Analysis of Key Points of Design and Construction in Municipal Water Supply and Drainage Engineering

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【**Abstract**】 Municipal engineering is an important part of urban basic engineering. In order to promote the rapid development of the city and provide more and more people with higher quality of urban life, the quality of municipal engineering design and construction has become the starting point of the government's project management. Water supply and drainage engineering plays an important role in municipal engineering. To do a good job in the design and construction of water supply and drainage engineering can effectively protect the integrity of urban roads, promote urban ecological construction and environmental protection construction, and enhance the ability of urban flood control and drainage. In this paper, the main points of design and construction in municipal water supply and drainage engineering will be analyzed and summarized in detail.

【**Keywords**】municipal works; water supply and drainage works; key points

1 introduction

The purpose of municipal engineering construction is to promote the rapid and healthy development of the city, and to provide convenient conditions for more people. The water supply and drainage projects in municipal engineering have a huge impact on people's lives. If the design and construction quality of water supply and drainage engineering does not meet the engineering standards, the construction and development of the city will be greatly affected. Therefore, it is necessary to actively summarize the main points of municipal water supply and drainage engineering design and construction in the practical work to better promote the benign development of water supply and drainage engineering.

2 Analysis of the planning, design and construction points of water supply and drainage engineering

During the construction process, attention should be paid to the centralized discharge of rainwater. According to the principle of first deep after shallow, first easy after difficult construction, to reduce the mutual interference between the process as far as possible. Do a good job of earthwork balance, reduce earthwork reverse transport as far as possible. In the construction of water supply and drainage engineering, attention should be paid to the planning and design of trench excavation, concrete flat foundation and pipe base construction, and the design of key construction nodes and the specific construction plan analysis.

2.1 Planning of the trench excavation stage

The bottom width of the excavation of the trench shall be based on the width of the outer edge of the pipe structure plus the width of the specified working face. When using mechanical grooves, technical personnel should dig the size of the groove section and the position of soil pile, the existing underground structures and construction requirements, etc. During mechanical construction, the construction personnel familiar with the site situation must be designated with the driver to cooperate

with the construction.[1] During mechanical digging, ensure that the groove bottom soil is not disturbed and damaged. Keep the design groove bottom elevation above the groove bottom original soil to be cleaned and formed manually. In the process of digging the groove, if special problems such as sudden change of soil quality and garbage backfill are found, the work should be stopped in time, and the construction should be conducted after determining the foundation treatment scheme together with the supervision and design unit. The earthwork dug out of the trench shall be properly arranged for storage. Most of the earthwork dug out of the trench shall generally be piled on the side of the trench. The soil shall not be buried with fire hydrants, rainwater outlets, measuring marks, and the manhole covers of various underground pipes shall not interfere with their normal use. Due to the limitation of construction environmental conditions, one side or both sides can not meet the needs of the soil heap, should choose soil heap, to avoid affected by the rainfall should watch the construction site drainage measures, trench excavation should timely observe the groove edge without cracks, active earthwork and other affect the safety situation, if abnormal should be handled in time.

2.2 Concrete flat foundation, pipe seat construction planning

During the construction of branch formwork, the geometric size of each part of the structure should be correct, and the error is in the allowable range. Ensure sufficient stability, stiffness, strength, and reliable bearing of the pouring of the gravity side pressure and the load generated during the construction process. Ensure that the joints of the template should be closely matched, and corresponding measures should be taken immediately to prevent slurry leakage. During the construction, a special person should be set up to patrol, and pay close attention to and observe whether there are cracks in the trench, and whether the support is stable.

During concrete construction, the mixing of flat base concrete adopts centralized mixing, and the concrete mixing station should not be too far away from the construction site. The flow groove used for the concrete pouring must be firmly connected, and the concrete mixing station must hang the construction mix ratio of the mixing concrete at that time. It must be equipped with the loadometer for sand and stone measurement, and special personnel should be responsible for measuring and weighing. It is strictly prohibited to produce concrete without construction mix ratio and measurement. Concrete pouring should be carried out continuously, when the need to interval should control the time in the front layer of concrete condensation before the second layer price pouring completed. The time of concrete unloading from the mixer to the second layer shall not exceed the relevant temperature regulations. After the completion of concrete foundation, timely sprinkling maintenance, the top surface of concrete foundation must be made into wool surface is strictly prohibited to receive light. Ensure the accuracy of concrete ratio measurement, the template shall not be displaced and deformed, concrete dismantling and tamping must be in place, no leakage of vibration and concrete is not dense phenomenon.

When the pipeline is installed, check whether the appearance quality and size meet the requirements, no cracks, protective layer falling off, interface Angle and other defects. Before lowering the pipe, clean the inside and outside of the pipe, and put it gently at low speed when falling. The bottom elevation of the pipe is controlled by the level and the groove wall and waist pile, and special attention should be paid to the accurate pipe spacing in the well. After the elevation of the pipe joint and the center position is adjusted, the pipe cushion must be secured with precast cement pad to avoid rolling, and the pipe joint should be treated in time to pour the concrete of the pipe seat.

In the masonry inspection well project, during the construction at room temperature, the clay

bricks should be watered and soaked before use to keep them fully wet and have no dry heart phenomenon. Winter construction is strictly prohibited to water soaking bricks. The masonry surface connected with the concrete foundation should be washed clean in advance. Before the brick laying, the wall baseline should be released according to the center line, and the masonry laying method should be determined by the bottom swing joint. The mortar shall not be empty. Brick masonry should be overlapped inside and outside between the upper and lower wrong joints, mortar should be full and crowded, no vertical ash joints, the thickness of horizontal ash joints and the width of vertical ash joints shall be checked according to the specification requirements.

3 Design principle and design methods of water supply and drainage works

3.1 design discipline

The design principles of municipal water supply and drainage engineering are as follows:（1) When arranging the related system of water supply and drainage pipes, The catchment area should be planned reasonably according to the actual use of the pipeline and the layout principle of the underground pipeline, [2] And properly handle the direction of the drainage pipe and the drainage outlet position; (2) Detailed analysis of the urban road environment around the construction area, Study the vertical problem of road drainage according to the actual situation, Ensure that the water in the catchment area can be discharged quickly, Reduce the impact on the roads; (3) When designing the flow rate of the water supply and drainage pipeline, The actual urban sewage discharge and the standard sewage discharge formulated by the state should be comprehensively analyzed, Then, we can fully investigate the recurrence period of urban precipitation and the seasonal time of urban road area water, The design of the water supply and drainage pipe shall be determined after the investigation and analysis of the relevant data and data; (4) Water supply and drainage pipe shall be designed with slope and buried depth, The slope shall not be greater than the requirements of the national standard; (5) In the design of water supply and drainage engineering, the displacement design, The design of displacement needs to comprehensively consider the relevant regulations, construction conditions, fire protection requirements and other regulations, In addition, the local climate conditions and the amount of rainfall during the rainfall period should also be fully considered.

3.2 design technique

There are three commonly used design methods in the design of municipal water supply and drainage engineering: (1) dynamic method: the design of the whole drainage pipeline is divided into multiple stages, and the design is continuously optimized in each stage; (2) direct method: direct modification of different design schemes, different parameter selection and different calculation methods in water supply and drainage engineering design; (3) genetic algorithm: genetic algorithm is an aspect of evolutionary algorithm, which is a related, natural genetic variation and randomized algorithm in Mobi biology.

Three common design methods applied in the design of municipal water supply and drainage engineering can reduce the construction time, reduce the construction cost and increase the economic benefits of the project to different degrees.

4 Analysis of the construction key points of municipal water supply and drainage engineering

4.1 Analysis of the key points in the early stage of construction

In the early stage of construction, the construction drawings should be comprehensively reviewed in combination with the actual situation of the project, and the three parties should be actively organized to systematically review the key design points in the drawings, so as to solve the doubts and problems of the construction personnel. Do the basic work of measuring and laying out lines before the construction, adopt various measures to ensure the accuracy of laying out lines, and provide accurate data support for the laying and burying of pipelines. In addition, we need to do a good job of the quality of construction materials, to avoid the quality of unqualified materials into the site.

4.2 Analysis of the key points in the construction process

In the construction process, whether there are defects in the appearance of the pipeline should be checked, and the quality of the trench excavation should be strictly controlled to avoid large areas of collapse, overdigging, water soaking at the bottom of the trench and other situations that affect the construction quality of the project.[3] In the process of slope protection, first calculate according to the type and nature of the soil, and then determine the slope of the slope. In the construction process, we must pay attention to safe construction and do a good job in safety preparations to avoid safety accidents.

4.3 Key points of analysis after the completion of the construction

Closed water test must be carried out after the construction of water supply and drainage pipe. If the length of the pipeline line is long, it can be carried out in different stages and in different regions. The construction personnel should always observe whether the pipeline has water seepage and leakage in the closed water test. If found, the cement mortar should be used to brush in time for repair. After the completion of the closed water test. In the process of landfill, humus soil, garbage soil and silt produced in the construction process shall not be used, and there shall be no water at the bottom of the ditch. When the construction quality and strength of the pipeline all meet the requirements of the project, the segmented concealed work can be carried out, so that it can effectively prevent the sunlight exposure to the pipeline and the phenomenon of water soaking the pipeline for a long time. After the pipeline landfill, the road surface structure can be laid to restore the road traffic work. However, in the rolling of the asphalt pavement, the tonnage of the roller should be reasonably selected, and the underground pipeline should not be damaged in the process of rolling.

5 Conclusion

Urban municipal water supply and drainage engineering design and construction quality directly affects the normal operation of the city and people's normal life, so you need to firmly grasp the key points in the process of design and construction, fully consider every link, every detail, in ensuring the quality of urban municipal water supply and drainage engineering at the same time, better promote urban basic engineering construction, for the development of urban modernization and long-term make due contributions.

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