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CALCULATION OF POWER WASTE IN ELECTRICAL NETWORKS IN THE TERRITORY OF OUR REPUBLIC.

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Abstract: The quality of electricity in the territory of our republic mainly depends on current and narguz, taking into account the interaction of magnetic currents used in the control and management of currents of power supply networks, frequency, voltage, currents.

Key words: electricity, currents, power dissipation, control, voltage, magnetic flux, element, Rogovsky belt - stem, reed switch, probability of working state, model, reliability indicators, working ability.

РАСЧЕТ ЭНЕРГЕТИЧЕСКИХ ПОТЕРЬ В ЭЛЕКТРИЧЕСКИХ СЕТЯХ НА ТЕРРИТОРИИ НАШЕЙ РЕСПУБЛИКИ.

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Аннотация: Качество электроэнергии на территории нашей республики в основном зависит от тока и наргуза с учетом взаимодействия магнитных токов, используемых при контроле и управлении токами электросетей, частоты, напряжения, токов.

Ключевые слова: электричество, токи, рассеиваемая мощность, управление, напряжение, магнитный поток, элемент, ремень Роговского - шток, геркон, вероятность рабочего состояния, модель, показатели надежности, работопособность.

РЕСПУБЛИКАМИЗ ХУДУДИДАГИ ЕЛЕКТР ТАРМОҚЛАРИДА ҚУВВАТ ИСРОФЛАРИНИ ҲИСОБЛАШ.

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Аннотация: Республикамиз ҳудудидаги электр энергиясининг сифати электр тармоқлари токларини, частотасини, кучланишини, токларини кузатиш ва бошқаришда қўлланиладиган магнит оқимларнинг ўзаро таъсирини ҳисобга олган ҳолда асосан ток ва юкламага боғлик.

Калит сўзлар: электр, токлар, қувват сарфи, бошқарув, кучланиш, магнит оқим, элемент, Роговский тасмаси - новда, қамиш калити, иш ҳолатининг эхтимоллиги, модел, ишончлилик кўрсаткичлари, ишлаш.

$$\Delta P = 3I^2 r = 3(I_a^2 + I_p^2)r \quad (1)$$

$$\Delta Q = 3I^2 x = 3(I_a^2 + I_p^2)x \quad (2)$$

Here r and x are active and inductive resistances of the line; I_a and I_R – active and reactive components of the full load current I.

As is known,

$$P = \sqrt{3}UI\cos\varphi; \quad Q = \sqrt{3}UI\sin\varphi. \quad (3)$$

Full current through its active and reactive components

$$I\cos\varphi = I_a, \quad I\sin\varphi = I_p (4)$$

we express:

I_a and I_P in (3):

$$P = \sqrt{3}I_a U, \quad Q = \sqrt{3}I_p U. \quad (5)$$

From now on

$I_a = \frac{P}{\sqrt{3}U}; \quad I_p = \frac{Q}{\sqrt{3}U}$ Substituting the expressions (1) and (1) we get the following important expressions:

$$\Delta P = 3I^2 r = 3(\frac{P^2}{3U^2} + \frac{Q^2}{3U^2})r = \frac{P^2 + Q^2}{U^2}r = \frac{S^2}{U^2}r. \quad (6)$$

$$\Delta Q = 3I^2 x = 3(\frac{P^2}{3U^2} + \frac{Q^2}{3U^2})x = \frac{P^2 + Q^2}{U^2}x = \frac{S^2}{U^2}x. \quad (7)$$

Here is S full power.

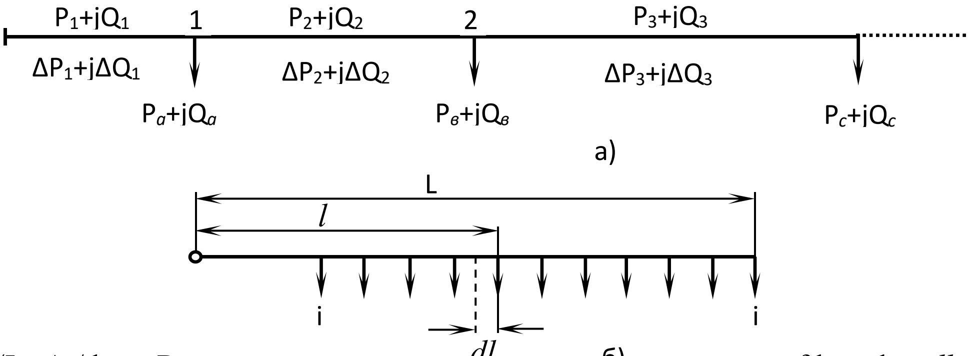
Based on the expressions obtained above, we make the following conclusions:

The waste of active and reactive power depends on P and Q.

$$\Delta P_z = \Delta P_1 + \Delta P_2 + \Delta P_3 + \quad + \Delta P_n,$$
$$\Delta Q_z = \Delta Q_1 + \Delta Q_2 + \Delta Q_3 + \quad + \Delta Q_n.$$

Here, ΔP_1, ΔP_2, … and ΔQ_1, ΔQ_2,... are determined by expressions (6) and (7), respectively.

the load on a line per unit length by i_0,



that is $i_0 = I/L$, A / km . Pro 4.1-расм. б) of length q dl within the distance download idl to is

The power dissipation resulting from the flow of current through the resistance $r_0 dl$ *of* the line length *dl is:*

$$d(\Delta P) = 3(il)^2 r_0 dl$$

To determine the total power dissipation *ΔP in* the entire line of length *L* , we add up all the very small dissipation values *d* (*ΔP) in the interval 0 – L , that is:*

$$\Delta P = \int_0^L 3(i_0 l)^2 r_0 dl = 3i_0^2 r_0 \int_0^L l^2 dl = 3i_0^2 r_0 \left. \frac{L^3}{3} \right|_0^L = I^2 r = \frac{P^2 + Q^2}{U^2} r. \tag{8}$$

In the above order

$$\Delta Q = I^2 x = \frac{P^2 + Q^2}{U^2} x. \tag{9}$$

Thus, when the load is uniformly distributed along the line, the power loss is three times less than when the load is at the end of the line.

For three-phase networks $S = \sqrt{3} U I_3, \qquad I_3 = \dfrac{S}{\sqrt{3} U}.$ (10)

For single-phase networks

$$S = UI_1, \qquad I_1 = \frac{S}{U} \varphi. \tag{11}$$

Power dissipation for a three-phase network

$$\Delta P_3 = 3I_3^2 r_3, \qquad \Delta Q = 3I_3 x_3 . \tag{12}$$

Power dissipation for a single-phase network

$$\Delta P_1 = 2I_1^2 r_1, \quad \Delta Q_1 = 2I_1^2 x_1 . \tag{13}$$

Substituting (10) and (11) into (12) and (13), respectively, we get:

power dissipation for a three-phase network

$$\Delta P_3 = \frac{S_2}{U_2} r_3, \quad \Delta Q_3 = \frac{S^2}{U^2} x_3 ; \tag{14}$$

power dissipation for a single-phase network

$$\Delta P_1 = \frac{2S^2}{U^2} r_1, \quad \Delta Q_1 = \frac{2S^2}{U^2} x_1 . \tag{15}$$

However, in a single-phase system there are two conductors, and in a three-phase system there are three. To reduce the metal loss, the cross-sectional area of the conductors in a three-phase network should be reduced by 1.5 times compared to that in a single-phase system. In this case, the resistance increases by 1.5 times, that is, r_3 =1.5 r_1 . Substituting this value into the expression for ΔR_3, we obtain the following:

$$\Delta P_3 = (1{,}5 S^2 / U^2) r_1$$

Therefore, power loss in single-phase networks is 2/1.5=1.33 times more than in three-phase networks. [3]

Here *D R* $_{money}$ is the active power dissipated in the steel of the transformer (that is, in the core, which is usually made of steel. [4]

$$\Delta Q_{пул} = \Delta Q_c = \frac{I_c \% S_н}{100} = U^2 b_т \tag{17}$$

The active power dissipation in a short-circuit condition spent on heating the coils (this dissipation is called the power dissipation in the copper) can be found as follows, as in formula (6):

$$\Delta P_т = \frac{P^2 + Q^2}{U_н^2} r_т \tag{18}$$

In the same way, the loss of reactive power caused by the spread of the magnetic flux can be determined as in the formula (7):

$$\Delta Q_т = \frac{P^2 + Q^2}{U_н^2} x_т \tag{19}$$

$$\Delta P_т = 3 I^2 r_т = \frac{S^2}{U_н^2} r_т .$$

the relationship $\Delta R_t / \Delta R_k$ we form the following expression:

$$\Delta P_т = \Delta P_к (S / S_H)^2 . \tag{20}$$

Literature

1. ..Nabijonovich JA Renewable energy sources in Uzbekistan //ACADEMICIA: An

International Multidisciplinary Research Journal. - 2020. - T. 10. – no. 11. - S. 769-774.