Study on Key Technical Points of Rainwater and Sewage Pipe Network Construction in Municipal Road Engineering

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Abstract: In order to fully meet the development needs of the times and the living needs of urban residents, many cities have taken various measures to strengthen the quality and efficiency of related work such as improving the urban environment, transforming urban infrastructure and improving the living standards of urban residents. In this paper, the key technical points of rainwater and sewage pipeline operation in the process of municipal road engineering construction are analyzed in detail to ensure that rainwater and sewage can be discharged in time in a good pipe network, ensure that urban traffic is always kept in a smooth state, and further improve the overall beauty of the city. While improving the construction quality of municipal road engineering and the construction technology level of sewage pipe network in China, it will lay a solid foundation for the further improvement of the development level of urbanization in China.

1. Introduction

According to the detailed analysis of the construction of most urban municipal roads, it can be known that the problems such as short construction period, narrow construction space, changeable construction conditions, complex surrounding buildings and underground pipe network lines can't be completely solved, which has seriously hindered the improvement of the construction quality of sewage pipe network. In order to effectively solve these problems, new processes and new materials are continuously combined, and a large number of practices are carried out to effectively shorten the construction time on the basis of ensuring the construction quality and construction safety. There is an inseparable relationship between the construction of rainwater and sewage pipe network in urban municipal road engineering and people's safe travel, which is the basis for ensuring the smooth and unimpeded operation of the city. Therefore, relevant personnel must correctly recognize and attach great importance to the importance of rainwater and sewage pipe network construction in improving the overall quality of urban road engineering, deeply explore the complex environment of rainwater and sewage pipe network construction from a diversified perspective, and fully understand the application requirements and applicable environment of relevant technical points, provide active help for further improving the construction quality of rainwater and sewage pipe network.

2. Strengthen the Strict Review of Design Drawings Before Construction

For urban road environment, it has high variability and complexity. In the process of municipal road rainwater and sewage pipe network design, designers often fail to accurately control the actual environmental changes on site due to the lack of timeliness of information transmission. As a result, the relevant contents of the design scheme can't fully meet the construction requirements of municipal road rainwater and sewage pipe network, there are obvious defects, and the technical problems existing in the construction site can't be effectively treated. Therefore, before designing the construction scheme of rainwater and sewage pipe network, the designer must personally investigate the construction environment. Not only the actual traffic flow on the construction site, the direction of rainwater and sewage pipelines, the existence of communication optical cables, the

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groundwater level and many other contents shall be comprehensively surveyed, but also the relevant data shall be found and practical investigation shall be carried out to predict the possible environmental change problems in the construction process in advance, so as to ensure that the relevant measures of the design scheme are highly perfect and forward-looking and it can be highly consistent with the actual construction site environment of rainwater and sewage pipe network. In addition, before the construction of rainwater and sewage pipe network, the soil quality of the construction site shall be strictly reviewed to ensure that the drawing design content has high reliability and accuracy, solve the repeated construction caused by design defects to the greatest extent, and reduce the inconvenience caused by construction to urban residents and urban traffic [1].

3. Carry out in-Depth Analysis of Key Technologies of Trench Excavation

During the construction of municipal road sewage pipe network, trench excavation is not only an important construction link, but also a basic construction link. The construction quality and progress of trench excavation have an important impact on the construction quality of each link and the overall progress of the later stage of the project. Before the trench excavation, the designer shall conduct a field visit to the construction site to completely empty the site garbage and other facilities that affect the construction.

In the process of on-site measurement, it is necessary to check whether the basic data involved in the design scheme is highly consistent with the actual situation of the site. The designer shall establish close and effective communication with the construction personnel. The construction personnel shall put forward the requirements for the construction environment in combination with the actual situation, and the designer shall reasonably design the size and depth of trench excavation in combination with relevant requirements to ensure that the construction quality is improved to the greatest extent without affecting the traffic conditions.

In the process of trench excavation, constructors should always pay attention to the changes of weather. If there is heavy rainfall during construction, they should reasonably negotiate with relevant personnel, adjust the construction period, reasonably delay the unexcavated works, speed up the construction progress of the excavated works and avoid construction in rainy days as far as possible, effectively waterproof the excavated trench. In addition, some soil can be reserved for the excavated trench in combination with the actual situation to minimize the damage borne by the trench in the exposed environment for a long time [2].

4. Strengthen the Effective Control of Pipeline Laying Technology

Municipal rainwater and sewage pipeline has high particularity, and many kinds of sewage has certain corrosivity. Therefore, in the process of laying municipal rainwater and sewage pipe network, it must be ensured that the selected pipe network materials meet the design indicators and can effectively resist the corrosivity of rainwater, sewage and acidic soil. It is necessary to strengthen the scientific analysis of construction conditions, ensure that the selected pipe network material strength can fully withstand the internal sewage pressure and external soil load.

During the transportation of rainwater and sewage pipe network materials, protective measures must be taken between pipes to avoid damage due to friction during transportation. After the pipes enter the construction site, the engineering quality inspection personnel shall strictly check the quality of the pipes again and replace the unqualified pipes in time.

In the actual construction process, the construction personnel shall avoid rolling and bumping the pipes, the interface between the pipes must be operated in strict accordance with the requirements of relevant standards, and the staff performing various operations must be professional technicians. The laying of pipes shall be completed at one time as far as possible to avoid replacing technicians and pipe network materials during construction, so as to solve the situation that has a great impact on the construction quality due to different materials and operation methods [3].

5. Strengthen the in-Depth Analysis of Pipeline Closed Water Experimental Technology

After the construction of municipal rainwater and sewage pipe network, in order to ensure the high tightness of the laid pipeline, relevant staff should also carry out closed water experiment, so that they can not only detect the leakage problem of the pipeline in time, but also take corresponding measures to effectively solve the problems of the pipeline at the first time.

Before conducting the closed water test, the construction personnel shall strictly check whether the connection part of each section of pipeline has high tightness and whether the pipe is damaged. At the same time, the foundation pit should be fully cleaned to ensure that there are no hard objects inside the foundation pit to damage the integrity of the pipe, so as to make full preparations for the effective development of the closed water experiment.

During the closed water experiment, the staff must ensure that the pressure applied to the pipeline can fully meet the relevant specifications and requirements of the construction design of rainwater and sewage pipeline, and control the experiment time in strict accordance with the industrial standards. After the experiment, the staff should carefully observe whether there is water leakage in the rainwater and sewage pipe network, and carry out subsequent construction operations only after ensuring that the closed water experiment results are qualified [4].

6. Effectively Control the Key Technologies of Backfilling Trench

After the closed water experiment, the trench backfilling construction shall be carried out on the basis of passing the inspection. The actual stress condition of rainwater and sewage pipeline will change to varying degrees under the influence of backfill. Therefore, in order to effectively solve the problem of pipeline position movement because of large pressure caused by backfill on both sides of rainwater and sewage pipeline during trench backfilling, constructors can fix the pipeline before trench backfilling, and ensure that the backfilling operation on both sides of the pipeline is carried out at the same time, so as to keep the pressure on both sides of the pipeline in a balanced state. Before formal backfilling, relevant staff shall conduct quality acceptance for other invisible projects again, and the backfilling construction can be officially carried out only after all works are accepted.

For the backfill used in the process of trench backfilling, generally, the large particles and sundries such as stones, wood, broken glass and garbage should be cleaned in advance to solve the damage of rainwater and sewage pipelines due to the lack of high-quality backfill [5].

7. Strictly Control the Key Technologies of Temperature Regulation

Rainwater and sewage pipelines are usually laid at different depths underground. Therefore, they are obviously affected by the temperature. When the underground soil temperature changes, different degrees of internal pressure will be generated, which will have an impact on the rainwater and sewage pipelines. In this regard, designers should fully consider the influence of temperature factors in the process of selecting rainwater and sewage pipes.

The designer shall give priority to the pipeline materials with strong temperature adaptability to ensure that the pipeline materials have certain elasticity and can fully adapt to the thermal expansion and cold contraction caused by the change of soil temperature. At the same time, they should strengthen the further optimization of the construction design scheme, and reserve settlement joints and expansion joints with reasonable size between the pipeline and the soil to avoid cracks in the pipeline under the environment of soil thermal expansion and cold contraction. The construction personnel can also fix the thermal insulation material outside the rainwater and sewage pipe to reduce the impact of temperature on the pipe and improve the adaptability of the pipe to temperature. The water stop ring and culvert clothing shall also be set at the pipeline interface to avoid large-scale collapse due to leakage of rainwater pipeline and soil corrosion [6].

8. Conclusion

Under the background of accelerating urban development in China, the impact of traffic

environment on people’s daily life and work, social production and transportation is becoming more and more obvious. The construction quality of rainwater and sewage pipe network directly determines the overall quality of municipal road engineering. We must fully grasp the key technical points of sewage pipe network construction, completely solve the serious problems caused to people’s daily travel due to the lack of perfection of drainage function in the process of traditional municipal road construction, and reduce the number of urban road construction to the greatest extent. Therefore, the urban road construction unit must strictly control the construction quality of rainwater and sewage pipe network, ensure the high perfection of urban infrastructure, and contribute to the further improvement of China’s urban comprehensive development level.

References

[1] Ji Xiaoxin. A municipal road network system integrating drainage, sewage treatment and emergency pipeline: CN207499106u. no.5, pp.27, 2018.

[2] Zhang Chen, Lv Yongpeng, Deng Jing, et al. Research on the system and technology of systematic and global promotion of sponge city construction in Shanghai. Environmental Engineering, vol.38, no.04, pp.115-119+107, 2020.

[3] Li Dezhi, Gu Tiantian, Wang Yanqing. Obstacles and breakthroughs of residents’ participation in sponge transformation in old residential areas -- a case study of Zhenjiang City, Jiangsu Province. Modern Urban Research, no.10, pp.184-190, 2019.

[4] Wang Dengfeng. Construction quality control and prevention of municipal roads and rainwater and sewage pipelines. Construction Engineering Technology and Design, no.13, pp.3125-3125, 2017.

[5] Zhu Dan. Construction quality control and prevention of municipal roads and rainwater and sewage pipelines. Theoretical Research on Urban Construction (Electronic Version), no.2, pp.76, 2018.

[6] Cheng Wenlong. Construction quality control and prevention of municipal roads and rainwater and sewage pipelines. Theoretical Research on Urban Construction (Electronic Version), no.28, pp.4088-4089, 2019.