Power Engineering

The description of installation for researches of assemblies of the microhydroelectric power station created on the basis of hydrodynamic stands of laboratory of the hydraulic machines of Institute for mechanical engineering problems of NAS of Ukraine is presented. Power parameters of hydrodynamic stand EKS-15 and the characteristic of the modernized measuring and computing complex which provide possibility to conduct exploratory power cavitation tests of models of assemblies of microhydroelectric power station with split-hair accuracy are resulted. It allows to use the gained experimental data for verification of the program complexes modeling a three-dimensional fluid flow for the purpose of their use for working out of the new turbine settings of hydraulic machines.

The conception of using the peak load turbine as high-temperature topping part for 300MW power unit is introduced. Its initial and final parameters are obtained. The thermogas dynamic and design values of action and reaction turbines is calculated for rotor speed turndown $n = 50 \div 200\ s^{-1}$. The optimum alternative of the peak load turbine with $n = 100\ s^{-1}$ is chosen. The estimation of strength properties of rotor blades is carried out.

Heat Transfer in Engineering Constructions

The problems of increasing the accuracy of solution of geometrical inverse heat conduction problems are examined. It is shown that the presence of a priori information about unknown geometric characteristics results in additional limitations on unknown geometrical parameters. That allows appreciably reduce the set of their allowed value and increase the accuracy of solution. The numerical results of the model shape identification problem show the efficiency of proposed approach.

An investigations of thermal and gas dynamics processes have been carried out for thermal stress estimation in steam turbine exhaust hood. The direct coupled problem of heat exchange has been solved. Based on these results the heat transfer coefficients on surfaces by the decision of inverse problem of heat transfer are defined. Data will be used for durability estimation of steam turbines.

A thermo-economic model of the heat-pumping drying installation with closed cycle and the by-passing of part the drying agent around heat-pump evaporator were developed. The model allows to take into account both thermodynamic, and economic parameters simultaneously by optimization of facility design and choice of economic modes of the operations. The solution of the equations system describing of exergy flows through borders of model and economic costs was obtained. The solution can be used for any steam-compression heat-pumping drying installation, which works according to the suggested scheme.

Dynamics and Strength of Machines

Applied Mathematics

High Technology in Mechanical Engineering

Materials Science in Mechanical Engineering