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CRITERIA FOR EVALUATING THE EFFECTIVENESS OF THE "HYDRO TANK - COOLER" SYSTEM

G'aybullayeva Gulchiroy Zavqijon kizi
Master of the Department "electrical mechanics of mining" at Navoi State University of mining and technology, Navoi, Uzbekistan

Salimova Shaxrizoda Sanjar kizi
Student of the department of "Mining Electromechanics", Navoi State Mining and Technological University, Navoi, Uzbekistan

The energy lost in the control circuit turns into heat, increasing the temperature of the working fluid, which reduces its viscosity, increases the flow of leakage, and in turn is accompanied by a progressive increase in temperature due to the additional loss of escape energy.

An increase in temperature also leads to the oxidation of the working fluid and the formation of various deposits [1, 2].

q (Vt) with respect to [3] solving the equation - the thermal equivalent of the generated hydroelectric power. Volumetric transmission and absorption system, at a certain ambient temperature t_0^0 we have:

$$q = \frac{\sum_1^n k_i F_i}{1-\exp\left\{-\frac{\sum_1^n k_i F_i}{\sum_1^n G_i c_i}\right\}} (t^0 - t_0^0), (1)$$

Here: e - the temperature of the working fluid at the outlet is a power-regulating complex (the temperature of the drain collector), deg.

In turn, E(BT)lost in hydrostatic transmission [2] the thermal equivalent of the capacity will be:

$$E = rc_1 Q(t^0 - t_0^0) = Q\Delta P \frac{1-h}{h}, (2)$$

here t^0 - the temperature of the working fluid at the entrance to the "hydro tank - cooler" system is equal to the temperature of the working fluid at the output of the power control unit.

r - density of working fluid, kg / m^3;

c_1 - the specific heat capacity of the working fluid is, J/ kg grad;

Q- working fluid output current, m^3/ s;

ΔR - pressure drop in the hydraulic lines of the power control complex, Pa;

h - General efficiency of hydraulic circuit.

Naturally, by updating the generated power plant surface miner, it is necessary to direct the lost power to the "hydro tank - cooler" system, for normal operation of the" hydro tank - cooler " system:

- $\mu \geq \mu_{max}$ to maintain the viscosity coefficient in the surface miner's positive temperature range, the following condition must be met:

- $\frac{q}{E} \geq 1,0;$ (3)

The viscosity coefficient in the negative temperature range of the surface miner's work is $\mu \geq \mu_{max}$ to hold inside, the following condition must be met:

$$\frac{N+E}{q} \geq 1,0, \qquad (4)$$

Here N_H - tank heater power, Vt.

Notable [2] according to the equation, the power of the tank heater:

$$N_H = \sum_1^n k_i F_i \left(1 + \frac{1}{\ln\frac{t^0}{t_6^0}}\right)\left(t^0 - t_6^0\right) \qquad (5)$$

- here t_6^0- hydraulic machines of the surface miner's power control complex can operate without a heater the minimum temperature of the tank, grad.

In addition, considering that the duration of the temporary process is much less than the duration of the work cycle, for example, the surface miner we are considering, can be estimated with sufficient accuracy:

$$\mathrm{Exp}\left\{-\frac{\sum_1^n k_i F_i}{\sum_1^n Gc_i} t\right\} \to 0,$$

then using the installed capacity of the full combine power plant pumps, equations (3) and (4) in the range of (2) and (5) positive operating temperature$t_{0max}^0 \geq t_0^0 \geq$ 0°C up to miner, they take the form

$$\frac{\sum_1^n k_i F_i}{[Q]_H [P]} \frac{h}{1-h}\left(t^0 - t_0^0\right) \geq 1,0; \qquad (6)$$

here: $[Q]_H$ - nominal flow rate of working fluid of pumping station of power plant, m^3/s.

In turn, the surface miner's$t_{0min}^0 \leq t_0^0 \leq 0$°C taking into account (2) and (5) in the range of negative working temperatures up to (3) and (4) the equations take the form:

$$\frac{\left(t^0 - t_6^0\right)\left(1 + \frac{1}{\ln\frac{t^0}{t_6^0}}\right) + \frac{[Q]_H [P]}{\sum_1^n k_i F_i} \frac{1-h}{h}}{t^0 - t_0^0} \geq 1,0. \qquad (7)$$

Analysis of equations (6) and (7) (graphic interpretation is presented in shows that they can be used as a criterion for temperature adaptation of the hydro tank - cooler system of a mining machine power plant. to evaluate posteriori already created cars. Previous studies [3, 4-11] show that the efficient and reliable operation of hydraulic mining machines is ensured by the practically efficient operation of the "hydro tank - cooler" system of the working fluid.

Therefore, even at the design stage of the machine, it is necessary to perform an entire line to assess its priority performance, which allows us to determine the rational parameters of the hydro tank – cooler system, research towards solving the urgent scientific problem of finding reasonable parameters of the hydraulic cooling tank system for modern and promising structures.

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