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THAI INDUSTRIAL STANDARDS INSTITUTE, PHASE II

DP/THA/72/027

THAILAND

23 NOV 1979

Technical report: Assistance in standards engineering\*

Prepared for the Government of Thailand by the  
United Nations Industrial Development Organization,  
executing agency for the United Nations Development Programme

Based on the work of Jan Jalewski, standards  
engineer

United Nations Industrial Development Organization  
Vienna

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Explanatory notes

The monetary unit in Thailand is the bath (B). During the period covered by the report the mean value of the bath in relation to the United Nations dollar was \$US 1 = B 20.15.

The following abbreviations are used in this report:

ASEAN	Association of South-East Asian Nations
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
PVC	Polyvinyl chloride
QCA	Quality Control Association
TC	Technical Committee
TISI	Thai Industrial Standards Institute
TSA	Thai Standards Organization

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1. SUMMARY

- 1.1 The Thai Industrial Standards Institute (TISI) has made continued progress in producing standards and certification works. Facts and figures confirm the accelerated development of standardization in Thailand. The total number of TISI's standards reached 360, total number of certifications issued 2583 (section 3.1, Table 1).
- 1.2 Further progress is being hampered by a deplorable lack of staff and inadequate test facilities. Both problems should be the subject of wide consideration and practical national effort to improve the situation (section 3.5 and 3.6).
- 1.3 The production of new and revised standards is now stabilizing at 50-70 per year. This means that at the end of this decade TISI will have published 500 standards. The target for Thailand in terms of standards should be about 2000 in 1990. It means that the output of standards must be at least doubled in the next years (section 5.1.1).
- 1.4 In order to attain these targets 100-150 figure for the year, it is advised :
  - to increase the staff in Standards Division from actual 59 to 100 at the end of this year.
  - to implement the new organization chart, with Standard Research Development Section and its own Laboratory (section 5.1.3 and 5.1.4) and with Translation Services (section 5.2.1).
  - to introduce the new TC procedure (section 5.2.2).
- 1.5 11 drafts have been analyzed and the comments and suggestions have been given to TC members. Many of these comments and suggestions have been accepted and introduced to the standards (section 5.3).
- 1.6 Current advisory service to TISI staff and TISI TC has been given about technical matters, draft translation. Where there was a query concerning technical clauses in foreign or international standards the expert has handled this type of correspondence (section 5.4).

- 1.7 The expert has participated in 10 meetings when principle questions were under study and when the comments and suggestions given by him were discussed (section 5.5).
- 1.8 In an internal training course lectures have been given concerning standardization in production processes, advantages of SI units, metrication and international standard organization (section 5.6).
- 1.9 12 bigger companies and a few medium size factories have been visited. The main purpose of these visits was to give the technical assistance in standardization at company level and in standards implementation. Such activities should be continued by TISI (section 5.7).
- 1.10 Project Proposal for the Improvement Quality Control of Tapioca Products in Thailand has been prepared and sent to the Leader of European Tapioca Expert Mission (section 6.1).
- 1.11 Equipment provided by UNDP/UNIDO during reporting period have been listed (section 6.2).
- 1.12 Fellowships awarded during 1978 and 1979 have been shown (section 6.3). It is suggested to increase the number of long term fellowship from 1 (21m/m) to 2 (42m/m).
- 1.13 It is advisable to train more frequently the TISI staff and others concerned in standardization through taking part in different standardization courses, international standards conferences practices at bigger industries (section 7.1).
- 1.14 In order to integrate all activities in Thailand concerned with standardization and provide a valuable forum for exchange of views on standards matter and to ensure closer co-operation between TISI and those using standards - it is suggested to set up a Thai Standards Association (section 6.5.2).
- 1.15 Proposal for creating Regional ASEAN Standards Committee has been made (section 6.5.3).

- 1.16 Calibration and repair services for instruments and gauges utilized in certification should be improved (section 7.4).
- 1.17 It is suggested to nominate the TISI as a national standardization body (section 7.5).
- 1.18 Recommendations and proposals for the work programme have been given (section 8).

#### Acknowledgements

The expert wishes to express his thanks to the TISI staff members for their excellent co-operation. It has been a great pleasure working together closely with staff of TISI.

Special thanks are due to Mr. Chaiwai Sangruji, Secretary General of TISI, Mrs. Phani Na Rangsi, Head of Standards Division and the expert's direct counterpart as well as to Miss Kanya Sinsakul, Head of Certification Division.

He wishes to express his thanks also to the Bangkok UNDP and Vienna UNIDO staff in the myriad details of administrative backup in support of technical activities and personal arrangements.



## 2. INTRODUCTION

The expert's job at Thai Industrial Standards Institute (TISI) started on 27 of August 1978. Mrs. Phani Na Rangsi, Head of Standards Division of TISI, was introduced by Project Manager to the expert as his counterpart. The expert was requested to concentrate his work entirely on preparation of standards. After departure of the Project Manager, Mr. R. Hopper, on 7th September 1978, the expert was also involved in project administration matters.

This report covers the period from 23 August 1978 to 22 August 1979, during one year assignment to TISI on UNDP/UNIDO post TIA/72/027/11-01 Standards Engineer.

Two semi-annual progress reports have been prepared on the project for this period giving details of the overall programme, staff budget, etc. This report will avoid repetition of these progress reports and more concentrate on the specific activities of the expert concerning standardization.

The last Final Report covering the period from March 1973 to September 1978, prepared by R. Hopper, contains many findings and recommendations still relevant and the expert's intention is also not to repeat them.

The purpose of the Project :

To assist the Government in establishing Thai Industrial Standards Institute as an official, effective and central Government body for preparation and publishing of standards and for certification of standardized products in order to facilitate further increase of quality of commodities, both locally produced and imported.

The Project up to now has two phases of development :

Phase I, covered a period from January 1970 to March 1973 and Phase II covering the period from March 1973 to December 1979.

### 3. GENERAL ACCOUNT OF THE PROJECT IMPLEMENTATION

The Thai Industrial Standards Institute (TISI) is a government body, established within Ministry of Industry under the Industrial Product Act, B.E. 2511 (1968). TISI became fully operational in the early seventies and since that time has made continued progress in producing standards and certification works. It is the major national standards body in Thailand with 142 actual staff and the only one empowered by law to control a voluntary and mandatory certification scheme. However, TISI by law is not the only standardization body in Thailand to publish the standard. At present there are at least 7 standardization bodies. The highly decentralized standardization system is confusing and not the most efficient.

#### 3.1 TISI's Progress

A summary of statistics by year from 1973 to 1979 on number of employees, standards, technical committees and quality certification is given in Table 1. This summarizes progress until today indicates that a foundation has been laid for the continued growth of standardization. A catalogue of TISI standards issued up to the end of July 1978 is available. This lists the standards by number and with an alphabetical index. It contains 250 numbers. The list of standards published from this time up to June 1979 is now in editing phase. At the end of June 330 standards were published and 30 were ready for publication bringing to the total of TISI's standards to 360. It is expected to reach 400 standards at the end of the year 1979.

An output of 150 voluntary and 2433 compulsory licenses issued during the year 1973-1979 including visits, period tests, and test programmes indicates the range of the work carried out in the certification activities.

These data indicate the beginning of a programme of national standardization and certification in Thailand.

### 3.2 Organization Chart

An organization chart of the TISI is presented in the following figure. Organizationally TISI consists of the five divisions indicated, viz. Administrative, Documentation and Foreign Contact, Standardization, Certification, Promotion of Quality and Standardization.

### 3.3 Staff

As shown in Table 1, TISI has now a staff of 142, but the number of posts given by Civil Service Commission is 326. TISI has had many vacancies for a long time. The reason for this might be that the salary level offered to staff and other work conditions are not sufficiently attractive.

For TISI assigned tasks - including preparation and publishing of standards, their implementation via a national quality marks Certification programme and increase of quality of commodities both locally produced and imported - this actual staffing is inadequate. TISI should have in the region of 300 by 1980.

### 3.4 Budget

The total Government inputs for the budgetary year (Oct. 1978 - Sept. 1979) is 10,658,100 Baht (\$532,905). The UNDP/UNIDO budget for 1978 was \$100,700, for 1979 it is \$264,073.

### 3.5 Major problems

The major problems are

- shortage of annual budget and staff
- inadequate testing facilities

### 3.6 Inadequate testing facilities for certification.

At June 30, 1979, the Certification Division of TISI had certificated 63 different products and has now under control inspection above 1000 factories, of which approximate 900 cover tapioca, the most important export product.

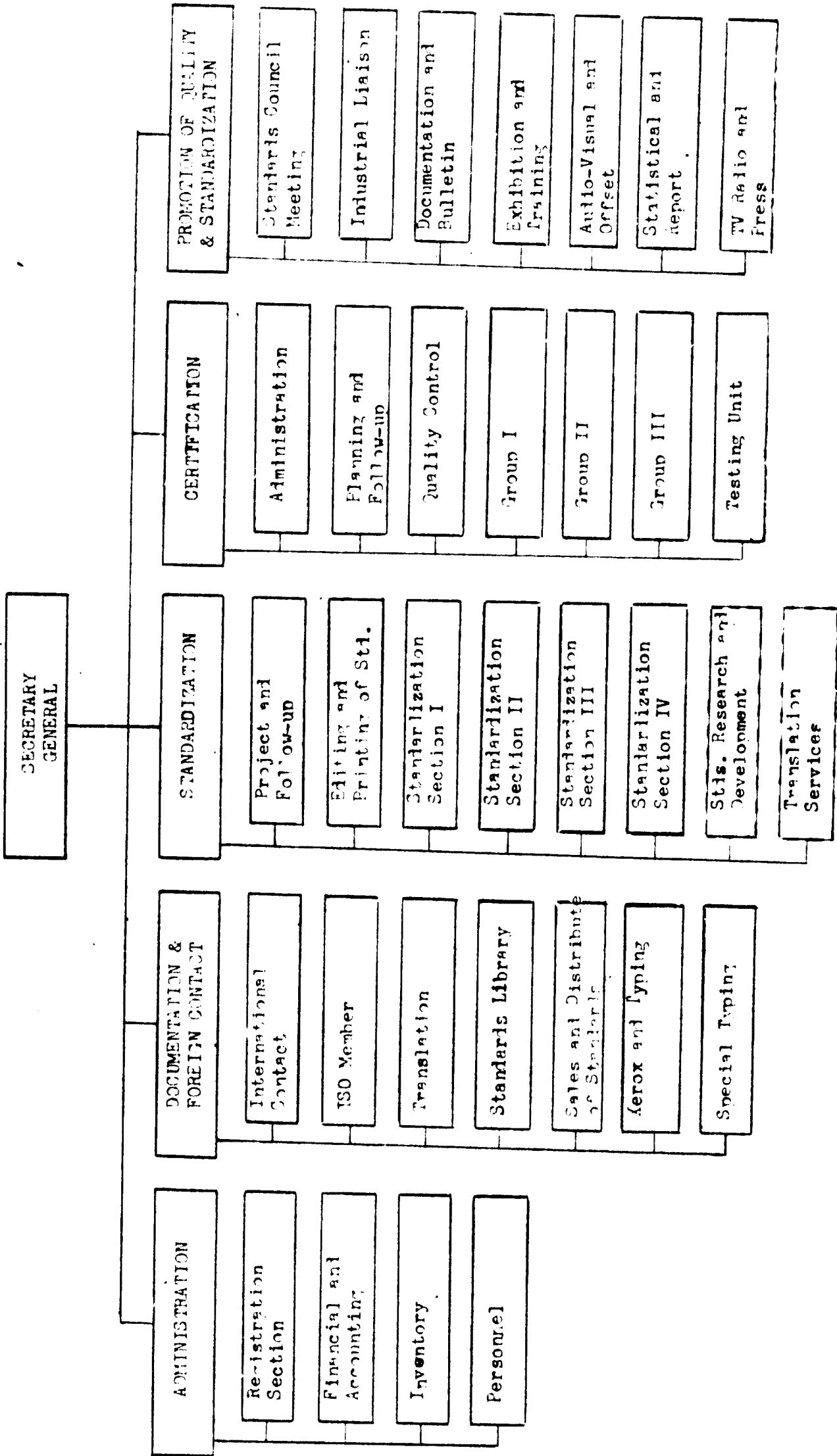


FIGURE 1. ORGANIZATION OF PTB

Year	Number of TISI Employees		Number of Stds. Issued		Number of TC organized		Number of TC meeting held	Number of Certification Licenses issued			
	Approved	Actual	No.	Cum.	No.	Cum.		VOLUNTARY		Cum.	
								No.	Cum.		No.
1973	73	47	56	56	37	-	928	18	18	-	-
1974	96	51	52	108	45	82	1113	23	41	893	893
1975	98	62	37	145	24	106	1157	33	74	36	929
1976	131	76	43	188	37	143	1042	34	108	131	1120
1977	139	106	49	237	25	168	1046	25	133	414	1534
1978	151	122	74	311	36	174	1200	27	140	532	2073
1979 up to end of June	236	142	49*	360	13	187	700	10	150	360	2433

\* 13 were published, 30 were approved and ready for publication, total 43.

Table 1. TISI progress during the period 1973 - 1979  
(No. papers, standards, technical committees and certification)

The major problem in the certification field is the inadequate testing facilities. TISI was using the services of over 20 testing laboratories, see Annex No. 1. Due to their own work load and lack of testing equipment, a few of them were not able to complete the tests for TISI. At present, there are above 20 applications from manufacturers for a TISI certificate which could not be tested.

The other major important problem highlighted by factory visits and test overseeing is the inadequate calibration of testing equipment and co-ordination of the test methods.

Both problems should be the subject of wide consideration and practical national effort to improve the situation.

#### 4. THE TISI'S STANDARDS DIVISION

##### 4.1 Objectives

The main objectives of this division are :

- to prepare new standards
- to make revision of the standards
- to give comments to international standards

After approval by Standard Council

- to print and publish them
- to promote their adoption by industry

##### 4.2 Organization

Organizationally, the division consists of 4 technical and 2 administrative sections as it is shown in the figure. Two new sections : one for research and development of standards and one for translation services have been proposed.

##### 4.3 Staff

The Standards Division has around 55 technical people (of whom most hold B.S and M.S degrees) and 3 other support staff.

The division is headed by Mrs. Phani Na Rangsi, M.S., highly qualified with long experience in standardization works.

The base technical work is carried out by technical committees and their technical secretaries.

##### 4.4 Technical Committees (TC)

A technical committee is appointed for each standard to be drafted. About 180 technical committees have been at work during reporting period. Each committee has as an average of 10 members, representative for producers, consumers, researchers and general interested bodies. The number of technical committee meetings held in 1978 was 1200, in the first half of 1979 was 700.

During its work the committee in most cases has a TISI staff member as secretary. The main task of the secretary is to study international and foreign standards and prepare the draft for the technical committee.

The work is carried out at a number of meetings finally leading to a draft that is circulated for general comments to all who should be interested. After due attention has been paid to the comments, the final draft is sent to the Standards Council for approval.

The problems affecting the Standards Division are discussed in Section 5.



## 5. EXPERT'S PRINCIPLE ACTIVITIES

The following activities have occupied the majority of the time and effort :

- analyzing of the targets, staffing and organization chart,
- principle procedure co-ordination for speeding up standards production,
- drafts analyzing and commenting,
- current advisory service to TISI staff,
- participation in technical committee meetings,
- training course for the TISI staff,
- factory visits,
- miscellaneous

### 5.1 Studying of the targets, staffing and organization chart

#### 5.1.1 Targets

Having in mind the number of standards in some foreign countries, developed as well as developing, the target for Thailand in terms of number of standards should be about 2000 in 1990.

It is expected to reach 400 standards at the end of this year and 500 in 1980. The average number of standards produced per year in the next 10 years should be around 150 at least. It means that the output of new standards must be doubled in the next years.

Second main task is the revision of published standards. The Standards Division must study and eventually revise additionally 20-30 standards a year.

Third main task is the co-operation with technical committees of ISO. The number of TISI's technical committees involved in this work should be increased from actual 36 to 40-50. This task for TISI development is very essential. Participation in ISO works, giving comments enables a current influx of ISO documents and research results.

Another main task is the implementation of the standards, visits the factories, discussion of the problems arising during application of standards with factories management and the knowledge of the economics of standardization made available to them.

### 5.1.2 Staffing

In the light of growing tasks the actual staffing is inadequate and should be increased from actual 59 to 100 at the end of 1979 as shown in table 2.

Table 2. Staff required for the Standards Division

	POST	ACTUAL AT 6/79	ADDITIONAL STAFF RE- QUIRED AT END OF 1979	TOTAL
1	Senior Sc. Officers	20	9	29
2	Scientific Officers	10	15	25
3	Assistant Sc. Officers	26	15	41
4	Others	3	2	5
	Total	59	41	100

### 5.1.3 Implement of the new organization

During the reporting period a new organization chart of TISI's Standards Division has been elaborated and implemented. The Standards Division consists now of 4 technical and 2 administrative sections. Each technical section is divided into teams related to the technical fields. In this way to the team leaders a possibility has been given to become specialised and to prepare the drafts better and quicker. Some of the teams indicated are for the time being small 1 or 2 - man units but the teams should be strengthened accordingly as soon as possible.

#### 5.1.4 New Sections

TISI is currently involved in developing standards for different industrial products. In the past, it has relied mainly on ISO and IEC or various foreign national standards, but it has been found that these are not always suitable to Thai requirements. Therefore, it is suggested to set up a new Standard Research and Development Section, which would work in close collaboration with other institutes and it would also be a leading force in planning and giving advice about priorities and assistance to all technical teams. The Standard Research and Development Section should have its own laboratory. Examples of the equipment needed only to test the samples of rubber, plastic, safety helmets, brake and clutch, automobile parts, food products, chemicals etc., so that data concerning its chemical and physical characteristics can be determined and set as a standard, are given in Annex No. 2. A full set of equipment should be listed by the short term consultants who are now under requisition by UNIDO and will come to study this problem soon.

#### 5.2 Principle procedure co-ordination for speeding up of standards production

This part has been given much time. The aim of these activities was to speed up the standards production and to attain the target of 100-150 figure for the year.

The review in the TISI's standards production, the investigating step-by-step the production phases and all factors affecting standards production have given the following results :

##### 5.2.1 First phase, the technical committee (TC) secretaries work

The main factors those most frequently hamper the draft preparation were

- a) waiting for testing results,
- b) waiting for translation of standards from foreign language into Thai,

c) too many standards simultaneously prepared by one TC secretary (average 10 standards).

To reduce the factor a) the following three ways are possible

- a) to find such a test method for which the test equipment is available,
- b) to go further with standard drafting and come back to the clause after receiving the test results,
- c) to increase the capability of the co-operating labs,
- d) to set up the Standards Research and Development Section with its own laboratory.

The TC secretaries have been instructed to use immediately the ways a) and b). The way c) and d) require new equipment (as it was explained already in section 5.1.4).

The need to increase the capability of the labs collaborating with TISI or to build its own lab has been reported many times. The lack of testing facilities hamper not only certification works but also standard production. Support for this activity by UNIDO is highly recommended.

As mentioned above, two further main causes were noted :

- waiting for translation
- too many standards for one TC secretary.

Most TC secretaries know the English language, but nearly all have troubles with translation of some technical terms and with creating new technical terminology in Thai. Some important standards from the Federal Republic of Germany and Japan are not in English version and some of them must be translated.

To solve the translation problem there are two ways

- a) to send the standards for translation to professional institutions.
- b) to employ more staff who know foreign languages well.

The way a) is expensive and takes a long time. The secretaries need advice and help currently. Therefore, it has been suggested the way b) to organize a translation services at TISI Standards Division (section 4.2 and the figure on page 11).

To reduce the number of standard preparations for one TC secretary, in addition to the staff strengthening, it is advisable more frequently to obtain a first draft from knowledgeable source, see section 5.2.2.

#### 5.2.2 Second phase, the technical committees work

The following observation has been made :

- a) the main essential part of the work within TISI is carried out by the technical committees. Their work is carried out at a number of meetings which eventually leads to a draft. Such a procedure for preparing standards takes about one year for urgent standards and sometimes up to five years for the general standards. This method of standards preparing is quite expensive.
- b) Some unnecessary delays have occurred through committees spending time disagreeing about editing terminologies and precise translation of technical terms.
- c) There are not standards or precise rules specifying the technical committee work procedure. The TISI's Format in drafting the standards does not specify any technical committee procedure.

To speed up the TC work it is advised :

- a) to prepare the draft well before giving it over to TC by a small drafting pannel or by TC secretary only in consultation with TC chairman concerning technical problems and in consultation with translation services concerning editing terminologies.
- b) a first draft, if possible should be obtained from knowledgeable source (research institute, company, etc.).

- c) the draft after circulation for comments should be the final matter for discussion by TC.
- d) the problems eventually arising during the TC discussion should be not solved by TC but only noted and submitted to technical secretary. It is less wasteful in time to hand this to the secretary to provide a solution to technical committee than to make this job "ad hoc" during TC meeting.
- e) the Chairman of TC - after a project has been accepted and assigned to create the standard - is obligated to establish target dates for two major stages of its preparation. The aim should be to reach the final stage of approval in a maximum of 12 months. That includes a period of 8 weeks for the receipt of comments.
- f) the TC secretary is obligated to monitor the current progress of all drafts in hand and provide regular reports to the head of the Standards Division.

To improve the actual procedures and to co-ordinate all the works of TISI technical committees the expert has prepared a draft on standard "TISI Technical Committee Organization and Procedures" which was discussed on a few TISI senior staff meetings and after some small changes it has been accepted for translation and implementation, see Annexes.

### 5.3 Drafts analyzing and commenting

All drafts given to the expert have been analyzed and the comments and suggestions have been written. When invited, the expert has explained the comments to TC members and taken part in the discussion during the TC meeting. Many of the comments and suggestions have been accepted and introduced to the standards.

List of Some Memo Concerning Drafts on Standards

No	Date	Subject	Contents	No of Pages
1	78-10-12	Stationary Lead-Acid Storage Battery	General and detailed comments. Suggestions for implementation	2
2	78-10-20	Separators for Lead-Acid Batteries	"	3
3	78-10-31	Switches for Domestic and Similar Purposes	"	4
4	78-11-10	Edison Screw Lampholders.	"	2
5	78-11-21	A.C. Double-Oscillating Fans	"	4
6	78-12-21	Power Transformers (76 pages)	"	3
7	79-01-10	Room Air Conditioner	"	4
8	79-01-31	Household Refrigerator (30 pages)	"	3
9	79-01-31	Additional comments on draft separators	"	1
10	79-02-09	Incandescent Lamps and Permissible lamp cap temperature rises problem	"	1
11	79-03-13	Liquefied Petroleum Gas Cylinders (TIS 27)	"	2
12	79-03-16	Pin-Type Porcelain Insulators	"	3
13	79-04-05	Additional comments concerning TIS 27	"	2

5.4 Current advisory service to TISI staff

TISI's TC secretaries have been given consultation on day-to-day basis about technical matters, oversees draft translation. Where there was a query concerning technical clauses in foreign or international standards

the expert handled this type of correspondence. Many discussions took place with secretaries on how to plan the work and to prepare documents for meetings. This part has been given much time in order to provide the TC secretaries with guidance on how to start new project and improve the ongoing ones.

#### 5.5 Participation in TC meetings

The expert has participated in about 10 committees meetings when principle questions were under study and to sort out problems they have had and to advise them on the best course to adopt.

Another aim of the participation in TC meetings was to observe the actual procedure in order to prepare a new instruction for TC procedure for speeding up of standards production.

It has been observed that to a great extent the meetings were dealing with translation of foreign standards from English into Thai and this sometimes led to excessively time consuming attempts to find accurate expressions in Thai for the English original. The discussion about wording of course is necessary but it should take place before TC meeting. Therefore, it is suggested to set up a translation team within the Standards Division.

#### 5.6 Training course for the staff

In an internal training course lectures have been given during the reporting period. The number of participants, mostly TC secretaries and other staff from Standards Division was 25-30.

The topics were :

- Guide to International Organizations concerned with standards
- Standardization in Production Processes,
- The Advantage of SI System of Units, Metrication in Thailand
- Guide to use of SI System of Units (Metricize)



Detailed papers were prepared for each topic and distributed before the meeting in order to enable the study and preparation of questions as well as to understanding of English.

Besides the formal lectures, the expert met often with different officers on an individual basis to discuss the standardization problems and current application of the lectured methods to their own work.

Arrangements have been also made with Chulalongkorn University, Dpt. of Electrical Engineering and the lectures on H.V. Equipment Design and on the national and international implication of standardization have been given. The number of students and engineers from the University and industry was about 80.

### 5.7 Factory visits

12 bigger companies and a few medium size factories have been visited by the expert together with TISI staff, technical committee members and quality control experts (see table 3).

Table 3. List of companies visited

Date	Name of Company and Place	Main Products
78-09-27	TANIN INDUSTRIAL CO.LTD., Bangkok	Radio, TV sets
78-09-28	THAI YAZAKI ELECTRIC CO.LTD., Bangkok	Wire, Cables
78-11-16	KIMBERLY-CLARK CO.LTD., Bangkok	Tissue
79-02-21	AUTOMOBILE PARTS FACTORY, Bangkok	Radiators parts
79-02-07	THAI SAWAT FACTORY, Korat	Tapioca pellets
79-05-23	CONCRETE PRODUCTS & AGGREGATE CO.LTD. Bangkok	Concrete Elements
79-05-23	BRIDGESTONE CO.LTD., Bangkok	Tyres
79-05-28	THAI MATCHES FACTORY, Bangkok	Matches
79-05-28	SIRIWIWAT TRANSFORMER FACTORY, BKK	Power transformer
79-05-31	ELCOM FACTORY, Bangkok	Electronics
79-06-14	UNIVERSAL FOOD CO.LTD., Lampang	Pineapple canned and other food
79-06-14	THAI TOMATO CO.LTD., Lamphoon	"
79-06-15	TADA, Chiangmai	Handmade Silver

The main purpose of the visits was to give the technical assistance in standardization, to discuss with the factory management the TISI's standard implementation and to observe the standardization technique used in the factories. Sometimes the new standards have opened the way to the reduction at product low cost but sometimes they have also created new technological difficulties. The benefits from such visits were mutual for both sides. Proposals for factory management how to improve the control structure and how to avoid the difficulties were made. The experience gained through use of standards could be led back into standardization works at TISI.

#### 5.8 Miscellaneous

- 20 letters have been sent abroad to check revision and new edition of standards
- 1 Standard for Gold Colours has been translated from German into English
- 3 books and several standards have been bought and handed over to counterpart.

## 6. OTHER ACTIVITIES

### 6.1 Tapioca products

Project Proposal for the Improvement of Quality Control of Tapioca Products in Thailand has been prepared (together with Mr. Surasak) and sent to the Leader of European Tapioca Expert Mission in Rotterdam, see annex 5, item 3. The Leader of the Mission as above has seen the possibility of financial assistance for 5 such units from Dutch and other Authorities.

High ranking Dutch officers have threatened earlier to introduce the law to restrict the import of tapioca products because the product has caused dust pollution at Rotterdam Port area.

TISI is preparing now a revision of standard for tapioca products. The aim of the revision is to introduce among others the hardness requirement and to reduce the dust pollution and also to raise further the quality of tapioca products.

The tapioca products exported last year to all markets totalled 6.25 million tons worth \$500 million reached a record high level and became the country's largest foreign exchange earner.

### 6.2 Equipment

6.2.1 Printing equipment such as collator, folder purchased earlier and delivered in September 1978 value \$10,385 have been handed over to counterpart.

6.2.2 Mobile inspection unit subcontract, value \$100,000

- Contract for the preparing of the unit project first phase, value \$10,736 to Tropical Product Institute in London has been awarded. It is hoped that the delivery of the inspection unit would be followed to TISI in the third quarter 1979.

After some experience with the mobile inspection unit imported this year, 4 further such units will be required. The subject can be included in a project revision to be prepared by UNDP/ UNIDO mission.

- 6.2.3 The order on two sets of precision ring gauges for pipe thread testing - value \$8,241 to Coventry Gauge in England has been awarded. The delivery will follow August/September 1979.
- 6.2.4 Bending formers for galvanized and black iron pipe have been designed local by TISI and Industrial Service Institute which will manufacture it during the third quarter 1979.

The value of the materials for making bending formers is approximately \$2000 to be paid by UNDP/UNIDO.

### 6.3 Fellowships

During the reporting period two long term fellowships in the USA have been completed and two others, also in USA, are continuing and will be completed in 1980. One short term fellowship is awaiting a place.

Fellowships leading to degrees are essential to the progress of TISI. In the project budget for 1979-1980 only one long-term fellowship is planned and one short-term fellowship. In June 1979 it was suggested by project revision "0" to increase the number of long-term fellowships from 1 (21m/m) to 2 (42m/m).

### 6.4 Exhibition, seminars

- 6.4.1 On 30 March 1979, at TISI H.R.A. Princess Chulabhorn opened the exhibition of Thai Products conforming to the TISI's standard. The exhibition organized by QCA ran from 30 March through 8 April 1979.
- 6.4.2 At the same time the QCA under auspices of TISI had conducted a seminar on the "Development of Quality Control". Besides the QCA members many specialists from industry took part in the seminar.
- 6.4.3 TISI took part in a seminar on Applied Standardization and Product Certification in Electrical Engineering in Singapore on 16-22 May 1979. On the seminar one paper under the title "Harmonization of Standards and Mutual Recognition of Certification Mark to Promote Trade", prepared by Miss Kanya Sinsakul and expert was presented.

## 6.5 Associations

### 6.5.1 Thai Quality Control Association (QCA)

160 members are actually working in the QCA, many of them are very active. Prof. Aroon Sorathesn as president and Miss Kanya Sinsakul, Head of TISI Certification Division play the main role in QCA. It is a useful channel through which to feed knowledge of the economics of standards and certification.

### 6.5.2 Thai Standards Association (TSA)

Having good experience with QCA, in order to bring industry and others into closer collaboration with TISI in the field of standardization activities, proposals have been made for the establishment of Thai Standards Association. All necessary documents concerning the establishment such as initial letter, background and justification, organization chart have been prepared and handed over to counterpart.

### 6.5.3 Proposal for creating Regional ASEAN Standards Committee

It would be apparent that trade is effected by differing standards in the ASEAN member countries. It is quite impossible for ASEAN neighbors to trade in some products because of differing national standards. In regard to exports it is apparent that regionally accepted standards would be a strong support for general move towards ASEAN economic co-operation.

In order to achieve proper international co-operation in solving the organizational problems and to be a centre of harmonizing actions, and to integrate activities, provide a valuable forum from which it would be possible both to inform ASEAN and gain from its members in what way the ASEAN Standards Committee would be useful, it is suggested that UNDP/UNIDO include into UN Development Programme the setting up of ASEAN Standards Committee and give the Committee assistance to obtain some funds. The initial UNDP input for the first stage it is estimated would be approximately \$50,000.

One of the most advanced standards bodies in ASEAN countries is the TISI. Secretary General of TISI, Mr. Chaiwai Sangruji, has been appointed as honorary Regional Representative of ISO. Therefore, the most suitable place for ASEAN Standards Committee at first stage would be TISI.

A memo concerning this matter to Mr. Christian Newman, Senior Industrial Development Field Advisor, UNDP, Bangkok was sent on 1979-04-25.

## 7. SOME OBSERVATION AND RECOMMENDATIONS

### 7.1 Training courses and conferences

It is advisable to train more frequently the TISI professional staff and others concerned in standardization through :

- taking part in different standardization courses
- training standardization at big industries
- participating in internal standard conferences

Training opportunities for standardization personnel organized by UNIDO, ISO and others should be more frequently utilized.

Some industries abroad have standard departments much bigger than the national standards institutions. The transfer of modern technology through standardization could be obtained by training at big industries, e.g. in industries for electrical appliances, transformers, motors, cars, etc. The expert thinks that a number of big industries would be willing to sponsor TISI officers for standardization in studies lasting a quarter to one year.

A one or two-day conference should be organized by TISI or after establishment by Thai Standards Association for country work managers, standardizers and quality control managers. The delegates ought to have the opportunity to develop ideas among themselves on aspects of standards and quality assurance. Another time there should be a further conference focused on the theme of company standards and/or on safety and liability of products.

### 7.2 Compulsory Standardization

Compulsory standardization in the best interests of industrial and economic growth of Thailand cover these products only where sub-standard products are likely substantially to affect public safety and the economy of the country.

In this respect compulsory standards are imposed upon the following products : tapioca, canned pineapple, matches, ballasts, PVC covered electric wire, automotive safety glasses (3 standards for glass - laminated, tempered and zone-tempered), steel bars for reinforcement concrete

(also 3 standards for round, deformed and re-rolled round bars). Altogether there are 11 standards. The latter 6 standards have been implemented recently. Under preparation are 2 compulsory standards : for gas cylinders and for plug and socket-outlets.

The aim of the two under preparation compulsory standards besides the safety is also to reduce the large number of varieties. Presently the market is overcrowded with plugs and sockets which are very often unsafe. The design is based on the North American practice where they are used to 110V only and in Thailand up to 220V. After implementation of the new standard there will be only 2 or 3 types available. Some difficulties are in formulating the draft because the IEC Specifications are not yet ready and the proposal for Worldwide Plug and Socket System is still under consideration.

### 7.3 TISI's electrical standards and public safety

It may be that the electrical industry has in the region of 5% of the GNP of Thailand only. This is, however, enough to justify the standardization from the point of view of public safety.

Approximately 50 electrical standards as the minimum is believed to be required to protect the general public. There are the following products : wiring appliances and everything ranging from electric stoves to refrigerators, radio and television sets, electric irons, toasters, mixers, socket plugs and outlets. All these products may cause a fire or electrical shock, if they are poor quality.

TISI up to now has published 10 electrical standards, namely for lamps, link fuses, PVC cables, ballasts, lampholders, copper conductors, copper wire, hard drawn copper conductors, enamelled copper wire and polyvinyl formed enamelled copper wire. Two of these are compulsory standards, namely for ballasts and wires. Seven further electrical standards have been recently prepared : for double oscillating fans, air conditioners, refrigerators, batteries, small transformers, power transformers, plugs and sockets.



The sooner the TISI adopts standards for all remaining electrical products mentioned above, the sooner the public will be provided the protection it needs.

#### 7.4 Standards Act and calibration

The Act specifies that TISI can deal with products only. Some fields of standardization are not covered in Thailand by any standards body, e.g. methods of measuring noise, symbol of units, quantities and nomenclatures in physics and methematic.

A calibration service for instruments, for all quantities is not organized. The Applied Scientific and Technological Research Corporation of Thailand decided a few years ago to include in its work also calibration and instrument preparation. This activity is still too weak.

In future this activity should be taken over by TISI as co-ordinator. The expert thinks that the two problems might be considered by the Government.

#### 7.5 Thai National Standards Institute

In Thailand actually there are at least seven agencies responsible for setting standards, viz :

- Centre for Thai National Standards Specification
- Thai Industrial Standards Institute
- Standards Section of Regulatory Division
- Office of Commodity Standards
- Food Quality Control Committee
- Drugs Committee
- Office of Weights and Measures

At present there is a lack of uniformity and co-operation among various standard offices. The present system with a highly decentralized standardization is confusing, not the most efficient, leading to some duplication of work and documents.

A National Standards Institute responsible for all types ranging from measurement to products would be very useful.

As TISI is the most developed standards body in Thailand, the expert suggests this body be the central one, which should be further strengthened accordingly.

## 8. RECOMMENDATIONS

### 8.1 Target and the necessity of further development of TISI's Standards Division

The target for Thailand in terms of the number of standards should be about 2000 in 1990. It means that the average number of standards produced per year in the next 10 years should be around 150 at least. Actually TISI is publishing 50-70 a year. It means that the output of new standards have to be doubled.

In light of the growing tasks it is recommended :

- to increase the staff in Standards Division from actual 59 to 100 at the end of this year
- to implement the new organization chart of Standards Division with Standard Research and Development Section, with its own laboratory and with translation services.

Examples of the equipment needed to test the samples of some products, so that data concerning its chemical and physical characteristic can be determined and set as a standard, are given in Annex No. 2.

UNIDO's further assistance, approximately \$100,000 would be required to purchase the equipment for the laboratory within Standards Division.

### 8.2 Drafts preparation

In order to improve the draft and to speed up the draft preparation, it is recommended :

- more frequently to use a first draft from knowledgeable source (institute, company, association, etc.)
- if no draft is available, the secretary of technical committee (TC) should prepare one in consultation with the TC chairman and with individual TC members or with a small drafting pannel. The terminology problems eventually arising during these works should be solved by translation services,

- to create a translation services team within Standards Division in order to give the help in translation to the TC secretaries,
- not to wait for testing results but go further with standards drafting and come back to the clause after receiving the test results,
- to apply such a test method for which the testing equipment is available,
- in the future, after the own lab is organized, to carry out the trials at TISI,
- to follow in detail works the Principles for Standards Drafting, see Annex No. 3.

### 8.3 Technical Committee (TC)

To improve the TC procedures and to speed up the TC work, it is recommended :

- to oblige the chairman of TC to establish target dates for the major stages of its preparation viz :  
completion of the draft for public comments and submission of the final draft for formal approval by Standards Council. The aim should be to reach the final stage of approval in a maximum of 12 months,
- to oblige the secretaries of TC before TC meeting to divide all received comments into editorial and technical comments. The TC or small sub-committee appointed by chairman of TC reviews only the technical comments received on draft, not editorial comments which should be considered by Editing Section,
- in the final stages of TC works, the problems eventually arised should be not immediately solved, but only noted and submitted to secretary of TC to provide the solution. The task of TC secretary or drafting pannel is to prepare the draft. The role of TC is to discuss and to approve this draft,
- to oblige the secretary of TC to monitor the progress of all drafts in hand and provide regular progress report to the Head of Standards Division.

Recommended principles for TISI Technical Committee (TC) work, see Annex No. 4. The draft on Standard TISI Technical Committee Organization and Procedures, see Annex No. 5, item 5 List of Documentation.

#### 8.4 Testing facilities

TISI's policy is to serve as the forum for the preparation of standards and to implement the standards via the certification programme. However, the main part of the difficulties is the capability of various authorized laboratories to test products submitted for certification, see Annex No.1. There is also a need for testing facilities for standardization works (see section 8.1). Interest in a test laboratory for TISI is growing.

It is recommended that a survey of this situation be made by UNIDO with the possible formulation of a project to assist in the development of a test and calibration facility. Such laboratory should include the most constant electrical, mechanical, and chemical testing and calibration facilities. Calibration facilities and services are very limited in Thailand.

To contribute to solving the inadequate testing facilities in the near future in accordance with the project revision "N" short-term consultants should be recruited as soon as possible and their recommendations implemented both for certification and for standardization purposes.

#### 8.5 Mobile inspection unit

The situation in which 20 applications have had to be turned down for lack of test facilities is not conducive to progress. Further assistance would possible include more mobile units to cover this lack of laboratory capacity.

It is recommended that after some experience with the mobile inspection unit imported this year, 4 further such units will be required. The subject can be included in project revision to be prepared by UNDP/UNIDO mission.

#### 8.6 Training

Training on all aspects of quality control at TISI as well as in industry is urgently needed. The UNIDO's QC expert in accordance with Work Plan should be recruited as soon as possible.

It is recommended to arrange fellowships with industrial companies in Thailand and abroad in order to gain manufacturing experience.

It is advisable to train more frequently the TISI professional staff and others concerned in standardization through taking part in different standardization courses and participating in internal standard conferences.

The number of long-term fellowships should be increased from actual 1 fellowship (21m/m) to at least 2 fellowships (42m/m) for the next 2 years.

The possession of degree in engineering production plays a substantial role during discussion with the factory management and with committee members to make decision in line with principles of TISI and avoid un-economic decision. None of Universities in Thailand can provide this kind of study.

#### 8.7 The Thai National Standards Institute

It is recommended that there should be established a Thai National Standards Institute in order to centralize the work of various institutions. The Thai National Standards Institute would co-ordinate all related activities into an efficient structure likely to have a substantial effect on the national economy.

As TISI is the most developed standards body in Thailand, it is recommended this body be the central one, which should be further strengthened accordingly.

#### 8.8 The ASEAN Standards Committee

The appropriate ASEAN organizations, including or with the support of UNDP/UNIDO, at the request of and in close collaboration with the countries concerned should set up an ASEAN Standards Committee in order to prepare and harmonize, where necessary subregional and regional standards and certification marks for quality control and mutual recognition of the certification mark.

#### 8.9 Proposals for the work programme

- Assistance in setting up a Thai Standards Association
- Collaboration with industry to achieve company standardization
- To determine what needs to be standardized when natural gas reaches Bangkok and other areas, namely : domestic equipment, industrial burners, safety measures and the like,
- To incorporate into standards, where necessary, requirement concerning permissible noise level and pollution level as well as the requirements concerning the conservation of energy and control of the use of oil.

It is advisable that TISI expands its spheres of interests to many untouched areas like :

- Codes of Practice in which conditions of safe application and working conditions are specified.
- National Standards for pressure vessels and a system of follow-up inspection and certification of installed equipment.

Annex No. 1

List of Labs Collaborating with TISI

1. Department of Science, Ministry of Science, Technology and Energy
2. Department of Medical Science, Ministry of Public Health
3. Faculty of Engineering, Chulalongkorn University
4. National Energy Authority
5. Metropolitan Electricity Authority
6. Provincial Electricity Authority
7. Electric General Authority
8. Department of Irrigation, Ministry of Agriculture
9. Department of Natural Resources, Ministry of Industry
10. Department of Highway, Ministry of Communications
11. Telephone Organization of Thailand
12. Naval Science Department, Ministry of Defence
13. Agriculture Technical Department, Ministry of Agriculture
14. Department of Forestry, Ministry of Agriculture
15. Army Quartermaster General Department, Ministry of Defence
16. Tannery Organization
17. Faculty of Engineering, King Monkut Institute of Technology, Thonburi
18. Faculty of Engineering, King Monkut Institute of Technology, Bangkok
19. Faculty of Science, Chulalongkorn University
20. Faculty of Science, Mahidol University
21. Industrial Promotion Department, Ministry of Industry
22. Institute of Food Research and Product Development
23. Applied Scientific and Technological Research Corporation of Thailand



Annex No. 2

Examples of Equipment needed for TISI's  
Standards Laboratory

I. Apparatus and Equipment

1. Tensile testing machine (Type : constant rate of extension - INSTRON)  
with load cell capacity : 19-200 kg
2. Balance (Fine weighing)  
. Accuracy : 0.001 mg
3. Balance set (course weighing)  
Accuracy : 0.1 mg
4. Colour Fastness Testing machine
5. Hydrostatic head test
6. Shock absorbtion tester for safety helmet
7. Penetration tester for safety helmet
8. Retention system tester for safety helmet
9. Friction tester for brake and clutch
10. Electrical resistance at high temperature tester for brake and clutch
11. Flow capacity tester for safety relief device for gas cylinder
12. Electro-plating thickness tester for automobile rims
13. Automatic Muller for tint strength of carbon black
14. Reflectometer (1 set) including Reflectance standards for tint  
strength of carbon black
15. General motor V-8 engine, 6964 cm<sup>3</sup> capacity for corrosion resistance  
(engine test)
16. Labeco CLR gasoline engine - single cylinder - 4 stroke for the  
determination of low temperature deposit and bearing corrosion
17. V-8 Ford Engine, 494 cm<sup>3</sup> or equivalent (MIL-L-204C)
18. I-Y 7500 single cylinder four stroke caterpillar diesel test engine  
for the determination of ring-sticking, wear, and accumulation of  
deposits
19. Caterpillar single cylinder four stroke diesel test engine with  
I-Y 7630 supercharger group for the determination of same as  
item 18

20. Caterpillar single cylinder four stroke diesel test engine with I-Y 7999 high speed change-over group for the determination of same as item 18
21. Accelerated weathering tester
22. Scratch Tool for the determination of resistance to various substance of PVC asbestos floor tiles
23. Curl gauge for the determination of curling of PVC asbestos floor tiles

Explanation :	Item	To test and investigate samples of :
	1 - 5	Textile, Consumer Products,
	6 - 12	Mechanical Engineering Products,
	13 - 23	Chemical/Non-Metal Products

## II. Conditioning Equipment

Conditioning equipment at the laboratory room for the control of temperature and humidity including the apparatus to report temperature and humidity.

## III. Estimated Costs

US\$100,000

Annex No. 3

Principles for Standards Drafting

1. International and national standards should be followed.
2. Do not hesitate to ask for material from abroad.
3. Metrication should be respected.
4. Overlapping sizes should not be specified
5. Types, sizes as possible should be included
6. Brackets should be used to indicate what should be avoided, and what will disappear at a revision in the future.
7. Keep strictly apart requirements and testing.
8. Each type of product should be dealt with in a separate standard.
9. Great care should be given to designation of products to allow simple references on drawings, especially in electrical field.
10. Nothing should in the standard be mentioned about organizations or person to inspect the products.
11. Terms like "Special types can be agreed" must not be used in the official part of a standard.
12. All kinds of helpful explanations for the use of a product could be given. However, not in the requirements. Clause "Comments" at the end of the standard is recommended.
13. Pictures, drawings, tables should be used as much as possible to reduce the amount of text.

Annex No. 4

Recommended Principles for TISI Technical Committee (TC) work

1. It is important for the overall economy of Thailand to consider not only the present but also a future situation in the field of trade, co-operation with other countries.

One feature of the work, therefore, is to study international and foreign standards. Whenever international standard exists this should in all technical respects be keenly studied e.g. types, values, test methods. Deviation in the TIS draft from the international standards should be clearly justified and reported to all TC members. If international standard doesn't exist the most popular foreign national standard should be studied and in the same way used.

Confirmation should be obtained that the international and foreign documents used as reference standards are not withdrawn and not under revision.

2. The metric system of SI units should be used. This means on one side presentation of all data with SI units on the other that from the old "inch-standards" the data are to be given in round numerical values. The standardized preference numbers and regular distributions over the total range are to be considered and suitable conversion factor should be used.
3. The number of different items represented by standard should be kept low - at an optimum level - to permit concentration and lead to the economy of the long series. Consideration of preferred numbers logical steps between sizes are recommended. In a first edition of a standard - in case of some uncertainty - it is better to give few alternatives not many. At a revision an extension is easier than a reduction.

Establishment of two parallel series for an item should be avoided e.g. inch series - metric series, old series - modern series, domestic series - export series.

During a transition period two series may exist provides a clear indication is given about the future situation to be aimed at.

4. The committee work should be kept to a minimum. Wherever possible, a first draft should be obtained from a knowledgeable source (company, association, research institute etc.) and then circulated for public comments before the Committee begins detailed work on the draft. If no draft is available, it is the responsibility of the committee secretary to prepare one in consultation with the chairman and with individual committee members or with a small drafting panel.

The typed draft, after circulation for comments should be the final matter for discussion by TC. If some problems eventually arised during the TC discussion, it should be not immediatly solved, but only noted and submitted to the technical secretary to provide the solutions. Editorial matters should be left to the secretary and not to be discussed in detail by the TC. It is not necessary to follow the editorial layout of foreign standards. Only principle matters on terminology and wording should be considered by full committee.

5. The TC - after a project of the standard has been accepted by Standards Council - should establish target dates for two major stages of its work.
  - completion of the draft for public comments
  - submission of the final draft for formal acceptance to the Standards Council.

These dates should be fixed not later than the second meeting of the TC. The aim should be reached the final stage of approval in 12 months. The committee secretary from all meetings is preparing brief minutes and monitors the progress to the head of Standards Division of TISI. The minutes should clearly reflect decision taken, documents studied, principle views etc., but not be a full report of all statements and opinions.

Annex No. 5

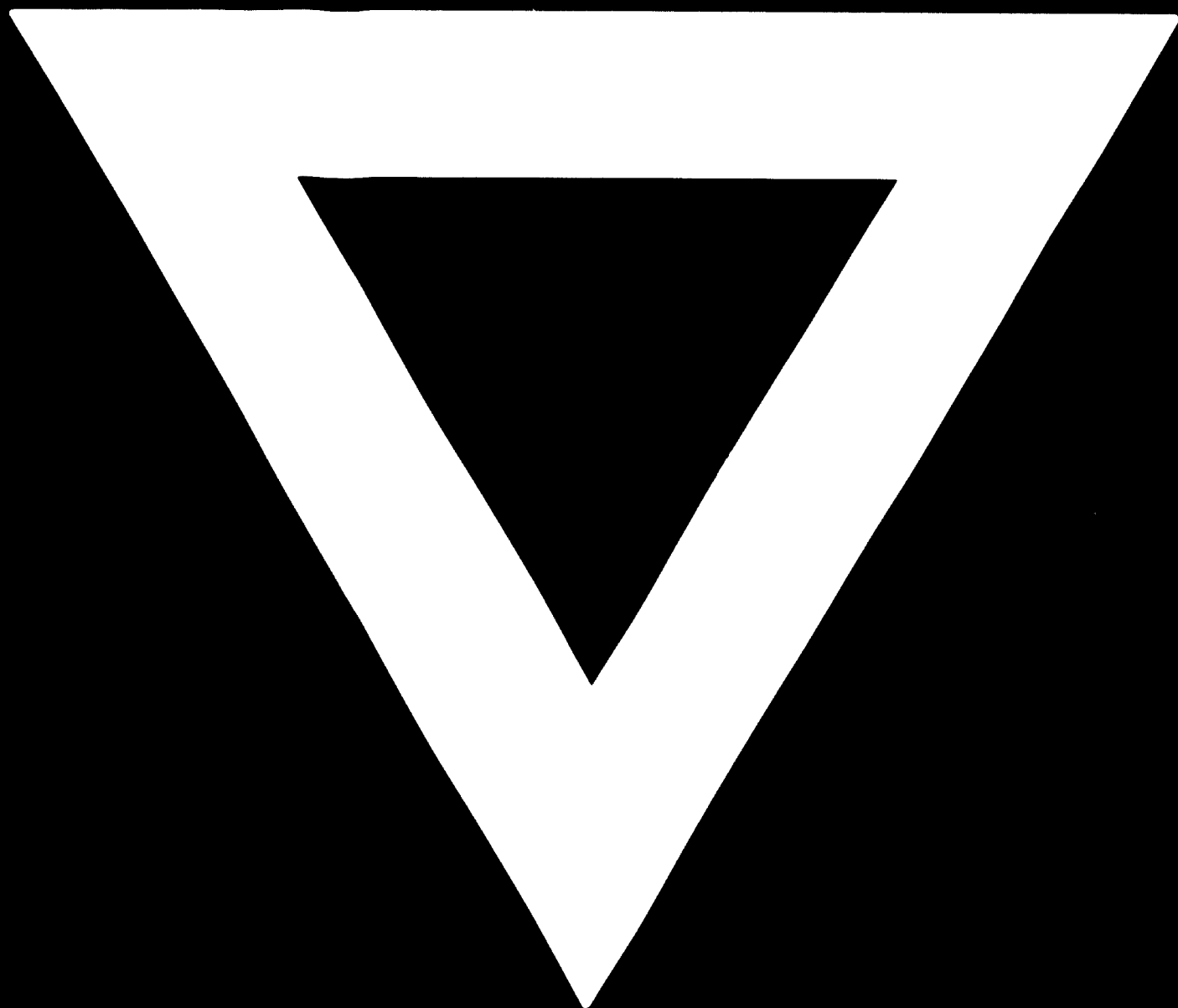
List of Documentation

Documentations prepared by the expert during the assignment, left at TISI Office.

1. Draft on Standard TISI Technical Committee Organization and Procedures  
April 1979, 4 pages A-4
2. Selected Lectures on Standardization  
May 1979, 21 pages A-4
3. Project Proposal for Improvement of Quality Control of Tapioca Products  
in Thailand  
June 1979
4. Draft on Charter of Thai Standards Association



**B-368**



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