THE CALCULATION OF THE CRITERIA FOR MATHEMATICAL MODELS OF CIRCULATING WATER IN THERMAL POWER PLANTS

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Annotatsiya. Issiqlik elektr stansiyasining issiqlik ta'minoti tizimida aylanma suvlarni sovutish jarayonlarini optimal ko'rsatkichlar bilan tashkil etish orqali samaradorligini oshirish masalalari yoritilgan va tavsiyalar ishlab chiqilgan. Issiqlik elektr stansiyasidagi aylanma suvlarni sovutish jarayonlarini optimal ko'rsatkichlar bilan tashkil etish bilan samaradorligini oshirish masalalari yoritilgan va tavsiyalar ishlab chiqilgan.

Annotation. Issues of improving the efficiency of the thermal power plant in the Heat Supply System by organizing the processes of cooling circulating water with optimal indicators are covered and recommendations are developed. Issues of improving the efficiency of circulating water cooling processes in a thermal power plant with the organization of them with optimal indicators are covered and recommendations are developed.

Keyword. Fuel, energy, temperature, technical water, circulation, condenser, steam turbine, steam condensation.

Introduction. The technical water cooling system begins with hot water pipes returning to the tower from the general system. At the top of the Gradirnia blog are round air-absorbing holes that pull hot air upwards.[1].

Water cooling tower-serves to lower the temperature of the operating "Technical water" after returning from the cycle in the common cycle cooling system and in the condensing process in the capacitor. It removes heat from circulating water with a temperature of 55-60 ℃, and transfers this heat to the incoming air stream, providing the resulting cooling system with constant 16-17 ℃ temperature technical water [2].

Looking at the world experience, it seems that the technical water cooling system has different styles: with an open pool, with a spray pool and with a cooling tower. The most optimal choice among these styles by economic and Environmental is the cooling tower style, since it does not require as large an area as in the rest of the styles, and the water cooling capacity and quantity are large, the productivity is high. Therefore, in recent years, countries of the world have been using only the style with a cooling tower [3-4].

The structure of the water cooling apparatus, the mode of adjusting the heat regime and the hydraulic resistance must meet the requirements of the technological process. The most optimal water cooling apparatus is compact, small weight, inexpensive, reliable in operation, low pollution, it is advisable to consider, clean and repair.

When choosing the material of the water cooling surfaces and components of the apparatus, the following are taken into account:

• need for long-term use at specified temperatures, physical and chemical properties;

• non-toxic heat carriers;

• that the material has sufficient thermal conductivity;

• high pressure and wear resistance;

•strength against chemical and temperature corrosion.

It will not be possible to select the construction of the hardware that meets all of the above requirements at the same time. In some cases, consideration of important factors is targeted. For example: aloxida pays attention to the stable operation of the water cooling apparatus in conditions of high temperatures or in conditions of aggressive environments, etc., Its compactness, small weight and low pollution [5-6].

A comparison method is used to select the optimal option, which is initially based on the group of water cooling apparatus. The technical and economic comparison options are based on calculations on heat, hydraulic and strength.

If liquid or Steam is applied from both sides of the water cooling surfaces of the apparatus, the choice of dual or multi-pipe sectional water cooling apparatus is targeted [7].

The algorithm is set the initial parameters and constants of the interacting flows, then the calculation of the air velocity in the flow part of the cooling tower, then the total area of the drops is determined. The humidity and enthalpy of air, the evaporation coefficient are determined. We describe the Nusselt number n the coefficient of heat transfer from water to air, as well as the coefficient of heat transfer from the drop surface.

Based on the results of computational experiments on the same regions, the development of a mathematical model is carried out according to the algorithm presented in figure 1.1.

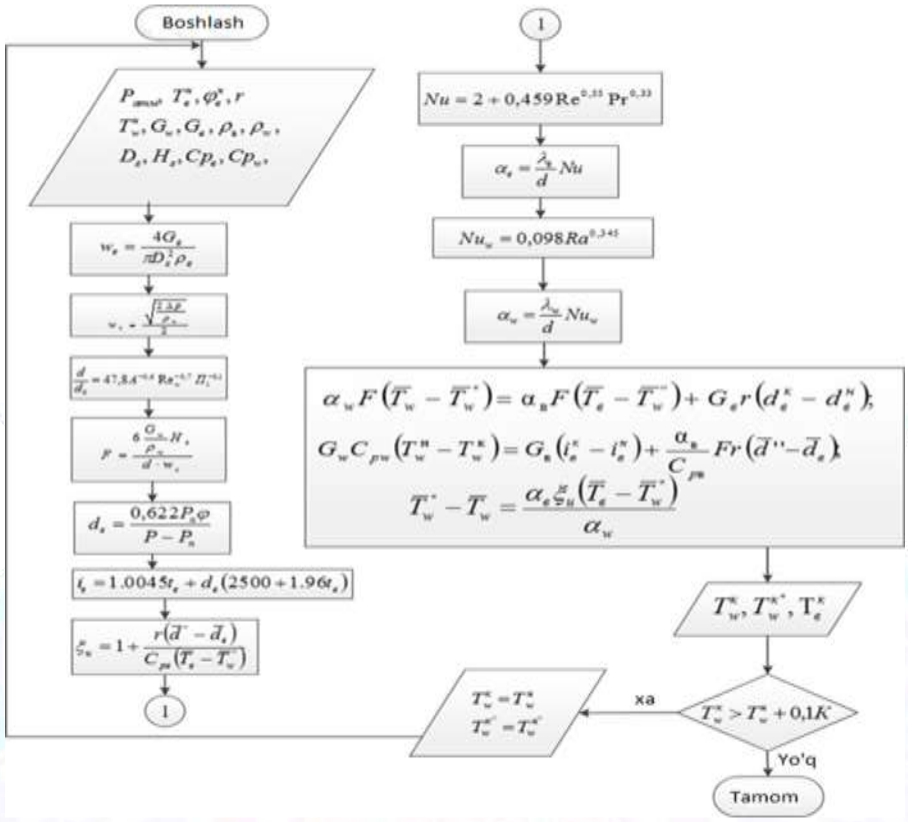

Figure 1.1. Algorithm of the method for calculating the temperature of the bounded water at the outlet of the device

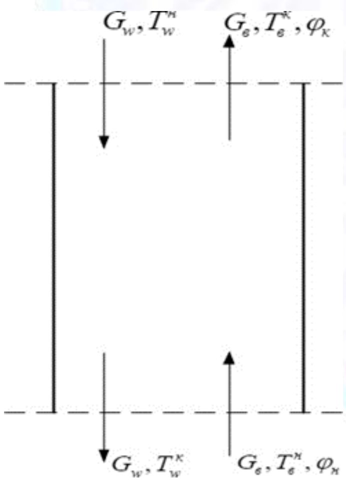

Figure 1.2. Calculation scheme

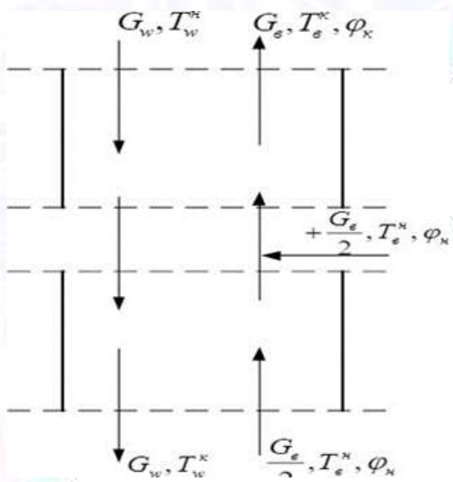

Figure 1.3. Calculation scheme for a cooling tower with a single air supply

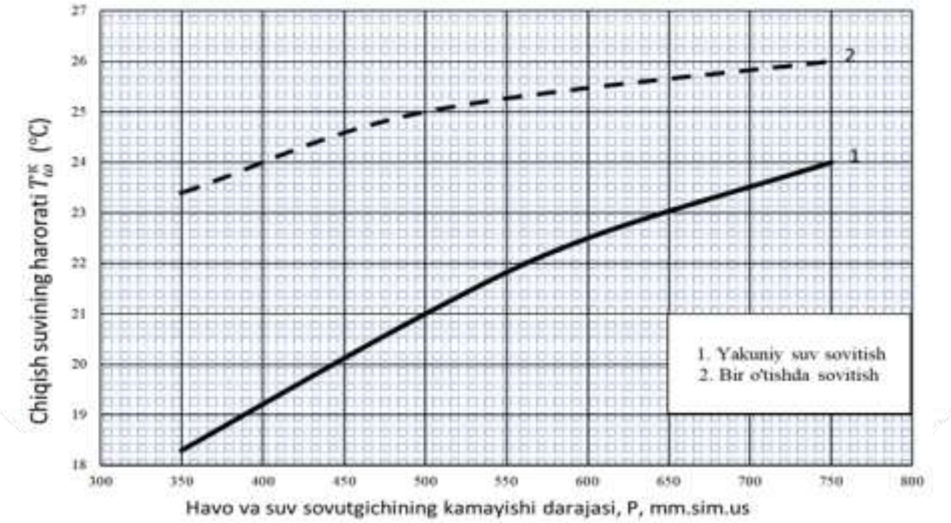

Figure 1.4. Graph of the dependence of the final water temperature at the outlet of the water cooler on the degree of air depletion

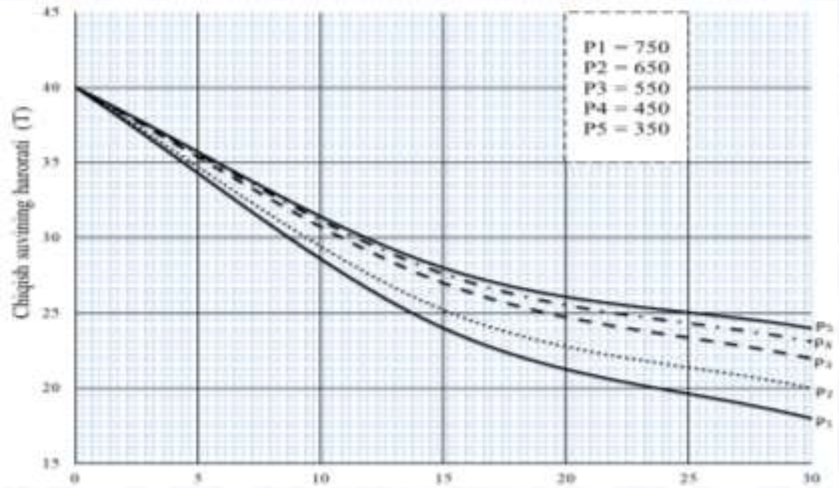

Figure 1.5. Graph of the dependence of the final water temperature on the irrigation area at different air pressure

All the parameters described above are entered into a system of equations, which is calculated on a computer using the MATLAB program for mathematical calculations. As a result of the solution, we get the output parameters of water and air. Next, we calculate the water temperature at the output of the cooling tower, and if the results are not satisfactory, the output values are given to the initial values, and the calculation process is repeated until the end of the water temperature. The process practically stops changing. As a final result, the value of the water temperature is obtained [8].

A comparison of the performance of a high-altitude cooling tower with a sea-level operating cooling tower is shown in Figure 1.4 below. The calculation was carried out in the altitude range from 0 to 3000 meters, which corresponds to the air pressure in the range 760 - 535 mm Hg. The calculation parameters for the two options remained unchanged:

The water temperature at the entrance to the cooling tower is $T_{\omega}^{H} = 40$ °C, the air temperature at the entrance to the cooling tower is $T_{v}^{n} = 25$ °C, the air humidity is -60 %. When calculating, temperature and air humidity change with height, which is considered constant. The variable is air pressure, which is strongly dependent on altitude above sea level by the barometric formula [9].

One method of accelerating water cooling is to strengthen the transition cross-sections with an equivalent diameter and create the movement of flows in a wave-like way, which can be performed relatively easily on plasticine water cooling machines.

Figure 1.6 shows some variants of high turbulence water cooling surfaces. Package comparator is performed from plates (1.6.V-figure), in some chess sequences, the bulges from the spheroid are indicated by dots, and the depressions (indicated by kreketes) are stamped. When assembling and welding stamped plates of this option, curvilinear zigzag and waveform channels are created, and turbulence of the flow of heat carriers is increased in these channels.

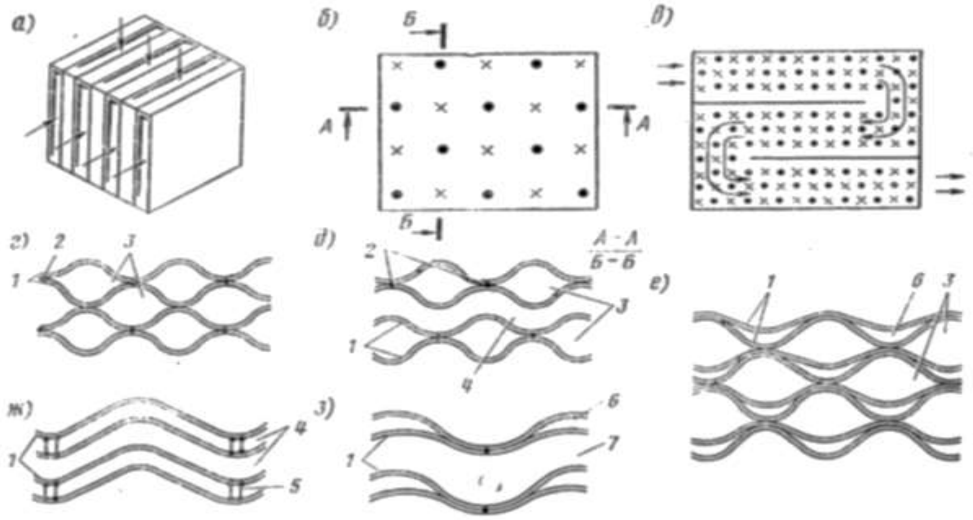

Figure 1.6. Plate water cooling surfaces

a–an element assembled from flat plates; B, v, g, d, e, j, z –stamped plates with different configurations; b and d –one–lane, spherical corrugated v–three–lane opposite the pit, spherical corrugated opposite The Pit; 2 –bulging opposite the bulges; j–having a bulging Channel; z–bulging and serp–looking; e–for water–in the form of serp and xavo–having a zigzag–looking Channel; 1–stamped plate; 2–point welded; 3-zigzag Channel; 4-wavelet Channel; 5-distension coil; 6-sickle-shaped channel; 7-sickle Wave channel.

Waveform channels can be changed in an optional Sox when designing the ratio of cross-sections for both heat carriers with width changes. For example, if two plates are welded in pairs, then the movement of one of the heat carriers is 1.6.it can be done in several steps, as shown in Figure V. 1.6.zigzag channels of equal or unequal cross section are created for both heat carriers when the package is compagnosed by the type shown in Figure G.

The direction of each heat carrier for such a case always varies in two mutually perpendicular planes.

Packages assembled from plates with high turbulence can be found in other variants of companovka (1.6.e,j, z-pictures) are possible.

1.6.according to the j-figure, both plates are point welded with each other through bobbins (5). In this case, waveform channels are created for both heat carriers. The assembly of such packages is compact, and the susceptibility to contamination by both heat carriers can be small.

1.6.the companovka, according to the z-figure, is intended to harack one of the heat carriers in the sickle–like Channel (6), and the other in the sickle-wave cross-sectional Channel (7), with enhanced turbulence.

1.6.in the preparation of packages in the z-figure variant, distension bobbins do not apply. In general, in the case of application of type (j) and type (z) water cooling apparatus, application is targeted when the transition cross section for one of the heat carriers is much smaller than for the other. For example, when water and air are heat carriers.

1.6.in the element of the plate water cooling apparatus, which is presented in Figure E, a sickle (small-cut) channel and a zigzag (large-cut) channel for water are designed for air. The allowable water pressure in the channels is $(4 \div 6) \cdot 10^5$ Pa. For air, however, the pressure must be close to atmospheric pressure.

The experiments carried out showed that water cooling apparatus with a corrugated plate is more compact than radiators. Their frontal cross section is 28-30% smaller than that of radiators when heat productivity is equal; it is resistant to accidental water freezing in water channels.

The performance of the plates with ribs of different appearance allows them to be more compact in relation to the wavelet apparatus. Such a situation is especially acute when the size and weight are relative to the hardware. Because the small size of the water cooling apparatus saves not only the area occupied and the spent metal, but also the amount of heat that the walls of the apparatus give.

In the hajmi unit of such apparatus, the water cooling surface is 800÷1600 $\frac{m^2}{m^3}$ and more. Due to the incessant application of new methods of stamping, welding, water cooling apparatus with a surface area of 4500 $\frac{m^2}{m^3}$ can be created in a compact form.

When creating the construction of stamped plate and plate - ribbed heat exchange apparatus, the shape and dimensions of the surfaces can be combined differently according to the specific nature of each heat carrier.

The plasticine - ribbed surfaces of the apparatus separate their ribs by type as follows:

- flat ribbed surfaces;

- jalyuzili surfaces;
- short plate surfaces;
- undulating surfaces;
- axial surfaces.

CONCLUSION

An analysis has been carried out that allows you to carry out research on coolant and up to the marginal value in the passage of a certain amount of water through the working area of the cooling tower.

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