

METROLOGY IN AFRICA - ROLE OF THE CAFMET

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2. METROLOGY IN AFRICA

Abstract – This article presents the CAFMET (African Committee of Metrology), a non-profit organization that tries to meet the needs of African countries in the field of metrology. Its objectives are to spread a metrology culture in Africa in different domains (analysis, tests and calibration). The metrology development difficulties in Africa and the different activities, events and projects of the CAFMET are presented.

1. WHAT IS THE CAFMET?

The CAFMET (African Committee of Metrology) is not a Regional Metrology Organization like APMP, COOMET, EURAMET, SIM.

AFRIMETS (intra-AFRICA METrology System) is the Regional Metrology Organization of Africa, launched in March 2006. The CAFMET is only an observer member of AFRIMETS. For more details on AFRIMETS, here is its website: <http://www.afrimets.org>.

The CAFMET was founded on March 30th, 2005. Since the beginning, it has been encouraged and supported by many African, American, Asian and European organizations. The CAFMET's main objective is to develop an effective members network in different countries, to date, we already count members from Benin, Cameroon, Egypt, France, Gabon, Morocco, Senegal, Switzerland, Tunisia. The CAFMET aims at settling its missions in Africa.

The CAFMET head office is in France, and it is composed of a general assembly, an executive board, a management committee. Although most committee members are industrialists, the committee is meant for all countries, all organizations or people interested in metrology. At the present time the committee involves both African and European members nearly in the same proportion.

The CAFMET is an independent and a non-profit organization. Since 2005, the number of its members has been increasing thanks to the different important events organized in Africa (Metrology Forums, International Metrology Conferences, Technical Workshops, Training sessions).

The main concern of the CAFMET is the "work floor" metrology and not the organisation of the institutions. Therefore, the CAFMET intends to provide the closest possible assistance to the local measurements needs.

First a brief history of the introduction of metrology in France will allow explaining and understanding the difficulties in African countries today. Until the 70's, there was no structured metrology organization in France. Some laboratories provided calibrations because industrialists needed them. The system existed and worked very simply: When an industrialist needed to have guaranteed and reliable measures to control his process; then he would ask a company to make "appropriate calibration". Progressively, it became necessary to coordinate the activities of all the calibration laboratories : that is why the National Office of Metrology (BNM : "Bureau National de Métrologie") was created in 1969.

Excepted, in a little number of African countries, the technical level of metrology is in general far from being equivalent to the American, Asian or European level. As a matter of fact, a national organisation of the metrology is important in any country, but what is still even more important is to have an operating metrology activity, especially in the industrial sector. In France, for example, the BNM was created in 1969 but the French industry had already been performing measurements with calibrated instruments for one century at least. The French metrology organization changed another time in 2005; the National Metrology Laboratory (LNE : "Laboratoire National de métrologie et d'Essais") took over the role of the Bureau National de Métrologie.

In Africa, it is not usual to have measurements performed on the basis of a calibration chain, but it is true that there is no a great demand for industrial measurements performed on the base of a sound metrology. The notion of improving the industrial process through the improvement of the quality of the measurements has not been really developed sofar.

That is why, it is useful to examine the market, to investigate and assess the needs for metrology in the industries and then to answer in establishing calibration laboratories which will be connected to the laboratories distributing the references.

Then, we will have to identify the entities, the bodies, the industries carrying out physical measurements and being in trouble, essentially for two reasons. The first reason is due to the lack of laboratories which can give the desired uncertainty, in Africa. The second one is due to the non existence of the corresponding SI unity.

Therefore, an investigation must be made into both the persons carrying out measurements and the persons requesting them in order to support the laboratories that can meet the needs of the industries.

These laboratories must have suitable references in relation with recognized national and international references to work properly. But if each instrument is to be sent abroad, it will be costly without mentioning the waste of time and the disorganization of the system. The solution is to establish, a body taking care of the best instruments, allowing the calibration of the instruments used by the calibration laboratories. In this way, a body saving the references and being useful to everybody can be established.

What should the nature of this body be? This body will have some difficulties to finance its work by its own commercial activities only, because it does not have a high productive capacity. Therefore, this body should be created apart of the market and should receive the help of the country and keep some kind of freedom towards industries, in order to be available for everybody. Its financing would be of another nature. This body could be established in association with some universities which have the capacity to use these laboratories to do research and development and to inform the students about metrology as well.

Currently, the needs are not properly expressed in most African countries and we are in a situation where there is no body to help industry reduce its production costs.

In fact, we should have an entity on-site, to frame, harmonise, formalise all the different activities related to calibration; this entity could prevent the fact that the calibration activities costs would support the references establishment.

The first reason why metrology knows trouble to develop itself, is the lack of basic infrastructures. For example, metrology training could take place in universities. This training must have a fundamental aspect, both theoretical and practical. Being an experimental science, metrology must propose practical works to train the students properly.

First, it is essential to be close to the field, to answer the users needs and then avoid the hollow organization which seems complex and can just be a brake for the development of metrology.

3. THE CAFMET'S MISSIONS

Whatever the field of analysis (the environment, food industry, human or animal health, etc.), the field of tests (civil or mechanical engineering, etc.) or the field of calibrations (temperature, pressure, mass, flow rate, etc.), the control of measurement process is essential to guarantee the reliability of the results given by the industries or the laboratories.

The CAFMET aims at sensitizing the African organizations (public or private) on the importance of metrology for the sustainable development of a country, helping them

implement metrological process, proposing tutorials given by international, well-informed experts, and having the competence of the laboratories recognized thanks to the quality assurance of the results they provide.

The axes developed by the CAFMET are:

- Promoting and spreading a metrology culture in tests, analyses and calibrations;
- Assisting African bodies in their development meeting the international standards drawn up by international organizations (BIPM, OIML, ILAC, EA, etc.);
- Contributing to sharing knowledge among the technical experts of African countries;
- Inviting international experts from all the world to take part in technical activities such as the drawing up of technical guides setting out common recommendations in metrology;
- Facilitating the participation of African experts in technical groups of other international organizations (BIPM, OIML, ILAC, EA, etc.) and in standardization committees (ISO, etc.).

4. THE ACTIVITIES OF THE CAFMET

In order to achieve its goals, the CAFMET has different deploying activities on the ground in Africa.

Among these activities, one, that the CAFMET considers very important, today, is the organization of several meeting points in Africa.

INTERNATIONAL METROLOGY CONFERENCE AND METROLOGY FORUM

One major obstacle to the development of the African metrology is its relative isolation from the rest of the metrology world. Another important obstacle is the bad knowledge of metrology by some of the African governments.

The African metrologists should benefit from meeting international metrologists; unfortunately the number of possible events is quite limited. Due to the costs, African people cannot afford to participate in metrology conferences organized on other continents. In order to connect African and international metrologists the CAFMET has imagined to bring international experts in metrology in Africa through the organisation of activities held in Africa. Therefore, the CAFMET started its activities by organizing several events in different countries in Africa with the hope that African governments will be more and more sensitized on the field of metrology.

The first event was organized in Casablanca (Morocco), it was a seminar on "Test and Calibration Laboratories Accreditation". That event was a small success considering the number of participants (less than 50), but was a great success because some important persons (from ministry and industry) were present.

After that first experience, the CAFMET held its First International Metrology Conference CAMET'2006 in the same town. During that event, several national metrology

institutes and countries were represented and there were about 200 participants.

That International Metrology Conference of Africa provided an opportunity for industrials and scientists to exchange information, share ideas and experiences. The conferences, tutorials and exhibitions worked towards the following objectives:

- promoting communication among companies, government agencies, universities, institutes of higher education and laboratories dedicated to the research and development of metrology;
- presenting the evolution of metrology and its importance to industry, quality management, the environment, safety and research;
- assessing the organizational techniques of the metrology function and see how to master this function and to evaluate the development of analysis as well as the measurement processes.

Different topics were proposed:

- Metrology Organization – Industrial and economic development;
- Metrology in Africa;
- Legal Metrology;
- Standardization, accreditation, certification;
- Metrology in Environment and health;
- Hygrometry;
- Electrical and Electromagnetic measurements;
- Statistical Process Control, uncertainties evaluation;
- Flow rate, Mass, Pressure;
- Pyrometry;
- Dimensional and optical measurements;
- Temperature and thermal measurements, etc.

Open discussions and an exhibition of professional stands were also proposed to participants along with the conference.

A few months after the international conference in Morocco, a Moroccan Metrology Organization (“Association Marocaine de Métrologie”) was created.

Unfortunately, few participants from Sub-Saharan countries attended that first great international conference in Africa. Therefore, the CAFMET decided to organize a METROLOGY FORUM in Dakar in 2007 to attract more Sub-Saharan countries ; As a result, more Sub-Saharan participants - from Benin, Ivory Coast, Togo, Gabon, Cameroon, Burkina Faso,... – came to Dakar.

Different industrial sectors from Senegal were present. Professor DIATTA, the Biofuels and Renewable Energy Ministry of Senegal delivered a speech in closing session and underlined the importance to have a metrology center in Senegal. Furthermore a Senegalese Metrology Organization (“Association Sénégalaise de Métrologie”) is now about to start.

After the event in Dakar, because it was a success, the CAFMET thought it was the right time to schedule an International Metrology Conference every two years and a Metrology Forum in-between. The CAFMET increased the

frequency of the events according to the needs and in order to be near people and countries everywhere in Africa.

The Second International Metrology Conference CAFMET’2008 was launched and organized in Tunisia in April 2008. It was also a success for the CAFMET thanks to the quality of conferences and papers (80 conferences), the number of participants from Sub-Saharan countries and from Europe, and also the support of different bodies. In the same time, the number of professional stands increased. The topics of CAFMET’2008 were similar to the ones of the first conference organized in Morocco.

During the first and the second international metrology conferences, and also the event organized in Dakar, several tutorial sessions were proposed to participants. Many African participants were more attracted by these sessions thanks to the interventions of world famous technical experts. The CAFMET decided then to carry out some technical workshops based on trainings.

TECHNICAL WORKSHOPS AND TRAININGS

The first great technical workshops were organised in Casablanca in June 2008. During four days, 150 participants attended three training sessions particularly oriented upon analysis domains. The same technical workshops were organized in October 2008.

Other trainings will be organized in 2009 in Benin and Gabon.

Different topics of trainings can be proposed like:

- Implementation of ISO/IEC 17 025,
- Implementation of ISO 10 012,
- Metrology in an analysis laboratory,
- Measurement uncertainty evaluation,
- Assessment of a laboratory according to ISO/IEC 17025,
- Temperature Measurement, etc.

Today, several technical experts are contributing to the training sessions, all of them are volunteers.

INTERLABORATORY COMPARISONS

The CAFMET intends to develop the activity of interlaboratory comparisons.

The CAFMET is now studying the best way to support this activity especially for tests and analysis laboratories. An organizing network is being created in order to define the main topics to develop.

5. THE FUTURE OF THE CAFMET

Other countries in Africa and in the rest of the world and many bodies are more and more interested in our activities. The CAFMET has no frontier, its members may be from anywhere in the world and from any bodies.

A sustainable African “work floor” metrology will be supported by organizing regional and international events in

Africa and by implementing more and more trainings. The CAFMET's activities allow metrologists to meet and to update the technical knowledge of metrology.

Two future events will be organized in Africa by the CAFMET:

- The METROLOGY FORUM 2009 will be held in Cotonou (BENIN), October 26-30, 2009;
- The Third International Metrology Conference in Africa CAFMET'2010 will be in Cairo (EGYPT), April 19-23, 2010.

For further information :

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