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Feb. 2016 Vol. 35, No. 2 Total Issue No. 401

Study of thermoelectric power generation technology driven by marine diesel engine waste heatXIONG Bing, CHEN Lin-gen, MENG Fan-kai, et al
(China Satellite Maritime Tracking and Control Department, Wuxi 214431, China)

Abstract: For the characteristics of waste gas heat of marine Diesel engine, a finite time thermodynamic model of two-stage thermoelectric generator with air-cooling device driven by waste gas heat of marine Diesel engine is established. Thermal resistance distribution and temperature variations along the flow passage are obtained. In the case of the temperatures of heat reservoirs change over flow passage, the effects of heat source parameters and module parameters on the power output per-area and efficiency are derived. The results show that waste gas temperature drops 30°C per meter and the maximum power-per-area of are available for waste gas heat of marine diesel engine of 350°C.

Key words: waste gas heat of Diesel engine; waste heat recovery; two-stage thermoelectric generator; finite time thermodynamics

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Simulation analysis and optimization of the effect of Diesel Particulate Filter fuel injection rate on the regeneration temperatureDENG Wei, SUN Hou-huan
(School of Mechanical and Power Engineering, Nanjing University of Technology, Nanjing 211816, China)

Abstract: The wall flow honeycomb ceramic as filter material, we adopt renewable fuel injection method to solve the particle emission in diesel engine after treatment. Regeneration temperature of Diesel Particulate Filter (DPF) internal impact caused by the internal temperature of the filter is difficult to achieve uniform, easy to cause thermal stress damage. The results showed that in the Diesel Particulate Filter (DPF) fuel injected regeneration process and injection rate on the DPF internal temperature does not have a significant effect. Increasing fuel injection rate can increase the burning power, but the fuel injection rate is increased, the oxygen content in the exhaust gas is reduced, and the combustion efficiency decreases. This need to increase the oxygen content in the exhaust to increase.

Key words: diesel; Diesel Particulate Filter (DPF); fuel injection assisted-regeneration

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Simulation study on expert PID control of aeroderivative gas turbineWU Sen, SUN Feng-hua
(Naval Consumer Representative Office of Engine in Shenyang, Shenyang 110006, China)

Abstract: Aeroderivative gas turbine is a very complex control object. The application fields of Aeroderivative gas turbine is expended gradually, and the cascade control scheme is used usually. But when

the gas turbine is used in ship power, industrial power generation, etc, for loading disturbance, conventional cascade control is difficult to achieve the ideal control effect. In this paper, the control performance simulation of the cascade control and the expert PID control is studied, when the gas turbine is under the condition of large load disturbance. The simulation results show that, expert PID control has better performance than cascade control.

Key words: aeroderivative gas turbine; cascade control; expert PID control

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The improvement for rural area heating based on counter balance thermal efficiencyLI Hao-ran, GAN Jun-wen, ZHENG Guang-hua, et al
(Northwestern Polytechnical University's Base of Energy-saving, Xian 710129, China)

Abstract: Using the theory of counter balance thermal efficiency which is designed mainly for industrial boiler, do some research on the heating system in rural area with showing some reasons for thermal efficiency loss, providing with formulas about rural heating system thermal efficiency calculation. Based on a certain 45kW rural area heating system, test its thermal efficiency and analysis several design factors which influence its efficiency. The results shows that there are four key factors decide the heating thermal efficiency, which are exhaust gas temperature, cooling area, the amount of fuel, coal leakage rate respectively.

Key words: rural area heating; counter balance thermal efficiency; thermal efficiency loss; efficiency calculation

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The program design of gas waste heat recovery in steel reheating furnaceWANG Peng-fei
(WISDRI (Wuhan) WIS Industrial Furnace Co. Ltd., Wuhan 430223, China)

Abstract: The program design of moderate and low temperature gas waste heat recovery is introduced. Major particulars which need calculated and noticed are pointed out. The economic and social benefits are analyzed on the program design of gas waste heat recovery's implementation. Similar heat recovery projects can borrow ideas from the program design.

Key words: gas waste heat recovery; program design; benefit analysis

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Application of steel slag desulphurization in FGDYIN Ning
(Baogang Group Design & Research Institute, Baotou 014010, China)

Abstract: Through the application of Steel Slag Method in the design example. This paper showed that the technology of steel slag flue gas desulfurization was a safe, reliable, low cost, high efficiency, environmental protection and economic benefits. The successful experience of project construction provides a scientific basis for the promotion of the green recycling of steel slag and the technical progress of the flue gas desulfurization industry.

Key words: FGD; Steel Slag Method; benefit analysis

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Simulation and analysis of energy consumption of a commercial building in the cold areaFENG Lu-fei, WANG Sen, NIU Dong-yang, et al
(School of Energy and Environment Engineering, Hebei University of Technology, Tianjin 300401, China)

Abstract: Energy consumption of the air-conditioning system of a typical commercial building in the cold area was simulated and ana-

lyzed using the software Energy Plus. Results showed that the average electricity consumption was 155.97 kWh per building floor area, of which the air-conditioning system, lightning and elevator occupied the percentage of 41.7, 28.9 and 29.4, respectively. For the air-conditioning system, fans and chillers occupied the percentage of 66.7 and 24.5, respectively. In summer, the electricity consumption of the air-conditioning system varied greatly with operating months, compared with the lightning and elevator. The electricity consumption of fans varied greatly with operating months, compared with chillers.

Key words: cold area; commercial building; energy consumption; energy-saving retrofitting

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Impact of widow style on indoor natural ventilation

PAN Bo-wen, ZHENG Weng

(Guilin University Of Electronic Technology, Guilin 541004, China)

Abstract: The windows style has important influence on indoor natural ventilation. Simulating and analyzing the natural ventilation of the typical family of a residential district in Nanning, we achieved the two window style's influence on indoor natural ventilation, providing a reference and basis for region's natural ventilation design.

Key words: window style; natural ventilation; numerical simulation

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The influence factors analysis of heating energy consumption of residential buildings in Lanzhou Area

LUO Chong-lai, LI Yan, LIU Yan-ju

(Lanzhou Jiaotong University, Lanzhou 730070, China)

Abstract: In order to study the influence factors of Lanzhou area residential buildings of heating energy consumption, under the premise of envelope parameters in full compliance with the current national cold region residential buildings energy-saving efficiency requirements, regarding Lanzhou city two residential buildings as benchmark models, using DeST-h software to calculate the heat load in all heating season, analyzing the window-wall ratio, shape coefficient, towards of three factors effect for the all heating load, the main conclusions of the calculations are follows: the Lanzhou area 30 degrees west of south towards compared 30 degrees east of south towards and due south towards of the total heat load are minimum, but the maximum thermal load are maximum, so the South West building heating regulation is energy-saving measures. The south wall of concave residential buildings are not suitable to estimate the heat load by area thermal index method.

Key words: heating energy consumption; DeST-h; window-wall ratio; shape coefficient; towards; solar radiation; heating regulation

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Performance analysis on different terminals of water source heat pump air conditioning system

LI Gang, SHE Can-ming, WANG Huan, et al

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

Abstract: Combined operating of two air conditioning system (water source heat pump terminal and fan coil; water source heat pump terminal and capillary network) running energy efficiency comparative study has been investigated by example of the air conditioning system in Liaoning hospital. Through experimental analysis, it is known that when heating the COP of water source heat pump and fan coil system is 2.72, the water source heat pump and capillary network system is 4.21; while cooling the COP is 5.82 and 7.78 respectively. Compared with combined operating system of water source heat pump and fan coil terminal system, the running energy efficiency of combined operating system of water source heat pump and capillary network terminal system is higher which reflect obvious superiority.

Key words: water source heat pump; capillary network; fan coil; operation energy efficiency

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Safety energy saving and reliability analysis of gas fired boiler using RSI nanostructured ceramic coating technology

PAN Jian-cheng, ZHANG Wei, LI De-wen

(Chengdu Special Equipment Inspection Institute, Chengdu 610036, China)

Abstract: In 2006 the United Nations development program (UNEP) environment in the Asia-pacific low-carbon guide pointed out that the current of furnace safety, high efficiency, energy saving, environmental protection is the most effective and most valuable solutions for heating pipe and lining application of nanostructured ceramic coatings. Nanostructured ceramic coatings can be the least money and improved the performance of the boiler and to reduce nitrogen oxide emissions, is a high ratio of furnace safety technology of energy conservation and environmental protection. Our city medium and small industrial boiler is numerous, but did not see the technology in local application reports. In this paper the city one gas boiler RSI trace analysis of rare earth nanostructured ceramic coatings application cases, discusses and analyzes the problems existing in the technology application in WNS gas boiler, for the application of this technology in small industrial boiler to provide the reference.

Key words: nanostructured; ceramic coating; boiler; energy-saving

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The reformative repairment of WISCO HSM2 1# reheating furnace

ZHANG Da-bao, CAO Bing-lei, WU Jing-yang, et al

(WISDRI (Wuhan) WIS Industrial Furnace Co. Ltd., Wuhan 430223, China)

Abstract: Through the reformative repairment of WISCO HSM2 1# reheating furnace, the structure of 1# reheating furnace were optimized, the combustion equipments and the control system of the furnace were upgraded comprehensively, the operating environment of the furnace were improved. After nearly one years running of the upgraded 1# reheating furnace, the energy consumption were decreased significantly, the steel billet heating quality were improved obviously, and the operation environment were improved effectively. The desired purpose of the reformative repairment were achieved.

Key words: reheating furnace; reformative repair; energy consumption; operating environment; heating quality

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Research on status and improvement technology of desulfurization and denitrification of power generation boilers in Tangshan

LIU Jing-xin, WANG Ming-ting, CUI Jian, et al

(Tangshan City Special Equipment Supervision and Inspection Engaging in Utility Inspection, Tangshan 063000, China)

Abstract: Based on development situation of electric power in Tangshan, summarized and analyzed the emission data with desulfurization and denitrification condition of state control coal fired units in Tangshan, the paper aimed at the ultra low limit for the control of pollutant discharge in power plant, proposed modification suggestion for the equipments of desulfurization and denitrification. To provide a technological reference to the reform of the desulfurization and denitrification equipments for coal fired power plants in Tangshan.

Key words: desulfurization, denitrification; ultra low limit; power generation boilers

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