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INDUSTRIAL DEVELOPMENT AND STANDARDIZATION

Presented by the Executive Director of the United Nations Industrial Development Organization and by the Executive Secretary of the Economic Commission for Asia and the Far East

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I. IMPORTANCE OF INDUSTRIAL STANDARDIZATION FOR ECONOMIC DEVELOPMENT OF DEVELOPING COUNTRIES

Problems of developing countries in industrialization

1. Standardization, conceived as an instrument for bringing order out of chaos, now serves a vital economic need of the individual and the community. In most of the developed countries in Europe and North America, the large-scale industrial development following the Industrial Revolution was not really based on any co-ordinated effort, but a result of the pressure of economic needs and forces of trade and in all these countries organized standardization took its rightful place only at a much later stage, i.e. when the industries were fairly advanced. The introduction of standardization was brought to co-ordinate, adjust and introduce economy and harmony in the existing patterns of industry, which had, to say the least, developed in a haphazard manner. Standardization was introduced as a remedial measure mainly in the form of simplification or unification, to reduce the number of sizes and types of products - the uncontrolled growth of which had made production uneconomical - and to achieve interchangeability of components and parts.

2. If the developing countries have to catch up with the industrially advanced countries in as short a period as possible, they cannot afford to allow their industries to go through the same experience. They can bypass the eighteenth and neneteenth century problems experienced by the developed countries by the judicious application of standardization from the earliest stages of planning, design and establishment of industries. The modern form of organized standardization is as much an instrument of direction and co-ordination as of efficient production and distribution; its application at early stages ensures interchangeability and eliminates the need for the reduction of variety from arising.

3. The rate of economic growth of developing countries depends to a large extent on systematic and rational development of the industrial sector on the basis of the latest achievements of science and technology. Some of the major problems that countries have to tackle in the process of introducing balanced industrialization on a broad front centre around the following points:

(a) Closer integration and co-ordinated development of different types of industries, both in the small and large-scale sectors considered viable for the country's economy;

(b) Optimum utilization of available human resources and material resources, maximum use of capital equipment and systematic exploitation of unexplored resources;

(c) Rapid development and provision of power, transport, communication and marketing facilities;

(d) Rapid transfer and maximum use of the accumulated wealth of technical know-how and practical experience from the industrially advanced countries with a view to envolving correct procedures for installing and maintaining heavy machinery such as transformers, rectifiers, boilers, etc. and minimizing wastage during handling, processing, transport and marketing of products;

(e) A check on the growth of an unnecessary variety of materials, parts, tools and appliances, and an assurance of their interchangeability;

(f) Assurance of consumer satisfaction of products through their quality, serviceability and workmanship at economical cost;

(g) Raising the quality and quantity of exports to augment foreign exchange resources to freely enable importation of capital equipment, machines components, specialized items and basic raw materials;

(h) Bringing the results of applied research expediously to the doorsteps of industry and consumers.

Organized standardization provides effective solutions to these problems and helps developing countries to change over to an industrial economy in a systematic and orderly manner.

Standardization as a co-ordinating factor

4. The developing countries are attempting to create within a short period of time adequate economic strength, often with limited resources and under severe population pressure. This requires a great deal of co-ordinated, integrated and co-operative planning for various sectors of national economy, optimum exploitation of natural and human resources of the country, increase in the agricultural and forest produce, development of power transport and industries and expansion of social services programmes, such as education and health. Organized standardization which in the past few decades has emerged as one of the major co-ordinating factors for orderly economic development on a planned basis, can play a unique role as a regulatory and guiding discipline in uplifting various sectors of a developing economy. This role is particularly significant in the development of the industrial sector. It is essential, therefore, that the plan for industrial development of a country provides for the functioning and growth of dynamic standardization activity which will serve as a catalytic agent for continuous and harmonious growth of industry, trade, transport and other allied sectors of national economy, and thereby ensure the fulfilment of the national development plan as a whole.

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5. Standardization is both the cause and the effect of industrial growth; the relationship between the two is so intimate and vital that neither one can have a healthy and sound growth independent of the other. Just as the orderly development of modern industry is not possible without the use of efficient standards, so the development of a standardization activity on a large scale without an expanding industrial sector to implement it and make use of standards is also wasteful.

6. It has been pointed out previously that standardization leads to optimum utilization of resources - human and material. For a country attempting large-scale development, such utilization of resources and achievement of a high level of productivity are of obvious importance. Standardization must be brought into full play to utilize the scarce scientific and technical manpower to the best effect, and to expand it through integrated training programmes.

7. Modern industries are closely interdependent in many aspects and call for close co-ordination. The raw materials, the processing materials and the equipment of many industries are the finished products of others. The growth of industry in any country is marked by a closer and intensive integration, with a corresponding rise in the interdependence among various sectors of the industrial structure. Each sector has to look to others for the supply of raw materials, machinery, components and services and in turn, it provides similar facilities to other sectors. The complex relationship cannot be sustained unless adequate understanding of the products and processes involved is achieved at the innumerable contact points at which products pass from one hand to the other. Standards serve as a common language and

facilitate the flow of products and services through transition points in an orderly and efficient manner. Thus a network of national standards is necessary to create and to strengthen the vital links between related industries and to establish the close integration among them that is so very essential to progressive industrial growth.

8. Organized standardization on a national level is a co-operative activity in which various sectors of industry and trade, professional and consumer societies and associations, the Government of the country, scientific, technical and research institutions all take part by contributing their special skills and know-how. The national standards body, as the focal point for this activity, plays the role of central co-ordinating agency and brings together the diverse interests in its forum and stimulates close collaboration among them. This activity helps to pool the technical know-how and the mature experience available in the country in specific fields for the common use of all. Such activity is of special interest and value to developing countries where technical know-how is limited and has to be applied effectively to yield maximum benefits. For example, the United Arab Republic which started organized standardization in 1957 held 819 meetings of its 192 technical committees during the years 1964 and 1965. About 1,050 technologists, specialists and experts from different parts of the country working diverse sectors of the economy, participated and contributed their know-how and experience to these committees. It has been observed in the early stages in certain fields the views of the interests concerned were so divergent that without this unique machinery of the national standards body, there were no grounds for reconciliation.

9. One of the common means generally adopted by developing countries to accelerate the pace of their industial growth has been to seek collaboration from the advanced countries in setting up new industries.

Such collaborations supplement the meagre resources of developing countries by saving foreign exchange and bringing in advanced technical know-how. There are innumerable examples where various industrial groups in advanced countries or Governemnts have provided financial resources, capital equipment, technical personnel and industrial know-how to set up new industries in developing countries. These collaborators in most cases bring in the design, the detailed requirements of raw materials, jigs, fixtures and tools, etc. based on standards set up in their own country. A sequel to this importation of collaboration from different parts of the world has been the multiplicity of standards for the same type of materials or product in the recepiant developing country.

10. To cite an example, in India collaboration to promote industrial growth had been sought from all available sources. A number of units in the same industry set up by collaboration with different countries brought into use innumerable varieties of the same material most of which had to be imported to maintain production lines. When, due to an acute foreign exchange position of the country, the required varieties of materials, parts, components, etc. could not be imported, many of the industries had to slow down production and expensive plants and machinery were rendered idle. In the context of the imperative need for import substitution, it is obviously essential to minimize to the extent possible the varieties of imported equipment and material. The Indian Standards Institution (ISI) is fully aware of this problem and has been taking remedial measures to simplify and reduce the varieties of such materials. ISI has also evolved measures to be adopted for future collaborations to avoid the recurrence of similar difficulties.

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Standardization in small industries

11. In addition to setting up a few heavy, basic industries with overseas collaboration (or otherwise), industrialization in developing countries requires the establishment of a large number of industrial units in the medium and small-scale sectors. The economic success of these medium and small industry sectors is more dependent on good national and international standardization programmes than the success of big industries. Big industries by the sheer size of their purchases are able to impose many of their standards on suppliers and buyers. Small industries cannot do this but must buy their raw materials and products in accordance with the prevalent national or international standards.

12. One of the easiest ways for small industries to build consumer confidence in their products is to manufacture in accordance with national or international standards. The ability to state that their products comply with a specific national or international standard compensates for many inadequacies they confront in marketing. This is particularly important in the starting-up operation of new small industries. The availability of national standards also encourages the use of company standardization and quality control techniques in these sectors which in turn encourage higher quality production from small industry. This is important because it is imperative that the quality of the goods produced by them is in no way inferior to that of the goods produced on mass scale in larger industries.

13. Thus standardization activity in developing countries where the development of small-scale and cottage industries forms a part of national economic growth, requires that special attention be given to the products of small industry. This is a new component in the standardization activities of developing countries for which little guidance or assistance could be derived

from the developed countries. Only other developing countries that have gone through this experience can be of assistance in this regard.

14. Attention to this facet of standardization has been paid by the Indian Standards Institution which has laid down a number of national standards for products made in cottage or small-scale industries, particularly those entering export trade, such as handloom fabrics, carpets, druggets, vegetable oils, sports goods, cutlery and builders' hardware.

Export promotion through certification-marking

15. Export trade demands particular attention to the quality and standardization of products. In foreign markets products have to compete with similar products imported from other countries; if a product is inferior in quality, the market will be lost forever.

16. Certification marking makes an effective instrument and is a lever in the promotion of overseas trade of a country. The success of Japan in establishing foreign markets is due mainly to its compulsory pre-shipment inspection regulations based on national and international standards.

17. China, India, Pakistan and Philippines have also taken steps to extend the use of standards for controlling quality of their exports by establishing pre-shipment inspection agencies.

18. To imporve the overall quality of exports and to build up markets in new products on a lasting basis, developing countries should formulate a central guiding system for quality control and pre-shipment inspection and should set up an agency to conduct its activities.

II. NATIONAL STANDARDIZATION - A SURVEY OF PRESENT CONDITIONS

19. The developing countries for many years have been suppliers of raw materials to the developed countries and have normally shown little interest in standardization. The increased interest in industrial development that followed the First World War gave the original impulse to the present movement of industrial standardization. At the same time industry of the developed countries experienced a great technological transformation. These changes which were later accentuated by the Second World War brought into focus the full benefits of interchangability of parts, compatability of components and mass production as the offspring of national and international industrial standardization. With the present extensive use of standardization in the developed countries, the developing countries are now forced to promote national standardization as a necessary measure for the survival of their incipient industry in an increasingly competitive world market.

Africa

East Africa

20. The East African sub-region comprises thirteen countries and territories: Burundi, Ethiopia, French Somaliland, Kenya, Madagascar, Malawi, Mauritius, Rwanda, Somalia, Southern Rhodesia, United Republic of Tanzania, Uganda and Zambia. Except for the Standards Association of Central Africa, covering Southern Rhodesia, Zambia and Malawi, other countries have not yet developed standards organizations. British or French standards are in use depending on which ones were first introduced in the country. Standards of countries which had their political connections with France use the metric system of weights and measures, while in the majority of the former British colonies, the foot-pound system is still used. There is a move in some countries to change over to the metric system. Southern Rhodesia and Zambia are the only two countries which have a system of testing products and certifying their quality.

21. At present in Madagascar standards based on the French norms are used in several technical fields, but the formation of a national standards institute is under active consideration by the Government, which also has shown interest in international standardization by joining the ISO as a correspondent member.

22. A proposal to establish a national standards institute in Ethiopia is under active consideration by the Government. Ethio-Swedish Institute of Building Technology (ESIBT) which is a member of International Building Research Institute, is well equipped with standards on building and allied industries.

23. For all purposes Kenya continues to make use of British standards but makes amendments where necessary. There is no move at present to establish a national standards body.

24. At present there are no national standards bodies nor any standardization activity in the United Republic of Tanzania, Uganda, Burundi, Rwanda, French Somaliland and Mauritius.

25. In 1961 Malawi, Southern Rhodesia and Zambia set up a multi-national standards organization in Salisbury, called the Standards Association of Central Africa (SACA). The Governments and the industries of all three States take part in its activities and contribute to its funds and the standards promulgated by it are applicable to the three countries. By the end of 1965 SACA had published about 60 standards designated as Central African Standards; most of them are based on British standards.

West Africa

26. The West African sub-region is comprised of the following countries: Dahomey, Gambia, Ghana, Guinea, Ivory Coast, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, Togo and Upper Volta. No standards institution on a national, multi-national or sub-regional level exists within this area of West Africa. Steps to establish national standards bodies in Guinea, Ghana

and Nigeria have been taken. The Government of Guinea has given approval to establish an office for standardization, weights and measures. In Ghana considerable spade work has been done; it has joined ISO and a director for the Institute for Standards and Industrial Research has been appointed. The Government of Nigeria has under study a recommendation by the United Nations for the establishment of a standards organization and a testing laboratory. The other eleven countries of West Africa have not taken steps to initiate a standardization activity.

North Africa

27. In North Africa the United Arab Republic and Morocco have developed standardization activities at a national level. National standards bodies have been set up and affiliated with ISO as members.

28. In Morocco the standardization activity at the national level is carried out by the Industrial Standards Department (SNIMA), a part of the Industrial Directorate of the Ministry of Commerce and Industry, set up in 1962. It has published more than 20 standards.

29. The Egyptian Organization for Standardization (EOS), the national standards body of the United Arab Republic, was created in 1957. It has made great progress since then, and more than 700 standards dealing with various industries have been published and work on a large number of subjects is in various stages of progress. EOS is an autonomous body receiving substantial grant from the Government. It also operates the use of certification marks.

30. The Sudanese Government is in the process of setting up an industrial research institute which will have a national standards body as an integral part of its organization.

31. Algeria, Cameroon, Central African Republic, Chad, Congo (Brazzaville), Congo (Democratic Republic), Gabon, Libya and Tunisia have not initiated activities to establish national standards bodies. The total absence or inadequacy of national standards and the different systems of standards adopted hampered the expansion and development of industry and trade in the continent. The ECA has formed study teams to investigate the extent to which standardization has been introduced in the sub-regions of the African continent. It has also proposed to work out a programme for the intensive development of standardization in various countries of Africa.

Asia and the Far East

32. Considering the entire Asian continent, Australia and the Far East together, we find that standardization activities at the national level are fairly advanced in Japan, China, Australia, New Zealand, India and Israel. These countries have well-organized national bodies which have done substantial work for guiding the industries and trade of the respective countries. Pakistan has also made good progress in this direction. In addition, Burma, Ceylon, Indonesia, Iran, Iraq, Lebanon, the Philippines, Singapore and Thailand have initiated national standardization activities. A brief comparative review of their activities is given in Table 1 of the annex. The following have not initiated activities to establish national standards organizations: Afghanistan, Brunei, Saudi Arabia, Cambodia, Hong Kong, Jordon, Laos, Malaysia, Mongolia, Nepal, Republic of Viet-Nam and Western Samoa.

33. The Government of Kuwait is actively considering the proposal to set up a national standards body. A correspondent membership in ISO has been taken out by the Government.

Latin America

34. Only ten of twenty-four countries of the Latin American area have individual national standardization organizations. Costa Rica, Guatemala, Honduras, Nicaragua, Panama and El Salvador have a regional standardization organization which was created in 1962. The Latin American countries are listed in Table 2 of the annex. The Government of Barbados and Trinidad and Tobago are considering the feasibility of establishing a national standardization organization. Ecuador, Bolivia, Guyana, Haiti and Jamaica do not have national standards bodies. All the national standardization bodies of Latin America are members of the Pan American Standards Committee, and all but one are members of ISO.

III. INTERNATIONAL STANDARDIZATION

35. International standardization is the language of international commerce. Exporting countries are encouraged to market their new products internationally, with the confidence that, by meeting compatible, reliable and internationally accepted standards, their products will be bought by the international market. Buyers are encouraged to buy these products because they can be sure such products will meet their requirements and specifications. Standardization provides an atmosphere in which all nations can compete on the world market on an equal footing and not be handicapped; it can enable nations to develop

their special skills and technologies so as to participate fully in world economic activities.

36. At present the most influential organizations working in this field are the International Organization for Standardization (ISO) and the International Electechnical Commission (IEC). The recommendations of ISO and IEC are therefore, of considerable importance in bringing better understanding among the commercial and industrial sectors of nations and promoting external trade.

International standardization and developing countries

37. All national standards bodies should take active interest in the work of ISO and IEC. Developing countries have a greater stake in the promotion of international standardization than the developed countries. It is in the interest of the developing countries to make sure that their view points receive consideration in the formulation of international standards so as to give them reasonable access to as many markets as possible.

38. Further, standardization enables new engineering techniques to be applied in industrial practices with less expenditure of labour and finance. When techniques collected in the form of standards, such as the results of research conducted by institutions and manufacturing enterprises in the highly developed industrial countries, these standards can be used in practice in other countries without a loss of time or money.

39. A developing country must safeguard its interest in the formulation of international standards as much as a developed country. Special requirements to suit its state of industrial development, climatic conditions and raw materials should be built into international recommendations; this can be done only by active participation in the work of the relevant technical

committees. The following two examples are significant enough to prove that the needs of developing countries and their knowledge and experience could help to solve difficult international standardization problems and make international recommendations world-wide in their coverage.

40. The standard atmosphere for testing, which prescribes the temperature and humidity at which samples of materials are conditioned and tested to ensure comparable results, is a matter of considerable importance to any country. The cost of installing and maintaining necessary conditioning equipment, and the comfort and health of the workers who have to expose themselves alternately to the standard atmosphere and the outside prevailing atmosphere must be taken into consideration in fixing the standards. At first the atmospheres considered for this purpose by ISC and IEC were those widely used in Europe and North America. These were unsuitable for tropical and sub-tropical regions where temperatures are much higher during most part of the year. If the European standards were adopted in these regions, testing laboratories would have to maintain costly equipment for air conditioning. Recently, on the suggestion of a developing country of the tropical region, a different standard atmosphere for tropical countries has been accepted both by ISO and IEC.

41. Because of the non-interchangeability of dimensions of electric motors made in various countries, the importing countries of machines equipped with electric motors found that it was not always possible to replace a motor made in one country by one from another country. IEC has been engaged on this problem for several years, but could not resolve the difference between the countries using the metric system and those using the FPS system.

A compromise solution based on the experience of a user developing country paved the way for an international recommendation for dimensions of motors adopted by IEC.

42. Even if in the initial stages representatives of the developing countries are not in a position to make solid contributions to the work of ISO/IEC technical committees, in which the trade or industry of their respective country has a positive interest, active participation in these committees will be useful in more than one way:

(a) It provides an opportunity to come in closer contact with their counterparts from industrially advanced as well as developing countries. Exposure to a great variety of backgrounds and experiences, can lead to a better appreciation of the viewpoints and standardization practices of various countries;

(b) These contacts can develop into friendships and facilitate exchange of technical information among individuals and thus open avenues for the exchange of technical data that is often unobtainable through normal channels;

(c) Further, the recommendations of the international bodies will be understood more readily if there is a positive participation during the formulation process. Participation helps in the incorporation of appropriate material into national standards.

43. At present ISO has 56 full members and IEC has 40. Four members of ISO and five of IEC are not members of the United Nations. A geographical breakdown of the developed and developing countries (members of the United Nations) and represented at ISO and IEC is shown in Table 3 of the annex.

44. Two developed countries and 61 developing countries are not members of ISO, while three developed countries and 81 developing countries have not established participation in IEC.

45. In the sphere of international standardization, the contributions made by the developing countries is insignificant at present. An International recommendation in order to be useful to all nations of the world must reflect the needs of all the countries. Therefore, it is essential that every country becomes a member of ISO and IEC; by so doing each country will not only benefit from the work on standardization at the international level, but will also contribute its share to the development of international recommendations.

46. In view of the importance of international standardization to the developing countries it is necessary to encourage their participation in the work of ISO and IEC. Even countries that have no well established national standards bodies should have a voice in the work of ISO/IEC technical committees. To enable such countries to participate in its work, the ISO has recently created a special category, "Correspondent Membership". A similar provision in the IEC constitution is also called for and developing countries should make full use of this facility.

47. The two organizations could further promote the interests of developing countries by inviting them to send representation to the technical committees in which they have interest as producers, buyers or sellers of the commodity under consideration. Any international recommendation formulated without such participation, even though the country concerned be a non-member, may face difficulties in its implementation.

48. It is a fact that the administrative committees of ISO and IEC are comprised mainly of representatives from the industrially advanced countries; this is because of their better know-how and long experience in standardization work. Developing countries should have greater representation in these committees to give them a larger share in the work of the organization as a whole.

Standardization and the United Nations

49. The United Nations and the specialized agencies, particularly, Food and Agriculture Organization, World Health Organization, International Labour Organisation, International Civil Aviation Organization and the United Nations Educational, Scientific and Cultural Organization, are interested in standardization in their respective fields of work.

50. The co-operation between the United Nations and ISO has increased considerably since the establishment of the United Nations Centre for Industrial Development. This Centre recognizes the role that standardization can play in the industrial development of the newly emerging countries and has included the promotion of standardization as an active item in its work programme. In pursuance of this objective the Centre has issued a study on standardization in developing countries[1/] and in 1965 the Centre conducted an Inter-Regional Seminar in Copenhagen on promotion of industrial standardization in developing countries. Its offices were also used to provide financial and expert assistance through the Special Fund component of the United Nations Development Programme for the establishment of one institution in Paraguay and another in Central America which are actively engaged in standardization.

1/ See Industrial Standardization in Developing Countries (United Nations publication, Sales No: 65.II.B.2).

51. With the establishment of the United Nations Industrial Development Organization (UNIDO) in 1966, a body with the responsibility of assisting and accelerating industrial growth in the developing countries of the world, the CID has ceased to function and its activities have been taken over by UNIDO. In co-operation with the regional economic commissions and the United Nations Development Programme, UNIDO is in a position to assist standardization activities and accelerate the development of standards in the developing countries by providing technical and advisory services, supply of equipment and training facilities. The scope of such assistance may include:

(a) Establishment of new national standards bodies in the developing countries;

(b) Organization of industrial standardization training programme, which may include courses for general standards experts for planning, developing and running the national standards bodies and specialized courses such as company standardization, introduction of quality control techniques and certification marks schemes;

(c) Expansion of the activities of existing standards bodies in the developing countries where they require extension to cover new projects or areas considered important for the growth of the national economy;

(d) Assuring adequate flow of standardization data and information from the developed countries to the developing ones.

Regional standardization

52. Standardization on regional basis or by groups of countries with common economic problems and interests has been found beneficial to the participating countries. A few examples of such attempts are listed below.

53. ABC Conference: During the Second World War the allied nations experienced serious delays and increased costs for the repair and mairtenance of aircraft, tanks and other equipment due to different standards in use for

bolts and nuts etc. Representatives of the three English speaking allies, America, Britain and Canada, the so called ABC countries, set to work to unify their engineering standards. After a series of meetings they were able to agree upon a common unified screw thread system and also to achieve unification in some other engineering standards.

54. Commonwealth Standards Conference: With a view to closer co-operation among the national standards bodies in the Commonwealth Countries and to evolve a uniform approach to problems of mutual interest, the representatives of the national standards bodies in the Commonwealth Countries have met in conference every five years since 1946. They have been able to offer certain policy recommendations at the end of each conference for their mutual guidance.

55. European Standards Co-ordinating Committee: Early in its operations the European Economic Committee (EEC) or Common Market realized that standards were essential to establish a common language on which to base its operations. As all the national standards bodies of the countries involved except one were members of ISO, they agreed to adopt the ISO Recommendation wherever they were available. European Free Trade Association (EFTA) or the "Outer Seven" also made a similar decision concerning the use of ISO Recommendations. After functioning separately for some time through their individual standards committees, EEC and EFTA decided that since their standards committees were functioning under the policy of using ISO Recommendations as far as possible, there would be advantage to both organizations if their standards committees were combined. This gave birth to the European Standards Co-ordinating Committee (CEN).

56. Middle East Standardization Conference: With the object of evolving a common approach to the development of standardization activities in the middle Eastern Countries, two conferences, one in 1958 in Beirut and the second in 1961 in Cairo, were held. A standing committee for standards and measures of Arab States was formed in 1961 and there is a current move to establish an Arab Organization for Standardization (ASO).

57. International Commission for the Regulation and Control of Electrical Equipment: Although international in name, its operations are confined to European countries. Its recommendations, which are mainly safety standards in the electrical field, are used as government regulations governing the importation of electrical equipment.

58. Commission on Standardization of th, Council for Mutual Economic Assistance (CEMA) of the Socialist Countries: To meet the needs of mutual trade among its member countries, CEMA spells out the details of specifications to be followed.

59. Pan-American Standards Committee: The countries of Argentina, Brazil, Chile, Colombia, Mexico, Peru, Uruguay, Venezuela and the Central American republics are members of the Pan-American Standards Committee which started in 1961. In four years of operation it has had 23 technical committee meetings attended by about 650 professionals and has approved 106 recommendations.

60. Institute - Centroamericano de Investigacion Technological Industrial (ICAITI): The six central American countries, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama, have set up with United Nations assistance, a joint organization for industrial development, research and formulation of standards. The ICAITI is an ISO member and takes care of the interest of all six countries collectively.

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61. Standards Association of Central Africa: This association is an attemrt of three African countries, Southern Rhodesia, Zambia and Malawi, to establish a multi-national standards body to look after the standardization work of the three neighbouring States.

62. It may be noted that the aim of the first seven groups mentioned is co-operation for mutual trade arrangements, for which the existence of a national standards body in each of the participating countries is necessary. The last two associations seek closer integration in small neighbouring countries where resources do not permit separate standards bodies. Pooled resources enable these countries to establish a common multi-national standards organization, and also help them to have closer co-operation in industrial development and trade.

IV. COMPANY STANDARDIZATION

Role and purpose

63. The term "company standardization," in its broader sense, includes all activities of a company or an industrial unit to streamline, co-ordinate and document routinized procedures within the organization with the aim of achieving overall economy at the company level. Once an industry introduces the company standardization programme its problems are minimized, as the solutions to recurring problems are recorded for future guidance and more time can be devoted to the fundamentals of design and original research work.

64. Even in countries with national standards programmes the need for company standards arises from two factors. The national standar is formulated with an overall perspective of the whole country, and as such must encompass the requirements of a number of industries using different types

or grades or sizes of the same article, from which each company has to select those which best suit its own requirements. For instance, the national standard on limits and fits for engineering in India (which corresponds to the well-known ISA system) allows 16 standard tolerances and 21 standard deviations. Naturally a large number of limits and fits can be derived from them, each of which will require different sets of tools for manufacture. Obviously each company must restrict its choice of limits and fits for economical production; but this choice which will be the subject of a company standard has to be within the range provided by the national standard.

65. The second reason for company standardization is that national standards do not, and cannot, cover all operations of each individual company. The field of national standardization is dictated by the national needs; and on the other hand, company standardization is not necessarily confined to technical issues which may have national significance and its scope cover all the activities and operations of the company. The idea is to simplify, rationalize and document all company practices, in respect to products, raw materials, organizational matters, accounting, purchase and sales practices, stock controlling methods or any other practice followed in any of the spheres of a company's activity. It is obvious that national standards for many company activities will be non-existent.

66. Thus there are some areas in which company standards will be based on national standards, international standards or on some other recognized standards; but there are many areas in which company standards have to be drawn from the information available within the company and from the practices followed by it.

67. The extensive use of company standardization techniques by the industry is a necessary ingredient for a successful national standardization programme

because its success depends largely on the active participation of the industry in the formulation of national standards. They can do so only when they are actively engaged in internal standardization programmes.

Company standardization programmes for developing countries

68. In many of the developing countries, very little attention is being paid to this important level of industrial standardization. The urgent need for rationalization of production and consumption in the industrial undertakings from the very beginning calls for an accelerated effort to plan, organize, and conduct a national programme for company standardization. Such a programme can be organized by the NSB of the country, if it exists, with the co-operation of the Government and other organizations concerned with industrial production, such as the productivity councils and the manufacturers associations.

69. In organizing such a programme, the following steps may be followed with advantage:

(a) All available data and information on the status of standardization in the country and its importance to the national economy should be collected, compiled and collated;

(b) Those responsible for the activity should have the support of the Government, particularly the officers connected with industries, overall manufacturing problems, commerce, export, quality control, etc.; all these officers should be supplied with the literature on standardization and data mention in (a) above;

(c) It would be useful if a directive emphasizing the need for company standardization and establishing it as a national policy is issued by the Government;

(d) A study of the experiences of other countries in this matter would give useful ideas for adoption;

(e) A thorough review of the available materials on standardization should be undertaken with a view to drawing whatever guidance is possible from the manner in which standardization in general, and in-plant standardization in particular, was developed in other countries; a review of such data from a country at a stage of industrial development similar to that of the country making the study would be beneficial;

(f) A training programme for in-plant standards engineers and responsible officials in the technical ministries is strongly recommended. Guidance for training may be sought from countries where standardization at national and industry levels has been established and has proved its utility;

(g) Visits to industries for on-the-spot surveys of their activities falling within the orbit of company standardization, should be arranged;

(h) On the basis of the survey, a report of findings by standardization expert (or team of experts), giving constructive suggestions to the company managements for improvements in their existing methods of operation would provide the basis for a detailed programme;

(i) A planned procedure should be drawn up to convince the management of the advantages of standardization; without their help the programme cannot make any headway. Such a procedure should also give careful consideration to the human problems and allay the fears that standardization imposes unwarranted control over technical and administrative operations.

70. The introduction of standardization in companies is not simply a technical problem; standards acceptance will not automatically follow the introduction of a system of organized documentation. Human problems encountered as a result of the introduction of standards will also have to be reconciled by providing guidance for facilitating the transition from unrecorded habit patterns to written specifications.

V. IMPLEMENTATION OF STANDARDS

Policies of implementation

71. The formulation and publication of standards by itself achieves little towards industrial development. Standardization implies the extensive use of approved standards. To the newly created national standardization body or standardization department of a company, the actual implementation of the standards, normally present a difficult task because of the usual initial resistance to change, apathy, and sometimes prejudice towards standardization.

72. In countries where the economy is completely controlled, standards are compulsorily introduced in all industrial units; while in countries with free or partially free economy standards are generally expected to be used without compulsion. However, even in countries where national standards are voluntary, the authorities make certain standards mandatory for the protection of health and safety.

73. Some countries in their anxiety to implement their industrial standards rapidly, rely heavily on the legal compulsion of standards. This policy unfortunately places a heavy burden of responsibility in the national standardization body. In such cases it is most important that the standards be prepared with the full participation and approval of those directly or indirectly affected. The approval of compulsory standards which later are shown to be practically unenforceable can cause considerable damage to the prestige of the national standardization body. This danger is particularly significant in developing countries where the knowledge of standardization techniques is usually limited to the employees of the national standardization body. Since compulsory standardization involves certain restrictions of

technical freedom in the industrial process it is necessary that the national standardization body have a perfect insight at all times in all relevant matters affected by the standards.

74. Voluntary industrial standards prepared with the intensive participation of those affected by the standards are normally readily adopted. And the mistakes in judgement made will not have critical consequences since poor standards will be simply ignored as impractical. Perhaps the best solution is a judicial combination of voluntary and compulsory standards, reserving the compulsory standards to very special cases.

75. In developing countries where the participation of the industry in the national standards body is often meagre or perfunctory the implementation of voluntary standards presents a serious problem. For this reason the divulgation of standardization knowledge in industry in particular, and all sectors of the economy in general should have the highest priority in the newly established standardization bodies. A knowledgeable industrial participation is the key towards the implementation of voluntary industrial standards.

76. The Government can effectively contribute towards the rapid implementation of national standards by issuing policy directives to its various organs to use national standards as a basic for their purchases.

77. Some of the most successful national standardization bodies in the developing countries are paying adequate attention to the implementation problem. In particular the Indian Standard Institution (ISI) has an intensive programme of implementation on basic standards. The experience of ISI is particularly illuminating because one of the major problems of

the developing countries is the simultaneous use of multiple systems of weight and measures in industry and commerce. The Indian experience shows that this is not an insoluble problem if the implementation programme is handled by knowledgeable experts.

78. Another means to promote the implementation of standards is the issuing of certification marks. These marks which are property of national standardization bodies, or consumers or industrial associations may be stamped on the product only when it complies with the appropriate standards. The scheme of certification marks is particularly useful in matters concerning safety and health.

Conclusion

79. This paper has attempted to point out the importance of standardization to developing countries. As an additional argument it should be noted that the progressive industrialized countries do not foster activities that are unproductive. The fact that leading industrial countries are paying increasing attention to standardization activitics can mean only that standardization activities are an essential ingredient of their industrial growth. The industrial development of industrialized nations is growing so fast that the developing countries will have to, as in Alice in Wonderland, run very fast just to remain where they are.

Table 1

National standards bodies in Asia and the Far East

Country (1)	Name of the National Standards Body (2)	Year established (3)	Govt./Non-Govt. (4)	No. of Standards Published (approx) (5)	It operates Certification Mark (6)
Australia	Standards Association of Australia	1922	Autonomous body receiving support from the Government	Over 1,300	Yes
Burma	Union of Burma Applied Research Institute	The Standards programme was assigned to the Institute in 1959	Government	N.A.	No
Ceylon	Bureau of Ceylon Standards	1964	Autonomous corporation	-	-
China (Republic of)	National Bureau of Standards	1947	Government	2,000	Yes
India	Indian Standards Institution	1947	Autonomous semi-Government corporation	3,500	Yes
Indonesia	Dewan Normalisasi	1954	Private, Non-profit making organization	57 (17 Original and 40 Dutch Standards translated)	No
Iran	Standards Organization of Iran	1960	Government, part of the Ministry of Commerce	N.A.	No
Iraq	Iraqi Organization for Standardization				
Israel	Standards Institution of Israel	1945	Corporation	520	Yes
Japan	Japanese Industrial Standards Committee	1921	Government	6,000	Yes

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Table 1 (continued)

Country (1)	Name of the National Standards Body (2)	Year established (3)	Govt./Non-Govt. (4)	No. of Standards Published (approx) (5)	It operates Certification Mark (6)
Korea, Democratic People's Republic of	Committee for Standardization of the D.P.R.K.	1954	Government	1,300	
Korea, Republic of*	Korean Bureau of Standards	1961	Government	600	Yes
Lebanon	Lebanese Standards Institution	1962	Autonomous	25	Yes
New Zealand	New Zealand Standards Institute**	1936	Government	1,650	Yes
Pakistan	Pakistan Standards Institution	Estd. 1951 as a Govt. Dept. 1959 changed to autonomous body	Autonomous body	164	Yes
Singapore	Singapore Industrial Research Unit	1966	N.A.	N.A.	N.A.
Thailand	Centre for Thai National Standard Specifications	1966	A unit of the Applied Scientific Research Corporation	Nil	No

* The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country or territory or of its authorities, or concerning the delimitation of its frontiers.

** From 1 April 1966 changed to Standards Association of New Zealand as an autonomous body.

N.A. = Data not available.

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Table 2

National standards bodies in Latin American countries

Country	Name of the NSB	Year of Creation	Govt./Non-Govt.	No. of Standards published	Operates a certification marks scheme
Argentina	Instituto Argentino de Racionalization de Materiales	1935	Non-Government	1,800	Yes
Brazil	Associaçào Brasileira de Normas Técnicas	1940	"	1,100	Yes
Chile	Instituto Nacional de Investigaciones Technologicas y Normalizacion	1944	Private Corporation (a major share of finances is contributed by the Government)	350	Yes
Colombia	Instituto de Normas Colombianas	1958	A part of the Division of Scientific Research of the Industrial University of Santander	50	No
Cuba	Department de Normas Tecnicas; Direction de Normas y metrologia	1961	Govt. A department of the Directorate of Standards and Metrology	50	No
Mexico	Direction General de Normas	1946	Government	600	Yes
Paraguay	Instituto Nacional de Technologia y Normalization				
Peru	Instituto Nacional de Normas Tecnicas Industrials y Certification	1959	Attached to the National Engineering University	130	Yes
Uruguay	Instituto Uruguay de Normas Tecnica	1939	Private Entity		In preparation

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Table 2 (continued)

Country	Name of the NSB	Year of Creation	Govt./Non-Govt.	No. of Standards published	Operates a certification marks scheme
Venezuela	Comision Venezolana de Normas Industriales	1958	Government	276	Yes
Costa Rica) El Salvador) Guatemala) Honduras) Nicaragua) Panama)	Centroamericano de Investigacion y Technologie Industrial	1962	A multi-national Research and Standardization Centre	106	Yes

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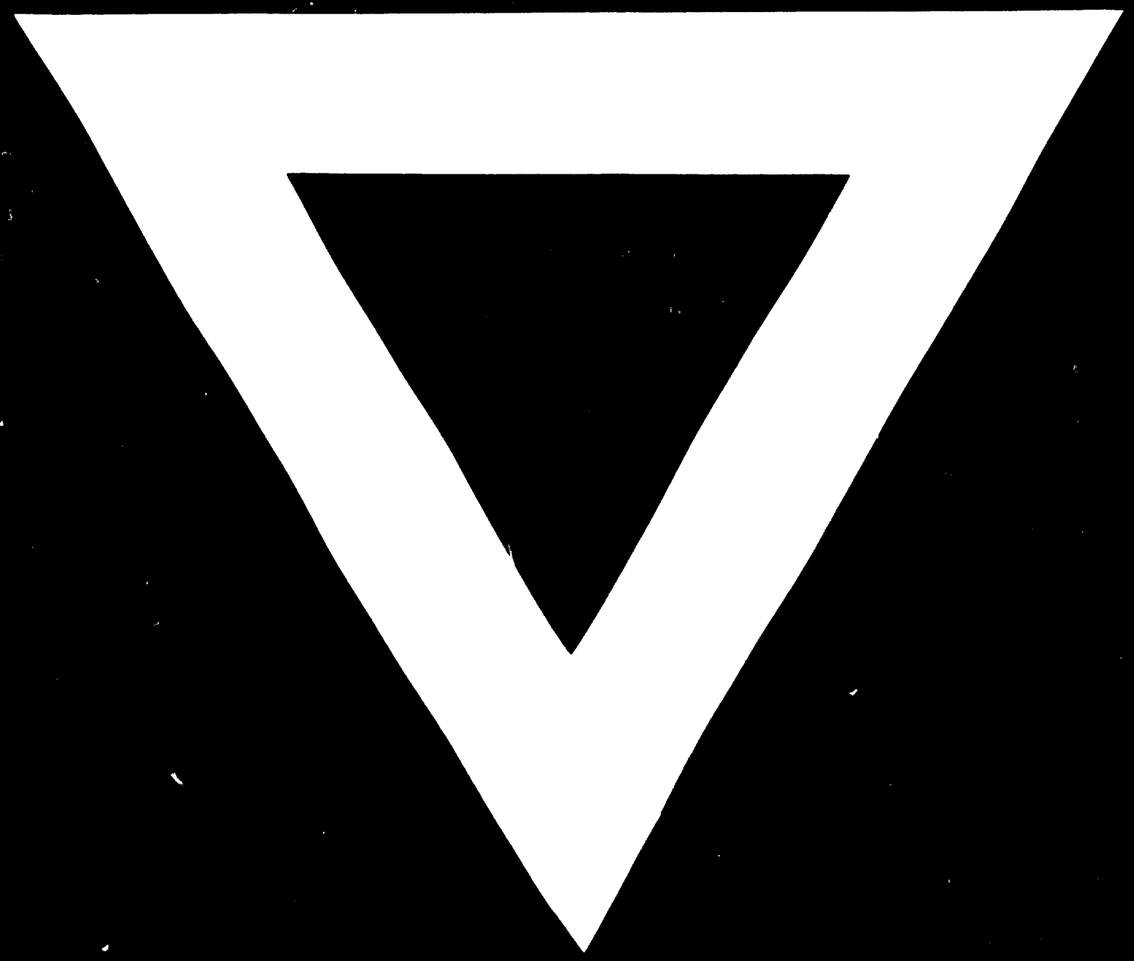
Table 3

United Nations Members belonging to the International Organization for Standardization (ISO) and the International Electechnical Commission (IEC)

Region	No. of Developed Countries			No. of Developing Countries		
	UN Members	ISO Members	IEC Members	UN Members	ISO Members	IEC Members
Europe	21	16+3[a]	15+3[a]	8	5	3
Americe	2	2	2	24	9+6[b]	3
Africa	1	1	1	37	3	1
Asia and the Far East	3	3	3	25	10	6
Total	27	25	24	94	33	13

a/ The Byelorussian Soviet Socialist Republic, the Ukrainian Soviet Socialist Republic and the Union of Soviet Socialist Republics are represented at ISO and IEC by the USSR State Committee of Standards, and the Committee for the USSR Participation in International Power Conferences respectively.

b/ Six Central American countries are represented by one regional organization (ICAITI).



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