service and of the chief technologist's department with respect to ascertaining that the technological process of repairs is provided with the required measuring equipment is coor-
dinated by means of the standards STP 407-033-78 on "CWQCS. Procedure for mastering the re-

The most important criterion for evaluating the quality of repairs consists of the rela-
tive amount of products certified for the factory Seal of Quality. The STP 407-046-78 on
"CWQCS. Certification procedure for the factory Sign of Quality" establishes the method for
certifying technological processes. An important role is allocated to metrological certifi-
cation carried out according to the requirements of STP 407-034-77, which is initiatory in
this respect.

The aggregate of measures carried out according to the CWQCS standards which specify
explicitly or implicitly the procedure of metrological provisions for high-quality repairs
helps to improve the equipping of production with measuring instruments, to increase the
trustworthiness of the measurements, and to detect in good time and remove all the defects.

UNIFORMITY OF MEASURING MEANS AND METHODS AT THE MINSK
TRACTOR PLANT

K. A. Karatov

The metrological service of the Minsk tractor plant has the chief metrologist at its
head and consists of three test laboratories for various types of measurements, a bureau for
metrological provisions and examination of normative and technical documents (NTD), a group
for measuring-equipment supervision and inspection control, as well as ten control and test-
ing stations in workshops.

The main tasks of this service consist of supplying laboratories with measuring equip-
ment; exercising metrological inspection; rendering metrological assistance and selecting
and allocating measuring equipment in technological processes; providing information on the
latest measuring equipment; carrying out complicated measurements in production; making
metrological provisions for nonstandard measuring and testing equipment; examining tech-
nological and design documents on testing equipment metrologically; analyzing the condition
of metrological provisions for production; etc.

There are more than 300,000 measuring instruments at the plant, and of this number only
1% are state tested, whereas the remaining instruments are subjected to departmental testing
in accordance with a schedule. This became possible owing to application of high-precision
reference instruments and testing installation and to successful training of metrological
testers.

The metrological service started its activity in 1972 by comprehensively analyzing the
level of metrological provisions in the factory workshops and laboratories. The annual in-
spections of the enterprise by the Belorussian Republican Center of Standardization and
Metrology (BRCSM) commissions were carefully studied and generalized.

All this data served as a basis for adopting organizational and technical measures aimed
at raising the level of metrological provisions for production.

The most important of all the adopted measures consists of establishing and applying a
system for assessing and inspecting the condition of testing and measuring instruments at
all production stages. For this purpose the chief metrologist's department together with
other factory services carried out comprehensive stock-taking of all the measuring equip-
ment used in production. This made it possible to discover some 7000 additional thermo-
electric instruments which for a long time were not subjected to testing and, therefore,
could not ensure precise measurements. It also aided in the compilation of an objective
schedule for state and departmental testing of measuring equipment.

In order to improve the inspection and increase the responsibility of the users for the
technical condition of measuring equipment, the plant introduced the "Regulation on the per-

Translated from Izmeritel'naya Tekhnika, No. 3, pp. 5-7, March, 1979.

sonnel responsible for the condition of measuring equipment in workshops and services." In accordance with this regulation, each workshop and service should appoint a person responsible for the condition of the control and measuring instruments (CMI), whose duties comprise: organizing a strict CMI registration; timely presentation of CMI for testing in accordance with schedules; writing off and replacing defective instruments; checking the storage and utilization of CM instruments; etc. These experts bear personal responsibility for the utilization of rejects or inopportunistically tested control and measuring instruments.

In order to ensure complete assessment and constant supervision of the CMI condition the metrological bureau in conjunction with the chief bookkeeper developed a precise system for registering all the measuring instruments and recording their movements. The basic regulations of this system were reflected in instructions whose application made it possible to raise metrological discipline, reduce to a minimum the utilization in workshops of defective measuring equipment, and improve the registration and testing regularity of measuring equipment.

One of the basic metrological-service assessed activity indexes consists of the percentage utilization in production of measuring equipment which provides the required measurement precision. In determining this index it is necessary to take into account all the equipment which has not passed its scheduled testing and was released by the CMI controllers in a defective condition for utilization in production. The factory economic-planning service pays considerable attention to this index and, therefore, it has included it in the additional conditions for awarding incentives to engineers and technicians of the chief metrologists' department. Thus, the fact that the index "Percentage utilization of measuring instruments which do not provide precise measurements" is included in the planning of the chief metrologist's department constitutes an economically stimulating factor which constantly tends to improve metrological provisions for production.

The technical level of production cannot be raised under modern conditions without a constant improvement of technology, without the application of progressive, often fundamentally new, technological processes, and without equipping enterprises with new measuring instruments. Nondestructive testing methods have recently acquired wide application in our factories. More than 30 technological processes for nondestructive methods of testing components were developed and are being applied. About 100 external grinding operations in the factory mechanical workshops are provided with process-control equipment.

The hole-homing operations have been provided with process control by means of fixed gauges with automatic stopping of the machine when the required dimensions have been reached. Statistical monitoring methods are also being successfully applied. They cover 25 technological processes in casting.

In recent years our plant developed and adopted the comprehensive quality-control system which includes technical, organizational, and economic measures aimed at improving the marketed products' quality indexes, as well as raising the reliability and durability of tractors. However, a critical analysis of the existing system has shown that it has not fully solved the problem of comprehensive quality control. The system covers a limited number of quality indexes and does not take into account several basic criteria. In this connection it became necessary to develop and apply, on the basis of a set of enterprise standards, an automatic system for controlling the quality of labor and products by means of computers. Our plant started developing this system in 1974 in cooperation with the Volgograd Institute of Automatic-Control Systems and the Belorussian Republican Administration of the State Committee of Standards (Gosstandart).

This system has already been applied in the assembly shop of tractors of type MTs-1, MTs-2, MTs-3, MTs-4, and LTs-2 and in the technical departments. The chief metrologist's department has developed and is applying the subsystem on "Metrological provision for production quality," which constitutes a component part of the Machine and Tractor Plant (MTZ) Automatic Quality-Control System (AQCS).

The metrological service drafted enterprise standards for specifying the working procedure of the chief metrologist's department. In accordance with these standards' regulations the metrological service provides information on infringements of such indexes as, for instance, the utilization of measuring equipment which does not meet the normative and technical documents (NTD) requirements; disruption of the measuring-equipment (ME) testing-