ENSURING ELECTRICAL ENERGY QUALITY IN TEXTILE ENTERPRISES

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Abstract: *Factors affecting the quality of electricity in textile enterprises and issues of quality assurance are considered in the article. In particular, based on the nature of the technological process of the textile enterprise, interruptions in the technological process, interruptions in the technological process as a result of changes in the voltage value are analyzed based on the results of experimental research, and the dynamics of changes in the comparative consumption of electricity and the damage seen in the production of products in the enterprise through these interruptions are considered.*

Key words: *quality indicator of electric energy, continuous characteristic operation process, voltage deviation and fluctuation, factors affecting the operation process of a textile enterprise, voltage drop.*

The quality indicator of electric energy means that it corresponds to the nominal indicators of the main parameters in the production, transmission and distribution of electric energy. One of the quantitative indicators of the quality of electric power is voltage deviation and fluctuation. Any electrical consumer is built according to the nominal value of the voltage, so that a normal voltage change does not affect its normal operation. Deviation of the voltage from the nominal value in the power supply system is allowed by ±5% for industrial enterprises, and an additional 5% in emergency modes.

It is known that textile enterprises are considered to be continuous production enterprises according to the nature of the technological process. This makes the issue of continuous and high-quality electricity supply to these enterprises urgent. The analysis of the technological process of textile enterprises shows that the change of the voltage value in these enterprises from the nominal has a direct impact on the continuity of the technological process. These situations are caused by external and internal factors. External factors can be directly caused by planned shutdowns in electrical networks, line replacement and repair work carried out in them, emergency situations and abnormal modes of large-load consumers around the enterprise, and internal factors can be caused by the failure of equipment inside the enterprise during overloading. The voltage drop from the nominal value is the most observed in electrical networks. In textile enterprises, depending on the duration of the voltage drop, it can be short, medium and long-term, one-time and repeated depending on the

repetition during the shift. A voltage drop affects not only the disruption and complete stoppage of the work process of this enterprise, but also the operating mode of neighboring enterprises. Damages caused by one drop of the voltage value in the textile enterprise have been considered below. The company "CLOBAL CARPETING PRODUCTION" LLC, taken as an example of the research object, produces yarn products using thirteen spinning machines. Based on the results of the research conducted at the textile enterprise and interviews with the responsible specialists of the enterprise, the analysis of the research work was formed. During normal operation, the enterprise produces 26 tons per day, 179 tons per week, 780 tons per month, 2340 tons per season, and 9490 tons per year. During the research conducted at the facility, the consequences of short-term voltage drop due to internal factors were considered in the enterprise. It takes 3-4 hours to bring the technological process of the enterprise to working condition. Figure 1 was formed based on the results of the research, and the table shows the volume of the product that is not produced during the time when the technological process stops due to a voltage drop at the enterprise.

Figure 1. The value of products not produced due to interruptions in the enterprise's electricity supply (t)

The enterprise produces 1,083 tons of products per hour. The enterprise will not be able to produce 3.25 tons of products per day due to a single power outage. In the diagram, the volume of non-produced products of the enterprise is 22.75 tons in 1 week, 97.5 tons in 1 month, 292.5 tons in 1 season and 1186.25 tons in 1 year. The enterprise produces 1186.25 tons of products during a month and a half during normal operation.

The following table shows the values of the volume of products produced by the enterprise on March 14-20, 2023.

Days:	The volume of products produced by the enterprise under normal operating conditions (tons)	Product volume (tons) produced during the period of operation of the enterprise with stoppages
	26	26
15-march	24,75	24,75
16- march	25,5	21,668
17- march	26	26
18- march	25,167	25,167
19- march	26	22,75
20- march	25,167	25,167

Figure 2 was formed based on the data of Table 1 above, and the first column shown in the figure shows the volume of products produced during the continuous operation of the enterprise, and the second column shows the volume of products produced during the period when the enterprise worked with stops. During continuous operation, the volume of products produced by the enterprise remains almost unchanged, short deviations in the first column occur due to the performance of some reels in spinning devices, but the value of product production does not change significantly from the nominal value. A significant drop in the second column leads to a decrease in the value of the produced product compared to normal working days as a result of the short-term voltage drop that occurred on March 16 and 19 of the observed observation period.

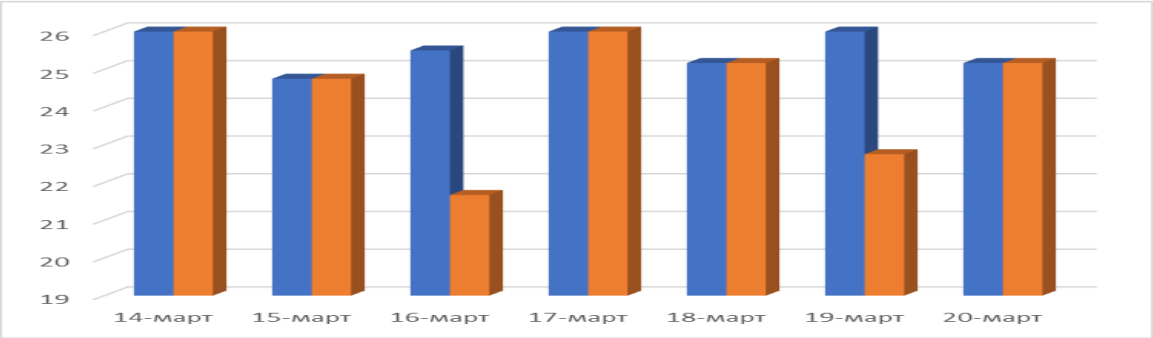

Figure 2. The volume of products produced by the textile enterprise on March 14-20, 2023 (tons)

It can be seen from this graph that disconnection of the enterprise from the power supply system, the stoppage of the work process leads to a violation of the volume of production.

Based on the above, it can be said that the deviation of the voltage value from the nominal value in textile enterprises affects the continuity of the technological process of the enterprise, causes a decrease in its work productivity, and a decrease in product production. A decrease in the volume of product production leads to a decrease in the competitiveness of the enterprise. Improving the quality indicator of electrical energy in textile enterprises prevents not only the inefficient use of energy, but also the losses analyzed above.

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