The production and treatment of industrial waste water

Haoyu Peng *
School of management, Tianjin University of Technology, Tianjin, China
*Corresponding author e-mail: penghaoyu@tjut.edu.cn

Abstract. With the acceleration of industrialization in China, the quantity and scale of industrial waste water will continue to increase, and higher requirements will be put forward for the treatment of industrial waste water. This paper aims to analyze the current situation of industrial waste water production, summarize the problems in the process of waste water treatment, and provide measures to improve the quality of industrial waste water treatment based on the actual situation, so as to provide reference for similar research. At present, the rapid development of China's industrial industry, the continuous increase of industrial economic scale, promote the rapid development of the national economy, resulting in varying degrees of environmental pollution. In fact, many industrial enterprises pay more attention to efficiency than waste water treatment, or directly discharge waste water that does not meet environmental standards, which directly affects people's normal life and destroys the original ecological balance. Through the powerful industrial waste water treatment, has the practical significance.

1. Introduction

1.1. Industrial waste water
Industrial waste water refers to the production waste water and production waste water discharged in the process of industrial production. According to the different nature of industrial waste water, its reuse method is also different, among which the production waste water is the most serious pollution. Because in the production process, the production sewage contains a large number of heavy metals and other toxic substances, treatment measures are more complex. Once pollution is caused, it will not be improved for a long time. Therefore, the treatment of production waste water is the key problem of industrial waste water reuse at present. With the concept of building a sustainable development society in China, the requirements for industrial enterprises are becoming more and more stringent. The waste water produced in industrial production must be strictly treated and discharged to the standard, so as to realize zero pollution in industrial production and build a green ecological industry, which is of great significance to improve ecological benefits and economic benefits.

1.2. Sewage treatment plant
Sewage treatment plant is the pollution (waste) water discharged from the source of pollution. Due to the high total amount and concentration of pollutants, it does not meet the discharge standards, or does not meet the requirements of environmental capacity. Therefore, it is necessary to strengthen artificial treatment when reducing the water environmental quality and functional goals. Generally divided into the city centralized sewage treatment plant and the source of scattered sewage treatment plant, after
treatment into the water or city pipeline. In order to recover wastewater resources, the quality of water must be improved after treatment, and sewage treatment plants must be built for reuse or recycling of sewage. The following table compares the main economic indexes of sewage treatment plants.

**Table 1.** Classification table of power consumption per unit volume of sewage treatment plant (unit: kWh/m³)

| Design scale (m³/d) | The size of 4 or less | 4 < Size < 10 | 10 < Size < 40 | Size > 40 |
|---------------------|-----------------------|---------------|---------------|----------|
| Outlet water level A | 0.25-0.52             | 0.21-0.36     | 0.23-0.35     |          |
| Outlet water level B | 0.20-0.38             | 0.19-0.34     | 0.19-0.33     | 0.21-0.30|
| The water level 2    | 0.19-0.36             | 0.18-0.31     | 0.18-0.31     |          |

**Table 2.** Schedule of operation costs of sewage treatment plants of different scales and processes (unit: yuan/m³)

| The size of the process | Class 4 factory(<40,000m³/d) | Class 3 factory (40,000-100,000m³/d) | Class 2 factory (100,000-400,000m³/d) | Class 1 factory (>40,0000m³/d) |
|-------------------------|-------------------------------|-------------------------------------|-------------------------------------|-------------------------------|
|                         | No sludge digestion           | No sludge digestion                 | Sludge digestion                    | Sludge digestion              |
| Traditional activated sludge process | 0.45-0.55                | 0.38-0.49                           | 0.55-0.70                           | 0.40-0.55                     | 0.31-0.45                     | 0.30-0.45                     | 0.21-0.31                     |
| Oxidation ditch         | 0.42-0.49                   | 0.35-0.42                           | 0.50-0.60                           | 0.40-0.50                     | 0.35-0.40                     | 0.30-0.40                     | 0.21-0.28                     |
| AB                     | 0.42-0.49                   | 0.35-0.42                           | 0.50-0.60                           | 0.40-0.50                     | 0.35-0.40                     | 0.30-0.40                     | 0.21-0.28                     |
| A²/O                   | 0.49-0.62                   | 0.42-0.52                           | 0.60-0.75                           | 0.40-0.60                     | 0.42-0.50                     | 0.50-0.60                     | 0.25-0.35                     |
| SBR                    | 0.55-0.65                   | 0.45-0.55                           | 0.60-0.70                           | 0.45-0.60                     | 0.45-0.50                     | 0.50-0.60                     | 0.35-0.45                     |

2. **Analysis of problems existing in industrial waste water treatment**

At present, the technology and level of industrial waste water treatment are not ideal, and the main problems are reflected in the insufficient capital investment, backward technical means and insufficient discharge equipment. Specifically, they are as follows:

1) The management of industrial waste water requires a large amount of human and material resources. Funds can ensure the success of waste water treatment. However, many industrial enterprises have difficulty obtaining capital, resulting in a lack of capital. The efficiency and quality of waste water treatment equipment, sewage treatment equipment does not meet the requirements, may lead to, because the waste water treatment will be difficult to enter the next stage, which will affect the uninterrupted treatment of waste water, thus limiting the improvement of the quality and efficiency of waste water treatment.

2) Technical means backward industrial waste water treatment means to ensure the normal operation and treatment of industrial waste water treatment. Although it is guaranteed on the premise of efficiency, the technical means of industrial waste water treatment are still backward and there are various problems in the current situation. For example, the low degree of automation of the machine, large consumption, low efficiency problems, no technical means to guarantee the premise.
3) From the current situation, industrial waste water treatment of industrial waste water discharge device facilities there are a variety of deficiencies, is a more prominent problem. Industrial waste water treatment is mainly carried out by drainage pipe network, but now the number of drainage pipe equipment is insufficient. In addition, there are various problems with pollutant discharge pipes in many areas. For example, problems with discharge equipment such as broken pipes, aging, and delayed cleaning can affect the industrial waste water treatment process.

3. Analysis of industrial waste water treatment optimization measures

3.1. Primary and secondary waste water treatment measures

3.1.1. Primary waste water treatment measures. 1) Waste water screening treatment methods. Different amounts of solid contaminants are usually present in industrial effluent and can be removed using a sieve. With the improvement of relevant technology level, the function of filtration equipment is continuously improved, the types of pollutants directly removed are also increased, and the treatment efficiency is significantly improved.

2) Sedimentation and drainage treatment methods. Due to gravity, the harmful substances in the waste water are removed by precipitation. This method can remove ordinary floating objects.

3) The method of plank tonic drainage treatment. Treatment of oil or small-size floating matter in industrial waste water, reduce the possibility of secondary pollution.

3.1.2. Secondary processing key measures. 1) Carbon waste water treatment method: directly remove the organic waste in the waste water, by continuous feeding way to cultivate microorganisms into clusters, gradually form activated sludge, remove the organic pollutants.

2) Bio film treatment. Using bio film to complete the material exchange in industrial waste water and achieve the purpose of degradation of organic matter in waste water. In the treatment of industrial waste water, the activity of microorganism is used to transform the pollutants in waste water and realize the smooth purification of waste water.

3.2. Benefit to low temperature microorganism, reduce the possibility of secondary contamination. The introduction of cryogenic microorganisms into industrial waste water treatment can improve the treatment of pollutants. Physical mass and level. When using low temperature microorganism to treat industrial waste water, there will be difference according to the different temperature of the season, which will affect the treatment effect of microorganism. The content of nitrogen and phosphorus in industrial waste water exceeds the standard obviously, which brings different degrees of eutrophication to the water body and affects the surrounding water body. Therefore, one of the important measures for the treatment of industrial waste water is to remove nitrogen and phosphorus elements, and use low-temperature microorganism in waste water treatment, and focus on the control of waste water temperature. The unsuitable temperature will affect the metabolism of microorganisms and eventually affect the effect of waste water treatment. In this context, scientists have taken out cold-resistant filamentous bacteria to quickly remove harmful substances from waste water, which can significantly improve the level of waste water treatment.

The low-temperature microorganism can treat the industrial waste water containing hydrocarbons, decompose and treat it, and improve the quality and efficiency of waste water treatment. These microorganisms can break down hydrocarbons at low temperatures, reducing secondary pollution from waste water treatment. The following figure shows the microbial treatment part of a simple wastewater treatment process.
3.3. Chemical treatment of industrial waste water

3.3.1. Precipitant application. Industrial waste water contains a large number of chemical substances, usually can choose chemical methods to reduce the content of harmful substances, or direct removal of solid substances; Precipitation method, the use of chemical reactions between the formation of insoluble compounds, the selection of appropriate equipment to complete the separation. Hydrogen and oxygen compounds and barium salts are usually selected to be integrated into waste water to separate heavy metal ions.

3.3.2. Chemical oxidation treatment. Chemical oxidation treatment method refers to the use of oxidizing agents into difficult to decompose organic matter, decomposed into easy to decompose organic matter, direct reaction to carbon dioxide and water method.

3.3.3. Super critical water oxidation. As the temperature of water changes, the composition of industrial waste water changes chemically. The super critical water oxidation process chosen for waste water treatment can raise the temperature of industrial waste water to a critical point and improve its transport capacity, promote the formation of organic matter and gas in the waste, water and dissolved medium, and successfully achieve the goal of dissolving pollutants in the waste. However, this method is rigorous and requires high material characteristics, and in practice catalysts are added to accelerate the reaction in order to control the reaction temperature.

3.4. Rational use of big data to improve the efficiency of waste water treatment.

The definition of big data varies from organization to organization. In information management technology, big data mainly refers to the data set formed by the current database management tools or
conventional data processing applications. In a company's enterprise, big data is usually large and diverse data, that is, big data collects large amounts of data. This must be seen as a combination of innovative thinking, analytical applications, and data objects. Research on big data is mainly conducted through the analysis and integration of certain data to find the rules between the data, so as to discover the value of the data. Therefore, we need to establish a mathematical model through big data technology to effectively apply it in waste water treatment. Relevant technicians need to establish a reasonable, scientific and effective mathematical model and take it as a certain reference basis.

First of all, do a good job of waste water information collection. Under the influence of big data, the traditional way of information collection has undergone great changes. Due to the influence of new technologies and equipment, the scope of information collection is expanding. Traditional data collection tools such as QQ and We Chat have also been gradually improved. On the other hand, as the amount of information collected increases, so does the quality of information. In the process of innovation and development of e-commerce technology and big data technology, the specific situation of information collection has also changed. Therefore, in order to ensure that the current big data environment information management system plays a better role in the process of enterprise development, attention should be paid to improving the level of information management, meeting people's needs, reducing the complexity of information, improving the accuracy in the process of data analysis and processing, and improving the way people need to meet their storage needs. This is loaded with big data and cloud computing technology. Cloud storage is independent of the size and quality of the data and is a big improvement over previous models. Finally, in the big data system, after data collection, we need to pay attention to the analysis of the data, and finally get the accurate data we need, so as to provide an important basis for the development of enterprises. In data analysis, the timeliness of data must be guaranteed, so the real-time analysis of data is the key content of data analysis. In the process of work, we should pay attention to the application of batch processing and stream processing. When necessary, the efficiency of data analysis can be improved by combining the two processing methods. In addition, due to the increase of the amount of data, the function of data can be used to make predictions to a certain extent. The occurrence of any risk has a certain foreboding. For a long time, because of the backwardness of information processing, the detection of risk signs is relatively difficult. At present, we can simulate risks through statistical modeling, data mining technology and so on, so as to find rules in dynamic data, and find rules through real-time monitoring of data, and finally achieve the purpose of avoiding risks and reducing risk losses. Compared with traditional ex post risk management, risk prediction will play a greater role.

3.5. Chemical treatment of industrial waste water

The development of innovative technologies is an important driver of industrial development, as is the case for the waste water management sector. The efficiency of waste water treatment facilities can only be maximized by the continuous introduction of innovative technologies and the improvement of the efficiency of waste water treatment equipment. Firstly, in designing a waste water management network, the technology can be improved and optimized to adapt to the actual development, thus reducing the demand for sewage. Minimize energy consumption during waste water management. In addition, in this cycle, innovative technologies can be realized to fully improve the production capacity of the waste water treatment plant and the recycling of water resources. Improving industrial waste water treatment efficiency is necessary to improve the professional level of industrial waste water treatment workers.

Since the professional level of industrial waste water treatment workers directly affects the efficiency of industrial waste water treatment, the relevant departments should strengthen the training of industrial waste water treatment professionals, and improve their professional ability and comprehensive ability through training. Environmental agencies must be determined more clearly their own responsibilities, according to the actual situation of industrial waste water, the development of practical system meets the needs of industrial development and the management method, in order to adjust the responsibility, and improve the level of industrial ecological consciousness, especially in the industry and enterprise,
this is a very important problem, because it involves the pollution of the environment, and improve their awareness of the environment.

At the same time, environmental protection departments should pay attention to water pollution monitoring and verification, control the content of common pollutants, achieve all-round monitoring, timely report of excessive pollutants and new pollutants, timely investigation and punishment, severe punishment, timely improvement and optimization. In the treatment of industrial waste water, the source control must be regarded as an important content, and the corresponding treatment plan and solution should be formulated to control the water pollution. To fully implement the source of treatment, pay attention to prevention, avoid polluting furniture, improve the quality of industrial waste water treatment.

4. Conclusion
In general, the rapid development of industrial production and economy has caused serious consequences of environmental pollution, the most obvious problem is the treatment of industrial waste water. Enterprises should make rational use of equipment and technology to reduce emissions. Industrial waste water, effective management of industrial waste water, reduce the impact on the environment, in order to achieve the goal of promoting industrial development and environmental protection harmonious coexistence.

Acknowledgments
The work was sponsored by the School of Management, Tianjin University of Technology.

References
[1] Wu Hui. Research and analysis of industrial waste water treatment and recycling [J]. Chemical Engineering Design Communication, 2017, 43(10): 199.
[2] Tang Xiaodong. Study on waste gas treatment technology in industrial waste water treatment unit [J]. Chemical Engineering Design Communication, 2020, 46(08): 235+247.
[3] Zhou Zhihai. Research on the treatment methods of industrial waste water [J]. Leather Manufacture and Environmental Protection Technology, 2020, 1(06): 78-80.
[4] YANG Binbin. Suggestions on the treatment of industrial waste gas and waste water [J]. Environment and Development, 2020, 32(08): 245+247.
[5] Zhu Wen-hui. Urban water environment treatment and pollution prevention and control measures [J]. Engineering Technology Research, 2020, 5(16): 247-248.
[6] Zhao Yi, Zhang Baibing. Possible problems in the process of industrial waste water treatment [J]. Chemical Engineering Design Communication, 2020, 46(02): 213-214.