

# Energy and Water Conservation Technology Analysis of Water Supply and Drainage of the Building

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**Abstract:** At present, China's social and economic development is faster and faster. At the same time, people pay more and more attention to the construction concept of energy and water conservation. We can see the popularization and development of the concept of energy saving and water saving in every major field of our country, the same is true in the construction field. In order to effectively protect the ecological environment and maximize the use of limited resources, the energy-saving and water-saving technology of the building, as well as water supply and drainage technology should be actively used. Based on this, this paper first analyzes the application significance of water supply-drainage and energy-water conservation technology in the construction field, analyzes the current situation of water supply and drainage in China, and proposes the application of water supply-drainage and energy-water conservation technology of the building for reference.

**Keywords:** Construction Engineering; Water supply and drainage; Energy and water conservation technology

**Publication date:** July, 2020

**Publication online:** 31 July, 2020

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Since the development of human society, water resource, as an indispensable part of it, plays an important role in people's life and production. As an important part of construction engineering, water supply and drainage will waste a lot of water resources in the process of construction. Therefore, in order to ensure the sustainable development in the construction

field, we need to increase efforts to control the energy and water conservation. Only in this way can we realize the high efficiency and practicality of water resources and promote the development of the construction field towards the direction of green building.

## 1 Application significance of water supply-drainage and energy-water conservation technology in the construction field

In terms of the increasing shortage of water resources in China, in the field of construction, energy saving and water saving have always been the key and difficult problems faced by water supply and drainage projects of the building, and the current society is also very concerned about this. With the rapid development of social economy, it also brings some pressure to the ecological environment. This causes the corresponding damage to the ecological environment, such as frequent natural disasters, people's quality reduction of life and so on. These have a certain impact on people's health, so it requires the construction industry to take effective measures to minimize the waste of water resources. Based on the above, this requires the application of energy-saving and water-saving technology in water supply and drainage engineering. This technology can effectively control the water resources used in the construction of the project, and also have positive significance for improving the application efficiency of water resources. In addition, due to the increasing shortage of current water resources, it will have a certain impact on the construction industry and even the national economic development. Therefore, it is an urgent problem to reduce the waste of water resources

in the construction field. Through energy saving and water-saving technology, we can improve this problem and promote the stable development of China's construction field and national economy<sup>[1]</sup>.

## 2 Technical analysis on water supply-drainage and energy conservation of the building

### (1) Rainwater collection technology

The application of rainwater collection technology in water supply and drainage engineering of the building can further improve the utilization efficiency of rainwater resources; on the other hand, it can realize the protection of ecological environment. When the rainwater collection technology is applied in the water supply and drainage engineering of the building, the most important part is to design the rainwater collection channel in combination with some basic information such as the terrain and structure in the construction area before the actual construction, so as to ensure the effective collection of urban rainwater. The rainwater obtained by rainwater collection technology can not only be used in the water supply and drainage engineering of construction projects, but also can be used in the water sources' use of urban production and life. It can improve the current shortage of water resources in cities and the water shortage for engineering construction at maximum level. In addition, when this technology is applied to urban water supply and drainage engineering, the cost of investment is also very small, which is worth promoting and using in a wide range<sup>[2]</sup>. The following Figure 1 shows the principle of rainwater collection technology:

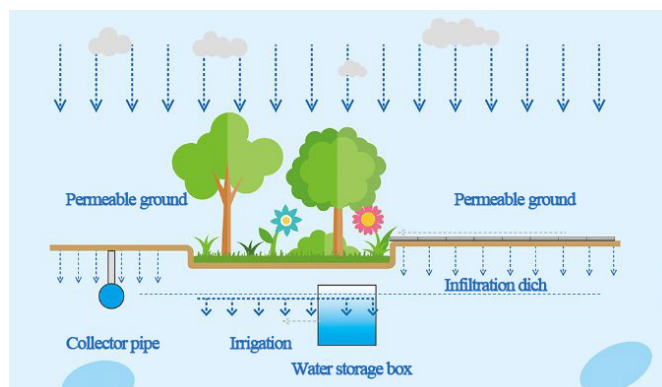


Figure 1. Principle of rainwater collection technology

### (2) Vacuum water saving technology

Simply speaking, the so-called vacuum water-saving technology is to use vacuum negative pressure

to change the original air into a high-speed water vapor mixture in the vacuum environment during the construction of water supply and drainage engineering of the building, and then through this technology, the high-speed water vapor mixture can be activated in a relatively fast speed environment, so that the water vapor mixture will become a mixture applied to water supply and drainage engineering of buildings. On the whole, this technology is a relatively new type of water supply and drainage technology of the building, which is also widely used. On the one hand, it can effectively improve the utilization rate of water resources, play a certain role in saving water resources; on the other hand, it can achieve sewage purification and sewage treatment, reduce the waste of water resources. With the wide use of this technology, it has good water-saving effect. According to relevant data, the water saving rate of this technology is higher than 65%. The application of vacuum water-saving technology in water supply and drainage engineering can maximize the utilization rate of water resources<sup>[3]</sup>.

### (3) Reclaimed water recycling

In short, the so-called reclaimed water recycling is to treat the waste water, sewage and so on, so that it can reach the water-using standard in the water supply and drainage engineering of the building. However, it should be noted that even after treatment, this part of water cannot be used as drinking water, and can only be used in engineering construction. Therefore, it can reduce the water waste of construction enterprises to a certain extent through adopting scientific way to treat the reclaimed water and making it used in engineering construction. The reclaimed water can be used in the following aspects of the construction, such as watering and irrigating the green plants, cleaning the vehicles in the construction site, and using it as the water source during the construction. Through the above, it is not only to reduce the discharge of waste water and sewage in the project, but also to protect the ecological environment, and to improve the utilization rate of water resources. The following Figure 2 is the reclaimed water recycling system in a residential area.

### (4) Frequency control technology

In real life, people's use of water resources will change with the variation of season and temperature. Generally speaking, the amount of water that needs to be used

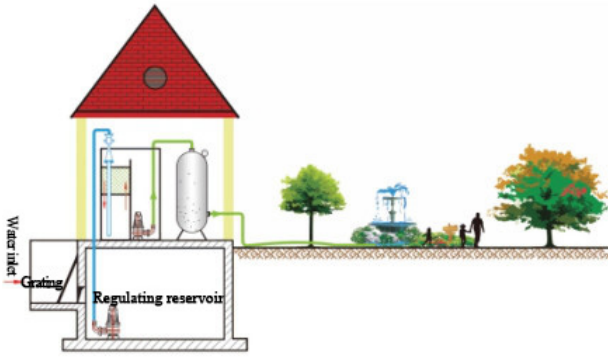


Figure 2. Water recycling system in a residential area

in winter is significantly less than that in summer, and the amount of water that people use every day changes significantly. However, from the perspective of the construction, if the water supply is maintained through pumps all day, it is easy to waste a lot of water sources. Based on this, in order to ensure the practical application of energy-saving and water-saving technology in water supply and drainage engineering of the building, we can change the former water supply and drainage mode through frequency control. Its main purpose is to regulate the running speed of water pump, regulate the water pressure according to the water demand, so as to ensure the water-using balance in engineering construction. The following Figure 3 shows the frequency control water-supply system in a residential area:

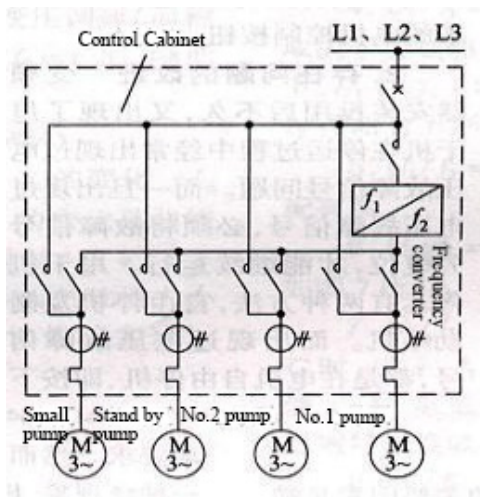


Figure 3. Frequency control water-supply system in a residential area

### 3 Technical analysis on water supply-drainage and water conservation of the building

#### (1) Use of renewable energy resources

If we want to realize the goal of saving and utilizing resources effectively, the most fundamental is to change the using form of energy resources. The utilization of renewable energy can achieve the fundamental purpose of saving resources and energy. At the same time, it can reduce the pollution caused by the use of non-renewable resources acting on ecological environment to a certain extent, and effectively improve the ecological environment. Based on the above, the application of renewable energy resources in the construction of water supply and drainage engineering can minimize the using amount of traditional energy, and improve the energy conservation and environmental protection of water supply and drainage engineering. In addition, there are many patterns of renewable energy resources. Among them, the more common energy sources are solar energy, wind energy, etc. Moreover, the above-mentioned energy will not discharge pollutants harmful to the environment in the use process, which can effectively play a role of cleaning and saving, and promote the development of water supply and drainage engineering towards a more green and environmental protection direction<sup>[4]</sup>.

#### (2) Frequency control technology

In the construction of water supply and drainage engineering, the most energy consumption is water pump. Its main function is to provide power for the project to carry out drainage work. Based on this, in order to reduce the energy consumption caused by water pump, it is necessary to adopt frequency control technology for water pump. On the one hand, the frequency control technology can reduce the energy consumption caused by water pump; on the other hand, it can save the capital expenditure of construction enterprises. In addition, the frequency control can also realize the secondary pressurization of the drainage pipe network used during the construction of the project, so as to reduce the water pressure, improve the water supply efficiency and ensure the sufficient water for the project.

#### (3) Use of water-saving equipment

With the current tense use of water resources in China, the government has also formulated a sustainable

development strategy for the use of water resources. In addition, people's living standards are improving day by day, and their awareness of water resource conservation is also improving. In the water supply and drainage system of the construction project, it is very important to scientifically select the sanitary appliances and other equipment that need to be used. Based on the above, in order to achieve the goal of energy and water conservation for water supply and drainage, when selecting sanitary appliances, first of all, we should ensure that they have their own functions, and try to select equipment with energy conservation function. For example, when selecting shower equipment, the water-saving shower equipment with infrared control function should be selected as possible as we can. Through the use of water-saving equipment, the waste of water can be reduced effectively. In addition to the above, the pipeline material of the selected water-saving equipment should meet the current national water-using standards, so as to ensure the water safety for the people [5].

#### (4) Reclaimed water recycling system

At the current stage, the use of water resources in China is increasingly tense. In order to effectively improve the shortage of water resources, major cities are also actively looking for solutions. Among them, the well-known energy-saving and water-saving technology, the reclaimed water recycling system has effectively solved the problem of water shortage. At present, many cities in our country have gradually constructed reclaimed water recycling system, and at the same time, the treated water is used for urban irrigation, street cleaning and other purposes. This effectively reduces the sewage discharge in the city and protects the ecological environment. In addition to the above, the rainwater in the city can be collected and reused after treatment, which can also play a role of energy conservation and water conservation to a certain extent. But on the whole, there are many areas in our country using rainwater recycling technology. However, the final rainwater collected is of low quality, so the treatment capacity of rainwater needs to be improved. Therefore, it is necessary to strengthen the innovation

of rainwater recycling technology, so that the rainwater can be truly applied to urban greening irrigation, public facilities cleaning and other aspects, and this technology truly plays a role in water saving.

## 4 Conclusion

To sum up, in the construction of water supply and drainage engineering of the building, the main purpose of the application of energy-saving and water-saving technology is to reduce the consumption of water resources. Therefore, this paper first proposes the application significance of water supply-drainage and energy-water conservation technology in the construction field. Then, the energy-saving technology of water supply and drainage is analyzed from four aspects: rainwater collection technology, vacuum water-saving technology, reclaimed water recycling and frequency control technology. Finally, the water-saving technology of water supply and drainage is analyzed from four aspects: renewable energy resources, frequency control technology, water-saving equipment, and reclaimed water reuse system, so as to promote the sustainable and stable development in China's construction industry.

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