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Monitoring in the evaluation of overhead power lines

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ABSTRACT. In the process of transmitting electricity through high-voltage networks, wastes are increasing. In this case, the process of transmission of raw energy occurs in conductors, in Switch devices. To reduce energy waste, the voltage sent is delivered to consumers via power transformers. And the equipment installed in instants allows you to control Energy, check its current state, reduce wastes and control the quality indicators of electricity [1,2].

KEY WORDS: Transportation of electricity, energy adjustment, reliable transfer of energy, efficiency, energy waste, arrangement of the monitoring system

I.INTRODUCTION

Providing electricity consumers with quality and reliable electricity is an urgent issue today. More than half of all interruptions in consumer power supply are caused by problems with power lines. The reasons for disconnecting power lines can be divided into the following main group:

• suspension isolation degradation problems that develop much more slowly over a long period of time; these are internal defects of the suspended isolation of the network, surface contamination;

• various high voltage pulse overvoltage in nature,

• problems of electromagnetic and dynamic effects on the line, which include all types of short circuit of line wires to each other and to the ground.

Therefore, there is a need to carry out monitoring on all parameters of the transmission line. The Monitoring system consists of a network in which a measurement system is placed, transmitting information through a communication channel to the equipment of control rooms located at various points in the electrical system. In electric structures with neutrals of power lines, the resistance of the connected device of the neutrals of generators and Transformers or the outputs of a single-phase current source should not exceed a voltage of up to 1000 v. A three-phase current source with voltages of 660, 380 and 220 V, or a single-phase current source has line voltages of 380, 220 and 127 V, respectively, of 4 and 8 ohms. Currently, various systems for monitoring overhead power lines are widely used all over the world, and a detailed information about the current state of power supply networks is developing to the system operator. The Monitoring system consists of a network of units of measurement connected to the equipment in the control room through a communication channel. The measurement system is distributed along the transmission path of the transmission line and is installed on supports or directly on high-voltage conductors. The structure of the transmission power monitoring system of power lines is somewhat complex. Control rooms are located at different points in the energy redistribution networks [3,4].

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Table 1. Relative voltage losses, 1 kW * km, through the reactive power factor.

Nominal Cross sectional area mm^2	*Relative voltage losses, 1 kW * km, through the reactive power factor.*								
	1.02	0.88	0.75	0.62	0.53	0.48	0.36	0.28	0.90
16	1.52	1.58	1.55	1.52	1.50	1.49	1.46	1.44	1.37
25	1.13	1.10	1.07	1.03	1.02	1.00	0.97	0.96	0.89
35	0.87	0.84	0.81	0.78	0.76	0.75	0.72	0.70	0.64

In this regard, the f4103-M1 device is used in monitoring the energy system. The f4103-M1 device allows you to measure the resistance of almost all voltage electrical devices. The device has a built-in constant power supply that provides at least 800 measurements, an AC converter stabilized from alternating current with a frequency of 280 Hz, and high noise protection. Measuring the resistance of their devices with the ground is carried out according to the scheme shown in Figure 2.

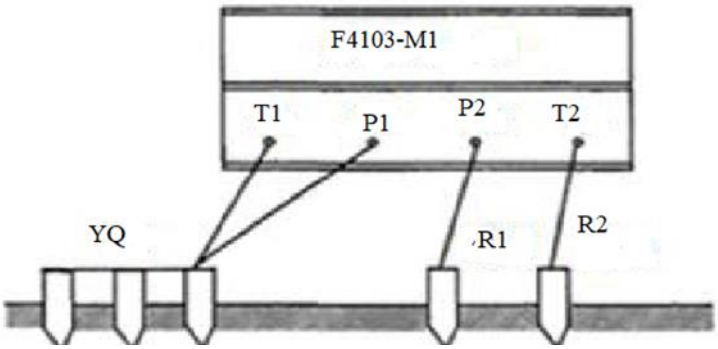

Figure 1. Short circuit current measurement scheme with f4301-M1 device

II. RESULTS AND DISCUSSIONS.

When installing the current meter on the conductor of the power transmission line, the control of its mechanism is carried out using a rotary barbell. Before installation, the barbell is rotated differently from the clock Arrow, and the meter is installed on the conductor of the electrical network. The position of the current meter is set to the conductor by rotating the technological barbell Clockwise. In this case, both halves of the barbell merge and cause the contacts around the conductor to rust. The built-in couplings ensure that the current meter body is firmly fixed to the conductor of the electrical network. The need for increased energy forces energy systems to operate power cables within the limits of their physical capabilities, with safety and efficiency interests being of great importance to operators who need to know what processes take place along the conductor's direction (local heating, critical accumulation, freezing of conductors) [5].

Currently, as a rule, management tools use SCADA systems that provide processing and interpretation of information obtained from units of measurement. The measurement process includes the following main components:

- group of measuring instruments for measuring the basic parameters of electrical conductors;
- processor module for processing measured data;
- data transfer system

The lines of power grids with high voltage are distinguished by a considerable length. Processing of results and measurements is carried out after deletion with line protection. The simultaneous installation of the signal before the power supply is turned off by current and voltage control devices in the conductor of the overhead power line, and the combined processing of measurement results with the proposed methods allows us to quickly and easily determines the location of the power supply. The diagnosis and monitoring of air power lines should be problem-oriented and reliable.

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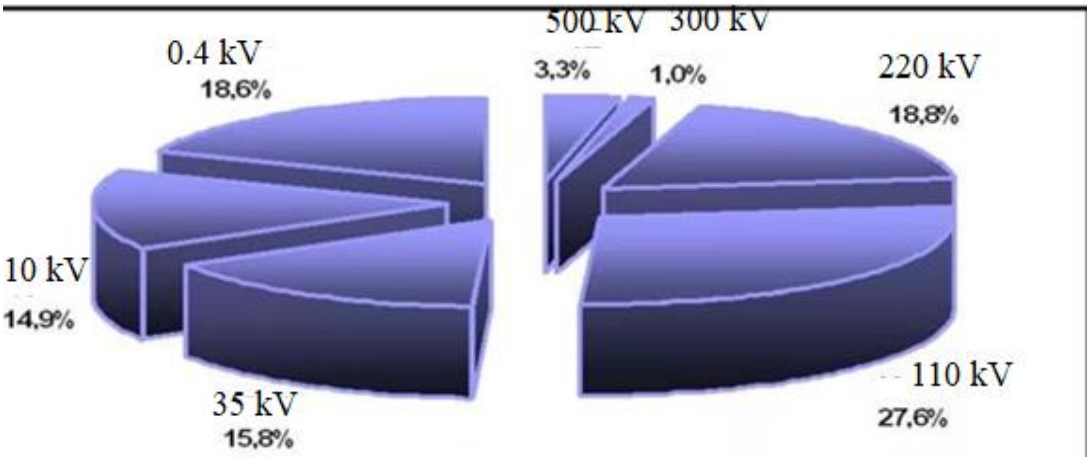
High power grid monitoring systems provide additional functions to increase power transmission efficiency and reduce losses. Monitoring not only increases the reliability of electricity transmission, but also the localization of emergency situations, as well as in the direction.

Diagram 1. **Efforts in different sectors. Distribution of waste in percentages.**



The most disruptions in the supply of electricity to various consumers are associated with problems that arise in overhead lines. The "Delyn" branded system is designed to organize stationary monitoring and evaluation and control the technical condition of the power transmission line. Using several diagnostic methods based on the Delyn system complex, use-based feature analysis studies the propagation of high frequency pulses.

The Dilin system is installed in a cabinet with IP65 protection level, which is located in the room of all technical means of the system at the entrance to the substations of the power transmission line, installed in a certain area [6].

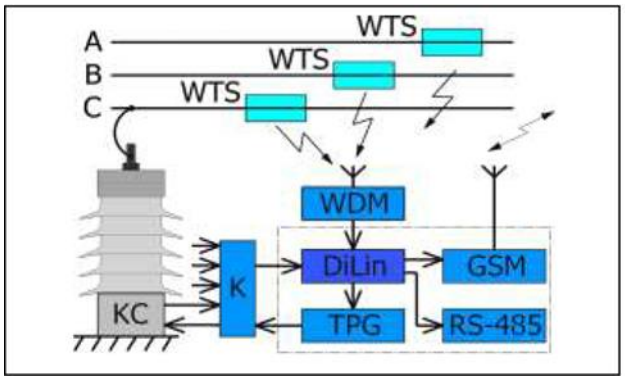


Figure 2. **Scheme of connecting the technical means of the Dilin system to the controlled line wires**.

One of the first commercial monitoring systems was the CAT-1 system, developed in 1991 by the American company the Valley Group, Inc. It is currently in use with over 300 CAT-1 monitoring systems worldwide. The system provides real-time monitoring of the voltage of the conductor at the points of connection to weather conditions and supports. The main module of the system is installed on the power line support and weighs about 50 kg.The main CAT-1 module consists of a moisture-resistant aluminum body, an electronics block, a built-in modem, information antennas and fasteners. The module is designed to operate in the ambient temperature range of -40...+60 °C. To ensure the continuous operation of the module, a 12V battery, a charger and a solar battery are used. Working without turning off electrical devices and electrical equipment of electrical networks is currently becoming the main service method, and it is widely used in power transmission lines of all voltage classes - from 0.38 to 750 kV-in different countries of the world. The use of this system makes it possible to ensure the normal operation of electrical networks during the installation of additional equipment and regular maintenance. The progressiveness of work under tension gives economic advantages

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in ensuring the safety of operators.For installation work on overhead lines under tension, hydraulic lifts, an insulation system are used **(Figure 3).**

Figure 3. Installation of measuring blocks on overhead power lines.

The entire system guarantees protection against current force below the sensitivity limit. This is achieved by equalizing the potentials of the workspace in a" conductor-bearing part-operator " system and reliably isolating the workspace from the ground, or turning the elements with simultaneous use. For the convenience and manufacture of installation on the conductor, the meter body consists of a measuring instrument, a power transformer and an electronics block. Both halves of the body are connected using a mechanism.When installing a current meter in an electrical network conductor, the mechanism is controlled using a special Rotary sterjen with a hexagonal key. Before installation, the key is rotated differently by the clock sphere, and its parts are separated from each other. Next, the meter sticks to the conductor of the electrical network. The part of the current meter is installed on the conductor by rotating the technological key clockwise. In this case, both halves of the sphere merge and lead to the rust of contacts around the conductor. Mounted couplings ensure that the current meter area is firmly fixed to the conductor of the electrical network **(Figure 4).**

(Figure 4). Installation of the meter on the transmission conductor

The need for growth and energy forces energy systems to use conductors within the limits of their physical capabilities, safety and efficiency interests are of great importance for operators who need to know what processes take place along the conductor's direction (local heating, accumulation of critical conductors, high electrical network monitoring systems provide additional functions to increase electrical transmission efficiency and reduce losses

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III. CONCLUSION

In this way, the total wastage will grow insignificantly and the equipment will be used more rationally. Measures to reduce electricity waste in the electrical network can be divided into the following groups: The need for growth and energy forces energy systems to use conductors within the limits of their physical capabilities, safety and efficiency interests are of great importance for operators who need to know what processes take place along the conductor's direction (local heating, accumulation of critical conductors, high electrical network monitoring systems provide additional functions to increase electrical transmission efficiency and reduce losses. As you can get acquainted with various monitoring programs and measuring tools above. In this process, structures such as the Prevention of short circuits in power lines, the causes of occurrence and the Delyn system, the CAT-1 meter, the SCADA system are characterized by working parameters, control indicators.. The difference between high-voltage and low voltage capacitors is as follows: voltage 6-10 kV - up to 15%; voltage is 0.4 kV - 35 percent. It is necessary to analyze the components of electricity waste in order to identify the centers of maximum waste, as well as to take the necessary measures to reduce them. Currently, technical losses are of the greatest importance, because they are the basis for calculating the planned standards for the loss of electricity.

REFERENCES

1. Togayev I., Tursunova A., Eshmirzayev M. Monitoring of overhead power lines //international conference: problems and scientific solutions. 2022. -T. 1. – №. 2. – c. 267-21.
2. Akram T., Islomjon T., Shahrizoda R. Energy Problems in uzbekistan. Their solutions and rmedial measures //Yosh Tadqiqotchi Jurnali. – 2022. – T. 1. – №. 2. – C. 273-277.
3. Ibodulaev, M., Tovboyev, A.N. Research of Ferro-Resonance Oscillations at the Frequency of Subharmonics in Three-Phase Non-Linear Electric Circuits andSystems//E3SWebofConferences,2020,216,01113https://www.e3sconferences.org/articles/e3sconf/pdf/2020/76/e3sconf_rses2020_01113.pdf
4. Tog'ayev I.B., Isoqulov D.SH., Turniyozov Z.A. Monitoring of air power lines with an assessment of their condition // Central Asian Research Journal For Interdisciplinary Studies (CARJIS) ISSN (online): 2181-2454 Volume 2 | Issue 5 | May, 2022
5. Islomjon Bekpo'lat o'gli Togayev, and Tovbaev Akram Nurmonovich. "statistical analysis of power waste on 6-10 kv air power transmission lines." international journal on orange technologies 2.10: 92-94.
6. I Togayev, A Norqulov, S Shirinov. modern technologies for improving the quality of electricity. Results of national scientific research international journal 2 (2), 177-181
7. T Akram, T Islom, U Islombek. analysis of the impact of the installation of reactive power sources on the quality of electricity. Web of semantic: universal journal on innovative education 2 (2), 198-201