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Research on whole process quality management and supervision on photovoltaic power station

WU Feng-hua, WEI An, HE Fa-lin
(Shenyang City University, Shenyang, 110179)

Abstract: In China, renewable energy has been developed and utilized for recent years so that the photovoltaic (PV) power is replacing other kind of energy instead of appending them. With the PV power stations spread rapidly, their quality becomes a serious problem since more and more accidents happen. As a complex system engineering, PV station comes into being through the schedules of scheme design, material procurement, engineering construction and operation. Quality accident may derive from any of these stages where lack scientific and strict management. Thereby, the complete process quality management becomes an urgent problem to all of the PV industries. This paper presents a management and supervision method for whole process quality of a large-scale PV station constructed by Zonergy Co., Ltd. The remarkable effect has made this case a benchmark for the whole enterprises.

Key words: photovoltaic power station; quality problem; whole process; management and supervision.

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Big data on the influence of the cooling tower

ZHANG Li-xia; LIU Ming-tian
(Shandong Jianzhu university, Jinan 250100, China)

Abstract: With the rapid development of science, technology and engineering, in recent decades, research and application of the cooling tower has produced a large amount of data. Although it has formed huge amounts of data, there are a lot of inaccurate data. Data under different operating conditions, it is difficult to find the correlation between them. With the application of Big data analysis, The researchers can abandon useless information and find the correlation of a large amount of data. This paper first introduces the basis of large data and cooling tower, then analysis of the necessity of big data applications, finally showed the influence of big data to cooling tower.

Key words: big data; prediction; cooling tower

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Brief study of scenario analysis on energy saving planning in the industrial park

JIANG Hai-dong
(Foshan Energy Conservation & Emission Reduction Service Management Center Co. Ltd., Foshan 528000, China)

Abstract: Brief description of the content of energy saving planning in the industrial park and the method of scenario analysis applied to the energy saving planning of the industrial park. A general framework for calculating energy planning indicators, Scenario analysis on the trends in the evolution of new industrial project and energy saving project to introduce the different development way, quantitative prediction by specific index calculation, so as to formulate scientific and rational energy conservation plan.

Key words: scenario analysis; scenario analysis; industrial park

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Analysis of energy saving effect of recovering building exhaust air by using CO₂ air source heat pump

HUANG Kai-liang, BIAN Jiang, FENG Guo-hui
(Shenyang Jian Zhu University, Shenyang 110168, China)

Abstract: with the residents' increasing attention on the indoor environment, some of the northern building started using machinery haze air system, and take the form of natural exhaust way. A lot of available potential energy was included in the exhausted air. To understand exhaust recycling of construction energy saving potential using CO₂ air source heat pump, the performance curves of CO₂ air source heat pump is measured and compared the COP difference of two kinds of heat recovery mode, namely the exhaust mixture of outdoor air and pure outdoor air low temperature heat source. The results show that the average value of COP increases by 17% when the exhaust air is mixed with the outdoor air as the heat source at low temperature. It can provide a stable domestic hot water for 24 hours and meet the needs of residents.

Key words: Exhaust air heat recovery; CO₂ air source heat pump; TRNSYS; Coefficient of performance

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Field synergy analysis of laminar convective heat transfer in flat plate channels with inner ribs

GUO Xun-hu, YUN He-ming, MA Fang-fang, et al
(School of Thermal Energy Engineering, Shandong Jianzhu University, Jinan 250101, China)

Abstract: In order to study the heat transfer enhancement performance of flat plate channels with inner ribs, three different geometric models of the inner ribs had been established. The numerical simulation of the heat transfer enhancement in flat plate channels with water as fluid had been carried out by using CFD techniques. The velocity field, pressure field and temperature field of three models had been obtained at the condition of laminar flow and constant Reynolds number. Based on the principle of field synergy, the synergistic effect of velocity and temperature gradient and the synergistic effect of velocity and pressure gradient were analyzed and compared.

Key words: Inner ribbed plate channel; CFD (computational fluid dynamics); Numerical simulation; Coordination principle

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Study on the air pollutant emission regulation of the utility boiler outside area variation

WANG Shi-chang

(Energy, Power and Mechanical School, North China Electric Power University, Beijing, 102206)

Abstract: On the basic structure data of 60 utility boilers, this paper calculates the outside area of the utility boilers, including the secondary air duct area, and analysis the heat release, power supply coal consumption and the SO_2 , NO_x , Hg and flue gas dust emission regulation caused by the outside area variation. The calculation reveals that, based on the average outside area of the four tangential burner and opposite burner arranged II type pulverized coal fired boiler, (1) "Back-to-Back" arrangement oil fired boiler reduce the utility boiler outside area, W shape flame, lignite burnt and tower shape PCB increase the utility boiler outside area, the CFB boilers have the largest outside area, H shape CFBB has the bigger outside area than the M shape CFBB. (2) Larger the outside area, larger the power supply coal consumption increment, CFBB has bigger intensity of the power supply coal consumption increment than PCB. (3) Larger the outside area, greater the air pollutants increment coming from the utility boiler outside area.

Key words: Utility Boiler; Outside Area; Heat Release Increasing; Power Supply Coal Consumption Intensity; Air Pollutants Increment

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Effect of chemical water supplement on thermal economy of thermal power plant

WANG Yu-tian, HUANG Zi-hao, WANG Jiong

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Abstract: In the actual operation of thermal power plant, the chemical water must be added to the thermodynamic system. There are two common ways of water supply; first, the chemical water enters the system through the condenser; secondly, the chemical water enters the system from the deaerator. In this paper, the effect of two different ways of water supply on the thermal economy of the power plant was analyzed by using the equivalent enthalpy drop method, which is an example of a N25-35 thermal power system. The theoretical calculation results show that the energy efficiency of water from the condenser into the thermal system is better than that from the deaerator into the system, its thermal efficiency was increased by 0.16223%, coal consumption fell by 0.796 g/kW·h, a year can save standard coal 149.25t. The conclusion of this paper has certain guiding significance for the design of power plant thermodynamic system.

Key words: Thermal system; The equivalent enthalpy drop method; Extraction equivalent enthalpy; Thermal economy; Energy saving

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Experimental design of air temperature field in high building atrium

WANG Lin, YU Jin, HAN Chao

(School of Municipal and Environmental Engineering, Shenyang Jianzhu University, Shenyang 110168, China)

Abstract: Objective to design an experimental method for measuring the temperature field of the vertical direction of the atrium of public buildings. Methods using the atrium under winter conditions as the ex-

perimental object, the temperature change of 1.5 meters in the atrium 24 hours a day was measured. Results the lowest temperature was 7°C, and the temperature was the highest. According to the energy-saving design standard, the winter heating design of the library hall should reach 18°C, and only 5 and 6 levels will appear briefly at about 14:00 in the afternoon, higher than 18°C, reach the standard temperature. Conclusion the trend of temperature in the vertical direction of the atrium in winter is investigated, and the reference scheme is provided for the researchers to measure the winter heating temperature in the atrium.

Key words: tall atrium; winter condition; temperature field; experimental design

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The reformative repairment of Boiler Air Preheater and Auxiliary Equipment

ZHANG Yong-wang

(Hebei Steel Xuanhua Steel, Equipment energy division, Xuanhua 075100, China)

Abstract: Through the research and analysis of the leakage and leakage of the air blower and auxiliary equipment of the boiler air preheater and the auxiliary fan, the corresponding solutions are put forward, and the air preheater leakage and induced draft fan and blower are realized. Bearing the purpose of oil spills, boiler operation stability can be improved.

Key words: Air Preheater; Auxiliary Equipment; Reformation

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Analysis of defect Inspection and eliminating method for pressure vessel

ZHAI Kun, GAO Ming-fei, DONG Chang-wei, et al

(North China University of Science and Technology, Tangshan 063210, China)

Abstract: The pressure vessel under long time running will appear all sorts of defects in the failure environment. It is required to do a scientific test in order to find the existence of these defects for pressure vessel. A chlorine gas tank was taken as an example to conduct a comprehensive inspection on it. The defects was found and analyzed of existed reason. Solving measures and methods were put forward to eliminate the defects. The results can provide theoretical basis and technical support for a long time, safe and stable operation for pressure vessel.

Key words: pressure vessel; damage model; inspection methods; defect analysis; elimination

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Application analysis between diesel generator and natural gas engine in data center

SHEN Jian-feng, MAO Yu-hai, XIANG Bing, et al

(Jiangsu Sunpower Piping Technology Co. Ltd., Nanjing 211112, China)

Abstract: This paper analyzed the differences between diesel generator and gas engine in combination with the load demand and fuel properties of data center. In addition, the feasibility of transformation of diesel generator using natural gas as fuel was discussed.

Key words: data center; diesel generator; natural gas engine

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