

# Discussion on Outdoor Water Supply and Drainage Design of Industrial Areas

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**Abstract:** In recent years, with the continuous improvement of people's living standards, people's requirements for urban infrastructure are getting higher and higher. At the same time, the city's important infrastructure is water supply and drainage engineering, and it is closely related to people's daily life and production. Therefore, to effectively improve people's satisfaction with buildings, and improve the economic benefits of construction projects, we must do a good job in the design of water supply and drainage for buildings. In this paper, the author combined with their practice on our country's industrial plant indoor and outdoor water supply and drainage design has done related analysis and discussion.

**Keywords:** Industrial plant area; Water supply and drainage; Energy saving design; Analysis

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## 1. The problems that may exist in the water supply and drainage of industrial plants

(1) Both industrial water supply and domestic tap water use tap water as a source of water, but there is no good quality water supply, which has caused a waste of water and increased the cost of enterprises to a certain extent.

(2) The whole industrial plant uses tap water as a source of water and does not achieve a reasonable partial pressure water supply. At the same time, a set of drainage pipe networks is generally adopted in the factory area. This design form will have a greater impact on the work of pollution diversion and rain and pollution diversion, which not only increases the cost of treatment but also causes the waste of water resources.

(3) There is no reasonable planning. For wastewater recycling and other work, there is no sufficient market research, and the a lack of necessary planning, for pollution diversion, lack of necessary plans, at the same time, for sewage diversion and its recycling work, the relevant process technology is not mature enough, there are generally larger problems, leading to the difficulty of wastewater treatment and increase of Fudan University. Thus, resulting in the repeated increase in its cost. For the treatment of wastewater, it should first be shunt, then coagulation and internal electrolysis, but the lack of complete planning in the practical operation process, which leads to the work not being carried out orderly.

## 2. The choice of drainage system in the factory

The drainage system of the general factory is mainly based on the requirements of urban municipal drainage systems and environmental protection. The drainage system of most factories in Shizuishan City has not considered a separate rainwater collection system. I think the main reasons are as follows: First, Shizuishan City has not built a special rainwater system in the old city, and some of the existing rainwater pipes are combined with the transformation of the old city pipe network in the city. The addition of the main water section is equivalent to the incomplete shunt system. At the same time, due to the increase in the flow of the sewage collection pipe network after the addition, the operation burden of the sewage treatment plant is caused. The second is the investment and management of rainwater systems. Since the design of the rainwater system is generally determined following the local rainstorm intensity formula and confluence area and other parameters, compared with the sewage network, its flow is about 3 to 8 times the sewage flow of the same area, in addition, after the completion of the rainwater network, because it is mainly for the flood season operation, usually idle, so for the rainwater system setting, the relevant policy is not clear requirements, while due to the rainwater system, The problem of investment and rainwater outlet has not been considered in the construction of factory infrastructure. Moreover, from the management, the supply and drainage of the plant, gas, telecommunications cables, etc. are assisted by the relevant management departments, and for rainwater, the management object is not easy to clear. In addition, in recent years, it has been found that around the renovation and expansion of the plant and the catering industry, it is easy to occur the phenomenon of rain and pollution mixed connection. However, from the general development trend, people's requirements for an urban living environment continue to

improve, the new factory, especially the overall terrain is relatively flat areas, so it is necessary to establish an independent rainwater system. A few days ago, Shizuishan City government had the old city rainwater system renovation project as a key construction project for next year. The rainwater system of the factory can also adopt the incomplete split system, set up the rainwater pipe network at the main water crossroads, or combined with the landscape design and green water of the overall plan of the factory, the collected rainwater can be stored and used on the spot.

### **3. Water-saving measures in water supply and drainage design of industrial plant area**

#### **3.1 Determine reasonable water consumption quota of the plant area**

Generally, this can be achieved by the following methods: make full use of the pressure of the municipal pipe network and direct water supply. Reasonable vertical partition, balance water pressure at water points; The use of parallel feed water pump partition, minimize the setting of pressure reducing valve; It is recommended to reduce pressure as a measure of energy saving and water saving, reduce the outlet pressure of the water point of the plant; Reasonably set the location of the living pool, as far as possible to reduce the depth of the plant setting, to reduce the lifting height of the pump; Give priority to the water supply mode of a water pump and a water tank. Promote the use of water-saving sanitary appliances. Reasonable adoption of variable frequency speed regulating pump group water supply. When using variable frequency pump water supply, priority should be given to using variable frequency variable pressure variable flow water supply mode, its energy saving effect is better than variable frequency constant pressure variable flow water supply mode. When variable frequency constant pressure variable flow is used, the setting of working pressure should be close to the lower limit of high-efficiency section head when the pump is running at power frequency; The working pump should be selected 2 or more, and the flow of the pump with different levels should be changed by 1/2 of the flow ladder, it is appropriate to use the form of dachang pump, and set up the pressure tank plant flow water supply. When the municipal conditions allow, it is appropriate to use the superimposed water supply equipment, which is also the "building water supply and drainage design" 2009 edition of the newly added design to consider the content.

#### **3.2 Energy-saving choice of hot water system heat source in the factory area**

In general, in industrial plants, hot water is mainly supplied in bathrooms and canteens, which is a regular hot water supply system. The choice of heat source in the hot water system is the main influencing factor of whether the design of the whole factory is energy-saving. The selection of heat source should first consider the use of waste heat in the plant, the use of waste heat generated in the production of indirect heating of cold water, such as steam condensate should be recycled, not directly discharged. The heat supplied by the waste heat should ensure the heat consumption when the hot water system is designed; Secondly, solar energy should be considered. As a clean energy source, solar energy is inexhaustible and is an important way to save energy. Most areas of China are located in the north of 40° north latitude, the sunshine time is longer, suitable for promoting solar water heaters. The solar water heater is composed of a collector, storage tank, water supply tank, distribution pipe, circulation pipe, circulation pump, and so on. The collector is generally divided into two types: flat plate type and vacuum type, which are generally installed on the bathroom roof. Because heat energy is a low-density, unstable decentralized energy, its energy supply is unable to meet the requirements of use at any time, to ensure the safety and reliability of the water supply of the solar hot water system, it is necessary to have a reliable auxiliary energy to ensure that the hot water system can still be used in continuous rainy days. When the hot water generated by solar energy cannot meet the requirements of the bathroom and the canteen, the hot water is used as a preheating water source, and the insufficient part is heated by the auxiliary heat source. The energy-saving effect of solar water heating systems is quite obvious, but in the design of solar water heating systems, attention should be paid to factors such as its anti-freeze performance, thermal shock resistance, and pressure-bearing capacity in cold regions in winter. Other areas with conditions, can also choose renewable energy (wind energy, solar energy, water energy, biomass energy, geothermal energy, ocean energy, and other non-fossil energy) for building a hot water supply.

#### **3.3 Improve the comprehensive utilization efficiency of water resources in the plant area**

As one of the energy resources, the contradiction between its development and utilization and the serious shortage of water resources has become increasingly prominent. In more than 600 cities in China, there are more than 300 cities lack water, 108 cities are seriously short of water, and the annual loss of industrial output value due to water shortage of hundreds of billions of yuan, water has become one of the main factors restricting China's social and economic development. Saving water should be a long-term necessary policy to prevent the crisis of water resources and solve the contradiction between supply and demand. In the industrial plant area, the comprehensive utilization of various available water resources is a direct and effective way to save energy and improve the economic benefits of enterprises. The water repetition rate of the enterprise is also one of the standards to assess whether the production of the enterprise is energy-saving.

The water in the industrial plant refers to the production of wastewater, domestic wastewater, cooling water rainwater, and other drainage in the factory after proper treatment to reach the water quality standards of miscellaneous water, and then used in the factory buildings

and the greening of the factory. The reclaimed water facilities are composed of raw water collection, storage, treatment, and supply. From an economic point of view, when the factory needs to set up a sewage treatment station to treat production wastewater and domestic wastewater, the treated water can be used as a source of reclaimed water, which can be further treated by reclaimed water for flushing water in the factory buildings, watering the green space in the factory or flushing the road in the factory. When the water quality requirements of the production water points in the factory are not high, the treated water can be used for production.

#### **4. Conclusion**

It is necessary to do a good job in energy-saving design of industrial plant water supply and drainage, which is an important link in the design. Reasonable water supply and drainage design can better improve the energy conservation of today's factories, make outstanding contributions to solve the energy crisis and make efforts to improve the efficiency of energy utilization.

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