actually used and the specifications in the documentation, $b$ is the coefficient for the actual performance of monitoring operations with these means of measurement, and $c$ is a coefficient representing the metrological complexity of the process (this is determined by calculation from the complexity of the methods and means of measurement).

The values of $a$ and $b$ are given by the following formulas:

$$a = 1 - (a_0/a_1 - a_1),$$

where $a_0$ is the total number of means and methods of measurement indicated for use in the process, $a_1$ is the number of methods and means of measurement so indicated but not actually used in production, and $a_2$ is the number of methods and means of measurement used in production but not corresponding to the process; and

$$b = 1 - (a_0/a_0 - a_1),$$

where $a_2$ is the number of means of measurement incorrectly used by the operator, or else faulty or unsuitable for use.

The coefficients $a_b b_b c_b$ for use in calculating the base parameter $A_b$ are derived from the specifications in the technical documentation.

The classification system has been drawn up for the complexity of means of measurement, together with an approximate scale for comparative evaluation of the level of metrological support.

The following economic results have been obtained from this system. In 1975, 17.6% of the products received the State Award of Quality, which rose to 21.4% in 1976 and to 41.3% in 1977. The acceptance rate from the first batch onwards rose from an average of 75.4 over the plant to 90.3%. The number of items scrapped within the plant fell by 10% over the two years. The savings from complete operation of the system constituted 116 thousand roubles per year. The system should have been fully implemented during the course of 1978.

LITERATURE CITED


EXPERIENCE OF THE METROLOGICAL SERVICE AT THE VÉF ELECTRICAL ENGINEERING PLANT, RIGA

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Product quality improvement is a complicated but important task that could not be handled without the participation of metrologists and proper metrological support to production; the design, production, and testing of any product begin and end with measurements, and the measurement data can be said to result from metrological support, which thus becomes the basis for quality management. The Lenin VÉF State Electrical Engineering Plant in Riga has therefore given considerable attention to improved metrological support to production.

The activities of the metrological service at the plant are guided by the standards within the All-Union State Standards (GOST) system and by those in the All-Union State System for Unified Measurements, along with technical instructions, any current regulations, and the definition of metrological services derived from "The type situation for the metrological service of an industrial organization," RDTP 57-75, which has been agreed with the Latvian Board of the All-Union State Standards Commission and with the base metrological service. Also, "Basis of the metrological service in a plant" defines the structure, the basic tasks, and the functions and obligations of the service.

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The metrological supervision of means of measurement is designed to ensure unified and reliable measurements, with means of measurement kept permanently available for use in accordance with the specifications of GOST 8.002-71: "The state system of unified measurements: Organization and sequence of performance of checks, updating, and evaluation of means of measurement."

Much has also been done to implement GOST 8.054-73: "The state system of unified measurements: Metrological support to preparation for production: General concepts," as well as GOST 8.103-73: "The state system of unified measurements: Organization and sequence of performance of metrological evaluation for design and engineering documentation." In 1976, in-house standards were drawn up covering organizational and technical aspects of metrological evaluation of technical documentation. At the present time, all new technical documentation is submitted for metrological evaluation at the point of formulation, while the main forms of documents are supervised by the metrological-evaluation office. This serves to detect wrong decisions on the choice of means of measurement at the stage of the definition of documentation, and it also serves to detect deviations from accuracy standards, proper monitoring methods, and the like. Metrological evaluation of such documentation for nonstandard means of measurement starts with evaluation of the specification for the design and ends with the technical description and the instructions for operation. This is of particular importance, since numerous nonstandard means of measurement are used in the plant, and the number of these increases every year by about 300.

A group of specialists has been set up to certify nonstandard means of measurement, and an in-house standard for methods has been laid down. The primary metrological certification is based on establishing whether the nonstandard means of measurement is suitable for the purpose, and a protocol is drawn up for the metrological certification, with indications for subsequent metrological supervision and issue of a metrological certificate.

The metrological service has also drawn up an in-house standard that lays down specifications for the formulation, presentation, and general format of working documents for nonstandard means of measurement made in-house, as well as an in-house standard for comprehensive evaluation of projects to ensure that metrological rules, specifications, and standards are maintained.

Much has also been done to define a system of measurement facilities that will provide efficient monitoring of wire-communication equipment. The system consists of various means of measurement operating under program control that encompass the entire process from the manufacture of relay coils up to complete telephone installations.

For example, electrical parameters are checked automatically and relay boards and other such units are tested by means of the PAS-380 programmable automatic system, which enables one to evaluate a test result on an accept-reject basis. Figure 1 shows the system used for checking relay racks and units.

The electrical and time parameters of electromagnetic relays are checked with the UPR-1M, which also works under program control; the complete test program is read from a punched card, along with the working currents, release currents, magnetizing current, hold-on current, and so on. Figure 2 shows the system used for this purpose. Similar measuring and monitoring

Fig. 1

Fig. 2