reported to the construction supervision team in time, and the design team determines the relevant solutions. For the laying of pipeline cushion, sand cushion is mostly used on the material. It generally is medium coarse sand. The construction of cushions should conform to the corresponding design requirements to ensure that the uneven coefficient of particles is no more than 10%, and can not contain bark, grass roots and other impurities.

2.2. Pipeline installation technology for municipal engineering water supply pipeline

For the pipeline installation technology of water supply pipeline in municipal engineering, it is divided into two aspects. The one is the pre-treatment of the pipeline, and the other is the installation process of the pipeline.

For the pre-treatment of the pipeline, the most important thing is the anti-corrosion treatment of pipeline. The anti-corrosion treatment of water supply pipeline is not only the anti-corrosion treatment of the inner layer of the pipeline, but also the anti-corrosion treatment of the outer shell of the pipeline in consideration of soil erosion. Before the anti-corrosive treatment, the surface of the pipeline should be treated with rust removal and the dust on the surface of the pipeline should be removed. For welded steel pipes, it is necessary to check whether there are weld nodules, burrs and other phenomena at the weld seams, and to treat or re-weld the welded steel pipes with the above phenomena.

During the process of pipeline installation, the installation of concrete pipes should be the first thing to do. It should follow the installation principle of first low, then high and backward flow. Small pipe wells should be installed by manual means, while large diameter pipes should be installed by crane. The construction method is similar to that of drainage pipes. When assembling the steel pipe, the installation position should be first determined, and then the pipeline should be cleaned and damaged and welded to ensure the integrity of the pipeline. Finally, the final interface is detected by external detection and visual observation to ensure that there is no obvious damage on the surface of the pipeline. In the process of pipeline installation, due to operational problems, it is inevitable to cause certain damage to the pipeline during the operation. In order to minimize the damage caused by pipeline installation, both manual installation and mechanical installation during the installation process need to be prepared, and the damage location needs to be promptly filled with after the installation.

2.3. Backfill and hydraulic test

After the installation of the pipeline, the pipe body should be backfilled in time to prevent the rainwater and groundwater from causing water to accumulate in the pipe trench, eventually causing floating pipes and even destroying the pipeline. In the process of backfilling, we must first do the preparatory work in
advance, clean up the debris, and then we should strictly abide by the rules of backfilling, and carry out the two sides at the same time, layering and compacting. The hydraulic test is to test the final test of pipeline installation. When the test is carried out, each test section should not exceed 1000m. The test section should be determined by the terrain, pipeline direction and other factors. Before the experiment, the pipeline should be flushed and exhausted. After 48 hours of water filling, the pressure should be added to the required pressure by the pressure test pump. For pressure application, it can be divided into strength test and tightness test. The strength test refers to keeping the pressure for 10 minutes when the pressure is 1.5 times of the working pressure, and the pressure drop is no more than 0.05 MPa; tightness test is to raise the pressure to 1.25 times of the working pressure, and check whether the pressure drop has changed, and then determine whether there is leakage in the pipeline.

3. Municipal engineering drainage pipeline construction technology

The construction technology of municipal drainage pipeline can also be divided into three parts, namely, measurement technology, mining technology and pipeline erection technology.

3.1. Measurement technology

For the construction of drainage pipeline, the preliminary measurement is very important, and the quality of the measurement directly affects the quality of the construction of the later drainage system. For the construction of drainage pipelines, the most basic requirement for measuring the defense line is to prepare for the measurement. It is strictly forbidden to make measurement errors. Surveyors must be professionals. Only special staff can carry out the specific line-off work and multi-stage inspection to ensure the quality of the work of the inspection and release work. Although modern measuring instruments have a higher measuring accuracy and can ensure the accuracy of measurement, the specific measurement process still has certain differences because of the level of human measurement. Therefore, engineering measurement must select specialized technical personnel. In addition, in the construction process, it is also necessary to do a good job of measuring the distance between the pile points to ensure that the next protection work can be carried out smoothly, and the measurement accuracy of the distance between the pile points is also required higher. Because the measurement of the distance between the pile points will affect the positioning work of the next project. After the completion of the measurement of the pile points, it is necessary to calculate the space needed for the construction of drainage projects. In the process of measuring, the labeling and accounting should be done to determine that the final construction site is large enough. During the construction of drainage project, the accuracy of these details will have a direct impact on the quality of the overall drainage project.

3.2. Mining technology

The technical points of excavation technology can be divided into two parts. The first part is the key point of the traditional excavation work. The second part is to pay attention to the gap avoidance between various pipelines. Only the work of these two parts is done well, is the drainage engineering excavated, and can work be regarded as a real completion to ensure the quality of the final drainage project.

In the construction of drainage works, the most important part is to bury the drainage pipes underground. Therefore, in the process of municipal construction, digging workload is needed. In addition to the municipal excavation according to the budget of the excavation scheme, the municipality also needs to select the appropriate excavator according to the actual situation of the site, and then it is possible to excavate the underground pipeline laying scope which is most suitable for this project. In addition, there are many and complex pipelines in drainage engineering. How to arrange the pipelines correctly is very important for the whole construction of drainage engineering, especially for the design of indoor drainage pipelines. Because of the large volume of drainage pipeline equipment, there will be more problems in construction and excavation.
3.3. Pipeline erection technology

The hoisting of the drainage pipeline can only be carried out after the hardness of the engineering concrete reaches a certain level. At the same time, the rope required for the hoisting process needs to be stipulated accordingly. It must be achieved after a certain strength. In the process of hoisting, the uniform force of the pipeline should be made as fare as possible, and the damage caused by hoisting to the pipeline is reduced in this way. And, in the process of hoisting, in order to ensure a smoother hoisting, it can also be appropriate to use lubricants, but when using the lubricant, the use of a lubricant with corrosive action should be avoided as much as possible to avoid additional damage to the pipeline. In addition, there should be corresponding measures for the personal safety of construction workers. For example, it is mandatory for construction workers to wear a helmet before entering the construction site, otherwise they are not allowed to work.

In addition, before the waterproof test of the pipeline, it is necessary to make sufficient preparations beforehand to ensure that the pipeline is intact, and to do the corresponding water treatment and impurity treatment, laying the foundation for waterproof test. As for the key point of pipeline construction is the underground part of the erection work, this part of the construction difficulty is very easy to errors in the construction process, municipal departments in the construction process should pay attention to the wrong place timely correction or demolition and reconstruction. Another important part is that the number of drainage pipelines and the complexity of the pipelines, so the installation of the pipelines should be as accurate as possible. It can be not only to prevent friction between the pipelines, but also to minimize construction costs. Therefore, the Construction Department of municipal engineering needs to consult the relevant experts and design by the experts concerned to make the whole drainage pipeline more economical, scientific and reasonable.

4. Conclusion

In a word, the construction quality of water supply and drainage projects in municipal engineering is directly related to the overall practicability of municipal engineering and the daily life level of residents. Therefore, the construction of water supply and drainage projects in municipal engineering should constantly improve the construction level of water supply and drainage projects. Through continuous analysis of technical difficulties and key priorities in the water supply and drainage project, targeted technical research and development and reform work will be carried out to strengthen the construction technology level of water supply and drainage projects, and to ensure the final engineering quality of the final water supply and drainage projects.

References

[1] Ge Zhijing. Analysis of Key Points of Water Supply and Drainage Construction Technology in Municipal Engineering [J]. Building Materials and Decoration, 2016 (37).
[2] Sun Weihua. On Main Points of Water Supply and Drainage Construction Technology in Municipal Engineering [J]. Shanxi Architecture, 2016 (03).
[3] Yin Jingchao. On Construction Technology of Municipal Engineering Water Supply and Drainage Pipeline [J]. Jiangxi Building Materials, 2017 (14).
[4] Li Bingfeng. Discussion on Construction Technology of Municipal Engineering Water Supply and Drainage Pipeline [J]. Building Materials and Decoration, 2016 (24).
[5] Wu tie Mei. Analysis of Construction Technology of Municipal Engineering Water Supply and Drainage Pipeline [J]. Shandong Industrial Technology, 2016 (03).
[6] Cao Hui. Study on Construction Technology of Water Supply and Drainage Pipeline in Municipal Engineering [J]. Modern Industrial Economy and Information Technology, 2016 (01).
[7] Song Lei. On Problems and Countermeasures in the Planning and Design of Municipal Water Supply and Drainage Projects [J]. Technology Entrepreneur, 2012 (16).
[8] Sun yuan ting. Research on Quality Management of Water Supply Pipeline of 200 Thousand Tons Water Plant in Yantai Development Zone [D]. Ocean University of China, 2015.
[9] Zhou Jinyang. *Feasibility Study of H Company’s Annual Output of 16 Thousand Tons Polyethylene Plastic Pipe Project* [D]. Beijing University of Chemical Technology, 2015.

[10] Yan Ran. *Discussion on Construction Quality Control of Water Supply and Drainage Pipeline Engineering* [A]. Peer, 2015.