

Discussion on Energy Saving Technology of Building Heating Ventilation Air Conditioning

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Abstract: Heating Ventilation Air Conditioning (HVAC) is an important part of modern architecture, and it is also the most important energy consumption system in the use of modern buildings. With the continuous development and progress of the society, energy saving and emission reduction has become a hot topic in today's society, and people pay enough attention to the application of building HVAC energy-saving technology. Through the application of this technology, the effect of reducing building energy consumption is achieved. The author explores and analyzes the necessity and main advantages of building HVAC energy-saving technology, and puts forward an effective way to apply HVAC energy-saving technology, which is hoped to help reduce building energy consumption.

Keywords: Building; HVAC; Skill technology; Application approach

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1 Introduction

HVAC plays an important role in the building, not only consumes a lot of energy, but also causes certain pollution to the surrounding environment. With the increasing environmental problems in the world, we should focus on strengthening the application of building HVAC energy-saving technologies, reducing the environmental energy pressure while reducing the building energy consumption, and thus promoting the long-term development of the construction industry.

2 The necessity of building application of HVAC energy-saving technology

2.1 The emergence of an energy crisis

With the rapid development of the world economy, the global environmental pressures are also increasing. The global resources are facing a crisis of shortage or even exhaustion, and the atmosphere causes serious pollution. Therefore, in the global initiative to propose energy conservation and emission reduction, while developing the economy, China should pay sufficient attention to environmental and energy protection. According to the actual use of energy in China at this stage, China's natural gas and petroleum energy are relatively scarce. At present, China's energy consumption is mainly based on coal energy^[1]. These energy sources are all non-renewable energy sources. In the face of extreme energy consumption, China must complete the issue of energy conservation and emission reduction as a key task. The construction industry is the pillar industry of China's economic development. In the process of development of this industry, we should focus on strengthening the application of HVAC energy-saving technology and reducing energy consumption. It can be seen that the application of HVAC energy-saving technology in the construction industry is imperative.

2.2 Environmental pollution is getting worse

The excessive exploitation and use of energy, the discharge of a large amount of waste gas and pollutants, has brought tremendous pressure on China's environment^[2-5]. The increasing energy consumption has caused the environmental pollution problems facing our country to become increasingly serious. China has

abundant coal energy. With the development of social economy, the consumption of coal energy is getting bigger and bigger, and the problems of air pollution and environmental damage are also intensified. Therefore, China should actively respond to the global energy conservation and emission reduction initiatives, while reducing energy consumption and achieving the goal of protecting the natural environment.

3 An effective way to apply HVAC energy-saving technology

3.1 Ensure the patency of the cooling water of the HVAC system

For the construction of HVAC systems, in the process

of operation, the cooling water system often has various failures, resulting in unnecessary energy waste, in violation of the worldwide initiative to promote energy conservation and emission reduction. Building HVAC systems operate for a long time and at the peak of HVAC systems during the relatively dense nights^[6]. If it is a public building, the HVAC system will enter the peak period during the daytime. The HVAC system will generate a lot of heat during the operation. If the HVAC equipment has poor heat dissipation performance and cannot be cooled in time, it will increase the operational burden of the system. The heat dissipation of the HVAC system relies on the cooling water system. As shown in Figure 1, once the cooling water system fails, it will have a serious impact on the normal operation of the entire HVAC system.

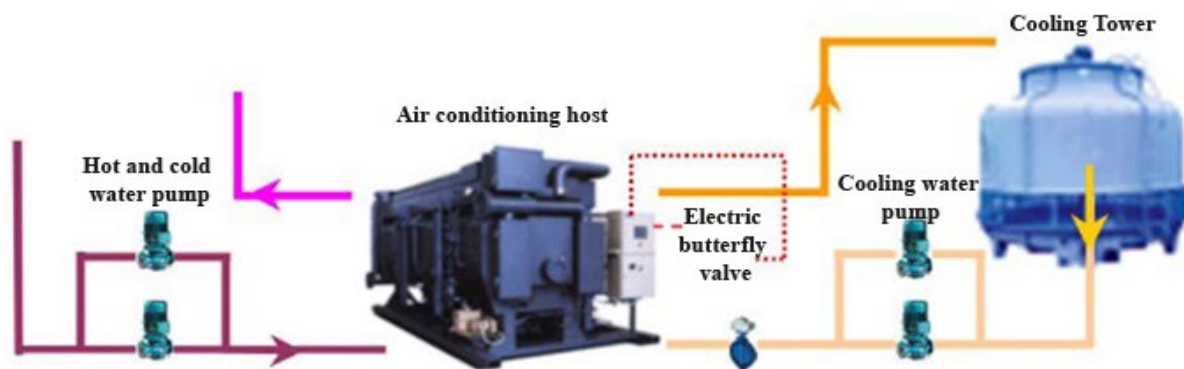


Figure 1. HVAC cooling water system

Therefore, before designing a HVAC system, a comprehensive survey should be conducted on the actual construction site to comprehensively understand and master the structure of the building and the demand for HVAC function, and as an important basis, rationally locate the cooling water pipe of the HVAC system^[7]. During the installation of the cooling water pipe, sufficient attention should be paid to the water temperature and water pressure, the quality and specifications of the cooling water pipe should be strictly controlled, and the heat resistance and corrosion resistance of the pipe should be paid attention to ensure stable operation of the entire HVAC system. In addition, designers should also recognize the impact of water quality on the cooling water circulation of HVAC systems and avoid the problem of blockage of cooling water pipes. It is also necessary to strengthen the monitoring of the quality of cold water. Once the water quality is

unqualified, it must be dealt with in a timely manner. At the same time, the cooling water pipeline is regularly maintained and repaired, which lays a good foundation for the smooth application of HVAC energy-saving technology.

3.2 Strictly control the noise pollution of HVAC systems

Building HVAC systems will cause a certain degree of noise pollution during the operation. Whether it is public building or civil building, the noise pollution will have a serious impact on people's quality of life, which is contrary to the concept of environmental protection^[8]. Therefore, in the process of applying HVAC energy-saving technology, we should pay attention to strengthening the strict control of noise pollution in HVAC systems, and optimize the noise generated in the operation of HVAC systems from various aspects. See Table 1 for specific measures.

Table 1. Measures to control noise pollution in heating and air conditioning systems

Measures	Specific contents
Strict quality control of HVAC equipment	(1) During the installation process, ensure the stability of the installation of HVAC equipment, and avoid noise pollution caused by the quality of the equipment and the unreliable installation. (2) For the position where the noise is difficult to avoid, the installation of the spring damper can be used to prevent the equipment from colliding and generating noise, and solve the noise pollution problem in the operation of the HVAC system from the source.
Installation of noise absorbing materials	In the HVAC system room of the building, the noise can be absorbed by the installation of sound absorbing materials to prevent the noise from spreading and avoid affecting the quality of life of the people around.
Regular inspection of fans and water pipes in HVAC systems	Water pipes and fans are the most common places where HVAC systems generate noise. Therefore, relevant personnel must regularly check the fans and water pipes of HVAC. If there is any potential failure risk, it must be solved in time.

When installing the fans and water pipes of the HVAC system, the installer should install them in a reasonable position to ensure a scientific distance between the devices without any collision and friction and noise.

3.3 Dealing with water condensation in a timely manner

The structure of the building is generally complicated, and water condensation is likely to occur during the operation of the HVAC system^[9]. HVAC pipes are

generally hidden inside the stairs of buildings. Under the interference of multiple factors, water condensation problems are easy to occur. If the external temperature suddenly drops, water condensation will occur. As the temperature decreases, the water condenses. The problem will also increase, which will have a serious impact on HVAC systems and even buildings. Therefore, in the process of applying HVAC energy-saving technology, the problem of water condensation should be dealt with in a timely manner. See Table 2 for specific measures.

Table 2. Measures to deal with water condensation problems

Measures	Specific contents
Optimize HVAC pipeline design	Conduct on-the-spot investigation of construction projects, according to the actual needs of the building, rationally design the angle, length and slope of the HVAC system pipeline to ensure timely discharge of water.
Ensure a tight connection between the pipes	(1) During the process of installing HVAC system management, it should be ensured that the joints between the pipes are tightly coupled. (2) Focus on checking the interface of each pipeline. Once the problem of water condensation is found, the installation of the water seal device should be carried out at the interface position of the pipeline to prevent the problem of water condensation.
Strict control of the insulation of piping materials in HVAC systems	Do a good job of thermal insulation of cooling water pipes and ducts

In addition, the sealing of the HVAC system piping should be checked regularly, and the insulation layer should be placed outside the pipeline to avoid cracks and damage on the pipeline, and to maintain the insulation and sealing of the pipeline.

3.4 Reasonable planning and layout

Under normal circumstances, in order to achieve the goal of energy saving and emission reduction of HVAC systems, some renewable natural resources, such as wind energy and solar energy, should be used reasonably to lay a good foundation for the application of HVAC skills^[10]. In the process of utilizing these

renewable resources, the actual situation of the building structure should be fully considered, and the HVAC system should be planned and laid out reasonably. This also puts higher requirements on the designers of HVAC systems. Therefore, HVAC energy-saving technicians should strengthen communication with designers to achieve reasonable and effective application of natural resources such as wind and solar energy. In addition, in the process of applying HVAC energy-saving technology, we should also strengthen the understanding of the energy consumption of HVAC systems, including the heat and cold loss of HVAC systems, and ultimately achieve the goal of energy

saving and emission reduction.

3.5 Energy-saving design of building heating and air conditioning system

The primary problem in the energy-saving design of building heating and air conditioning systems is the reasonable choice of interior design temperature. Through the interaction of indoor and outdoor conditions, maintenance structure and heating and air conditioning equipment, the rational and ingenious design can meet the energy-saving technology of heating and air-conditioning technology, and achieve the purpose of energy saving on the basis of ensuring the comfort of the indoor environment. According to relevant practice, in the summer, the energy consumption will increase by 8% for every one degree Celsius drop in indoor temperature, and the energy consumption will increase by 8% for every one degree Celsius increase in winter indoor temperature. If the temperature difference between indoor and outdoor is too large, it is easy to feel uncomfortable, and the relatively ideal temperature difference is about 6 degrees Celsius. In the process of designing a building heating and air conditioning energy-saving system, it is necessary to calculate the cooling load of the system item by item in detail, and select the host of the heating and air-conditioning system according to the accumulated maximum value never by calculation, only based on the estimates in the design manual. Once there is a large deviation in the estimated value, the system pipe diameter is too large; the end equipment is too large, etc., which will result in waste of energy.

3.6 Strengthening the control of the delivery and return air system of the building HVAC system

At present, China's construction is often used in the intermittent operation of heating and air conditioning. If you want to make the indoor temperature reach a preset, it needs a certain process. Therefore, in this part, the heating and air conditioning system can be preheated or pre-cooled to close the fresh air, so as to ensure that the system can quickly reach the set temperature. After each use, the wind circulation system and the water circulation system need to be shut down, so that the temperature in the room is naturally slowly adjusted back, so that the purpose of reducing energy consumption can be achieved. For some equipment that needs to run for a long time and some large air-

conditioning systems, it is necessary to achieve energy-saving effects through the application of frequency conversion technology.

4 Conclusion

In summary, in the face of the global energy crisis and serious environmental pollution problems, we must focus on strengthening the application of HVAC energy-saving technology in the construction industry. HVAC energy-saving technology has the important advantages of economy, environmental protection and convenient operation. It can be seen that the application of HVAC energy-saving technology in the construction industry is very important for the development of the construction industry and environmental protection, reducing energy consumption. Therefore, it is necessary to strengthen the patency of the cooling water of the HVAC system, strictly control the noise pollution of the HVAC system, timely deal with the problem of water condensation, reasonable planning and layout, so as to achieve the purpose of reducing energy consumption and environmental protection.

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