NBS SPECIAL PUBLICATION 438

U.S. DEPARTMENT OF COMMERCE / National Bureau of Standards

Testing and Certification for Export Products in Industrializing Countries

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[2] Located at Boulder, Colorado 80302.

Testing and Certification for Export Products in Industrializing Countries

Proceedings of a Regional Seminar
held at the Regional English Language Centre
and International House, Singapore
May 19-20, 1975

Edited by

H. Steffen Peiser and Robert S. Marvin

Office of International Relations
National Bureau of Standards
Washington, D.C. 20234

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Chairman SISIR

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Abstract

A regional seminar sponsored by the Singapore Institute of Standards and Industrial Research, the National Bureau of Standards, and the Agency for International Development was held in Singapore in May of 1975. The participants represented most of the countries in south Asia concerned with increasing their exports, and concentrated on various problems connected with the testing and certification of such exports. Most of the prepared papers reviewed the practice and future plans of these countries. During the discussion a number of specific problems and issues were raised, with a good deal of attention focused on the extent to which the standards and certification of goods by an exporting country can be and are recognized by the importer. This report includes both the prepared papers and a mildly edited version of the discussions following each.

Key Words: Certification; developing countries; exports; industrializing countries; labeling; seminar; south Asia trade; testing

SISIR/NBS/AID Regional Seminar

on

"Testing and Certification for Export Products in Industializing Countries"

Preface

The program of the National Bureau of Standards (NBS) in support of the United States Agency for International Development (AID) is characterized by a number of experiments to find ways in which the experience of NBS in the U.S.A. can assist industrializing countries in standardization and measurement services.

One of these experiments is to sponsor seminars on regional cooperation between developing countries. The idea is firstly to restrict each seminar to original discussions on one highly specific topic of current regional concern and secondly to choose that topic from areas in which NBS itself has a need to learn. The justification of this guideline rests on NBS not being an experienced teaching institution and on joint learning being often more effective than teaching. The first such NBS/AID seminar was held in La Paz, June 1974 on systems of Latin American cooperation in standardization (centered on Comision Panamena de Normas Industriales y Tecnicas (COPANIT)) and metrology (to be centered on a needed new collaborative organization now being contemplated for sponsorship by the Organization of American States).

Believing that first Seminar to have been a success, NBS immediately looked for interest in a second such experiment this time among South East Asian countries. The reponses received were so positive that it is hard to establish who was the originator of the various suggestions which were adopted. At any rate, the topic of the Seminar "Testing and Certification for Export Products" came from Mr. Phi Minh Tam, Director of the Institute for Standardization, Republic of Viet Nam, and his USAID advisor, Mr. Niels C. Beck , Industrial Advisor, USAID, at that time in Saigon. It is most unfortunate that Mr. Tam was unable to take part in the Seminar. May I record here my hope that he may one day read these Proceedings.

I am not sure now whether I can claim credit for first hitting on the idea of holding the Seminar in Singapore with co-sponsorship by the Singapore Institute of Standards and Industrial Research (SISIR). Singapore has shown us how to develop the human resources of a small country. SISIR itself has been recognized for its remarkable technical support for rapidly developing small industrial enterprises.

So I was encouraged to approach SISIR, and I was immediately accorded a positive response, followed by generous support in the planning and execution of the Seminar. President Lee Kum Tatt took over the leadership in more than name, and put himself and his organization into the venture. Detailed organizational work was done by Mr. Freddy H. C. Soon and his highly efficient staff. The Seminar received special guidance also from Mr. Yeow Chee Tiong, Deputy Director, the official SISIR participant.

The facilities at the Regional English Language Center International House are excellent for this type of Seminar. Special appreciation goes to the delegates from eleven regional countries, and especially to Mr. R. Hopper, the United Nations Adviser to the Thai Industrial Standards Institute who, with Professor Kenneth S. Stephens of Georgia Institute of Technology and Professor Donald Ermer of the University of Wisconsin, worked with much devotion and in harmonious friendship.

Most of the participants stayed some hours before or after the Seminar to enjoy what appears to me as the paradise of Singapore. The only adverse recollection was a fall suffered after the Seminar by Mr. Vidalito F. Ranoa, Director of the Philippine Bureau of Standards, from which he has since recovered.

The papers delivered by the participants on "Testing and Certification for Export Products in Industrializing Countries" should have a long term significance, and the publication of these Proceedings is therefore believed to be well justified.

H. Steffen Peiser

Group Photograph

First Row, Left to Right

Mr. Yeow Chee Tiong, Mr. Arnold Wexler, Mr. H. Steffen Peiser, Mr. Lee Kum Tatt, Mrs. Phani Na Rangsi, Dr. Ronald T. Wijewantha, Mr. Vidalito F. Ranoa

Second Row, Left to Right

Mr. A. B. Rao, Prof. Donald Ermer, Mr. Khawaja Ammar Hussain, Dr. Kim, Zae Quan, Dr. Choi, Jong Wan, Mr. Sumantri, Mrs. K. S. Tan

Third Row, Left to Right

Mr. William E. Andrus, Prof. Kenneth S. Stephens, Dr. Merwyn Probine, Mr. Joseph Hilsenrath, Dr. Werner Y. F. Ning, Mr. R. Hopper, Mr. Freddy H. C. Soon

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Seminar President

Dr. Lee Kum Tatt
Chairman of SISIR

Program Committee

Mr. Freddy H. C. Soon
Mr. H. Steffen Peiser

Local Committee

Mr. Freddy H. C. Soon
Mrs. K. S. Tan

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OPENING SESSION

Mr. Freddy H. C. Soon, Chairman

WELCOME ADDRESS

Mr. H. Steffen Peiser
Chief, Office of International Relations
National Bureau of Standards
United States

It is a great pleasure and satisfaction for me to welcome you here. The Singapore Institute of Standards and Industrial Research and the National Bureau of Standards have planned this Seminar which I believe is a really worthwhile effort for examining the challenges of more and more complex testing to respond to the more and more complex requirements by consumers for products and for the quality and safety of life. Hand in hand with these additional requirements, we find fortunately that new scientific techniques are coming upon us with great speed and diversity. Although the theoretical, physical or chemical basis for those test methodologies may be complex they can often be easily handled by "black boxes" as long as they work and as long as they are properly calibrated. Who would have thought that positron annihilation, which only a few years ago was quite a recondite subject, would invade our metallurgical shops? Who would have predicted that we would manage to control our pollutants by using excited electron orbitals in complex molecules? We did not foresee that lasers in the hands of manufacturers would give them new opportunities for guiding their production. We realize only now that with servo controls, automation, and computers we can control the quality of products. We are just amazed at the impact of all the instruments that now are entering into technology. Well may we ask "How are we going to manage to calibrate them all so that their readings really mean something?" It is just at this critical time that the new techniques connected with standard reference materials are developing very fast to enable us to accomplish that huge task.

That is one side of our program; the other topic, which we are discussing here, is how we can use all those test methodologies for quality control and inspection under a system of great integrity. How can we instill confidence between vendor and buyer, even in different nations? These are the topics which will be discussed in the papers to be presented at this Seminar. These are also the topics which I hope we will discuss in informal sessions as in the hallways between meetings. These individual contacts between leaders of the many standardization and measurement laboratories which are here represented, I regard to be the principal potential value of this Seminar. Therefore, it is my very great pleasure as a scientist, at heart and as an office worker in fact, to give the microphone back to Mr. Freddy Soon, of SISIR, our Chairman, to call on the next speaker to get this Seminar off to an auspicious start.

Mr. Soon:

Thank you Mr. Peiser. I now have pleasure in calling on Mr. Henry Engelbrecht, Chief, Economic-Commercial Section of the U.S. Embassy in Singapore, to make his address.

Mr. Engelbrecht:

Dr. Lee, Mr. Peiser, Mr. Soon, ladies and gentlemen: I am very pleased to have this opportunity to add the Embassy's words of welcome to all of you and we hope that your deliberations over the next few days will be both fruitful and enjoyable and that you will enjoy your stay in Singapore. The Ambassador was very sorry that he couldn't personally come and give you a few words of welcome and when I looked at the schedule I see we are running a little bit behind so I will cut my remarks a little bit short, but essentially I think this is an ideal place for such a conference. Singapore has a greater amount of trade than it does GNP and it also has a very distinguished record since 1963 in the operation of SISIR and I see that you are going to be fully briefed and have some on the job training or on the job experience here this afternoon at SISIR. We are very pleased that the United States Government and Singapore can cooperate on this project. We feel that foreign trade is very important to world peace and harmony and we think that was demonstrated and reiterated by the recent oil embargo and problems that people have had with balance of payments since then. We are always trying to expand exports. We have never been a great foreign trade country, but our country is large enough that we need standardization of measurements and standards just between the east coast and the west coast. It has been our tradition that the National Bureau of Standards was originally established, I believe, to push the idea of having national standards, national measurements, and that sort of thing to give quality assurance to people in different regions of the United States and now we are very happy to turn that to foreign trade and exports. In addition to the fact that Singapore is an ideal place from the standpoint of its location and its trading and manufacturing development in recent years, I think you will find the facilities for conferences and the hotels and environment very pleasant for Seminars and Conferences of this sort. We, in the Embassy, sometimes regret the fact that this is such an attractive place. It seems that we are called on to handle delegations every week or so because Singapore is so attractive. But I think you will find that this is a very pleasant place to visit and I see that we have eleven countries here represented, including the gentleman from here who is bugging our conference. I think this is

very fine that we have this opportunity to add our words of welcome, so I hope you will have a very fruitful get-together.

Mr. Soon:

Thank you Mr. Engelbrecht. I now have the pleasure of calling upon Dr. Lee Kum Tatt, Chairman of SISIR, and President of this Seminar, to make his welcoming address.

NBS/SISIR SEMINAR ON
"TESTING AND CERTIFICATION FOR EXPORT PRODUCTS IN INDUSTRIALIZING COUNTRIES"
HELD AT THE RELC ON MAY 19, 1975

WELCOME ADDRESS

Dr. Lee Kum Tatt
Chairman
Singapore Institute of Standards and Industrial Research
Singapore, Singapore

It gives me great pleasure to welcome you at the opening of this Seminar on Testing and Certification for Export Products. I would like to bid a very special welcome to our overseas guests and to wish them a pleasant stay in Singapore. I must congratulate the NBS for bringing together so may interested parties and internationally eminent figures in the field of quality control and standardization to exchange opinions and experiences. The variety of your experience and knowledge will, I am sure, contribute significantly to the solution of some of the common problems we face in the quality control (QC) domain, and I hope, point to the direction which the developing countries should embark upon.

What we all recognize today is that developing countries have a vastly different industrial community from that which existed in the sixties. For many of us, industrial development over the past decade has led to significant changes in the structure of the manufacturing sector. Firstly, an increasing range and array of products is today processed and manufactured in our countries. Import substitution programs have been superseded by manufacturing for export. Industries would therefore need to adopt more modern and efficient methods of control of production, quality,and cost,if their products are to compete successfully in international markets. The consumerism movement, which is beginning to make its impact in developing countries, would bring strong pressures on manufacturers to enhance product reliability, quality and safety. Consumers all want better value for their hard earned money. Industries would have to contend with, what I would call, a new dimension. National standards and testing bodies must objectively respond and constructively contribute to solving the quality problems of today.

The real challenge before us today lies not so much in our ability to develop relevant industrial standards or to implement effective certification programs, but more in our ability to provide an integrated approach to quality control to assist, counsel and encourage industries to respond to the impact of consumerism. For, in the final analysis, consumerism is concerned with such broad issues as the role of profit, the impact of technology, the depletion of natural

resources, the state of the environment and the consequences of economic growth.

Over the next two days, we are going to hear about the experiences and programs of all the organizations participating in this Seminar. I have no doubt that we will all be exposed to new concepts, new philosophies and new systems from which we will all benefit in one way or another. What is more important, I think, is that we will be developing closer links with each other and enjoying a greater sense of mutual understanding and cohesion. This closer relationship should facilitate better communication and exchange of ideas and programs, which I hope will lead to some projects of mutual benefit to our organizations.

As you will be hearing from me again this afternoon, I think it is only fair that I keep this address short. In conclusion, I would like to thank the NBS for sponsoring this Seminar and Mr. Steffen Peiser for making the necessary arrangements. I am sure that during the Seminar we will all get to know each other better. I hope we will be able to identify areas of common interest which will lead to closer cooperation between ourselves for the good of all.

I INTRODUCTORY SESSION

Mr. Sumantri, Chairman

Mr. Sumantri:

Mr. Peiser, distinguished participants, ladies and gentlemen. First of all, I would like to take this opportunity to express my sincerest thanks and gratitude to the U. S. National Bureau of Standards and the U.S. Agency for International Development for inviting me to this very important Seminar, and to SISIR, the Singapore Institute of Standards and Industrial Research, for the hospitality accorded to me. This morning I experienced a pleasant surprise, being appointed by Mr. Peiser as Chairman of this session. I have accepted this appointment not without hesitation because English is still not so easy for me. It is my fourth language but after all, there are different kinds of English - British English, American English, and, maybe what I am speaking is Indonesian English. The appointment as Chairman of this morning's session is indeed a great honor for which I thank you. In this session three presentations will be given, namely by Mr. Andrus from NBS, by Dr. Ning, from the Republic of China, and by Dr. Wijewantha, from Sri Lanka. We begin with the first presentation and the floor is given to Mr. Andrus.

EXPORT TESTING, LABELING AND CERTIFICATION - AN OVERVIEW

Mr. William B. Andrus, Jr.
Chief, Office of International Standards
National Bureau of Standards

Mr. Chairman, Ladies and Gentlemen:

First I would like to say how happy I am to be able to participate in this Seminar and to visit Singapore for my first time. After a 31 hour flight, I arrived Friday morning and after resting a bit I had an opportunity to see this charming city with its charming people. It has been a most pleasant experience.

In my remarks this morning I am going to be brief and very informal, and I hope I will set the tone for our discussions the remainder of our two days here. During these sessions you will be hearing of the product testing and product certification programs in most of the countries represented here, so I will not dwell on those programs. I would like, instead, to focus on the concept of product testing, product labeling and product certification. I would like to do two things. First, to describe my concept of the various facets of these activities; and secondly, to pose some problems -- some of which are readily solvable and some of which may not be in the foreseeable future. In doing this I hope that while we are listening to the other papers we will keep these concepts and problems in mind and evaluate whether the programs described are structured properly and have really faced up to the related problems. Perhaps they will have solved them or perhaps recognition of them here will be one of the benefits of our meetings.

Let me begin with product testing. Consider product testing as three basic phases. First there is Qualification Testing -- testing a new, pre-production or prototype product. This is fundamental to the introduction of a product into the marketplace in that it is the initial test that qualifies a product a Qualified Product. It sometimes leads to Prototype or Type Approval.

Secondly, there is Conformance Testing. This is the on-going testing of production products in order to insure that products continue to be in conformance with applicable standards. It consists of many types of activities -- audit sampling, quality control and other various activities which allow you to maintain and to guarantee quality level.

Thirdly, there is Compliance Testing -- an audit function used by the "User" to test that the system itself is effective. It is an investigative testing activity where complaints or problems that are

suspected are uncovered. Of these three phases the second, Conformance Testing, is the most important in maintaining on-going product quality.

When we talk about product testing many visualize immediately sophisticated measurement instruments and complex laboratories in which products are tested. Actually product testing can be a mere visual inspection of a product like the size and color of oranges. The other extreme, of course, is the testing which does in fact require very sophisticated instrumentation and measurements. The first step which I call qualification testing is required on products where type approval is required; usually by law. This is true for example in electronic products -- walkie-talkies, marine radios -- and is required in order to ensure that the basic design is such that frequency stability and radiation eminations are within legal requirements. The third, compliance testing, is basically the "User" or the regulatory body's tool to ensure that the system is in full operation and that the products that are being shipped are in compliance with the requirements.

Let's look now at product labeling. Many of us consider product labeling as merely putting a mark on a product, a SISIR mark in the case of Singapore, which implies that the product meets a certain set of technical requirements. But if you look at product labeling generally, we have had product labeling in various forms for many years. We have "Brand Names", which is a form of product labeling and which the customer has historically relied upon to measure the quality level of the product that he buys. Another type of product labeling is "Country of Origin". Country of Origin labeling is required in many countries by law. However, when we look at it in our context here, Country of Origin implies to some people a level of quality. Cite the Japanese situation. It wasn't but some thirty years ago that a product made in Japan was considered to be of poor quality and very cheap. Today, a product that says "Made in Japan" and exhibits the JISC mark is recognized to be a product of very high quality and with integrity behind that product. Historically, as I have said, we have had types of product labeling for a good many years. Today, however, marks that are put on by our national standards bodies and other agencies authorized to do so are becoming increasingly required and accepted. But why should we label a product? Some countries require it by law. Some users, particularly industrial users, will only buy the products that are guaranteed to be in conformance with certain standards. Some insurance organizations require that a product be labeled for insurance purposes, and unless the product is certified as being in conformance with a certain set of standards the insurance is null and void. And then probably the most complex is the one which deals with credibility of the product label, the acceptance and recognition by the private consumer that the mark does in fact mean something. I think that the credibility issue in the consumer

marketplace is extremely important. It does not come about instantaneously but has to be built up over the years based upon consumer experience so that the consumer begins to rely on these marks.

Let's move on to the third. We have talked about product testing, and product labeling, but product certification means something much more than just product labeling. First it not only implies that the product has been approved by some recognized body, it also implies implicitly and explicitly a guarantee of some form. Also, and probably most importantly, it implies a liability for non-conformance. Liability in industrial products is generally a simple matter. In the refusal to accept the shipment, your liability is the loss of that production, the cost of shipping and so on. However, as we get more and more into consumerism the matter of liability on consumer products, particularly those that can affect health, safety, life and death, the question of liability is extremely important.

Who assumes this liability?

In many of the national product certification programs, the guarantee is assumed by the national standards body or the agency that tests and puts the mark of conformance on the product. But when we deal with liabilities in the case of life and death, are the standards bodies ready to assume that level of liability? Is it assumed by the manufacturer? By the importer? We must also recognize that there is liability regardless whether the product is marked. I might cite a case in the United States of a canned lobster bisque that was manufactured and sold by a company called Bon Vivant, a soup processing company. Some people died because of botulism contained in a few cans of this soup. The product was not labeled in the sense that we mean it here. It was not guaranteed nor was it certified by a recognized authority. It was packaged with a brand name of a highly respected company, but today, that company, Bon Vivant, is no longer in business. It was the ruination of that company. So the matter of liability when we deal in consumer products is extremely important and must be solved for any product labeling or certification program.

If I might summarize this first part, the whole question of product testing, product labeling and product certification is an extremely complex process. Many of us have only experienced this at a level of industrial products where we certify a steel or some basic material. But as we move into the labeling and certifying of consumer products, and perhaps very complex industrial products, that can affect human health and life, the responsibilities associated with certification are increased many fold.

Now I move to my second point and indicate some of the problems associated with this subject. First, Olle Sturen, Secretary General

of ISO, gave a speech at the National Bureau of Standards three years ago and he made a very interesting point dealing with differences of philosophy. He said that you would think that the Netherlands and Belgium, which are neighboring countries and have a culture somewhat similar, could agree on what was healthy or safe. He said that sometimes they can't agree and this difference of philosophies becomes much more difficult when dealing internationally with vast differences in cultures. Hopefully, in the long term we can arrive at an acceptable international level in certain areas but in other areas these differences may be unresolvable.

Another problem is differing and changing national priorities. Each country has its own set of priorities of what is important to its economy. Balance of trade, balance of payments, are important to certain countries, the conservation of energy and materials is important to other countries, and the protection of the environment is important to others. These differences have to be recognized if we are to arrive at an effective international product certification system.

Thirdly, let me say, that probably one of the most difficult of problems to overcome is the question of minimum quality versus comparative quality. Historically, in a competitive and free enterprise system the matter of comparative quality has been left to the buyer to establish. The buyer determines if product A is better than product B through experience. The only measure we have had in the past is the cost of the product and as we all know this has not always been a true indicator of whether product A is better than product B. I think, however, we are rapidly approaching a state where comparative quality labeling will become more acceptable, to a limited extent, worldwide.

In product testing and certification we normally certify a product as to its meeting an acceptable or a minimum set of requirements. But what is acceptable? What is acceptable to one buyer may not be to another. Sears Roebuck and Company recognized this and has for three or four years now indicated products in their catalogue as being Good, Better, or Best. This is a form of comparative quality labeling. We have also seen comparative quality labeling for automobile batteries in their guarantees for 12 months, 24 months, or 36 months. One of the more recent changes has been brought about by a national priority. Conservation of energy has forced comparative quality measurement in energy labeling of appliances in the United States. This labeling indicates the amount of energy these appliances use and thus a measure of their efficiency, and cost of operation.

Another problem has to do with harmonization and nontariff barriers. Most of you are familiar with the standards harmonization programs underway in the Common Market, European Economic Community. These

programs in most cases have a product testing, a product labeling, and product certification requirement of one form or another. This is giving rise to an EEC certification system and our concern is that it is regional in nature and closed to non-member countries of the region. It can be viewed as a form of nontariff trade barrier in that it requires multiple testing of imported products and does not allow for non-reciprocal testing agreements with non-member nations. Hopefully, as we move towards agreement on the GATT Standards Code, regional (and national) barriers of this nature will disappear and we will arrive at a truly international system of product certification.

Another question, and this is not as true with developing nations because they have a more integrated standardization program, is that in many of the developed countries we differentiate between technical standards and technical methods of test on the one hand and national laws and regulations mandating technical requirements for products.

Another problem which has to do more with standardization but is reflected in the whole concept of product testing, labeling, and certification is the question of design versus performance standards. Over the years the vast majority of technical standards have been design oriented, that is, they have defined a product. This inhibits innovation and today we are seeing more and more pressure to move to the performance based standard. The example is that we don't really care whether a wall is made of brick or tissue paper. What we do care about is that the wall, regardless of what it is made of, has certain thermal, sound, strength, and other characteristics. Any kind of material and any kind of construction that meets that set of performance criteria would be acceptable.

I understand Mr. Peiser is going to read Mr. von Ranke's paper, if it arrives in time for our session here. I have not seen this particular paper, but I know basically Felix von Ranke's theme since I have worked with him for many years. He is a very strong supporter of international certification and objects to regionalization of the standardization process. I hope his paper arrives in time for our session because he has a lot to contribute to these discussions.

One of the fundamental things behind a successful product testing, labeling, and certification, is a common measurement system. I don't mean widespread use of the metric system nor being involved with the General Conference of Weights and Measures. What I really mean is the measurement system which we can agree upon for trading commodities; an agreed method of how to measure the moisture content of grain or how we will measure the specific gravity of liquified natural gas. These commodities have an enormous economic value in international trade, and we must have a common measurement system in order to establish equity for buyer and seller.

When the United States became a member of OIML, the International Organization of Legal Metrology, in 1972, I was honored by being named the U. S. Representative. This organization is responsible for recommending model laws and regulations relating to the calibration, accuracy and use of commercial and industrial measurement instruments. OIML demonstrates again the matter of differences in philosophy. In the United States regulations covering measurement instruments are primarily concerned with the commercial marketplace, e.g. scales, petroleum pumps, taximeters, and the like. In OIML and under the philosophies of many of the member countries industrial and scientific measurements are also governed by law and cover such things as medical thermometers.

If I might make one final comment, I think it is important in looking at some of these problems related to standardization that we take the sytems approach, both in the standards development process and in standards implementation. We must consider changing priorities. We went through a very excruciating exercise in the United States these past two years where the effort in reducing pollution was negated by the energy shortages. We had to retrack or delay many of the programs that were done for protecting the environment in order to conserve and find new sources of energy, a matter which became equal or more important at that particular time. Changing priorities! We have to consider also the economic impact of some of these programs and who really pays for them. You can almost say categorically that in the long term the consumer is the one who really pays and we must be careful to balance the economic issues with the environmental and health and safety issues. We must use the systems approach.

In conclusion, we have historically considered standardization as basically the development and promulgation of a set of technical requirements. And this has, again historically, under the international system, been voluntary, --- voluntary in its application. However, in our discussions here today we are talking about product testing, labeling, and certification which are, in fact, converting these voluntary standards into mandatory standards. We are talking about the true application, or implementation, of these standards. In doing so we must face some other questions. What products must conform? When must they conform? And how do we determine and indicate that they conform? This is Product testing, labeling, and certification.

With that as my concluding remark I took the liberty of asking that my colleague, John Paton from Ausralia, be given a few minutes to relate the activities of CERTICO since he is just returning from Amsterdam where CERTICO was meeting last week. CERTICO is the ISO Certification Committee and with that I'll ask John if he wishes to add to these remarks.

Mr. Paton:

As Bill Andrus says, I have just returned from a meeting of CERTICO. To those of you who are not familiar with the work of CERTICO it is an ISO committee concerned with certification as carried out by national standards bodies. It has been preparing a handbook on certification systems which is intended to lay down guidelines on how the various types of certification can be applied. It is not, however, meant to be an international standard. CERTICO also concerns itself with definitions as used in certification, for instance, what is a certification system, what does "approved" mean. Another aspect discussed by CERTICO was the possible role of ISO itself in certification. One of the problems that has arisen is that ISO standards themselves are basically not suitable for certification because of their very nature. As a result some guidelines are being prepared for ISO technical committees on how international standards should be written to make them suitable for certification. Various other types of documents are being prepared by CERTICO including check lists for inspection reports, test reports, and so on. CERTICO is also looking into establishing criteria for judging the competence of testing laboratories and inspectorates. We are fortunate in Australia that we have the National Association of Testing Authorities which does concern itself with approving the competence of laboratories. I do not think one could reasonably expect anything startling to come out of CERTICO as there are so many difficulties associated with international certification.

Prof. Stephens:

A question directed to John Paton on the CERTICO. Is the program being developed by IEC also a part of the CERTICO activities?

Mr. Paton:

Not really. The bug-bear of international standardization is that there exist two separate organizations, ISO and IEC, which is probably rather unfortunate. The IEC scheme for the assessment of the reliability of electronic components strictly belongs within the orbit of IEC. In each country, of course, the national standards bodies are looking at it but it does not really fall within the ambit of CERTICO.

Dr. Probine:

The point that John Paton made about registering a laboratory in relation to its competence is a very important one in this field of certification. I thought I would just mention that I would be dealing with it in my paper tomorrow.

Mr. Peiser:

I would like to let this audience know that unfortunately John Paton is with us only today. This is a great tragedy and so he will actually not be able to comment on Mr. Probine's paper. I suggest to the Chairman, if this is possible, that Mr. Paton might mention a word or two more about this remarkable Australian team for accreditation of laboratories which many of us are looking at with admiration, if only from a distance.

Mr. Paton:

Mr. Chairman, I am sure that Mr. Probine knows all about NATA as there is a companion organization being set up in New Zealand and so I am confident that the paper of my New Zealand friend will probably cover the Australian situation. Am I correct?

Dr. Probine:

Yes, the New Zealand organization is called TELARC which stands for Testing Laboratory Registration Council. It will follow NATA organization and procedures very closely, and we hope to have reciprocal recognition of NATA and TELARC. Laboratories in New Zealand are now being assessed for TELARC registration. NATA assessors are being used so that we can get the scheme "off the ground" in the two countries with similar standards of assessment and reassessment.

Mr. Hopper:

I would like to touch on one subject, particularly with Bill Andrus. It is relevant to CERTICO and, in fact, regional standardization and certification reciprocal agreements. Where you've got a nation like the United States which is almost a region in itself, there is no doubt at all that international trade is hampered - imports to the country are hampered - first of all by federal standards and State regulations placed upon those and by further clauses and requirements even by local authorities. I know several quite appalling incidents of importing traders having to meet these conditions and in fact of whole installations having to be ripped out which have met the federal requirements but did not meet local requiremtnts within the United States. This is a very serious problem and I'd like to know whether this is improving, whether federal regulations, federal standards are beginning to take hold in the States. It would be quite interesting to know this because, you know, in the USA you really do have a regional problem.

Mr. Andrus:

I think what you say, Ron, is exactly true. In fact, when you look at the gross national products of the United States and Western Europe, they are roughly the same, so your equivalency of the regional concept, is well taken. Perhaps we should be considered as a region and given something like fifty votes in ISO instead of one, to compare with the nine votes of the EEC. However, there is improvement, particularly in our occupational safety and health regulations which are federal and which are now being applied as federal laws, superseding local requirements. The same is true of our Consumer Product Safety Commission and their regulations relative to consumer products. The problems associated with export to the United States is not limited to exports. We have the same problems within the United States. I cite as an example Sears Roebuck again. We have some 12,000 jurisdictions in the United States dealing with building codes, safety of electrical appliances and so on. The Sears Roebuck Company has one version of a refrigerator in which I understand they must manufacture 111 different models to meet various building codes - installation codes, around the country. They must manufacture seven different models just for the metropolitan city of Chicago. So, the problem is not limited just to exports.

Mr. Hopper:

Now, let's take up the second point - it's again on reciprocal agreements. It's just an observation, but I think that on the international side of reciprocal agreements we put the cart before the horse. As everybody here knows, on the international scene there has been an enormous complication (particularly in Europe with CEN) of trying to harmonize standards and test methods to begin with, and then reach some kind of reciprocal agreement. I said it when I was here before in Singapore and the more I think about it the more I think that the right way to go about it is that we should reverse this process. There should be regional agreement, in fact one that we are trying to do here in Southeast Asia, where you take a reputable national mark in good faith, regardless of the differences between countries. At least it is a mark, at least is is a certification process. Achieve reciprocal agreement first for the sake of trade and then take the long and arduous course of harmonizing test methods and standards. It is just a thought for people involved in harmonization that we should drop our protective adherence to our own systems as being the only perfect systems and accept that other people are doing a reasonable job - if not the job that we want ourselves - and get cooperation first on a reciprocal agreement basis. And then start the long haul on standardization and harmonization.

Mr. Hussain:

I would like to discuss some aspects of the international certification. Certification of exports in many countries is being

carried out by marking which is called a certification mark. This scheme is being carried out by national standard bodies. Normally a difficulty arises in the case of international certification. The certification marking is normally associated with national standards under a country's laws. There was a legal status, so in a country under the law only the national standards can be enforced but as far as international certification is required, they can't require conformance to any standard other than national standards, so in that case, the standard mark of the national bodies of the country cannot be applied. In other words, certification marking in accordance with national law cannot be carried out. This was the case very recently in the meeting of RCD (RCD stands for Regional Cooperation for Development among Pakistan, Iran, and Turkey). We are developing certain common standards for our trade and industry and one of the recommendations was that each country should recognize other standard marks. The difficulty arose that standard marks of other countries cannot be recognized under national laws, so I would like to ask Mr. Paton if there is any solution to that? Personally, we have covered this difficulty by authorizing or recognizing the certification by the national standards boards of each country in their country but not international certification or standard mark. What I mean is their certification marking. We have not been able to find any solution to that. Thank you very much.

Mr. Paton:

The topics touched on by Mr. Hopper and Mr. Hussain have been talked about in standards circles for about 20 years to my knowledge. There are immense problems in the recognition of a country's certification mark by another country. Quite apart from any legal difficulties, even in the case of a fairly simple product, national standards can differ considerably. In one country you can have a very rigorous standard associated with a very rigorous and expensive scheme of control, in another country a less rigorous standard and possibly a less rigorous quality assurance scheme. Were the first country to recognize the second country's certification mark, that would then immediately put the manufacturers in the first country at a considerable disadvantage in that they would have to make to the more rigorous local standard whereas the imported goods would comply with a much less rigorous standard. For this reason principles were enunciated way back in 1956 when it was felt that recognition could only be given to another country's certification mark if (a) the standards were identical, and (b) the quality control exercise was identical. That just does not happen unfortunately. For this one needs harmonized standards and harmonized quality assurance. All we have been able to do in Australia, as in other countries, is to work out bilateral arrangements and work on this one step at a time.

Prof. Stephens:

One of the first steps is the sharing of information of each nation's certification mark program with the other nations. Each country can then assess the standards and the quality assurance programs to determine whether they, in fact, want to accept the certifications of the other country. I think that this conference is a very good initial step in getting this process started.

Dr. Choi:

I would like to comment further on the program that Mr. Hopper brought out about international certification programs. He was mentioning that there is a difficulty because of the different state and local standards in the United States. I would like to mention one more difficulty facing the promotion of international trade. In Korea we try to build up our electronic and electric industries, most of whose products we hope to export to foreign countries. If we want to export our electrical or electronic equipment and appliances to the United States, they must be inspected by a private agency. Small and medium industries cannot afford the inspection fee required to send a specialist all the way from the United States to Korea to inspect, for example, 10,000 radios and other electronic products. Only big companies with large volume can afford to pay for that kind of service. I think this barrier should be brought up as a subject to be discussed at this international standards meeting. Thank you.

Mr. Hopper:

Let me qualify what I said about reciprocal agreements on product standards. I was talking about the idiosyncrasies of this world when we very often have to put quite expensive equipment into one country in order to test exports to other countries when in fact this is purely an academic distinction. I can quote you crash helmets where in BSI we had to set up two test rigs, one for the British and European and one for the American system, each country holding rigidly that theirs is the best. Nevertheless, for the sake of trade, we had to do it. I was making a plea that for heaven's sake let's drop this nonsense and agree that we go about things in different ways, and where a certain reputable organization exists, recognize its certification and get down to harmonization of test methods a bit later. I would say in defence of such systems and in answer to Dr. Choi, in Thailand that law allows for reciprocal recognition. It is a very open and fair-minded law which places no restriction on trade at all, providing importing companies can guarantee us or assure us that the system is within reasonable boundaries of quality assurance. But Ken Stephens - and certainly later myself - tried to get from a number of importing countries the outline of their systems. We wrote to the standards institutes for our requirements in brief form. I think Ken Stephens had seven replies, I had one hell's own job getting replies that were absolutely necessary to import equipment into Thailand and,

I would make a plea to you gentlemen here that if you get such requests please reply to them because you may be holding up trade from your own country.

Prof. Stephens:

Yes, I just have a brief comment to Dr. Choi's remarks. And I'm not afraid to mention the UL mark as one of the private organizations to which he referred. For small industries in Korea is there not a coordination of the UL activities? Has not UL established some agency within Korea that will serve as its agent?

Dr. Choi:

No, The organization sends its specialists all the way to Korea to inspect although some concerned agencies in Korea have tried unsuccessfully to establish such bilateral agreements.

Prof. Stephens:

Well, they do have the mode of operation of establishing a local organization that will serve as their representative and we might, in fact, invite some comment on that in connection with the Philippines. Maybe Mr. Wexler would comment on this. UL has now made arrangements to establish a representative within the Philippines to do testing for them of the local products for exportation. Does not your Fine Instrument Center perform this type of inspection in behalf of other organizations?

Dr. Choi:

FIC has tried to establish that kind of relation but no positive results were achieved. It is my understanding the Japanese also tried to establish some kind of bilateral agreement between UL and the Japanese testing laboratories but they are unsuccessful so far. They have an agreement with Canada. It is my feeling they like to contract business ventures.

Mr. Sumantri:

The last comment will be given by Mr. Andrus.

Mr. Andrus:

I really don't know what to comment at this point in time. I'm not so sure that dealing with government agencies would be any easier than dealing with private enterprise. I think the UL situation is unique as the whole product certification program in the United States is unique in that we do not have a national certification program. I

think what was brought out here in your comments, Mr. Choi, is the fact that when standards become mandatory it is not necessarily a government decree. It is the option of the user, the purchaser, to establish what standards he wants the products that he is purchasing to meet. There is also a de facto situation in which it is accepted practice that products meet certain standards without any law or regulation involving it and what you are facing, I think, in the case of electronics, electrical, is the case of what is common practice rather than what is a matter of law.

Mr. Sumantri:

I am sorry, the time is very short. It has been very interesting. I would like to thank Mr. Andrus and also Dr. Paton. Let us proceed to the next presentation of "Testing and Certification for Export of Products in the Republic of China". Dr. Ning, the floor is given to you.

TESTING AND CERTIFICATION OF EXPORT PRODUCTS IN THE REPUBLIC OF CHINA

Dr. Werner Y. F. Ning
Director
National Bureau of Standards
Republic of China

In my brief exposition on testing and certification for export products from the Republic of China I hope to show that we have in operation a system based on historical development, on rigorous and effective control where needed, on accommodation to the buyers' genuine needs, and on flexibility to accommodate new trends for freer, more reliable, efficient and cost effective international trade.

With minor change of name the Bureau of Commodity Inspection and Quarantine (BCIQ) now in the Ministry of Economic Affairs has been in existence since 1929. With an evolving legal basis it has had the responsibility to decide on the need for tests, inspection, quarantine, or certification of all export products; as well as to carry out such relevant procedures. While BCIQ itself has laboratories and inspectors much of its work is delegated under supervision, but with confidence, to responsible organizations specialized in the testing of specific items.

The original purposes for the creation of BCIQ still apply:

(i) to improve the quality of commodities:
(ii) to stimulate confidence in markets:
(iii) to protect health, safety and other interests of manufacturing personnel and consumers:
(iv) to promote product development:
(v) to prevent the spread of diseases and pests:
(vi) to offer no proper basis for import denial for products of China.

Recent trends have been towards tests and inspection of all products for the home as well as the export markets. Foreign trade continues to enjoy high priority. Presently 1058 carefully coded items are subject to certification in 26 categories of exports as follows:

(1) food and fodder
(2) fruits (fresh)
(3) vegetables (fresh)
(4) seeds
(5) bristle
(6) wool
(7) feathers
(8) meats
(9) eggs

(10) sea food
(11) tea
(12) canned fruit
(13) seasoning
(14) sugar
(15) preserved vegetables and fruits
(16) mats
(17) acids and alkalis
(18) non-ferrous metals and their products
(19) fertilizer
(20) essential oils
(21) industrial raw materials
(22) fuel
(23) paper and allied products
(24) textiles
(25) iron and steel
(26) construction materials and machinery

Tests are carried out in accordance with Chinese standards, developed by representative committees reaching consensus, or with tentative standards, or even by buyers' standards or specifications. Procedures generally involve five steps: vendors' application, rapid response sampling, inspection, certification, and loading port check.

In its proud history BCIQ has not been made aware of a single defect of its certification for freedom of animal disease or plant insect pest. If anyone wishes to learn more about the service of BCIQ I will be happy to discuss other features such as how we assure a 24-hour inspection response to export applications, how we adjust certificates to differences in origin, any tariff preference or other bilateral agreements, or how we ensure that for items, for which strict in-plant hygenic or quality control systems have to be applied, only suitably qualified manufacturers are authorized to request certification.

Perhaps here I should simply stress the importance of sound national standards, revised at intervals, and harmonized to international standards to the greatest extent possible. This, in the Republic of China, is the responsibility of my agency, the National Bureau of Standards of the Republic of China (NBS/ROC). It also has an important scheme for quality marks which may be granted for products conforming to the Chinese National Standards (CNS). This marking scheme is not only assisting BCIQ but it is finding increasing acceptance by local consumers. I believe that it could form the basis for reciprocal recognition with mutual confidence in other national commodity testing and certification authorities. This type of arrangement to foster I regard as the high aim of this Seminar. Clearly one must start from modest beginnings and as such I proudly show you two items on which NBS/ROC is authorized to place the standards mark of Australia, as agents of the Standards Association of

Australia, side by side with our own. These items are tempered glass plate and protective helmets for use in general traffic for instance by motor bicyclists.

In conclusion, Mr. Chairman, permit me to offer a few general remarks. Along with the rapid development of science and technology the assurance of product quality is becoming ever more complex. As the standard of living of our peoples rises, so the form, quality and new demands for consumer goods become a more serious, delicate, technically based concern than ever before in the history of mankind. How to achieve and maintain the best quality of export products from my country and how to win the optimum market reputation at home and abroad has become a prime national concern. The improvement by evolution of our relevant systems and perhaps the establishment of new modern organizational structures are constantly under review. The increasing problems and challenges we realize must also rest on the sophistication of our home market. In the United States of America and Japan product quality is aggressively sought by the entire society. I submit that we all should realize that effective export product inspection is everyone's business who has heart and mind on development and prosperity of all of our nations.

Mr. Paton:

Professor Werner Ning, could you tell us some of the criteria used for one of your points here about suitably qualified manufacturers - how you judge who is a suitably qualified manufacturer?

Dr. Ning:

The National Bureau of Standards, Ministry of Economic Affairs of the Republic of China is in charge of the CNS Certification Mark.

The license can only be granted to the manufacturers whose factory is located within the boundary of the Republic of China and whose product is in conformity with the National Standard in question. When the factory is considered as qualified through inspection and test, the Certification Mark Section of the National Bureau of Standards will submit a report to the Director of the Bureau for approval of issuing the Certification Mark license. After issuing license, a periodical inspection will be conducted once every six months.

Mr. Paton:

Did you mean the company that you certify can make a request that they have to follow these ASTM standards? These are companies that you...

Dr. Ning:

The granting of a license is based upon an undertaking by the manufacturer to conform to the National Standard in question. An application for a license to use the Certification Mark can only be made in relation to a published National Standard of the Republic of China.

Dr. Probine:

I was particularly interested in the fact that the Australian Standards Association had given approval for its mark to be put on the various goods - a sort of reciprocal recognition arrangement. I wondered whether the Australian Standards Association does this in other cases, and whether this is at least a partial answer to some of the problems of getting CERTICO "off the ground". Could I direct this question to John Paton?

Mr. Paton:

Yes, Mr. Probine. As I said earlier we do have bilateral arrangements with countries on specific products against specific standards. In the case of the Republic of China, Dr. Ning's organization acts as our

agent with respect to motor cyclists helmets and safety glass made to Australian standards. We have similar arrangements with many countries including Canada, South Africa, New Zealand, United Kingdom, France, and so on. It is not a matter of recognizing the certification mark of these countries, it is purely a matter of mutual cooperation with regard to particular standards.

Mr. Hopper:

Could I just ask Dr. Ning if his system in the Republic of China is continued surveillance?

Dr. Ning:

Yes.

Mr. Sumantri:

More questions or comments? Shall we now proceed with the next presentation? But before we start with the next one I would like to thank Dr. Ning for his presentation. Dr. Wijewantha, the floor is given to you.

PRE-EXPORT TESTING & CERTIFICATION IN SRI LANKA

Dr. Ronald T. Wijewantha
Director
Bureau of Ceylon Standards
Colombo 3, Sri Lanka

INTRODUCTION

Pre-export testing and certification are becoming increasingly popular in developing countries. Turkey, Iran, Ecuador and India have achieved significant progress resulting in increased export earnings and stabilization of their national trade image. Today, products of developing countries face heavy competition from those of developed nations. In this climate every effort should be made by developing nations to withstand the pressure of competition by measuring up to the exacting requirements of the sophisticated modern consumer. To achieve and ensure this, measures are needed to prevent sub-standard goods from entering foreign markets. One established method towards this end is by the mandatory imposition of pre-export inspection. Such a scheme not only ensures a third party independent guarantee of the quality of the product exported, but also precludes the export of sub-standard goods.

The decision to enforce pre-export inspection in Sri Lanka arose due to the increasing number of complaints that were received from abroad over the quality of our exports. These complaints were naturally of great concern to us especially at a stage when Sri Lanka had begun to place high priority on the promotion of exports. The damage resulting from such trade complaints is undoubtedly detrimental to our foreign trade.

At the end of 1973, it became possible for the Bureau to take the initiative in planning for the setting up of an effective pre-export inspection scheme in Sri Lanka to be administered by the Bureau of Ceylon Standards as the responsible controlling agency. Towards this end the Bureau held meetings with all interested parties including the Chambers of Commerce and all Government Agencies concerned to work out a strategy for the pre-export inspection, initially of minor agricultural products which are cinnamon, cocoa beans, whole black pepper, whole cloves, whole cardamoms, nutmeg and mace. This was followed by meetings aimed at evolving a suitable methodology. The accepted methodology was then submitted for further scrutiny and comments to a panel of experts with the Director of Commerce as chairman, and finally to the Council of the Bureau of authorization and approval. The next step was to obtain formal Government approval which was received in a matter of a few days.

MECHANISM

The Export Inspection Scheme that is operative in Sri Lanka is one of export license control, whereby exporters of specified commodities are required to obtain an export license prior to shipment. The authority for the grant of the export license is the Controller of Imports and Exports. One of the conditions for the grant of this export license from the Controller of Imports and Exports is for a certificate of quality issued by the Bureau on a particular consignment to be obtained. This Scheme is operated under the provisions of the Imports and Exports Control Act No. 1 of 1969.

METHODOLOGY ADOPTED FOR AGRICULTURAL COMMODITIES (Table 1)

The exporter has first to grade and pack his produce for export. He is then required to have his consignment certified as conforming to the appropriate Ceylon/Sri Lanka Standard by a surveying organization recognized by the Bureau for this purpose. Simultaneously, the exporter notifies the Bureau that the services of the surveyor have been sought for the initial survey of the consignment and that the said consignment would in turn be ready for inspection by the Bureau officers. Once the surveyor has surveyed the consignment he is required to send a copy of the survey certificate to the Bureau. On receipt of this survey certificate the Bureau inspection personnel will visit the same stores of the exporter and draw samples of the commodity representative of the consignment. This drawn sample will then be divided into two, one for examination and the other for referee purposes. Once the requisite samples have been drawn by the Bureau personnel, all components of the sampled consignment will be sealed appropriately. Back at the Bureau the sample for examination will be further inspected for compliance with the relevant requirements and a certificate of quality will be issued to the exporter who will have to annex it to his application for the export license. When the export license is granted by the Controller of Imports and Exports, shipment can be effected. At the Customs a check will be made on the intactness of the seals already placed on the consignment. If the consignment does not conform to the Ceylon/Sri Lanka Standard, the exporter will be notified by the Bureau of its non-conformity, with reasons for same, in which case the exporter could either appeal to the Director of the Bureau within 24 hours of receipt of notice of non-conformity of his consignment or agree to regrade his consignment and start all over again. In case of an appeal, further investigations will be carried out by the Bureau and the verdict that is given will be final (refer Table 1 for flow-chart on methodology).

METHODOLOGY ADOPTED FOR MARINE PRODUCTS
(Table 2)

The second major sector of export commodity inspection is frozen shrimp and lobster products. In the execution of such a scheme for consumable food items which deteriorate rapidly except under rigidly controlled conditions, the need for adequate safeguards against spoilage and decomposition are absolutely essential. Therefore, the first step in the stepwise Scheme of Pre-export Inspection has been to register establishments processing lobster products and frozen shrimp. Such processing establishments are inspected by a team of personnel drawn from the Department of Commerce, the Department of Fisheries, and the Bureau of Ceylon Standards, for conformity to the standard Code of Hygienic Practice for the processing of frozen prawns and lobster products. This Standard Code of Hygienic Practice (C.S.208), formulated by the Bureau, lays down conditions in regard to hygienic standards that should be operative in the plant, to processing methodology to raw materials, freezing conditions, storage and to transport.

A list of establishments for processing of frozen prawns and lobster tails thus registered will be compiled and sent to the relevant Government Institutions such as the Department of Import and Export Control, the Central Bank of Ceylon and the Department of Commerce, so that export of this commodity, by non-registered organizations will be prevented.

The next step in the methodology of this Scheme is to maintain a continuous check on processing in each of these registered organizations. This is provided by inspecting officers paying random monthly routine visits to each processing unit. Samples from the production line would be drawn and examined for conformity to standard and a check will also be made as to whether the Standard Codes C.S. 208 is being adhered to.

The third and final requirement is to check every processed consignment or batch (depending on the requirements of individual exporters) for conformity to the standards laid down by the Bureau (C.S.10 and C.S.188). For purposes of testing these marine products the Bureau has recognized the laboratories of the Department of Fisheries. The Department of Fisheries issues a test report to the Bureau on the basis of which a certificate of quality will be issued to the exporter who will obtain clearance for shipment from the Controller of Imports & Exports. After obtaining the required clearance, shipment of the consignment could be effected. Here, too, there is provision for appeal in case an exporter disagrees with the assessment relating to a particular batch or consignment. The Director of the Bureau will in such instances authorize an

investigation by a competent authority whose verdict shall be final (refer to Table 2 for Flow-chart on methodology).

FEES

Routine sampling and sealing of consignments and issuance of certificates of quality is a free service by the Bureau. A fee of Rs.100/- is charged only in the case of a re-test.

EXPORT INSPECTION INSTITUTIONS

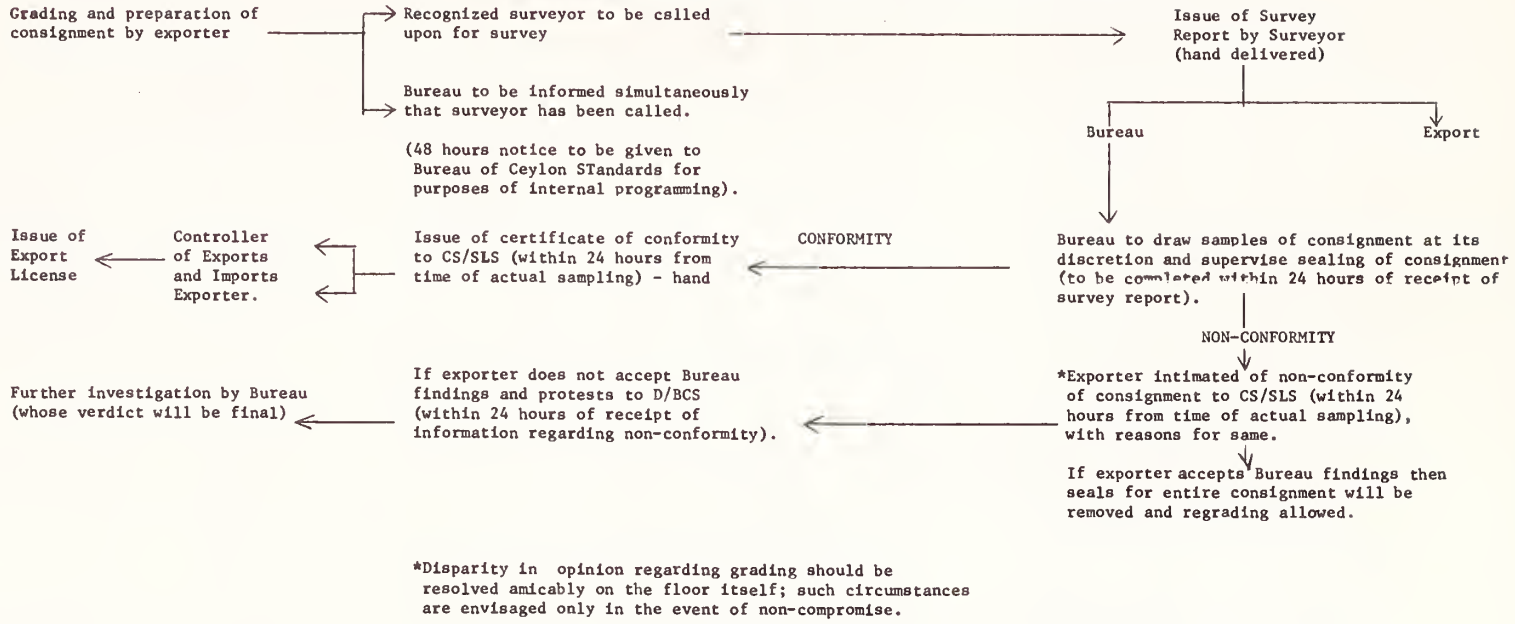
The Government of Sri Lanka has recognized the Bureau of Ceylon Standards as its Central Certifying Authority for the purpose of pre-export inspections. Hence, there are no other certifying authorities for this purpose. The Bureau, however, intends to recognize laboratories under Governmental control to carry out tests and analyses of samples on behalf of the Bureau.

S U M M A R Y

The Bureau of Ceylon Standards operates a National Pre-export Inspection Scheme on behalf of the Government of Sri Lanka. The mechanism adopted for the export inspection for different specified commodities is essentially the same, i.e., one of export license control. The methodology for different commodities however, differs due to inherent differences in the nature of the commodities. The Bureau intends to extend this Scheme to cover fruit juices, cordials, jams, jellies and canned fruit during the course of next year and in the years to come to semi-industrial and industrial products. The constraints in regard to the last is the non-availability of suitable test facilities.

Although we have been faced with numerous teething problems in the implementation of the Scheme, we are confident of its smooth operation due to the co-operation and enthusiasm shown by the relevent Government institutions concerned and also by the trade circles involved.

PRE-EXPORT INSPECTION SCHEME : FLOW-CHART : AGRICULTURAL COMMODITIES

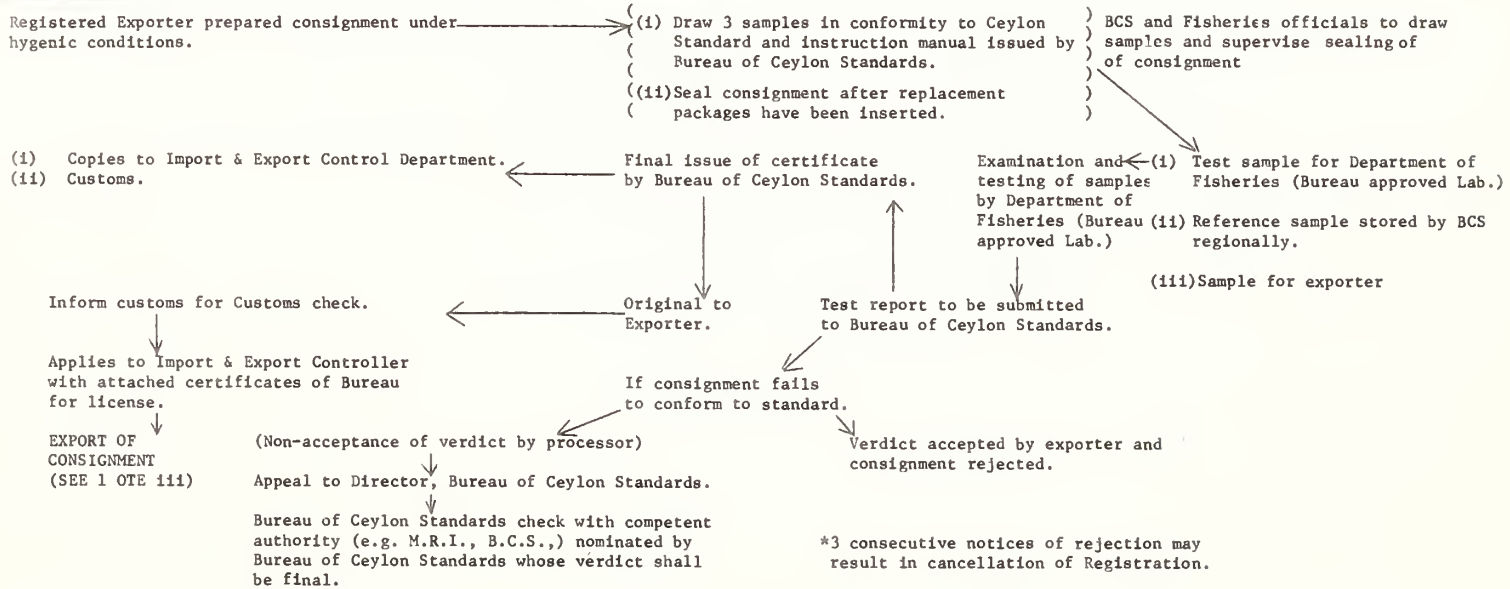


*Disparity in opinion regarding grading should be resolved amicably on the floor itself; such circumstances are envisaged only in the event of non-compromise.

TABLE 1

PRE-EXPORT QUALITY CONTROL SCHEME: FLOW-CHART FOR FROZEN PRAWNS AND LOBSTER PRODUCTS

SAMPLING OF END-PRODUCT & TESTING PRIOR TO SHIPMENT



NOTE - (i) Port Cargo Corporation must ensure that there is no dealy in loading cargo on to the vessel so that the temperature of consignment does not rise beyond the specified limits.

(ii) Processor must in eveyr case at time of notification to Bureau of Ceylon Standards must give assurance of refrigerated transport at the specified temperature from stores to ship.

(iii) Customs to verify if transport was actually done under refrigerated conditions. This will be one of the conditions on the export license issued by the Controller of Import and Export.

TABLE 2

Mr. Hussain:

I have a few questions for my colleague from Sri Lanka. What are the qualifications for the appointment of surveyors? Are there any special enforced standards for the national standards that are applied for pre-shipment? In case national standards are applied, what practices are adopted for a lengthy test? Number three: Who prepares national standards for food and agricultural produce and who enforces them? Are the authorities safe? The last question on which I would also like some enlightenment from my Indian colleague is: For the food and agriculture produce, is it the national standards board who produces, or who prepares and establishes the standards, and who enforces them? I would also like to have this information from both, from Ceylon as well as from India.

Dr. Wijewantha:

Thank you, Mr. Hussain. The first question is in regard to the qualifications of the surveyors. Well, having surveyors to carry out this preliminary inspection is something which is unique to Sri Lanka. You see, before we brought this scheme into operation, the Chambers of Commerce had experienced hands who were called "surveyors" to assess each consignment before it was shipped out. This was the limit of pre-shipment assessment. When we came into the scene, while we have our own qualified staff to do a final assessment, we did not want to do away with the surveyors. We wanted them also to have a place in the sun to start with, otherwise we felt there could be resistance from the Chambers of Commerce and so on. To answer your question, surveyors are experienced hands in grading but they do not necessarily have a degree behind their name. We find that in most of their assessments, i.e., in at least 70% to 80% of their assessments, there was agreement with our own gradings. I might mention that there is now agitation that we do away with the surveyors. This in effect is actually a vote of confidence in us since exporters feel that a single check by us alone is sufficient. The second reason why we retained surveyors was that we wanted to see that the time of my own people was not ill spent. Our earlier experience was that exporters have a habit of just getting their produce together and asking the Bureau to certify it. By having the surveyors we at least ensured that there were minimal chances of consignments not being properly graded, before notification is sent our office.

The second question I think was whether implementation of the scheme is by the national standards. The answer is yes.

Mr. Hussain:

What happened with lengthy tests? Because the national standards involve very exhaustive tests.

Dr. Wijewantha:

No, most of the tests are not lengthy and can be performed within the 24-hour limit given by us. In the case of bacteriological tests which are applicable in the case of marine products, there is the incubation period which takes more than 24 hours, that is why I say that for marine products we need a minimum of about 4 to 5 days before we could issue a certificate of conformity. The next question was: Who prepares the national standards? We follow the usual procedure in standards writing as adopted by all national standard bodies. Representatives of the trade, representatives of government organizations, experts in the field, all the usual people who are involved in the preparation of standards, serve on the particular drafting committee.

Mr. Hussain:

My point was particularly about the agricultural produce and food products. Perhaps you know this.

Dr. Wijewantha:

In this case, too, we are very particular that there is representation by all parties concerned. And, you wish to know who imposes this? Our Bureau of Sri Lanka will be implementing some of the agricultural standards. This will be in respect to certification of export consignments. Thank you very much.

Mr. Hussain:

I would like my colleague from India to respond also. You know, we happened to be partners in the practice of law once.

Mr. Rao:

In the matter of food and agricultural products we have the laws of the Ministry of Agriculture, and also an Agricultural Marketing Advisor's office with laboratory facilities for essential tests. By agreement with the Agricultural Marketing Advisor, standardization in agricultural and food products in areas where the national or international interests predominate is controlled by the national standards body. In areas where such interests are not involved, it is the Agricultural Marketing Advisor. The Export Inspection Council

also comes into the picture from the year 1963 or 1964 onwards, and they have also certain agreement with this Ministry for inspection of exported food and agriculture items. The endorsement, therefore, in these fields, rests with three authorities. For instance, the export of agricultural produce like bananas has been entrusted to the Export Inspection Council, and so are frozen marine products. There are many items on which you would find what is called an AGMARK - by the Agricultural Marketing Advisor's Office, and those relate to a number of items including agricultural commodities, essential oils, edible oils, and many other items. Where we the Indian Standards Institution come into the picture is with our certification of certain manufactured products, like biscuits, macaroni, infant foods, breakfast foods, condensed milk and so on. So, our fields of activity are quite well defined and implementation, I must say, is reasonably good and without conflict. Does that answer your question, Mr. Hussain?

Mr. Hussain:

There is one point. Is the distinction between the Food and Agriculture producers based on manufactured or non-manufactured goods?

Mr. Rao:

Well, it is both. For instance, an essential oil is not quite an agricultural produce; it's a manufactured product. Therefore, specifications, though drawn up by the National Standards Institution have been adopted by the Agricultural Marketing Advisor. This kind of agreement has been going on for years now, and we didn't want to change the status of such an agreement.

Mr. Wijewantha:

What about the edible oils?

Mr. Rao:

Edible oils, by and large, are also AGMARKed.

Mr. Wijewantha:

If I may ask one question of Dr. Rao. Referring to the AGMARK scheme - we have all studied it a bit - we find that in the case of marine products there is a variation between standards, the export standard laid down under the AGMARK scheme for micro-biological limits is different from that in the national standard. Now, this fact is quoted very much, by our trade circles, against the position which we have taken of only having the national standard. They say, "Why

can't you have two standards? One an export standard and the other a national standard as in the case of India."

May I pose the question. Do you think that is advisable to have two standards? An export standard as opposed to a national standard?

Mr. Rao:

Well, to say that we should have two standards is probably much too much. We could have two grades, rather than two standards. When we talk of standards, each is much more comprehensive. When we have two grades under the same standard it should be better. All along, in our national standardizing activity, we have been in consultation with our overseas buyers, be it micro-biological limits, be it moisture content of grain, be it any other requirement, our overseas buyer's preferences are guiding us in fixing the grades. For instance, on tea-chest plywood, U.K. and their Ministry of Food, have their regulations, regulations on the tea, regulations on its packing...we were mostly guided by their regulations and the fixation of timbers, the interlining of the tea-chest with certain materials like aluminum foil, paper, or so on, was to satisfy their requirements. Similarly, in our national standards on food products we are guided by the American regulations because - though they are very high, we felt that if we satisfied them in micro-biological and other requirements, we would satisfy a lot of others and that particular grade is within the national standards all right, and there is no separate standard. Now, our Export Inspection Council does adapt some of the national standards and comply with them. Therefore, we cannot say that they are different, they are part of the same standard, either higher grades or extracted from the national standard. Does that answer you, Mr. Wijewantha?

Mr. Hussain:

Excuse me, one more question...if you don't mind. Dr. Rao has just recommended sort of a grading system for pre-shipment inspections. Perhaps this would not provide the complete answer because the national standard, by and large, gives the normal standard (what shall I say) the lowest acceptable tolerances, you know. And when you prescribe the grade, you know, the test will remain the same, and only the tolerances would be changed. So perhaps, in my opinion, the grading system would not solve the difficulty for perishables. It might be that we would have to cut down the number of tests and some special standard would have to evolve for perishables, cutting down all the lengthy tests. That is my opinion. Thank you very much.

Mr. Rao:

If this still requires an answer from me, well: for export, grading standards are an essential part because, I will cite an example of our exports of walnuts to U.K. Walnuts of some sort of mixed grade have been exported and then there were complaints. Then the walnuts were graded very high and only the high grade walnuts were exported, then, a reverse complaint came to us and that was "Who wants the highest grade of walnuts? You send us the mixed grades and we will grade them according to the consumer market about which you do not know." Therefore (laughingly) we went back to the old practice of a mixed grade being sent to the U.K. Now, in certain countries, still, a high grade of walnuts, a second grade of walnuts, a third grade of walnuts are still required. Perhaps in your exports from Pakistan in many items like dates, grapes, and so on, a similar situation would arise. For instance, the grades that come to us from you are of mixed grade and our wholesalers grade them to different varieties and sizes and sell them. So it depends on what your customer or our customer requires, and we have to go accordingly. Therefore, I still feel that the gradation or rather specification of various grades would be essential unless otherwise required by the customer.

Mr. Hussain:

I have never disputed grading. That was not my gripe. Grading is very frequently essential. And we also do provide it in our national standards. But, the question is the export standard...should there be some special standard or the national standard? Or the national standard, if you observe all the tests, the material tests, performance test, die tests, all would be needed. So if you provide grading, and grades, the dollars might be reduced, but the number and nature of tests would remain the same. For pre-shipment dispatch what you need actually is to clear a consignment in the minimum possible time. For that very purpose, it is quite essential that the number of tests, particularly those lengthy tests, should be reduced. That was my point. Not degrading grading...grading is quite essential, I do agree there.

Mr. Rao:

As far as the length of the tests are concerned, I don't know if we could reduce the duration of the tests because of certain requirements. For instance; if you are just testing the moisture content of wood or plywood or somethings like that, it is fairly easy. But if you are to test the micro-biological content of food, it is lengthy because you have to incubate the item and take it out and see the population of the fungus and other micro-biological elements, so the test has got to be a little long and drawn out. I'm afraid on that issue we cannot compromise.

Dr. Probine:

I wonder if I could direct a question to Mr. Wijewantha of Sri Lanka. The scheme you outlined was of great interest. The question is this: Having fixed the standard which you will use in Sri Lanka, do you have any problems at all in meeting standards of specific countries which may be at variance with one another? Does the fact that you have established a proper inspection procedure mean that goods are being accepted almost without question?

Dr. Wijewantha:

We find that the standards which we had laid down for agriculture commodities at a quite high level. And, as such, there has been no question of the non-acceptance at the other end. To start with, what we are trying to do, actually, is to insure that anything leaving our country meets with the minimum requirements as set down in our Sri Lanka standard. We have found that at the same time it has been at an acceptable level to all importing countries.

Dr. Probine:

Thank you very much.

Prof. Stephens:

I would like to extend that question a bit more. Perhaps in two parts. Are there exports from Sri Lanka not covered or not yet standardized by the Bureau of Ceylon Standards, and, if so, how are those export products inspected and to what standard? And the second question is: Is there in operation a certification program for domestic products, excluding exports?

Dr. Wijewantha:

Now, in regard to the first part of that question. We have not laid down Sri Lanka standards specifications for all agricultural items, commodities which we produce in Sri Lanka. To start with, our scheme covers only the items specified in my paper. During the course of this year we will be including fruit, juices, cordials, jams and jellies for which two Sri Lanka standard specifications have been laid down. We have already prepared our standards for some essential oils and other commodities, but we will not be imposing the pre-export inspection scheme until about next year because of questions of personnel and laboratory facilities for testing. As for the second part of the question about the certification program, we have found that in Sri Lanka, although we have tried our level best to get the certification marking scheme going, because of lack of internal competition and being a seller's market, it is very difficult to get manufacturers to join in our certification mark scheme. There is also the difficulty that a large number of our products are produced in

government manufacturing organizations, you see, and they do not think of joining our scheme because it is, again, a monopoly. I wonder whether this answers you.

Mr. Hopper:

I would like to question the gentlemen from India, Pakistan and Sri Lanka. My personal belief is that grading is not very successful, and in fact, not desirable. From a practical point of view, this rather bewilders me as to how these three countries manage to put it into effect. A certification scheme that covers one product is difficult enough, Lord knows; that is, with the money that developing countries have for these standards bodies and for certification teams. When you split these up into grades you're tripling or doubling your methods of testing, your grading and your surveillance which is the worst part, perhaps, the most difficult part of this certification. I am against it but I'm quite willing to change my mind...I'd like to know how these three standards bodies manage to achieve this grading but above all, how they've managed to produce the staff, the testing, the time to grade effectively into a certain number of grades. There is just one final point. From our experience in Thailand, grading would have positive dangers. I'll give you an example of this: the British Standard, and I think many other standards, on lead content in glazing. There are clearly defined admissions going down to the two parts per million where the lead is likely to be consumed, and I think something like 20 (I can't remember exactly) allowed for such things as ashtrays. In Thailand the standards have been set at two parts per million for everything simply because the differences in preparation among what is largely an expanded cottage industry, are so full of pitfalls that we simply cannot allow this variation to take place in the industry and the standard is set for all things, regardless, at two parts per million. It is this sort of complexity, this sort of - how do you really control your industry when you're grading? How can you trust them so much, how can you form the certification teams and the surveillance to survey these various grades? I'd be very interested to hear from these gentlemen exactly how they control this grading.

Mr. Rao:

Well, Dr. Wijewantha wants me to answer first. In a standard we cover quite a number of grades and there is no difficulty in isolating the testing of one grade from the other. For instance, the export of aluminum ware from India required that we should be on grade one. Now, our national body has given a certification mark for aluminum, grade one for exports. We do not find any difficulty in the export of that item under grade one. And our buyers abroad are satisfied in receiving this high grade aluminum with only a few traces of other

elements. For internal consumption, we have the next grade, which we find good enough and therefore we do not find any difficulty in making that grade and using that grade. I cannot off hand give other examples but there are many where the gradation has been helpful to our export trade. Referring to the examples of glazing for certain items, which Mr. Hopper has raised, probably no problems arose in our country with our exports but surely there are similar requirements in food items and so on, which do not bother us at all.

Recently, the survey team visited one firm in Manila where certain food items, like beer, ice cream, milk and other things are being produced and this firm had set upon itself a zero limit for micro-biological requirements. It is a very high grade. Perhaps for local consumption they could have the micro-biological limit to the extent that the Food and Drug Administration of the Philippines and others permit, but still they had zero limit. And they had no difficulty at all. They felt no difficulty in achieving it, either in testing or in production. Therefore, I for one feel the grading system in a standard, other requirements being common, should not present any difficulty at all.

Mr. Hopper:

How do you ensure that grade three is not sent out as grade one?

Mr. Rao:

Oh, now I understand your question! How do we ensure that having grade one, a grade two or a grade three does not go out? Well, that is an intrinsic requirement of quality marking everywhere, and, if somebody wants to cheat, he can cheat once, twice, but not all the time...because not only the quality marking scheme would be vigilant, the receiver at the other end would also be vigilant. And, how long can the cheating go on? At one stage or another the mark would be cancelled or suspended and the business stopped. Therefore, we do not, at least in India, we do not foresee any difficulties.

Dr. Wijewantha:

I would like to add a few words briefly to what Dr. Rao has said. If I may take as an example one agricultural product, say pepper, we have only one grade of pepper and assessment is on the basis of ash content, moisture content, extraneous matter and enzymatic activity, and these are ascertainable by laboratory test. Once a consignment is ready for shipment we have a scheme whereby we can draw out a sample, do the test, seal up our consignment and thereby ensure that the quality of the consignment that goes out conforms to that particular grade which is being shipped out. The same thing applies over and over again to the other agricultural products. If we use pepper as

another example, then we would have a grade one, two, three, and four, depending on the moisture content, amount of extraneous matter and the amount of immature berries. The exporter or the producer is expected to grade according to what is required by the buyer and then assess it according to the Sri Lanka standards specification so that he can say, that his consignment is conforming to grade one, two, three or four. We would be drawing the appropriate number of samples on a statistically laid down method of sampling, testing the sampling and assessing the consignment before we pass it for shipment.

Mr. Sumantri:

I think that the purpose of this seminar is to exchange information, ideas and experiences. I thank you very much for your participation and I thank Dr. Wijewantha for his presentation.

II SESSION ON METROLOGY and TESTING

Prof. K. S. Stephens, Chairman

Prof. Stephens:

We will call this second day's session to a start. It may be significant to note that exactly one year ago today a conference of similar nature was convened in this very same room. We beat that one by one day yesterday but just one year ago today a conference sponsored by UNIDO on the subject of quality control and certification marking of products convened here. We enter into the second day's activities and this morning's session on metrology and testing. Before we get under way we'll have Mr. Peiser give a few announcements.

Mr. Peiser:

Thank you, Mr. Chairman. In view of the fact that you have just reminded us about what happened one year ago, I also wish to remind you of what happened exactly one hundred years ago today. And that is that the Treaty of the Meter was signed, which is the oldest international treaty in existence in current operation. Obviously, we here, a hundred years later, are, in a sense working to make it a more effective document than it was 100 years ago.

Mr. Chairman, thank you very much.

Prof. Stephens:

You're welcome. We'll get under way right away with the first talk by Dr. Merwyn Probine, Director of the Physics and Engineering Laboratory, of the Department of Scientific and Industrial Research of New Zealand, speaking on evolution of a national measurement system. Dr. Probine.

DEVELOPMENT OF A NATIONAL INFRASTRUCTURE OF SUPPORT SERVICES FOR QUALITY CONTROL FOR EXPORT

Dr. Merwyn Probine
Director
Physics and Engineering Laboratories
Department of Scientific and Industrial Research
New Zealand

INTRODUCTION

When I was asked to give this talk, I gave a lot of thought as to what I might say that would be of value to you. Rightly or wrongly, I finally decided that I would say something about the way in which we were tackling this question of quality control, quality certification marking, and standards, in New Zealand.

I decided to do this, not because we do this any better than other people (we don't), but because, although we are a relatively wealthy country, we are nevertheless a developing country in the sense that we are at present trying to develop our export of manufactured goods. Our successes and failures may, therefore, be of interest to you. Furthermore, we are a small country (population 3 million) with a relatively short history of manufacturing, and our present experience may not be very different from that being experienced by other developing countries.

Some of what I have to say will, I am sure, be irrelevant to your situation to some degree, but I hope that some of it will be of value to you.

The paper is divided into two parts. In the first part, I will deal with some background to the New Zealand Economy and some of the infrastructure services we have introduced with a view to encouraging better quality in New Zealand Manufacturing; and in the second part I have dealt with some of the steps we are taking to strengthen our national measurement organisation.

In talking about quality control, quality certification marking, and standards, what we are really talking about is the production of manufactured goods which both local and overseas people can buy confident that they are of good quality.

One can, of course, make good quality articles without formal quality control systems. The sculptor, the artist, and the individual craftsman can, and does, produce objects of exquisite beauty and of very high quality, without the need for formal quality control systems. This is because the craftsman sets his own personal standards, checks the quality

of his own work and, when he releases it for sale, gives his own personal "Certificate of Approval".

But the "personal approval" system used by the craftsman cannot be carried over into large-scale production. Mass produced products are not made by one person but by many people; there are usually a large number of individual components which have to fit accurately together so that the product can function as a whole; and the making of the individual components may involve the use of a large number of separate technologies.

Because interchangeable parts are the key to mass production, they must be measured accurately to fit together. To design the complex technological systems, the physical and chemical properties of a wide range of materials must be accurately known. Materials must be selected to meet a wide range of operating conditions and to make such selections, the engineer depends on accurate data on the characteristics and properties of materials.

For these reasons, as the industrial technology of a country increases in sophistication, so too does the need for making accurate reproducable measurements. We could say, therefore, that good measurement is one of the keys to the development of an advanced industrial economy.

At an early stage of a country's development, when it still has a strong agricultural bias, and when it is producing such products as, say, meat, wool, dairy products, leather, rubber, palm oil, tea, etc., it has a more modest precision measurement requirement than does a highly industrialised country producing, say, machine tools, scientific instruments, automobiles, communications equipment, computers, etc.

In the highly industrialised country, there is a need for very advanced measurement, testing, and quality control methods, to a degree which is not necessary in a primarily agricultural country. To provide the less developed agrcultural country with the measurement and testing facilities which are necessary for the advanced industrialised country, is unnecessary, and it would be a waste of valuable resources if it were attempted.

The first major point I wish to make, therefore, is that it is sufficient to provide facilities which are matched to the country's needs and to ensure that the measurement and testing facilities are kept constantly under review and strengthened as and when necessary, so that the real needs of the country can be met as industrial development places greater and greater demands on accuracy of measurement and on advanced quality control procedures. In this way, the resources which are allocated will be utilised to the full and employed so as to give the maximum benefit to the country's science and technology.

Good measurements are, of course, only a small part of the total services required for industrial development. Industrial development needs a well-educated work force covering the whole spectrum of skill and knowledge right through from training in the simplest "bench" skills, to the

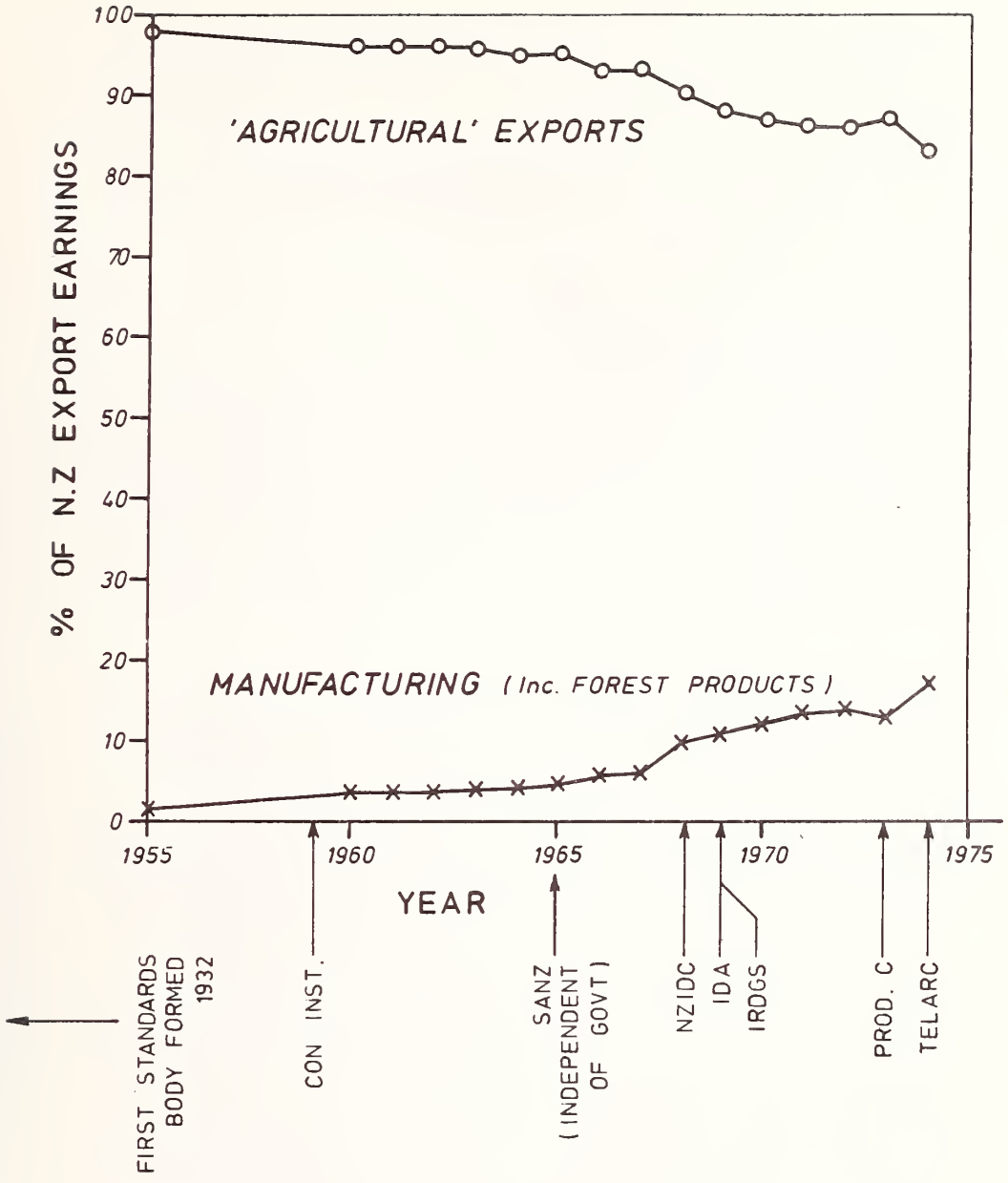


FIG. 1

% of N.Z. export earnings from Agricultural Exports and Manufacturing Exports. The dates of introduction of some significant infrastructure services are shown.

training of professional scientists and engineers; it requires business institutions with skills in finance, management, and marketing; and it requires highly competent government departments and institutions to support government policies aimed at assisting business development.

Although these latter topics are outside the scope of this talk, they are mentioned here because some of the broader aspects of industrial development will be touched on as I discuss our experiences in New Zealand.

PART I

SOME BACKGROUND INFORMATION ON THE NEW ZEALAND ECONOMY

The New Zealand economy has been, and still is, based on the production and export of agricultural products - mainly meat, wool, and dairy products. In Figure 1 it will be seen that 20 years ago, in 1955, agricultural exports comprised 98% of the total export earnings. 10 years later, in 1965, they still comprised 96% of the total; but since then there has been a marked rise in the export of manufactured goods, (including forest products such as pulp and paper) so that today the export earnings of agricultural exports are only about 80% of the total, whereas manufacturing which was only 2% in 1955, has risen to about 20% at the present time.

This dramatic increase in earnings from the export of manufactured goods is shown in Figure 2. It will be noticed the export earnings of manufactured goods (excluding forest products) has been increasing at the rate of 27% per annum since 1969, and the export earnings of forest products have been increasing at the rate of almost 15% per annum.

Manufacturing has been actively encouraged in New Zealand since the early 1940's, and it was initially developed under the protection of import control and tariff barriers. During the 1950's and early 1960's, the production of manufactured goods increased rapidly until it was supplying a substantial fraction of the home market; but although some of our manufactured production was exported, it was a very small proportion of the total exports (see Fig. 1). During this time when manufacturers were producing goods for the highly protected home market, I think it would be true to say that there was little real attention to quality control or testing by New Zealand manufacturers.

This dramatic swing towards export of manufactured goods since 1968, however, has meant that manufacturers are now producing for the highly competitive international market where, not only is there no protection, but they actually have to compete in many instances against goods which themselves enjoy tariff protection. This change in the marketing situation has meant that there is now very much more emphasis on quality control and testing to meet the needs of discerning overseas purchasers.

The shift towards manufacture for export has also meant that we have had to strengthen and develop an infrastructure of services which are designed to increase the quality and technical excellence of our manufactured goods, and to increase the productivity and efficiency of our industry.

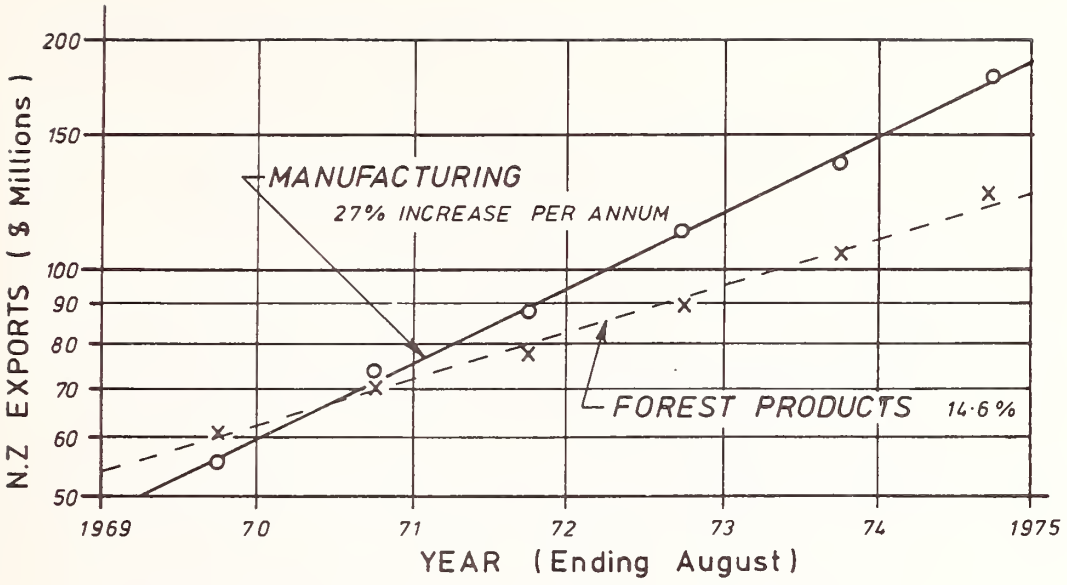


FIG. 2

OUTLINE OF THE "SUPPORTING SERVICES" INFRASTRUCTURE

There are a very large number of services which can give valuable aid to manufacturers - particularly to the small and medium-sized manufacturers - to make it possible for them to produce better products, products which employ more advanced technologies, products which are well designed, products which are produced efficiently, and products which have been adequately tested.

So that you will obtain some idea of the extent of these advisory services, a small booklet produced by the New Zealand Productivity Centre will be available for distribution. Some of the services which are relevant to this seminar, however, are listed below together with a brief summary of their principal functions. Services will undoubtedly be improved and expanded as time goes by; but you will see that there is developing in New Zealand a valuable core of services to aid manufacturers in their export drive (the phasing in of these services is shown in Fig. 2).

Standards Association of New Zealand (SANZ)

(Object : to produce national 'Consensus' Standards)

- standards specifications
- codes of practice
- certification mark scheme

Testing Laboratory Registration Council (TELARC)

(Object : to promote good measurement practices throughout the country)

- assessment and registration of laboratories
- directory of testing and calibration facilities
- assistance to achieve good laboratory practice and management

New Zealand Inventions Development Authority (IDA)

(Object : to promote the development of N.Z. inventions)

- advisory service on patenting
- technical and commercial assessments of patents
- assistance with launching patented equipment
- financial assistance

Industrial Research & Development Grants Scheme (IRDGS)

(Object : to simulate research and development in New Zealand industry)

- cash grants based on salary, plant and miscellaneous research expenditure to firms undertaking eligible industrial research and development
- contract research let by firms to approved laboratories may also qualify for grants.

N.Z. Industrial Design Council (NZIDC)

(Object : to promote good industrial design)

- information and advice on product and graphic design
- liaison between those who supply designer services and those who supply them
- evaluation of products for the award of "Designmark" to well designed products.

Productivity Centre (PROD.C.)

(Object : to improve the productivity of N.Z. industry)

- promotion of improved productivity in manufacturing and servicing industry
- advice on productivity improvement
- interfirm comparisons
- productivity groups
- productivity improvement teams

Consumer Institute (CONS.INST.)

(Object : to protect the consumer and promote good products)

- testing and evaluation of consumer goods and publication of results
- evaluation of services to the consumer
- submissions on consumer legislation
- information service to consumers
- consumer complaints service

The ways in which these organisations can improve the quality of goods of N.Z. manufacture will be obvious from their objects. One of them, the Consumer Institute, deserves further comment because its effect on quality control and testing may not be immediately obvious. The Consumer Institute has about 126,000 members (1975), which is 43 members per 1000 of population. This is the second highest membership per capita in the world. 'Consumer' magazine is read monthly by between 400,000 and 500,000 people (in a population of 3,000,000). Products which are tested by 'Consumer' are reported on by brand name and price, and critically evaluated for their performance under the following general headings - safety, efficiency, reliability in use, durability, appearance, convenience, and price. Manufacturers whose products are rated poorly, suffer a significant drop in sales, and make every effort to improve their product so that they will not be 'caught out' again. If they have not tested their products previously, they certainly will do so in the future. In the 16 years it has been in operation, the Consumer Institute has done a great deal, indirectly, to change manufacturers' attitudes to testing and to quality control.

In discussing infrastructure services to assist manufacturing, the work of two government departments should also be mentioned. They are :

Department of Trade & Industry

Information, advice and assistance to manufacturing and servicing industry is available from the department on :

- opportunities and requirements for industrial expansion or development
- availability and cost of industrial land, power, labour, transport and other services
- availability and sources of supply of raw materials, components and finished goods
- government and private services available for assistance to industry
- price stabilisation and control regulations
- regulations concerning trade practices, consumer protection, monopolies, mergers and takeovers
- import licensing
- industry protection
- productivity
- exporting and export incentives
- resource conservation
- industrial research and development grants
- regional development and regional development incentives.

Department of Scientific & Industrial Research (DSIR)

Broadly speaking, the DSIR objective is to initiate, plan, and implement research calculated to promote the national interest of New Zealand.

It is Government policy for DSIR to encourage industrial development through co-operation with industry in the development of New Zealand resources, and in the manufacture of new products, designed and/or developed in New Zealand, and which may have export potential for commercial applications.

More specifically, DSIR helps industry by the following:

- advice to Government on specific technological matters
- research on natural resources and on methods of exploiting these resources
- introduction of new methods and new technologies to the New Zealand scene
- provision of scientific and technical advisory services to industry
- provision of national testing, calibration and analytical facilities and services - with the proviso that DSIR should not undertake work that could satisfactorily be done by available private organisations
- scientific and technical advice to such bodies as the Inventions Development Authority, Consumer Council, Design Council, Industrial Research & Development Grants Act Committee, Testing Laboratory Registration Council, etc.
- research and special development programmes aimed at building up a pool of skill and knowledge in techniques, processes, and methods, of importance to industry - with a view to making this knowledge available through advisory services
- provision of special facilities, such as pilot plant facilities, testing facilities, etc.
- making grants, and letting contracts, to universities and technical institutes, for research and development projects which are important from an industrial point of view
- funding research associations.

PART II

DEVELOPMENT OF MEASUREMENT AND TESTING SERVICES

New Zealand has for many years had a standards association (Standards Association of New Zealand) which produces 'consensus' standards, or 'standard specifications', and codes of practice. Without such consensus standards, components could not be interchanged readily, and such things as communications systems, television systems, etc., could not be fully utilised or operated, on a national or on a world basis. Consensus standards also ensure safety, performance levels, methods of test, and so on. The value and purpose of consensus standards is so well known that I will not pursue the matter further here.

What I would like to do is to trace the way in which we are at present developing our measurement and testing services to meet the needs of manufacturing for export.

In order to do this, I would first like to describe the type of organisation which is used in a number of developed countries to ensure its measurement system is uniform throughout the country and uniform with measurement systems used throughout the world.

The 'National Measurement Standards Laboratory' Type of Organisation

The organisational details differ from country to country; but a fairly general type of pattern is that which is illustrated in Figure 3 by means of a block diagram.

In this diagram we have represented the situation in which there is one national body which has the responsibility for custody, maintenance, and development of national standards of measurement, and for the provision of means and methods of making measurements consistent with those standards. In the diagram we have called this body the 'National Measurement Standards Laboratory'.

In the field of international standards, the Bureau Internationale des Poids et Mesures was created with the principal task of providing uniformity of measurement in science, trade,and industry for the whole world. Thus, through this international organisation, and with the help of international collaboration, uniformity and improvement of measurement is made possible. In the "international" part of the diagram, international standards are shown by a single block indicating that the standards of measurement in the National Measurement Standards Laboratory can be referred back to international standards, either directly to the International Bureau of Weights and Measures, or through another National Standardizing Laboratory.

It is customary, in many countries, for the body which is responsible for "Weights and Measures" used in common trade to be a separate organisation from the "National Measurement Standards Laboratory". The "Weights and Measures" organisation has the responsibility of administering an Act, which provides for the regulation, administration, and control of weights and measures used in commerce and trade. Such an organisation employs inspectors to ensure that the provisions of the Act are adequately policed; and ensures that the standard measures used by the "Weights and Measures" Inspectors are regularly or periodically verified, and that there is an approved system of checking the standard measures against measures of higher quality, up to the level at which the higher quality measure is the accepted national standard.

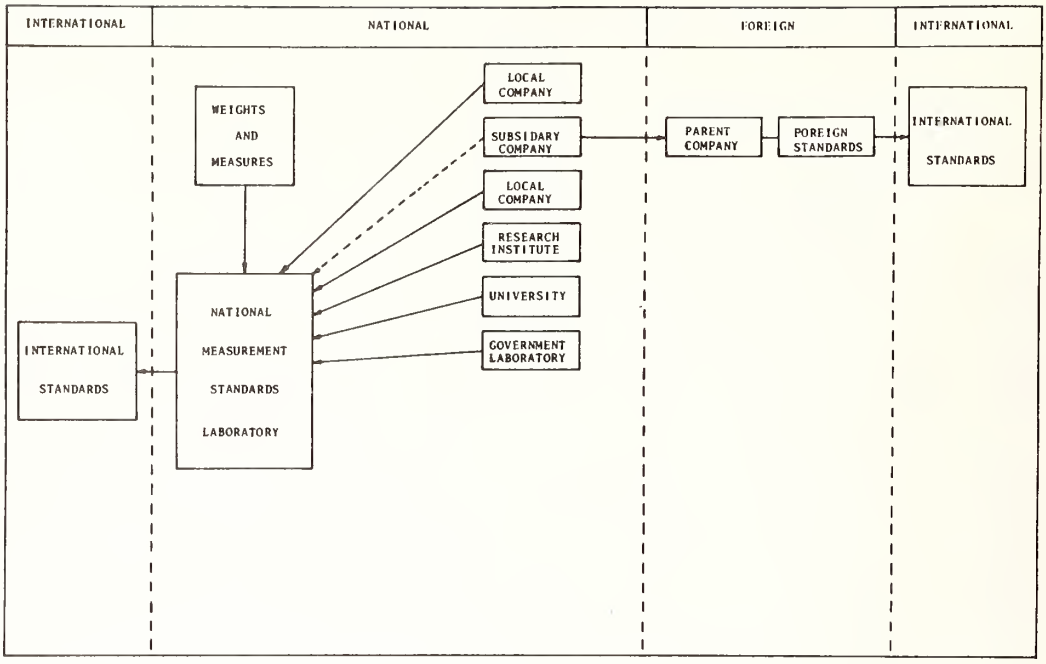


FIGURE 3.

In the diagram, the "Weights and Measures Organisation" is therefore shown as relying for calibration of its highest quality measures on the standards facilities provided by the National Measurement Standards Laboratory.

Local companies, research institutes, universities, and government laboratories within a country, can refer to the National Measurement Standards Laboratory for calibration of their highest quality measurement standards. This reliance on the National Measurement Standards Laboratory for calibration of the highest quality instruments is illustrated in the diagram by arrows leading from each type of institution to the national body.

In almost all countries throughout the world there will be companies which are subsidiaries of overseas companies, and it is quite usual for these subsidiary companies to rely on their parent company for such measuring equipment, gauges, etc., as they require to ensure that the parts produced locally are interchangeable and uniform with the company's products produced elsewhere. In the diagram the "subsidiary" company is therefore shown as having its main route to international standards through the parent company whose standards, in turn, are traceable to "international standards" through a foreign national standards laboratory.

The organisational pattern described here is not the only one possible. Sweden has built up a very advanced industrial economy without having a "National Measurement Standards Laboratory". Responsibility for the precision measurement is shared by a number of complementary laboratories concerned with specific fields of measurement.

The "National Measurement Standards Laboratory" supported by "Approved Laboratories"

It is the personal opinion of the author, that the question of linking precision measurement in the national standards organisation, to the needs of the industry, has been tackled most successfully in Australia through an organisation called The National Association of Testing Authorities (NATA). New Zealand has recently set up a similar organisation called the Testing Laboratory Registration Council (TELARC). NATA in Australia, and TELARC in New Zealand, are organisations which run voluntary approval and registration schemes for testing laboratories.

Briefly, the idea behind the laboratory registration scheme is that firms and institutions which are capable and willing to undertake calibration and testing work, are first examined by assessors chosen for their knowledge of the field, to see whether they have the appropriate equipment, whether it is installed in suitable premises, and whether the operators are experienced in measurement and in reporting the results of measurement. If these and other conditions are fulfilled, the laboratory is registered as an "approved" laboratory in the measurement field in which it has the necessary skills. It has the right to use a standard mark on its test documents which guarantee to the industrial user of the service that the calibrations have been carried out by a laboratory competent in this field of measurement.

The interrelations between organisations requiring calibration work to be done, and organisations offering to do calibration and testing work in countries where this type of scheme operates, is shown diagramatically in Figure 4.

The principal difference between the organisational scheme illustrated in Fig. 3 and that illustrated in Fig. 4, is that a number of local companies, research institutes, universities, and Government laboratories can, if they wish, have their own laboratories assessed and registered as "approved laboratories" for carrying out both their own calibration and testing work, and for carrying out calibration and testing on behalf of other organisations. The standards used by these "approved" laboratories must be directly traceable back to the national standards held by the National Measurement Standards Laboratory in order to qualify for approval.

The advantages of the scheme are many. Industry benefits from the improvement which takes place in laboratory practice, and from the better testing, which leads to better quality control and higher quality products. NATA and TELARC endorsed documents become a reliable basis for the purchasers acceptance of the suppliers test results, and this avoids unnecessary duplication of test work and speeds acceptance of goods supplied under contract. It therefore conserves scientific and technical manpower.

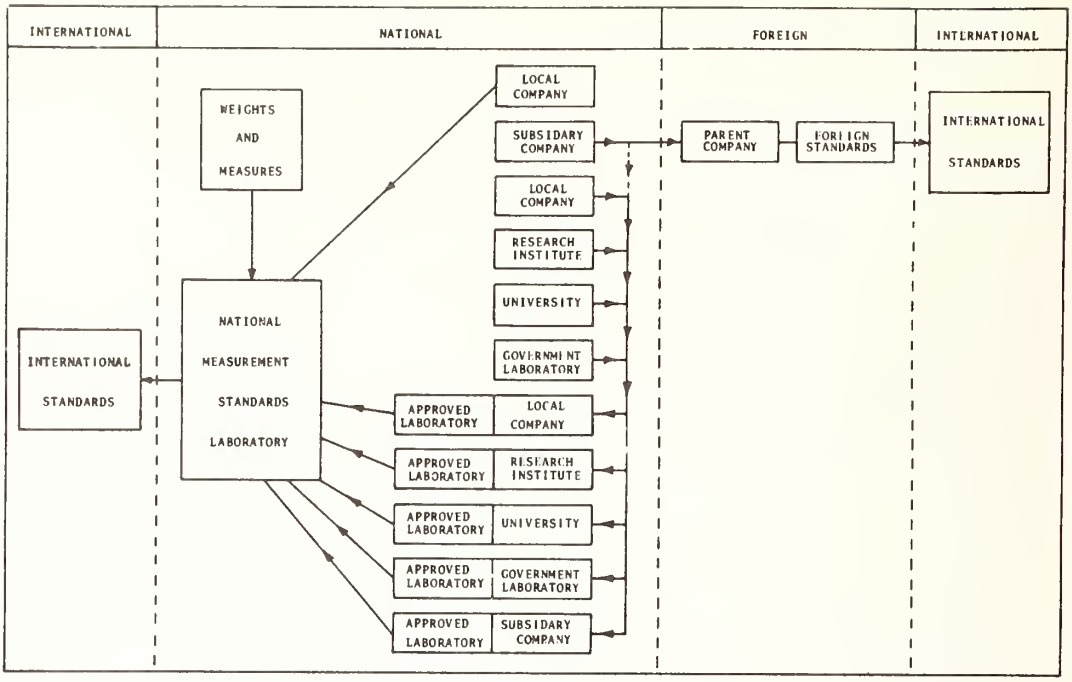


FIGURE 4.

The fact that laboratories can be approved wherever they are in the country, means that precision measurement and testing work can be carried out in regions well removed from the locations of the National Measurement Standards Laboratory; but in such a way that measurements made in the regions are directly traceable to National Measurement Standards.

Assessment and re-assessment of their laboratories, provides management in industrial firms with an independent measure of laboratory performance.

Finally, publication of lists of testing and calibration facilities, provides industry with a list of facilities which are available to it for calibration and test work, so that the industrial firm knows exactly where to go for the type of measurement or testing service it requires.

I think that most people would agree that the existence of a laboratory registration scheme of this sort is a valuable aid to good quality control in industry.

The Present Organisational Situation in many Under-developed Countries

The pattern of organisation of precision measurement facilities as found in many under-developed countries, is shown diagramatically in Figure 5. This diagram does not aim to represent the situation in any particular country.

In this case there is no single body which is responsible for precision measurement and national standards. In other words, the National Measurement Standards Laboratory does not exist. The body responsible for "weights and measures" has its principal standards directly verified by the International Bureau of Weights and Measures; or by a foreign National Measurements Standards Laboratory. The subsidiary company can still have its equipment, gauges, etc., supplied and verified through the parent company, and its standards are, therefore, traceable to international standards through a foreign National Measurement Standards Laboratory.

Local companies, research institutes, universities, and government laboratories are not so fortunate. It is true that the imported measuring equipment of these organisations is traceable to international standards at the time of purchase, by virtue of the fact that the instrument supplier can trace his standards back to international standards.

In Figure 5, however, it may be noted that a gap has been shown between the local company, research institute, university or government laboratory, and its respective instruments supplier. This gap is inserted to indicate that, while these various bodies have their measurement facilities traceable back to international standards through the route indicated at the time of purchase, they do not maintain this link to the international standards because they do not submit their equipment for recalibration.

Many of the companies and institutes which do not have calibrations updated, recognise the need for recalibration; but, because the amount of money made available for maintenance is so small, they cannot afford to meet the costs involved in transporting the equipment to a foreign National Measurement Standards Laboratory and meeting the test fee involved.

A POSSIBLE PATTERN OF DEVELOPMENT OF TESTING SERVICES

The standard of measurement and testing facilities, and therefore of facilities or good quality control, varies widely among the so-called "under-developed" countries. In some under-developed countries, facilities are very elementary indeed, and quite inadequate to support even a modest industrial development. All of the countries of Southeast Asia which I have visited are, however, making strenuous efforts to improve their measurement facilities because of their importance to their industrial development programme.

It would be presumptious of me to make any specific suggestions as to how individual countries should tackle the general problem of developing their measurement and testing services. There are, however, some general comments that one could make in the hope that they may be helpful.

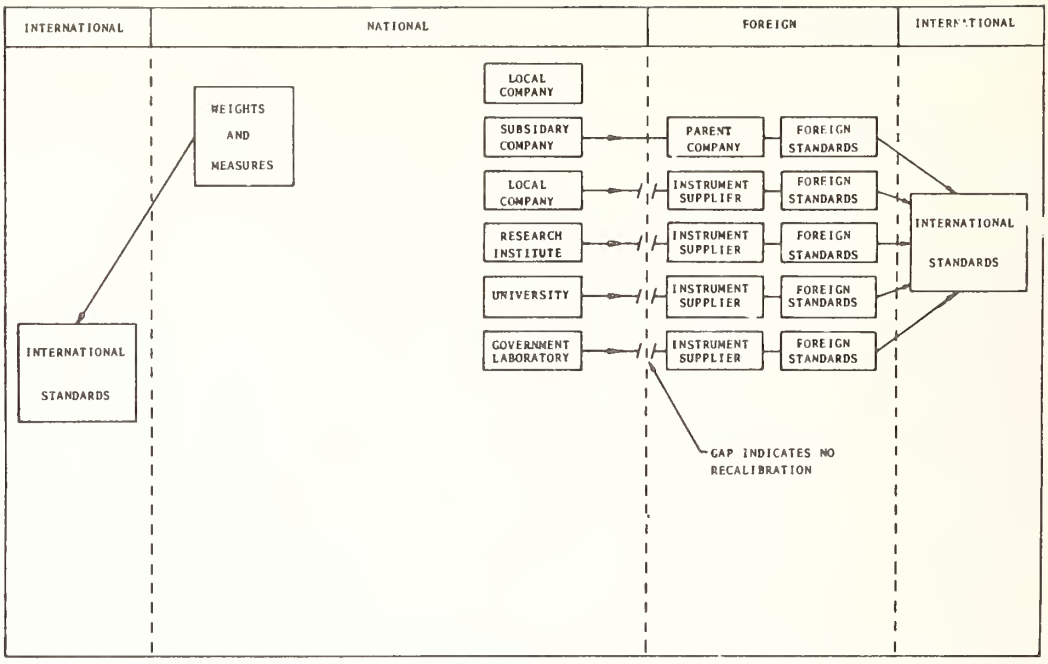


FIGURE 5.

Repair and Calibration

Effective testing and analytical services, and industrial efficiency generally, depend on equipment which is not only competently used but which is maintained in proper working order. There can be no doubt at all that the general state of equipment servicability in under-developed countries is a serious problem. It is typical that there is a shortage of money for repair and maintenance; low stocks of spare parts are held by instrument suppliers; and there is a shortage of servicing skills. The problem of instrument servicability is often compounded by environmental factors such as high temperatures and high humidities, which lead to rapid deterioration of instruments even when they are not in use (contacts corrode, mould grows on the optics of microscopes, electronic components and circuits break down, and so on).

For these reasons, laboratories have been set up to undertake the repair and recalibration of instruments in several under-developed countries by UNESCO, and by other agencies. In general, these small groups are performing an extremely worthwhile service, and it may be, that by gradually building up these groups, one can provide for at least some of the precision measurement needs of the country.

The availability of facilities for repair gives these institutions a very valuable link with users of such equipment

and, because equipment must be recalibrated after repair, these laboratories have a core of instruments which can be used for calibration purposes. For the very reason, therefore, that such groups have good contacts with users, and must have precision measuring equipment for calibration work, they could, with suitable strengthening, provide for some of the measurement needs which are presently lacking.

Where there are laboratories within a country which have special skills and equipment for precision measurement in particular fields, a good deal could be achieved by strengthening the measurement skills of these laboratories and by giving them specific responsibilities for meeting the measurement needs of the country in the areas where they have specific skills.

These laboratories and institutes could be given increased government and international support for improving their laboratory accommodation, and adequate maintenance grants to provide for periodic recalibration of existing instruments and funds for the purchase of new and approved equipment as the need arises. The equipment and skills built up in this way could become the nucleus of a national measurement standards laboratory at a later stage, and in the meantime the needs of the country in various areas of measurement, could be met in a reasonably adequate way.

Directory of Precision Measurement Facilities

In many countries of the region, user groups are unaware of facilities which could be used to assist them with instrument repair and calibration problems. User groups are also unaware of the location of testing and analytical facilities which already exist.

It would therefore be extremely valuable if, for each country, the facilities available could be summarised in a suitable document which would be a ready reference to the available facilities. We have done this in New Zealand, and it has been carried out in a preliminary way in Indonesia. A tabulation of equipment available in Hong Kong has also been compiled by one of the staff of the Royal Observatory.

Although the possession of precision measuring equipment does not necessarily imply that the equipment is well housed, or that it is operated by skilled operators, the existence of a list of facilities would nevertheless be extremely valuable in many cases. I include below two brief extracts from the New Zealand Directory, and from a draft Directory I compiled for Indonesia **(see Annex I)**.

Education in Precision Measurement

We are often told of the great need for university graduates in developing countries. While this need undoubtedly exists, and while under-developed countries undoubtedly need to increase their output of skilled professional engineers, scientists, there is also a very great need to provide training in the "bench" skills, needed for instrument repair and calibration.

There is a great need in many under-developed countries for elementary and advanced training courses for instrument technicians and repair men. This training should include training in workshop skills, such as fine mechanics, electronics, glass blowing, etc.

I cannot stress too strongly the need for training in these basic skills, because without the people to repair, calibrate, and use advanced analytical and testing facilities, there will be no adequate quality control, and standardisation for export.

Laboratory Management Training

Precision measurement demands good management skills as well as good technical skills. I believe that many groups involved in testing and analytical servicing work, could be improved if selected senior laboratory staff were given laboratory management training in suitable foreign laboratories. Most of the training which has so far been supplied under the auspices of UNESCO, and other agencies, seems to have been directed towards improving the technical skills of the people selected for training. The need for laboratory management training should not be overlooked, as it is of very great importance in this field as it is in any other.

Technical Education

I have already mentioned the subject of education in precision measurement above. It is also extremely important that, if a country wishes to increase its industrial and manufacturing base that it should have a good educational system - particularly in technical education. In my opinion, we in New Zealand, concentrated for too long on building up a strong university system at the expense of advanced technical education. I would hope that under-developed countries would not make the same mistake. Training of professional engineers, scientists, etc., by universities is extremely important in a national development scheme; but many of the fruits of professional training in university cannot be harvested unless there is also a strong base of technical education to carry out the multitude of technical tasks required by industry.

METROLOGY — FIELD 1

ENGINEERING METROLOGY

1.00 EXAMINATION OF ENGINEERS' LIMIT GAUGES

Name of Organisation	Location	Availability R=Restricted G=General	Name of Contact
Air New Zealand Ltd	Auckland	G	Manager, Engineering Customer Services
Auckland Technical Institute, Mechanical and Production Engineering Department	Auckland	R	G. H. Vervoort, Head of Department
Automotive Instrument Services Ltd	Auckland	G	P. R. Goodwin
University of Canterbury, Department of Mechanical Engineering	Christchurch	G	M. Rodger, Senior Lecturer
Ministry of Defence, HMNZ Dockyard	Auckland	R	Deputy Engineer Manager (Marine)
Fieldair Ltd	Palmerston North	R	Engineering Manager
Fletcher Steel, Technical Service Centre	Auckland	G	S. Hill
New Zealand National Airways Corporation	Christchurch	G	P. Allard, Customer Services Engineer
New Zealand Government Railways, Chief Mechanical Engineer's Office	Wellington	R	
Repco Engineering (N.Z.) Ltd	Auckland	R	Marketing Manager
DSIR, Auckland Industrial Development Division	Auckland	G	W. R. Beasley
DSIR, Physics and Engineering Laboratory	Lower Hutt	G	D. Asteraki, Section Head, Metrology
John Shaw (N.Z.) Ltd	Auckland	G	J. Parsons
Wakefield Laboratories Ltd	Auckland	R	D. A. Newcomb, Engineer

Extract from a Directory of "Testing Facilities in New Zealand"

TEMPERATURE MEASUREMENT

LIMITED FACILITIES at National Institute for Instrumentation, Materials Testing Institute, and Garuda Indonesian Airways

THERMAL CONDUCTIVITY

NO CAPABILITY

NON - DESTRUCTIVE TESTING

RADIOGRAPHIC EXAMINATION OF METALS AND NON METALS

6.01/14 Materials unspecified	- Materials Testing Institute
	- Garuda Indonesian Airways
	- Barata (planned)
	- Metal Industries Development Centre

RADIOGRAPHIC EXAMINATION OF COMPONENTS

6.21 Aircraft structures	- Garuda Indonesian Airways
6.22 Components and assemblies	- Materials Testing Institute
	- Garuda Indonesian Airways
	- Barata (planned)
	- Metal Industries Development Centre

ULTRASONIC EXAMINATION OF METALS

6.31/33 Metals unspecified	- Garuda Indonesian Airways
	- Barata (planned)
	- Metal Industries Development Centre
	- Materials Testing Institute
	- Institute for Research, Development and Industry and Posts and Telecommunications

Extract from a list of testing facilities in Indonesia compiled by the author in 1973.

Mr. Andrus:

Dr. Probine, I would like first to certainly endorse what you say about the need for approved laboratories. And, we are, in the United States, facing the question of laboratory accreditation today. The Department of Commerce is taking the initiative in setting up a laboratory accreditation system. I would like to ask you if the same type of a system could be in being in the foreign country where the parent company is?

Dr. Probine:

Yes. For example, when we buy equipment from the United Kingdom, it is often supplied with a calibration from a laboratory approved by the British Calibration Service. We accept such certificates in the same way that we used to accept certificates from the National Physical Laboratory. Provided that we have confidence in the approval system in the country of origin, we in New Zealand would be very pleased to accept calibrations from approved laboratories in foreign countries.

Mr. Wexler:

Do you run into any difficulty in the way of conflict of interest when a given company has an approved laboratory and another company wishes to have tests made and that is the only company that is available and they are competitors on the open market?

Dr. Probine:

That is a very good question. Let me reply by way of example. Manufacturers of refrigerators may not wish to use an approved laboratory of a company in the same line of business, particularly if they're developing a new model. In that case, of course, they could come to us, and we would test their products in complete confidence. In such circumstances, however, when we accepted goods for tests, we would point out to them that if they were really going to develop good products they ought to be doing this testing in-house; and perhaps they ought to be thinking about obtaining good laboratory facilities themselves.

Mr. Hopper:

Well, first of all I would like to congratulate Dr. Probine on an extremely interesting talk. I wonder how you would get on with the multitude of equipment, various types of equipment, and methods, and even the sort of competence of the staff that exist in most developing countries. We had thought in Thailand, because we had a number of problems along this score, that setting up a collaboration panel of all the laboratories, all the leading laboratories, anyway, could iron

out differences in standards, methods, possible equipment. And in one way, if one laboratory possibly has more skill, to bring up in these discussions, the differences, results, etc., could raise the competence of those less skilled. And, so far we haven't gone anywhere with this one but I would be extremely interested to know whats happening in New Zealand on this question.

Dr. Probine:

First of all, in order to get the New Zealand scheme off the ground, and because the Australian scheme has been so successful, we recruited, as director of the New Zealand Laboratory Registration Council, a member of the NATA staff from Australia. Secondly, for our initial assessments, we are using NATA assessors. This is because New Zealand trades with Australia, and we would wish Australian importers to be confident of TELARC registrations and accept tests and calibrations from TELARC approved laboratories in the same way that they accept test and calibrations from NATA registered laboratories. So we are using Australian assessors to assist with the registration of our laboratories in the first instance. The aim is to have reciprocal recognition of approvals by the two organizations in Australia and New Zealand.

So far as underdeveloped countries are concerned, I think that one has to move slowly. A national laboratory "approval scheme" is a very sophisticated stage in the development of a national measurement system, in the sense that you have to have a good national standards laboratory on which to base the scheme, and you have to have a high degree of competence in the laboratories seeking approval. The method of registration does allow for a spread of ability, both in accuracy and range. A laboratory is only registered for the particular type of measurement, or range of measurements, over which that measurement can be made, and to the accuracy to which it can be made. If a laboratory undertakes work outside of the terms of its assessment, it cannot use the TELAC mark. It can only use the TELAC, or the NATA mark, in those areas of measurement for which it has been assessed and reassessed.

In developing countries the stage of development might require a different approach. With Mr. Sumantri's permission, I might mention the situation in Indonesia. There are a number of laboratories that have good basic facilities in particular fields of measurement. The National Instrumentation Laboratory has a high degree of competence in certain areas, particularly in relation to what we might call the classical physics area. The National Electronics Laboratory has competence in the field of high frequency electrical measurement. The Power Research Institute has competence in the high voltage and heavy current area. And all of these have quite good basic facilities. A possible suggestion would be that each of these laboratories take responsibility for that area of measurement in which it is competent.

Further, one might have one central laboratory, which was at the heart of the network, and it might be responsible for coordinating the work of all of the laboratories involved. Through the publication of a list of testing facilities, organizations would know where to go to get calibration or testing done. A registered laboratory scheme would be a later development. I think that is the direction in which to move ultimately.

Prof. Stephens:

Lets see, we'll entertain one more question. Dr. Choi. And then Mr. Peiser wants to make a comment and I want to make a comment about this. With that schedule we'll have to close this particular session and we'll move on to the next one. Dr. Choi.

Dr. Choi:

I would like to ask a few questions. The first one is: What is the main source of staffing for the National Standard Laboratory? And the second question is: How many staff have they? And the third one is: Are they busy all the time? If busy, what main policy of the government made this laboratory such a busy organization?

Dr. Probine:

It will vary, of course, from country to country. In Australia the National Measurement Laboratory has a staff of about 250 devoted almost entirely to measurement and standards development. In our own case, in New Zealand, we have a staff of 258 at the Physics and Engineering Laboratory; but only about 30 of those are working directly in the measurement and standards field. We have a wide program of research and development in other areas of physics and of engineering. In New Zealand we have adopted the policy of developing our measurement facilities only to the stage that we can meet the needs of the country now, and for a few years into the future. This means that we have to have a good idea of the needs of industry. We don't try to join what I call the "World Standards Club". We do not seek to compete with the NBS, the National Measurement Laboratory, or the National Physical Laboratory. We have only three million people and must use our manpower or scientific resources to best advantage. Our National Measurement Facilities are being developed rapidly at present because manufacturers need greater measurement sophistication as the New Zealand economy develops into export of manufactured products. We are financed wholly by government, and we charge a fee for calibration work. That fee, however, does not come back to us - it goes directly back into government revenue and we can't use it.

Mr. Peiser:

I also would like to congratulate Dr. Probine on an interesting and very useful paper. The only point on which I would slightly disagree with him is that a large country that is highly industrialized can afford to work in topics within what the French call la haute metrologie - "high metrology" - for which there is no direct need in the country. Our analysis in the USA is certainly that the days have long gone when we can do that kind of work for its own sake. We, with some 200,000,000 people, feel we should stick to the same restraint which Dr. Probine has suggested. In answer to the question "How do you iron out common problems between test laboratories?", I should explain that we have, in the United States, an organization that calls itself the National Conference for Standards Laboratories. This Conference is not really part of the National Bureau of Standards but we do supply a secretariat for it. Representatives of the 3,000 odd test laboratories of the country meet once a year to discuss with each other and with the National Bureau of Standards the problems in measurement and testing that arise from time to time. Many problems are, of course, in very high technology, and perhaps not every country would be interested in sending a delegate to the annual meeting of NCSL. However, I have been trying, in the United States, to persuade NCSL, although it calls itself "National", to be host to representatives from other countries. For the first time, this year, they are having a drive to invite people from abroad, who wish to join those discussions between experts from test laboratories. This meeting is to take place in the fall, during the first three days of October.

Prof. Stephens:

This is obviously a topic of great interest to many and perhaps a topic that you would want to pursue during the various coffee breaks, lunch breaks and the like. I'm just going to take my prerogative as Chairman to read a paragraph from my paper that I'm going to deliver here this afternoon but which touches on this particular point and which Mr. Hopper alluded to a little bit. I think its more relevant here than it would be this afternoon. This is just a paragraph, and you will all receive a copy.

"The testing program associated with TISI (that is, the Thai Industrial Standards Institute) certification will grow rapidly and to large proportions. In planning for this, it has been recommended that Thailand seriously consider the formation of a testing and calibration working committee consisting of top level representatives from some of the main testing laboratories, from TISI, and even from interested industries, to map out a program of tests and coordination of testing facilities. In such planning, it may be recognized that certain laboratories concentrate on testing in certain major fields, eliminating the duplication of very expensive testing apparatus and raising to a high performance level the tests within these major

fields. Coordination of deliberate overlapping of tests for scheduling purposes can be planned. Coordination of calibration can also be planned. And, it is perhaps possible that the cooperative work of such a group may be more successful in obtaining equipment grants from the various sources that are available for these." That is a comment we have made in connection with Thailand. Mrs. Phani can well ponder this and the paper by Dr. Probine can be a very good source of information in this area.

Prof. Stephens

All right. We'll move on to the next Session which represents a change in your schedule. We're happy to report that the von Ranke paper has arrived but we had made some previous adjustments in the scheduling of these papers and we will next hear from Dr. Kim, Director General of the National Industrial Standards Research Institute of Korea, and he will give a paper on the metrology plan for Korean Industrial Development at this time and you will also have a copy of that in front of you, I believe. Dr. Kim.

METROLOGY PLAN FOR KOREAN INDUSTRIAL DEVELOPMENT

Dr. Kim, Zae Quan
Director General
National Industrial Standards Research Institute
Ministry of Commerce and Industry
Republic of Korea

I Introduction

Korea's basic strategy, which has been employed so effectively in the past, is to promote strong export oriented heavy and chemical industries to generate a high overall economic growth rate. Within the context of social and political development, this basic strategy is dictated to Korea because of relatively poor endowment of natural resources: Korea must "export to live". Korea recognizes that successful pursuit of this strategy will require a significant broadening of the technological base and a deepening of the quality-control consciousness of the economy. Fuller development of Korea's national standards system (NSS) is a very important element in the country's plans to strengthen the overall industrial base. A developing country without an effective NSS is handicapped for trade in the international market place.

II The National Standards System (NSS)

A critical consideration for Korea is to define an "acceptable" standards system for its particular needs.

In 1967, a NBS survey team in which Mr. H. Steffen Peiser participated recommended the strengthening of the NSS. Again, in 1972, a second NBS survey was conducted. The experts involved concluded that Korea's standards system can be judged no better than fair in relation to other countries at a similar level of development. Korea's NSS must be improved in time.

We recognize that it is inadequate to serve industry's current need. The inadequacies of the system are due mainly to lack of investment in its improvement mostly because those responsible for resource allocation formerly believed that such investments were relatively unproductive in comparison with other possible resource uses. Their view has been reversed, and all authorities in Korea are now convinced that the potential payoffs from investment in the NSS are so high, given the present level of Korean development, that they cannot be postponed any longer. These payoffs will come from improved product quality, reduction of waste, and more efficient production methods.

In September 1974, a feasibility study was undertaken to make comprehensive recommendations on ways to strengthen the NSS and to eliminate its present inadequacies. It was concluded that the existing standards system is basically well-organized and coordinated by function. However, its most critical requirement is a strong central organization to coordinate metrology standards activities, to supply technical guidance and instruction on measurement, to ensure that these activities are efficient and effective, and to link the Korean metrology system to the international one.

Our present institution, the National Standards Research Institute (NISRI), which is currently charged with the responsibility for national metrology standards, has neither the staff nor the facilities to carry out this responsibility effectively. The Weights and Measures Department of NISRI has a staff of only 38, of whom 30 are full-time employees. Of these, only 13 are regular employees. Moreover, the Department has little chance of attracting scientists and technical personnel with higher educational qualifications and broader experience because of the low salary structure dictated by civil service regulations.

The present physical facilities of the Weights and Measures Department are also inadequate in terms of both layout and environmental control for the needs of a national metrology standards institution. Despite the fact that NISRI is supposed to be the primary standards organization, most of NISRI's instruments have only secondary and tertiary standards capability. NISRI's service is mostly for legally-required inspection of measurement instruments. Calibration service for the supply of standards is severely limited.

III Autonomous Research Institute

To remedy the primary defect in our NSS, it was recommended and our Government has endorsed the establishment of the Korea Standards Research Institute (KSRI), which will be the immediate and principal output of our efforts over the past decade in the standardization sector. We feel in particular that KSRI's establishment makes more sense than the other major alternatives available including that of strengthening various existing elements of the NSS.

In essence, the judgment arises from the conviction that strengthening the already fairly good present system without providing the requisite

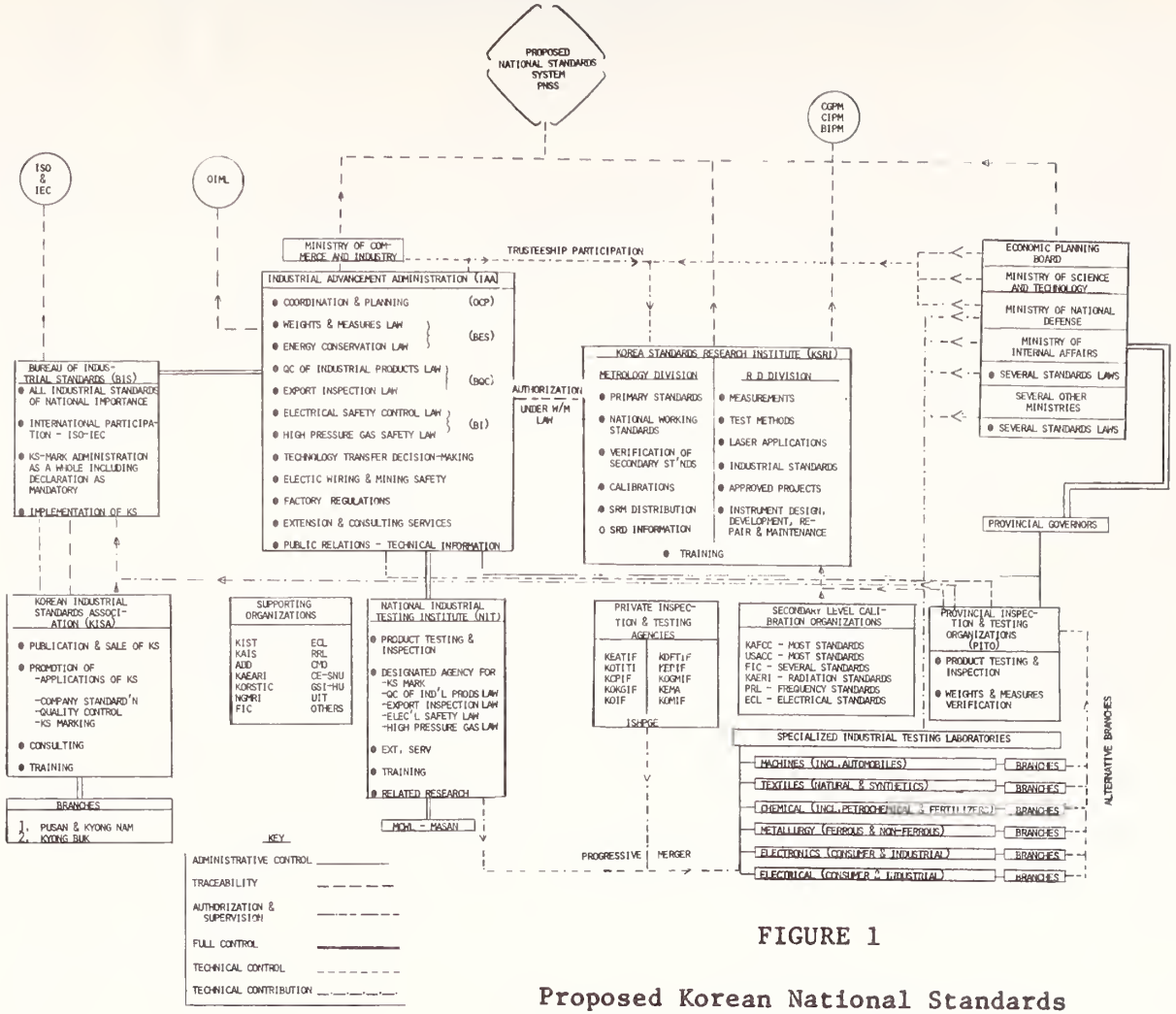


FIGURE 1

Proposed Korean National Standards System Concept

metrology functions and scientific leadership of KSRI would prove to be wasteful, because the basic measurement capabilities on which the rest of the system depends would still be lacking. It is recognized that this strategy will result in a period during which the high-level capabilities of KSRI will be somewhat overdeveloped technically in relation to most of the other elements of the NSS which are already operating and in relationship to the subsidiary elements in the national metrology standards sub-system, but it is felt that ours is the only strategy which will lead to a system of the quality and depth required by Korea. (Fig. 1)

With substantial agreement on the need to establish KSRI, it was decided that it should be an autonomous organization. The autonomous status of the institution will allow it more freedom of action than would be possible in case of a line organization within the Government. This status will allow KSRI to pay salaries above those offered by the ROKG's civil service scale, a necessary feature, if KSRI is to recruit and retain staff of the quality needed to carry out its mission. Personnel will be recruited not only within Korea but also from among Koreans now working in Europe or the United States. The autonomous status of KSRI will effectively ensure that any income it is able to generate from services will remain in its own coffers. The decision to set up KSRI as an autonomous organization is primarily the result of the success achieved by other organizations established in this fashion in Korea over the past ten years. There are numerous such organizations but the one most often cited is KIST, the Korea Institute of Science and Technology. KIST was organized to undertake advanced research projects for industry and Government in Korea. It has been in operation since 1966 and is considered an outstanding success in its ability to perform its functions well and efficiently.

In the past we have had many fruitful cooperations with the National Bureau of Standards in studying standards and quality control practices in domestic and export industries, and in examining the national measurement system and the mechanisims by which it could be made more readily available to the Korean economy. Our two institutions have agreed to collaborate in support of international programs for standards and measurement practices. We expect to exchange experiences and personnel to benefit KSRI and to strengthen our declared "sister relationship".

The remaining decision needed is on the location for KSRI. Strong preference has been expressed by both the Ministry of Commerce and Industry and the Ministry of Science and Technology (MOST) for

MASTER PLAN FOR DAEDUK SCIENCE TOWN

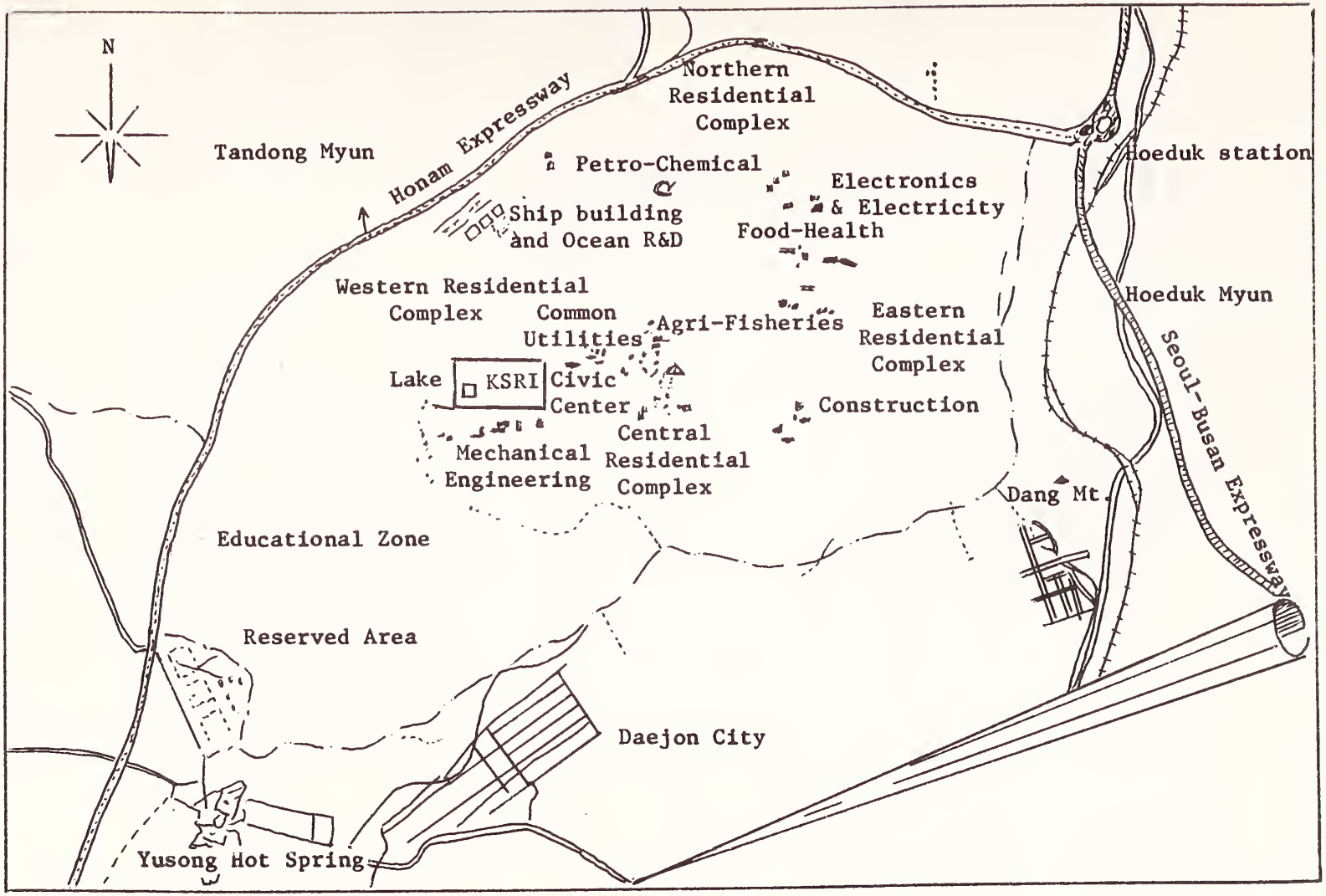


FIGURE 2

locating KSRI in the huge proposed Dae Duk Science Town, which is being constructed near Taejon in central Korea (Fig. 2).

Recognizing that effective research, development, and technical support will be prime factors in the expansion of heavy and chemical industries, the ROKG has decided to establish, in one well-planned complex, new specialized industrial research institutes such as for shipbuilding, oceanography, mechanical engineering, petrochemical products, electronic communications, etc. The advantages for KSRI offered by the Science Town are that it will provide an environment conducive to research, foster interdisciplinary contact and cooperation, and facilitate joint use of expensive central facilities such as an electronic data processing center and an extensive technical library.

The location of KSRI among this constellation of institutions is viewed as almost necessary to facilitate scientific interactions. Another equally important factor is KSRI's hoped-for support for the other institutions at Dae Duk in metrology, standards and measurement systems.

IV Implementation Plan

(1) Construction Schedule

KSRI will be formally created in July 1975, following authorization of a foreign loan and the associated domestic fund appropriation. The scheduled completion date of the facilities at the Dae Duk Science Town is July 1977. Six months are projected for the installation and testing of most of the basic equipment. The following are the principal events and the dates of completion:

Execution of design contract	-	July 1975
Execution of construction contract	-	January 1976
Completion of laboratories, including environmental controls	-	July 1977
Beginning of operation	-	January 1978

(2) Capital Investment

The proposed investment in KSRI and projected recurring costs are substantial, as itemized below:

Capital Costs

o Initial foreign exchange cost of USAID loan in establishing and equipping KSRI	$ 5,000,000
o local currency cost of establishing KSRI and constructing its facilities	$ 6,500,000
o Creation of a special endowment fund for KSRI	$ 6,250,000
	$17,750,000

Recurring Costs

o Annual Government subsidy for KSRI operation (average for 1979 - 1983)	$ 700,000
o Recurring foreign exchange costs for operation (average for 1979 - 1983)	$ 300,000
	$ 1,000,000

(3) Organizational Structure

The attached figure 3 illustrates the proposed organizational structure of KSRI. Figure 4 shows our staffing plan, with anticipated staff requirements by position, age, educational qualification, and professional experience. The organizational structure calls for three divisions: Metrology, Programs, and Support. The Metrology Division is organized into six departments according to metrological discipline: mechanical, electrical, thermal, radiation, chemical and materials.

The Programs Division consists of only three departments; research and development, metrology propagation, and instrument development. Only the departmental heads are permanently assigned to the division. The programs of the division are to be carried out through "matrix management" whereby the department head recruits personnal to collaborate on a specific task from the Metrology Division and, if appropriate, from the Support Division. The Support Division, as

the name suggests, provides technical and administrative services to assist the work of the other two divisions.

The staff requirements for each division and section were estimated on the bases of anticipated workloads through 1980, and assumptions concerning the amount of staff time necessary to perform the essential services of KSRI. The staffing pattern assumes a balance of workload whereby personnel devote half of their time to service functions and the other half to the activities of the Programs Division.

V KSRI's Role in the Economy of Korea

In essence, the function of KSRI would be to bring about conditions in Korea that would promote the widespread use of measurements of the desired accuracy and to ensure all-round compatibility of these measurements in the fullest sense of the word, so as to ensure traceability of all Korean measurements to one central point at KSRI and through KSRI to the world master station at the International Bureau of Weights and Measures in Sevres, France.

For discharging this function KSRI will have to assemble a multi-disciplinary team of scientists, engineers, and technologists, who will have to be of high enough calibre and accomplishments, on the one hand, to command the confidence of industrial and commercial leaders of Korea and on the other hand, to be fully qualified to lead the Korean measurement system in a manner required under Korean conditions and for worldwide recognition.

The efficiency and speed with which KSRI is able to assume and continue to discharge these roles and the proper functioning of the Korean measurement system will lead to the proper judgment on its contribution to the advancement of the Korean economy.

ORGANIZATIONAL CHART OF KSRI

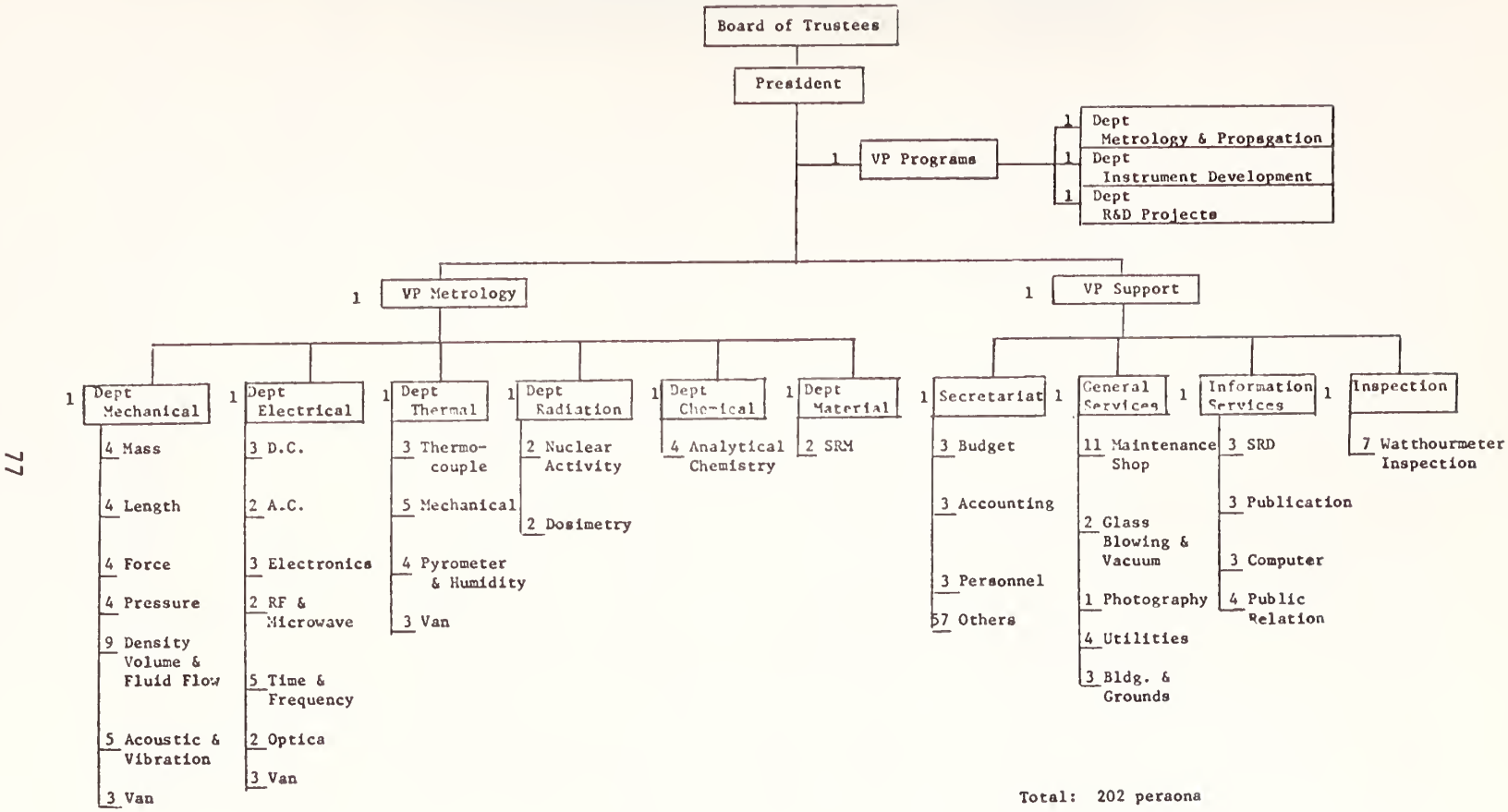


FIGURE 3

Proposed Staffing Plan of KSRI

Serial No.	Designation	Approx EPB Level	Number Required	Min. Educ'n Degree	Discipline	Experience in Years		Age	Skills	Probable Venue Recruit
						Research & Profs'nal	Management			
1	President		1	Ph.D	Sci.Eng	10	10	45-55	High leadership	
2	Vice President-M		1	Ph.D	Sci.Eng	10	5	40-50	"	
3	Vice President-P		1	Ph.D	Sci.Eng	10	5	40-50	"	
4	Vice President-S		1	Ph.D	Eng.Adm	10	5	40-50	"	
5	Dept.Chief -Mech	RCM	1	Ph.D	Sci.Phys	7	5	30-45	Leadership	
6	Dept.Chief -Elec	RCM	1	Ph.D	Sci.Phys	7	5	30-45	"	
7	Dept.Chief -Ther	RCM	1	Ph.D	Sci.Phys	7	5	30-45	"	
8	Dept.Chief -Rad	RCM	1	Ph.D	Sci.Phys	7	2-3	30-40	"	80% Abroad
9	Dept.Chief -Chem	RCM	1	Ph.D	Chem	7	2-3	30-40	"	Recruited (excluded
10	Dept.Chief -Mat	RCM	1	Ph.D	Chem	7	2-3	30-40	"	No.14,15 16,17)
11	Dept.Chief -Prob	RCM	1	Ph.D	Sci.Eng	7	2-3	30-40	"	
12	Dept.Chief -TD	RCM	1	Ph.D	Sci.Eng	7	2-3	30-40	"	
13	Dept.Chief -RD	RCM	1	Ph.D	Sci.Eng	7	2-3	30-40	"	
14	Dept.Chief -Sec	ACM	1	MA	Adm	7	2-3	30-40	"	
15	Dept.Chief -GS	TCM	1	MS	Eng	7	2-3	30-40	"	
16	Dept.Chief -IS	ACM	1	MA	Adm	7	2-3	30-40	"	
17	Dept.Chief -Insp	TCM	1	MS	Eng	7	2-3	30-40	"	
18	Senior Researcher (Section Heads)	RCM	38	Ph.D	Sci.Eng	5	-	25-40	Research	
19	Junior Researcher	RM	40	MS	Sci.Eng	4	-	25-35	Research	
20	Senior Engineer	TM	7	BS	Eng	5	2-3	30-45		Korea
21	Admin. Section Heads	AM	6	BA	Adm	4	2-3	30-45		Korea
22	Research Ass't	RAM	85	BS	Sci.Eng	3	-	25-35		Korea
23	Junior Engineer	TAM	8	BS	Eng	3	-	25-35		Korea
24	Admin.Clerks	AAM	7	BA	Adm	2	-	25-35		Korea
25	Technicians		16			3	-	25-40		Korea
26	Ass't Clerks		7			1	-	25-35		Korea
27	Others		57							
	T O T A L		288							

RCM: Research Co-ordinating Member

RM: Research Member

RAM: Research Ass't Member

TCM: Technical & Co-ordinating Member

TM: Technical Member

TAM: Technical Ass't Member

ACM: Administrative Co-ordinating Member

AM: Administrative Member

AAM: Administrative Ass't Member

FIGURE 4

Dr. Probine:

I just have one question of detail. In Section IV where you detail the capital costs and the recurring costs, there is an item here "recurring foreign exchange". Would that be mainly for the purchase of instruments and equipment and for calibration and recalibration external to the country?

Dr. Kim:

Yes.

Mr. Hopper:

When your new KSRI is established as an autonomous, independent organization do you anticipate any difficulty with an independent body dealing with remaining government bodies?

Dr. Kim:

No, we don't think so. The autonomous status will allow it more freedom of action than it would have operating as a government agency. It is expected that more rational metrology functions will be conducted by this new institute.

Hr. Hopper:

Do you anticipate a problem because of differences in pay, differences in status, perhaps, internal jealousies between one and the other?

Dr. Kim:

I don't think we will have any difficulties in this kind of relation, because we have already such autonomous organizations which are established by the government. They are already highly paid, just like the private institutions. They have excellent internal operations and harmonious cooperation with the government bodies.

Mr. Hopper:

I see, then you have a comparable situation. I see. Fine.

Mr. Rao:

In planning the metrology division of the National Standards System the Korean body seems to have listed primary standards, secondary and

working standards, working and calibrations of all these. This, compared to Dr. Probine's suggestion that each country should have facilities matched to its needs, seems to me to be a little overplanned in the sense that Korea may not be able to afford the luxury of having primary standards in all the measurements: length, mass, volume, temperature, electrical current, luminous intensity, and so on. I was toying with an idea of having such primary standards on a regional basis so that the countries within a region could perhaps trace their secondary standards, or different standards, to the primary standards of the region. May I have your opinion on this, please?

Dr. Kim:

Yes. It is a very hopeful direction to have the regional primary standards organization to have all the required standards. But, there are all sorts of problems. We have planned to cover our needs but not the instruments that are seldom used in Korea. Because of this budgetary limit some special calibration services which are needed in Korea will depend on such high quality calibration from some older international bodies such as BIP, NBS and so on. So, anyway, the equipment that we plan to install in Korea is needed, not only in Korea but also in the other countries too.

Mr. Rao:

Mr. Chairman, that brings us to one point, and that is, whether national standards, reference or secondary, or things like that, could be called primary in that country though they may not be generally recognized as such. It is very hard to define a primary standard and decide whether to call a national prototype a primary standard, or not.

Mr. Peiser:

I would like to comment on Mr. Rao's question and, with Dr. Kim's permission, I would like to point out that in the short time he had available for his paper he may not have been able to give details of what I consider to be one of the most thorough investigations in Korea of the real industrial needs for various types of standards. This has been conducted over the past year and a half and it is really a remarkably fine study so that Dr. Kim and Dr. Choi in planning KSRI have had the opportunity of making sure of what Dr. Probine stressed earlier, that this new organization, KSRI, will be there to serve real needs of industry.

I am doubtful about the answer to Mr. Roa. Is the word "primary" really applicable in all cases mentioned? I think if you say "primary national standards" you would probably be in order.

Dr. Probine:

Dr. Peiser has stressed the fact that a very careful initial study was made which resulted in this particular proposal. Is there any mechanism of continually remaining in contact with industry and the national needs? Is there any form of advisory committee, or anything of that kind, to ensure that this very good contact, which you had in the initial study, is kept up as you develop?

Dr. Kim:

For example, in the Board of Directors of the new Institution, we have industrial representatives numbering one third of the whole membership. And, also, there are representatives of the heads of the secondary calibration institutions. So, in the governing body, we have already harmonized the relationship with industry and other institutions also.

Prof. Stephens:

All right, ladies and gentlemen, we will again call this meeting to order. We have moved a paper up from the morning by Mr. Joseph Hilsenrath of NBS. Mr. Hilsenrath.

CAN DATA COLLECTION AND ANALYSIS REDUCE THE REJECTION OF EXPORTED PRODUCTS?

Mr. Joseph Hilsenrath
National Bureau of Standards
Washington, D.C. 20234

1. Introduction

When Mr. Peiser asked me what I could contribute to this Conference, I was reminded of an offer made six or so months ago by an official of our Food and Drug Administration to supply me with information and data concerning the certification and inspection system employed by that agency which I shall refer to now as FDA. It seems that FDA keeps detailed records of each shipment of food, drugs, and related items that have been rejected and/or detained because it did not measure up to standards.

Mr. Benjamin A. Gutterman, the Assistant Director of the Bureau of Foods under FDA, to whom I am greatly indebted for the substantive content of my report, offered to supply me with copies of their monthly detention reports. He offered and indeed delivered to me copies for distribution. At the time of his offer, Mr. Gutterman thought that these reports were computerized so he volunteered to have the data sorted down by country for those countries represented at this Seminar.

It was on the strength of that offer that I committed myself to give this report on the role of data collection and analysis viz-a-viz exports. Since FDA could supply me with very complete and highly relevant data, the data collection portion of my title was assured. The analysis portion could then be my own contribution as we have a very facile data analysis program at NBS which I am always eager to apply to new situations.

Well, it turned out that the detention reports were actually not available in computerized form. Nevertheless, Mr. Gutterman kept his word and had his staff do a laborious, but complete, hand tabulation country-by-country of shipments detained by FDA for the years 1973 and 1974.

Before we take up the FDA data in detail, let me digress a few minutes to discuss the certification and inspection of meat and meat products which are the responsibility of our Department of Agriculture.

2. The U.S.D.A. Meat Inspection Program

I also made inquiries at our Department of Agriculture which has the responsibility of administering the Federal Meat Inspection Act, for the purpose of assuring the quality of imports of meat and meat products. I found that unlike FDA, they do not disclose details of their rejected shipments. They do, however, present in their annual report to the Congress, summaries by country and by product of both total imports and totals refused or condemned.

That report describes the inspection and certification policy and operations and lists:

a) all plants authorized to ship meat and meat products to the U.S. from 45 countries
b) total pounds passed for entry in 29 categories from each of the countries
and c) total pounds refused entry and/or condemmed in each of the 29 categories for each country

Of the countries represented here, only Australia and New Zealand export meat to the U.S. so it will be of interest that in 1974 about 4.7 million pounds of meat had been refused entry from Australia and nearly 1.4 million pounds had been refused from New Zealand. These figures represent a rejection rate of 1% in the case of Australia and 1/2% for New Zealand. While the rejection rate for a few countries exceeds 2%, the overall rejections comprise about 1% of the total imports for the year.

Dr. Probine, the Chairman of the session in which this report was originally scheduled, suggested that it would be useful for me to give a brief account of the U.S. meat inspection program. So, I shall now read a few excerpts from "Foreign Meat Inspection 1974: A Report of the Secretary of Agriculture to the Committee on Agriculture [of the] House of Representatives [and the] Committee on Agriculture and Forestry [of the] U.S. Senate" issued March 1975 by the U.S. Department of Agriculture:

> "Only those countries which have meat inspection systems with standards at least equal to those of the U.S. meat inspection program are permitted to ship meat to the United States. In 1974, there were 45 such countries. Approval of a foreign country's meat inspection system is based on an evaluation of the particular country's laws and regulations governing its inspection program and on-site survey of the system in operation. Recognition is not accorded to any country without the concurrence of the U.S. Department of State."

Further details are contained in the above cited report, a copy of which has been left with the Chairman of this seminar for further reference.

"The Foreign Programs Staff in Field Operations of APHIS has the responsibility to determine which foreign countries should be officially recognized. The Staff reviews operations in certified foreign meat plants and coordinates the activities of U.S. import and export inspectors. In calendar year 1974, 20 veterinarians were assigned to conduct the foreign plant review function of the Staff. Twelve of these employees were stationed overseas. The remaining reviewers are stationed in Washington, D.C. and travel to their assigned countries on a rigorous schedule. In total, about 100 domestic field inspectors are engaged in the inspection of meat at the point of entry into the United States."

"Plants exporting large volumes and other plants of special concern are visited at least four times annually. All other certified plants are visited at least twice a year. No claim is made that the visits are unannounced, but the Foreign Programs Officers are trained to consider this factor when making evaluations. They conduct an independent, in-depth survey of every feature requiring inspection in the foreign plant."

"In doing this, they check the same items that supervisory inspectors look for in U.S. plants. For example, the U.S. veterinary reviewer insists on careful examination of the animals both before and after slaughter, clean operative practices, sanitary maintenance, and construction of facilities, necessary sampling for laboratory analysis, accurate labeling, inspectional controls over materials leaving and entering the plant, safe water supplies, and effective supervision of inspectors."

"Foreign Programs Officers are not permitted to order changes or take other definitive action until their findings have been evaluated by the Administrator, Animal and Plant Health Inspection Service. However, the Foreign Programs Officer is delegated authority to issue a product segregation order if, in the officer's opinion, the Administrator will probably remove the authority for a plant to export to the United States."

3. The FDA Monthly Detention Reports

In returning to the data supplied for this Seminar by the U.S. Food and Drug Administration, I should like to read to you a brief statment of policy also provided by the FDA.

"The Food and Drug Administration has a policy of fostering the mutual recognition of equivalent regulatory activity by means of

bilateral agreements with counterpart agencies in other nations. FDA will endorse reciprocal recognition of inspections with any nation which has established a system that is fully equivalent to that it has established here in conformity with the FD&C Act and the applicable Good Manufacturing Practice regulations."

"FDA has negotiated agreements on reciprocal recognition of drug plant inspections with Switzerland in 1968 and with Sweden in 1972 and on the sanitary control of shellfish production with Canada in 1948, Japan in 1962, and Korea in 1972."

"Other agreements, or understandings, have been signed with France, and The Netherlands on the sanitary quality of dry milk; and, with India on the sanitary quality of frozen frog legs. Each lot of these products exported to the U.S. must be accompanied by a certificate of production under sanitary conditions and a report of analysis. FDA audits the shipments to assure that all requirements are being met."

"FDA has an agreement with Mexico to exchange information and to train Mexican analysts with particular reference to pesticide examinations. Once their laboratories are in operating condition, they will examine fruits and vegetables intended for the U.S. market and certify that legal residue tolerances are not exceeded. Again, FDA will audit shipments."

"FDA and Canada have agreed to exchange information and to consult with one another in the development and implementation of regulations designed to control radiation emission from electronic products."

"Agreements of this nature assist in achieving the primary goal of providing increased protection to the consumer. In addition, each side gains -- the exporting country does not face the serious economic loss of a refused entry and FDA gains by the reduction in expenditures of our limited resources of funds and manpower. FDA feels that this is not only good law enforcement, but is also good citizenship in the world community."

I have brought along a copy of each of six representative memoranda of understanding which I will leave with Mr. Soon to make available to those members of the Seminar who might wish to see them. As important as these are, the reports of more immediate interest are the detailed detention reports issued monthly by the FDA.

If the report for March 1974 is at all representative, nearly 400 shipments are detained each month for dozens of reasons ranging from soiled bags to salmonella; from dented cans to detined cans; from inadequate marking to insect infestation. There are even a number of

shipments of acupuncture needles which were rejected for lack of instructions on their use.

Each of you has been given a sample copy of a detention report which will give you a good picture of the state of affairs in 1972. While these data are not secret, they are rather sensitive. Thus, the distribution of information four or more years old should prove less embarrassing since presumably the situation has improved during the intervening four years. In any case, I have left with the Secretariat of this Seminar, copies of more current reports to be used at the discretion of SISIR.

In addition to the typical monthly detention report which you have, I have placed into the hands of the representative from five of the countries (Korea, Philippines, Singapore, Sri Lanka, and Thailand) represented here today, a two-year summary of shipments detained by FDA. Included is a classification of reasons for detention under the main headings: Standards, Labeling, and Adulteration/Other. These reasons, shown in Attachment A, showed up in approximately 781 separate FDA actions during 1973 and 1974 involving 10 countries; the five countries mentioned above, plus the five other countries (Brazil, Ecuador, Indonesia, Malaysia, and South Vietnam) which were scheduled to be represented at this Seminar.

For those who have received a country breakdown, Attachment A serves to identify the number and letter codes used in the analysis. For the rest, Attachment A provides a catalogue of reasons for detentions reported by the FDA field personnel during the period 1972-1974.

I had hoped to be able to demonstrate to you the advantage of a more detailed analysis of these detention reports. Had the data been available in machine-readable form, we could have sorted them down in a variety of ways: by product, by port of entry, by dollar value, etc. We could have struck totals and subtotals at will. We could have identified more easily the major causes for these detentions and the responsibile shippers or manufacturers.

A number of you have already indicated to me how useful, and indeed how important, such data are for your work. I am sure that these data can be made available to you via appropriate official request to the U.S. Food and Drug Administration.

For my part, I will, upon my return to Washington, relay your interest in the data to Mr. Gutterman. I will also undertake to advise the FDA on the value of having the detention information in computer-readable form so as to make their data more timely and useful to the inspection and certification programs of the exporting countries.

COMMERCIAL IMPORT DETENTIONS
REASONS FOR DETENTIONS*
CODE FOR TABULATIONS -- 1973 and 1974

LABELING

1. Product does not conform to the FPLA

2. Inconspicuous labeling

3. False labeling: (a) Label misleading; (b) Misbranded

4. Identity of product missing
   a. No common or usual name for product

5. Mandatory labeling omitted

6. Short weight

7. Inaccurate ingredient (contents) statement
   (a) No list of ingredients
   (b) Undeclared ingredient added

8. Identity of product misrepresented

9. Inadequate directions for use

10. False claims

11. Lacks net weight

12. Net weight declaration not properly located; type size requirement

STANDARDS

1. Identity

2. Quality
   a. Excessive core
   b. Blemish limitation exceeded

3. Fill of container

ADULTERATION/OTHER

1. Contains filth and/or other extraneous materials
2. Contained in insect contaminated bag

* Reported by FDA Field personnel during 1972, 1973 and 1974

3. Contains insects
4. Contains animal (rodent, bird, etc.) filth, hair, etc.
5. Contained in stained bags (oil, other)
6. Mold
7. Decomposed
8. Unfit for food
9. Held under insanitary conditions; packaged under insanitary conditions.
10. Damaged containers
11. Containers dented, rusted/leaking
12. Unregistered "low acid" canned food manufacturer
13. Bacteriological contamination:
    (a) Unspecified, (b) aflatoxin (c) salmonella
    (d) E. Coli (e) coagulase positive staphylococcus
14. Unsafe additive
15. Heavy metals: (a) mercury (Hg), (b) Lead (Pb), (c) Cadium (Cd) (d) zink (Zn), (e) Unspecified
16. Pesticide: (a) DDT, (b) Endrin, (c) Unspecified
17. Other, (a) No effective NDA, (b) Hazardous product, (c) Does not comply with RCHS Act (d) a prescription required, (e) Does not comply with FHSLA

Prof. Stephens:

Well, I think the only answer to the question that Joe raised in the title of his talk is an emphatic yes, and I hope that in the future we will be able to make use of the information that he has discussed to assist us in putting the proper pressures or getting the proper information to the right channels to help improve the quality of exports. But, are there any questions that anyone would like to direct to Mr. Hilsenrath? Yes, Mr. Hopper.

Mr. Hopper:

Well, I think it's apparent, with certification schemes being assurance schemes and not 100% guarantees, that information like this - and we've said it so many times over the last day or two - is absolutely vital to our countries. Certainly in Thailand, as a backup check that the quality assurance scheme is operating, and certainly in any punitive action that they might take, this is extremely useful. I can't emphasize how useful this will be. We've had certain cooperation from the Commercial Attache in Bangkok on the main importers of canned pineapple and I can see some business reasons for not divulging the FDA list. Quite obviously, it shouldn't be given out to companies who might use it for attack against competitors. But for official bodies, certainly government standards bodies, I would hope that officially, Steffen, you might, or Joe might, advise the FDA of the enormous help that such information would provide for the exporting countries. Of course, with an assurance that it would be kept absolutely confidential.

Mr. Peiser:

I am not sure how the Public Information Act in the United States will deal with such situations. In conjunction with Mr. Joe Hilsenrath's statement, I wish to reemphasize what he has said, in the paper. The Food and Drug Administration has to guard the health of the consumers in the United States, to make sure that they receive only wholesome and nutritious foods. This applies just as strictly to food manufactured within the United States as to food imported from outside the United States. FDA is, perhaps, among U.S. agencies one of the most thoughtful in terms of international relations. The programs cost something to the countries that want to make use of these services. I would like to expand on this very slightly because I think our delegates may be interested. It may be difficult to collect the money to engage in these programs. If the countries concerned benefit, so that the loss due to denial of entry of food products into the United States is smaller, the chief beneficiary is the private exporter. A private exporter, however, would not like to hand to his government money for losses he has not suffered. The Food and Drug Administration offers two services. One is for suitably qualified, English speaking specialists, from abroad. Under certain conditions

they may work side by side with qualified inspectors in the United States, to see the program as it is applied in the United States. There is no training fee. It is simply a question of visiting specialists paying for travel and subsistence while in the United States. Secondly, the Food and Drug Administration is prepared to send selected experts to visit a requesting country to explain in that country the requirements of the Food and Drug Administration in implementing the U.S. Food and Drug and Cosmetic Act. The host countries have to pay travel, subsistence and salary of the visiting specialists. However, very experienced specialists are sent on such assignments. If the country concerned then shows capability and application of the United States standard procedures, the Food and Drug Administration applies less inspection at the port of entry. Now, the Food and Drug Administration, by law, is not allowed to delegate their inspection responsibilities to another country, but it may quite openly increase the speed of inspection and reduce the amount of sampling that is applied to produce from countries that have taken the trouble to invite that type of cooperation.

For low acid canned fruits and vegetables, the Food and Drug Administration both in the United States and abroad, is obliged to certify individual suppliers based on inspection of the premises, as Joe has mentioned. Under those circumstances, the Food and Drug Administration is prepared to work with the national standards body, or inspection authority, to apply licensing and supervision of the canning operations.

I am sorry that Ben Gutterman, or other experts from FDA are not here on this occasion. I refer, you, however, to Ben Gutterman's papers on these topics, both at the NBS-AID workshops and for the La Paz, Bolivia, Seminar.

Dr. Probine:

If this information could be analysed it would be a great deal of help in developing a cost benefit analysis for an inspection service. I'm sure that many people are in the position of having to sell the idea of an inspection service to their governments, and, if this material were readily available, and well analyzed, I'm sure it would help people to put up a good case. I think it would be a real service to have information available in the way Dr. Hilsenrath has suggested.

Prof. Stephens:

Dr. Choi, of Korea.

Dr. Choi:

I appreciate very much your candid opinion and the detailed data shown on the papers distributed. And if we can get this kind of information from an agency in the United States it would be a great help to correct and readjust the export situation in Korea and also in other countries. I read an example of such a problem in the newspaper just before I left Korea four or five days ago. One of the Korean shopping bags made of straw reef, which is supposed to be inspected by the Ministry of Agriculture and Fisheries was exported without inspection. As a result it proved defective. So I took action to correct that. If you can give us such information constantly, it would be very helpful.

Prof. Stephens:

Mr. Hilsenrath has dealt with that matter a bit in his paper and in fact there isn't at the moment. But if this becomes computerized it would be that much more readily available.

Dr. Choi:

To whom do we have to write to get this kind of specification from the United States? FDA?

Mr. Peiser:

Please feel free to write to the National Bureau of Standards and consider them as a mailbox to pass on such requests to the appropriate authorities.

Mr. Hilsenrath:

If I may just have a couple of minutes more to show something about the value of analysis. I happen to have here a report from the Philippines and what sticks out here are all the X's in these columns and I dare say that 50% of the rejections are a result of the mishandling of the shipments after they left the shippers. Broken cases, soiled bags, oil soaked, and so on. Even without a computer a simple tabulation of causes hits you in the face. You don't have to spend much time studying it.

Prof. Stephens:

Of course, we would apply a Pareto analysis to such data. (That was just a plug for quality control techniques.) Mr. Rao.

Mr. Rao:

I have been able to see, in a few of these reports distributed, that some of these observations would be of special interest to my government, who could tighten their regulations about food packing. Specifically report No. 73.10 of FDA records that frogs legs have been very highly infested, though other food products are not that serious. If my government had received any report of this kind they would have tightened the sanitation conditions of those factories. I will, on my own, draw attention of my government to this serious situation. I would also like this conference to record that such an observation may be brought to the notice of governments and, I assure you, we would take it in the right spirit, and improve the conditions, since we are not only involved in the losses but we are involved in the health of the people we are supplying. Therefore, it would be a right step that the FDA should inform the respective governments. If they inform the individual factories, it would not be enough because the individual factories, for reasons well known, may try to hide the observations, whereas at the government level we would take appropriate actions. And, not only that, the individual certification authorities, like in my country, the Agricultural Marketing Advisor, or the Export Inspection Council, will be able to take a serious view of things.

Prof. Stephens:

Thank you. I believe that we would all agree that it is almost axiomatic that the schemes that are being practiced in the countries for export inspection and certification of producers, by no means constitute a quality control of that individual commodity. The major responsibility for quality is still with the manufacturer and ours is an audit, it is a check. Information of this sort can help pinpoint the areas in which we can make that inspection service more efficient and essentially achieve a bit of management by objective here, through this information.

As I mentioned earlier, we were pleased to report that the paper by Felix von Ranke, of Brazil, did arrive and Mr. Peiser has kindly agreed to read or comment or otherwise give this paper to us. This is entitled "The Institution of a Worldwide System of Testing Facilities". Mr. Peiser.

Mr. Peiser:

I must say that I am very sad, Mr. Chairman, that Felix von Ranke is not with us. He is not only a leader of technical standardization in Brazil, but he has participated with great distinction in regional and international standardization bodies. Felix von Ranke cabled at the very last moment that he was unable to come to Singapore because of organizational changes at the Brazilian Association for Technical Standards. He has sent Notes to us on the remarks he wanted to make, and as Bill Andrus pointed out yesterday, we really know a little bit about the very attractive way in which he puts across his particular viewpoint. Rather than just reading his Notes, I will also comment to the best of my ability and I hope that Bill Andrus will correct me or help me in interpreting von Ranke's Notes.

As you know, the timing was good. We were watching the post office here in Singapore as carefully as we could, and five minutes before the start of this session von Ranke's Notes arrived. Here follow the Notes:

Lecture Notes on

THE INSTITUTION OF A WORLDWIDE INTEGRATED SYSTEM OF TESTING FACILITIES (WISTF)

Mr. Felix von Ranke
Executive Secretary General
Brazilian Association of Technical Standards
Brazil

1. A worldwide certification of quality is forecast. A start has been made in the field of electronic components by the International Electrotechnical Commission (IEC). The necessity to get such service at a low price, requires the establishment of a worldwide integrated system of testing facilities (WISTF).

2. In the schematic figure 1, such a WISTF is shown as proposed at the Regional Seminar organized by the Directorate General of Standardization and Technology in cooperation with the National Bureau of Standards in La Paz (1974-06-25).

3. The WISTF shall operate in close association with the standardization operation at all levels (CS - Company, AS - Association, NS - National, RS - Regional and IS - International Standardization). This interaction should apply to the first phase of the development and establishment of standards, as for the basic reference document for certification and also to the improvement by revision of the standards.

4. The WISTF may also be used eventually for research and teaching.

5. The establishment of a WISTF is required for avoiding parallel work, for reducing unused testing capacity and for enabling technical specialization to proceed to optimum advantage.

6. The WISTF will be very important in the transfer of technology.

7. It would be convenient to have all testing facilities adjusted as much as possible to the requirements stated in international standards of the International Organization for Standardization (ISO), IEC, Codex Alimentarius, the International Organization for Legal Metrology, (OIML) etc., resulting in a maximum of Harmonized Testing Facilities, TF (H) at all levels that is ITF (H), RTF (H), ATF (H), NTF (H), CTF (H), with a reduction to a minimum of the Not Harmonized Testing Facilities TF (NH), that is ITF (NH), NTF (NH), ATF (NH) and CTF (NH), where I, R, N, A, and C again refer to internatonal, regional, national, association, and company, respectively.

8. For avoiding inessential differences in Testing Facilities for the pioneering field in ITF (P), RTF (P), NTF (P), ATF (P), CTF (P), it is very necessary to arrange good channels of communications between CTF, ATF, NTF, RTF and ITF activities.

9. ITF (NH), RTF (NH), NTF (NH), ATF (NH) and CTF (NH) may be used in restricted fields, transitorily or permanently as for instance in teaching or when conversion is no problem.

10. Somebody should be charged with the organization of the WISTF. An existing organization would be preferable.

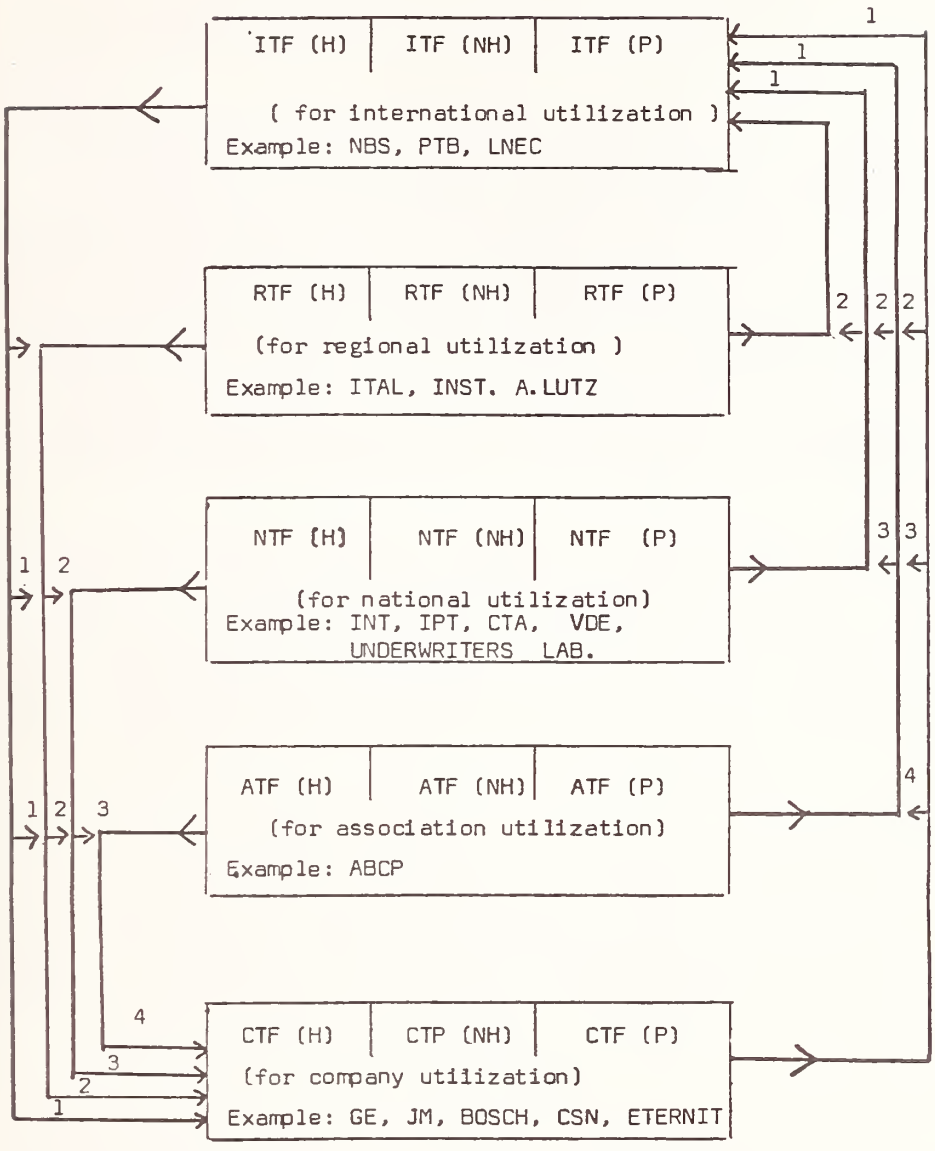
11. The WISTF should be provided with an administrative mechanism for planning, coordination and control of its activities.

12. All the Testing Facilities existing in a country should be integrated by the NTF.

13. The establishment of the WISTF will improve the relations between all countries of the world and stimulate development for mankind.

WORLDWIDE INTEGRATED SYSTEM OF TESTING FACILITIES

(WISTF)



TESTING FACILITIES (TF)

TF (H) - HARMONIZED WITH I.S. PROVISIONS
TF (NH)- NOT HARM. " " "
TF (P) - OF PIONEERING CHARACTER

TECHNOLOGICAL TRANSFER:

1 - IF THERE IS A WORLDWIDE INTEREST
2 - IF THERE IS ONLY A REGIONAL INTEREST
3 - IF THERE IS ONLY A NATIONAL INTEREST
4 - IF THERE IS ONLY AN ASSOCIATION INTEREST

FIGURE 1

Mr. Peiser:

Basically, von Ranke makes 13 points. The principal point is that a worldwide certification of quality is expected to become operative. Logically, there then exists a need for testing services at a low price which can be obtained only through the establishment of a worldwide integrated system of testing facilities. The scheme of interacting facilities is best understood by Figure 1 which shows what I can almost call a von Ranke type chart because his charts for standardization and training are very similar. At the top of the chart he has an international box going to a regional box to a national box to an industry association box and finally to another for company level. He sees an interacting system which ought to be harmonized as far as it is possible without taking away initiatives for pioneering work or a mechanism for work which is so clearly limited to one area, such as for one company alone, that a separate testing facility, appropriate to that particular product in that particular company, is all that is needed. In general, however, he always feels that one should work towards a harmonization progressively towards the top of this chart.

I realize that is is always difficult to present somebody else's paper and I am obviously not particularly well able to answer questions but will try. I believe I understand some of the points, or perhaps most of the points that von Ranke wants to make and perhaps we can seek comments from the audience. I will also pass questions and comments on to von Ranke so that perhaps he can give us the benefit of his responses for the proceedings. Thank you.

Dr. Probine:

Could I refer to the diagram on the board? It seems to me that the arrow indicating the communication route should not lead directly from the companies, and from the associations, directly to the international body, but rather through the national body. It is a detail but I think that is how communication would actually be routed in practice.

Mr. Peiser:

I would like to make a comment on what I think the answer of von Ranke might be to this particular point. He would agree that, in general, you should go up or down the chain, but in some instances an international organization might greatly benefit from the experiences or opinions of a company or trade association. This will be particularly important if the country does not adhere to the international organization. I would like to illustrate my response with one example. In the case of OIML to which the United States did

not belong until one and a half years ago, the members of the petroleum industry in the United States, especially through their association, interacted directly with the International Organization. I think it was a beneficial interaction. Yet, I agree with Dr. Probine that these would be exceptional cases, where you would jump all the way in your arrow to the highest level.

Mr. Andrus:

I would like to make just a few comments. I have to disagree with Dr. Probine on one point, but I will get to that in just a moment. First, one thing I think I appreciate most first is the use of testing facilities. We have to recognize, I think, that testing is not limited to a laboratory. It can be an individual who is licensed as an inspector, such as a licensed elevator inspector, or in one specific case of testing for the oil content of cottonseed, in the United States an individual is licensed and is tested on his own merits to perform the test and to issue the certificates, so Felix von Ranke has used the term "facility" to include not only laboratories, but all kinds of testing activities.

The second point that I would like to make is that a testing facility exists someplace in the world and therefore it is either company, association, or national. To my knowledge, there are no testing facilities that are either regional or international. The closest one would be the BIPM in which they really don't test, but the countries test their standards against the standards at BIPM and maintain the difference between the national standard and the international standard. So that, first, the testing facility is limited to either company, association, or national. The regional and international talk is about systems of accreditation, or systems of recognition of these testing facilities. This is what Felix really means here. We have in the regional area - first, let me say that in the international area, to my knowledge, there are no truly international systems of accreditation or recognition of testing facilities. The closest we are coming is the CERTICO activity of ISO and the IEC program dealing with electronic components, at the moment. In the regional area we have one that has been operating for 20 odd years or more, and that is the CEE program in Western Europe which is the Committee for the Approval of Electric and Electronic Equipment (I'm not sure of the name). But, their system, very simply is, that under the signatory countries in Western Europe, if the home country, and one other country laboratory approves a product, then all other members of the CEE accept approval of the product. And the laboratories, themselves, through the CEE system are recognized as being the laboratories to grant that approval. You see, under the new regional system of laboratory accreditation coming up, in the EEC, the Common Market, they are building into their system of product approval, a system of recognized laboratories. What Felix has here I

think is a concept which is a long term need. What it really is is a multi-national recognition of testing facilities in which products which are tested by those facilities and recieve the national mark are therefore accepted throughout the world as having met the product requirement.

Now, I have to go back to where I disagreed with Dr. Probine on the association. Perhaps the United States is unique in this matter, but we have to recognize that certain association type laboratories and the certification of products by those laboratories are recognized internationally. In the case of UL, which doesn't fit in any of these since it is a third party private activity, we know that UL products are accepted under the UL label in many countries. In the association area, specifically, because of the system in the United States, we do not have a national certification system or a national accreditation system at this point in time. Therefore, products that - take as an example, plywood, on which have a grading and labeling system on grades of plywood, which is handled by the American Plywood Association. Its a very, very good program. Products that are graded by that association under their testing facilities are acceptable in many countries of the world. So that the association can, in the case of one country, at least, go directly to the international arena without going through the national system.

Mr. Hopper:

Well, Bill Andrus is stealing the thunder from the Europeans. However, for the moment this proposal - which I think everyone has been talking about for some time - is a pipe dream. Mr. Andrus was talking about the CEE scheme which requires both the country of origin and one other country, probably the importing country - to approve. It has gone a stage further though. The CB scheme for domestic electrical equipment covering I think, something like 29 countries has eliminated the two-lab system and approved laboratories in the country of origin of the product. This is the CB seal on domestic electrical equipment. It comes under the CEE with something like 29 countries - Europe and associates - where they've progressed to the stage now that they've eliminated the two lab system with all its drawbacks of shipping things and people out and back, with the proviso, of course, that the customer or the country can demand that second check within his own country. This international proposal may appear to be a pipe dream, when, in fact, there is already a framework on which international development along these lines could take place. I don't see it coming off yet...for example, you get practical difficulties with Lloyd's of London who still battle with the British Standards Institute in that they tend to want to specify, particularly on safety and pressure vessels, to their own specifications and they are reluctant, sometimes, to accept the British standard as the national specification.

Against such formidable obstacles in each country, you're faced with the assessment that this could never come about...you could never do this. But, we've got the international assurance scheme on electronic components beginning to take shape. As you know, the BS 9,000 was a base for the European scheme which is taking some shape, anyway, now. Perhaps through the chap who gave the paper one must begin at least to put down some detailed administration. Without such a program, which is written in great depth, covering many obstacles that will arise, it's not much use our proposing an international scheme that we all want, the international facilities and the recognition, unless somewhere someone is going to do that in detail. Perhaps you might write back to the author of this paper and say, "Please now, we want to see how its going to work in detail". But, I think then certainly, IEC might well begin to move on it.

Dr. Probine:

I wonder if Mr. Peiser could just say what the nature of the international approval might be. I think the examples that Mr. Andrus gave were regional rather than international.

Mr. Peiser:

I would really like to pass this one to Bill Andrus, if I may.

Mr. Andrus:

I think that in the remarks I made that the testing facility is located someplace. Its in a country, a company maybe, an association, or a national testing facility. What is international here is not an international testing facility. It is a multi-national accreditation of the other national-association-company testing facilities. That is the concept that he is considering, not the formation of an international testing facility. The same thing applies to the regional case. He is not proposing that a regional testing facility be established. He is merely saying that there are regional accreditation programs of testing facilities within that region so that, I think, we have to differentiate between the company-association-national talk about facilities and the regional and international talk about the accreditation of those facilities. Does that explain the point?

Dr. Probine:

That clears it up in part, but I'm still uncertain as to whether there would be an international body that would put its seal of approval on the operation.

Mr. Andrus:

That is what he is proposing. That there be a multi-national, or an international accreditation facility.

Dr. Probine:

Thank you very much.

Mr. Peiser:

Yes, I agree with this interpretation, but I do think that von Ranke does talk also about possible regional facilities and international facilities. So it is at least possible that he is talking about some international test laboratories which themselves have capability, not unlike the International Bureau of Weights and Measures. This is what I originally had in mind when I read his Notes, but I think Bill Andrus' interpretation may be superior. The word facilities to me suggests that some physical laboratory could be backing up the accreditation system.

Prof. Stephens:

So, if its any consolation to our third country participants here, if you have been concerned whether or not the national standards body of your country should, in fact, go into testing, now we've raised the whole thing to the level of whether ISO should go into testing. And I might just comment that we have enough problems in some of the developing countries, to get some idea what test facilities are going to be made available within that country for their own program, that this is at a more advanced and much higher level of discussion here. Yes, Bill.

Mr. Andrus:

If I might just make one comment. Having been a very active participant in IEC and the ISO Council work over a number of years now, I can assure you that neither IEC nor ISO have any intentions of establishing a test facility of any nature.

Prof. Stephens:

Well, we are approaching the lunch hour and we are very thankful for the excellent papers that have been given this morning and the stimulating discussion. I'm sure the discussion is not finished but I encourage you to get together with the speakers and continue the discussion during lunch and through the afternoon breaks. We'll call the meeting adjourned.

III SESSION ON PRODUCT MARKING AND CERTIFICATION

Dr. Merwyn Probine, Chairman

Dr. Probine:

We have three papers in the session before our afternoon tea break. The first is by Professor Stephens on the certification and quality marks program in Thailand. We also have a paper by Dr. Choi of Korea, and a paper by Dr. Ranoa of the Philippines. We will begin be hearing the paper by Professor Stephens. I understand that the paper has been circulated to you and Professor Stephens is therefore proposing to give a more general presentation rather than go through it word by word. Professor Stephens.

Prof. Stephens:

Thank you very much, Mr. Chairman. Ladies and Gentlemen. First of all, let me give a little word of thanks to TISI, now here represented by Mrs. Phani and also Mr. Hopper, for the excellent opportunity I have had to work with them for two and a half years. I served in Thailand on a UNIDO project with TISI from March of '72 to August of '74 and it was during that period of time that the certification program which Thailand has now implemented was developed.

THAILAND'S CERTIFICATION AND QUALITY MARKS PROGRAM

Professor Kenneth S. Stephens
Georgia Institute of Technology
Atlanta, Georgia

INTRODUCTION

Some enlightening results were obtained in a recent British national survey of public awareness of quality seals or quality marks. Among other things, 33 1/3% of adults surveyed claimed that they looked for quality marks on products when shopping. Another 43% said they would look for quality marks if they knew more about the marks and what they represented in the assurance of quality. The strong influence which quality marks can have on consumers is indicated by these results.

In Japan's rise to international recognition as a manufacturer of quality products, licenses to use the JIS (Japan Industrial Standard) quality mark have been issued to 10,919 factories (up to 31 March 1972). In 1949, the Industrial Standardization Law was established. One of the key characteristics of this law was the certification labeling system (the JIS mark). By the law, through Statistical Quality Control audit, the Ministry of International Trade and Industry permitted manufacturers to put JIS certification marks on their products. This program, together with an extremely active program of Quality Control education, implementation and public promotion, is credited with giving Japan its major thrust to its present position of industrial and economic leadership.

Historically, in the earlier developed industrialized countries, national certification marks programs proceeded (or are proceeding) from already mature standardization efforts. It took (or is taking) many years to achieve the overall benefits of standardization together with the implementation of standards through a certification program. The developing countries, Thailand especially, have an excellent opportunity to shorten the period to achieve a significant degree of industrialization (of quality goods appreciated on the international and domestic market) by simultaneously developing their standardization and certification programs.

THAILAND'S PROGRAM

The Thai Industrial Standards Institute (TISI) established by the Industrial Products Standards Act of 1968 and the governing Standards Council has launched the standardization and certification programs which can greatly assist this acceleration of quality industrialization in Thailand. UNIDO has supported this effort with a

major project by providing three advisors to TISI in standardization, certification and quality control and information and public relations. The project has also included equipment and training fellowships. With broad and active industry and government support, these programs have the potential to achieve significant results.

TISI's certification program includes a legal base, technical and administrative procedures, an organizational entity and staff, and has progressed rapidly in the number of investigations and issuances of licenses to certified producers. The program has already contributed significantly to an awareness and upswing of quality among Thai manufacturers and large scale consumers.

Documents, Procedures and Related Activities

The basis for TISI's certification program is set down in the Thai Industrial Product Standards Act of 1968 and in Ministerial Regulations 1 thru 8. English language copies of these documents have been prepared and are available for study.

In addition to the above, procedures and guidelines have been established to assist the implementation of TISI's certification program. One of the first developments in the project was the preparation, reproduction and distribution of the document, "Certification Marking Procedures - General." It presents some step-by-step instructions and explanations to manufacturers interested in certification as to how they can proceed in making application and what they can expect in the way of factory visits, obligations, etc. English language copies of this document are available.

Somewhat later in the course of the project, but of related interest in the sequence of procedures developed, preparation of instructions for importers in certification was undertaken. Importers become involved in certification on products under compulsory standardization which many are importing in Thailand. The document, "Grant of License to Import for Sale in the Kingdom the Industrial Products Required by a Royal Decreee to be in Conformity with a Standard," was prepared, reproduced and distributed in Thai and English. It was first applied to ballasts for fluorescent lamps and sent to importers of ballasts as well as local embassies. Like its counterpart document for indigenous certification it contains some step-by-step instructions and explanations to importers required to obtain certification on their products under compulsory standardization by TISI.

Briefly stated, upon application, certification involves the following major activities: (1) a factory inspection visit(s) to study the manufacturing operations, organizations and management, overall quality control, and final product tests and inspection,

(2) selection of a sample of products from the factory, (3) submission of these samples to a test laboratory (limited to government labs by the IPS Act) for testing to the TISI standard, (4) evaluation of the test results with feedback to the factory on acceptance or necessity for improvement, (5) assistance to the factory when necessary, (6) preparation of a report to the Standards Council for their approval, (7) preparation of a surveillance inspection scheme and schedule, (8) upon issuance of the license, factory surveillance inspection visits, market sampling and related activities.

An activity pursuant to the above program is the location of adequate testing lbaoratories (with the referenced limitation) and the necessary arrangements for submitting samples for test. This includes determination of the cost of testing, rationalizing these costs among different laboratories, summary and publication of the testing costs in the government Gazette for public notification. Due to its importance, additional discussion on this activity is given in a separate section later in the paper.

For purposes of training the certification staff as well as for information to manufacturers, instructions were prepared in the form of, "Guidelines to a Program of Quality Control and Assurance." It provides flexibility to the TISI staff making the factory inspection and motivation to manufacturers to develop or otherwise improve their controls.

It is appreciated that, with all the variables of different standards for different products, of different price and grade designations and all the other factors involved, the manufacturers' concepts and attention to the business of quality control will vary considerably. It is recognized that manufacturing and quality control details will differ from factory to factory. Therefore, it is not TISI's intention to suggest a rigid set of standards for quality control programs. There are, however, some basic areas which are of general industry-wide concern and which are evaluated by TISI in its investigation and surveillance. Briefly, these are: (1) control of manufacturing information, (2) control of incoming materials and storage, (3) control of manufacturing processes, (4) control of final product inspection, (5) control of measuring instruments and test equipment and, (6) control of corrective action quality assurance.

To assist in the factory inspections, a "Checklist of Questions for Factory Inspection" was prepared. For reporting the results of the factory inspections to TISI management and the Standards Council, a report format was developed. This includes (1) name of applicant, factories, and products, (2) specific product varieties to be certified, (3) summary of factory inspection(s), (4) summary of

independent tests on samples drawn from the factory (ies), (5) TISI's recommendation, and (6) expected surveillance inspection and testing.

Another significant document in the overall procedures developed is the scheme for surveillance inspection and testing which is drawn up by TISI to inform the factory what is expected of them for continued use of the quality mark after receiving the certification license. These schemes, for each company and product are treated confidentially. However, a sample copy showing format and general content is included in Annex A.

Surveillance inspection by TISI is an essential feature of the Thai certification program. It serves as a reminder to the factory of their obligation to produce a product in conformity to the applicable TISI standard. Some policy by way of a working program for surveillance inspection is included in the document entitled, "Minimum Program of Factory Surveillance Inspection Procedures." This is included in Annex B.

With the increase of licenses and certified factories with locations ranging from Northern Thailand, greater Bangkok, and Southern Thailand, scheduling of surveillance inspection becomes a crucial element in the overall certification program. In this connection a calendar of randomly distributed visits within the planned number was developed after several licenses had been issued. Some policy used in the development of this calendar and subsequent scheduling is as follows: (1) combining trips where possible, visiting two or three neighboring factories, minimizing the number of trips, time duration and personnel, (2) initially using surveillance visits for training of new personnel in accompanying experienced personnel, afterwards reducing the number of personnel to a minimum of two on each visit, (3) avoiding long periods between visits in order to keep before the factory personnel a fairly constant reminder of their obligation to continually produce a quality product in conformity to the applicable TISI standard, (4) reducing the frequency of visits based on good quality performance as well as some reduction in independent testing by observing tests in the factory, (5) sampling a reduced number of the licensed varieties and/or sizes on each visit and/or market sample where there is sufficient evidence that the quality of different sizes is not independent, and (6) using a calendar layout by licensee to assure that timing is reasonably spaced.

Another significant activity undertaken in support of surveillance inspection was receiving applications for certification on those products. Emphasis was placed in the review on the quality requirements of the product, tests easily conducted on the factory premises by the certification staff, tests to be conducted by laboratories and the number of product units to be sampled for tests.

An important principle is related to the latter item. The tests and sampling procedures as specified in the standards are primarily directed to be performed by the manufacturer. They are generally related to lots of consignments of products to provide some assurance (within the statistical validity and outcomes) to the producer and/or consumer that the current production is in conformity with the requirements of the standard. Certification by TISI is not a guarantee, nor is it an integral part of the factory's quality control program. It is an independent form of quality assurance providing a periodic check on the adequacy of the manufacturer's production, controls, and tests. It is an audit of the manufactuer's operations and product. Therefore, sampling by TISI does not necessarily follow the same program as outlined in the standard.

In most cases sampling of reduced portions is applicable. On the other hand, especially where the sampling procedure in the standard is inadequate (for numerous reasons) for lot-by-lot inspection and even for audit sampling, TISI's sampling program may exceed that of the standard. In these cases certification helps to provide an adjustment valve to correct inadequacies in the standardization process.

While most of the product tests, as specified in the standards, require laboratory test equipment, simple product quality requirements such as lengths, diameters, other dimensions, weights, visual properties, etc., can be checked immediately in the factories by the TISI certification team. For this purpose a small budget for certification equipment was included in the project. A review has been made of those standards applicable for certification to identity tests which can be performed in the field or readily in the office by the TISI certification teams. Equipment and instruments useful for these tests have been listed and orders placed to obtain these devices for the certification program.

Applications for Certification, Status, and Licenses Issued

TISI's certification program, as alluded to earlier, includes both voluntary and compulsory standardization. The voluntary program was launched first with an application dated 5 June 1972. As of mid 1974, 50 applications had been received under the voluntary certification program. This resulted in the issuance of 24 licenses to use the Thai Quality mark. The applications included Portland Cement, asbestos cement sheets, PVC pipes, round steel bars, electric cable, dry cells, ballasts for fluorescent lamps, silverware, lead acid storage batteries, monosodium glutamate, deformed steel bars, toilet soap, toothpaste, fish sauce, concrete building blocks, and pozzuolana type cement.

The first TISI license was issued on 19 October 1972 for Type I Portland Cement. Additional licenses on Portland Cement followed in addition to asbestos cement sheets, round steel bars, electrical cable, silverware, MSG, toilet soap, deformed steel bars, and fish sauce.

Compulsory certification was launched by the publication of the Royal Decree defining ballasts for fluorescent lamps which are to be manufactured in conformity with the TISI standard. This Decree was published in the Government Gazette, dated 7 December 1973. The Decree contained a 120 day grace period bringing compulsory certification on ballasts into force on 10 April 1974. Twelve applications from ballast manufacturers and fifteen from ballast importers were received. This resulted in the issuance (by mid 1974) of six licenses to ballast manufacturers and thirteen to ballast importers.

Subsequently, compulsory standardization (hence certification) has been set on two additional products, namely tapioca and canned pineapple. Nine applications from canned pineapple producers were received by mid 1974.

The program on tapioca is unique due to the large number of processors involved. Some 900 applications were received and 172 licenses processed by mid 1974. To facilitate this program, teams of TISI certification staff have traveled to the tapioca producing areas to assist in completing applications, inspect the factories, and draw samples of the product for testing.

Acceptance of the TISI certification program by local manufacturers and consumers as measured by the number of applications for voluntary and compulsory certification is encouraging, indeed. There has been a good beginning. But as with most good beginnings the pace cannot be slackened, but rather accelerated, to realize the full potential in progress.

Certification Testing Program

Included in the certification activities discussed above is the testing of product samples by laboratories selected by TISI. Some discussion was given concerning the selection of the test labs, coordination of testing costs, etc. The subject of actual testing, and ramifications thereof, has been reserved for this section. Testing is of crucial importance to the overall certification program. It might even be referred to as the "backbone" of the entire effort. The following observations, based on TISI experiences, are recorded here for general information on the program and to serve as a guideline for the development and implementation of other testing programs for

certification. In the following, "TISI" might denote any certifying institution.

Implementation of the certification program is dependent on accurate and competent tests of product quality characteristics at the factories and at the independent testing laboratories used by TISI to carry out tests on their samples. This is an extremely important part of the overall program and requires a great deal of cooperation and attention by all parties concerned.

TISI is in the middle of the certification program between the factory and the independent testing laboratory. Therefore, measurements supplied to TISI on the quality characteristics of the applicable standard must be as complete as possible. Average values or calculated quantities are generally not adequate.

TISI must have detailed test information as part of its overall evaluation of the quality (which includes variability as well as average value) of the manufactured product. This is especially important in the event of any discrepancies in measured values between the factory tests and the independent testing laboratory tests. It should not necessarily be considered unusual for some discrepancies to occur. There are many causes of differences in measurement, namely, different test equipment, different methods of calibration, different test methods, and even minor techniques of preparing and handling the test specimens. Possible errors in calculation and even in transcription from rough test notes to test notebooks cannot be ignored.

Especially during the early stages of the certification program, close cooperation in testing should be maintained between the factory, TISI, and the associated test laboratory. Each can learn from the other, resulting in greater knowledge and understanding of the tests and more accuracy in test values. Test personnel from test laboratories might accompany the TISI certification team during the factory inspection visits to become more familiar with the factory procedures of testing.

Close cooperation involves an open sharing of test results, test methods, test equipment, etc. Confidentiality of testing needs to be understood. Tests are confidential only with respect to an unethical sharing of such results with a company's competitor, organizations, or persons using the results contrary to the interests of the factory under investigation. The diagram in Figure 1 illustrates the nature of the cooperation, communication and confidentiality of the testing program.

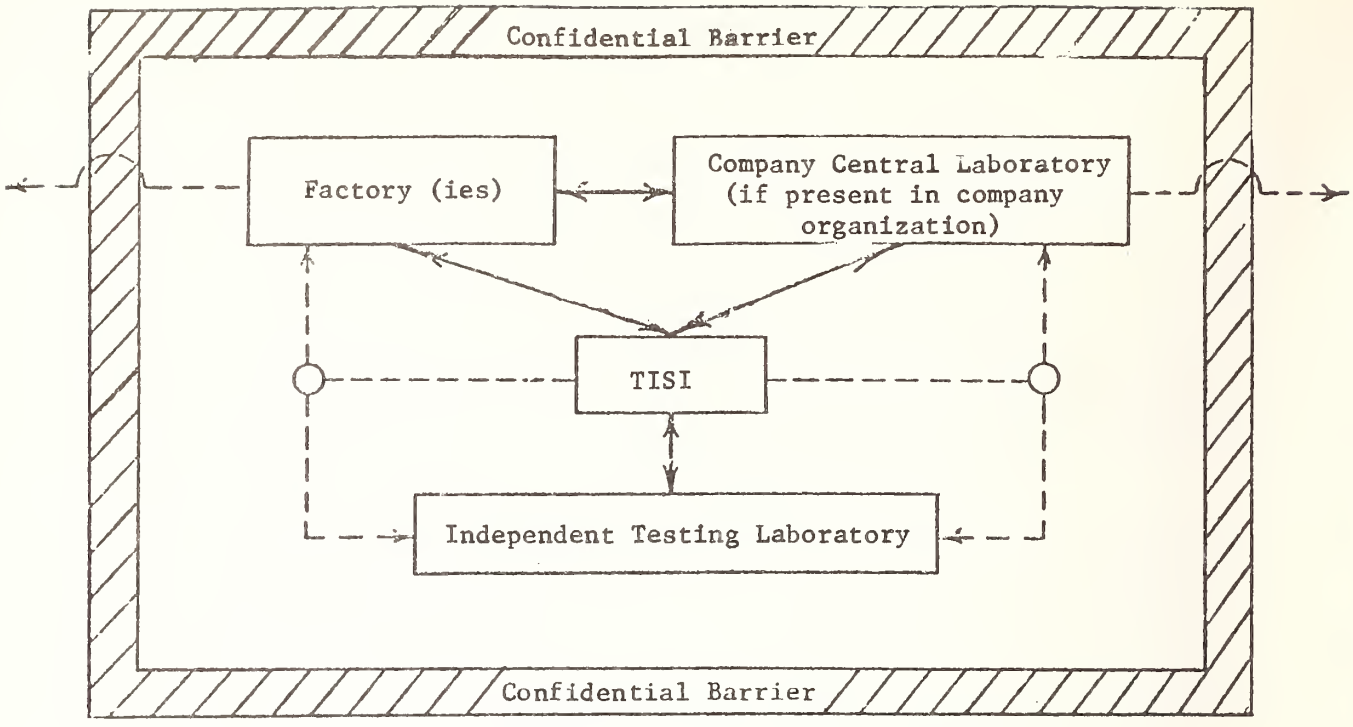


FIGURE 1 -- Diagram of Certification Communications

The solid lines represent the main flow of communication between the parties. TISI deals directly with the factory(ies) and/or a central company laboratory (if such exits). TISI also deals directly with the independent testing laboratory engaged by TISI to carry out the tests and report the results.

The dashed lines inside the confidential barrier indicate the possibility of the independent testing laboratory dealing directly with the factory(ies) and/or the central laboratory, but only with knowledge and approval of TISI. Such contacts may be necessary to calibrate equipment, check methods of test, calculations, etc. to achieve the greatest possible accuracy of results. These contacts may also be necessary for carrying out the tests on company owned equipment, when not available elsewhere. In this respect, it is recognized that tests for one company's products may have to be carried out on equipment owned by another company (and probably a competitor) by personnel from the independent testing laboratory. In these cases extra care must be taken to guard the confidentiality of the results.

The dashed lines outside the confidential barrier represent the company's right to share the quality of their product with others as they may choose.

In submitting the product sample or test specimens to an independent testing laboratory for testing and reporting the quality characteristics, TISI may need to design and submit an appropriate data sheet to indicate the detail desired in the test results. Other information may also be submitted including special techniques of handling and testing, charts to aid calculations, some average values and ranges which may be expected in the test results and which if deviated significantly from may indicate the necessity to study the tests prior to reporting final values, etc.

For TISI, and its associated testing laboratories to be the certifier of manufactured quality for industrial firms desiring certification, it is necessary to give some assurance to these companies that the quality of the test and evaluation process is held high and subject to controls and improvements itself. In our factory visits we were met with an open atmosphere of cooperation and willingness to examine and improve, if necessary, the quality of their products. In several instances quality improvements were necessary and work on these was fast and effective. This type of cooperation must be continued and extended to all organizations involved in the certification program.

The testing program associated with TISI certification will grow rapidly and to large proportions. In planning for this, it has been recommended that Thailand seriously consider the formation of a testing and calibration working committee consisting of top-level representatives from some of the main testing laboratories from TISI and even from interested industries to map out a program of tests and coordination of testing facilities. In such planning, it may be recognized that certain laboratories concentrate on testing in certain major fields, eliminating the duplication of the very expensive testing apparatus, and raising to a high performance level the tests within these major fields. Coordination of deliberate overlapping of tests for scheduling purposes can be planned. Coordination of calibration can also be planned. It is perhaps possible that the coorperative work of such a group may be more successful in obtaining equipment grants from the various sources.

This should have top priority in Thailand and be actively supported by industry and government leaders.

Akin to testing problems is the matter of clear specification on the required quality characteristics. And in this matter the problems are not by any means restricted to the developing countries alone. During

the duration of the U. N. assignment, the writer had frequent opportunity to read standards prepared in developed countries and by international organizations. Many contain vague, inadequate, and/or incorrect specifications of quality requirements and sampling procedures. To pursue this in sufficient detail will require another paper.

Process and Product Improvement Program

Another area of activity discussed earlier is that of assisting the factories when necessary to make improvements in the product or process to meet the requirements of the TISI standard. In every case of investigation under the certification program the mere process of factory and product inspection is bound to uncover some, at least minor, areas of possible improvement. When product samples fail under test to meet one or more quality requirements, indications of necessary improvements are almost immediate.

There have been some outstanding examples of product and process improvements which have been brought about by the TISI certification program. Some others, involving relatively long range improvements are presently underway, having been uncovered or highlighted by the certification effort. Due to the proprietary nature of this information, the accomplishments in this area of activity are not documented. However, for some degree of definitiveness, a number of experiences are included here.

Investigation of an application for certification on cement revealed an amount of SO_3 in excess of the standard requirement. Follow-up visits and investigation by factory personnel uncovered an inadequate flushing of the conveyor belt to the storage silos when changing between types of cement.

In addition to the solution of testing specifications and problems undertaken by TISI on asbestos-cement sheets, some specific improvements were necessary in the formulation of the asbestos-cement slurry and the associated company undertook a major change in the replacement of the main belt on the sheet forming machine.

For initial investigation of an application for certification of toothpaste, the TISI certification team was invited to visit the factory on one day to observe the formulation and mixing of the product and on the following day to observe the filling and packing operations. A requirement of the toothpaste standard, reflecting viscosity of the product, is that when the toothpaste is squeezed from the tube held in an inverted vertical position, a 10 mm. column of toothpaste shall hold for at least 15 seconds before separating from the tube. Several tubes were selected from the filling machine and

checked for this requirement. The failure to meet the requirement was dramatic. Company personnel immediately recognized this problem and the certification study was discontinued pending correction of the product.

It should be noted here that the company under investigation is a reputable pharmaceutical house with many successful products. Not only did the simple test described above highlight a product quality deficiency, it helped to explain lack of sales experienced in toothpaste in the past. The problem has been corrected and certification is proceeding.

QUALITY CONTROL -- A BROADER VIEW

Something needs to be said here concerning the broader aspects of quality control and its importance to the present and future Thai industrialization and economic progress. While statistical quality control is an essential part of the certification program, we must be careful that we are not lulled into thinking that certification is quality control. In Thailand, as in other countries of the world, there needs to be a parallel program to complement and supplement the Certification Marks Program in motiviating and achieving the manufacture of quality products at economical costs. There are at least three major reasons why application of quality control principles and techniques cannot be limited to a certification program.

1. Certification (as carried out in most developing countries) itself is an adjunct to a national standardization program. It is therefore limited to those products for which standards are prepared and published. SQC is not so limited. Standards preparation is also a relatively slow process. Then too, (even without the usual limited resources) standards cannot be prepared on all products simultaneously, lower priority products are bound to be delayed. Furthermore, the application of statistical quality control to the manufacture of products, before or during the preparation of national standards on those products, can improve the standard by an inherent improvement in the quality of the products.

2. Not all products (processes, procedures, etc.) for which standards are prepared are suitable for certification. Yet statistical methods may be employed to improve and /or control these products, processes, procedures, etc.

3. Manufacturers undergoing investigations for certification have a natural tendency to avoid discussion of quality problems on their products or processes, whereas the crux of the matter on quality control investigations, assistance and applications lies at highlighting major problems and directing detailed study where it will count the most. Of course, test failures under certification have a similar effect. But it is possible for a manufacturer to obtain certification on his products (demonstrating conformity to the standard) while still plagued with relatively high internal scrap losses, excessive repair or rework, poor delivery and other related ills. It is possible to miss the greatest benefits of SQC, if limiting quality efforts to a certification program alone.

Many papers have been written on quality control in developing countries. All of them include, at least in part, the following recommendations for developing an effective quality control program:

1. Establish strong national leadership through one or more influential national organizations.
2. Adopt an active national plan through participation by industry, government, academic and other professional groups.
3. Effect some government compulsion through required quality levels for government and/or military purchases, export quality requirements, etc.
4. Promote industrial applications of quality control through seminars, inplant training programs, consultative assistance, etc.
5. Communicate successes in seminars and journals through the establishment of national language technical media, etc.
6. Train personnel at all levels through an active program of seminars, short courses, fellowships, etc.
7. Promote public awareness of quality through radio, television, newspaper publicity, consumer seminars and exhibitions, etc.

Training cannot be over-emphasized. In one U.S. factory of approximately 4000 employees some 23,000 man hours of quality control training was conducted for personnel from top management to inspectors and key shop workers in a period of seven years. This was during a concentrated period of process studies using quality control principles and techniques (1952-1958). Over this same period savings in production waste and excessive inspection amounted to $27 million. The above factory was visited by many Japanese industrial study teams in the mid-to-late fifties.

The importance of training in Japan's rise to international fame in quality manufacture is summarized in several papers. It is estimated

that the total number of participants in the education courses outside companies reached more than 100,000 for the period from 1949 to 1968. With the in-company training programs, several million have been trained. In more than 2000 companies training has been completed for all employees including top management and workers.

Significant improvements have been realized among several producers of ballasts for fluorescent lamps. Product design changes, mainly on improved insulation, have been brought about by highlighting the voltage breakdown requirement. Several producers have installed test equipment where, prior to certification, no tests on the safety or performance of ballasts were made. Some low quality brands of ballasts have been discontinued.

The above examples indicate positive benefits in this area from certification. However, there is within the TISI certification program a tendency to de-emphasize assistance to manufacturers with quality problems, especially prior to certification and even after an initial investigation and test resulting in product failures. It is, of course, a correct premise that the manufactuer is responsible for the quality of his product. Any assistance rendered should be so organized to emphasize this premise. However, many manufacturers need assitance in quality control methodology, test information and design, and in understanding the benefits of lower costs and better delivery capability from improved quality of products and processes. TISI is in an excellent position to learn where this assistance is most needed, on products related to standardization and certification (more is said about this matter in a later section). The capability to render this assistance, however, must be developed through proper emphasis in policy, training, recruitment of staff, etc. At present TISI's situation is such that recruitment of new staff is almost entirely restricted to recent university graduates with no industrial experience. Industrial personnel are generally older, more experienced and highly respected by the more junior members of TISI's staff, a situation not conducive to providing industrial assistance without a great deal of concentrated training of these junior staff to provide them with a respected commodity not available in industry. There is, of course, the additional problem of losing these staff members to industry (at considerably higher salaries) once they are well trained.

It is entirely possible, however, to make this a deliberate national and institutional policy, accepting the associated inefficiencies within the institute. TISI needs to strengthen the program of assistance to industry and may well be aided in this effort by future UN and other multi-lateral or bi-lateral assistance.

Objectives

One of the principle purposes of TISI's Certification and Quality Marks program, in conjunction with its standardization efforts, is to encourage and assist the manufacture of quality products in Thailand, a prelude to economic growth and stability. In this, TISI recognizes the importance and need for manufacturers to establish and/or maintain an adequate program of Quality Control and Assurance. In the preliminary investigation for initial grant of license, as well as in the surveillance inspection and testing, for continuance of license, TISI tries to determine if the factory (ies) has an adequate program of control of production so as to assure continued conformity to the standards(s).

Then in addition to the Manufacturer's efforts, Certification by TISI provides an independent, 3rd party form of Quality Assurance, in general, Certification that goods are being manufactured in conformity with a standard. However, it is not a guarantee! The quality of manufactured product is primarily the responsibility of the producer. Since it is economically impractical to provide for 100% assurance, a system has to be devised, product by product, which will provide the desired assurance within practicable and economic limits. This can be achieved under a system of Quality Control and Assurance at the manufacturing plant, backed by regular inspections by an independent inspectorate and independently verified tests. In consonance with this principle TISI's Certification program has the following objectives:

- Implementation of Industrial Standards with Their Many Production Benefits.
- Encouragement of Quality Manufacture, Exports and Imports.
- Protection of the Consumer from Misrepresentation of Product Quality.
- Protection of the Producer from Improper Competition.
- Reduction in the Multiplicity of Quality Certificates (which reduces sampling, testing, time, and costs).
- Assistance to the Producer's Advertisement and Marketing.
- Improvement in the quality of the Standards by locating errors and/or outmoded practices for feedback to technical committees or the Standards Council for revision of Standards.

The Japanese Standards Association, since 1953, has been conducting seminars on Quality Control and Standardization. Every year the association holds 17 seminars of about 160 hours duration each. Above 1,100 attendants were trained in 1972 and more than 18,000 in total.

Dr. W. Edwards Deming, honored by the Japanese for his lectures and consultations on statistical quality control, has said, "I am firmly of the opinion that nothing can happen in the improvement of quality or in economy of production without active support and continued interest of management. Moreover, people in management must learn something about their own responsibilities. I find in my own practice here (U.S.) that management too often takes refuge in other problems as soon as they learn from the charts that they themselves must take some action to reduce the common causes. Management in Japan was different: they listened, learned, observed, and did something about common causes when they were indicated." This quotation sums up the action necessary to reap the benefits of statistical quality control.

SQS, correctly applied with an awareness of the importance of quality, can provide the active ingredient needed to achieve domestic and export quality and the resulting good reputation for products, "made in Thailand" (or anywhere). SQC is now widely used in almost every type of industry in most countries of the world. It has proved to be most effective (1) in improving the quality of products, (2) in raising the productivity of manufacturing processes, (3) in reducing manufacturing and other costs, and (4) in determining the marketability of products or services.

However, many developing countries, including Thailand, have yet to promote, utilize and benefit from SQC on a national scale. Most are receiving some assistance and interest in developing. Understanding the principles and benefits and placing them in proper perspective will surely help. It must also be understood that the commonly heard resistance to quality implementation such as, "Our problems are different.", "It will cost too much.", "Management will not accept it." etc., have been voiced before most successful applications, regardless of degree of development and/or scope of application.

For example, in Thailand it is conceded that price dominates the domestic market for many products at present. However, Thai consumers, bolstered by a relatively loose control on quantities of imports, continue to spend huge amounts (price plus large custom taxes) for quality imports. If Thai manufacturers are to capture a greater share of this capital, they will have to shift their emphasis to quality, at the lowest possible price. "Buy-Thai" movements are underway but they are mostly promotional. In addition to the domestic market, the export market continues to demand quality products, although they don't always get them as evidenced by the many and varied complaints, requests for controls, etc. SQC can provide the substance needed to make these programs effective.

Thailand, like many developing countries around the world, stands on the threshold of rapid industrial development. If this development is

to be successful in achieving domestic and export acceptance of locally made products quality, price and delivery must be placed in proper perspective and continually improved. Management personnel in government departments, private industry, management and industry associations, academic institutions, etc. must develop a genuine and growing interest in the use of Statistical Quality Control to achieve these results, which, if properly applied, will yield economic prosperity.

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ANNEX A

Thai Industrial Standards Institute
Certification Marking Procedure
Scheme for Surveillance Inspection and Testing
XYZ Company, Ltd.

1. This procedure applies to TISI's certification of (name of product), manufactured by the XYZ Company's (location of factory), factory in conformity with the Standard TIS (number of TISI standard). License to use the Standards Mark was approved by the Standards Council on ... (date of approval) ...following a satisfactory preliminary investigation of the factory by TISI.

   1.1 Certification by means of the TISI Standards Mark is regulated by the Industrial Product Standards Act, B.E. 2511. It is further regulated by Ministerial Regulations 1 thru 4, B.E. 2515 and future Regulations.

   1.2 This procedure regulates the continuance of certification including surveillance inspection and testing and thus supplements the Standard and other related documents.

2. The factory laboratory, where the tests are carried out, shall be maintained, equipped, and staffed in at least its present approved condition in order to continue to determine the products conformity to the Standard.

   2.1 Records of tests shall be kept on suitable forms as attached.

   2.2 Copies of any test records or charts that may be required by TISI shall be made available at any time on request. Information obtained by TISI will be treated as confidential.

3. (In this and its sub-paragraphs a detailed program of final product testing to be carried out by the manufacturer is outlined. The tests included are designed to verify that the final product meets the requirements of the standard. Each company and factory is considered separately in developing the program of tests).

4. It is recommended that, as far as possible, statistical quality control (SQC) methods shall be used for controlling the quality during production. These same methods may result in reduced costs and increased through - put of production. (In the associated sub-paragraphs a detailed program of in-process controls to be carried out by the manufacturer is outlined. The specified controls

are designed to assure that the products are consistently made to meet the requirements of the standard. In many instances, these process controls will be those already carried out be the manufacturer prior to certification. Otherwise additional or alternative procedures will be specified with emphasis on defect prevention and thus cost reduction and increased good production, and improved quality).

5. The TISI Standards Mark shall be printed on each (unit of product) as per Ministerial Regualtion No. 2 B.E. 2515, provided always that the product conforms to the requirements of the Standard.

   (In the associated sub-paragraphs additional marking requirements as set forth in the standard are specified. An approved marking layout incorporating the TISI mark is often included).

6. A separate record shall be maintained giving information relating to the rejection of production lots which do not conform to one or more specifications of the Standard. The disposition, action taken, and/or method of disposal of this product shall be indicated clearly. Tests as required by the Standard, shall be completed so as to make it possible to take corrective action on non-conforming product prior to its marking with the Standards Mark.

7. If at any time, there is some difficulty in maintaining the conformity of the product to the specifications, or the test equipment goes out of order, or if advised to do so by TISI, the marking of the product shall be ceased. The marking may be resumed as soon as the defects are removed, or when TISI advises to do so. The information regarding resumption of marking shall also be sent to TISI.

8. The licensee shall supply, free of charge, from his factory or go downs the samples required by TISI for its certification surveillance. (Provision for samples taken from the open market will also be specified).

9. The licensee shall send to TISI a statement of quantity produced, marked and exported by him and the trade value thereof during the half year ending....and....for the preceding half year.

10. TISI's surveillance inspection and testing will include periodic factory visits, as well as samples for testing drawn from the factory and from the market, or in transit from the factory to the market. Testing expenses, as they are incurred, shall be paid by the company. To permit fiscal company planning, the maximum expenses under normal quality are not expected to exceed....Excellent quality performance, as demonstrated on subsequent audits, will reduce the inspection frequency and ensure an expense considerably lower than the expected maximum.

ANNEX B

THAI INDUSTRIAL STANDARDS INSTITUTE
MINIMUM PROGRAM OF FACTORY SURVEILLANCE INSPECTION -- PROCEDURES

The following is designed to supplement the Certification Program Procedures, especially with regard to Surveillance Inspections.

Upon issuance of a license to use the Quality Mark, after a successful preliminary factory inspection and product tests, the certification program calls for periodic surveillance inspection of factories including sampling and testing of finished product. This is designed to provide a continuous motivation to the manufacturer to produce a quality product in conformance to the applicable Thai Standard.

Each surveillance inspection, based on the findings of the last previous inspection and/or pre-license inspections, can be made very efficient in time and effort. It need not be as thorough as the pre-license inspections. However, for effectiveness of the certification program, surveillance inspections should include the following minimum program which can serve as a guide to certification officials and company personnel.

1. Review the process control section of the surveillance inspection scheme with responsible factory personnel. Look for conformance to the program of process control. Review process control records to observe if tests are being made at the agreed upon frequency and if the product or subproducts are meeting prescribed specifications. Note any discrepancies or alternative procedures adopted since the last inspection (including pre-license investigation). If necessary, observe the process for execution of the process controls.

2. Review the final product testing section of the surveillance inspection scheme with responsible factory personnel. Look for conformance to this program and review factory testing records at least covering the time period from the present back to the last inspection visit. Note if final product has been meeting the requirements of the Standard. Particularly note periods of non-conformance and actions taken to correct substandard product.

3. Review the marking of the final product in accordance with the marking section of the surveillance inspection scheme. Note any discrepancies or modifications.

4. Obtain a sample of the finished product representative of current production over at least several hours (or days) of production by sampling, if possible, finished product being produced during the visit as well as final product in the factory's immediate go-downs.

This may require recognition of a factory's production pattern and scheduling of the surveillance visit (but still unknown to the factory) to include periods of production.

5. Review overall results of surveillance inspection visit with TISI certification officer and arrange for testing of the finished product sample. Analyze test results (observe tests if necessary) and note approval or prepare recommendations for improvements. Communicate findings with responsible factory personnel.

6. Maintain an up-to-date file on each license, containing materials from the pre-license inspections, each surveillance inspection and other materials which will be helpful in carrying out subsequent inspections.

Dr. Probine:

Thank you very much, Professor Stephens. Professor Stephens has given us some insight into progress of Thailand's industry; particularly with reference to the certification and quality marks program. Because we made a slightly late start, we're a little short on time for discussion, and I therefore propose that we take Professor Choi's paper now, and also now the paper by Mr. Ranoa of the Philippines; and then perhaps we could have discussion on all three papers at that stage. I will now call on Dr. Choi of Korea to give his paper, which has just been circulated to you. Dr. Choi.

BASIC EXPORT INSPECTION POLICY IN KOREA

Dr. Choi, Jong Wan
Administrator
Industrial Advancement Administration
Republic of Korea

I. History of Export Inspection System in Korea

Export inspection in Korea started in 1949 simply to ensure the quality of primary goods, such as agricultural and mineral products and other raw materials. However, a formal inspection system was only inaugurated in 1962 in accordance with the Export Inspection Law enacted to meet needs for increasing trade volume which has continued since then.

Export items which are subject to inspection are designated by decree of the Ministry of Commerce and Industry for manufactured products, and of the Ministry of Agriculture and Marine Affairs for agricultural and marine products. The total number of items under inspection now amounts to 216 as detailed in Table 1.

Table 1 - Number of Items Subject to Export Inspection

(A) Manufactured Products		179
Chemical	14	
Textile	45	
Electric, Metal and Machinery	105	
Other General Merchandise	14	
Not Classified	1	
(B) Agricultural and Other Products		37
TOTAL		216

The inspection is implemented either by public or private agencies in accordance with quality standards and testing methods established for each item. The list of items subject to inspection and inspection standards is frequently adjusted, amended, and supplemented to meet changing situations in export trade.

The public agencies are the National Industrial Standards Research Institute and five provincial testing stations; the private organizations are nine professional testing laboratories; all are listed in Table 2. The private agencies were established by a

judicial process. They conduct their work with delegated authority from and under the auspices of the Industrial Advancement Administration and other authorities concerned. To obtain this authority, an organization must be equipped with testing facilities and staffed with qualified inspectors as required by the Law.

Table 2 - Inspection Agencies

Public

National Industrial Standards Research Institute
Chungnam Industrial Inspection Station
Chungbuk Industrial Inspection Station
Chonnam Industrial Inspection Station
Kyeongbuk Industrial Inspection Station
Pusan & Kyeongman Industrial Inspection Station

Private

Korea Textile Inspection & Testing Institute
Korea Fabric Inspection & Testing Institute
Korea Knitted Goods Inspection & Testing Institute
Korea Chemical Products Inspection & Testing Institute
Korea General Merchandise Inspection & Testing Institute
Korea Electric Apparatus Inspection & Testing Institute
Korea Exports Packaging Laboratory
Korea Mineral Inspection Laboratory
Korea Register of Shipping

II. Description of Inspection System

1. Purpose of Export Inspection

The main purpose of export inspection is to improve the quality of export products in general and to maintain the worldwide reputation of goods made in Korea. It is not necessary that all industrial products should be subject to mandatory inspection by authorized agencies. The criterion for inspection standards are set up to satisfy the minimum requirement to accomplish the above-mentioned purpose.

Export inspection in Korea can be classified into three categories. Products whose quality is fully guaranteed by manufacturers under a complete quality control system are exempted from mandatory inspection. Products whose quality is assured by manufacturers who are relatively well-disciplined but lack a complete quality control system, are also exempted from direct inspection, but plants of such products are subject to periodic surveillance by qualified inspectors

from an authorized agency. All the other designated products are subject to full mandatory inspection by authorized agencies.

Products whose quality does not meet with national inspection standards, are prohibited from exportation by the Law even if prospective foreign buyers have agreed to purchase them.

2. Operation of Inspection Agencies

Export inspection agencies must perform their inspection duties in accordance with procedures established by the Law and Regulations. However, the ultimate in quality guarantee of export goods cannot be achieved only through inspection of finished products. An inspection method relying on rejecting finished products with defects can also not contribute in general to export promotion which is the final goal for the export inspection system. Therefore, it is most desirable that a quality control system is built into the entire process by all processors and manufacturers. The purpose is to prevent defects being introduced anywhere, or at least to recognize such defects where they occur.

In order to fulfill this final goal, the inspection agencies are assigned additional tasks to be performed besides their regular export inspection duties. Firstly, statistical data concerning defects of products are accumulated and classified so that the information is disseminated to manufacturers through meetings, such as round table conferences, seminars, or workshops. Secondly, if any technical difficulty is involved that is causing defects in the products, the concerned agency extends technical consulting service to overcome the problem. Short-term research often has to be performed by the agencies to provide needed technical assistance for eliminating such problems. Thirdly, educational activities and general guidance for quality control are provided to manufacturers by the agencies.

Constant improvement in available facilities and competences at each concerned agency is a pre-requisite for achieving this goal. The conduct of self-educational programs is, therefore, imposed on these agencies. In addition to these educational programs, necessary equipment and facilities are expected to be supplemented in line with improved services.

To implement the above policy, about 50 seminars, workshops, and meetings are scheduled to be held this year by the respective agencies. Technical extension services are given, such as a campaign for textile plants for the "Elimination of Slub", another for metal works on "Improvement of Surface Treatment", and 13 other similar campaigns. All the inspectors are asked to take quality control

training courses for obtaining professional quality control licenses issued by the Government.

III. Progressive Policy for Inspection System

1. Quality Control is a Practical Philosophy

It is a worldwide practice for efforts to be made by the states and companies to intensify international competition, develop new products, and explore new markets. Korea's export has grown rapidly due to success in carrying out the 5-year economic development plans in three consecutive periods. Further efforts are being made to pass $10 billion in the value of exports early in the 1980's. For this target, we are now endeavoring to re-align our industrial structure, renovate our industrial technology, strengthen managerial capabilities, and engage in extensive training of our workforce, etc. These endeavors will doubtlessly be facilitated by the development of industrial quality control systems which will play a vital role in the nation's industry. The Total Quality Control System is to be carried out and implemented by all persons ranging from top managers down to factory workers, from the time a new product is introduced, to and throughout the time it is marketed from any of our industrial bodies. This is Korea's fundamental position; it is our quality control policy. I recognize that the present export inspection system is not yet sufficient to respond adequately to the planned expansion of the Korean economy and its role in the world export market.

2. Function of the Industrial Advancement Administration (IAA)

Since the ultimate aim of export inspection is not merely the rejection of products with defects by inspection, the basic policy for export inspection of IAA is to recommend to export manufacturers the adoption of the T.Q.C. system for their managerial system. To supplement this policy, IAA is endeavoring to establish a nationwide infrastructure for quality control of industrial products.

One of the prominent elements of this infrastructure is the Korea Standard Research Institute (KSRI), which is in process of establishment. The KSRI project will be financed by a USAID loan which amounts to U.S. $5 million coupled with counterpart Korean funds valued at about U.S. $8 million. The function of this new Institute is to maintain the national physical standards and do research in the field of metrology, educate and train weights and measures specialists, and extend calibration services to industry for quality control.

3. Nationwide Campaign for Quality Control

IAA is presently conducting a nationwide quality control campaign to improve quality control of industrial products, increase industrial productivity, and advance industrial competitiveness. The scope of this campaign ranges from the creation of the right atmosphere for the promotion of a quality control awareness among industries to the practical adoption of the total quality control system suited to all industrial organizations. For the success of this campaign, the concept of quality control has been widely publicized through mass media, including TV, radio, and newspapers. Manuals and other printed materials are distributed and general meetings of licensed quality control specialists are held to activate the proper role of professionals.

The Korea Standards Association is given the task of carrying out educational and training courses for top managers, middle managers, and factory workers numbering about 2500 in this year. Prominent foreign quality control experts are invited to hold seminars and deliver speeches throughout the nation. The national quality control conference will be held during the latter part of this year to evaluate and re-assess our quality control campaign.

To perform the leading role in the campaign, about 500 state-run and private companies are designated model QC organizations by the Government. These companies are to adopt voluntarily the total quality control system. Fortunately, the initial stage of the QC campaign has been warmly received. Industrial companies, traders' and manufacturers' organizations, and various economic and financial establishments have favorably responded.

If we, in this stage of our developing economy, are provided with international understanding and co-operation, our campaign for quality control will be accelerated and achieve earlier and more concrete results. It is in this spirit that we are enthusiastic participants in this Seminar.

Dr. Probine:

Thank you very much indeed, Dr. Choi, for a very interesting paper. It brought up and emphasized some points that have been made by Professor Stephens. One of the interesting points that come out clearly was the difference between voluntary and compulsory standards. Dr. Stephens referred to this distinction earlier. I notice that, at least for some products, Korea has compulsory standards; but it is also encouraging the use of total quality control in other areas. However, even within the area where Korea has compulsory standards, there is some flexibility in the way in which these are employed, depending on the competence of the company to police its own products. There were also some very interesting points raised about licensing quality control inspectors, and also training top managers in quality control in order to get the importance of quality control understood throughout industry. However, with those few remarks, I think we will stick to the arrangement of having the discussion after the paper by Mr. Ranoa of the Philippines. Mr. Ranoa.

TESTING AND CERTIFICATION OF PHILIPPINE EXPORT PRODUCTS

Mr. Vidalito F. Ranoa
Officer-in-Charge
Philippines Bureau of Standards
Republic of the Philippines

My presentation will be very brief. Every time Steffen asks me to make a presentation, he always emphasizes to make it brief. This afternoon I will talk on procedures of testing and certification of export products which pertains to the Philippines Bureau of Standards only. We have other government agencies that also conduct testing and which also certify certain export commodities. The assurance of the quality of Philippine export products is one of the major aims of the Philippines Bureau of Standards. This responsibility is provided for by law, specifically Republic Act 4109, which, among other provisions, stipulates that no customs entry, declaration, release certificate, manifest, clearance, import entry, import permit, or permit to ship abroad and/or discharge shall be issued for any of the specified products and/or imported commodities unless they are first inspected. No product of the Philippines for which a standard has been established and promulgated by virtue of this Act shall be sold or disposed of in any manner or exported unless its standard shall have been certified by the Director of Standards or his duly authorized representative as conforming to the standard set, either for local distribution or for export. In order to carry out this function effectively, the Bureau maintains inspection units in all ports of entry and exit in the country.

Considering that the Philippines exports a variety of agricultural, forest, fish, mineral and industrial products and that these are produced by industries ranging from small enterprises without a good quality control system to giant conglomerates and multi-national industries whose operations and control systems are highly sophisticated, the use of different inspection schemes, each of which is designed to suit a particular export commodity, has to be adopted.

1. Pre-shipment product inspection:

Under this system, a commodity projected for export is presented for inspection at least five days before the probable loading date. An ocular inspection of the lots is made, after which random sampling follows. The composite sample drawn is tested in a reputable laboratory duly commissioned by the Bureau for conformance with the relevant Philippine Standard in the case of standardized commodities, or against company standards or buyer specifications for unstandardized products. If the lot under inspection is a standardized commodity and the sample meets the established quality specifications, a certificate of inspection and standard is issued.

For unstandardized products passing buyer specifications, the information to that effect is stamped on the shipping documents.

Should the lot under inspection fail to pass the requisite test, a letter of desistance from disposing of said lot in any manner is given to the exporter. An inventory of the lot is made. This commodity is then disposed of in the local market under the supervision of the Philippines Bureau of Standards for purposes other than that for which it was manufactured.

For example, the rejected lot of steel reinforcement bars may not be allowed for use as such, but may be disposed of as raw material for fabrication.

2. Philippine Standard Certification Mark Scheme:

Under this scheme of certification, a manufacturer/exporter, if he so qualifies, is issued a license to use the Philippine Standard Certification Mark. This is pursuant to Executive Order No. 101 of the President of the Philippines which reads in part:

> "Whereas, the Bureau of Standards, created for the setting of standards of Philippine commodities finds it more practicable to leave the technique and know-how of production to the producers/manufacturers, subject to a well-defined inspection, quality control and marking of goods with standards certification mark established by the Bureau;"

and

> "Whereas, such marking of standardized goods or commodities will serve as a guarantee that such goods or commodities conform to established standards, ...".

Under this scheme, a manufacturer who desires to use the standard mark must ascertain that his product meets the quality specifications of the Bureau. His manufacturing process and quality control systems are placed under inspection by the Bureau. Testing facilities are checked for adequacy at the different levels of control during production.

The testing and inspection scheme of the manufactuer is evaluated to determine if he is capable of producting goods under controlled conditions and has capacity to maintain and implement his testing and inspection scheme in the production chain. Samples are drawn as these come out of the production line. These are then tested in reputable laboratories for conformance with established standards.

Manufacturers qualified under this system are licensed to use the Philippine Standard Certification Mark on their products. Such mark serves as a guarantee that the product conforms with the relevant Philippine Standard since the license to use it was based on a rigid in-plant inspection of the manufacturer's plant facilities, process and quality control systems. Spot inspection of the licensee's premises is made from time to time as an additional safeguard for the quality of the products produced. Oftentimes, the Philippines Bureau of Standards conducts market sampling to see to it that relevant standards are complied with.

3. The Commodity Clearance Certificate:

Another mode of inspection adopted and implemented by the Bureau is the Commodity Clearance Certificate. This document, when presented by a manufactuer/exporter to our export units at any port of loading in the Philippines, serves as a permit to load and as a certification that the commodity which is covered by such clearance but which is not yet under government commodity standardization, was manufactured according to company standards or to buyer specifications as described in the shipping documents. This is in pursuance to Executive Order No. 286 of the President of the Philippines which was issued with the end in view of simplifying our export procedure. Towards this end, the Bureau devised an inspection scheme, the Semestral Commodity Clearance, which is based on in-plant inspection of companies (registered with the Board of Investments) with adequate testing facilities, and quality control and inspection schemes which guarantee the production of quality goods. The qualifications for the issuance of this clearance similar to those required for the grant of the license to use the Certification Mark, and similar spot inspections of plant facilities are made from time to time.

Mr. Andrus:

I have two questions, both of them directed to Dr. Stephens. The first has to do with the terminology. I have become increasingly concerned, in the last 48 hours, over the term "specification" which seems to be used predominately rather than the term "standard". The definition which Professor Stephens had on the board is rather a classical definition of a standard. I would like to ask Dr. Stephens if he might define for us his differentiation between a standard and a specification.

Prof. Stephens:

I suppose I might, in a very simple sense, say a standard is a set of specifications.

Mr. Andrus:

I have a second question. I think this is a very good response. However, there has been a great deal of discussion for the past few years on trying to differentiate between these two and what I'll do when I return to Washington is send you a set of NBS definitions which tries to differentiate between a standard and a specification by indicating that a standard has broad application and is established by some kind of an authority whereas a specification is of limited application and is used primarily for procurement or for manufacturing processes. That is the point that bothered me and I hope there is not the confusion in other' minds that there is in mine.

The second point that I would like to ask is this. Your last view graph showed the manufacturer, the manufactuer's testing facility, the certification agency and a third party testing facility, all encompassed in a confidential barrier. My concern is the credibility of such a system, the confidential arrangement. I might say that my concept is that the certification agency should not be within that barrier. There may be a confidential arrangement between the testing facility and the manufacturer during the course of the testing and changes to the product to make the product conform, but at some point in time that confidential barrier has to be broken by recording the results of the tests as a basis for certification. Did I misunderstand the meaning of this confidential barrier or was what I just related within the concept of what you were considering?

Prof. Stephens:

To explain this clearly would require tracing a little bit of the history and of the nature of the testing facilities and the relationship of TISI as the certifying body to the testing laboratories but, very simply, TISI, as a certifying body, as you indicate, must have that information. Therefore, if it is on the outside, then the confidential barrier must be violated to give it to them. If they're on the inside, then there is no necessity to violate that barrier in the sense that TISI, as a certifying body, or we could just speak of certifying bodies in general, should have the integrity to maintain the confidentiality of test results. The important thing is that they have got to have detailed test reports of the quality of the products that they submit for tests, so that a proper evaluation of certification can be made. In fact, one of the reasons why that diagram came into existence is the fact that there was considerable difficulty with certain laboratories in turning back results. In fact, TISI would go out to the factory, do the inspections, bring back the samples, submit them to the test laboratory, and then after some time for the testing, get back a report that said something like "Pass - Fail...this one passed, this one failed" and that's all....that's all the information they would get. And, especially in the case of a number of failures where there has been some doubt as to whether the product, in fact, can be ligitimately certified, depending upon the degree of that failure, TISI was in absolutely no position to make any evaluation. So it was necessary for us to go through quite an educational process for the personnel in some laboratories to make it clear to them that TISI had to have detailed information on test results. And, in fact, a number of memoranda, the memoranda that I read in connection with various products, show that when I did, in fact, get into some of these test laboratories and get detailed results I found things like miscalculations, for example, a strength test on asbestos cement sheets where they measure thickness and width and then breaking load, and then throw it into a formula for actually computing the stress. Many times I found that even the calculations of the breaking stress were in error. And, there were all kinds of problems associated with not performing the test correctly, even a problem with orientation of the piece in the test device. So, that diagram was created to emphasize the fact that there had to be a very good relationship between the factory, between the certifying body and the independent testing laboratory. And, of course, the factory is an integral and important part of this whole problem, too, because those results need to be fed back to the factory since they need to have an opportunity to defend their case. Another point that I'll make in some of the detailed discussion of that diagram, is that everybody benefits from that flow. The factory can learn from the test laboratory. The test laboratory can learn from the factory. Because in many instances the factory is at a much more advanced level - much better equipped - than the test laboratory. And the test laboratory can learn a lot from the factory.

Mr. Andrus:

I think that Professor Stephens and I are probably really not that far apart on concepts here. But I think I can discuss this better later this evening.

Prof. Ermer:

At the risk of saying that one professor helps another to keep on talking, two questions, Ken. One, what was the training and maybe education of standard institute officers who went out and observed the test? Did they have the technical training to discern what was taking place? The related question is, is Thailand able to attract technically qualified people to the institute to do this, who have the background to observe tests and to look at the results?

Dr. Probine:

Professor Stephens, I wonder if you could be fairly brief on that reply because we're running short of time.

Prof. Stephens:

Well, the answer is yes and no. They have some and they don't have enough.

Dr. Probine:

That was a brief reply! Thank you. I'm sorry that I will now have to close the session because time has run out.

CERTIFICATION MARK AND EXPORT INSPECTION IN INDIA

Mr. A. B. Rao
Deputy Director General
Indian Standards Institution
India

At the national level in India, certification can be said to be done mainly by the Indian Standards Institution and the Agricultural Marketing Adviser of the Government of India, both in clearly demarcated areas. Some States, through their departments of industry, have quality marks of their own in the fields in which the States specialize.

Export inspection of materials and products is controlled by the Government of India.

The relationship between certification by the Standards Institution and export inspection by the Government is discussed in this paper.

The Indian Standards Institution, (ISI) since its inception in the year 1947, planned to have industrial standardization under its orbit, with emphasis on the voluntary nature of adoption of standards, certification of products conforming to standards which again is optional for the manufacturer to adopt, and testing applicable to both the activities. The voluntary character of standards and choice of certification mark is in accordance with accepted principles of the International Organization for Standardization (ISO) and also in tune with the activities of a number of sister organizations in many countries. A manufacturer in India chooses the ISI certification on his own volition but once he comes under this scheme he will be under obligation to the Indian Standards Institution (Certification Marks) Act of 1952. The Certification Marks Act confers a lot of important duties and responsibilities on the Institution, such as establishment of standards, recognition of standards from other bodies and countries, prescribing the Standard Mark and its application, granting renewal, suspension and cancellation of a license to use the Mark, inspection procedures by the manufacturer and the Institution, and recognition of laboratories, etc. The Act also prescribes the duties of the inspector, actions in case of improper use of the Mark, penalties for offences, appeals and related items.

When a manufacturer voluntarily applies for the certification mark on an available Indian Standard the ISI arranges to inspect the factory in order to ascertain the capability of the manufacturer to produce the particular product and from this and the evidence available from the manufacturer a preliminary assessment is made. To check on the

required quality the product is tested in the laboratory of the Institution or in other well established and recognized laboratories. This and other actions satisfying the Institution of the ability of the manufacturer to produce and, more important, to maintain the quality, enables the manufacturer to obtain a license to use the Mark. He uses the Mark under a scheme of testing and inspection provided by the Institution and keeps a record of the quantity produced, inspection and testing data, rejections and their disposal etc., under the aegis and overall control of the ISI. The ISI maintains a supervisory control with several inspections, testing samples from production as well as the market. By and large, the Certification Scheme underlines a great trust that the manufacturers enjoy while coming under the orbit of the law and supervision of the Institution.

For purposes of inspection, the Institution has a large number of inspectors qualified in all fields of engineering and science. The inspections are controlled by regional and branch offices situated throughout the country. Activities of the inspectors are strengthened by a well equipped central laboratory and smaller versions of it in regional offices. In addition, the Institution depends for its voluminous testing on more than 100 laboratories which have been recognized both on account of their own standing as well as for recognition of competence for the job. Certain measuring tools are also available to inspectors going for inspection and surprise checks, and under some limitations they use the facilities available with the manufacturers also.

Over 4,000 licenses have so far been granted for the ISI Certification Mark covering a wide range of products amounting to about 700 different articles. The Scheme can be said to be very fair in operation.

The Government of India has made the ISI Mark compulsory for some exports. Pure aluminum utensils and plywood tea-chest are examples of compulsory certification for the purposes of export. Other marked goods are also exported. Particular mention may be made of jute goods, cables and food items. For internal use also the mark has been compulsory in the fields of LPG cylinders, food colors and similar safety areas.

For sound export trade, the quality pronouncements of the ISI Mark, the Agricultural Marketing Department's Mark (AGMARK), the Quality (Q) Mark of various States no doubt provide a strong basis of quality but to regulate the numerous exports of the country the Government of India enacted a law, the Export (Quality Control and Inspection) Act of 1963. Under this Act an Export Inspection Council was appointed under the Ministry of Commerce with well dispersed Directorates of Inspection and Quality Control at all points of export. Under the

Act, the Government, from time to time, notifies producers and manufacturers of the commodities which would be subjected to quality control and inspection, specifies the type of quality control and the applicable standards and also recognizes other inspection agencies, approves test houses and laboratories to help inspections and establishes an export inspection mark.

The export inspection covers a lot of commodities including food items like shrimps, bananas, etc. The Council, no doubt, recognizes the certification marks, especially the Standard Mark of ISI and the AGMARK for export purposes but it has developed its own inspection procedures and expertise. Cooperation with the existing certifying departments provided ample liaison and also helped development of facilities and personnel of the Council. The Council, besides having its own testing facilities, recognized a number of laboratories for tests and inspection agencies like the ISI for augmenting export inspection.

In this seminar with limitation of time, presentation of more details, perhaps, would be out of place. Clarifications needed can always be requested and our Government would be very willing to share information and offer facilities for study of its schemes. Our Government would also welcome any views which would contribute to improved quality of exported goods and certification that is relied upon for exports.

* * * * * * *

Brief but enthusiastic closing statements, especially by the Seminar President, Dr. Lee Kum Tatt, and other formalities concluded the SISIR/NBS/AID Seminar.

QUALITY CERTIFICATION IN DEVELOPING COUNTRIES

Mr. Raul Estrada
General Director
Instituto Ecuatoriano de Normalizacion
Quito, Ecuador

I. The Quantity and the Quality in the Economy

An old saying that "the poor man wants more and the rich man the best", applies also to countries. In the countries that are more developed and prosperous, the markets are very critical with respect to the quality of products, while in poor countries, which are underdeveloped, the price market rules. This last fact is highly restrictive to the general development of the economy and particularly of industry. Competition among producers, in a market sensitive only to quantity and price, results in a continuous degradation of quality and becomes a serious impediment to improving it.

This situation contributes also to widening of the disparity between the poor and the rich, because the wealthy have always greater means for obtaining quality products which they want (either in the internal market or by importation) while the person with small resources does not obtain the necessary advantage from the products that he buys. He spends more in replacements or adaptations and becomes poorer and poorer.

Consequently, AN APPROACH TO A PRACTICAL LEVEL OF QUALITY IS A SOCIAL necessity.

II. The Relativity of the Quality Concept

Contrary to the concepts of many, quality is external to the product. In its true sense, quality is the degree to which that product satisfies the necessities of the consumer, in other words, it is its FITNESS FOR USE. Consequently, quality depends upon the user whose necessities are circumscribed among certain social, economic, and political aspects. These necessities are not static; they change according to the evolution of the person and the society. The concept that the user has about quality depends not only upon the fitness for the use of the product, but also, upon the value that the monetary unit has for his economy or his capacity for buying, and upon the related advantages that are derived from his own analysis of the alternatives. Many times, the capacity of the consumer to make judgments and decisions is influenced by the level of his education and his understanding of how the characteristics of the product may satisfy his necessities. Rarely the consumer, especially in developing countries, is in a position to judge adequately the

characteristics of a product. He is strongly influenced, many times, by fraudulent advertising, or by discovery of imitations, or by confused analysis of his necessities.

III. The Circuit of Quality

The quality of a product should be expressed in terms of all the necessities of the consumer that can be recognized; this quality can be formulated in engineering terms and then, during the production process, built into the product with the intention of satisfying those necessities. For this reason, the product is necessarily the result of a series of decisions which can be visualized as being in the shape of a closed circuit. As, however, we are dealing with an evolutionary process, a spiral shape is a better representation.

The primary BASIC DECISIONS are made in relation to the market sector whose needs the product tries to satisfy; then they have to be formulated in coherent qualitative and quantitative terms, that require a great number of FUNCTIONAL AND DESIGN DECISIONS that result in the DEVELOPMENT OF THE PRODUCT.

In the PRODUCTION PHASE, MORE DECISIONS ARE TAKEN. These decisions are related mainly to the economy of the production techniques that will be utilized for the fabrication of the product. Costs have to permit entry of the product into and competing in the market during certain times. Prices also have to guarantee returns for the investment.

The sale of the finished product also requires DECISIONS RELATED TO DISTRIBUTION, which, if they are correctly made, will allow the product to reach the consumer for whom the product was designed in adequate quantities with opportunity, and from a sufficient number of outlets. Any failure in the distribution system may affect the quality of the product, whether it is by deterioration or through misuse if the product goes to a different kind of consumer or to a consumer who uses it in a different way from that for which it was designed. The product then will not have "FITNESS FOR USE", it will invite claims and require replacements, and its sale may even stop with consequent loss to productive efforts.

A satisfied consumer generates good DECISIONS OF SERVICE after selling. These relate not only to teaching the consumer the correct use of the product, so that he does not reduce its quality, but also to providing for the fact that no system of economic quality control can avoid the occurrence of an occasional defective product passing through all controls and reaching the consumer. A policy of quick replacement and attention to claims is, consequently, part of the circuit of quality.

IV. The Quality "Dilution"

During the manufacture of a product and in all steps of the circuit of quality, there occurs a "dilution" of the original good intentions. Many times the aim to satisfy specific necessities of a defined sector of the market is lost because the MINIMUM SCALE OF PRODUCTION and economic factors demand a large production that consequently has to reach a wider sector of the market. The definition of the parameters of quality of the product are diluted by the necessity to adapt to a group of consumers and necessities that are very changeable and subject to extraneous influences that are difficult to identify. Good decisions for distribution are confronted by established systems, difficult to change, and lacking the versatility required for modern large-scale distribution. Lastly, good service policies are penalized by limitations of education, experience, and initiative of the user who can spoil the final quality of a product. All these circumstances point to the necessity for the enterprise to be aware that quality is not entirely internal to production but depends largely on external factors, which depend mostly on the consumer.

V. The Moment of the Purchase Decision

The modern consumer faces greater difficulties than before in making the final decison on which product to buy. He has to decide between many alternate products that appear to have the same FITNESS FOR USE, but entail properties, intrinsic value, declared characteristics, and advantages that are difficult to evaluate.

The considerations of a consumer, even though many times intuitive, refer always to his individual judgment and measurement of the products' characteristics, properties, and advantages, without having at his disposal in many cases technical standards that were used for its fabrication. The standards can provide a description in qualitative and quantitative terms, objectively, that will give all the necessary elements for a good comparison. Without having more appropriate means for measurement than his unassisted senses, he has to judge the APPEARANCE, or to believe in the advertisement, the prestige of a trademark, or to the monetary value that he assigns to the product in relation to that of the currency, a judgment that is influenced by his earnings, social position, education, etc. The consumers' decision often is not right. And this situation is extremely important not only because it can affect adversely good trade of a quality product, weakening the finances of the producers' enterprise, but also because in macroeconomic terms a product that does not yield FITNESS FOR USE to its consumers represents a loss to the general economy of the country, because it means a waste of always limited resources.

VI. Quality Certification Comes to the Scene

Quality certification, made by a responsible organization (standardization body) is introduced to give to the consumer the technical help that he needs for making a sure judgment about the quality of a product. The certification assures that the product satisfies the minimum requirements that were established in the relevant technical standard that was used for its design and fabrication. This standard at the same time is the result of thorough, objective, and scientific analysis of the parameters that assure at least the fitness for use of the product. The fact that the certification comes from an independent, in many cases "official" organization, without compromises with the producer, assures that the consumer can trust the certification as the best means for obtaining confidence in judgments relative to the intrinsic properties, declared characteristics, advantages, and the value of the product. Only the second part of the judgment remains for the purchaser to make and that is to balance these values with his particular monetary purchasing power. The consumer decides if the value which the currency has for him, which depends on his own judgment, balances the cost. In any event, the decision of the consumer has been helped because he can relate the price of the product with its properties, characteristics, value, and benefit in rational terms that separate facts from illusions of advertisement.

VII. Difficulties in Quality Certification

Quality certification systems, operated by public or private organizations not directly related to the manufacturers, are largely based on an analysis of the finished products with the aim of establishing whether they stand up to the requirements of technical standards. These systems work satisfactorily in highly industrialized countries where factories have their own highly developed quality control systems based on their own laboratories where tests and research can be carried out. Another related factor is that, in such countries, the market is quality oriented and highly competitive. In developing countries, however, these conditions generally are lacking. Quality control methods are often inadequate. Available scientific and technical infrastructure is usually insufficient to provide the necessary technical aid. Besides, such countries are facing markets oriented towards quantity and price rather than quality criteria.

Therefore, the application in underdeveloped countries of conventional certification systems, based on an analysis of the finished product, either does not work or, at the best, is effective only for a small part of industrial output without any real significance for the general economy.

In Ecuador, a different system has been in use since 1974, based on certification of the industrial output, i.e., a type of auditing system of the manufacturer's quality control system. This auditing is the task of the Ecuadorian Institute of Standardization (INEN), under which the Institute signs a contract with the manufacturer. In it, an INTEGRATED QUALITY CONTROL SYSTEM is specified. The manufacturer takes part in the decision making and execution of the control in all stages of production. Inspection methods as well as information analysis are decided. External (official) laboratories carry out independent analysis. Independent inspections and other suitable practices are established.

Such a system offers several advantages. It supplements the manufacturer's technical capabilities in quality control. It provides additional means of analysis and assurance, periodic calibration of measuring instruments in the government metrology laboratories attached to INEN, a service of Standard Reference Materials. Training is made available for personnel. Technical consultation is provided and, perhaps even more importantly, the means of ascertaining consumers' requirements is given. The system also has the inherent capability of establishing or modifying the parameters of technical standards (norms) in question, using the services of INEN in order to reach a carefully considered agreement of all sectors involved (producers, consumers, and general interests). However, it must not be forgotten that the technical norm, for the time it is in force, must give assurance to investors, in the sense that, at least for a certain time, the parameters of the norms will not be capriciously or suddenly modified, and that, therefore, the characteristics of design will not have to be changed (especially as far as machinery, materials, and production methods are concerned). Good management of norm development and revision thus provides a guarantee that capital equipment can be reasonably amortized. The manufacturer is given an assurance that a good economy will prevail.

VIII. Effects of Economics on Quality Control and Its Certification

Developing countries always face very difficult decisions in the choosing of technological alternatives which are the most appropriate for their development. On some occasions, when highly sophisticated technology is used, this choice may cause distortions of the economic and social environment, causing political serfdom. It may even increase the degree of dependency on foreign industry, when the home environment offers only an unsatisfactory scientific and technical infrastructure.

Other alternatives, based on obsolete or old-fashioned techniques, must be rejected because they lead to low efficiency in production and a product quality which does not satisfy the requirements of present day consumers who are greatly influenced by products imported from

highly industrialized countries. With regard to this kind of conflicts, my concept of "MODERN TECHNOLOGY" means a technology which has to satisfy the PRESENT NEEDS of the consumer.

Standardization must transform these needs into concrete (qualitative as well as quantitative ones) requirements demanded of the product. Industry has to satisfy these needs, producing items by efficient use of production equipment available in a given country. Technology must be chosen according to availability of the elements of the microeconomics (material, manpower, methods, and raw material), as well as to adequacy in terms of the macroeconomics (social and political factors).

Quality Certification can contribute to guarantee a market, and to establish the necessary vertical and horizontal interdependencies on material used as well as on other unfinished and finished products. Thus, social and economic conflicts can be avoided to a large extent. At the same time, help is given to the process of creating a pyramidal industrial structure. Foreign dependence is reduced through domestic rationalization of commerce and industry.

Analyzed in this way, the technological problem loses many of its rigidities and adapts in a better way to evolution of a man's education, economic, political, and social. This analysis also provides a place in decision making processes where necessary importance can be given to the improvement of the QUALITY OF LIFE.

PRE-EXPORT QUALITY CONTROL SCHEME FOR CRUMB RUBBER: PILOT PROJECT AND EXPERIENCE OF INDONESIA

Mr. Sumantri
Deputy Chairman for Technology
Indonesian Institute of Sciences
Jakarta, Indonesia

It is my great privilege to be accorded this opportunity of participating in this SISIR/NBS/AID Regional Seminar on "Testing and Certification for Export Products" in Singapore. I would like to take this occasion to express my sincerest thanks and gratitude to the U.S. National Bureau of Standards and the U.S. Agency for International Development for inviting me to this Seminar, and to SISIR for the hospitality accorded to me.

Allow me now to present a short note on my country's experience in the field of "Testing and Certification for Export Products", the topic of this Seminar. My country has been doing some experimentation in looking for a Pre-export Quality Control Scheme, best suited to our particular circumstances. The experimentation started in 1968 and the export commodity chosen for the experiment has been Crumb Rubber, bearing in mind that it is still one of our important foreign exchange earners and that quite a lot of our people find their living in rubber plantations and processing plants.

Various factors have to be considered in setting up the above mentioned Pre-export Quality Control Scheme, such as:

a. Rubber plantations and crumb rubber factories in Indonesia are located in different areas at great distances from one another.

b. Shipment of crumb rubber for export is done from a great number of harbors at distant locations from one another.

c. Good transportation and communication facilities are not always available.

d. Test facilities are still very limited, in terms of the equipment, manpower, the number of testing institutes, and the number of sampling inspectors.

In view of these factors under my country's Pre-export Quality Control Scheme for Crumb Rubber, much is left to the discretion and integrity of all those working in the production units. The Government function

is just to inspect to see that everything is running properly. The surveillance could be lessened or tightened as deemed necessary.

Before the scheme could work satisfactorily, a number of preconditions had to be met, such as:

a. Old crumb rubber factories were upgraded or modernized and a number of new factories established. The total number of factories is now about 80, producing around 400,000 tons SIR (Standard Indonesian Rubber) a year, or about 50% of our country's annual production.

b. Old test laboratories were upgraded or modernized and a number of new test laboratories established. The total number of laboratories is now 11, of which 9 act as commercial test laboratories, one is a so-called "standard laboratory" responsible for the periodic calibration of test equipment, and the remaining one is a so-called "control laboratory" which controls whether the testing done by the various commercial test laboratories is carried out properly and uniformly.

c. A campaign has been launched from the very beginning to improve the quality mindedness of all concerned.

d. Each crumb rubber factory is provided with a Process Control Laboratory.

My country's Pre-export Quality Control Scheme for SIR (Standard Indonesian Rubber) is very much streamlined, and is working as follows:

1. Every producer of SIR is registered and licensed by the "Working Committee for Crumb Rubber", which was appointed by the Indonesian Government in 1968 to establish a standard for technically specified natural rubber produced in Indonesia, and to set up a program for production, development, and marketing of the product.

2. Every producer of SIR is responsible for sending product samples to the nearest commercial test laboratory to obtain a quality certificate. A factory process control laboratory with good reputation may be licensed and authorized by the "Working Committee for Crumb Rubber" to issue a quality certificate, which has to be countersigned by a commercial testing laboratory. For this purpose the factory process control laboratory has to send a 10% sample of each lot to the

nearest commercial test laboratory for immediate cross check. Samples have to be taken according to prescribed procedures.

3. Export of a lot of SIR must be accompanied by a Quality Certificate issued or countersigned by an authorized commercial test laboratory.

Our experiment up to the present could be considered successful. Claims are fewer than one percent of the total number of consignments exported. Preparations are now being made to extend our Pre-export Quality Control Scheme to other export commodities.

SISIR/NBS/AID REGIONAL SEMINAR ON
"TESTING AND CERTIFICATION FOR EXPORT PRODUCTS IN INDUSTRIALIZING COUNTRIES"

May 19 - 20, 1975

LIST OF PARTICIPANTS

Name	Designation/Address
ANDRUS, William E.	Program Manager Office of Engineering and Information Processing Standards National Bureau of Standards Washington, D.C. 20234 U.S.A.
CHOI, Jong Wan (Dr.)	Administrator Industrial Advancement Administration Ministry of Commerce and Industry Yeong Deung Po Seoul REPUBLIC OF KOREA
ERMER, Donald (Prof.)	Associate Professor University of Wisconsin-Madison College of Engineering Mechanical Engineering 1513 University Avenue Madison, Wisconsin 53706 U.S.A.
HILSENRATH, Joseph	Physical Scientist Data Systems Design Group National Bureau of Standards Washington, D.C. 20234 U.S.A.
HOPPER, R.	UN Adviser Thai Industrial Standards Institute Ministry of Industry Rama VI Road Bangkok THAILAND

Name	Designation/Address
HUSSAIN, Khawaja Ammar	Director Central Testing Laboratories Pakistan Standards Institution Block 77 Karachi PAKISTAN
KIM, Zae Quan (Dr.)	Director General National Industrial Standards Research Institute Ministry of Commerce and Industry 199 Dong Sung-Dong Chong Ro-Ku Seoul REPUBLIC OF KOREA
LEE Kum Tatt (Dr.)	Chairman Singapore Institute of Standards and Industrial Research 179 River Valley Road Singapore 6 REPUBLIC OF SINGAPORE
NING, Werner Y. F. (Dr.)	Director National Bureau of Standards Ministry of Economic Affairs 61-1 Sung-Chiang Road Taipei, Taiwan 104 REPUBLIC OF CHINA
PATON, John	Technical Director Standards Association of Australia Standards House 80 Arthur Street North Sydney, NSW AUSTRALIA
PEISER, H. Steffen	Chief Office of International Relations National Bureau of Standards Washington, D. C. 20234 U.S.A.
PHANI Na Rangsi (Mrs.)	Senior Scientific Officer Thai Industrial Standards Institute Bangkok THAILAND

Name	Designation/Address
PROBINE, Merwyn (Dr.)	Director Physics & Engineering Laboratories Department of Scientific & Industrial Research Lower Hutt NEW ZEALAND
RANOA, Vidalito F.	Officer-in-Charge Bureau of Standards Department of Commerce & Industry P.O. Box 3719 Manila REPUBLIC OF PHILIPPINES
RAO, A.B.	Deputy Director General Indian Standards Institution "Manak Bhavan" 9 Bahadur Shah Zafar Marg New Delhi 1 INDIA
SOON, Freddy H. C.	Executive Secretary Singapore Institute of Standards and Industrial Research 179 River Valley Road Singapore 6 REPUBLIC OF SINGAPORE
STEPHENS, Kenneth S. (Prof.)	Head Adaptive Technology Group Industrial Development Division Georgia Institute of Technology Atlanta, Georgia U.S.A.
SUMANTRI	Deputy Chairman for Technology Indonesian Institute of Sciences Jl Teuku Tjhik Ditiro No 43 Jakarta INDONESIA
WEXLER, Arnold	Chief Humidity Section National Bureau of Standards Washington, D.C. 20234 U. S. A.

Name	Designation/address
WIJEWANTHA, Ronald T. (Dr.)	Director Bureau of Ceylon Standards 53 Dharmapala Mawatha Colombo 3 SRI LANKA
YEOW Chee Tiong	Deputy Director Singapore Institute of Standards and Industrial Research 179 River Valley Road Singapore 6 REPUBLIC OF SINGAPORE

COUNTRIES REPRESENTED

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Thailand
United States of America

PROCEEDINGS OF THE REGIONAL SEMINAR ON
"TESTING AND CERTIFICATION FOR EXPORT PRODUCTS IN INDUSTRIALIZING COUNTRIES"
19-20 May 1975, Singapore

Seminar President: Dr. Lee Kum Tatt

PROGRAM

Monday, May 19

9:00 a.m.	OPENING SESSION Welcoming Remarks by Mr. H. Steffen Peiser, Chief, Office of International Relations, NBS. Address by Mr. Henry A. Engelbrecht, Chief, Economic Commercial Section, US Embassy, Singapore. Welcome Address by Dr. Lee Kum Tatt, Chairman, SISIR.
9:30 a.m.	Reception
10:00 a.m.	INTRODUCTORY SESSION (Session I) (Chairman, Mr. Sumantri, Deputy Chairman for Technology, Indonesian Institute of Sciences, Indonesia). "Export Testing, Labeling and Certification - an Overview", Mr. W. E. Andrus, Program Manager, Office of Engineering and Information Processing Standards, NBS. "Testing and Certification for Export Products in the Republic of China", Dr. Werner Y. F. Ning, Director, National Bureau of Standards, Republic of China. "Pre-Export Testing and Certification in Sri Lanka", Dr. Ronald T. Wijewantha, Director, Bureau of Ceylon Standards, Sri Lanka.
2:15 p.m.	"Quality Control and Allied Program in Support of Economic Development and Industrialization - A briefing by Dr. Lee Kum Tatt, Chairman, SISIR, on the Institute's Program and Services. Tour of SISIR's facilities.
6:30 p.m.	Reception

Tuesday, May 20

9:00 a.m. SESSION ON METROLOGY AND TESTING (Session II)

(Chairman, Mr. K. S. Stephens, Head, Adaptive Technology Group, Industrial Development Division, Georgia Institute of Technology, Georgia).

"Development of a National Infrastructure of Support Services for Quality Control for Export" Dr. Merwyn Probine, Director, Department of Scientific and Industrial Research, New Zealand.

"Metrology Plan for Korean Industrial Development", Dr. Kim, Zae Quan, Director General, National Industrial Standards Research Institute, Korea.

"Can Data Collection and Analysis Reduce the Rejection of Exported Products" Mr. Joseph Hilsenrath, Physical Scientist, Data Systems Design Group, U.S. National Bureau of Standards.

"The Institution of a Worldwide Integrated System of Testing Facilities (WISTF)", (Lecture Notes), Mr. Felix von Ranke, Executive Secretary General, Brazilian Association of Technical Standards, Brazil Presented in the author's absence by Mr. H. Steffen Peiser).

2:00 p.m. SESSION ON PRODUCT MARKING AND CERTIFICATION (Session III)

(Chairman, Dr. Merwyn Probine, Director, Department of Scientific and Industrial Research, New Zealand)

"Thailand's Certification and Quality Marks Program" Professor Kenneth S. Stephens, Head, Adaptive Technology Group, Georgia Institute of Technology, U.S.A.

"Basic Export Inspection Policy in Korea" Dr. Choi, Jong Wan, Administrator, Industrial Advancement Administration, Korea.

"Testing and Certification of Philippine Export Products" Mr. Vidalito F. Ranoa, Officer-in-Charge, Bureau of Standards, Republic of Philippines.

"Certification Mark and Export Inspection in India", Mr. A. B. Rao, Deputy Director General, Indian Standards Institution, India.

4:15 p.m. CLOSING SESSION

Remarks by Mr. H. Steffen Peiser, Chief, Office of International Relations, NBS.

Concluding Remarks by Dr. Lee Kum Tatt, President of the Seminar.

7:30 p.m. Dr. Lee Kum Tatt, host at dinner

Visit to the Laboratories of the Singapore Institute of Standards and Industrial Research

In the afternoon of May 19 the Seminar participants were received at the laboratories of the Singapore Institute of Standards and Industrial Research (SISIR) by Dr. Lee Kum Tatt, Chairman of SISIR's Board of Management, and SISIR staff.

Enthusiastic personnel described impressive ongoing laboratory projects, their opportunities and problems. Before these laboratory tours Dr. Lee himself gave an overview of the SISIR organization and its aims. For inclusion in the proceedings, SISIR has kindly provided a brief write-up, which is reproduced here with minor changes and a very few omissions:

SINGAPORE INSTITUTE OF STANDARDS AND INDUSTRIAL RESEARCH (SISIR)
(Established by an act of Parliament, the SISIR Act 1973)

Origin and Genesis

Singapore's rapid industrialization program in the sixties brought about an increasing demand from industries for specialized technical services. The Singapore Institute of Standards and Industrial Research was formed in 1969 to help the Government provide this assistance to industries, especially those which formed the infrastructure of economic development.

SISIR's history dates back to 1963 when the Industrial Research Unit (IRU) was set up as an affiliated division of the Economic Development Board with technical assistance from the New Zealand Government under the Colombo Plan. Its aims then were to provide technical advice and services to industry. This involved mainly trouble-shooting and testing activities. In 1969 as industrial development entered a new phase, the IRU was re-organized into SISIR. The emphasis on the setting up of labor intensive industries to combat unemployment was then being replaced by a preference for capital intensive and more sophisticated types of industries. The Institute therefore embarked on a new program of activities based on standardization and quality control, testing, engineering and consultancy services to cater to the immediate needs of industry.

Today SISIR's role as a national standards-cum-technological institute encompasses a diversity of operations and a growing tendency towards greater involvement of science and technology with national economic and socio-economic priorities such as pollution, upgrading of technology and inculcation of a national quality consciousness.

SISIR became a fully autonomous body on October 1, 1973.

Aims and Objectives

SISIR's main objectives as defined in the SISIR Act include the following:

(a) To promote and undertake industrial research and upgrade local skills and technology in industry

(b) To promote standardization in industry and trade with a view to improving the quality of Singapore-made products as well as industrial efficiency and productivity

(c) To provide for schemes of quality control in order to promote and improve the export trade of Singapore

(d) To issue from time to time, national standards and codes of practice that may be required

(e) To provide engineering, testing, consultancy and other technical services as may be required by industry.

Organization

SISIR operates as an independent statutory body directly responsible to the Ministry of Finance. It is headed by a Chairman who manages SISIR with the advice and guidance of a Board of Management, a Finance Committee and an Establishment Committee.

SISIR's Chairman is Dr. Lee Kum Tatt who agreed to serve as President of this SISIR/NBS/AID Seminar and our principal host at the SISIR laboratories.

Activities

As SISIR exists to serve industry, the management believes in identifying the problems and needs of industry and gearing its resources to suit these needs.

To meet the increasing demands for applied research and technical services and to help upgrade the level of technology of industries, SISIR offers an integrated range of services which covers support for innovation, specialist service work, consultancy and applied research and development work as follows:

Consultancy: This includes advice to industry in the various fields as well as technical feasibility studies.

Research and Development: Research is not so much basic research as mission-oriented, involving product and process development and technical investigation work. Contract Research and Development is undertaken on a problem-solving basis and this is gradually assuming a more important role in SISIR's service to industry constituting 30-35% of the total workload. In carrying out these projects, the emphasis is on a multi-disciplinary approach whereby the technical resources from diverse fields are pooled together to tackle industrial problems. These services are backed by a team of about 250 engineers, graduates, technical and supporting staff and extensive scientific and engineering laboratories and workshops.

Specialist Service Work: Analysis, testing, calibration, hazardous waste control, product design, quality control and plant and process investigations.

Support for Innovation: Co-operation with industry or other organizations in the development of new products, pilot plant or prototype development.

SISIR's areas of operations have expanded considerably from the more routine testing, engineering and calibration services, standardization, quality control and technical information, to the more innovative fields such as Instrumentation, Non-destructive Testing, Environmental Control, Food and Microbiology, and Industrial Design.

Administratively, these activities have been organized under the following Technical Divisions:

(1) Engineering Services
(2) Scientific Services
(3) Standards and Extension Services

with the Secretariat forming a separate division providing administrative supporting services. The Engineering and Scientific Services Divisions provide a combination of both testing and Research and Development services, while at the same time they provide the supporting facilities for various quality control schemes organized by SISIR.

Engineering Services

This group of services are provided by four specialized sections, namely:

(a) Mechanical/Civil Engineering: The Section concerned conducts tests and inspections on engineering and building materials such as hollow blocks, cement, concrete, pipes and metals. It also offers calibration facilities.

(b) Air Pollution: With the passing of the Clean Air Act in 1971 to keep check on industrial air pollution in Singapore, air pollution services have assumed a new importance. Air pollution has become a national problem and SISIR assists in the abatement of such pollution problems through provision of consultancy services to industries. Some of the interesting projects include dust pollution control at granite quarries which involve designing of suitable control systems and equipment.

(c) Electrical Engineering: The Section concerned offers a comprehensive range of testing facilities for electrical products such as ballasts, cables, fluorescent lamps, ceiling fans, refrigerators. Besides providing testing and inspection services to industries through SISIR's various Quality Certification Schemes, it also undertakes the repair, calibration and maintenance of instruments.

(d) Instrumentation: Instrumentation Service is an area established in 1973 to provide consultancy to industries in the field of instrumentation technology, and to undertake special development projects. SISIR helps to calibrate and maintain equipment for industries. It also develops and constructs custom-made equipment for industries and government, including schools. A Batch Production Unit has been set up to undertake the construction of such equipment. Special services involving instrumentation for the oil and oil exploration industries are also available.

Scientific Services

(a) Chemical Technology: Services provided range from technical advice to industries on improvement of processes, quality evaluation and miscellaneous analyses of various products such as asphalt premix, ores, cement, floor tiles and vitreous china sanitary ware, to testing of products under the Government's Pioneer Status and Control of Manufacture Schemes.

A special Paints Laboratory conducts the testing of all types of paints, mainly emulsion, enamel and cement wall paint, including studies on their durability and their resistance towards attack by micro-organisms under different conditions.

The prevention of algae growth in buildings is one example of the projects undertaken.

A Rubber Testing Laboratory has also been set up with facilities for the testing of rubber as well as to serve the needs of the rubber and plastic industries of Singapore.

(b) Food and Industrial Microbiology: Besides rendering consultancy services and conducting quality control and regular testing of foodstuffs for firms under SISIR's Certification and Marking Schemes, the Section undertakes research into food technology involving the development of new products and processes as well as in industrial microbiology.

With the aid of a Mobile Training Laboratory, the Section is able to extend its services to the various food establishments in Singapore and familiarize them with modern canning and other processing techniques.

(c) Materials Science and Non-destructive Testing: This Section offers services in the fields of acoustics and vibration, non-destructive testing and radioisotopes applications, besides the testing of textiles, helmets, footwear and other products. Among these services, NDT is a high priority area that is being further developed by SISIR to meet the increasing demand from the shipbuilding and repairing and building construction industries. Projects include inspection of pipe lines and welds for shipbuilding industries.

(d) Environmental Pollution (Water) and Trouble Shooting: To help industries reduce and control pollution, SISIR conducts investigations into problems of industrial effluent management and helps devise ways and means to combat this problem. The development work involves the design of plants and processes for the treatment and disposal of industrial effluents and trade wastes and the recovery or reutilization of process materials.

Standardization and Extension Services

Quality Control and Certification: While the Engineering and Scientific Services Divisions concentrate on providing technical and consultancy services to industry, SISIR is also simultaneously engaged in standardization and other promotional activities which complement the former. In helping government promote its manufacturing industries and the image of the Singapore-made product, it is imperative that SISIR upgrade the quality of locally made products to international level. Then only will local products be able to compete in quality and price with foreign goods. To achieve this, SISIR introduced its Quality Certification Scheme in 1969 followed by the Certification Marking Scheme in 1971. Under these Schemes, products which are found to meet with international standards will be awarded the SISIR Quality Certificate while products that conform to Singapore standards will be awarded a license to use the SISIR Mark.

The SISIR Mark serves as a third party assurance to consumers that the goods have been tested and found to conform to established standards. The Government on its part supports these Schemes by encouraging its departments and the people at large to buy products bearing the SISIR Mark.

Establishing a Liaison with Industry: To date a total of 115 firms are participating in the Quality Control Marking Scheme. While serving to promote quality consciousness among firms, these Schemes also provide a means through which SISIR engineers and scientists could learn of the problems of industries and thereby help provide remedial action. To further promote quality consciousness, SISIR also conducts training courses in quality control for both management and factory personnel in industry.

Recently, testing and inspection services have been extended to cover export inspection of products under the Canadian Standards Association (CSA) Scheme. SISIR has also launched a Good-Housekeeping Scheme to help maintain good sanitary conditions at food establishments and upgrade their technology. SISIR also has working arrangements with Arab, German, British, Japanese and Australian inspection authorities.

Standardization: Tied up with the above activities, Singapore Standards have also to be drawn up for testing of the products. In this again, SISIR obtains active participation and support from the Government, business and industrial sectors. Standards are drawn up by the various technical committees and industry standards committees for final approval by a Standards Council which comprises members from Government, the manufacturing sector and various professional bodies. A total of 126 standards have been published since 1969.

Promotion - PQR Campaign and related activities: SISIR is a service-oriented organization. Besides developing its technical services on the one hand, the management realized and decided that concurrently, promotional efforts must be stepped up to publicize SISIR and its increasing number of activities. SISIR set about dong this in many ways:

1. The PQR Campaign

   As the manufacturing and industrial sector constitutes the major portion of its market the promotional activities are chiefly aimed at helping them improve their products and making their management and workers more quality conscious. In conjunction with the Singapore Manufacturers' Association therefore, SISIR organized a year-long nation-wide Prosperity, Quality and Reliability (PQR) Campaign in 1973 to promote quality consciousness, project an image of quality and reliability in Singapore-made goods, inculcate in workers a sense of pride in their work as well as to upgrade skills and attract investment. Activities organized for this purpose included courses and seminars on quality control for senior and production personnel, Worker-of-the-Month Competition, issue of commemorative stamps and first

day covers depicting the PQR theme and advertising through TV and other mass media. Promotion of quality consciousness is a continuing activity of SISIR.

2. Publications

SISIR's quarterly bulletin - the Industrial News and Research (INR) - keeps members abreast of the latest technological developments in research and of SISIR's activities. This is supplemented by occasional write-ups on SISIR in the press.

3. Projecting the Institute's Image Abroad

To project its image abroad as well as to establish and maintain useful contacts with overseas institutions, senior personnel actively participate in relevant seminars and conferences, both regional and international.

Technical Information Service and Industrial Design: Other promotional and extension services include Technical Information Services and Industrial Design Services.

Technical Information: SISIR has an effective technical information network and is able to obtain relevant data through contacts with overseas organizations and provide an efficient Question and Answer Service to industries. It also has a computer which helps the section to store and retrieve the required information. A well-stocked library serves as the store-house of technical information to clients.

Industrial Design: The Industrial Design Section offers advice and services in Product Design and Packaging which are becoming increasingly important in enhancing the quality of products.

Staff

Experienced professional and technical staff constitute the vital resource in a technological institute like SISIR. SISIR today has a total workforce of about 250 professional engineers and scientists and technical supporting staff. Recognizing that expertise resides only in man, SISIR has a very active program for staff development. This involves the award of generous grants for research and of training fellowships to upgrade staff capabilities. There are also available schemes through which special staff could be taken in from time to time to augment local expertise in the new areas. This is usually done through bilateral agreements with foreign agencies.

Finance

SISIR has an annual operating budget of around $4 (Singapore) million ($(U.S.)1,782,531) for the financial year 1974/75. Government contracts constitute 42% of the overall operations while the remaining 58% covers the other services for industry and development operations.

SISIR is a non-profit making organization. Any excess revenue that may be earned however is channelled to the Reserve Fund which is utilized for research projects, staff development and further development of SISIR.

The measure of SISIR's success however does not rest solely on the amount of revenue earned. Rather, its strength lies in the capability of its highly trained experienced staff and in winning the confidence of industry through providing them with practical solutions to their problems. In this SISIR can be said to have done remarkably well. The total number of jobs handled for the public and private increased considerably both in number and in degree of sophistication.

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A regional seminar sponsored by the Singapore Institute of Standards and Industrial Research, the National Bureau of Standards, and the Agency for International Development was held in Singapore in May of 1975. The participants represented most of the countries in south Asia concerned with increasing their exports, and concentrated on various problems connected with the testing and certification of such exports. Most of the prepared papers reviewed the practice and future plans of these countries. During the discussion a number of specific problems and issues were raised, with a good deal of attention focused on the extent to which the standards and certification of goods by an exporting country can be and are recognized by the importer. This report includes both the prepared papers and a mildly edited version of the discussions following each.

17. KEY WORDS (*six to twelve entries; alphabetical order; capitalize only the first letter of the first key word unless a proper name; separated by semicolons*) Certification; developing countries; exports; industrializing countries; labeling; seminar; south Asia trade; testing.

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NOTE: At present the principal publication outlet for these data is the Journal of Physical and Chemical Reference Data (JPCRD) published quarterly for NBS by the American Chemical Society (ACS) and the American Institute of Physics (AIP). Subscriptions, reprints, and supplements available from ACS, 1155 Sixteenth St. N. W., Wash. D. C. 20056.

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Voluntary Product Standards—Developed under procedures published by the Department of Commerce in Part 10, Title 15, of the Code of Federal Regulations. The purpose of the standards is to establish nationally recognized requirements for products, and to provide all concerned interests with a basis for common understanding of the characteristics of the products. NBS administers this program as a supplement to the activities of the private sector standardizing organizations.

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