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TRAINING IN STANDARDIZATION ✓

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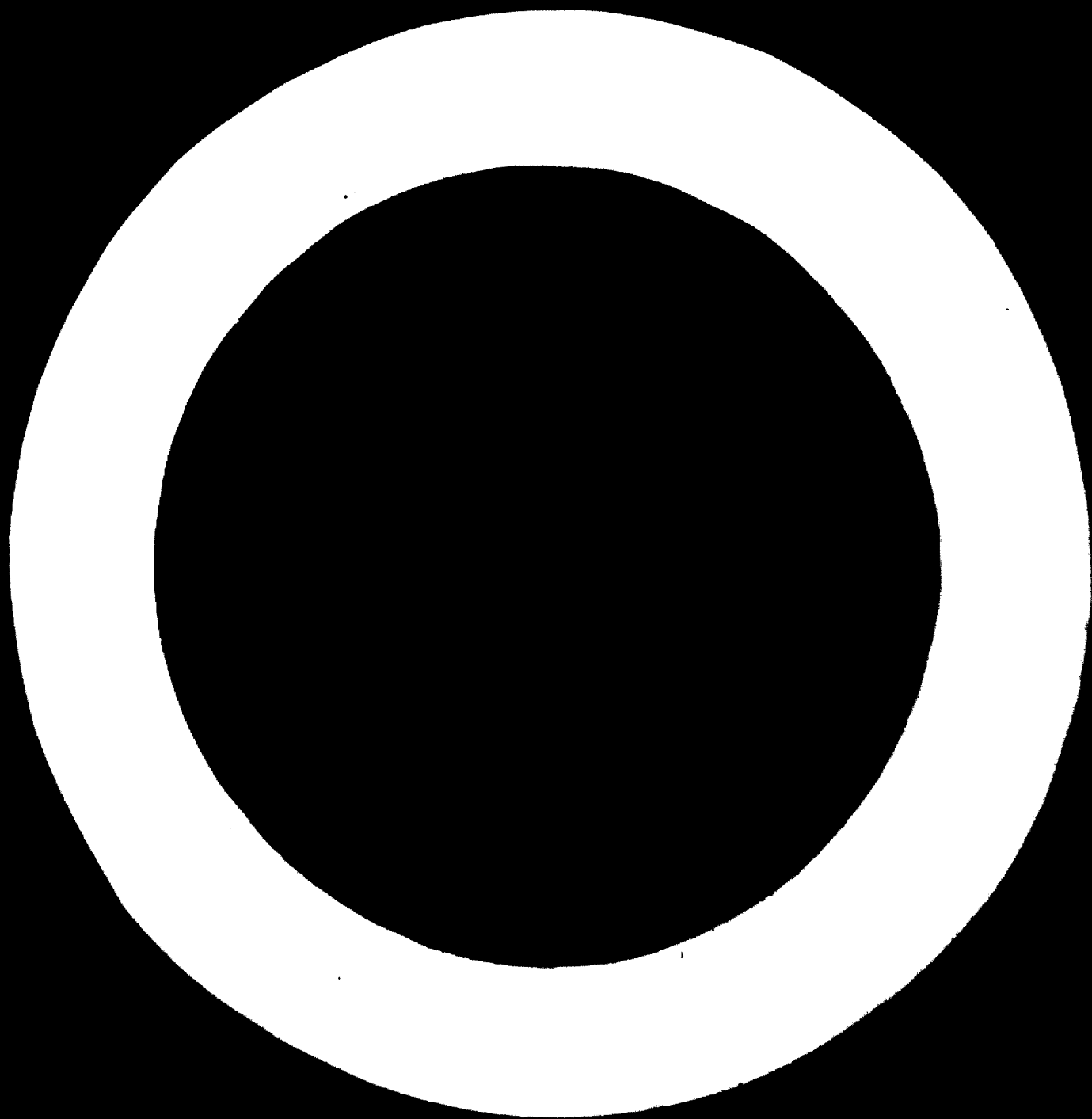


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TRAINING IN STANDARDIZATION

During the early days when wheels of industry started turning to mass produce goods at a scale without any parallel in the previous history, they also forced attention on the importance of standardization and interchangeability to forestall chaos which had started overwhelming both the producers and the consumers. At first, the personnel who took part in the preparation and implementation of standards were those who were immediately concerned with the production, design, use or other aspects of a product or a service. They did their job on the basis of their experience and no systematic efforts were ever thought necessary to impart them any specialized training for drawing up the standards. Further, since standardization pervaded the entire gamut of science and technology, specialized training in standardization was expected to be very difficult. Even today, although several countries have instituted training schemes in standardization, this subject does not form part of curriculum for study in the schools, universities or technical institutions in most countries of the world.

1. LEVELS OF STANDARDIZATION

1.1 More and more countries have realised that standardization offers special advantages as a powerful instrument for co-ordinated development which is the very basis of all planning. This realisation has led the countries to undertake standardization activity in a large measure at various levels.

1.2 Broadly, the levels at which standardisation activity is carried out are categorised as follows:

- Company
- Association
- National
- Regional
- International

The object and procedure for formulation of standards at each of these levels are different. At the company level, a standard will be solely concerned with the activities of the company whereas at the association level, co-ordination of activities of several companies with similar activities would have to be undertaken. At the national level, note will have to be taken of the related activities amongst a large number of companies and associations whereas at the regional level and international level the requirements of many countries of the world would have to be co-ordinated. In most of the developed countries, the standardization activity is initiated at the company level and then reaches the international level in stages through the association and national standards. Once an international recommendation is formulated through this process, the national and association standards are often modified to fall in line with the international recommendations unless there are specific reasons for not doing so.

However, in the case of most of the developing countries, the national standards institutions usually take up the responsibility of preparation of most of the standards at the national level and then get the company standards actively initiated. A typical example of this mechanism is provided by the standardization activity in India.

It is, therefore, important to note that in order to carry out the standardization activity at different levels the persons concerned should have a clear understanding of the methodology and objectives of standardization effort at each level which in turn underlines the need for proper experience and training. This is the reason why during the last two decades several countries have initiated different types of training programmes for the standardization personnel.

2. EXISTING PROGRAMMES

2.1 As mentioned earlier, several nations of the world have already introduced training courses in standardization for their own nationals as well as those from other countries. Information on the programmes of some of the countries is given below. This is by no means comprehensive, nor complete but may be taken only as illustrative of the attempts that are being made in many countries to meet the pressing need for trained personnel.

2.2 France

In order to develop the standardization activity, the French Standards Body (AFNOR), has made commendable efforts in imparting training to standards personnel. For many years, it has been welcoming visitors (over fifty each year) from all over the world who come to learn about the organizational structure of AFNOR, its methods and its work. The length of such visits varies considerably, from one day to several months, depending on the reasons and the purpose of the visit. In each instance, AFNOR arranges a programme for the visitors so that his requirement for information is satisfied to the fullest extent possible.

In an attempt to satisfy requests received from its correspondents, AFNOR has instituted training programmes for both individuals and groups. Over the past decade in addition to its training programmes for French engineers (which often received participation from overseas countries also), AFNOR has organized five 18-week training programmes for overseas engineers as follows:

- The first one, in 1961-1962, for 11 trainees from seven countries;
- The second, in 1963-1964, for 8 trainees from seven countries;
- The third, in 1966, for 21 trainees from 13 countries;
- The fourth, in 1968, for 18 trainees from nine countries;
and
- The fifth in 1970 for 19 trainees from 10 countries for six weeks.

Moreover, two training courses on standardisation have been offered to nationals of the French-speaking countries of Africa (each course lasting 12 weeks). The first one, held in 1967, was attended by 13 trainees from five countries and the second, in 1969, by 10 trainees from seven countries. (1) AFNOR has also sent experts to countries desirous either of setting up a national standards body or of benefiting, for a given period of time, from the assistance of an experienced person in standardization.

2.3 India

The following three types of training programmes are offered by the Indian Standards Institution (ISI):

- a) Training programme on national standardization for ISI officers;
- b) Training programme on national standardization for developing countries; and
- c) Company standardization training.

The Institution also organizes a number of other training courses including those for technical personnel in specific industries for familiarizing them with techniques of quality control and for teachers and instructors in engineering colleges and polytechnics for introducing them to the precepts, advantages and limitations of standardization.

2.3.1 Training Programme on National Standardisation for ISI Officers

Objective - The programme is aimed at imparting intensive and extensive training for standards engineers to work at the national level as officers of Indian Standards Institution.

Participation Requirements - The training is available to officers of ISI who are recruited directly after graduation in different branches of science, engineering and technology.

Duration - Two years.

Outline - The training is divided into four major phases as follows:

| <u>Phase</u> | <u>Approximate Duration</u> |
|--------------------|-----------------------------|
| a) Acclimatisation | 15 weeks |
| b) Study | 10 weeks |
| c) Practical | 25 weeks |
| d) Responsibility | 40 weeks |

Acclimatisation - On joining, each trainee is assigned to a Department of the Institution for which he is best suited. Here he is given some insight into the working of the Department and also of the Institution. Specific duties are then assigned to him under close supervision of a senior officer and without any detriment to the tasks specifically included in the scheme of training. The trainees after some time are sent in small groups to each of the other departments of the Institution in turn to acquaint themselves with every phase of Institution's work and to observe how inter-departmental co-ordination is achieved.

Study Phase - This phase consists chiefly of a course of lectures on principles and methodology of standardization and covers different aspects of the work of a national standards body. Each lecture followed by open discussion and coupled where appropriate with exercises is so organized that the trainees have by and large to teach themselves and learn to develop the faculty of independent thinking and self-reliance. Below is given list of subjects covered:

- Principles of standardization
- Organization for standardization
- Office administration
- Standardization in various fields
- Techniques useful in standardization
- Implementation and promotion of standardization
- Public relations
- Development plan for national standardization
- Materials management including inventory control value analysis, codification, etc.

The trainees, during this period, are also given opportunities to attend as observers some of the routine technical committee meetings. They are encouraged to raise questions regarding committee work at subsequent lectures for clarification. Practical exercises in drafting agenda, minutes, reports, standards, etc., related to the work of the meetings actually attended, are also assigned to them.

Practical Phase - This phase of training consists of two parts: (a) in-office training, and (b) in-field training. In the former, the trainees are given responsibility of acting as secretaries to panels and subcommittees and sometimes sectional committees, under the guidance of a senior officer. The in-field training aims at familiarizing the trainees with industries, testing laboratories and research institutions through a programme of visits. Industrial units having standards departments are particularly studied in detail. The trainees are instructed to evaluate the various problems that arise in formulating standards and at the end are required to submit critical reports on their observations.

Responsibility Phase - It covers almost the whole of the second year of the two-year period of probation. Trainees are expected to assume gradually the responsibilities of the normal work of the staff under the direct supervision of the Departmental Head, the pace being determined largely by the ability of the individual to work independently.

2.3.2 Training Programme on National Standardization for Developing Countries

Objective - This programme provides training in national standardisation for standards engineers nominated by the developing countries under Technical Co-operation Scheme of the Colombo Plan, Special Commonwealth African Assistance Plan and Indian Technical Economic Co-operation Programme. Under these Plans, financial assistance is provided by the Government of India to trainees sponsored by the respective governments. Prior to 1967, this training was being coupled with the programme for ISI officers, but suitably abbreviated to suit the needs of the nominees of the developing countries. However, since 1967 this training is being independently offered every year on regular basis.

Participation Requirements - Participants are required to have specialized experience in engineering or technology related to standardization with adequate standing to be able to make practical use of the training on return. A working knowledge of English is also an essential requirement. Those engaged in national standardization activity in their own country are given preference.

Duration - 15 weeks (January to April every year).

Outline - The training consists of the following phases:

- a) Acclimatization 2 weeks
- b) Study 10 weeks
- c) Practical 3 weeks

After the general orientation during the acclimatization phase, the trainees participate in lectures, group discussions, workshop sessions on principles and methodology of standardization and observe the application of the principles in the work of ISI. The subjects are similar to those enumerated for the training of ISI officers (see 2.3.1). The trainees are also given opportunity to attend meetings of ISI technical committees.

During the practical phase, the trainees visit industrial establishments, testing organization and other units of interest to enable them to see practical application of standardization in various spheres of industrial activity.

So far 47 standards engineers from the following countries have been trained by the ISI during the last seven years:

| | | | |
|--------|-------------|-------------|--------|
| Burma | Kenya | Singapore | UAR |
| Ceylon | Malaysia | South Yemen | Zambia |
| Ghana | Philippines | Thailand | |

2.3.3 Company Standardization Training

Objective - This programme is intended to train personnel in individual companies to set up and run a Standards Department of their own. In order to do that it is necessary for them to know the standards activity at various levels and also realize from a practical exercise the advantages of setting up of a Standards Department of their own.

Programme - The programme for training consists of three parts:

- a) Briefing sessions
- b) In-plant survey
- c) Review sessions

During the Briefing sessions, participants learn what company standardisation means and how the survey should be conducted to evaluate the standardisation status of a company. Useful techniques to undertake detailed project work in specific field are also discussed. During the in-plant survey, participants are expected to conduct a survey on the existing status and future

possibilities of in-plant standardization activity in their respective firms and also undertake detailed investigation on a specific project for development of one or more draft company standards. On the basis of evidence collected from the investigation, participants could formulate proposals for an organized in-plant standardization effort in their respective companies. Participants are required to write reports, including details of their observations, which they would submit to their managements at the conclusion of the programme. These draft reports will be discussed at the Review sessions. Unless participants prepare the draft report, they are not likely to derive the desired benefits from the programme.

Participant Requirements - Participants to these programmes are expected to be technical personnel of mature judgement and experience. They should have worked effectively with people at all levels in the company and should have adequate position and authority to carry out the task of realistic evaluation of existing status and future possibilities of standardization within their companies besides being capable of formulating proposals for organizing in-plant standardization efforts. Management representatives or heads of planning, design, manufacturing, inspection and quality control, stores and industrial engineering departments are among those who would benefit most from these programmes.

2.4 Iran

The Institute of Standards Industrial Research of Iran (ISIRI), Tehran, offers facilities for training in standardization including certification marking, quality control of agricultural products for export and industrial testing. This course has so far been offered twice, but may be organized again on a regular basis or may be specially arranged for a group of participants. Duration of these courses has been for about four and a half months. In this case, the participants are expected to meet their travel expenses, but ISIRI offers adequate subsistence allowances.

2.5 Japan

Japan has assisted countries on their way to development in South East Asia and Middle and Near East, Central and South America on the introduction of standardization as the basis of industrialization. Their course is of three months' duration on industrialization and Quality Control and is organized as a part of overseas technical co-operation agency under the Colombo Plan. The trainees (18 from 15 countries in 1969) were of medium standing in their respective countries. The curriculum consisted of the following:

- I. Orientation (one week)
- II. Lectures and practical exercises (ten weeks)
 - Essentials of standardization
 - Outline of quality control
 - National standardization
 - Legal metrology
 - Regulation standards (safety, hygiene, etc.)
 - Company standardization
 - Presentation of data

- QC installation and case studies in Japan
- Introduction to statistical methods
- Measurement, test and analysis
- Methods of sampling
- Sampling inspection
- Control charts
- Design of experiments
- Standardisation in design and drafting practice
- Product and materials specifications
- Standardization on production, planning and control
- Procedure of formulating standards
- Expert inspection system
- Certification mark system and informative labelling system
- International and regional co-operation of standardisation activity
- Publicity and training concerning standardisation and quality control

III. Observation tour (one week)

IV. Evaluation, report making, etc. (one week)

A similar course was repeated in 1971 for twelve weeks in which 18 trainees from 15 countries participated. (2)

2.6 Poland

(3) The Polish Standards Committee had several programmes of standardisation. These can be grouped under:

a) Programme of Training for the Personnel of the National Standards Body

Aims

- Information on the stage of standardisation in the company, national and international, and the scope of activities;
- Information on standardisation as a catalyst for the technical progress, development of production, importance of the quality of products, as well as the general improvement of human life;
- Training in the methods, organisation and procedure for standardisation.

b) Programme for Company Standards Engineers for Preparation and Application of Standards

Aims

- Training of personnel in the work of standardisation in the company standards division especially regarding the preparation and application of standards.

c) Programme of the training of the Lecturers Regarding Standardization Questions

Aims

- The purpose of the training is to train lecturers in standardization for all levels of education.

d) Seminar on Standardization for Doctorate Degree in Science

Aims

- The seminar receives participation from candidates having Master Degrees in one of the selected technologies. The main objective is to give suitable information on the theory and practice of standardization and to initiate the participants for independent studies of the economic and technical problems of standardization. The next objective is to assist the candidates to obtain the Doctor's Degree after they prepare the appropriate thesis and pass the prescribed examinations.

e) Programme of Training for the Managers and Directors of the Factories

Aims

- The training gives the participants the general view regarding the scope and effect of the standardisation activity as an important technical aid to achieve optimum economy in production.

2.7 U A R

The Egyptian Organisation for Standardisation (EOS) has taken certain steps to organize training in the field of standardization, metrology and quality control. Standards engineers of UAR have to go into the factories to learn first-hand how standardization could be best applied, to see what testing facilities are available and to try to understand production problems. They make the necessary investigations to determine the existing state of knowledge and development in the field in question. They have to discuss all matters relating to the specifications of the product and collect all the necessary data for preparing the primary draft standard which is then discussed by the concerned technical committee.

The training period in the factories covers the study and investigations of the following:

- The raw materials used for production and their specifications and properties
- Type of production
- Inspection of raw materials and compliance with their specifications on reception
- Materials which could substitute the original materials

- Conformity certificates to specifications for raw materials
- Effect of lower-quality raw materials on final product
- Proposals and solutions if proper raw materials are not available
- Storing conditions for raw materials
- Semi-finished products used and their specifications
- Inspection during production and inspection of final products
- Quality control system in the factory
- Testing facilities
- Tests carried on product and test methods adopted
- Factors affecting quality of product
- Consumers complaints
- Difficulties or problems encountered during production
- Research work aiming at higher quality level
- Criteria of acceptance and rejection

The standard specifications division in BOS supplies the standards engineers with all necessary instructions and data that would be helpful to them and assist them to prepare the primary draft standard on a concrete basis.

2.8 United Kingdom

The training courses offered by the British Standards Institution (BSI) are of several types.

There is one organized on an ad hoc basis to suit the requirements of each particular candidate, taking into account his qualifications, field of interest and duties to be taken up on return to his parent country. It is considered by BSI that courses of this kind, organized for individuals or for small groups with similar needs and qualifications, are more beneficial than general-type courses of very general nature.

A Typical Training Programme includes:

- A week of general introductory talks on the structure and organisation of BSI and the operation of its various departments;
- A period of attachment to the relevant technical division; and
- Visits to Government departments, National Physical Laboratory, testing agencies, trade associations, research laboratories, certifying bodies, and individual firms in the industries concerned.

The programmes are always planned in advance, in consultation with the various agencies concerned, but are sufficiently flexible to allow for any modifications, which may be requested by the student as the course progresses. The normal duration of a training programme is 6-12 weeks. The majority of students come to BSI through the British Council or the Ministry of Overseas Development, under the technical assistance training award scheme, sponsored by the British Government and sometimes they are financed by the UN Technical Assistance funds. During the last 18 months, BSI has organized amongst others,

courses for students from Thailand (Scientific Officer in charge of calibration and testing); Singapore (Standards Officer); Jamaica (Senior Scientific Officer in charge of testing and quality control); Malta (Standards Laboratory Analyst); and Iran (Textiles Officer).

2.8.1 Courses for United Kingdom Engineers and Management

In addition to organizing training programmes for students from overseas, BSI also provides courses for standards engineers and management within the United Kingdom. These programmes are arranged by the BSI Standards Associates Section.

The programme provides for three types of courses:

- a) For management executives, to convince them of the advantages of standardization;
- b) For standards engineers with experience of standardization in their companies;
- c) For beginners in standardization work.

So far, efforts have been directed to type (b) and two such courses have been held at Manchester University, and one at the University of Strathclyde. These have been of 3 - 4 days' duration with an attendance of 35 - 40 persons. All the three courses have been financially self-supporting.

The type (b) courses have been undertaken wherever possible in collaboration with universities which have a school of management studies preferably allied to engineering or other technical departments with an interest in standardization. Lectures at the course so far held have come from the universities themselves, industry and BSI. In this way new ideas and the result of research at the universities can be combined with the practical experience of industry within the framework of national and international standardisation.

The courses include talks on the management of a standardisation policy in a company; coding, allied to an efficient system of information retrieval as a means of avoiding unnecessary or costly stocks; a company's market strategy and product planning; variety control, value analysis and the results of new research into improved costing techniques for management control and their usefulness for standardization.

In the courses so far held, an attempt has been made to show how standardization can be applied to all company functions, finance and administration, as well as production. The aim is to raise the status of the standards engineer in the United Kingdom and to make him feel that he has a share in planning for the greater profitability and efficiency of his company.(4)

2.9

U.S.S.R.

The Committee of Standards, Weights and Measures Equipments of Soviet Union organizes a number of training courses to provide requisite information on the problems of quality, economy and metrology to engineers and other managers of production and trade.

Training on standardisation foresees three kinds of basic courses for standardisation for:

- a) High school of technology;
- b) High school of economy;
- c) Secondary school of technicians.

The Institute of Standardisation Science, Moscow conducts two series of programmes on the technical and economic implications of standardisation in the following industries:

- Chemical industry
- Heavy industry
- Mechanical industry
- Agriculture industry
- Electrical industry
- Radioelectrical industry
- Electronical industry

These programmes are meant for engineers and managers working in factories. National supervision and ministerial control exists regarding the application of standards in production, evaluation of quality and testing of products.

2.10

West Germany

The standards body of West Germany (DIN) has instituted the following programmes of training:

a) Courses for Standardisation

The course includes lectures on the following subjects:

- History of standardisation
- Organisation of standardisation
- Information on standards
- Techniques of preparation of standards
- Activity and achievement of standardisation
- Tactical indication for standardisation works

b) Course for the Specialists in the Planning and Steering System in Standardization

The course includes lectures on the following subjects:

- Planning and structure of the division for standardization
- Organization and officers for the standards division
- Number of standards and basis for economic gradation
- System of numbers for the organization purposes
- Aggregate active system as the rationalization of the effects in production
- Electronic data processing in standardization:
 - collection of data
 - programming
 - application
- Technical micro-picture of standards
- Economy of activity of standardization inside the standards committee
- Analysis of function, costs and effects of standardization
- Plan on needs and technical purposes of standardization
- Equipment and means for standardization action
- Main tasks and aims of DIN

3. NEED FOR ORGANIZING TRAINING COURSES AT DIFFERENT LEVELS

3.1 It may be noted from the existing training programmes that training courses are generally being organised for training personnel of the following types:

- a) Officers for manning national standards institutions
- b) Company standards engineers
- c) Top management personnel, and
- d) Technical personnel from developing countries

3.2 Training Programmes for Officers for Manning National Standards Institutions

It has come to be realized that standardization is a special field of activity and that this activity could be sped up and carried out more efficiently if the personnel concerned are given special training in this field. It is important that the technical personnel engaged in the preparation of national standards are fully aware of the procedures adopted in the preparation of national standards, availability of national standards of other countries, the working of other national standards bodies and international organisations engaged in similar work, basic standards which have already been published and also the status of the present industry, the procedure for quality control and methods of testing, etc. It is, therefore, important that these persons are

given a set of lectures to acquaint them with the broad principles of standardisation, on-the-job training for conducting the business of the technical committees and in-field training in the industry, so that the problems of the industry are kept in mind while preparing the national standards.

Such a programme has been run successfully for the last ten years by India from which the Indian Standards Institution has derived considerable benefits. In fact, at one stage, it was extremely difficult for ISI to recruit technical personnel for manning its various activities. But when this training programme was introduced such a recruitment was possible without much difficulty.

An ideal training programme should comprise instructions to the trainees on principles and methodology of standardization and different aspects of the working of a standards body. The trainees should be guided in grasping the fundamental concepts and their application to day-to-day problems of standardisation. The trainees should also receive a series of lectures in addition to participating in group discussions to work out solutions of practical problems. Briefly, the emphasis should be on the trainees to teach themselves and to develop the faculty of independent thinking and self-reliance.

This should be followed by in-field training, where opportunity should be afforded to the trainees to gain practical experience in the office as well as in the field. In the office, the trainees could be given responsibility to act as secretaries of small committees under the guidance of senior officers. The training in the field should aim at familiarizing them with the industries and organizations with which they might come in contact in their future work. Visits of the trainees should, therefore, be arranged to factories, testing laboratories, research institutions, etc., including units which hold the licenses for operating the national Certification Mark. In selecting the organizations for such in-field visits, preference should be given to those having standards departments where the trainees might have opportunities to prepare company standards.

The third and the completing phase should consist of inducting the trainees into actual work based on the experience gained in the earlier phases. In this phase the trainees should be put under the direct supervision of senior officers in the standards institution and with their assistance should gradually take over the job of handling independently the work and secretariat responsibilities of technical committees. By the end of this phase every trainee should normally be fit enough to devote his entire attention and energies to the regular work of the Department to which he is assigned in the institution.

3.3. Training for Company Standards Engineers

A company standards engineer has to have a general and overall knowledge of the working of the company right from the stage of preparation of drawings and designs to manufacture of products, their treatment, packing and dispatch besides being fully informed regarding the procurement of raw materials and the administration of the company as a whole. A competent company standards engineer can effect substantial streamlining in the working of a company and

bring considerable savings in terms of materials, money and effort. His proper training, therefore, assumes key significance particularly as it would take the benefits of standardization down to the operational level in industries in countries which have already achieved a certain level of industrialization. The training, of course, will be intimately concerned with imparting instructions to company engineers in standardization methods and techniques to promote and develop organized in-plant standardization practices in industry. The emphasis should be on developing a group of persons to survey and evaluate the status of existing company standardization practices in their respective firms as a first step and thereafter the establishment of a formal standards activity in companies in line with national standardization effort.

3.4 Training Programme for Top Management Personnel

The basic aim of organizing training for management personnel should be to bring home to them the value and importance of initiating standards activity in their plants with full management backing. The training could take the form of symposia or conferences, lasting no longer than a day or two, and organized with the active co-operation of the eminent leaders of industry, trade and technology. A standards programme is only as strong as the support it receives from company management. Of course there is a natural case for management to extend full support to standards programmes because they can make and save money for every company in business. Within a company itself management support for the standards activity perhaps can best be expressed in the form of a managerial standard defining operation and procedures for standards programme, approved and signed by a top company official, such as its President or General Manager. The training should underline the need for the management to ensure that standards are recognized, put into force, kept in operation in each division, department, section, or group of its organization, and also kept dynamic to meet future needs and changes in the industry, consumer requirements, and customer satisfaction. (5)

3.5 Training Engineers from Developing Countries

The developing countries attempting to establish standards institutions urgently need trained standards personnel fully acquainted with basic principles procedures and methodology of standardization. No international centre exists anywhere in the world today to cater to this need for training of specialized personnel from different countries. In developing countries, the demand for well-trained technologists for manning the production and planning operations of fast-growing industries is such that standards organizations find it most difficult to recruit experienced personnel. They have by and large to depend on the younger and relatively less experienced engineers and technologists, who naturally require an amount of specialized training in standardization before they could take on their weighty responsibilities.

The training programme for engineering personnel in an established standards body could have a duration of about 15 weeks divided into the following three phases:

| | |
|----------------------|----------|
| Acclimatization | 1 week |
| Study and Practicals | 13 weeks |
| Report Review | 1 week |

During the acclimatization phase, the budding standards engineers could study general literature on standardization to help them understand the working of a standards body in a developed or developing country and provide answers to many questions which they might have in mind. During the study and practical phase the heads of departments as well as other officers of the standards body could address the participants on the fundamentals of standardization and their application to practical problems. The lectures should be followed with a question and answer session to resolve doubts. The participants should also be given opportunity to attend meetings of technical committees to have first-hand experience of working of committees.

During the practical phase, the participants should visit industrial establishments, testing organizations and other units of interest to enable them to see practical application of standardization in various spheres of industrial activity. Individual programme of visits could be organized to suit the subject of specialization of the participants.

The final phase is meant for giving the participants an opportunity to write an objective report on the possibilities of applying the knowledge gained by them on return to their respective countries. These reports should be discussed before the completion of the programme.

4. PLANNING AND IMPLEMENTATION OF TRAINING PROGRAMMES

4.1 Depending upon the needs of every country, it is necessary to draw up suitable training programmes for personnel at various levels indicated earlier. The Development Committee (DEVCO) of ISO is seized by this problem and has already made a beginning by drawing up typical training programmes for standards engineers which are reproduced in Annexure I. For training of personnel for working in the national standards bodies, it would be useful to adopt the training programme currently used in India with such modifications as may be needed for the country concerned. The duration of this training course which is at present two years could also be modified suitably.

Similarly, the company standardisation training as adopted in India, with a duration of about two to three weeks, which include briefing session, in-plant survey and subsequent review sessions, has been found very useful by the Indian industry. This programme could be adopted with suitable modifications by the developing countries.

The training programme for management personnel would consist of a series of lectures explaining the principles of standardization, the benefits of standardisation to the industry together with certain case studies to bring home to the management the importance of standardization and the need for setting up of standards departments in individual companies. Such a training programme will normally last for one to three days.

The developing countries could also take advantage of the current training programmes being organized by several other countries including France, India, Iran, Japan and UK. As explained earlier, the duration of training for such courses normally lasts up to three months.

5. INTERNATIONAL ACTION

5.1 Even from this incomplete review of the training programmes available in various countries, it is evident that the need for training standards personnel is recognized throughout the world and each country in its own way is trying to help itself as well as other countries in this task. Time is, therefore, ripe for an international effort for co-ordinating and augmenting training programmes for standards engineers in the various countries. Such an effort is particularly needed to unify the curricula and training periods as obtaining in different countries so that the experience of all the concerned authorities is pooled together for providing uniform training to technical personnel on global basis.

Such an effort could be undertaken by a world authority like the UNIDO which has the necessary financial resources. The outcome of such an effort to make available trained specialists in standardization on global basis would be not only valuable to developing countries but may also benefit developed nations. This will also bring into sharp focus the need for developing and making available basic standardization literature to feed the need of curricula at different levels. The aims and targets of international action have been admirably summed up by Dr. Lal C. Verma, (7) former Director General of ISI and at one time Chairman of the Development Committee of ISO:

a) Training of standardization specialists.

To begin with facilities for a small number of trainees may be provided, with the possibilities of increasing them as the demand arises.

b) Development of standardization technology.

This will require organization of symposia and conferences of leaders of profession for exchange of knowledge and experience, having the specific object of stimulating research on the advancing frontiers of knowledge and its codification.

c) Conducting research in original problems

Specifically the problems of developing countries may be given particular attention, which have no counterpart in the more developed countries, such as for example how to approach systematically the problems of standardization in the field of cottage industries and small scale industries. Then there are

many problems of universal interest, such as those dealing with the procedures generally adopted and their efficacy; the unduly long time involved in preparing national standards; the psychology of representatives and volunteer workers on standards committees; the effects of standardization on the economy of nations; and so on.

- d) Preparation and publication of basic literature on principles and practices of standardization

At present there is a great dearth of such literature, including textbooks for use in teaching and training. This effort will require as a step the collection and compilation of whatever literature is available in all parts of the world, so as to have it available for ready reference of the training and research staff.

- e) Establishment of a documentation centre.

A comprehensive documentation centre on the pattern evolved by UNESCO could render useful service by supplying free on demand any information on standardisation to developing countries, who could not readily afford to set up extensive libraries. Translation facilities from the various languages of the world (estimated number: 35) in which standards and standards information are being published should form a part of the services of the centre.

- f) To provide a source of professionally competent experts.

The teaching and research staff would constitute a valuable source of personnel required for highly specialised studies, surveys and reviews for assisting the promotion of standardisation among developing nations.

ANNEXURE I

STANDARDIZATION CURRICULA SUGGESTED BY DEVCO

a) TYPICAL TRAINING PROGRAMME FOR PERMANENT MEMBERS OF STAFF OF A STANDARDIZATION INSTITUTE

Lectures

- What is standardisation?
(Brief history, general characteristics)
- Organisation and function of a standardization body
- What a standard provides, a typical plan
- International standardization
- The development stages of a standard
- The problem of direct contact with industry and the standard user. Councils, participating or correspondent members, miscellaneous assistance, dissemination of standards, etc.
- Standardization and metrology
- Standardisation and quality
- Standardization and safety
- Marks indicating conformity with standards
- Standardization and the public markets
- Standardization of products used in agriculture
- Weighing and measuring methods
- Standardization in the field of refrigeration
- Standardization and trade
- Standardization and agricultural machinery
- Standardisation in the textile field
- National standardization: publicity problems
- Economic aspects of standardization
- Standardization and the company
- The working programme of a newly created standardisation institute

Themes for Practical Training

Development of a Standard

- Establishing a draft proposal
- Study of a draft proposal by the committee
- Establishing the minutes of a meeting
- Establishing a second draft proposal
- Consultation : dissemination of draft
- Consultation : preparation of analysis of comments
- Committee meeting after consultation
- Drafting of final draft and submission for approval

International Standardisation

- Application of ISO Directives
- Application of the ISO Guide

Marks Indicating Conformity with Standards

- Setting-up of a special committee to administer the mark
- Enquiry of application for license
- Complaints - sanctions

Miscellaneous Work

- Drafting a press communique and a news bulletin
- Drafting a leaflet on popularisation
- Preparing a text for use in schools
- Practical work on particular standards

b) TYPICAL TRAINING PROGRAMME FOR COMPANY STANDARDS PERSONNEL

Lectures

What is standardisation?
(Brief history, general characteristics)

The different levels of standardisation:

- international
- regional
- national
- professional
- company

Place and function of company standardization
Programme and management of company standardization
The different forms of expression of standardization
General reference data for the practical management of
standardization activities
Nomenclature and codification in a company
Document retrieval
Practical management of standardization activities
Practical management of standardization studies
Reduction in variety
Standardization and supply
Standardization and technical drawing
Standardization of test methods
Quality control
Analysis of the value
Forecast and verification of the results of standardisation
activities
Dissemination of standardisation documents to company
personnel

Themes for Practical Training

Selection of subjects - establishing a programme
Nomenclature and codification, the tools of standardisation
Document retrieval
Conducting a study (documents, methods)
Conducting a meeting
Calculation of action
Dissemination of documents

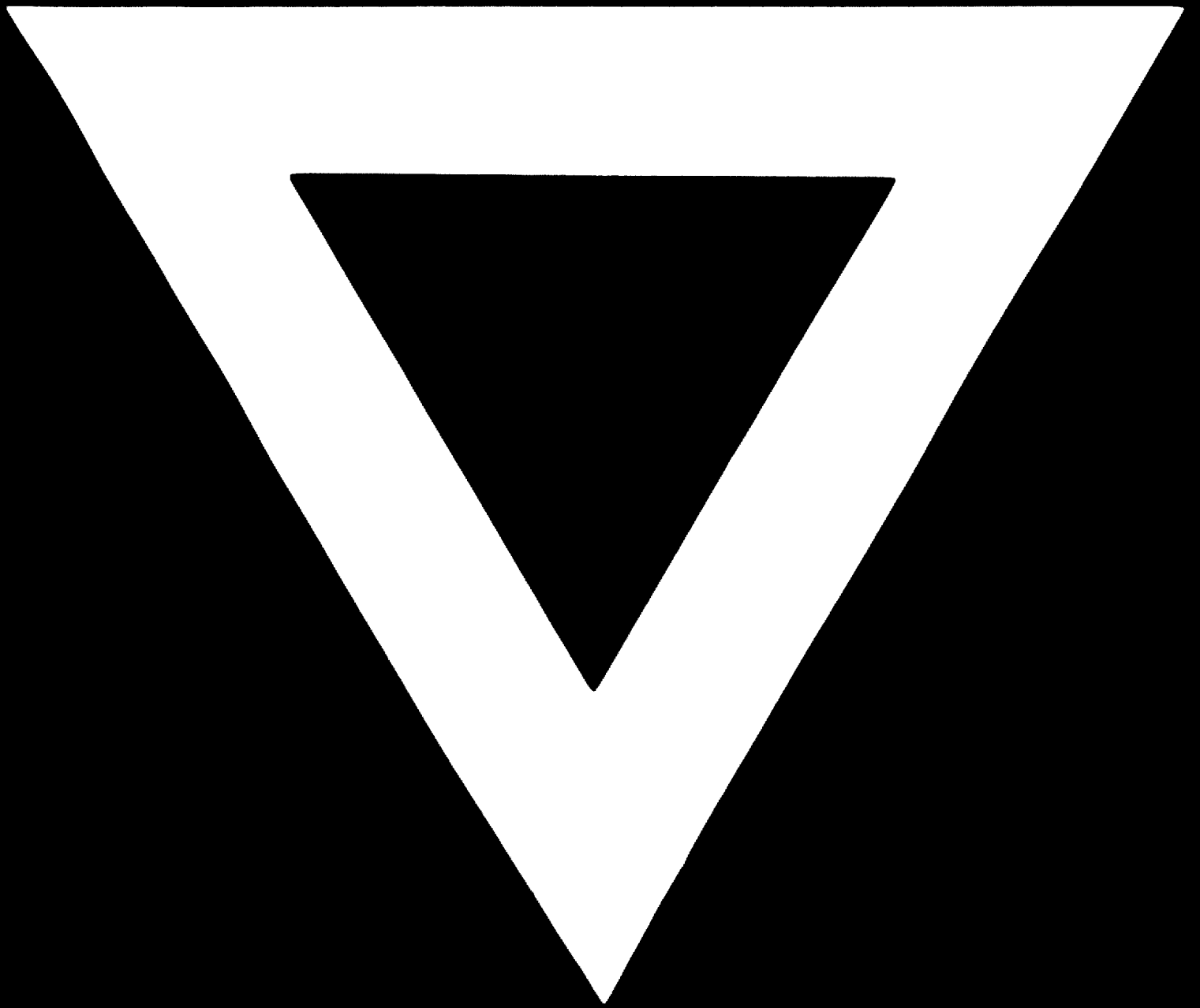
c) **TYPICAL PROGRAMME FOR INFORMATION DAY FOR OFFICIALS IN THE
ECONOMIC FIELD**

Morning : What is standardisation?
(Brief history, general characteristics)
Afternoon : Standards in economy
The policy of company standardisation
Examples of results

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