Management and Construction Strategy of Water Supply and Drainage Engineering

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Abstract: For the water supply and drainage project, it is not only beneficial to the country and the people, but also an important industry in China's economic structure. Therefore, it is necessary to effectively manage the water supply and drainage project and actively apply advanced construction technology to ensure that its construction quality meets the corresponding requirements and standard specifications. This article summarizes the construction management of water supply and drainage projects, analyzes the water supply and drainage construction techniques, and proposes corresponding construction management strategies.

1. Introduction
The construction of tap water supply and drainage project is directly related to our country's economic development, and it is closely related to people's lives, and also affects social production. When constructing and managing the water supply and drainage project, it is necessary to lay the water supply and drainage pipe reasonably, clarify the construction points, use appropriate construction technology, and strictly manage the construction quality of each link to ensure the efficient operation of the water supply and drainage system.

2. Overview of construction management of water supply and drainage works
In urban planning, water supply and drainage engineering occupies an important position. Whether it is in project management or design planning, it needs to be coordinated with urban planning. At present, when constructing the water supply and drainage project, it should be implemented around saving water and protecting the ecological environment. Through the application of the integrated management model, the project can meet the needs of social development at this stage. Through integrated management, the construction of the sewage treatment system of the integrated water supply and drainage project (Figure 1) is conducive to improving the urban sewage treatment effect and achieving the management goals of the water supply and drainage system. Therefore, in actual construction management, it is necessary to put the water supply and drainage project in the same position, so as to fundamentally improve the utilization rate of water resources, and achieve the goal of saving water. At the same time, in the management of water supply and drainage projects, this work should be reflected in the characteristics of marketization, especially under the continuous development of economic technology, many water companies have adopted a market-based management method to carry out market management of daily business activities. However, its market-oriented development situation requires further research, especially in river channel and flood control facilities management. The functions of waterworks should be further refined, and the construction of urban water supply and drainage pipelines should also be refined. To fully implement the integrated management method, it is necessary to establish a perfect management organization,
whether it is a water supply unit or a drainage unit, it must be managed in a unified manner to ensure that water resources are reasonably allocated and the protection of water resources is well done. In actual management, a professional management agency should be set up, which is more professional and can effectively improve the efficiency of construction management. In terms of construction organization, relevant functional departments need to increase supervision and management efforts, water affairs departments, construction units, sewage monitoring stations should all perform their duties to ensure that the goal of integrated management is achieved [1].

3. Technical analysis of water supply and drainage construction

(1) Foundation construction and anti-corrosion operations
According to the construction requirements of the water supply and drainage project, when constructing the water supply and drainage pipeline, it is necessary to ensure the stability of the overall structure, and to effectively pave the concrete to improve the stability of the pipeline. Normally, the concrete should be paved in the horizontal direction for the first time, and the pipe base part should be poured in the subsequent pouring operation to control the parallel paving range. In the water supply pipeline system, the commonly used pipeline types include: welded steel pipes, ductile iron pipes, pipes used for rainwater pipes which are hard polyvinyl chloride and secondary reinforced concrete pipes. In the pipeline connection, rubber rings should be used to improve the anti-aging ability and corrosion resistance of the interface. The specific pipeline types and interface methods are shown in Table 1. Sewage pipes need to use HDPE hollow wall winding pipes. It is worth noting that for steel pipes and ductile iron pipes, anti-corrosion work needs to be done. After welding the inner wall of the welded steel pipe, a layer of cement slurry must be applied. The outer wall of the pipe should be derusted. Asphalt, glass fiber, etc. can be applied for anti-corrosion. For the inner wall of the ductile iron pipe, centrifugal sediment will be used for corrosion protection. The pipeline and the interface need to be derusted. Use two cloth and four oil anti-corrosion layer. The corrosion resistance length of the pipeline interface should exceed 10cm.

Table 1 Specific pipeline types and interface methods

| Pipe type                        | Diameter (mm) | Interface method       |
|----------------------------------|---------------|------------------------|
| 1. Polyethylene pipe             | 100-1000      | Socket rubber ring     |
| 2. Rigid PVC                     | 223-400       | Socket rubber ring     |
| 3. Glass fiber reinforced plastic sand pipe | 600-2000     | Socket rubber ring     |

(2) Line-out measurement and trench excavation
In the construction of water supply and drainage pipelines, the line-out measurement operation runs through the entire project. No matter which link has a measurement deviation or a measurement error, it will have an adverse effect on the overall pipeline quality. Once the situation is getting serious, it is easy to fall down. Therefore, it is necessary to strictly control the line-out measurement, to effectively protect each measurement point, and also to do re-test work to ensure that it can meet the actual construction requirements. During the line-out survey, the surveyor must not change the direction of the pipeline without permission. If an obstacle is encountered, it should be avoided, and the relevant functional department should also provide an accurate construction route. In the trench development process, the construction personnel need to consider the surrounding environment and other influencing factors, not only to analyze the geological conditions at the construction site, but also to carry out a comprehensive survey of the groundwater level, road direction, etc. to ensure that a suitable construction location is selected. On this basis, according to the actual situation of the site, select effective construction technology, the distance between the excavation point and the earthwork should be kept above 0.8m to avoid water seepage problems and ensure the overall stability of the
(3) Pressure test of pipeline
After laying the water supply and drainage pipelines, a pressure test is required to test the construction quality. Under normal circumstances, section pressure test method is adopted to detect the pipeline pressure. The maximum pressure test length is 1000 meters, and the length of the pipeline accessories should be controlled within 0.5 kilometers. For different pipeline materials, it is necessary to apply targeted detection technology. For the baffle part of the pipeline, in addition to testing its firmness, it is also necessary to check whether a valve sealing plate is provided. Before the pressure test, all preparations should be made, such as a pressure gauge and a pressure test pump. If the pressure gauge is a spring pressure gauge, its accuracy needs to be checked. The diameter of the dial should exceed 15cm, the accuracy level should exceed 1.5, and the valve should be in the open state during the pressure test. After the pipeline is filled with water, the water pressure should be controlled at 0.2-0.3MPa, and the pipe wall should be completely immersed for 2 days. During the pressure increase, the pressure should be gradually increased. Each pressure increase should be controlled at 0.2 MPa. During the pressure test, it is necessary to strictly check whether there is a pipeline leakage, and also to conduct water leakage detection. If the pressure difference does not exceed 0.05MPa within 10 minutes, it can indicate that the pipeline is qualified and no water seepage test is required [3].

4. Shortcomings in the construction and management of water supply and drainage engineering
In the entire urban system, the water supply and drainage project directly affects the urban economic development and also affects people’s normal water usage. Whether the water supply and drainage project runs smoothly directly affects the quality of municipal engineering construction, so the management and construction of the water supply and drainage project is very important. According to the actual situation of the water supply and drainage project at this stage, there are still the following shortcomings: Firstly, the project management effect has not yet reached the expected goal, some construction units have not been able to carry out in accordance with the construction process, and the supervision of relevant functional departments also needs to be further improved. Secondly, for the construction personnel, their comprehensive quality needs to be further improved, the construction technology they master is still relatively backward, and they have not been able to keep pace with the times. In actual construction, violations often occur, which will affect the quality of water supply and drainage construction, once the quality of the water supply and drainage project fails to meet the standard requirements, it will reduce the overall benefit of the project. Thirdly, regarding the quality of construction materials, the inspection efforts need to be further improved. The management personnel need to do a good job of quality control, especially the sampling inspection of applicable materials. Intensive inspections should also be strengthened in concealed projects, but there are still some potential safety hazards which have not been completely eliminated. Fourthly, during the project acceptance stage, the pipeline test personnel are absent, and the temporary blind plates cannot be removed, and some security work has not been able to be implemented, which will bring personal threats to the construction personnel and other site staff.

5. Construction management strategy of water supply and drainage engineering
(1) Adopt a responsibility mechanism
In the water supply and drainage project, there are many participating departments, and each unit needs to fully perform its responsibilities. Since a unified management mechanism has not yet been formed, various problems will be encountered in the pipeline laying process. In order to do a good job in construction management, the relevant functional departments need to play a supervisory role, adopt a responsibility mechanism, and each position must have a dedicated person in charge.
managing front-line construction personnel, they need to let them fully understand the content of the drawings and complete each construction link with high quality, so as to prevent pipeline misalignment.

(2) Improve the comprehensive quality of management personnel
When managing the water supply and drainage project, it is necessary to train the management personnel. The management personnel should give full play to their subjective initiative, evaluate the comprehensive quality of the construction team, especially check the comprehensive strength of the construction unit, and review the qualification of the enterprise. Moreover, the construction equipment must be effectively managed to ensure that the construction personnel have a good overall quality. When evaluating the construction unit, first of all, the qualification of the construction unit must be evaluated to see if the construction company has all three certificates; Secondly, the personnel and equipment of the construction unit should be evaluated, and the certificate should be held to ensure that the selected construction unit has strong professionalism and can meet the actual requirements of the water supply and drainage project.

(3) Strengthen the control of pipeline leakage and seepage
In the water supply and drainage project, water and pipeline leakage is relatively common. In order to prevent these problems, it is necessary to do corresponding precautions and fully identify the causes of water leakage and seepage. In general, the factors that cause water leakage and seepage of pipeline include the following: Firstly, uneven settlement occurred in the foundation construction, which caused the water pipe to be pulled off and water leakage occurred; Secondly, during the construction process, the materials and equipment used did not meet the actual requirements; Thirdly, the assembly techniques used during the construction process were not reasonable enough, and there were gaps at the connection points of the pipeline; Fourthly, during the assembly process, the debris in the pipeline was not effectively removed, which caused the pipeline to become blocked. Therefore, in the construction management, the cause of the problem needs to be clarified, and the specific problem should be further inspected. The construction quality of each link must be strictly checked to eliminate potential safety hazards.

(4) Increase supervision
In the process of inspecting the construction quality of water supply and drainage, the relevant inspection departments need to increase inspection efforts, especially to strictly inspect the quality of construction materials. The construction materials need to be banned once it is found that they do not meet the quality standards. In the construction site management, the construction process needs to be strictly controlled to prevent the occurrence of leaks. For specific problems, effective resolution measures should be taken, and the inspections should be summarized into reports to provide a reliable basis for risk assessment. The construction unit can cooperate with the corresponding professional quality inspection unit and hand over the risk assessment to a third party to strengthen risk prevention, to prevent quality accidents, and to ensure the progress and quality of the project. This can also effectively improve the social benefits of water supply and drainage engineering.

(5) Strictly control the quality of construction materials
In water supply and drainage engineering, the quality of pipe fittings directly affects the overall quality of the project, and also affects the application value of water supply and drainage engineering, so it is necessary to give high attention to materials. When inspecting the quality specifications of materials, materials must be inspected and accepted in strict accordance with the corresponding standard specifications. Once unqualified materials are found, it is prohibited to enter the site. Before the material enters the site, it is necessary to do a random check and determine whether the material meets the standard through corresponding experiments. After the material enters the construction site, it needs to be well preserved and managed, and be reasonably stored according to the type and
specifications of the material to ensure the normal use of the material. In the water supply and drainage project, because it is often applied to the corresponding mechanical equipment, it is necessary to effectively manage the mechanical equipment, reduce the equipment failure as much as possible, improve the operating efficiency of the mechanical equipment, and then lay a good foundation for the efficiency of the water supply and drainage construction.

(6) Clarify water supply and drainage construction standards
With the continuous development of science and technology, new construction techniques have gradually been developed. The traditional water supply and drainage construction specifications cannot meet the actual needs at this stage. At present, when constructing water supply and drainage pipelines, new standards and specifications need to be used, and the construction system also needs to be further improved. We should seek a balance between new technologies and new specifications, so as to ensure that the construction enterprises can adapt to the new standards, not only that, relevant functional departments need to constantly improve the construction standards, effectively solve the bottlenecks in the theoretical standards, and realize the innovative development of water supply and drainage design specifications.

(7) Strengthen the follow-up construction management
When the water supply and drainage project enters the late stage of construction, its construction quality needs to be checked and accepted. After completion, the management personnel should conduct spot checks on construction materials such as pipelines, concrete, or construction technology. If deficiencies are found, they need to take effective measures in a timely manner to ensure the normal use of water supply and drainage projects. In addition, if the water supply and drainage project has entered the usage stage, it is also necessary to do corresponding maintenance work, regularly check the water supply and drainage pipes, and promptly deal with any hidden safety hazards to ensure that the water supply and drainage project can meet the needs of social production and daily water consumption, so as to promote the urban development process [4].

6. Conclusion:
In summary, for the water supply and drainage project, it has made great contributions to the development of national livelihoods. At this stage, with the in-depth exploration of science and technology in our country, in the actual construction of water supply and drainage projects, it is necessary to do a good job in construction management, apply suitable technology, improve the optimal allocation of resources, and make a better direction for the development of water supply and drainage projects.

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