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Discussion on design of building electrical supply and distribution lines

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ABSTRACT. *The design of power supply and distribution lines in building electrical is a systematic work. In order to improve the design level of power supply and distribution lines, this paper starts the design of electrical supply and distribution lines for buildings, discusses the current supply and distribution lines design in China, and analyzes the electrical construction of buildings. Design problem, based on the design principle of power supply and distribution lines in building electrical, proposes the design method of power supply and distribution lines.*

KEYWORDS: *building electrical; power supply and distribution lines; design*

1. Introduction

With the gradual acceleration of China's economic construction and development, population policy adjustment, infrastructure construction increased investment[1], investment in urbanization construction is also increasing, and the consumption of power resources is gradually increasing. In order to promote the simultaneous development of energy conservation and environmental protection issues in urban economic development, research on the design of electrical power distribution lines in construction projects has become necessary and the degree of emphasis has gradually increased.

2. China's power supply and distribution line design

With the accelerated development of China's economic construction, people's living conditions are getting better and better, and the consumption of power resources is getting bigger and bigger. As the industry with the largest power consumption in China at this stage, the importance of energy-saving design research in building electrical engineering[2]. It goes without saying that it is also obvious to help reduce the annual consumption of electricity resources in China. The reduction of the consumption of power resources will not only reduce China's economic investment, but also bring more economic benefits to China, thus promoting the healthy and rapid development of China's economy, and it is also essential to reduce global environmental problems (such as the current global The greenhouse effect problem plays a key role in the protection of the Earth's natural resource

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environment. Therefore, attention should be paid to the attention to energy conservation work in the construction and construction of building electrical, and thus the effective use of electrical resources should be improved to promote the good development of China's construction industry.

3. China's building electrical design issues

At this stage, all areas of China's construction industry have applied energy-saving technologies for building electrical supply and distribution lines, which promoted the sustainable development of China's construction industry. Although with the gradual improvement of China's scientific and technological development level, the energy-saving design of the building electrical supply and distribution lines is more and more perfect[3], but due to the influence of various factors, the electrical supply and distribution lines of the construction project still exist in the design process. There are many problems: First, as the most populous developing country in the world, China's technology for designing electrical power distribution lines in construction projects is not very mature. Because the construction industry has not learned the world's advanced energy-saving technologies, It can only be limited to existing technologies, hindering the improvement and optimization of building electrical design. Second, most construction companies in China lack the propaganda for energy-saving construction technology, which has led to the fact that the relevant staff and most of the residents in China have little understanding of the energy-saving design of the building electrical supply and distribution lines, which hinders the housing. The work of electrical energy saving design is carried out.

4. 3. Design principles for building electrical power distribution lines

4.1 Economic benefits

In the design process of electrical power supply and distribution lines for construction projects, energy conservation cannot be pursued blindly[4], but the consideration of economic benefits is neglected, and the consideration of the amount of funds invested is considered, so the relevant building electrical designers are carrying out design work. At the time, according to the actual situation of the construction project, the materials used in the design of the electrical supply and distribution lines of the construction project and related equipment should be fully considered, and then scientifically and rationally selected and applied to maximize the economic benefits. .

4.2 Functional requirements

The functional requirements of the building are reflected in many aspects. For example, the air conditioning of a building has a certain influence on the air volume, so it should satisfy the satisfaction of the hotel, the shopping mall and various

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entertainment places to meet certain conditions of comfort; Since the unit has special requirements for electric power, such as high reliability of power supply, it must first meet its functional requirements. It cannot be considered only for the development of energy-saving work, that is, it should ensure that the basic requirements of the power supply of the building are met and then corresponding Energy saving work.

4.3 Energy efficiency

In the design of electrical power distribution lines for construction projects, the most important point is that for the work of reducing energy consumption, the relevant electrical designers in the process of design work, the relevant equipment energy consumption situation should be detailed Understand, in order to give appropriate energy-saving design according to the specific conditions of the house[5], take scientific and reasonable measures to reduce consumption. In the design of electrical supply and distribution lines for construction projects in China, there are many waste phenomena, such as energy loss in the transmission process of power supply and distribution lines, and power and energy consumption of transformers. Therefore, electrical supply and distribution in construction projects In the process of designing electric circuits, it is necessary to fully consider the efficiency of energy utilization and ensure the smooth development of energy conservation work.

5. Design method of building electrical supply and distribution lines

5.1 electrical classification design

In the daily life of modern people, there are many types of building electricity. Before designing the system for power supply and distribution, it is necessary to design for the normal use requirements, and to ensure the effectiveness of the overall design. When designing electrical supply and distribution lines for buildings[6], it is necessary to comprehensively analyze the types of electrical appliances, and choose a design with high stability to ensure that all electrical equipment can meet the requirements of operational stability, thus effectively ensuring electrical equipment. Safety and stability during operation, no safety accidents will occur.

5.2 shunt power supply design

Because there are a large number of high-load electrical equipment inside the building structure, the power supply and grounding requirements are affected by the load size. Therefore, it is very necessary to provide shunt power supply. For example, a fluorescent lamp in a lighting circuit is a kind of non-linear load, and an electrical device may also have a harmonic state due to an operating state during daily work. For example, a power supply device with a relatively large load such as

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a computer room should be designed independently when designing the line, and an uninterruptible power supply should be used, so that the problem of unexpected power failure can be eliminated. When designing large-scale building power supply and distribution lines, centralized control devices should be installed to effectively reduce power loss.

5.3 line design

According to the current actual situation, the buried type is the main mode of the current power supply bus. Because there is a direct impact between the load and the transportation, it is necessary to analyze the specific conditions of the load from various aspects and select the appropriate bus power supply mode. The shunt power supply is implemented in combination with specific application conditions, and different wires are selected to supply power to the electric appliance. Eliminate unexpected problems by choosing reasonable measures to avoid sudden power outages and avoid unnecessary effects and losses. Finally, in the structure of the building, a dedicated power distribution room should be arranged in the area where the electricity is concentrated to control the power distribution system, so as to achieve scientific and reasonable control to reduce the power consumption.

5.4 power factor design

If the natural factors of the system in the whole operation of power supply and distribution and the requirements of accessing the power grid cannot meet the requirements of consistency, in order to comprehensively improve the system power factor, the method of reactive power compensation is generally applied, which can reduce energy consumption. (1) In the system design, in order to improve the system power factor, it is necessary to select suitable equipment to reduce the reactive power loss. (2) Reactive power compensation device installation. At present, the main application of civil buildings in China is the centralized setting compensation of the low-voltage side of the transformer. Although it can be improved to a certain extent, it cannot eliminate this problem, but only reduces the reactive power transmission in the high-voltage line. However, the low voltage transmission of the transformer in the system to the busbar does not achieve reactive power compensation, and the energy saving effect of the system cannot be guaranteed.

5.5 Grounding design

In the design process of the building electrical system, the grounding system design is the main consideration, because it is an important factor that can directly affect whether the power supply system can meet the reliability and safety. Establishing a scientific and reasonable grounding system can ensure the safety of the electrical system during operation, and at the same time ensure that the electrical equipment can work normally. More critically, the grounding system ensures that some precision equipment and systems such as computers are in optimal working

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condition, improving the safety and stability of the system operation, and eliminating the electromagnetic interference problems of external systems.

6. Conclusion

With the increase of energy consumption and the shortage of energy reserves, the design of power supply and distribution lines in China's construction industry should continue to improve and innovate in the energy conservation and efficiency with the development of the times, thus promoting the development of the construction industry. The design of the electrical and distribution system of building electrical should be considered from many aspects to ensure the safety of the system design.

References

[1]Omer A M(2016). Sustainable Energy Development and Environment. Research Journal of Environmental and Earth Sciences, vol.2, no.2, pp.21.
[2]Facta M , Hermawan(2016). Interconnection of hydro power plant through 20 kV distributed line to improve electrical power supply in Dieng Central Java, IEEE International Conference on Information Technology.
[3]Honda H, Hongo Y, Kado H, et al(2016). Mechanism of pole-mounted transformer damage by backflow lightning and measures against the damage on low-voltage distribution line. Electrical Engineering in Japan, vol.171, no.2, pp.1-11.
[4]Kikuchi T, Yoshimi M, Hikosaka T, et al(2015). Analysis of one-line ground fault surge on simulated overhead distribution line. Electrical Engineering in Japan, vol.118, no.1, pp.52-60.
[5]Yu Z, Zhu T, Wang Z, et al(2016). Calculation and experiment of induced lightning overvoltage on power distribution line. Electric Power Systems Research, no. 139, pp.52-59.
[6]Gang L, Yu X I, Jun T, et al(2014). Influence of Triggered Lightning of High Voltage Overhead Transmission Lines on 10 kV Overhead Distribution Lineês Lightning Trip Characteristics. High Voltage Engineering, vol.40, no.3, pp.690-697.