



## TRAINING

### A legal metrology training program in the Asia-Pacific Region

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#### Introduction

At its inaugural meeting in Sydney just four years ago the Asia-Pacific Legal Metrology Forum (APLMF) identified training of legal metrology staff as a major consideration. Of particular concern was the need to establish regionally consistent training to provide highly competent staff and harmonized legal metrology within the region; this greatly assists in the establishment of mutual recognition agreements within the regions.

#### Training policy

As a result the APLMF quickly developed a comprehensive training policy and has an ongoing training program for the region, in which the need for training at four different levels has been identified as outlined below:

- Level one:* Develop political awareness and commitment from senior administrators to enable the development of appropriate legislative and administrative structures, and financial support;
- Level two:* Develop the necessary knowledge and skills to put in place operational infrastructures through legislation, regulation and coordinated administration;
- Level three:* Train technical staff to develop a mutual understanding of OIML Recommendations so that these can be best implemented and train technical staff to enable them to monitor regulations, calibration and testing.
- Level four:* Raise the awareness of users and consumers.

Addressing training at each of these levels will ensure that an appropriate legislative and administrative structure is in place to provide the technical infrastructure to support the work of technical staff. Training at each level will use suitable and well-researched training techniques in order to achieve the identified outcomes for the target audience.

#### Training program

An ongoing training program has been developed in line with this policy and to meet the needs identified in a comprehensive needs analysis conducted throughout the Region during 1996. Over the last two years this program has included:

- a workshop/seminar on legislation and administration held in Tsukuba, Japan. Some thirty delegates from thirteen member economies attended and presentations were given by experts from Australia, Norway, Canada, and Japan. As a result of this workshop a resource document on modernization of legislative and administrative structures is being finalized.
- two introductory workshops on high capacity flowmeters and high capacity weighing.
  - The first workshop on flowmeters was held in Tsukuba, Japan and was attended by twenty-four delegates from thirteen member economies, with experts from Australia and Canada jointly presenting the workshop.
  - The second workshop on weighing was jointly organized and presented by the China State Bureau of Quality and Technical Supervision (CSBTS) and the National Standards Commission (NSC), Australia and was based on OIML R 50, R 106 and R 107. Some twenty-four delegates from fifteen member economies attended this workshop held in Shanghai; a site visit is pictured in Figs. 1 and 2.

- a train-the-trainer course on the pattern approval of nonautomatic weighing instruments based on OIML R 76. This course was initially trialed in Tsukuba in 1997 and a full course was held in Shanghai in 1998, jointly developed and presented by CSBTS and NSC. It was attended by some thirty delegates from sixteen member economies (see Figs. 3 and 4). The development of the train-the-trainer module is the result of a two-year cooperative project between China and Australia.

## Future plans

Following the successful development of the first train-the-trainer module launched in Shanghai it is planned to develop two further modules over the next two years using the same model.

The first is on the verification of nonautomatic weighing instruments according to OIML R 76 and the second is to be on the pattern approval and verification of drive-way petroleum and LPG dispensers based on OIML R 117 and OIML R 118.

The development of these modules is being funded by the Australian Agency for International Development (AusAID). The first module is close to completion, with the first train the trainer course to be held in Indonesia in August, 1999. It is planned to have the second module available early in 2000.

## Competency-based training approach used to develop the training modules

The train-the-trainer modules are designed as competency-based training (CBT), which is an approach designed to ensure that the student acquires the understanding and skills to the appropriate level specified by a recognized set of standards which are commonly called the "competency standards".

This approach then requires the establishment of these "competency standards", i.e. the specification of the knowledge and skill, and their application to the standard of performance required in employment. For these training courses the standards are determined by the specification of the knowledge and skills defined in the appropriate OIML Recommendations and Documents.

The only effective way to establish the application of the specified knowledge and skills is by direct, formal consultation with industry itself and with persons currently performing the task in a highly competent way. The direct result of this consultation is documented as the competencies and learning outcomes within the



Fig. 1 Automatic belt weighing conveyor at a major steel manufacturing plant in Shanghai (1998)



Fig. 2 Participants inspecting the weighing mechanism of the automatic conveyor belt weighing facility shown in Fig. 1

curriculum. This is the framework on which the training courses and modules are based.

In this way a competency-based training approach focuses any training program on the transfer of skills and understanding from experienced members of staff to less experienced staff. In the same way it can be used to transfer and develop similar skills and understanding throughout the Region, building confidence in the measurement systems between member economies and thus assisting in the development of harmonization and mutual recognition agreements.

## Developing the training materials

Once the curriculum framework is established (as detailed above) the development of the training module or materials can begin. These are designed to provide



Fig. 3 Workshop participants (Shanghai, September 1998)



Fig. 4 Participants in the Training Room during the OIML R 76 Train-the-trainer course (Shanghai, September 1998)

the teaching strategies, resources and ideas to ensure that the successful student will be able achieve the learning outcomes that have been set out in the curriculum.

For example, the training module on the implementation of OIML R 76 consists of:

- a trainer's manual that contains the curriculum, trainer's guide which provides step-by-step instructions on how to organize and run a training course, overhead projection slide masters, information and practical exercises to include in a student's workbook and a set of answers to the practical exercises;
- a procedure manual which contains an easy to follow procedure for each test required for pattern approval;
- a training video which visually demonstrates a number of the test procedures and which is now available in seven different languages including English;
- an sample student's workbook to be used as a guide to develop a student's workbook designed specifically for each training course;
- a computer program (as an optional extra) containing the evaluation reports based on OIML R 76-2 used by NSC.

The resources chosen to support the curriculum were carefully selected to be within the technologies readily available and within the budget of the majority of member economies within the Region. Other resources will be added as other technologies become more readily available and prove to be of genuine assistance in the training process. It is planned to develop the other modules in a similar way. A set of APLMF training modules to assist in the implementation of OIML Recommendations throughout the Region will thus be developed.

## Flexibility

The completed module on pattern approval has already proved to be very flexible. It was readily and easily adapted earlier this year in Australia (by NSC) to organize and run an industry training course on the requirements for pattern approval of nonautomatic weighing instruments. This involved modifying the student's workbook, changing the depth to which the testing procedures were treated and adding a section on the application requirements to submit an instrument for pattern approval.

## Training network

Successful training is a very interactive process involving the sharing of ideas, experiences (good and bad) and resources. The initial presentation of the training module at a workshop to potential trainers is only the first step, albeit a major one; the next most important step is for these new trainers to have enough support to use the module in organizing and running their own training courses within their own economy.

To help provide this support a contact network has been established among the whole group. This can offer advice, encouragement, assistance and most importantly the sharing of ideas, some of which can be used in the longer term to improve the module itself and to inform of the development of future modules.

The APLMF training program is very ambitious in what it has set out to achieve throughout the Region. In the same way to assist in its success, and to provide continuing support throughout the Region, a regional training network is now being established. This will provide the APLMF with a training contact in every member economy, a overview of the training currently taking place, as well as a list of all the training centers and colleges currently offering training in metrology. This information can then be shared throughout the Region.



## International network and accreditation

A great deal of effort, time and money is going into developing the APLMF training modules and to ensure they are internationally harmonized with OIML Recommendations. Could they be used successfully in other regions? If so, how do other regional organizations find out about them? Can other regional bodies who want to make use of them be confident that they truly reflect the criteria and test procedures set out in the OIML Recommendations and Documents? Perhaps they reflect regional and/or individual countries' interpretations and peculiarities?

These questions and problems were raised by the APLMF at the recent OIML Development Council Meeting. As a result of the discussion it was proposed that OIML consider international OIML accreditation of legal metrology training courses. This would ensure the quality of the product and an appropriate alignment to OIML criteria and Recommendations.

To do this would require the establishment of criteria setting out clearly what the minimum requirements would be for a training course to be considered for accreditation, the establishment of an assessment committee, one that is committed to the importance of the task so that the turn-around time is short, that appropriate training courses can be quickly accredited and out in the training rooms being used.

The selection of committee members is also very important, so that the courses that are accredited are educationally sound, technically correct and very practical. To ensure an appropriate balance would require expert input from a technical educator with experience in developing training packages and courses in metrology and preferably with experience in developing countries, expert input from a member of the technical committee that is responsible for developing the OIML Recommendation so that the interpretation is correct and expert input from a technical person who is currently implementing the Recommendation in the field.

Accredited training courses would then be put into an OIML register of training programs or modules to ensure members know about and have access to them. The register could be regularly published in the OIML Bulletin.

Effective training is more than a register of accredited courses, it is an interaction of ideas and experiences. In an interactive environment it will grow, develop and improve to meet ever-changing needs and demands. One way of encouraging this interaction is to establish an international training network, with regular reports and articles from members and regional organizations on training programs, on what is being used and/or achieved, what worked, what didn't work, etc. Again the OIML Bulletin could be used as the forum for the exchange of this sort of information, with a regular page for the OIML international training network. ■

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