Application of Electric Automation Technology in the Wastewater Treatment Process

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Abstract: With the rapid development of our economy, industrialization and urbanization, the production and life of the people create a lot of wastewater, and how to treat it has become the focus of public attention. Compared with conventional methods, the application of electrical automation technology in wastewater treatment has the characteristics of convenience and high efficiency, and its role in wastewater treatment cannot be ignored. In this paper, the problems in wastewater treatment are analyzed and discussed for reference.

Keywords: Electrical Automation Technology; Sewage Treatment Process; Application

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Quote

With the development of the economy and society, people's living standards and environmental awareness have been greatly improved, and the protection of water resources and environmental protection have attracted more and more attention. Water pollution significantly impacts people's production and life, and the relevant departments have reformed it to reduce water pollution. At present, using electric drive technology to treat sewage has the advantages of reducing labor costs, improving treatment efficiency and improving the water environment. Therefore, electrical automation technology is with the current social development and adapts to the green, environmental protection ideas; it has vital practical significance for wastewater treatment.

1. Overview and significance of electrical automation technology

1.1 Overview of electrical automation technology

Electrical automation technology is widely used in production and life; it can be through some technical means to achieve control of the relevant equipment to improve the degree of automation of the operation of the equipment and then realize the intelligent upgrade of the equipment. With the continuous development of modern power equipment, the continuous development of electronic control technology, the development of electrical automation technology are also more and more people's attention, especially in the 21st century; with the rapid development of computers and network technology, all kinds of sensor technology have a breakthrough. In the industrial technology upgrade, technical progress, the introduction of electrical automation technology, and the improvement of the industrial technology level are essential.

1.2 The role and significance of electrical automation technology in sewage treatment

With the progress of science and technology, sewage treatment technology is changing with each new day; different treatment methods have advantages and disadvantages, so in the actual use, consider the pollution material, pollution degree, treatment cost, and other factors, and according to different circumstances to choose. Modern sewage treatment technology will more or less use some electronic devices, and electronic control technology is inevitable. Given the complex nature of wastewater treatment, reliance on personnel should be minimized. Due to the limitations of labor level, operating ability, thinking habits, work intensity, and other factors, it is impossible to achieve high standards and high precision manual operation. Therefore, it is necessary to replace manual operation with electronic control technology to improve the speed and accuracy of manual operation. Therefore, it is of great significance to introduce electrical automation technology into wastewater treatment, conduct in-depth research on it, and improve the process technology and its treatment effect.

2. The advantage of electric automation technology in sewage treatment

There are many wastewater treatment methods, such as resin treatment, aerobic biological treatment, anaerobic biological treatment, automatic electrical treatment, etc. The anaerobic biological treatment technology has improved through the second and third generations, which has improved the ratio of height to diameter, the rate of rise, and wastewater treatment quality. Aerobic biological treatment technology converts oxygen in the air to a high degree so that the metabolism of microorganisms is faster, reducing the discharge of sludge. It is using the ion exchange method to treat the heavy metals in the wastewater effectively can transform the wastewater into cooling water to achieve the purpose of green and environmental protection. Compared with other technologies, the most significant advantage of electrical automation technology is complete automation. Because of its adaptability, it is wise to use this technology to treat wastewater. The most significant advantage of using electrical automation technology in wastewater treatment is realizing automatic control. Currently, the problem of water pollution in our country is an increasingly prominent, incorrect, and efficient sewage treatment problem, which is one of the main

reasons for water pollution in our country. Still, the traditional water pollution treatment method is relatively backward; not only is efficiency low, but the water quality is inferior. Therefore treatment effect is not ideal. Applying electric control technology to the sewage treatment process will benefit the development of automatic sewage treatment. In wastewater treatment, electronic automatic control technology is used, through the monitor, computer, central control system, and other equipment, to achieve the control of the wastewater treatment system to meet the requirements of the calculated work efficiency and then effectively reduce manual error, low efficiency, and other problems. Because of its high adaptability, electrical automation technology does not need much upgrading and improvement in wastewater treatment. Applying electronic control technology, a central computer for wastewater treatment, and monitoring systems for process control can significantly reduce labor costs. For enterprises, the adoption of electric drive technology can reduce production costs and labor costs and achieve the purpose of efficient and high-quality wastewater treatment. Therefore, adopting electrification technology is the inevitable trend of wastewater treatment in the future [1].

3. Discussion on the application of electric automation technology in the sewage treatment process

3.1 Grid unit control and implementation

The intake has thick and thin grates, which are straightforward, thick suspended matter that can clog pumps and valves. Each grid before and after each is equipped with a liquid level sensor; PLC can, according to the level sensor, detect water level difference and program set time, the grid machine for automatic control; In case the water level difference exceeds the setting or time limit, automatic control is carried out according to the preparation procedure.

3.2 Unit control and implementation of the inlet pump room

The water inlet pump is equipped with a radar level measuring instrument, which can automatically monitor and control the water level. The frequency converter's frequency can be automatically adjusted with the water level. The rest of the water pumps are soft, starting with the power frequency. PLC can adjust the switch change according to the liquid level change. During programming, PID adjustment reduces the switching quantity of the motor, avoids the waste of electric energy, and improves the working efficiency of the pump [2].

3.3 Control application of the blower room

A variable frequency blower controls the inflatable blower with two soft starts (one use at a time). Due to the traditional PID control algorithm is difficult to carry on the effective control; therefore, in practice, assuming that only set 3 mg/L oxygen, without the need to precisely control within the scope of the target, and melting the probe measurement accuracy will have a deviation, can only make a general reference, using the frequency conversion control fan is not to be transferred to the maximum frequency of 1/2, If set too low, it will cause the motor to heat up. When an operating frequency blower is activated, and the frequency is 45 HZ, if the dissolved oxygen level is below three mg/L, an alarm will be raised, and a manual inspection of the pipe will be required for leakage. In addition, the blower is a vital part of the

ventilation system, so corresponding protective measures must be taken. When all the intake valves are closed, all the blowers must be shut down immediately; If there is no open intake valve on site but there is a half-open signal, if this situation lasts for more than 10 seconds, you must stop the hair dryer.

3.4 Application of advanced technology in sewage treatment

Because of their low power consumption, and distributed and self-organizing characteristics, the wireless network brings new changes to people's information perception. Wireless network technology has been widely used in the water treatment industry for remote monitoring of water quality, environment, and other aspects of data. Through the application of wireless sensor technology and wireless network technology, as well as the application of near-field wireless communication, 4G, and other technologies, the remote monitoring of remote monitoring is realized. In recent years, with the progress of technology, the connection between PLC and DCS is increasingly close; in the field of water treatment, the application of PLC also generally has a strong simulation ability. This combination of technology, on the one hand, makes full use of PLC in the logic of rapid response; on the other hand, it also fully uses the advantages of DCS in complex operations. Water quality has the characteristics of uncertainty, multivariable, nonlinear, time-varying, and randomness, making the system quickly complete a variety of complex control. This system can effectively control the effluent index and reduce the influence of the external environment on the production process [3].

4. Future application development of electrical automation system

From the point of view of the degree of automation of various sewage treatment equipment, simple manual operation is no longer suitable for the development of society. Because there are many uncertain factors in the wastewater treatment process, such as water volume, concentration, temperature, gas volume, microbial status, system water distribution, etc., and the power supply, equipment working status, and other factors are relatively complex, using the pre-set method can not be effectively controlled. Therefore, it is necessary to establish an advanced control system that can collect, calculate and analyze various production process data to determine whether the current production status is normal and provide helpful information for operators and achieve absolute automatic control [4].

Conclusion

To sum up, with the rapid development of the Chinese economy, enterprises discharge wastewater more and more, which has caused a particular impact on human survival environment, and people's environmental awareness is gradually improving. How to treat wastewater scientifically and efficiently has become the focus of social attention. Scientific disposal methods will become the focus of all departments and the foundation of the whole wastewater treatment work. Due to the advantages of high efficiency, high quality, and economy, the application of electrical automation technology in wastewater treatment has become an inevitable development trend. Extensive use of automation technology and safe and reasonable use of wastewater treatment equipment has great practical significance for wastewater treatment and treatment and is also a development direction of wastewater treatment in China.

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