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Abstract:In order to investigate the effects of the stirred ball mills method to disintegrate the excess sludge,Glass beads,quartz sand and building sand were chose as the ball milling material. A set experiment were conducted to research the change of particle size distribution,dissolved chemical oxygen demand, nucleic acid and ammonia nitrogen concentration of excess sludge under different time, the size of ball milling and the ratio of ball milling, using rotary vane type tissue crushing machine. Research results showed that stirred ball milling was an effective method to disintegrate the excess sludge,and effects of the addition of ball milling material was better than that of without ball milling material. From the perspective of reducing energy consumption,the best disintegration time of the three kinds of ball milling materials were 15minutes;when the quality of grinding beads and time were constant,the best particle size of quartz sand to disintegrate the sludge was 1 ~ 1.43mm;and the best ratio between quartz sand and sludge was 1:12g/ml.

Key words:excess sludge;stirred ball mills method;sludge disintegrating;ball milling material;SCOD

Abstract:In order to solve the environmental air pollution problem, we have to better know air pollutant dispersion rule and pollutant condition. This paper makes a review of atmospheric pollutant dispersion model and research progress. Air dispersion model is a physical and mathematical model to research on transportation and dispersion problems of air pollutant in the air (mainly in the boundary layer). Starting with the classification and developmental stage of atmospheric diffusion model,then it discusses Lagrange model,Euler diffusion model, box model,Gaussian plume model and puff model,finally analyzes the advantages and disadvantages of atmospheric diffusion model.

Key words: air dispersion model;Lagrange model;Euler model; plume model;puff model

Abstract:Take a highway tunnel as the research object and based on Fluent simulation,this paper analyses the effect on the temperature,the oxygen concentration and the carbon dioxide concentration in the different water mist working condition,which fire in the water directly, spray cone angle of 60 degree and $100\mu m$ diameter. The results show that water mist has a better effect on fire suppression. When there is no mechanical exhaust, small mass flow of water mist (0. 1kg/s) can have a good effect on fire suppression,increase the quality (0. 2kg/s) will further accelerate this effect. When mechanical exhaust and water mist start at the same time,because the momentum of small mass flow rate of water mist (0. 1kg/s) is not able to overcome interference and drift caused by smoke exhaust, the function does not work well,and the temperature is obviously higher than the same mass flow rate of water mist without smoke exhaust. Water mist and smoke exhaust can be optimal coupling when adding mass flow rate of water mist (0. 2kg/s) ,which develops best fire extinguish,at the same time,high temperature flue gas excludes.

Key words: highway tunnel;water mist;smoke exhaust;numerical simulation

Abstract:A hydro-dynamics characteristics calculation model of supercritical pressure boiler was developed. According to the principle of equal working fluid temperature at outlet, the throttle compensating pressure drop was first numerically designed and the vertical water-wall hydro-dynamics characteristics of 2 953t/h supercritical pressure boilers were then numerically investigated. The results show that it is reasonable to design the throttle pressure drop of water-wall inlet with 50% boiler maximum continue rate (BMCR) for reference. This makes every load of the circuit characteristic tend to be ideal circuit characteristics,and the distribution of working fluid temperature at outlet becomes more uniform. The thermal difference is small and the metal temperature remains appropriate at normal working conditions. For weakly heated circuits, the gravitational pressure drop forms a greater part of the total pressure drop than the frictional pressure drop. However for heavily heated circuits,the frictional pressure drop is larger than the gravitational pressure drop,making forced circulation inevitable. The highest tube wall temperature at 100% BMCR is 497℃ , lower than the specified tube temperature of 580℃ ,suggesting that the reliability of the boiler unit can be ensured.

Key words: supercritical pressure boilers;vertical water-wall;hydro-dynamics;mass flow distribution;temperature distribution

Abstract:To study indoor thermal environment and thermal comfort

status of university dormitories in spring, the filed experiment and questionnaire methods were used to investigate the indoor thermal environment parameters in 14 university dormitories in spring in Lanzhou and a total of 181 effective questionnaires were collected. And then, the statistical method was used to analyze the data. The results show that 1) the mean clothes insulation for the students is 0. 689clo in spring, and 90. 1 % of the students considered their thermal conditions acceptable when the average indoor air temperature is 20. 4 ℃ ; 2) The measured and predicted thermal neutral temperature are 17. 8 ℃ and 19. 8 ℃ respectively, and the preferred temperature is 18. 7 ℃ ; 3) The operative temperature range corresponding to the thermal acceptability by 80% of the students is 17. 7 ~ 22. 1 ℃ , and the lower limit of thermal acceptability obtained via indirect investigation in Lanzhou is 3. 2 ℃ higher than that of Xi'an. This results can provide references for the controls of indoor environment and establishing the thermal comfort criteria of university dormitories in the future.

Key words: university dormitories; thermal environment; thermal comfort; thermal sensation; field experiment

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Numerical simulation of aerodynamic characteristics of Darrius wind turbine integrated with building

WANG Hao-peng, WANG Jun-qiu, ZHANG Wei, et al
(School of Civil Engineering and Architecture, Southwest University of Science and Technology, Mianyang 621010, China)

Abstract: Wind energy application in building has become a hot spot of research. Without considering the connecting rod and tip loss, this paper carries on the numerical simulation of two-dimensional model of wind turbine and the building integration of 6 m/s ,9 m/s and 12 m/s respectively in flow velocity, and1 ,2,3,4, and 5respectively in tip speed ratio, by using the slide mesh technology and SST k-ω turbulence model. The paper analyzed the impact of different flow velocity and different tip speed ratio on force wind turbine utilization characteristics and energy efficiency. The change of torque and energy efficiency with the tip speed ratio is summarized. The research shows that: When tip speed ratio equals to five, the average power coefficient of wind turbines is minus or close to zero in low flow velocity. However, the average power coefficient of wind turbines is relatively high in higher flow velocity. In low flow velocity, the best working parameter of the wind turbine of No. 2 and No. 3 is about 2.

Key words: building; slide mesh technology; turbulence model; tip-speed ratio; average power coefficient

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Construction and application of energy saving business in power grid corp

ZHOU Li, LIU Hao, SU Shi-jie, et al
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Abstract: In response to the call of the country's energy-saving emission reduction policies, power grid Corp actively explore to the contract energy management model implementation of internal energy-saving technological transformation, through collaborative and efficient internal and external combined, straighten out the management of energy-saving projects, the implementation of business norms, the development of electric power energy-saving service market. Power grid transformation project to explore the implementation of this model, has made tremendous economic and environmental benefits, and promote the healthy development of energy-saving business.

Key words: contract energy management; energy-saving power grid; energy-saving technical services

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Simulation design and engineering practice of factory lighting

FENG Zhan-guo
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Abstract: At present, we often use a simple estimate during lighting design in engineering projects which is in a large random without scientific computing. The choice of lighting fixtures' efficiency is more blindly or mechanically, which easily lead to electric energy waste. In this paper, combined with the thin strip continuous casting demonstration plant lighting design using Dialux simulation software, try to get a more accurate calculation of the intensity of illumination, both to ensure that the lighting and energy saving effect, but also more economical to determine the cost of lighting.

Key words: lighting design; dialux; simulation of lighting effects; thin strip continuous casting plant

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The design and implementation of metal valve calculation system

LIU Feng, JIN Zhang-min, SHEN Zhi-bin, et al
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Abstract: From two aspects of design and inspection, in the use of advanced network service platform, the metal valve calculation system is developed to design and inspect valves for valve manufacturing enterprises and inspection departments. The calculation is on the basis of national standards and the results accord with the relevant national and industrial standards. It can provide the valve design personnel or inspection personnel with the calculation process and detailed results of design, analysis and verification, and give feedback to the user in the form of electronic documents. The system combines the database, standard computerized calculation program, valve design specification of automatic generation, user management, remote management system, online charging and other functions. The system can improve design efficiency, reduce cost, and provide support for the later inspection and performance support.

Key words: design of valve; check; verification; calculation system

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Application of variable frequency and speed in energy saving transformation of water pump

YUE Li-fang, HAN Yi-jie
(Department of Civil Engineering TangShan Unisersity, TangShan 063000, China)

Abstract: In view of the high energy consumption of the constant speed operation of desalinized water pump in a cold rolling plant, energy saving reconstruction scheme for water pump is analyzed and compared, To reduce energy consumption and achieve variable flow water supply, frequency converter is added on the original power frequency control system of the pump. The power saving effect is significant by comparing the pump before and after the operation of economy.

Key words: water pump; energy saving transformation; variable frequency and speed; conceptual analysis

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