

Khimenko A.V., Tarasova V.A.

### **RESEARCH OF MODES OF FUNCTIONING OF ELECTRIC THERMAL STORAGE**

Numerical simulation modes of functioning electric thermal storage (ETS). Obtained the distribution of temperature in the thermal storage element with the speed control of air flow through the channel thermal storage element ETS. Showed the efficiency of electric thermal storage systems as compared to traditional electric heating systems.

Tovazhnyanskyy L., Babak T., Duic N., Kraycic G., Khavin G.

### **THE ABILITY TO USE THE HEATING SYSTEM AS SOURCE OF HEAT PUMP FOR THE HOT WATER SUPPLY IN INTERHEATING PERIOD**

The problem of modernization of the heating module (HM) with two-stage mixing scheme of the hot water supply by installing a heat pump (HP) meant for to work in interheating period. As a heat source is used water of the heating system of the building. During the summer, perhaps district cooling facilities in apartment heaters. The refrigerant R600 is selected as most environmentally friendly and low-pressure evaporation and condensation. An economic calculation is made for HM working with HP and without HP.

Ulyev L.M., Yatsenko O.A.

### **DATA EXTRACTION FOR PINCH ANALYSIS UREA PRODUCTION ON THE UNIT AK-70**

The goal of this project is investigated a process of production of granular urea on the unit AK-70. Definition all the technological flows that are required for integration process by using the method of pinch analysis. Using grid diagram was calculated existing thermal energy recuperation. The results of this work can be used for analysis of energy saving potential and reconstruction of the existing process.

Sokolov M.V., Ulyev L.M., Sulima A.N.

### **INVESTIGATION OF SIEVE-VALVE TRAY HYDRODYNAMIC FOR REFINEMENT TITANIUM TETRACHLORIDE**

The experimental investigation of pressure drop on contact device of sieve-valve tray was performed in this paper. The dependence pressure drop vs. steam velocity was received.

Ulyev L.M., Nechiporenko D.D.

### **PINCH RECONSTRUCTION OF HYDROTREATING AND CATALYTIC REFORMING SECTIONS ON UNIT L- 35-11/600**

Pinch diagnostics for hydrotreating section and catalytic reforming section of catalytic reforming unit L-35-11/600 was carried out. Comparative economic analysis of their effectiveness after the proposed retrofit was performed for each section separately and for the total their flowsheet. The

implementation of the pinch design allows to reduce power consumption for hydrotreating process by 2,2 MW, the payback period of the proposed project will be about 7 months. For the catalytic reforming section power consumption is reduced by 6,4 MW, the payback period of the proposed project will be about 10 months. Energy consumption for joint integration of hydrotreating section and catalytic reforming section reduced by 11,4 MW, the payback period of the proposed project will be about 8 months. Therefore, it was concluded that pinch design for these sections of catalytic reforming unit L-35-11/600 the most advisable to carry out for the two sections together.

Tovazhnyanskyy L., Kapustenko P., Ulyev L., Vasilyev M.

#### **DATA DEFINITION FOR TWO BENZENE DIVISIONS AND THE TAR DISTILLING SHOP WITH COMMON SUPPLY STREAM**

The process of benzene distillation and process of coal tar distillation being typical for East European countries is analyzed in this paper. The pinch analysis method was selected to perform a reconstruction project. Technological streams that are needed for the integration process by using the pinch analysis method were identified. The data obtained will be used to further the process of reconstruction.

Ulyev L.V., Sivak V.V.

#### **PINCH-INTEGRATION OF HEAT PUMP IN TITANIUM TETRACHLORIDE CLEANING PROCESS**

The flowsheet for new titanium tetrachloride cleaning process with rectification method with simultaneous vanadium oxitrichloride production is presented in this paper. Flowsheet studding and literature analysis allow to define the technological streams for process heat energy integration. The thermal physic and technological parameters were defined for streams. Application of the methods of pinch-analysis to the integration of heat pumps in the cleaning of titanium tetrachloride processes will reduce energy consumption more than 4 times the level of consumption of the present-time, and cold utilities will reduce almost in 8 times. The annual profit from the introduction of the project of modernization of heat treatment process of titanium tetrachloride will equal almost 3.127 million U.S. dollars, and the payback period in this case would be 5 months.

Sakhnenko N.D., Ved M.V., Karakurkchy A.V., Ermolenko I.Yu., Zubanova S.I.

#### **RESAURSESAVING TECHNOLOGY FOR WEAR MACHINE ELEMENTS RESTORATION**

The opportunity for electrochemical synthesis of functional iron-molybdenum coatings with high adhesion to substrate was shown. Formation in the galvanostatic mode or in the non stationary pulse polarization regime permits coatings' composition and structure verification caused by control of the elementary electrode steps direction. Iron-molybdenum alloying coatings corrosion resistances as well as microhardness are twice higher than latter both for galvanic iron coatings and substrate. This will be important for wear machine elements restoration technology.

Redko A.A., Kompan A.I., Redko A.F.

#### **THE THERMODYNAMIC EFFICIENCY OF THE CASCADE UTILIZATION OF POWER PLANT**

In article numerical research results of efficiency utilization cascade power plant cycles with different organic working substances are considered. It is showed possibility of their use at a temperature of flue gases heat consuming unit up to 350–400 °C.

Rassokha A. Cherkashyna A. Abaljayev V.

#### **NANO-SCALE PHENOMENA IN THE INTERFACIAL LAYER OF MODIFIED FURAN EPOXY COMPOSITES**

Nano-scale structure features of the interfacial layer of furan epoxy composites with modified filler are considered.

Vasylyev I.V., Kapustenko P.O., Perevertaylenko O.Yu., Ilunin O.O., Buhkhalo S.I., Arsenyeva O.P.

#### **PROBLEMS AND PERSPECTIVES OF SOME ADVANCED THERMAL RECYCLING TECHNOLOGIES OF MUNICIPAL WASTES**

The survey of some advanced thermal recycling technologies such as high-temperature incineration, pyrolysis, gasification including plasma-aided gasification for municipal wastes conversion was carried out. The advantages and disadvantages of each technology are discussed. It was underlined on integration of mentioned above technologies with best available techniques of gas cleaning and water treatment.

Kuzyayev I.M., Sytar V.I., Lobodenko A.V.

#### **MODELING OF THERMAL PROCESSES IN CIRCULAR CYLINDRICAL ELEMENTS**

In article mathematical models for modeling of processes of heat exchange in circular cylindrical elements on examples of process of cooling of polymeric pipes, and also for the analysis of distribution of a temperature field in plugs of bearings of sliding are received. Program modules on the basis of a mathematical Mathcad package are developed for modeling of temperature processes in exchange in circular cylindrical elements.

Kovaliv V.I., Malakhov V.A.

#### **CHINA'S POSITION IN THE ARMoured VEHICLE MARKET OF THE DEVELOPING COUNTRIES**

The article describes the role of China in the armoured vehicle market of the developing countries, determines which countries are the main importers of the Chinese armoured vehicles, defines the trends in the export of the Chinese armoured vehicles to various regions, and finds out what kinds of products are the main items of the Chinese export of armoured vehicles.

Kirilash Ye.I.

### **NUMERICAL INVESTIGATION OF FLUX-DISTRIBUTION IN GAS-TURBINE ENCLOSURE VENTILATED BY ONE AND TWO FANS**

Statement of the problem of flux-distribution in gas-turbine enclosure ventilated by one and two fans is defined. Numerical solution of the two problems using version of the enclosure heat state generic mathematical model made possible to find out the conditions of gas-turbine external cooling and to give appropriate propositions.

Kapustenko P.O., Ilunin O.O., Perevertaylenko O.Yu., Selyakov O.M., Shamraev A.A.

### **THE MATHEMATICAL MODEL OF THE DISTRIBUTED A BIVALENT HEAT SUPPLY SYSTEM**

The system of a connected objects set that generate, transport and distribute the heat by the heat carrier is discussed. The approach of distributed heating system is proposed taking into account the controlled streams delay and fuzzy intervals of external demand. The generation of permissible strategy management at  $k$ -th moment leads to solution of the uniform linear programming problem.

Kapustenko P.O., Ilunin O.O., Boldyryev S.O., Garev A.O., Leshchenko O.V., Perevertaylenko O.Yu., Selyakov O.M., Shamraev A.A.

### **THE CRITERION OF EFFICIENCY OF HEAT PUMPS WITH A VIEW OF GROUP INFLUENCE OF THE ARGUMENTS**

The method of accounting factors in completeness evaluation for the synthesis of the economic efficiency criterion of heat pumps is considered. An approach of a cross-analysis and the factors influencing to the effectiveness of the technical systems clustering is proposed. It was noted that the proposed method increases the sensitivity criteria and is suitable for the assessment of the mathematical objects models' adequacy.

Demirskyy A., Tovazhnyanskyy L., Arsenyeva O., Khavin G., Kapustenko P.

### **THE ANALYSIS OF SUGAR JUICE PLATE HEATERS SYSTEM IN VIEW OF DEPOSITS ON THE HEAT TRANSFER SURFACES**

The question of practical retrofit of the system of heaters of thin sugar juice before evaporation is considered. The operation of the heat exchangers network in season 2012–2013 is analyzed. The monitoring of heat exchangers operation has shown the increase of fouling and pressure drop, especially at initial period. The solution to reduce fouling and increase of heat exchangers operating time without cleaning is proposed.

Kuznetsova M.M., Ved V.E.

#### **THE INFLUENCE OF A GRINDING MODE ON THE POWER INPUTS OF THE PROCESS**

A method of energy definition was suggested, that is spend for grinding of a material, depending on the correlation of the scope of the impact fracture and friction distraction, and also change of the strengthening characteristic of the material in the process of grinding.

Krasnokutsky E.V., Ved` V.E., Ponomarenko A.V., Koschy V.A.

#### **STAND FOR STUDY OF KINETIC AND GAS DYNAMIC PARAMETERS OF THE CATALYTIC GAS PURIFICATION PROCESS**

Scheme of stand for studying kinetic and gas dynamic parameters of catalytic gas purification processes, which allows studying conversion of solid, liquid and gaseous wastes and their mixtures was developed and implemented. Designs of reactor that allow to create adiabatic and isothermal conditions of conversion processes, as well as carry out longitudinal and transverse measurement of gas flow temperature and surface of the catalyst were developed and presented

Ved` V.V.

#### **HYDRODYNAMICS STRUCTURE OF THE FLOW LIQUID IN THE CIRCULATION APPARATUS WITH JET-INJECTION GAS FILLING**

The model of the hydrodynamics structure of the liquid flow in the circulation apparatus with jet-injection gas filling was achieved. It is shown that the apparatus can be divided into the diffusion zone and the perfect mixing zone. The transfer function of the system was defined, the analysis of which will determine the effect of longitudinal mixing on the flow structure and can be used for calculation of mass transfer of the apparatus.

Birukov O.I.

#### **FEATURES OF OPERATION OF GUNS WITH FREE RETURN OF THE LOCK WHEN USING AMMUNITION AFTER-GUARANTEE PERIODS OF STORAGE**

In article the scientific task, concerning features of operation of guns with free return of a lock when using ammunition after-guarantee periods of storage is considered.

Birukov I.Y.

#### **MASKING OBJECT GROUND PAINTING AND METHODS OF THEIR RECOGNITION**

The article deals with camouflage paint terrestrial fixed objects and methods of recognition

Bandyra V.N., Kolyanovskaya L.N.

#### **INTENSIFICATION MASS TRANSFER IN EXTRACTION VEGETABLE OILS**

The article presents research data extracting oil from rapeseed varieties "Champion" and soybean varieties "Vinnichanka" alcohol solvent using microwave intensifiers.

Anipko O.B., Redin N.N., Shepcov O.V.

#### **EXPERIMENTAL RESEARCH STORAGE BATTERIES OF ELECTRIC TORPEDOES, BEING ON AFTER GUARANTEE STAGES OF EXPLOITATION**

On the basis of the conducted experimental researches of storage batteries of torpedoes being on the after guarantee stages of exploitation, the changes what is going on with elements and component parts of storage battery are shown.

Anipko O.B., Khaykov V.L.

#### **ARTILLERY AMMUNITION MONITORING SYSTEM AND ANALYSIS OF ITS POSSIBLE STRUCTURES ON THE DEGREE OF RATIONALITY**

For current state of artillery ammunition stocks necessity of transition to monitor their condition is proved. The analysis of the monitoring system structures of according to their rationality is performed.

Anipko O.B., Verteletsky V.F.

#### **CHANGE OF PHYSICAL AND CHEMICAL PROPERTIES OF THE POWDER CHARGE AND INITIAL SPEED OF ARTILLERY AMMUNITION OF THE SEA NOMENCLATURE OF CALIBRES OF 25/80 AND 30/54**

The problem of change of initial speed of shells of artillery ammunition of small calibre on послегарантийных operation phases on the basis of experimental data about change of weight of shots cartridge заряжания is solved.

Anipko O.B., Bol'shich A.A.

#### **PROBLEM RESEARCH GERONTOLOGICAL CHANGES PROPELLANT JET ENGINE SOLID FUEL ROCKETS BOMBING FACILITIES AND EXPERIMENTAL DATA FOR THEIR SOLUTION**

Set the ratio for the dependences of the maximum and the minimum is not reached by firing rocket-depth charges from the time of their storage in the range 29–41 year. After 29 years of storage all of the RDB shots when shooting are characterized by undershoot. Absolute dimensions undershoot exceed scattering in the range of 1 %, and in 3 %, and in comparison with the size of the ellipse fall of the RDB volley.

Alexandrova T., Lazarenko A.

**PARAMETRIC SYNTHESIS INVARIANT STABILIZER TANK GUN**

The problem is selected the gain on the pressure invariant stabilizer tank gun, which provides increased stability margin and rapid stabilization of the closed-loop system.