Application Analysis of Thermal Power Engineering in Boilers

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Keywords: thermal and power engineering; boiler; thermal power; innovation

Abstract: Thermal power engineering technology is widely used in the field of boilers with great importance. Through the analysis of the development history of thermal power engineering in boilers, applications and deficiencies of thermal power engineering in boilers are pointed out.

1. Introduction

The theoretical basis of thermal energy and power engineering is mechanical engineering and thermal energy and power engineering, which belongs to engineering application specialty. With the rapid development of social modernization, the demand for heat energy is also increasing. How to effectively apply thermal energy and power engineering technology to the process of innovation and reform in the boiler industry and to improve the application efficiency of thermal energy is that every employee All need to consider the issue.

2. Introduction of Thermal Power Engineering

Thermal energy and power engineering research areas include thermal engineering, thermal engine, fluid machinery, fluid engineering, energy engineering, refrigeration technology, engineering thermophysics, refrigeration and freezing engineering, etc., in general, is the study of thermal energy and power conversion. One of the main technology used in the boiler is thermal engineering, thermal engine, power machinery, engineering thermophysics, energy engineering and other technologies. Thermal and Power Engineering as the project that uses energy, the first thing to be solved is the technical aspects of energy and environmental protection. Today, despite the abundance of coal resources in our country, there is a growing shortage of reserves under the unbridled exploitation of some enterprises and, because of the large population base in our country, the per capita possession is low, making it the world average per capita

About 60%. In addition, coal resources also produce carbon dioxide, sulfur dioxide, carbon monoxide, nitric oxide and other harmful gases that threaten the survival of animals and plants and the soil environment. Therefore, it has become a very arduous task to develop technologies such as desulphurization to reduce the generation of harmful gases and the environmental pollution, and to transform and utilize coal resources more efficiently. First of all, we must make the planning of phased goals and overall goals so as to avoid risks based on full understanding of thermal energy and power engineering. Second, we must fully understand the needs of users and put forward feasible design plans to carry out targeted construction. Lastly, Enhance thermal and power engineering standards of operation, strict checks, so as to effectively avoid the waste of resources and time.

3. Introduction of Boiler

Boiler is a kind of energy conversion equipment that can convert various forms of energy, such as electric energy, thermal energy and chemical energy in fuel, into gas or liquid carrier with certain thermal energy. Boiler applications are very broad, in ships, factories, mines, electromechanical enterprises and other fields are used. The separation condenser invented by Watts in 1796 marked the establishment of a complete boiler operating system and the earliest steam boiler was born. In 1830, as the technology progressed, a fire-tube boiler appeared; At 19 The middle of the century,

the boiler manufacturing technology to further develop, began to appear in the water tube boiler; By the 20th century, it is the birth of a series of new type boiler such as curved water tube boiler, pulverized coal furnace, circulating fluidized bed boiler.

There are two kinds of industrial boilers and power station boilers currently used in our country. There are many kinds of boilers, such as boilers, water-tube boilers and water-fire boilers, according to the different structures of boilers. Boiler; according to the different shape can be divided into horizontal and vertical; according to different uses can be divided into hot water boilers and steam boilers.

The boiler is mainly composed of the shell part and the electric control part of the gas boiler, wherein the shell part is divided into a face shell and a bottom shell, the shell is mainly used for preventing the sand and dust from damaging and eroded while the bottom shell is used for fixing the boiler Of the burner, at the same time to install the recirculation pump, gas valve, expansion tank, three-way valve, the main heat exchanger and other accessories in the bottom shell, these accessories through the bottom shell to connect as a whole. In addition, the most important hardware for the boiler is the control part of the gas boiler electric appliance. Its main function is to control the operation of fans, air pressure switches, gas valves, recirculation pumps, fuel combustion, floor heating temperature detection and other devices. Today, with the continuous improvement of science and technology, most companies start using computer-controlled methods to operate, so that the temperature can be controlled more precisely to maintain their equilibrium.

4. Applications and Deficiencies of Thermal Power Engineering in the Field of Boiler

At present, thermal energy and power engineering in the boiler field is more and more widely used, and are still constantly developing new application technologies, in general, the following points:

4.1 Applications of combustion control technology of thermal power engineering in boiler

The combustion control inside the boiler is the core technology of whether the energy conversion rate can be successfully adjusted. With the development of science and technology, the fuel of the boiler has been changed from the manual filling of the boiler to the step-by-step automated filling of fuel and even Some advanced boilers have begun to enter the stage of automatic fuel filling. The combustion control of the boiler can be divided into two types according to the thermal energy self-control technology. The first one is composed of combustion controller, electric butterfly valve, proportional valve, burner, thermocouple, flowmeter, PLC and other components Control System. This system is controlled by the first thermocouple to detect the data sent to the PLC and set a good value comparison, calculated the difference between the output of the corresponding electrical signal, and according to the electric butterfly valve and proportional valve open comparison of the degree The corresponding adjustment, in order to carry out the furnace temperature adjustment. The disadvantage of this method is that the temperature control is not precise enough and needs to be carefully confirmed. The second is a double-cross control system composed of a combustion controller, a flow valve, a flow meter, a burner and a thermocouple. The control method is that the thermoelectric Even the need to accurately measure the temperature into electrical signals, according to the actual temperature and the difference between the pre-stored temperature data, by the PLC fuel and air valve opening and closing regulation. This control method can save material, you can also control the temperature in a more precise range.

4.2 Deficiencies of thermal power engineering in the field of boiler

Thermal and Power Engineering In boiler applications, the main problems lie in the fan of the boiler, which acts as a compression and delivery device for the gas that converts the rotating mechanical energy into the kinetic energy of the gas and the pressure energy of the gas and delivers it to a given Machinery, it is often used in the operation of the boiler, but as the boilers demand for energy is getting bigger and bigger, the fan working in the boiler will also be under increasing load,

often burned the motor burned out The situation not only causes huge economic losses to the factory, but also seriously threatens the personal and property safety of factory personnel. Therefore, only continuous improvement of fans, the rational use of thermal and power engineering, in order to better ensure the normal operation of the boiler and plant safety.

4.3 Comprehensive assessment of applications of thermal power engineering in boilers

Thermal energy and power engineering to make full use of coal resources, reducing the amount of harmful gases emitted by burning coal during boiler use, is conducive to saving resources and protecting the environment. In addition, thermal and power engineering research is a technical issue, thus increasing the field of boiler technology. The application of thermal energy and power engineering in the boiler field brings very obvious changes to the boiler field. With the development of society, thermal and power engineering will also play a greater role in the field of boilers. In the face of the constant demand for thermal energy Increasing trend, how to improve the efficiency of thermal power use, the boiler field should further explore this issue.

At the same time, thermal and power engineering also brings a series of problems to the boiler field. In particular, the problems caused by the application of the fan are particularly obvious. The load of the fan is always accompanied by the energy of the boiler. As the boiler is energy- The demand for wind turbines will increase, and the wind turbines will also bear a heavier load, which may result in burning out the motor and causing huge economic losses to the factory. In severe cases, the personal safety of the workers will also be threatened. To solve this problem, the factory needs to actively introduce advanced technology to improve the structure and performance of the wind turbine and effectively avoid the negative impacts caused by thermal energy and power engineering.

5. Conclusion

The application of thermal energy and power engineering in the boiler field has promoted the progress in the field of boilers and improved the utilization efficiency of resources, which is of great significance to alleviating the current energy crisis and is conducive to reducing environmental pollution. In the context of building a resource-saving and environment-friendly society, the application of thermal energy and power engineering is not only reflected in the field of boilers, but also in other fields. In the field of boilers, we should pay attention to the negative impact brought by thermal energy and power engineering when we see the favorable changes brought by thermal and power engineering in this area. The boiler area can not only rely on thermal energy and power engineering to promote the development in this area. Pioneering and innovative, continue to learn from the successful experience at home and abroad, the introduction of advanced technology, eliminate the factors that hinder their own development, to ensure efficient operation of the boiler, the only way to obtain sustainable development.

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