

THE AGING OF REFERENCE MEASUREMENT STANDARDS AND THE EXPERIENCE OF KENYA BUREAU OF STANDARDS

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Abstracts: The Kenya Bureau of Standards (KEBS) is a National Standards Body (NSB), set up in 1974 by an Act of Parliament, the Standards Act, Chapter 496 of the Laws of Kenya. It is a statutory organization of the Government with overall responsibility for standardization and all matters concerning Metrology, Standards, Testing and Quality Assurance (MSTQ).

One of the functions of KEBS as spelt out in Section 4(1)(b) of the Standards Act is "to make arrangements or provide facilities for the testing and calibration of precision instruments, gauges and scientific apparatus, for the determination of their degree of accuracy by comparison with standards approved by the Minister on the recommendation of the Council, and for the issue of certificates in regard there to."

KEBS discharges this function through its Metrology Division, which acts as the custodian of the national measurement standards and also offers calibration services to industry, commerce and the scientific community either directly or through the National Calibration Service (NCS).

Keywords: standardization, measurement, calibration

1 INTRODUCTION

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KEBS discharges this function through its Metrology Division, which acts as the custodian of the national measurement standards and also offers calibration services to industry, commerce and the scientific community either directly or through the National Calibration Service (NCS).

To meet the requirement of industry and the demands of the Kenyan economy, the Bureau has developed a wide range of measurement and calibration facilities which are currently grouped into two branches, namely:

- (i) the Mechanical Metrology Branch and
- (ii) the Electrical Metrology Branch.

The Mechanical Metrology Branch has established the following laboratories:

- Pressure
- Dimensional Metrology
- Temperature
- Force
- Volume and Flow

The Electrical Metrology Branch, on the other hand, has established laboratories covering:

- Time and Frequency
- DC/AC Measurements
- Energy and Transformer
- Instruments repair and maintenance

The Metrology laboratories came into operation in 1981 through the assistance of the German Government, with Physikalisch-Technische Bundesanstalt (PTB) as the implementing agency.

2 PROBLEMS FACING KEBS

From 1981, the measuring and test equipment supplied to the Bureau were new and relevant for the purposes to which they were put. The reference equipment in most fields were state-of-the-art and were able to meet the accuracy levels required by industry. KEBS instrument repair and maintenance department was also able to provide efficient and sufficient back-up service for minor repairs and breakdowns, since most of the equipment and instruments were new. It had an excess capacity and was therefore able to extend the service to industry both in Kenya and to the neighbouring countries, Uganda and Tanzania. It was well-equipped both in terms of qualified staff (Engineers and Technicians) and diagnostic tools. This unit therefore ensured KEBS equipment longevity and was also cost effective.

Unfortunately, every equipment and instrument has its useful life time and repair and maintenance can only help to an extent. With time, the equipment and instruments fail to match the accuracy and precision demanded by industry. The need for replacement becomes glaringly clear. As a result, the major problems currently facing the laboratories are:

- i) lack of a clear cut replacement programme for equipment
- ii) high rate of breakdown of equipment as a result of age
- iii) limited maintenance capacity as diagnostic tools breakdown, and trained and qualified experienced staff leave for greener pastures.
- iv) difficulty in acquiring badly needed spares and – they have to be imported.
- v) low budgetary provision for repair and maintenance.

2.1 Lack of adequate replacement programme of equipment

As a result of oversight, a proper depreciation policy was never put in place to take care of future equipment replacement. The fees charged for calibration and testing services were also inadequate to take care of future replacements. This has resulted into a pathetic situation whereby a number of equipment need to be replaced and yet there is no savings or money set aside to take care of this. The problem has been further compounded by a number of more urgent problems needing immediate attention, hence dividing the Management's attention. There is a sign of lack of preparedness as there is no evidence of any planned programme for equipment replacement.

2.2 High rate of equipment breakdown

Most of the reference and test equipment at KEBS are almost twenty (20) years old. A number of them are already obsolete. Unfortunately, this is happening at a time when spares are hard to find. In some cases, the spares are not there because the equipment is no longer being manufactured or the manufacturer no longer exists.

2.3 Limited Maintenance Capacity

One of the painful experiences KEBS has had to face is the rate at which its trained manpower have had to leave for greener pastures elsewhere in industry coupled with the breaking down of some of the diagnostic equipment, the problem has resulted into a disabling situation, resulting in capacity limitation in terms of staff and working diagnostic tools.

2.4 Spares acquisition

The sight of inoperational and broken down equipment is disturbing and yet the erratic exchange rates and the scarcity of hard currency have made it very difficult for KEBS to acquire spares in time. The spares have to be imported. Procurement of spares needs to be done early and if possible spares should be stockpiled. This needs a maintenance and repair culture and proper planning in addition to proper knowledge of the equipment under consideration. KEBS experience so far, is that the downtime for most equipment is on the higher side, thus affecting the normal operations of the laboratories. The shelves are virtually bereft of spare parts.

2.5 Low budgetary provision

The fast technological advancement and increasing costs of equipment has become a serious challenge to KEBS. There has never been a well-conceived budget allocation for the purchase of laboratory equipment and spare parts. Currently, the question of proper allocation of a capital budget to take care of the purchase of equipment and an operating budget to cover supplies, spare parts, maintenance and repair services as well as training of maintenance technicians is being discussed.

Strategy to overcome the problems:

Having accepted its position as a national standards body (NSB) with the added responsibility of maintaining the National Primary Reference Standards of Measurement, it is only prudent that the Bureau maintains its position as a measurement reference point for industry in Kenya. KEBS also has the statutory and moral duty to promote effective application of Science and Technology not just in research and development but also in other areas which can support the national economy. This promotion of Science and Technology is firmly based on the instruments and equipment that are daily used in detection, identification measurements, quality control and general systems integration. This has therefore elevated instrumentation to a level whereby it has become a vital part of a properly functioning MSTQ system.

As a remedy therefore, the Bureau has taken a number of steps:

- 1) **Budgetary allocation** for the gradual replacement of equipment and the purchasing of new ones has now been made a policy. Although this is not adequate, it will go a long way in sustaining the operations of the institution. With improvement, it is hoped new fields of measurements will be ventured into as and when required by industry.
- 2) KEBS has also set up a committee, "**Equipment Procurement Committee**", with the responsibility of ensuring that a proper procurement procedure is put in place. The committee will ensure that proper specifications and sourcing for the equipment is done and that at installation, the required manuals and circuit diagrams are supplied in addition to special training for the technicians who will maintain the equipment. Supply of vital accessories and spares will also have to be supplied by the supplier.
- 3) As the equipment age, there will be **regular depreciation** at a fixed percentage. The equivalent of this depreciated value in money terms, will be put aside and saved for future replacement of the equipment. In the past, this has been very difficult to implement.
- 4) Also recently put in place, is a "**five years equipment replacement programme**". Although it is a little bit too late, the idea, if well implemented should help stem the present downward trend in the quality of KEBS measurement facilities.
- 5) With the support of PTB of Germany, KEBS intends to strengthen its Maintenance Department by providing further training for the technicians and also by refurbishing the diagnostic equipment needed. Maintenance and repair capability is vital to any institution dealing with measurements. It is because of this realization that KEBS intends to develop an instrument maintenance centre which is expected to have enough capacity to serve the COMESA region. The centre is also expected to be able to offer training, to the maintenance engineers and technicians within the same region. The centre intends to eventually go into service contracts with instrument suppliers so that they become agents for the suppliers. These suppliers in the process will have to offer training and assist in maintenance knowledge transfer to KEBS technicians.
As a start KEBS is already developing a database for the different types of equipment and instruments in industry with the aim of helping decide on the type of spares to be stocked.
- 6) For most of the common instruments, KEBS intends to maintain **a level of spare parts**. When this becomes operational, it is hoped that the present downtime for most of the instruments will be drastically reduced.

3 KEBS FINANCIAL RESOURCES

KEBS does not receive any funding from the Government for its operations. However, the Government has enabled it to raise funds by levying industry. The major sources for funds for KEBS currently are:

- (a) industrial Levy
- (b) fees from calibration and testing services
- (c) fees raised from import/export inspection and
- (d) fees raised from training.

Other sources being explored for additional funds are in the area of consultancy and quality management installations. However, the level of funding needed presently is high and possibilities of donor support is being seriously explored. Possibilities of staff right-sizing and sub-contracting of some of the services are also being discussed.

4 CONCLUSION

This paper has highlighted the problems facing KEBS with reference measurement equipment. A number of equipment are already out of date and some have become inoperational as spares become difficult to get.

Attempt has been made to address these problems and find solutions to them. The problem of adequate budgetary allocation and having a strict policy of equipment replacement programme is still to be fine-tuned.

Also under review is the tariff structure (Fees charged for services rendered). It is hoped that they will be more in line with what the industry can cope with.

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