PS Mark license:	- 5,000 pesos (per factory, per product) - 2,000 pesos (periodical inspection)
Import Commodity Clearance:	- 2,000 pesos (per cargo)
Accreditation of Testing Laboratory:	- 3,000 pesos (at the time of accreditation), and the lower amount of 10% of the annual revenue or 1,000 pesos per product (maximum 10,000 pesos per year).
Test Fee:	- cost of test

The test fee can be decided by each testing laboratory for each test item based on the actual cost incurred for the test (salaries and wages, material required for the test, water, lighting and heating, etc.), depreciation of the testing equipment, office expenses, etc., and the system that BPS determines the test fee and notifies the testing laboratories to realize a unified fee is not adopted. Thus, the test fee for the same product could vary among the testing laboratories. In Japan, it is frequent that test fees are prescribed in relevant laws and regulations from the viewpoint of fairness, that is, a same sample, same fee system is adopted.

The fee and costs for certification are collected by BPS exclusive of the test fee conducted by the testing laboratories, but they all go to the national treasury and BPS receives only the annual budgetary appropriation. On the other hand, the test fee collected by the testing laboratories is the revenue of the testing laboratories.

(3) Testing Capability of the BPS Testing Laboratory and the Accredited Laboratories for Mandatory Certification

Description of the testing capability of the BPS laboratory and the accredited laboratories, including the equipment owned by them and the record of tests conducted by them in the last three years is attached as Annex 3. Here, the testing capability for the main products which are subject to the mandatory certification is summarized by the respective field.

1) Testing capability in the field of lighting apparatus

The products in this field which are subject to mandatory certification are tubular fluorescent lamps, incandescent lamps, fluorescent lighting equipment and decorative small bulbs set. The testing laboratories for these products are only BPSL and PHILIPS.

The product items that PHILIPS can test are only incandescent lamps and fluorescent lamps, and all other products therefore have to be tested by BPSL. But, PHILIPS is busy with tests of their own products, while BPSL can test only in a limited scope of the test items. Also, even if the testing equipment of the manufacturers were to be used, the equipment they possess is also inadequate and the result is that certifications are issued without testing all items required by the standards. The testing capability in this field is in a poor state and cannot meet the increased demand for tests accompanying the expansion of the electrical industry. Urgent measures should be taken.

2) Testing capability in the field of wiring apparatus

The products in this field which are subject to mandatory certification are fluorescent lamp ballasts, fuse, lamp-holders, starter-holders, starters for fluorescent lamp, Edison type lamp holders, ballasts for mercury lamp, and electronic ballasts. The testing laboratory for these products is BPSL only, but the equipment possessed by BPSL is inadequate so that the test items are limited. Also, even if the testing equipment of manufacturers were to be used, the testing equipment which they possess is also inadequate, and the result is that certifications are issued without testing all items required by the standards. The testing capability in this field is limited and thus constrains in extending the PS Certification Mark System in this field which is the mainstream of the electric industry of the Philippines at this stage. Urgent measures should be taken.

3) Testing capability in the field of electric wires

The products in this field which are subject to mandatory certification are thermoplastic insulated electric wires, copper redraw rods, aluminum redraw rods, polyvinyl formal enameled copper wires, polyester amide-imide enameled copper wires, and oleo-resinous enameled copper wires. The testing laboratory for these products is BPSL only, but BPSL has hardly any equipment necessary for tests in this field. Thus the testing equipment of the manufacturers must be used; but as the testing equipment of the manufacturers are also poor, the result is that certifications are issued without testing all items required by the standards. The testing capability in this field is very poor and thus constrains in extending the PS Certification Mark System. Urgent measures should be taken.

4) Testing capability in the field of electrical materials

The products in this field which are subject to mandatory certification are unplasticized polyvinyl chloride electrical conduit and polyvinyl chloride insulating

tapes, but also includes plastic materials used in general electric appliances. The testing laboratory for these materials is BPSL only, but with the equipment that BPSL possesses only a part of the dimensional measurement and the insulation property tests can be done. It is critical that safety tests for heat resistance and inflammability resistance which hold an important place in tests for electric materials can not be done. In this field too, certifications are issued without testing all items required by the standards. The testing capability in this field is poor and thus constrains in extending the PS Certification Mark System. Urgent measures should be taken.

5) Testing capability in the field of electric appliances

In this field the electric fan is subject to mandatory certification, and the testing laboratory in charge is BPSL. The test of this product requires various testing equipment, because the test items include those particular to the product in addition to all items described in 1) to 4) above. As mentioned before, however, BPSL does not have adequate testing equipment and the testing capability for electric fans is deficient. As discussed in 3-2 (2) of Chapter 3, the mainstream of certification strengthening plan in the future is in general electrical appliances and the effects of the present state on the implementation of the plan is a concern. Urgent measures should be taken.

6) Testing capability in the field of cement

The products in this field which are subject to mandatory certification are portland cement, concrete hollow blocks and pozzolan cement. The tests for these are all done by CCL. Although the volume of test work is large, CCL has adequate testing capability. Faster tests can be expected by strengthening the testing equipment and expanding the testing area necessary for it, but viewed from the present state of the cement industry it is considered adequate for the time being. Incidentally, the demand for tests on concrete is projected to increase in the future, and to cope with such a situation strengthening of the related testing equipment and the increase of testing engineers will be necessary.

7) Testing capability in the field of LPG

The products in this field which are subject to mandatory certification are LPG cylinders, automobile LPG cylinders, internal combustion engine LPG systems, and used LPG cylinders. Tests for requalification of used LPG cylinders are done by FEIC, ASEPHIL, AGE, SGE and ITM. It is said that ITM is not active at present. For the other product, MIRDC performs the tests on a part of the test items.

While almost all of the LPG cylinders manufactured in the Philippines are exported, most of the cylinders used in the Philippines are imported used cylinders. All of these imported used cylinders are the objects of the test and are released to the market after confirmation by the Standards Conformity Tests. Furthermore, as they are requalified every five years, the volume of the annual testing work is large. On the other hand, the current capability of the different testing laboratories roughly matches the demand for tests.

Therefore, the tests may be handled by the four testing laboratories excluding ITM for the time being.

Also, with respect to new LPG cylinders, automobile LPG cylinders and internal combustion engine LPG systems, the tests that MIRDC is able to do are only a part of the tests specified in the standards and the rest of the test items are done using the testing equipment of the manufacturers. As the test demand for such products are small at present, it seems that this method may be able to meet the present need. However, it will be necessary to set up one testing laboratory which can conduct complete testing specified in the PNS standards in the near future.

8) Testing capability in the field of tires

The products in this field which are subject to mandatory certification are tires and tire tubes. The three tire manufacturers (Goodyear, Firestone and Sime Darby) have the individual test laboratories accredited by BPS and tires of one company are tested by another company and not by itself. Therefore, there is an important problem of confidentiality and, conversely, it would be a problem if a company tests all tires it manufactures. Also, each testing laboratory owned by a manufacturer would give priority to its own products, extending the time required for the results of the PS Mark certification tests to become available.

These three companies are the only tire manufacturers in the Philippines at present and although it is conceivable that testing capability roughly meets the test demand, an improvement of the testing capability for automobile-related products including tires will be desired as the automotive industry develops. In that case, the third party testing laboratories should conduct them instead of the testing laboratories of the manufacturers.

9) Testing capability in the field of metals

The products in this field which are subject to mandatory certification are galvanized steel pipes, steel bars for concrete reinforcement, galvanized steel sheets, carbon

steel with rods, and nails. The testing laboratories for these products are BPSL in addition to MIRDC, but the testing capability of BPSL is low judging from the testing equipment it possesses. Therefore, the center of the testing related to metals is MIRDC which performs a large volume of tests each year. The testing capability of MIRDC is relatively good and may be expected to exhibit its strength adequately with the strengthening of its testing equipment and the technical level.

10) Testing capability in the field of gas

The product in this field which is subject to mandatory certification is medical oxygen gas only and CIGI conducts the tests. With respect to the testing capability of CIGI, many of its testing equipment are old and need to be replaced. Strengthening is necessary to meet the expanding demand for tests considering also the addition of mandatory certification in the future, although it is judged that the testing capability matches the current demand for tests.

11) Testing capability in the field of storage batteries

The laboratories performing tests on storage batteries are those owned by RAMCAR and CC UNSON, which are both manufacturers of storage batteries. As the procedure of testing, products of one company are tested by the other company and therefore there is a problem of confidentiality as in the case of tires .

Many of the equipment possessed by both companies are old but they conduct a large volume of tests each year and thus testing capability is observed to be adequate. However, an expansion of the testing capability owned by public institutions in place of manufacturers is desired to match the increasing demand for tests corresponding to the development of the automotive industry.

12) Testing capability in the field of fire-extinguishers

The product in this field which is subject to mandatory certification is portable fire-extinguishers, and BPSL and PIPAC are the testing laboratories that perform the tests but both laboratories perform only analytical tests of the fire-extinguishing agents and neither laboratory is able to perform tests of the vessels or simulation fire tests, etc. Therefore, the testing capability of fire-extinguishers in general is very deficient, resulting in issuance of certifications without testing all items required by the standard. As there are many manufacturers of fire-extinguishers and the demand for tests is large, an urgent improvement of the testing capability in this field is desired.

13) Testing capability in the field of consumer products

The products in this field which are subject to mandatory certification are safety matches, polyethylene water pipes in the chemical area and kerosene stoves and LPG stoves in the mechanical area. The laboratory which performs the tests is BPSL, but because of deficiency of the testing equipment they possess, all of the items of tests required by the standards can not be tested. Although the demand for tests in this field is relatively small except for safety matches, measures should be taken urgently because it would be a grave problem to the promotion of the certification system to issue certifications without testing all items required by the standards. As for safety matches, BPSL has to conduct a large number of tests. However, deficiency of the testing equipment they possess causes them unable to conduct all items of tests required by the standards. Urgent measures should be taken.

14) Testing capability in the field of wood

The products in this field which are subject to mandatory certification are sawn timber and plywood. The laboratory that performs tests on these is the Forest Products Research and Development Institute (FPRDI), which is not an accredited testing laboratory. For the equipment that FPRDI possesses are old and the testing capacity is limited, they are not able to perform all tests required by the standards. As sawn timber and plywood belong to the main industries of the Philippines and the demand for tests is large, urgent measures should be taken.

15) Testing capability in the field of food

Although there is no product in this field which is subject to mandatory certification, many enterprises receive voluntary certification for such products as bananas, pine-apples, sugar, molasses, tomato, canned tuna, canned sardines, etc., reflecting the fact that food is an important industry of the Philippines.

The laboratories that test these products are PIPAC, USCL and SGS. In view of the testing capability of each testing laboratory, they cannot perform all items of tests required because of deficiency of the testing equipment they possess, and thus their capability is inadequate to extend the certification system. Also, there is no laboratory located outside of Manila except USCL in Cebu, but its testing capacity is very poor due to deficiency of the testing equipment it possesses. Under these circumstances, all the tests are conducted in Manila, but this involves the problem of change in the test sample over time required by transportation to Manila creating problems of reliability of the test results. As the demand for tests in this field is large and as there are some other testing laboratories, the testing capability could be

improved by expediting the accreditation of such laboratories. For instance, the Food Development Center (FDC) of the National Food Authority (NFA) which has recently been completed have adequate testing capability with equipment, but this laboratory is not accredited yet. Moreover, in order to upgrade the testing capability, it will be necessary to enhance the testing facilities so as to meet the requirements for a wider scope of more complicated tests which may be demanded along with the development of the food industry in the future.

16) Testing capability in the field of textiles

There is no product in this field which is subject to mandatory certification. The laboratory in charge of the tests in this field is PTRI only. Looking at the equipment possessed by PTRI, there is a limit to the tests that can be performed.

(4) Testing Capability in the Regions

Summarized below are the observations on the testing capability in the regions of Cebu, Cagayan de Oro, and Davao where industrial development will be progressed.

1) Cebu

The main testing laboratories in Cebu are the Regional Standards and Testing Center (RSTC) of DOST, and USCL.

RSTC mainly performs chemical analyses, but the testing equipment it possesses are only basic equipment and it only performs analyses in certain fields. The testing capacity of USCL is also limited. Therefore, the testing capacity in this region is poor and is not able to meet the local demand. Urgent measures should be taken to enhance the testing capability in Cebu so that reliable tests can be done in time in Cebu, as needed by the regional manufacturers, since there are a large number of factories engaged mainly in food processing and woodworking.

2) Cagayan de Oro

As testing laboratories in Cagayan de Oro, there are the Region 10 Research Institute (chemistry) of DOST and the Xavier University (XU), but the equipment possessed by DOST Region 10 are elementary and the equipment of XU are of class work level. They are not capable to conduct testing on products for PS Mark license and other certifications.

The testing capability in this region is extremely poor, and urgent measures therefore should be taken to enhance the testing capability.

3) Davao

As testing laboratories in Davao, there are DOST Region 11, Immaculate Conceptions College (ICC), Ataneo de Davao University-Chemistry Research Laboratory (CRL) and the University of Mindanao (UM).

The equipment of DOST Region 11 is chemistry-related, but most are not for analytical work; the equipment of ICC is also chemistry-related but is of a students' class work level; and the equipment of UM is for class work use except for the universal testing equipment, which is the only one in Mindanao island.

CRL possesses relatively effective equipment for chemical analysis, but as the main work is in analysis of gold, they will not contribute to the PS Certification Mark System.

Under this situation, the testing capacity in this region is poor, and urgent measures therefore should be taken to enhance the testing capability.

(5) Tests for Research and Development

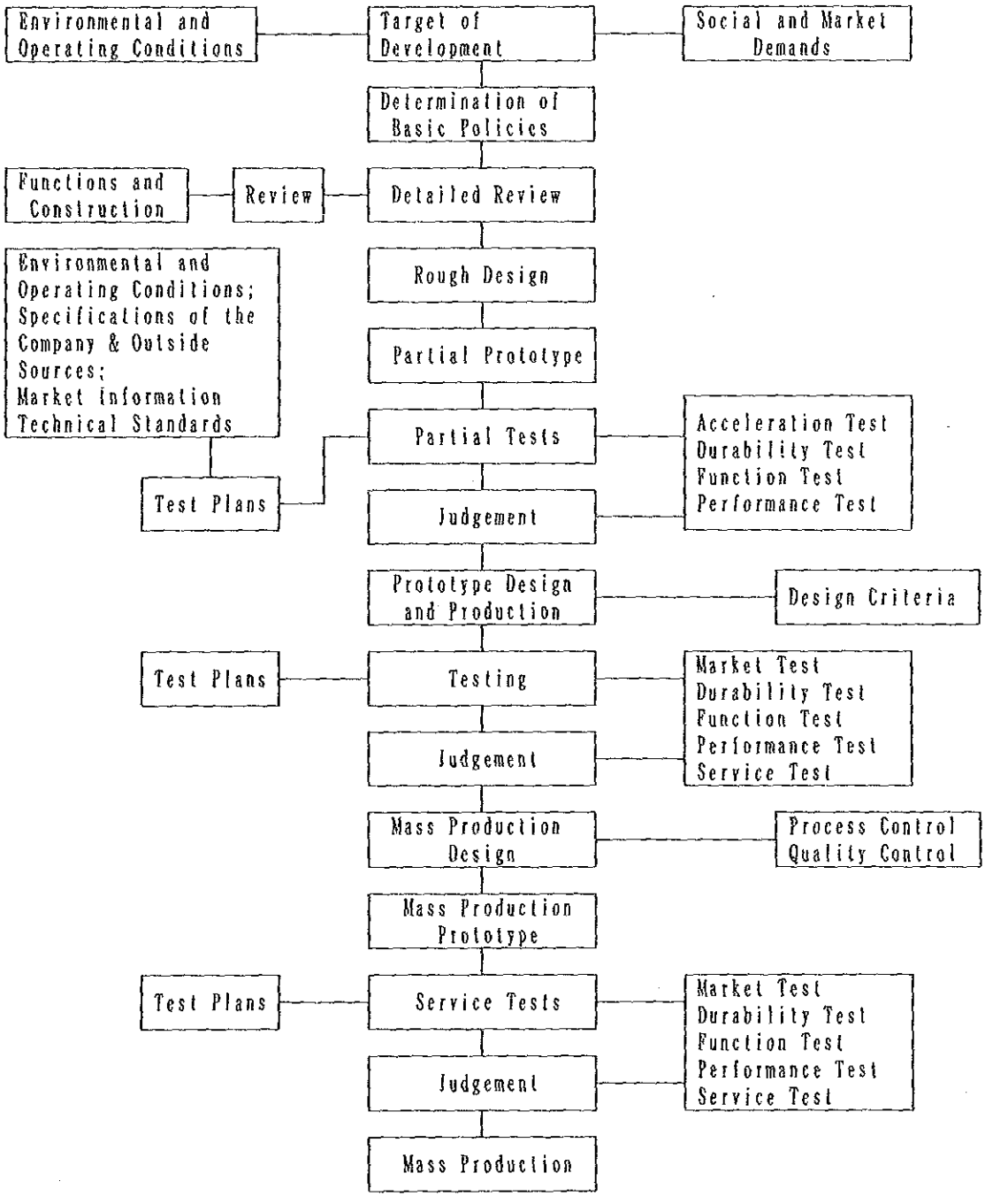
1) Tests for product development

A variety of tests are usually conducted in the several stages of product development through commercial production of the developed product to confirm whether the product conforms to the design standard applied for. Figure 3-3-1 illustrates the tests to be conducted in this process.

The tests which are to be conducted in the course of product development enable the evaluation of feature and nature of the product in a proper manner so as to take appropriate measures for cost reduction, standardization of parts and adaptation of interchange of parts and thereby improving production economics and product quality. As such, the tests which are conducted in the various stages of R&D activity have an important role in diversifying products to meet the need for expanding markets and also in developing products which are internationally competitive.

In the Philippines, investments in building factories, except for those built by foreign-capital-related large companies, are mostly for the acquisition of equipment and facilities directly related to production, and the thus established factories therefore are equipped with no testing facility or a very primitive type of testing facility. Thus, most of the existing factories are not capable of conducting tests by themselves to make a feedback of the test results for improvement of the products, and are shipping the products only with visual check of products made at the final stage. These customs

Figure 3-3-1 PRODUCT DEVELOPMENT AND TESTING/INSPECTION



often resulted in losses due to acceptance of price reduction demanded by buyers against inferiority of the supplied products or correction of defects in those products. In order to supplement deficits in the manufacturers' testing capability and also to receive objective evaluation of products by third party tests, manufacturers expect to enhance the testing capability of public testing institutions or private testing companies for their services.

3-4 Metrology System

(1) Outline of the System

1) Laws and regulations concerning the metrology

In the Philippines, there is no general law nor regulation pertaining to the metrology, but there are regulations stipulating the metrology in connection with the levy of taxes as listed below. With recognition of the necessity of enacting the general laws and regulations concerning the metrology, however, the preparatory work for legislation is under way with the assistance of UNIDO.

1. Rules and Regulations on the Implementation of Batas Pambansa Bilang 33 as Amended by Presidential Decree No.1865 (1983-08-03) - Bureau of Energy Utilization, Ministry of Energy: This was enacted by the Ministry of Energy, stipulating that the buckets, tanks and other tools for measurement which are used for petroleum refining and distribution of petroleum products shall be subject to the test and calibration of NIST/DOST (present ITDI/DOST) in order to maintain fair trade of petroleum products.

2. Batas Pambansa Blg. 8 - An Act Defining the Metric System and its Units, Providing for its Implementation and for Other Purpose (1978-12-02): This is to set forth that the adoption of the International System of Units (SI) shall be enforced on January 1, 1983; the Metric System shall be used for the domestic business affairs; and the National Standard for the Metric System shall be established and maintained in NIST (present ITDI).

3. Section 14 of the Local Tax Code enacted under Presidential Decree No. 231-1973: This is to set forth that municipal governments shall hold metrology instruments or tools to be used as the basis for the assessment of tax amount, which shall be subject to calibration done by NIST (present ITDI) once a year.

4. Chapter VI of the National Internal Revenue Code - 1970: This is to set forth that the Ministry of Finance shall hold metrology instruments or tools for length, weight, volume, etc. as the basis for the assessment of tax amount, which shall be subject to periodical calibration.

5. Republic Act No. 1365 - An Act Requiring All Copra Buyers to Use Moisture Meters in All Their Domestic Purchases of Copra in the Place where Each Such Purchase is Made, and for Other Purposes (1955-06-18): This is to set forth that moisture meters to be used for measuring moisture content of copra in the trade of copra shall be subject to approval of NIST (present ITDI) and its periodical check every six months.

6. Philippine Commission Act No. 1519 - An Act to Providing for Inspecting and Sealing Weights Measure and to Regulate Their Use (1906-08-03): This is to stipulate the definition of the Metric units and the traditional units and their application with respect to mass, length, area, capacity and volume, the control and surveillance of metrology standard, and test and inspection of metrology instruments or tools.

2) Metrology units

In the Philippines, the Metric unit based on the SI system has been adopted as the metrology unit according to Batas Pambansa Blg. 8 - An Act Defining the Metric System and its Units, Providing for its Implementation and for Other Purposes (1978-12-02) enacted in 1978. The outline of this legislation is as follows:

1. The units under the Metric System shall be only valid as the official metrology units in and after January 1, 1983. The official or legal measurement or document relating to the products, commodities, materials, public work, services, merchandise, or contract shall be based on the units under the Metric System.

2. The definition of the units under the Metric System shall accord to the SI established in the General Conference of International Weights and Measures, and details of its application shall be defined by the Metric System Board which has been established under the Presidential Decree.

3. The definition of seven basic units (namely, meter for length, kilo-gram for weight, second for time, ampere for electric current, kelvin for temperature, candela for luminous intensity, and mole for amount of substance) and its sub-units or combined units shall be stipulated.

4. It is defined that the metrology standard shall be physically embodying the units, and the national standard shall be the primary standard, and also that the definition of measurement shall be to express in a quantitative manner a state of mass, time, electric current, temperature-efficiency, light intensity, surface area, cubic volume, velocity, force, pressure, work volume, heat, angle, and other phenomenon.

5. The national standard for the Metric System shall be established and maintained in NIST (present ITDI), and if comparative calibration with the International Standard is required, it shall be conducted in conferring with the Metric System Board.

(2) Metrology Administration

The metrology administration is centered on the National Standards and Testing Laboratory (NSTL) of ITDI under DOST.

NSTL is one of the ITDI's subdivisions, and its main function is as follows:

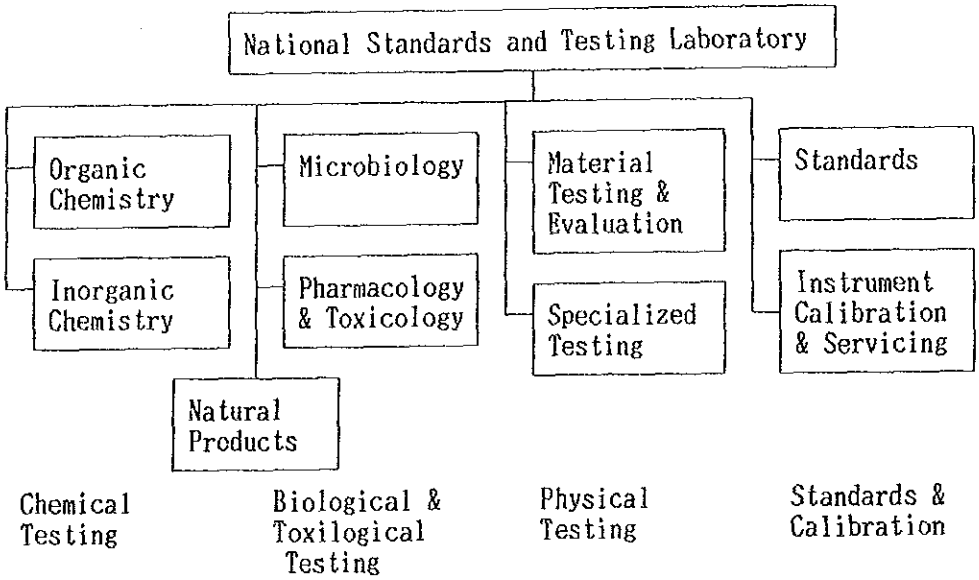
1. Establishment and maintenance of the national standard with respect to mass, length, electric current, temperature and light intensity
2. Chemical, physical, biochemical analysis and test
3. Research and development of measuring instruments or devices
4. Test and calibration of metrology instruments
5. Repair of relevant equipment
6. Research and development of testing methods

NSTL consists of eight divisions and have about 130 persons of staff. The organization and manning of staff in charge of metrology in NSTL are shown in Figure 3-4-1 and Table 3-4-1.

(3) Legal Metrology and Industrial Metrology

The metrology system is divided into legal metrology and industrial metrology. The legal metrology aims, for ensuring fair trade, to control by laws and regulations the correct indication of scale or graduations in the measuring equipment such as balance, tanks for measuring volume, etc. which have direct influence to consumers and to pursue the inspection of measuring equipment by the national authority to prevent them from unfair use in falsifying the indication of scale or graduations. On the other hand, the objective of industrial metrology is to ensure the accuracy of figures indicated in measuring instruments or devices. The development of industry will expand the volume of measurement while requiring more strict accuracy. The overall system of legal metrology and industrial metrology is illustrated in Figure 3-4-2.

Figure 3-4-1 Organization chart of NSTL



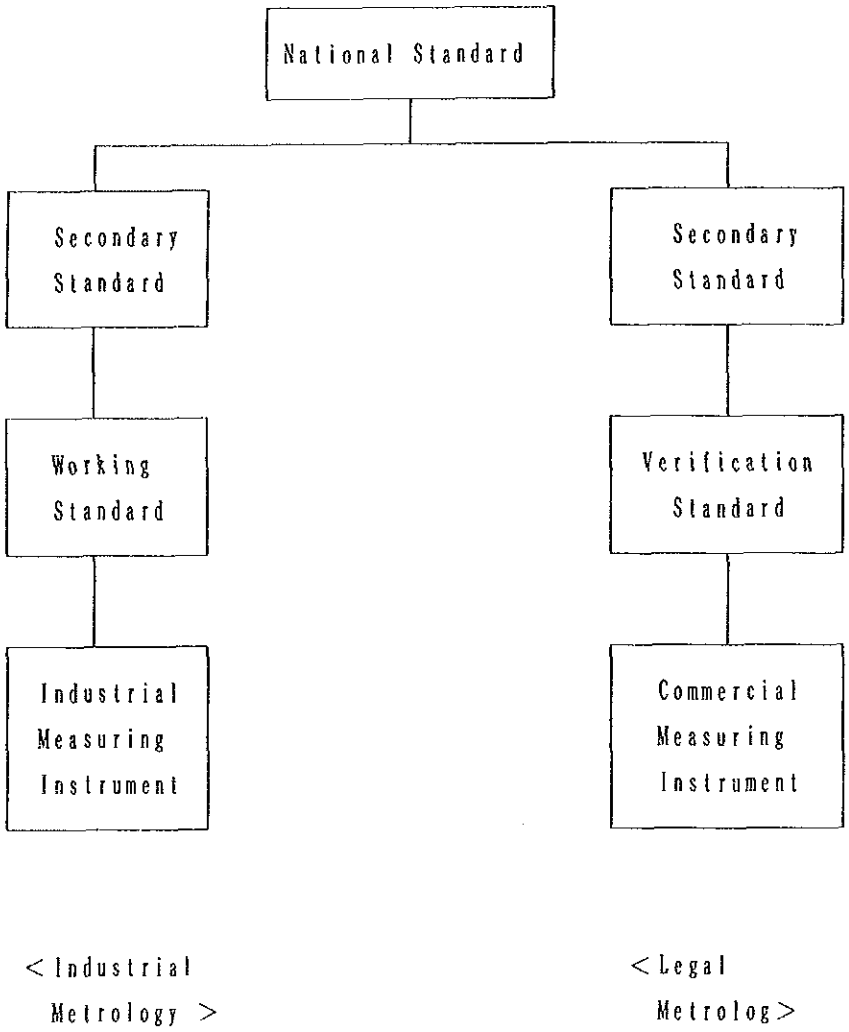
Source:NSTL

Table 3-4-1 METROLOGICAL MANPOWER OF NSTL

Field	Engineer	Technical Assistant	Total
Mechanical	8	10	16
Electrical/ Frequency	3	3	6
Temperature	2	0	2
Regional office	4	2	6
Total	17	15	32

Source:NSTL

Figure 3-4-2 LEGAL METROLOGY AND INDUSTRIAL METROLOGY



(4) Metrology Standard

ITDI/NSTL are responsible for the establishment, maintenance and supply of the national standard, secondary standard and reference standard. The standard and calibration equipment which NSTL possesses relate to mass, length, density, force, pressure, electrical (direct current), frequency and temperature for the primary standard and mass, length, volume, force, hardness, electrical (direct current, low frequency) and temperature for the secondary standard. Those equipment are listed in Tables 3-4-2 and 3-4-3. The accuracy of these standards is adequate to meet the level required as the national standard, but the scope of coverage will have to be expanded along with the development of industry. The implementing agencies of the legal metrology are NSTL, and DOST's Regional Offices in Regions 1, 6, 7 and 10.

System for the metrology standard is illustrated in Figure 3-4-3.

(5) Metrology Calibration

1) NSTL

NSTL in ITDI provides various organizations such as factories, schools, hospitals, governmental organizations, private associations, and other relevant concerns with metrology calibration with respect to mass, length, volume, density, force, pressure, temperature and electrical. The number of calibration provided by NSTL totals about 3,000 per annum, including the check of moisture meter which is included in the legal metrology.

About a half of the calibration service provided relates to volume and density, followed by the calibration of metrology instruments related to mass which amounts more than 800. The calibration service for metrology instrument related to electrical quantity has currently been increasing. (Refer to Table 3-4-4.) NSTL's performance on the provision of metrology calibration is satisfactory, although the scope of service is limited because of the limited equipment available. However, as it has been recognized by NSTL itself, the technical expertise of the staff seems to be insufficient. Many of the NSTL's engineers, after acquiring basic training and job experience, have resigned to transfer to the private sector, and it partly constrained institutional build-up of NSTL.

2) Regional Standard and Testing Center (RSTC), Region 7

RSTC, Region 7 is a DOST's testing laboratory located in Cebu. This laboratory undertakes the tests based mainly on chemical analysis and the calibration service for

Table 3-4-2 PRIMARY STANDARDS OWNED BY NSTL

Name	Specification	Uncertainty	Year of last International calibration
MASS			
-1kg stainless steel	1kg	0.3mg	1985
-set of weights	31pcs. 1mg-20kg	class E2	1983
LENGTH			
-1m line standard	1m	0.3um	1987
-set of gauge blocks	0.5mm-100mm	0.5um to 10um	1985
DENSITY			
-silicon density standards	2.329074g/cm^3	0.000019g/cm^3	1982
FORCE			
-deadweights	up to 4tf	$2x10^{-5}$	
-proving ring	90tf	0.03-0.25tf	1985
PRESSURE			
-deadweight piston gauge	up to 200kgf/cm^2	0.1%	
-U-tube mercury manometer	up to 760mmHg	0.1mmHg	
DC VOLTAGE			
-saturated standard cell	1V	0.4ppm	1987
DC RESISTANCE			
-Thomas type standard resistor	1ohm	0.2ppm	1985
AC-DC TRANSPER			
-Thermoelectric comparator	1:1 transfer 0.5 to 1000V	0.005%-0.5%	1985
FREQUENCY			
-time base of counter	10MHz		
TEMPERATURE			
-freezing point of water	0℃		
-freezing point of tin	231.9681℃		
-freezing point of zinc	419.58℃		

Source:NSTL

Table 3-4-3 SECONDARY STANDARDS OWNED BY NSTL (1)

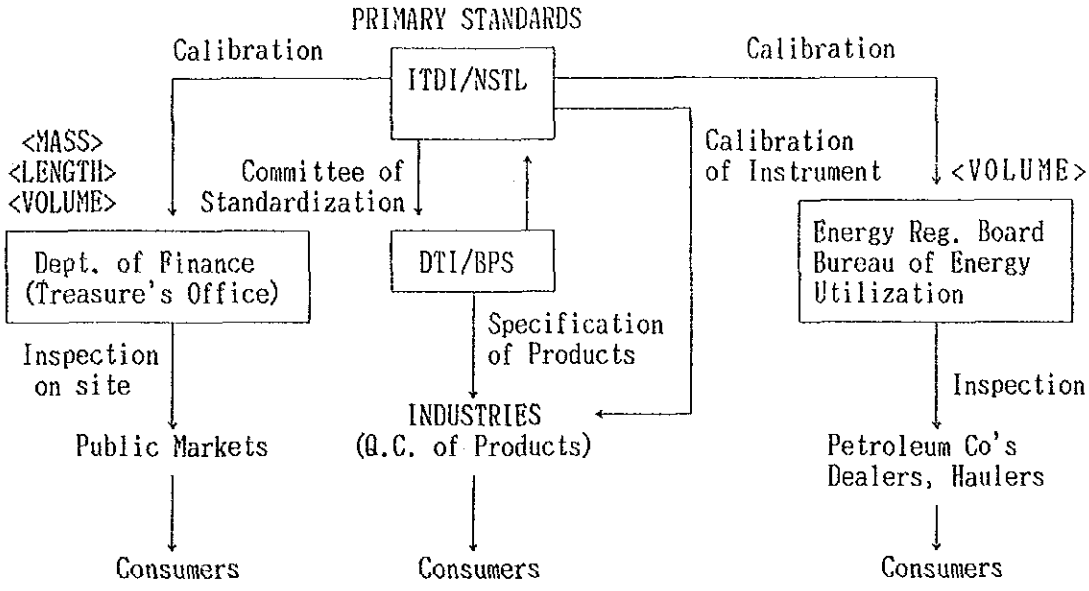
Name	Specification	Uncertainty	Year of last calibration
MASS			
-precision balance	0-20g	0.001mg	
	0-100g	0.01mg	
	0-3000g	0.1mg	
	0-50kg	50mg	
	0-100kg	200mg	
LENGTH			
-line comparator	0-1000mm	0.003mm	
-gauge block copmarator	0-250mm	0.03um	
-universal measuring machine	0-500mm	1um+10ppm	
-electronic gauging micrometer	0-1.5mm	0.3um	
VOLUNME			
-proving tanks	up to 500L	0.05%	
FORCE			
-universal testing machine	0-50tf	0.1%	
HARDNESS			
-Vickers, Rockwell and Brinell measuring machine			
DC VOLTAGE			
-Kelvin-Verley voltage driver -reference voltage divider	0-1000V	5 to 10ppm	
-null detector -DC voltage source	0-1, (1.1)	0.1ppm	
-potentiometer	0-16mV-1.6V	0.0025% to 0.0005%	
AC VOLTAGE			
-AC calibrator	0-1mV-100V	0.02%	
-AC/DC meter calibrator	0-10mV-1000V	0.2%	
AC CURRENT			
-AC/DC meter calibrator	0-10uA-10A	0.4%	
RESISTANCE			
-standard resistors	0.001Ω to 1MΩ	0.001%-0.002%	
-Wheatstone bridge	0.1Ω to 11GΩ	0.005% to 2%	
-seven dial double ratio set	1:11 to 11:1 0.1mΩ to 100kΩ	0.2ppm	
FREQUENCY			
-universal counter	0-4GHz		
-VLF/LF receiver/ comparator	1MHz, 10MHz		
-frequency difference meter	100kHz, 1MHz, 2.5MHz, 5MHz	$1x10^{-11}$	

Table 3-4-3 SECONDARY STANDARDS OWNED BY NSTL (2)

Name	Specification	Uncertainty	Year of last calibration
TEMPERATURE			
-industrial platinum resistance thermometer	0- 630℃		
-type S thermocouple	0-1000℃	1uV+0.07Emf	
-type R thermocouple	0-1000℃	1uV	
-standard mercury-in-glass thermometers	0- 300℃	0.1℃	
-digital thermometer	CA thermocouple -200 to 1370℃ PR thermocouple 0 to 1000℃	0.05%+ 0.3℃	
-mV potentiometer	10.1mV-100.1mV	0.03%	

Source:NSTL

Figure 3-4-3 METROLOGICAL SYSTEM



Source:NSTL

Table 3-4-4 CALIBRATION SERVICES RENDERED BY NSTL

Metrological Quantity	1986		1987		1988	
	Number	Income	Number	Income	Number	Income
Mass	865	44	973	29	838	51
Length	361	11	334	15	209	11
Volume/density	1,157	153	1,621	185	1,557	189
Force/pressure	320	28	312	29	279	31
Thermometry	106	19	171	21	89	20
Electrical					52	33
Moisture meter	92	13	182	10	71	5
Total	2,901	268	3,593	289	3,095	340

Source:NSTL (Unit of income: Thousand Peso)

legal metrology relating to mass, length and volume. There are 8 persons of the staff, of which metrological staff are 5 persons. The metrological equipment owned by this laboratory are limited to those relating to mass, length and volume, and not higher than those that can be used as standard for verification. (Refer to Table 3-4-5.)

In 1988, RSTC provided about 100 of calibration service for legal metrology. (Refer to Table 3-4-6.) As RSTC's calibration service is provided only in a limited scope, its performance is fairly satisfactory even with a limited number of the staff available. Nevertheless, it has never undertaken the calibration service for industrial metrology and, in fact, its capability seems to be inadequate to extend the service to that area.

3) Other organizations

Besides NSTL and RSTC, there are some organizations providing the metrology calibration; MIRDC for the calibration relating to length and electrical, CIGI relating to the standard gases, and CCL relating to force. The MIRDC's performance of the calibration service is given in Annex 3. The CIGI's calibration service is limited to the industrial gas producers, while the CCL's service is only to the cement manufacturers. Hence, the number of the calibration provided by them remains in only a few. CCL possesses a proving ring, but it is not well maintained without calibration for long time.

(6) Accreditation of Metrology Laboratories

Aiming at the promotion of metrology laboratories, in January, 1989, ITDI issued the Guideline for the Accreditation of Metrology Laboratory and started a program to accredit laboratories as the metrology laboratories according to that guideline. This program seems to be effective to meet the increasing requirements of metrology calibration services in the future. However, there are little laboratories which can satisfy the conditions required by ITDI for accreditation, and in fact there is no accredited laboratory yet.

The criteria applied to the assessment of laboratory for accreditation according to the foregoing guideline are as follows:

1. Organization
2. Technical level of the staff
3. Procedure for and method of calibration
4. Measuring equipment and standard possessed
5. Recording of calibration
6. Report of calibration

Table 3-4-5 METROLOGICAL EQUIPMENT OWNED BY RSTC

Name	Q'ty	Specification	Uncertainty	Year of last calibration
Proving tank	1	500L		
Proving tank	1	250L		
Proving tank	1	100L		
Weighing scale & set of weights	1	500kg		
Strength testing machine	1	500psi		
Tensile strength machine	1	100kg		
	1	50lbs		
Vernier caliper				

Source:RSTC

Table 3-4-6 CALIBRATION SERVICE RENDERED BY RSTC

Product	Number	Calibration fee
Tankers/trucks	68	14,660
Buckets	30	290
Truck scale	2	775
Weights	3	50
LPG automotive tank	1	60
Proving tank	9	544

Source:RSTC (Unit of fee:Peso)

3-5 Activity to Promote Quality Control

The organizations that are engaged in activity to promote quality control as the national level in the Philippines are 1) Philippine Standards Association, Incorporated (PHILSA), 2) The Productivity and Development Center of the Development Academy of the Philippines (PDC), 3) Philippine Society for Quality Control, Incorporated (PSQC), 4) Philippine Productivity Movement Incorporated (PPM), and 5) Buy Philippine Made Movement (BPMM), each launching activity of their own to promote quality control, the details of which are described in Annex 4. PHILSA has the longest history being organized in 1955. PDC follows in the length of history being organized in 1967. PSQC and PPM are organizations that separated from PDC to form independent organizations. These organizations interact closely in their activity. BPMM was founded in 1988 and is an organization for educational movement for the consumers, acting also on the manufacturers to supply products of good quality to the market.

A movement that calls particular notice in the promotion of quality control is the National Quality Campaign (NQC) promoted by PPM. This is a five year plan officially launched on September 2, 1988, and is operating under the slogan "Quality Means Productivity" for fiscal year 1988 and 1989. The organization is operated with Mr. Miguel R. Unson, Chairman of San Miguel Corporation as the chairman and Mr. Renatto V. Navarrete, Director of BPS and Mr. Menelo J. Carlos, Jr., President of Resins, Inc. as vice-chairmen and ten members of the committee appointed from the academia, government, and the private industry. NQC makes its objective to enhance the interest and responsibility in improvement of quality aiming at the top management of the manufacturers as the target.

Starting in fiscal 1988, PSQC started a system for awarding of superior firms in quality control for the year, which corresponds to the Deming Application Prize in Japan. The objective of this award is to extend the methods of quality control in production, management and all other fields and the firms who produced results by practicing exemplary quality control are selected annually for the award. This award system has been implemented with the cooperation of NQC, and it is the most authoritative award in the Philippines.

In the Philippines, NQC is launching on the nation-wide activity with a wide extent of professionals, in which PSQC, PHILSA and other professional associations are playing role for the dissemination of quality control. Nevertheless, NQC is a sort of movement, and it is not a professional institute which functions to provide continuous dissemination and extension of quality control. PSQC, PHILSA, PDC, PPM and other institutes or organizations conduct seminars on quality control, and the content of

these seminars are similar to those conducted in the industrial countries. However, their individual activities are situated in a rather limited capacity to drive the strong movement on a wide extension of quality control, and moreover their seminars are inadequate and the substance is also not so systematic.

In view of these situations, it is observed that there is no institute which can function as the core to pursue the promotion of quality control in a constant and systematic manner.

Chapter 4

MAIN TASKS AND GOALS OF THE INDUSTRIAL STANDARDIZATION AND QUALITY IMPROVEMENT PROGAM

Chapter 4 MAIN TASKS AND GOALS OF THE INDUSTRIAL STANDARDIZATION AND QUALITY IMPROVEMENT PROGRAM

4-1 Main Tasks and Goals

(1) Tasks of the Industrial Standardization and Quality Improvement Program in Developing Countries

The Industrial Standardization and Quality Improvement Program needs to be formulated on the basis of present level of the industrial sector with being able to support the development of economy and industry according to its development thrust. From this point of view, it is necessary to analyze the areas to which the industrial standardization and quality control can contribute in the development of economy and industry. In the case of industrialized countries, industrial standardization is set it in alignment with the technical progress of the country so that it can role as the foundation of industry and technology which leads to further advancement of technology. In other words, standards were formulated and standardization was progressed accordingly after a certain degree of technological development had taken place. And when there was further technological development, revisions of the standards to reflect the development took place. Quality control has contributed to preventing manufacture of inferior products and to manufacturing acceptable products by exercising overall control in production process utilizing the analysis results of quality specifications and manufacturing conditions based on the standards which are the concentration of technology available at that particular point of time. Thus, quality control has played an important role in generating the productivity and technological progress.

For the present developing countries, however, the required technologies are available abroad in the industrialized countries, and what they need to do is to develop its own technology on the basis of the technologies introduced from these countries. In such case, industrial standardization and quality control improvement, differing from that in the advanced industrialized countries, need to fulfill the role of guiding and improving the prevailing quality to the targeted level. From this point of view, therefore, the development of standards in the developing countries is necessary to match the level required for future development of the industry and economy, instead of prevailing present technology level in the country.

(2) Tasks Expected for the Industrial Standardization and Quality Control Improvement Program in the Philippines from the Viewpoint of Present Level and Future Thrust of *Economic and Industrial Development*

In considering the future thrust of the socioeconmic and industrial development in the Philippines, as already discussed in Chapter 2, the benefits expected from the Industrial Standardization and Quality Control Improvement Program may be summarized in the following points:

1. The first point is the contribution to export promotion by ensuring the quality reliability of the Philippines products in the export markets. In order to achieve this, one aspect is to prevent exports of substandard goods and another is to support the improvement of technology and quality.

   At the present time much of the exports of the Philippines is conducted according to the standards and specifications prescribed by the buyers. In the case of consigned processing, the raw materials are also provided by the buyers and thus there is almost no problem of quality. In other cases also, inspections are done in presence of buyers at the time of shipment or the buyers request the affixation of quality certification by neutral third parties, etc. and there is almost no exports of substandard goods.

   However, in the case of food, there is much general exports. There have been claims and complaints from the export markets because of inferior quality such as contamination by bacteria, mixing of foreign matter, deterioration of food due to defect in the packaging material, etc. Regulatory administration of food is conducted by the Bureau of Food and Drug at present, and further measures are required in this respect.

   Most of garments, electronic parts, toys, etc. for exports at present are manufactured on the basis of buyers' consignment or buyers' specifications. However, general export is expected to increase in the future. Also, exports of such products of low degree of processing and of volumes that are not extremely large, such as hand tools, special screws, etc. are promising. In this case, the specifications on the quality and standard of the products will be prescribed by the samples from the exporters, and shipping inspection will be increasingly conducted by the exporters themselves. It is necessary to start to establish a system to prevent exports of substandard goods in advance anticipating such change in the near future. In the case of exports of woodworking products, it is expected that there will be an increase in export of products of small- and medium-scale manufacturers with movement to specialization and parts production, and therefore establishment of a system to prevent exports of substandard products is also needed in this sector.

   In the export market, it is not easy to restore trust that is once lost or to change the recognition once set as an export source of inferior quality. Conversely, when confidence in quality is established, it is possible to secure a favorable position in price, too.

2. Expected next is the intensification of import substitution, particularly at the level of materials and components industries with further expectation of development to export-oriented industrialization. At present, the export industries and the large-scale manufacturers depend on imports for most of the materials and components they use because of the low quality of the domestic products. The improvement of the quality and standardization of the domestic

products to enable procurement of such materials and components within the country is desired.

In the future, it is expected that many export industries with high level of technology will be established by foreign investments in the Philippines along with the foreign investment promotion. For such establishment to take place, however, there is need for the presence of the peripheral industries to supply the intermediates and components as the basis. Some of such peripheral industries will also be established by investment in the Philippines of foreign manufactures because a high level of technology is required. However, they still rely on some items of materials and parts supplied from local manufacturers. Hence it is necessary to foster local manufacturers who can produce those materials and parts in acceptable quality.

Also, with the development of industry and economy such industries as the transportation, communication, construction, etc. must also develop. It is essential for a balanced development of industry and economy that the industries supplying products to such industries develop at the same time. Should such product depend on imports, there is fear for recurrence of a state of rapid increase of imports accompanying the development of industry and economy and an increase of foreign debts.

3. The third contribution expected is reduction of concentration of industry in Manila, and dispersal of the industries into regions with development of local industries. The major reason for the concentration of industry in Manila is the concentration of the infrastructures such as electricity and water supply, transportation, communication, etc. and the agencies for various business procedures. Thus to promote the dispersal of industry into the regions and the development of local industries, the various favorable conditions available in Manila should be made available also in the regions. The standardization and quality control may contribute to the following two points. That is, one is to develop the system related to technological and quality improvement in the regions including various testing and inspection facilities and equipment, the technical guidance functions and the training opportunities for technology and quality improvement. The other is to enable the products of the local industry which were handled only in the local markets to participate in the central markets by dissemination of standardization and quality control in the regions. The products now manufactured in the regions are not well-known and cannot win the confidence in the central market, and the certification system will improve such situation by enhancing the confidence of the certification mark.

(3) Tasks from the Viewpoint of Improvement of the Present Industrial Standardization and Quality Control System and Relevant Facilities and Equipment in the Philippines

When taking into account the present level of standardization and quality control in the industries, it is necessary that each enterprise 1) acquires the quality improvement technology by themselves,

2) thoroughly practice quality control by themselves, and 3) enhance their capability to develop quality control method by themselves, in order that the industrial standardization and quality improvement become effective. However, there are several obstacle factors which have to be overcome to reach such a level. These factors and what support by the government are required to overcome them will be discussed below.

1. There is the demand for substandard goods which is still dominant in the domestic market. Most of manufacturers chase such demand except for the export oriented manufacturers or manufacturers that have brands or corporate identity of an image of high quality. Therefore, in stimulating manufacturers to improve their product quality, development of quality consciousness is essential through the combined measures of encouragement and regulation. These include, 1) development of an atmosphere to appreciate the good quality through education and campaigns to increase consumers' quality consciousness and also to promote and manufacturers' understanding that quality improvement brings about benefits, 2) visualization of benefits which the producers can gain as the result of quality improvement through extension and enhancement of the certification system, and 3) quality regulation in the field related to safety, health and pollution which will not permit low quality. Regulation, however, should be limited to such fields as mentioned here, instead of extending all the standards mandatory. The forcing of standards means to ban all production from those who cannot meet them and if there should be demand for such quality, it will result in sustaining illegal production in the backyard and there is fear that it will lead to distrust and incapacity of the system.

2. Standardization and quality improvement is difficult to be achieved by quality regulation and administration or development of standards alone. Even if the manufacturers understand the necessity of standardization and quality improvement, the objective cannot be achieved if not accompanied by the corresponding technology for quality improvement. Also, even if a manufacturer intends to improve the quality, it is difficult in many cases for the manufacturer to carry out quality improvement by themselves alone without the market appreciating the effort. Particularly in the case of cottage, small- and medium-scale industries, it is frequent that they are not dealing with a market that appreciates the improvement of technology and quality. If they try to deal with a market which does, they will run into the contradiction that improvement of technology and quality is needed before they can do that. In the quality improvement plan in an industrially developing country, the support for manufacturers' aspiration is indispensable in 1) financing and taxation, 2) technology transfer, and 3) improvement of public facilities. Public support, however, has a tendency to fall into unreasonable and imbalanced protection of industry. If only the existence of needs is exaggerated, and no attention is given to the corresponding activities developing in the private sector, public support will bring adverse results of picking the fields of such activity. What is necessary and possible as public support is the one up to the encouraging or basic support in the initial stage. Subsequent to that, the development should be left to the private sector. The contents of the technology to be transferred through public means are limited generally to that

of the stage of a certain extension in society. It is necessary to keep in mind that the transfer of technology of a more advanced level should be carried out through competition and contract at the private level , that is, through technological license agreements or technical guidance based on sub-contracts.

4-2 Improvement of Standards and Certification System

The standards and the certification systems which are the basis of industrial standardization need to guide the technology development in the industrial developing countries. In the case of the Philippines, the manufacturers which have concern in quality improvement have been concentrated in export-related manufacturers, the manufacturers that introduced technology from abroad or the manufacturers that supplied parts and materials to these manufacturers. These manufacturers have a strong tendency to depend on the specifications designated by the buyers or on foreign standards rather than the national standards of the Philippines. At the same time, the standards formulated as the national standards of the Philippines were strongly administrative in nature. Therefore, a systematic standards development as the technical basis of industrial development was insufficient and the following improvements are recommended in the future.

(1) Improvement of the Medium-Term Standardization Program, and the Annual Program

1) Improvement of the Medium-Term Program

The present medium-term standardization program is compiled as "Visions and Targets (1989-1991)". This was prepared along the basic policies of DTI and by putting together the requests of the major related agencies and the private organizations. It briefly summarizes the basic policies of BPS for the next three years and the most important tasks in an itemized form. It is highly important in publicizing the direction of the policies of BPS among the people of the Philippines. In other words, should the direction of the policies of BPS be indicated to the people , the standardization efforts of the private sector will be oriented in that direction and the standardization in the Philippines will be accelerated. In order, however, for the "Visions and Targets (1989-1991)" to be fully understood by the people and utilized in their standardization efforts, the present itemization alone is insufficient. It is desirable that at least statements regarding the aims, the reasons for adoption, measures to be taken by the government, the roles expected of the private sector, etc. are added. Further, it is recommended to establish a "Basic Program of Industrial Standardization" taking into account the national economic development plan and present level of the industry, and publish it for public concerns.

It is necessary to explain the purpose, aims, and objectives, specifically for each item so that the principles of BPS's policy are understood by the general public in addition to the people who are involved in standardization. Needless to say, the Basic Program is to specify the policies and goals of the Philippine Government as a nation and those of DTI from the standpoint of standardization.

The Basic Program should be studied by the related bureaus and divisions of DTI to fully reflect their views, and submitted to the Standards Council to take up their views. Such procedure is essential in securing the cooperation of the people involved in the industrial standardization for an effective implementation.

2) Improvement of the Annual Program

While the "Visions and Targets (1989-1991)" mentioned above did not go beyond listing the items, the 1989 Standardization Implementation Program firstly indicated in an organized manner the basic problems and the measures for them so that they are understood at a glance and nextly describes specifically how each basic problem is taken up and at which division and what countermeasures will be taken. The problems were investigated thoroughly, and the countermeasures were examined well. The presentation as well as the contents is excellent. Further improvement, if necessary, may be in the following points:

1. For the item of standards development, add the description on the basis of selection of the strategic fields for standards development including the statement of policy direction, the type of standards to be developed such as product standards, testing method standards, terminology standards and classification of the implementation standards, and the technical committee in charge of the examination. As for the basis of selection of the strategic fields for standards development, the various publications prepared by BPS gives the detail, but it is desirable that these items are written in an organized way in the Implementation Program so that concerned people other than BPS and the general public may easily understand.

2. If the drafting of some of the standards is assigned to outside organizations, such standards should be explicitly stated in the program. Similarly when assigning the investigation and research necessary for the development of standards to other testing institutes and organizations, it is desirable that the assignee and the period of assignment for each item is stated.

3. As a priority means for promoting the formulation of standards, the introduction of a fast track method of standards which has been designed to shorten the formulation procedure is stated, but the detailed content is unknown because such is not explained well in the Implementation Program. As it will have strong effects on the people involved depending on the method of implementation, it is desirable that the specific contents and the method of implementation are explained to also obtain their cooperation.

4. As standards certification occupies quite an important position in the responsibility of BPS and affects a wide range of organizations, it is necessary to explicitly state the basic policy of BPS on the administration of the system for the particular year in the beginning. Particularly

when there are changes in important matters such as introduction of a new system or a modification of the method of examination and inspection, it is important to include the additional note to make it understandable for the people involved.

Since the Basic Program and the Implementation Program are necessary to be disseminated to the general public, it is desirable that effort is made for their dissemination through distribution of publications and other methods.

(2) Strengthening of the Standards Council

1) Improvement on the composition of the members of the Standards Council

The Standards Council is constituted at present by seven standing members and ten temporary members, a total of seventeen members. The fields represented by the members are as follows:

1. ITDI,DOST (Research and development of various technology)
2. Bureau of Food and Drug, Department of Public Health (Instruction, supervision and administration of the production, distribution, and consumption of food and drugs. The standards of processed food are established by BPS)
3. PHILSA (Extension of standardization)
4. Procurement Service Office, Department of Budget and Management (Procurement of articles of the government and related organizations)
5. Philippine Technological Council (Technological trends)
6. Bureau of Domestic Trade Promotion, DTI (Domestic commodities distributions)
7. Bureau of Trade Regulation and Consumer Protection, DTI (Consumer protection)
8. Philippine Chamber of Food Manufacturers (Food industry)
9. Lorenzana International Inc.
10. Food Development Center (Food development)
11. Philippine Association of Flour Millers (Flour milling industry)
12. Fitrite Incorporated
13. Simex International
14. Rufina Patis Inc.
15. General Milling
16. Silver Swan
17. Lorenzana Food Corporation

According to the contents of deliberation in the past, the above composition of the members seems to have functioned well,but in order to ensure reaching a conclusion balanced with reflection of various strata of people in the future, it is recommended to include such members as follows:

1. Experts on quality control technology
2. Representatives of the mass media or opinion leaders who have influence on industry and technology
3. Representatives of PCCI, the industries of important positions in the present economy, and strategic industries to be developed in the future

   Examples: Electrical and electronics industry, textile and garments industry, automobile assembly and automotive parts industry, iron and steel industry, furniture industry, building material industry, toy industry, etc.
4. Consumer representatives
5. Chairmen of major technical committees

2) Development of the contents of deliberations

The major items deliberated as important subjects of standardization in the Philippines at the six meetings held in 1988 are summarized as follows:

1. The priority fields in development of PNS were defined as the fields related to securing of the health and safety of the general public, and fields affecting the consumers seriously. The standards in these fields were proposed to be mandatory, and formulation of provisional standards was proposed in particularly urgent cases.

2. Items for which standards should be urgently developed following the above were specifically indicated. The majority of the items are livelihood related industrial products.

3. Because of the troubles on exported processed foods quality complained in the importing countries, the standard formulation and implementation, and reexamination of the export procedures, etc. were deliberated as highly serious and urgent problems.

4. Measures for dissemination and implementation of standardization including quality control were deliberated specifically as follows:

   - Dissemination to the general public
   - Promotion to the industrial organizations
   - Promotion by strengthening the communications and cooperation with the related organizations
   - Expansion of the scope of mandatory procurement of PS Mark products
   - Extension of mandatory legislation in PNS
   - Reinforcement of penalty rules
   - Introduction of standardization education in schools

5. Strengthening of the measures for extension of the metric system was stressed.

6. The necessity for strengthening of metrology and calibration was taken up in relation to the problem of short sales of daily necessities.

The Standards Council initiated activity in 1988 and despite the short history they have expressed superior views as mentioned above, contributing greatly to reflecting the need for and promoting standardization. During the year 1988, however, the deliberation showed a tendency to have been concentrated on the current problems of the industry and problems of certain fields and items. It is desirable that deliberations are carried out in a comprehensive and systematic way from the viewpoint of how should the standardization policies for the economic development and technological promotion of the Philippines be in the future and what should be and how they should be implemented as standardization projects. As the Basic Program and the Annual Programs form the foundation of the national standardization policies, they should be the most important subjects of the Council. The inclusion of the additional members, as discussed previously, in the Council is recommended so that such deliberation may be carried out in a thorough way.

(3) Improvement of the System to Develop Standards

1) Strengthening of BPS, and support for improvement of the capability of the industrial associations in drafting standards

The work relating to the establishment of national standards of the Philippines is handled by the Standards Development Division of BPS. The Standards Development Division consists of the Planning and Investigation Group, the Standards Formulating Group and the Organization Group. The number of regular staff to be assigned was 28, but actually fulfilled with 16 persons. The number of standards established in 1988 was 162 cases including those adopted from the international standards, foreign standards or the standards of the domestic organizations. In view of the number of standards established, the number of staff of 16 persons might not be too few. However, since the importance of work relating to standardization is expected to increase along with the development of the economy, and eventually the work volume of BPS to increase rapidly, it is recommended to take immediate measures for recruitment of staff as planned, considering the length of time required to develop manpower. At the same time, it is also necessary to strengthen the ability of the industrial associations to formulate the draft standards. This not only contributes to the smooth and prompt establishment of national standards but also to the promotion of dissemination and implementation of the standards in the private sector. BPS, realizing the importance, has entered standardization cooperation agreements with ten organizations and industrial associations and seeks their positive participation in the formulation of the draft standards. However, of these organizations, industrial associations in an exact sense are only four, namely, PARES, PTNMA, PLPGA and CGAP. The reason why there are so few

industrial associations that have entered into agreements with BPS seems to be that the industrial associations with the exception of a few are generally weak, having difficulty securing the funds and personnel necessary for the organization and operation of the association and therefore unable to respond satisfactorily to the request for cooperation with BPS. In light of the fact that organization of the enterprises into industrial associations is quite important for tackling the issues relating to the industry including standardization, it is recommended to support the formation of industrial associations and to strengthen their operation through various measures. Specifically, in addition to the present policies of BPS to promote the dialogue with the industries and to expand the object industries for agreements on standardization cooperation,it is recommended to examine the possibility to establish a system to subsidize a part of the cost for drafting standards to the industrial associations. Such financial assistance is especially desired to the strategic industries as the core industries of economic development such as the machinery industry, the automotive industry and the electric and electronic industry,and the industrial associations which are deeply involved in ensuring the health and welfare of the people. In addition, the timely dissemination of information necessary for the development of standards, the assistance in their use of testing institutes that will undertake the tests, and giving the order of priority for their participation in seminars and exhibitions carried out by the government may also be effective measures of support.

2) Establishment of Technical Committees in the future strategic fields

The Technical Committees which deliberate the draft national standards of the Philippines were established in 34 fields with a total number of members reaching 389 persons. A list of the Technical Committees classified into major industrial field is shown on the next page.

The characteristics of composition of the Technical Committees are summarized as follows:

1. There are a relatively large number of Technical Committees in the fields of electrical, chemicals, ceramics, daily goods and agriculture, forestry and fishery.
2. There is no technical committee, or very few if any, in the fields such as machinery, electronics, automobiles, etc. which are considered important in view of economic development of the Philippines in the future.

It is understood that such composition of the Technical Committees resulted from the present state of the economy and industry of the Philippines. But it is recommended to organize Technical Committees in the field of electronics and automobiles. In addition, it is also recommended to establish the Technical Committee in the field of electrical with technology of a high level such as electrical machinery and apparatus, telecommunication equipment and machinery, and electrical appliance machinery and equipment, etc. In establishing these committees, the cooperation of the experts of the large or leading enterprises and the professionals in these fields is essential. The cooperation with enterprises that are successful in exports is particularly required.

TECHNICAL COMMITTEES OF THE PHILIPPINES, BY INDUSTRIAL FIELD

Field	Technical Committee
1. Civil Engineering and Architecture	TC34: Doors and Windows TC 5: Concrete, Reinforced Concrete and Pre-stressed Concrete
2. Machanical Engineering	TC19: Machinereis for Agriculture and Forestry
3. Electrical Engineering	TC 1: Electric Wire and Cable TC 4: Lightings and their Fixtures TC 9: Batteries and Cells TC10: Wiring Devices
4. Automotive Engineering	No Technical Committee
5. Railway Engineering	No Technical Committee
6. Shipbuilding	No Technical Committee
7. Ferrous Materials and Metallurgy	TC 6: Gas Cylinders TC11: Steel TC33: Metal Casting TC36: Metal Coating
8. Non-ferrous Materials and Metallurgy	No Technical Committee
9. Chemical	TC 7: Surface Active Agents TC12: Petroleum Product and Lubricants TC14: Chemistry (Acid, Alkali, Gasses, Adhesives) TC15: Fertilizers and Soil Conditioners TC16: Rubber and Rubber Products TC24: Plastics and Plastic Products TC25: Paints and Varnishes TC31: Pesticides
10. Textile	TC17: Sizing System and Designation for Clothes TC18: Textile
11. Mining	TC32: Coal
12. Pulp and Paper	TC21: Paper, Board and Pulps
13. Ceramics	TC 3: Cement and Lime TC28: Glass and Glass Products TC29: Ceramic and Ceramic Products
14. Domestic Wares	TC 8: Safety Matches and Lighters TC23: Cooking and Heating Appliances TC26: Safety on Toys and Children's playthings TC30: Houshold Appliances
15. Medical Equipments and Safety Appliances	No Technical Committee
16. Aircraft and Aviation	No Technical Committee
17. Information	No Technical Committee
18. Agriculture and Forestry	TC20: Agricultural Food Products TC22: Lumber and Wood Products TC35: Plywood and Veneer
19. Stanndardization and Quality Control	No Technical Committee
20. Fire-fighting	TC 2: Equipment for Protection and Fire-fighting

(4) Development of Standard

The situation of the establishment of the Philippine National Standards is classified by fields and summarized in Table 4-2-1.

The objects of the standards in the respective fields in which 20 or more standards have been established are as follows:

1. Agricultural products: Important fruits, vegetables, grains, fishery products and animal products are included.
2. Building and construction materials: Most are related to cement and concrete products and in addition some items of other materials such as steel bars, tiles, plywood, etc. are included.
3. Chemical products: Some of the basic products including hydrochloric acid, sulfuric acid, caustic soda, alcohol, nitrogen, oxygen, etc. are included.
4. Containers: Most are related to freight containers and others include some cylinders.
5. Electrical products: Fluorescent lamps, incandescent lamps, storage batteries, wires, cables, electric fans, etc. are included.
6. Fertilizers: In addition to chemical fertilizers organic fertilizers are included.
7. Metals and alloys: In addition to iron and steel, aluminum, aluminum alloy, copper and copper alloys and metal foils are included.
8. Pulp and paper: In addition to common paper and cardboard paper, newsprint, tissue paper, paper bags and notebooks, etc. are included.
9. Petroleum products: Crude oil, LPG, kerosene, light oil, heavy oil, lubricating oil, asphalt, etc. are included.
10. Pipe and its accessories: Concrete pipes, plastic pipes and accessories are included.
11. Rubber: Most are related to specifications and analytical methods of physical properties and chemical components of rubber and rubber products.
12. Soap and detergents: Most are related to specifications and methods of analysis of the components of soap and detergents.
13. Textiles and garments: Testing methods for stability of dyes, size designation, breaking and stretching tests and methods of physical measurements for making garments.

Standards in the fields of machinery and automobile which are considered to become important in the future are;

1. Machinery: Standards are established for agricultural machines, and screws and steel balls for ball bearings as machine elements.
2. Automobiles: The breakdown of the 16 standards are 6 related to safety glass, 3 related to tires, 2 related to brakes, and 1 each for method of testing mechanical properties, plate springs, definition of weight, wheels and safety coat.

Table 4-2-1 NUMBER OF STANDARDS BY FIELD, THE PHILIPPINES (1)

	Total No.of Standard	of which: Developed in the Philippines
1. Adhesives, Glues, Gelatin, etc.	4	4
2. Agricultural Machineries and Equipment	11	10
3. Agricultural Products	78	60
4. Analytical Chemistry in General	5	5
5. Application of Statistical Methods	2	1
6. Architectural Design	1	1
7. Artistic Metalwork, Jewelry	6	2
8. Beverages, Stimulants	8	8
9. Brushes and Brooms	3	3
10. Building and Construction Materials	82	38
11. Chemical Products	36	18
12. Containers	34	16
13. Dentistry	1	1
14. Documentation	1	1
15. Electrical Products	50	29
16. Engineering Technology in General	2	1
17. Equipment for Protection and Fire Fighting	11	4
18. Explosives, Fuels and Combustive Materials	7	7
19. Fertilizers	34	31
20. Furniture and Allied Industries	6	5
21. Gifts and Housewares	7	7
22. Glass Products	8	1
23. Graphic Industries	8	8
24. Gums and Natural Resins	5	4
25. Gypsum and Lime	6	4
26. Laboratory Equipment	2	0
27. Laboratory Glassware and Related Equipment	2	2
28. Leather	16	2
29. Materials Testing in General	1	0
30. Mathematics	1	1
31. Measuring Instruments	16	17
32. Medical Instruments	2	2
33. Metals and Alloys	61	15
34. Metrology	2	2
35. Natural Oils, Fats and Waxes	2	2
36. Ophthalmology	1	1
37. Packaging	19	11
38. Paints and Varnishes	18	11
39. Paper, Board and Pulp	56	37
40. Petroleum Products	74	17

Table 4-2-1 NUMBER OF STANDARDS BY FIELD, THE PHILIPPINES (2)

Field	Total No.of Standard	of which: Developed in the Philippines
41. Pipes and Fittings	41	8
42. Power Transmission	2	0
43. Processed Food	14	14
44. Protection Divices	1	1
45. Protective Equipment in General	3	3
46. Quality Control	1	1
47. Refrigeration Technology	3	3
48. Road Vehicles	16	13
49. Rubbers	32	9
50. Plastics	14	9
51. Rules and Regulations	9	9
52. Safety Colors and Safety Signs	2	2
53. Soaps and Detergents	20	15
54. Sporting/Athletic Products	3	3
55. Standardization, Standards	1	1
56. Stationeries	3	3
57. Textile/Garments	65	40
58. Timber and Wood Products	6	5
59. Travel and Sports Products	1	1
60. Valves	2	0
61. Vibrations, Acoustics in General	5	5
62. Welding and Allied Processes	15	0
63. Toys	2	0
64. Footwear	3	0
65. Testing Standards	1	1
Total	954	535

Source: 1988 Catalogue of Philippine National Standards, Bureau of Product Standards

Thus, the national standards have been developed for 1) the products related to the industries which are important both in view of the national economy and export such as the agriculture, forestry and fishery industry, comprising agricultural products, processed food, lumber products, fertilizers, leather and hide, and the textile and garments industry, 2) the iron and steel and non-ferrous metals industry which holds an important position as a basic industry, 3) the building and construction industry and the petroleum products and paper and pulp industries which are directly related to public life, and 4) fire extinguishers and electrical products particularly important to ensure the health and safety of the people.

As of the end of 1988, 954 national standards were established, which are comparative to other developing countries. Furthermore, these standards were fairly well established reflecting the present state of the industry of the Philippines and the current national tasks.

The present Program for Implementation of Standardization of BPS is appropriate in general and it is expected that the national standardization activity will be developed in this direction. To ensure further development of the Philippine economy, however, it is recommended that the establishment of standards are extended to the following fields:

1. Basic industry field - establishment of product standards for raw materials of the industry: The quality and performance of a product cannot be ensured unless the raw materials and supplies used to manufacture the product do not have quality and performance exceeding a certain level even if the product standards were established. At the same time, the standards are also necessary for the inspection at the time of purchasing raw materials and supplies to check that the quality and performance relate to the manufacture of the product. In order to develop industries of high value added such as machinery, electrical and electronics, it is necessary that standards for quality and performance and for the test methods in the field particularly of iron and steel and nonferrous metals are established in time without falling behind the progress of the industry. In addition, it is recommended that the object of standards is extended to that of the quality and performance and the test methods with respect to the raw materials of textiles and garments, furniture, handicrafts, agricultural, forestry and fishery, and processed foods for which the Philippines is considered to have a comparative advantage over other countries.

2. Fields in which drastic improvement of production efficiency and quality assurance can be expected by the promotion of interface and compatibility - development of the interface standards and compatibility standards: Particularly stressed with respect to the assembly industry represented by the machine industry, enhancement of the compatibility of parts by setting standards will improve the production efficiency of the assembly industry and is important in obtaining quality assurance. For example, in the machinery industry, it is recommended that standards are established in time, matching the development of industry with respect to screws, pins, rivets, axes, rolling bearings, sliding bearings, oilers, gears, chain belts, piping, etc. and also with respect to drawings, symbols, dimension tolerance and processing accuracy. As for

such product elements as component parts, the standards for size and form are required. In establishing the standards not only for parts but also for the product, it is necessary to establish the standards from the viewpoint of ensuring interface to the possible degree.

3. Common and basic fields - establishment of the basic standards: There are some standards established for the application of statistical method, mathematics, measuring equipment, measurement, quality control and standardization. The standards development is particularly necessary to contribute to the improvement of quality control and production control. In addition, it is expected that standards will be established for common items which are applied broadly in the public life and the industry.

4. Export industry field - Establishment of product standards for export products: At present, in the exports from the Philippines, products produced and processed according to the specifications given by the importers are dominant. However, the exports of products based on the Philippines own specifications will increase with the upgrading of technical level and the export promotion. In order to accelerate the expanded exports, it is proposed to establish product standards for the important export commodities and for the commodities which are planned to be developed as strategic export commodities in the future. As mentioned before, standards were established fairly well for agricultural products and textiles and garments, but even in these fields it is desirable to develop additional standards or revise the existing standards responding to changes in the overseas markets without delay. However, in establishing the product standards, it is necessary to make them at a practical level considering the present state of the domestic industry and its technological level, and the consumers' propensities in the major importing countries. If there is a considerable difference in the propensity of the consumers depending on the market or if there is a considerable difference in the technological level of the domestic manufacturers, then it is proposed to set grades within the same product standard. The product standards should be reviewed and revised in time responding to the change in technology and the conditions of the market. For that purpose it is important to establish a system to collect adequate information relating to the subject commodity available in and out of the country.

In view of the increasing consumers' consciousness about the consumer protection and environment preservation in recent years, it is also very important that the relevant issues should be thoroughly studied and the necessary stipulations should be incorporated in the product standards.

(5) Implementation of the Standards

The 954 national standards established by the end of 1988 are classified into 917 voluntary standards and 37 mandatory standards based on the difference in their implementation. The details of the mandatory standards are as follows :

- Electrical (17 standards)
- High pressure gas (5 standards)
- Building and construction (4 standards)
- Daily goods (1 standard)
- Fire extinguishing (3 standards)
- Iron and steel (5 standards)
- Automobile (1 standard)
- Medical (1 standard)

Reviewing the contents of these standards, it is understood that mandatory standards have been established for those that strongly affect the health and safety of the people and the consumers. According to the BPS's Annual Program for Standardization for 1989, it is explicitly stated that the mandatory standards are established selectively based on the criteria of protection of the safety and health of the people, preservation of energy, foreign demands and the magnitude of impact on the consumers.

The experience of implementation of standardization in the industries is scarce in the Philippines, and the necessity of the standardization and the quality consciousness have not yet been understood well by the consumers. Under such situation, it is practical for urgent realization of particular important national objectives, that those standards relevant to the objectives have been implemented as mandatory standards. The particularly important objectives that are expected to be achieved by the establishment and implementation of standards are the following three items:

1. Ensuring of the health and safety of the people including protection of the environment
2. Development of strategic export industries by quality improvement and quality assurance
3. Promotion of industries by drastic improvement of productivity, cost reduction and improvement of product quality

For the standards categorized as Item 1 above, which is particularly important for assuring the safety of the people among the above three items, it is desirable that special legislations are enacted to regulate them and are vigorously enforced by appointing regulatory agencies to enforce them. If the appointed agencies are not able to formulate the standards and specifications for regulation, BPS may establish the standards for assuring the safety of the people as national standards and cite them in the legislation.

In the Philippines, there are several prospective industries which have potential to grow into strategic export industries as defined in Item 2 above. Among these the food industry including processed food and non-processed food would have the highest possibility to grow as the export industry with the comparative advantage of the Philippines if intensive guidance is made for quality improvement by compulsory conformity of standards. For this instance, it is recommended to

enact special legislations (for example, export regulation) to regulate the exports of food and appoint a certain agency to administrate the relevant industry under such legislations. If the appointed agency is not able to formulate the standards and specifications for regulation, BPS may establish standards for it as national standards and cite those standards on the legislations.

Item 3 should be the crucial item of the operation of BPS. As the securing of compatibility and interface among the parts and products is important and indispensable to achieve the objectives stated in Item 3, the implementation as mandatory standards is conceivable under certain circumstances.

If the legislation of separate acts and the establishment of separate organizations to implement the Items 1 and 2, are difficult, BPS is required to fulfill the responsibility of the enactment and implementation. When implemented as mandatory standards, however, the enactment of related acts and regulations, strengthening of the testing and inspection capacity, improvement of the certification system and organization and strengthening of the technical guidance and extension, etc. are indispensable, since it is necessary to be implemented strictly. As the volume of the ensuing work will notably increase, it is crucial that the necessary manpower and budget are secured.

Furthermore, with respect to the operation of the certification system, the certification relating to product safety, which is necessary to be mandatory, should be operated separately from the product quality certificate which fits the voluntary certification.

(6) Improvement of ICC (Import Commodity Clearance)

1) Definition of object commodities, and announcement to foreign countries

The LOI No.1208, which forms the basis of ICC, puts the obligation for standard conformity in general. Although the implementation guideline has been prepared, it contains unclear points. It is important to clarify and announce the detail of regulation and the commodities involved not only to the importers in the Philippines, but also to the relevant organizations in the exporting countries. The addition of commodities, modification of the system, and clarification of applied standards are the items to be announced in accordance with the GATT Standard Code. The implementation schedule should be also announced together.

The exception of this system is also required to be publicized together with its range and commodities, etc.

2) Obligation to carry the certification of clearance

There is no obligation for the imported commodities under ICC to carry the certificate of clearance. Under PS Certification Mark System, however, the products produced in the Philippines have to carry the certification seal when they pass the PNS standards. Thus, consumers can not identify the certified imported goods from others with the certification seal alone. This could not only cause the confusion among the consumers, but also result in the loss of consumers' confidence in the PS Certification Mark System. For the importers and manufacturers abroad, there will be a slight increase in the burden, but the system should be modified to make obligation for them to put certification seal on their products. This is also practiced in many foreign countries.

4-3 Improvement of Testing and Inspection System

There are several conditions which the testing and inspection system is required to satisfy. The primary requirement for the system is to have adequate capacity for undertaking the testing and inspection as required compulsorily for mandatory certification and ICC so that it can function as the basis for extending the certification system. Secondly, in order that the system can contribute to the expansion of exports, it should be capable to conduct the test in items and accuracy that are acceptable to the importers. Thirdly, the system should also function to feed back the results of the testing and inspection with assessment to the manufacturers so that they can use these results for improvement of their products. Further, the system should cover the requirement for testing and inspection in the regions so that it can support the improvement of technology and quality of the regional industries.

The present testing and inspection system is inadequate in responding to such demands including the testing organizations accredited by BPS. Particularly in the fields relating to electrical and machinery, there is almost no testing facilities and equipment available. Further the existing testing laboratories are concentrated in the central region of the country, and the tests and inspection available in the regions are limited to an extremely few items. In consideration of these points, the following improvements are recommended:

1) Improvement of test performing capability

Under the PS Certification Mark system, the confirmation test of the conformity to PNS standards is required, but the present testing and inspection capability is low in general, and the existing laboratories can perform only a part of the test items required by the standards. Therefore, it is necessary to enhance the certification test capability of the BPS and other accredited laboratories. This includes 1) the renewal and increase of the testing facilities and equipment, and 2) the enhancement of the technical level of the testing engineers. With respect to the technical level of the testing engineers, the present level is limited to the tests which cover that of the existing testing facilities and equipment. The training to acquire the technology is necessary to match the testing facilities and equipment to be renewed and newly introduced in the future.

2) Enhancement of the test performing capability in the regions

In the regions other than Manila, the capability to perform tests and inspections is quite limited and at present, the test samples are sent from the regions to Manila for testing.

Considering the present main industries of the regions and the industries expected to be dispersed to the regions in the future, the test performing capability in the regions is recommended to be improved.

3) Review of the accrediting criteria of laboratories

There are at present 23 laboratories which have been accredited under the PS Certification Mark System, which includes a number of laboratories of the private manufacturers. Although it is understandable as a means to complement the shortage of the test performing capability of BPS, there arise the problem of confidentiality of products because information relating to the test samples and other relevant information become available to the testing organizations by performing tests. To secure prevention of the leakage of information and the neutrality of tests, the accreditation should be limited to government organizations, the non-governmental neutral organizations, and private testing companies whose neutrality is strictly assured.

4) Extension of the application of the PS Certification Mark System to the manufacturers abroad

The PS Certification Mark System is at present applied only to manufacturers operating within the Philippines. For the imported goods, inspection is conducted for each cargo under the ICC System. With the objective of promotion of the PS Certification Mark System and simplifying the import procedures, it is desirable that the application of the PS Certification Mark System is extended to the manufacturers abroad.

5) Support for investment in testing and inspection facilities and equipment of small- and medium-scale industries, and the transitional measures for them

PS Mark license is not issued to factories that do not possess testing and inspection equipment even if the products meet the PNS standards under the PS Certification Mark System. Many factories are manufacturing products without applying the certificate because of the fact that they do not possess such testing and inspection equipment.

As the testing and inspection equipment are very costly, the investment in testing and inspection equipment tend to be delayed even if the manufacturers are not frugal in such investment. Since the manufacturers are obliged to possess the testing and inspection equipment as a condition of the license of the PS Mark under the PS Certification Mark System, the purchase of testing and inspection equipment is recommended to be facilitated by preferential measures such as tax exemptions, etc.

The present system that PS Mark license is not issued to the factories equipped with no testing and inspection equipment may be acceptable for the manufacturers of the products which are categorized as those for voluntary certification, because they can continue the production of those products even without PS Mark license. This condition, however, would be too severe for the manufacturers being engaged in the production of the products which are subject to mandatory certification, since the production of such products is not allowed without PS Mark license. It is recommended to provide special measures for small- and medium-scale manufacturers.

4-4 Improvement of Metrology System

(1) Restructuring of Metrology System

1) Legal metrology

a) Establishment of metrology law and implementation of legal metrology based on the law

Since the legal metrology is to secure the fairness in commercial practice, it is necessary to establish the metrology law as the general law, and develop the inspection and verification system based on the law.

b) Definition of the measuring instrument which are the object of the inspection and verification system

It is necessary to define, in the law described in a) above, the establishment of the inspection and verification system and the measuring instrument which are the object of the inspection and verification system.

c) Development of the inspection and verification system applicable in the central and regions

It is important to assign the organization which is responsible for the execution of inspection and verification system under the aforesaid law. The DOST, which is the administration organization of the national standards, and the Department of Finance or DTI as the operation body, will be in charge of the system in the government. Among them, DOST seems to be the most appropriate organization for execution. In the regions, regional offices of DOST will be appropriate.

d) Organizational reinforcement of regional offices of DOST

If the regional offices of the DOST is assumed to be in charge of operation of the inspection and verification system as stated in c) above, the organizational strengthening of the regional offices becomes necessary. Only the regional DOST offices in Regions 1, 6, 7 and 10 are able to render the metrological calibration service. However, since the legal metrology affects all the consumers in the country, the system is necessary to be implemented in all the regions. Thus, the regional offices of DOST should be enhanced to function as the regional inspection and verification stations for measuring instruments.

e) Education on metrology consciousness

It is necessary to extend the education regarding the necessity of inspection and verification system for fairness of commercial practice, not only to manufacturers and users (shops and super markets, etc.) of measuring instrument, but also the consumers who will be benefited ultimately by the operation of this system.

2) Industrial metrology

a) Establishment of the national standard system

In the industrial metrology, the establishment of standard supply system is essential. However, the establishment, maintenance, and management of the standard require high technical capability. Therefore, it is recommended to establish the standard supply system from NSTL to the secondary standard administration organizations with defining the NSTL, which is the current national standard administration organization, as the National Metrology Center.

b) Network of secondary standard supply organizations

The organizations which render the metrological calibration service to the measuring instrument of the factories, are the secondary standard supply organizations. It is recommended to establish the network of these organizations under the leadership of DOST, taking into account the present situation and future development of the industry. The transfer of metrology technologies is recommended to be handled by the network.

c) Cooperation with the organization for industrial standardization

The testing and inspection based on the accurate measurement are the fundamental step for industrial standardization. Therefore, the organization in charge of the industrial standardization is responsible for extending the guidance to the factories in metrological field. BPS is designated to carry out the factory assessment under the PS Certification Mark System, and therefore, it is quite effective for BPS to undertake the metrological calibration service. Further, most of the secondary standard supply organizations are the laboratories accredited by BPS at the same time. Thus, BPS is recommended to be the center of the network of secondary standard supply organizations in this regard.

d) Education on metrology consciousness

The systematic education of testing laboratories, which are the users of the measuring instruments and execution body of metrological calibration service at the same time, on metrology

consciousness is indispensable, in addition to the education of manufacturers of measuring instruments and also factories which are the users of measuring instruments.

(2) Improvement of Facility and Capability Related to the Metrology

1) Legal metrology

a) Development of metrological standards

NSTL is recommended to be designated as the National Center of the metrology system, and to be responsible for establishment, maintenance and management of the national standards. In the legal metrology field, NSTL will establish the national standards for mass, length, volume and force, and maintain and manage them. The existing metrological equipment should be renewed if the accuracy is not sufficient to maintain an internationally acceptable level. The room for those equipment is also necessary to be improved if the control conditions are inadequate.

It is recommended that the secondary standards are equipped at each regional office of DOST.

b) Improvement of inspection and verification capability

In order for the inspection and verification system to be undertaken efficiently, the inspection and verification engineers are necessary to be trained on inspection and verification technology. The periodical training at DOST is recommended for this purpose. The possibility to use vehicles for movable inspection should be examined to conduct the inspection and verification efficiently of the factories manufacturing measuring instrument which are scattered in the regions.

2) Industrial metrology

a) Development of metrological standards

It is recommended to designate NSTL as the National Center of the metrological system, which is in charge of establishment, maintenance and management of the national standards. In the industrial metrological fields, the national standards should be established adding the standards which may be required to be added along with the progress of industrial development, besides the existing standards; namely, density, hardness, pressure, electrical (direct current, low frequency, and high frequency), frequency, temperature, acoustic, vibrations, chemicals (standard products, and standard gas), The NSTL will establish, maintain, and

manage these national standards. With respect to mass, length, volume and force, the national standard mentioned in a) of 1) will be utilized.

b) Improvement of accuracy of the standards

The existing standards are necessary to be subjected to the international comparison, and to be renewed if the accuracy is difficult to be maintained. At the same time the required accuracy is necessary to be improved further in accordance with the development of the industry.

c) Improvement of calibration service capability

The demand for metrological calibration service is expected to increase conspicuously in accordance with the improvement of metrological calibration service system, and the development of the industry. In order to cope with this, it is recommended to examine the renewal and increase of measuring standard facilities according to the capability of the laboratories by the laboratories which are expected to be involved in the network mentioned previously. The periodical training of metrological technology is also recommended. In addition, the possibility should be examined regarding use of vehicles for the efficient calibration service for instrument of factories scattered in the regions.

4-5 Improvement of the System for Promoting Quality Control

There are several organizations which are engaged in the promotion of quality control in the Philippines, and they are pursuing individual promotion activities in a close cooperation among them. These organizations are gradually uniting around the National Quality Campaign (NQC). NQC, however, being a campaign, is inadequate because they lack the function of; 1) support for the enterprises that practice quality control, 2) formulation of appropriate themes necessary for promotion, and 3) training of leaders to promote quality control. The establishment of an organization which will be the core of such function is recommended.

4-6 Framework of National Standardization and Industrial Quality Control Improvement Program

The national standardization and Industrial Quality Control Program, which is proposed in this study, is formulated with the framework of the following four objectives which have been set on the basis of tasks and goals for industrial standardization and quality improvement in the Philippines as discussed in the foregoing sections.

1. Enhance the quality consciousness, and at the same time, develop the system required for promotion of standardization.
2. Develop public facilities necessary for standardization and also for supporting technology and quality improvement by industries.
3. Support individual and joint investment of enterprises to setup the facilities for technological and quality improvement.
4. Support quality improvement of industries by technology guidance.

(1) Improvement of the System to Enhance Quality Consciousness in the Industries and Promote Standardization

1) Background and objective

In the Philippines the level of quality consciousness varies depending on manufacturers. According to the results of the questionnaire survey of manufacturers on standardization and quality control conducted as a part of this study, it was stated by 85% or more of the respondents that the need for quality control was recognized, and by nearly 90% of the respondents that some sort of quality control was practiced by them. In view of the extent of the quality control practiced by them, however, some manufacturers conduct only visual inspection of the product at the final stage of the manufacturing process, and most of the factories are not equipped with, even the simple measurement equipment for quality control. Cases are rare in which the records of the inspection are fed back for the improvement of the manufacturing process even when such records are taken, as described in the foregoing section.

The manufacturing industry of the Philippines may be classified broadly into three categories on the basis of the markets they serve, namely, those that serve the export market, those that serve the domestic market, and those that serve the domestic market but their products are indirectly destined to the export market by use as raw materials for the export products. As the export market demands products of high quality, the enterprises engaged in the export industry and the enterprises that manufacture raw materials for the export products have strong concern in quality control. In the domestic market, however, the producers have a tendency to manufacture low price products sacrificing the quality because of the consumers price consciousness sometimes ignoring the quality due to the low level of their income.

It is obvious, however, that many enterprises recognize the need for quality control whatever the extent is, and that the need for quality control will intensify in the future. The export oriented industry imports almost all of the raw materials because of the poor quality of the domestic products, while the foreign capital enterprises and the large domestic capital enterprises that manufacture products for the domestic market use the raw materials and supplies either imported or manufactured by themselves in order to maintain the quality of the products they manufacture. Thus, if the small- and medium-scale manufacturers intend to undertake the production of any materials and supplies to be used by those foreign capital enterprises or large domestic capital enterprises, they should devote to improving quality of the products to be supplied to those enterprises.

Foreign manufacturers currently watch the future prospects of the Philippines as a possible country for setting up a manufacturing base abroad, and hence it is likely that a number of foreign manufacturers will establish their factories for manufacturing or assembling electrical appliances, precision machinery, or their components in the Philippines. In such events, they will prefer to maximize the use of parts and auxiliary supplies procured from local sources. In order to promote the development of such linkages, it is important to take measures for improving quality of those local made parts and supplies.

Industrial standardization is indispensable in promoting the application of quality control for improving product quality, although the need for standards is rather limited under the present circumstances which depend on the price conscious domestic market as mentioned before and also on the export transactions based on the buyers' specifications. In the developing countries where industries depend mostly on technologies developed in the advanced industrial countries, standardization has a role to induce the industries to apply advanced technologies, unlike the advanced industrial countries where standardization functions to define technical specifications for common practice meeting their industrial level. Therefore, it is also important for developing countries to exert adequate effort in the development of standards to meet the level of advanced technologies which are expected to be required in the near future.

Nevertheless there are several constraints in pursuing immediate standardization in all fields. There is an inadequacy in funds and institutional setup required for the pursuance of immediate standardization while manufacturers, except a few ones, have no urgent needs for standardization and also have inadequate capability in technology and equipment to produce the products meeting the standards. Should the standardization be forced under such circumstances, there may be enterprises that are unable to respond to the standards becoming impossible to continue their operation, and a great deal of resistance may be expected causing obstruction to its implementation. Therefore, it is necessary to implement standardization by selecting the key objects from the fields that are in urgent need of standardization, and implement simultaneous programs to support the enterprises' effort in meeting the standardization, as will be discussed later.

In consideration of the above, this Program makes it its objective 1) to enhance the quality consciousness of the producers through regulation of quality on one-hand, 2) while, on the other hand, to provide incentives for the improvement of quality by demonstration of the benefits brought about by the improvement of quality, 3) to simultaneously develop manpower for the leaders of quality improvement, 4) to develop a system to disseminate the methods to improve quality, 5) to investigate and research the appropriate means of quality control in consideration of the fact that direct application of the methods used abroad might be difficult or ineffective in view of difference in scale of the enterprises, the nature of the enterprises or the behavior pattern of the employees in the Philippines, 6) to improve the system to formulate long-term and basic policies relating to standardization and to strengthen the execution body of it, and 7) to promote the development of the standards in the fields which are in urgent need.

2) Outline of the program

1. Improvement and strengthening of the national standardization, and the system for quality regulation and administration

All the functions relating to regulations, inspection and the administration of quality standards except for food and drugs in the Philippines at the present time are concentrated in BPS. Because of this, both the development and the enforcement of standardization are not sufficient in view of expected development in the future, and the situation is in need of review and improvement. The Government of the Philippines has started reorganization to strengthen the system and is preparing a bill for this purpose. Under the new system, the quality regulation and administration will be executed by the government agencies that supervise the respective industrial sector. BPS needs to put its functional emphasis on coordination of standardization under this system. Development of basic plan of standardization is also necessary as a basis of the coordination. This Program makes it its objective to support the strengthening of the system in the aspects of formulation of basic plan, organizational setup, the manpower requirement, and procedural development.

2. Introduction of export inspection system

The Export Inspection System contemplates the implementation of mandatory inspection at the point of export on the goods prescribed as the objects of the System, permitting export of only those goods that can clear the prescribed quality standards, thus preventing the export of substandard goods and maintaining the reputation of the export goods of the Philippines.

The Export Inspection System can yield effects only on the basis of a mandatory inspection system. Therefore, the inspection and verification system is necessary to be set up to be able to handle the inspection promptly, and appropriately to inspect all the inspection items, for all

goods to which the Export Inspection System is applied. Conversely, if the inspection and verification system is inadequate, the application of the Export Inspection System should be restrained even for goods to which the application of the system is desirable.

The export inspection itself is a means to prevent the export of substandard goods, but for the producers it closes the export market unless they strive to improve the quality. From this point, this system is expected to make producers recognize the need for improvement of quality. Therefore, on the other hand, it is necessary to improve simultaneously a system to render financial and technological support for the producers who are striving for improvement of quality.

In 1970s, the Export Inspection System was introduced in the Philippines and applied to all the export goods. The inspection, however, conducted under this system was nothing but the visual inspection, resulting in delay in export procedure without ensuring the reliability of export market on these goods. Thus, the system was abolished in 1981. The Export Inspection System proposed here needs to be operated with consensus of industries on the following points to wipe out the bad impression on the past system and to operate the new system efficiently and effectively.

a) The system is applied to the limited items of export goods which is regarded effective in export promotion by ensuring the good reputation of Philippine goods in the export market.
b) The system is applicable only when the appropriate inspection method which is effective to prevent the export of substandard goods, is available.
c) The inspection will be conducted on all the applicable export goods once the system is introduced, but the operation will be started only after the inspection system is established sufficiently so that the delay in export procedure may be avoided.
d) The real objective of this system is not regulation, but to improve the profit of exporters.

3. Establishment of an organization for research and promotion of quality control - tentatively named as "Quality Management Institute (QMI)"

For improvement of quality, it is necessary to exert efforts to get all strata of the society and industry including the producers and the consumers to recognize the importance of quality consciousness. With this, it is necessary for producers to understand the need for improvement of production technology and the measurement techniques for the quality evaluation, and to make such technology function effectively within the enterprises. This Program will establish an organization with the objective to do application research on the methods for dissemination of the concept of quality, taking into full consideration the features of the industrial structure and the behavior pattern of the people of the Philippines, and to promote quality control.

4. Scheme for standards development in the strategic industry fields

Although the industrial standards are fairly well developed in certain industrial fields, the development of standards tends to concentrate on current problems, and many of the existing standards are for the purpose of regulation, resulting, as a whole, in a state which is not in harmony. In order for the industrial standards to further contribute to the upgrading of the industrial level of the Philippines, it is necessary to improve the following:

a) Establishment of long-term and integrated plan for development of standardization and strengthening of the coordination of its implementation
b) Strengthening of the system to draft standards
c) Strengthening of the system for such work on standards as formulation, review, and dissemination of standards
d) Improvement of the system for administration of the mandatory standards
e) Improvement of the systems for related inspections

Of the above, "c) the dissemination of standards" shall be dealt with in the Plan for Establishment of a Quality Management Institute (QMI), "d) the administration of the mandatory standards" shall be dealt with in the Plan to improve and strengthen the system for quality regulation, the inspection and administration, and "e) the inspection system" shall be dealt with in the Plan for establishing the central and regional testing laboratories. In this Program the strengthening in the field relating to the planning, formulation, and implementation of standards development is contemplated. Also, the Philippine Government is at present studying a significant reform of the development and implementation system of standards. According to the plan the governing and the regulation will be transferred to the government agencies in charge of the respective industrial fields and the burden of BPS will be alleviated for that aspect. It is, however, necessary to further strengthen the planning, the guidance and the coordination functions of BPS from its nature as the secretariat of the Standards Council which is the core of the coordination of the relevant government agencies as a whole, of monitoring the implementation and of the formulation of the long-term policies. Thus, the function of BPS will be changed from the present regulatory activities. In this respect, the reorganization and strengthening of the functions of BPS is necessary.

(2) Establishment and Improvement of Supporting Facilities for Standardization and Technology/Quality Improvement

1) Background and objective

Fields that require the improvement of the supporting facilities in the public sector as the infrastructure to proceed with the standardization and improvement of quality are as follows:

1. Research and development system for technology and quality improvement
2. Testing and inspection system needed as a part of the public regulation and administration system
3. Testing and inspection system for issuing quality certification to a third party
4. Metrological calibration service system for various testing and inspection equipment

With respect to the research and development for improvement of technology and quality, there exist testing and research institutes for most of the industrial sectors each producing certain results. However, even taking only the strategic industries selected in the previous chapter, there are many tasks that these testing and research institutes have to perform urgently in order for the industrial sectors to improve their technology and quality. Furthermore, even within these strategic industries, there are fields which are not covered by the existing testing and research institutes and new installations for such supporting facilities are needed.

In the fields to be covered by the public organizations with respect to the testing and inspection system, there is a field of testing and inspection required for quality regulation and administration as a system and a field as the certifying agency when the private sector needs certification for the third party. There are many cases in the Philippines at present where, in addition to the above, the individual enterprise contracts out quality inspections of raw materials and products, which they should have to perform by themselves, to outside testing and inspection institutes because they do not own the testing and inspection equipment and such demand is increasing remarkably in recent years with the activation of the industry.

At present, the testing and inspection according to the PS Certification Mark System are performed by the public testing and research institutes and the private laboratories accredited by BPS, besides the BPS laboratory. The original objective of the public testing and inspection institutes is not contract inspection but research and development and the technical guidance based on such for the industry; and an inadequate state of the equipment and manpower system for testing and inspection prevails. In addition, the demand for testing and inspection at present is not being met in time. If such demand increases, it is expected that the response would become increasingly difficult, and the proper research and development functions may be obstructed further. From this point, it is desirable that the testing and inspection laboratory should be built newly and operated independently from the testing and research institutes which were used in the past. Many of the private testing and inspection laboratories accredited are those owned by the manufacturing companies for their internal use, in which case it is pointed out that there is a delay in the contract inspections because the testing and inspections of their own products would be given priority. With the increase in the demand for inspection, a few number of private inspection institutes which engage primarily in contract inspection and analyses have been established in recent years. But, the need for establishment of public inspection institutes remains unchanged because of the fact that inspection institutes which are non-profit public service corporations and approved by international standards are needed. On the other hand, of course, such trend in

establishing inspection institutes in the private sector is necessary to activate the industry; and the public inspection institutes should be primarily engaged in the inspections accompanying the quality regulation and administration as mentioned before, and should handle testing and inspection if testing capacity is still available after performing the original testing function.

To maintain the accuracy of the equipment and machinery of the manufacturing sector, the improvement of the metrological calibration service system is necessary, but the service system at present is poor and the calibration is not adequate at the enterprises. The metrological calibration service system which is easily available is desired.

This Program contemplates the improvement of the systems for testing and inspection, research and development, metrological calibration service, etc. which have to be developed by the public sector through the new installations or improvement of the existing facilities.

2) Outline of the program

1. Establishment of a Central Testing Laboratory and Regional Testing Laboratories are proposed as organizations to conduct testing and inspection related to the PS Certification Mark System and other quality regulation and administration system separately from the existing testing and research organizations or technical centers. The Regional Testing Laboratories will have the functions to provide various technical services to the regional industries in addition to the functions to conduct the testing and inspection, in consideration of the difficult conditions for enterprises in the regions to access the existing technical centers. No regional laboratory will be established in Luzon because of the availability of the Central Testing Laboratory to be established in Manila and also of various existing research organizations. In the Visayas, Cebu which is developing as a new industrial center is appropriate to locate the laboratory. On the other hand, in the Mindanao, the laboratories will be located in Cagayan de Oro in the North and Davao in the south, respectively, because of the inconvenient traffic system between north and south Mindanao.

2. The equipment necessary for the metrological calibration service for the testing and inspection equipment of the various industrial sectors will be installed in the Central and the Regional Testing Laboratories above mentioned to conduct the metrological calibration service. Incidentally, with respect to the national metrological system, ITDI in DOST is formulating a development plan at present and the Program is premised on the implementation of their plan, but at the same time with consideration for probable delay in its implementation.

3. With respect to the following fields of research and development to be urgently implemented for the improvement of the technology and quality of the strategic industries selected, studies for formulation of a development plan is proposed to be conducted with the objective of establishing a new technical center or strengthening the existing center.

a) Metalworking: Strengthening of function of the research and development, and technical guidance of MIRDC
b) Metalworking, plastics processing: Die and mold technology center function for design, repair, and improvement of dies and molds
c) Plastics processing: Application research and development center function for high level technology and new technology
d) Furniture, woodworking: Technology guidance center function for technologies for improvement of the accuracy of tools, tool repairs, and maintenance and rearrangement of machineries
e) Furniture, woodworking: Strengthening of the functions of marketing research and design development of PTTC
f) Garments: Center function for marketing research and design development
g) Food processing: Strengthening of marketing research and new technology information dissemination function of FDC
h) Packaging material and technology: Research and development and technical guidance center function for improvement of packaging material production technology

(3) Support of Individual and/or Joint Investment on Technology/Quality Improvement

1) Background and objective

One of the major problems in actually tackling the standardization and quality improvement is inadequacy of facilities and equipment for technological and quality improvement. The successful quality control may be attained only when the integrated efforts for quality improvement are undertaken starting with the standardization and quality control of purchased materials and supplies, and proceeding to control in the manufacturing process, inspection of the quality of the products produced, the analysis of the results of the inspection and feedback of the analysis results to the production process for improvement. Under the present situation, the equipment for quality control and improvement of technology and quality are inadequate even in the large enterprises, not to mention the small ones. According to the survey of manufacturers conducted as part of this Study, enterprises which have sufficient equipment required for inspection of the product quality accounted only for a fourth of total manufacturers surveyed. Manufacturers should have to establish testing and inspection equipment and a system for research and development individually for their operation with quality consciousness. When the quality consciousness of consumers is improved, and they requires high quality products, the producers will strive on their own to build-up the necessary equipment and machinery for quality improvement. But, in the present state, the environment to demand such necessity is inadequate and, therefore, the policy support to induce such a situation is needed.

This Program makes it its objective to encourage and promote investment by the private manufacturing sector in the build-up of necessary equipment and machinery for quality control and improvement of technology and quality.

2) Outline of the program

Setup of institutional financing and preferential taxation treatment are proposed for the promotion of investment on the following facilities and equipment:

1. Equipment and facilities necessary for the quality test of the raw materials, parts, and products.
2. Equipment and facilities necessary for attaining precision and quality of products in the process of manufacturing as required in the standards.
3. Research and development facilities for improvement of technology and quality.

The investment support program consists of the two following sub-programs:

1. Institutional financing will be established and the preferential taxation treatment will be applied to investments by individual enterprises in equipment and facilities that meet certain predetermined objectives.

2. With respect to equipment and facilities which are urgently required for the improvement of technology and quality of the strategic target industries but which involve an excessive burden of cost for the individual enterprises to invest separately because of the small-scale production, support will be given to investment on commonly used facilities assuming the facilities to be operated jointly.

(4) Technological Support in Technology/Quality Improvement

1) Background and objective

When viewed from the standpoint of improvement of technology and quality, such means as regulation and administration of quality are merely means to get producers to recognize the necessity of quality improvement. Even if a defective product is checked in an inspection of the product quality, that alone cannot achieve quality improvement. Analyzing the cause of the rejection, and improving or removing the cause are the indispensable activities. But actually, in the Philippines, analysis of the cause is insufficient, and furthermore when it comes to improvement or removal of the causes, such is not done mostly because of lack of the technology to improve or financial constraint. In such cases, there is fear that a system with the objective of improving technology and quality might result in an obstacle to the operation, or cause an increase in illegal activities. Particularly with the small- and medium-scale industry which are necessary to be fos-

tered, response to the regulations seems difficult especially in technology and equipment upgrading.

Technical problems are not necessarily related to manufacture. Technology relating to adjustment of machines and equipment also fulfill important roles in the improvement of quality. In addition, it is important also to keep abreast of information of technology and market which are continuously progressing.

Such technology and information are obtained through transfer from abroad, development in the enterprise, and research and development in the research and technology center, etc. This Program contemplates to transfer such technology necessary for improvement of quality and market information which induces quality improvement to the enterprises that need them.

Most desirable from the viewpoint of standardization and quality improvement is for each enterprise to establish the technology thus transferred and acknowledged by the market within the enterprise so that they will be able to go into production based on it. From such a point, it is desirable that enterprises establish company standards and conduct quality control based thereon, and furthermore that such company standards are improved based on their own experiences into its own company standards instead of something that is transferred from outside sources.

It is desirable in view of technological and quality improvement that research and development work is continued to be carried on by the various testing and research organizations and private enterprises in the country to keep abreast of the technological progress in the world, instead of anticipating the further transfer of technology in the future, although such measure should be out of this Program. Also a system will become necessary in the future by which the technology developed in the testing and research organizations and private enterprises in the country becomes available to the industries.

2) Outline of the program

With respect to technology transfer, there are two types; some of technologies and information may be transferred through transmitting to and learning by enterprises that needs it, others will require a certain degree of application development on an existing technological base. For the former, the technology transfer may be carried out by seminars and workshops. In the latter case, it is necessary to carry out a development scheme centered on a certain technical center and to transfer the results to each enterprise. The Program consists of:

1. Holding seminars and workshops necessary for improvement of technology and quality.
2. Scheme to support the preparation of standards of the industry for improvement of technology and quality.

3. Research and development scheme to improve quality and the extension of the results to the industry.

Each theme is indispensable for the improvement of the technology and quality of the strategic industries previously selected, and the ones that are considered to have greater benefits on implementation are adopted. In the future, it may be possible that technology transfer of a number of themes may become necessary, but it is necessary that technology transfer of these priority themes are carried out first.

Chapter 5

NATIONAL STANDARDIZATION AND INDUSTRIAL QUALITY CONTROL IMPROVEMENT PROGRAM

Chapter 5 NATIONAL STANDARDIZATION AND INDUSTRIAL QUALITY CONTROL IMPROVEMENT PROGRAM

5-1 Improvement of the System to Enhance Quality Consciousness in the Industries and Promote Standardization

(1) Improvement and Strengthening of the National Standardization, and the System for Quality Regulation and Administration

The Program comprises 1) the program to strengthen the planning and coordination function of standardization which BPS will particularly need following the dispersal of the functions of quality regulation, inspection and administration to the respective government agencies for strengthening; and improvement of basic standardization program which formulates the basis of standardization policy, and 2) the program to implement the training program for the factory assessors of BPS, regional offices of DTI, and other relevant government agencies, which will be in charge of execution of quality regulation, inspection and administration.

(1)-1 Strengthening of the planning and coordination function of BPS, and improvement of the Basic Plan of National Standardization

1) Organization in charge : BPS

2) Contents of the program

The internal organization of BPS is proposed to be improved and strengthened in the following two respects:

1. Function as the secretariat of standard development and coordination
2. Function to maintain close cooperation with industries for the industrial standards to be the basis of industrial technology development

In implementing the program, BPS is recommended to form an ad hoc project team for examining the reorganization of BPS. The project team will study their past experience and the similar cases overseas, and undertake the following assignments:

1. To define the functions and activities which should be strengthened as that of the secretariat of standard development and coordination, examine the reorganization of BPS, if necessary, and prepare guidelines for work implementation.

(See Supplementary Information 1, Annex 1.)

2. To develop the Basic Plan for Standardization Development Plan which forms the basis of national standardization, and propose the plan to the Standard Council.

3. To define the required function and activity to keep close cooperation with the industries, examine the reorganization of BPS, if necessary, and prepare guidelines for work implementation.

4. To prepare a draft program of the direction of the standard development and quality regulation for the respective industries, in cooperation with the respective industrial associations. (The content is premised on the implementation with the approval of the Standard Council.)

(1)-2 Training of factory assessors of quality control system

1) Organization in charge: BPS

2) Contents of the program

A leader development course is organized for the factory assessors of BPS and relevant government offices who have certain experience in the assessment of quality control system. The persons who have completed the course shall subsequently carry out the succeeding trainings for new factory assessors. These courses should be established as the permanent course in BPS, and the BPS undertake the planning of the courses, schedule coordination, and lecturer arrangement, etc.

The example of the curriculum is given in Supplementary Information 2.

(2) Introduction of Export Inspection System

1) Organization in charge: BPS and BETP (Bureau of Export Trade Promotion)

2) Contents of the program

a) Implementation of the program

In implementation of the program, a Working Committee is proposed to be organized to introduce the system according to the introduction steps described below. The committee consists of the representatives from:

1. relevant government offices
2. industrial associations
3. professionals
4. testing and inspection organizations

BPS and BETP organize the secretariat of the committee. BPS is especially responsible for preparing the regulations and laws, applied standards and specifications, and establishment of execution organization with formulation of their operation guideline. BETP, on the other hand, should be in charge of examining the timing of system introduction, defining the object goods, and development of the system if necessary, in view of export promotion.

b) Step for introduction of the Export Inspection System

1. Modification and establishment of the legal and organizational setup for the Export Inspection System
2. Preparation for applying Export Inspection
   a. Establishment and promulgation of the standards and specifications to be applied
   b. Implementation of the program for improvement of technology and quality
3. Introduction of Export Inspection

c) Modification and establishment of the legal and organizational setup for the Export Inspection System

i) Legal setup

Enactment of export inspection law. The Export Inspection System is the mandatory system, and therefore, is necessary to be executed based on a law.

ii) Formulation of standards required for implementation of the Export Inspection System

1. Definition of the object products

It is necessary to clarify the selection standard of the object products to get the confidence of the export market. The products coincide with the selection standard will be added to the object products when the export volume is increased. The consensus of the industry is the prerequisite for the inclusion to avoid the useless conflict and implement it efficiently.

2. Formulation of inspection standard for each product

The standards will be formulated to be able to clear the minimum quality requirement with referring to the PNS, and also standards and inspection standards in the foreign countries.

3. Decision of inspection fee for each product

The inspection fee will be set so that the total fee does not exceed 0.3% of total export value by product. The fee is set at appropriate unit such as consignment lot, or piece, etc. depending on the products. The fee will be reviewed time to time with change in export situation.

iii) Assignment of the inspection organization, or formulation of accredit standard of the inspection organization

The accredit standard of the inspection organization will be set by product. It should include the following conditions:

1. Management base: the organization should be a neutral third party.
2. Technological capability: the required technical level and number of inspectors should be defined.
3. The inspection facilities and equipment: the minimum requirement should be defined.

iv) Establishment of qualification system of the inspector

The inspector should be regarded as a government official in terms of obligation required for keeping confidence and the penalty imposed by the violation of it. The other qualification required, for example, minimum technical requirement as the engineer specified in Electrical Engineer Law, should be specified in the system and the qualified engineer should be registered to the government organization in charge.

d) Organization for system operation

It is proposed to establish an new organization, Bureau of Export Inspection, in DTI, to be responsible for the operation of the system. The organization is necessary to have regional offices in the regions where the international port or airport is located. The organization will act as the secretariat of the export inspection system after it is introduced, and operate the system cooperating closely with the relevant government organizations which are in charge of promotion of the object industry.

e) Inspection organization

i) Required condition for the qualified inspection organization

The inspection organization should be the non-profit and the third party organization. The testing companies in the private sector and the laboratories of the private manufacturing companies are not adequate, but the laboratories in government sector can be qualified from this point of view. These organizations are necessary to have a sufficient number of the qualified engineers as mentioned in the previous section.

ii) Collection of inspection fee

It is proposed that the fee collected by the non-profit and the third party organization is allowed to be used for their operation. In the case of laboratories in the government sector, the fee will be delivered to the National Treasury.

f) Establishment of the guideline for selection of the object products

The export inspection system is the system with the strong legal force. Therefore, the execution without intensive support of the government organizations and sufficient consensus of the relevant industries, will result in the useless confusion. Thus, it is necessary to select the object products on the basis of clearly defined and generally understandable criteria with sufficient preparation for it.

The following is an example of the general guideline for selection of the object products. The actual guideline is recommended to formulate with serious examination and analysis of the various conditions in the Philippines.

1. Significant increasing tendency in export value or volume in the recent years
2. Large number of manufacturers
3. Frequent claims and complaints from the export market with the cause being attributable to the manufacturers in the Philippines
4. Strategic products of the government in view of increase in the appreciation of the Philippine products in the export market

g) Financial projection of system operation

The additional costs required for the operation of the export inspection system are:

1. Wage and salaries of the inspectors,
2. Direct inspection costs,

3. Costs of additional facilities and equipment required for the inspection, and
4. Indirect operation costs of the system such as the relevant costs of the government.

The basic facilities and equipment required for the export inspection will be installed in the Central and Regional Testing Laboratories to be proposed in the later part of this program, but still some additional facilities and equipment will be required depending on the products inspected.

According to the financial projection of the system operation described in Supplementary Information 3, the inspection fee can cover around 25% of total costs of the inspection facilities and equipment even in the initial stage of operation when the number of inspection is still few. When the number increases, the fee will be able to cover around 50% of the costs. In other words, if a certain portion of facilities and equipment are available already and the additional cost requirement is less than the range indicated above, then the system can be operated by the inspection fee alone. The additional cost requirement for the facilities and equipment is estimated to be less than around 30% of the total cost of it, assuming the existence of the Central Testing Laboratory which is proposed in the later part of this program. Thus, it is estimated that the implementation of the export inspection system will not result in the financial burden of the government with existence of the Central Testing Laboratory.

h) Effect of the implementation of the system

Figures 5-1-1 through 6 present the change in the rejection percentage in export inspection in Japan with that of total number of products inspected, or volume of export. Generally speaking, the rejection rate was decreased significantly after implementing the inspection, and the export volume was increased at the same time. It means the instability of product quality at the introduction stage to the market, but at the same time, it indicates the improvement in the quality stability and resulting growth of export.

(3) Establishment of the Quality Control Research and Training Organization - Tentatively Named as "Quality Management Institute (QMI)"

1) Organization in charge: BPS

2) Contents of the program

a) Contents of QMI's undertaking

This organization is given the status to perform the central function of the quality control activity of this country. The activities include not only the function to transfer the results of the research of this organization to those who will be the core of the quality control activity in the

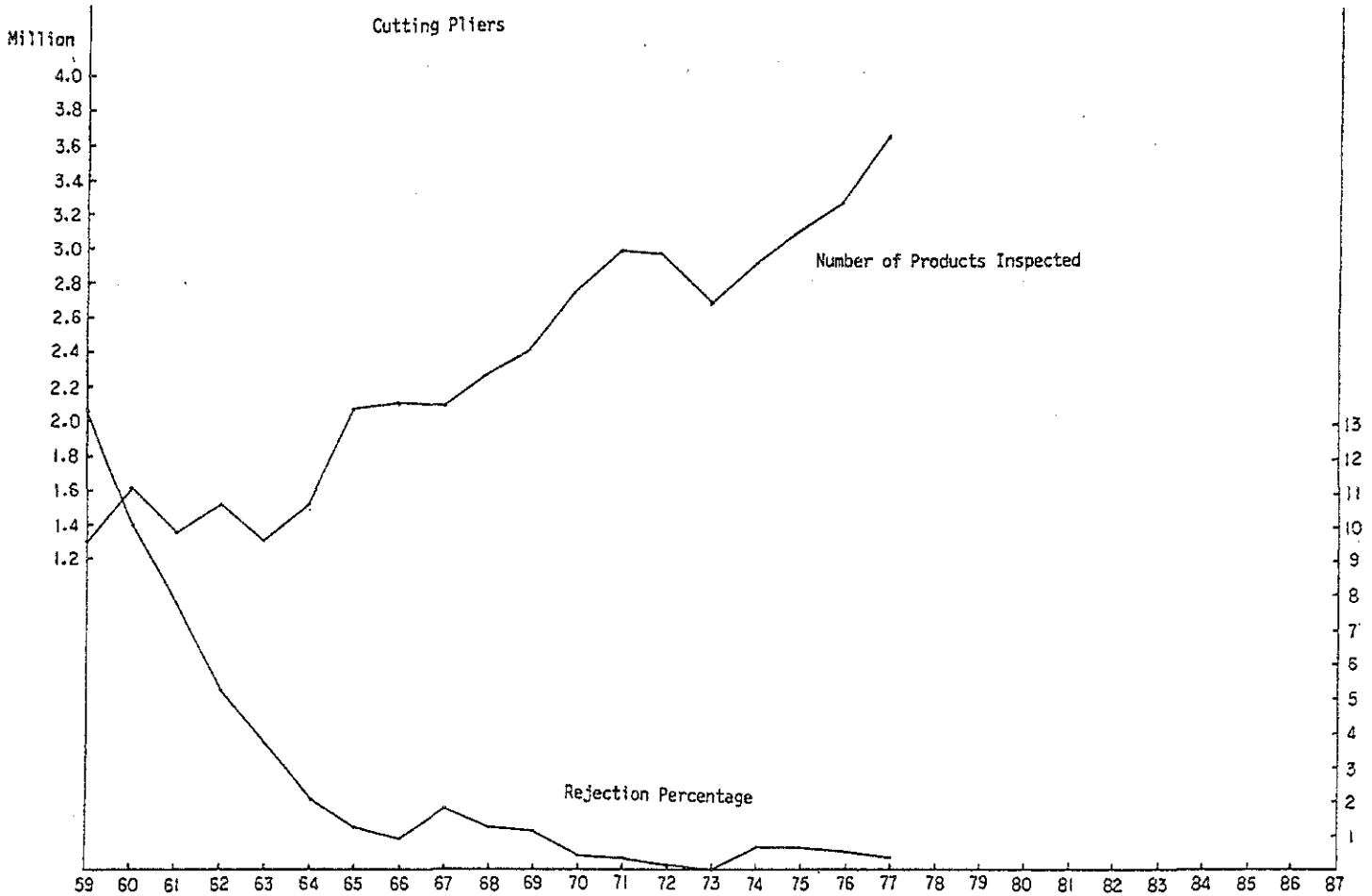


Figure 5-1-1 CHANGE IN REJECTION RATE AND NUMBER OF PRODUCTS INSPECTED IN JAPAN: CUTTING PLIERS

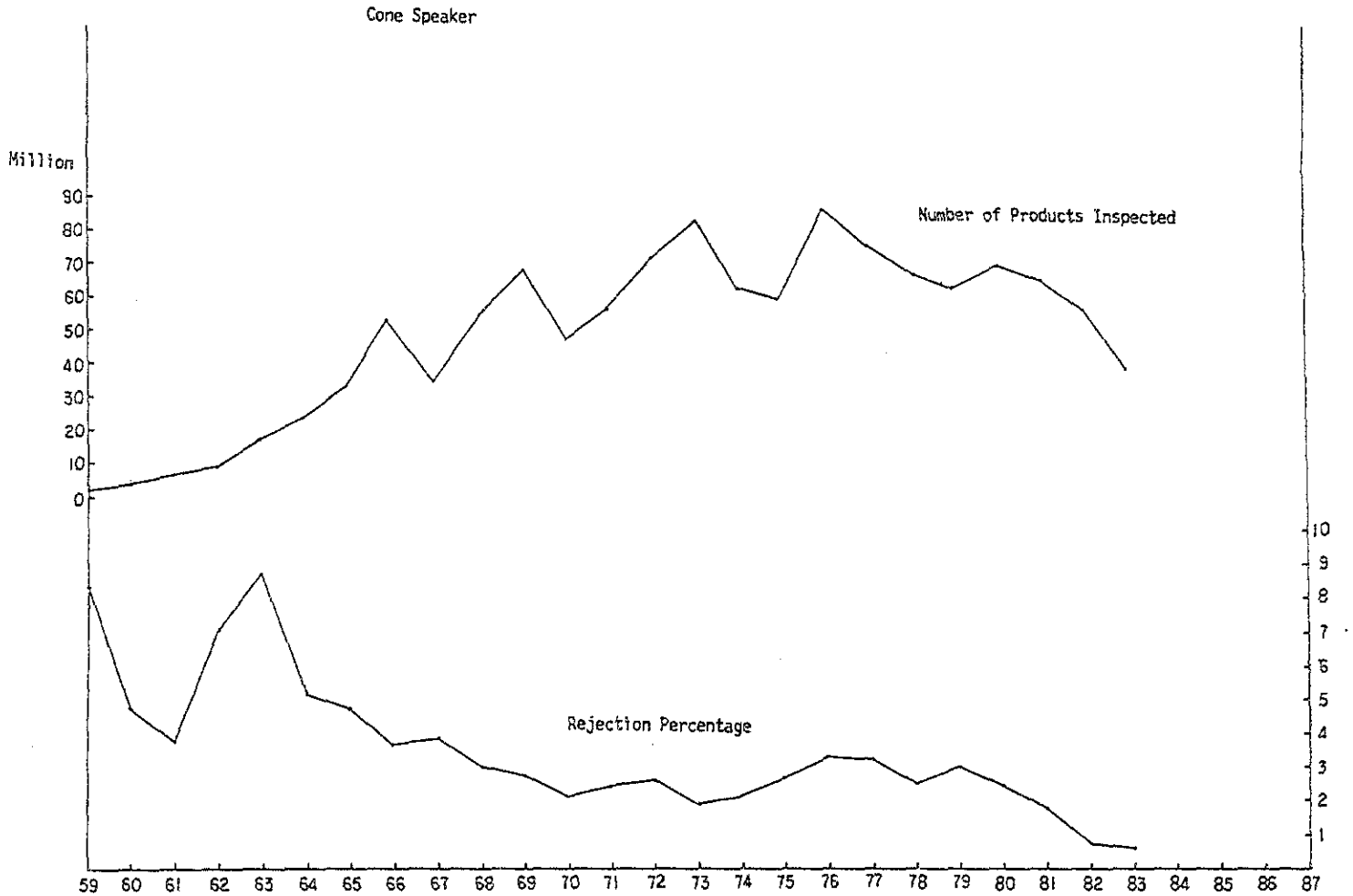


Figure 5-1-2 CHANGES IN REJECTION RATE AND NUMBER OF PRODUCTS INSPECTED IN JAPAN: CONE SPEAKER

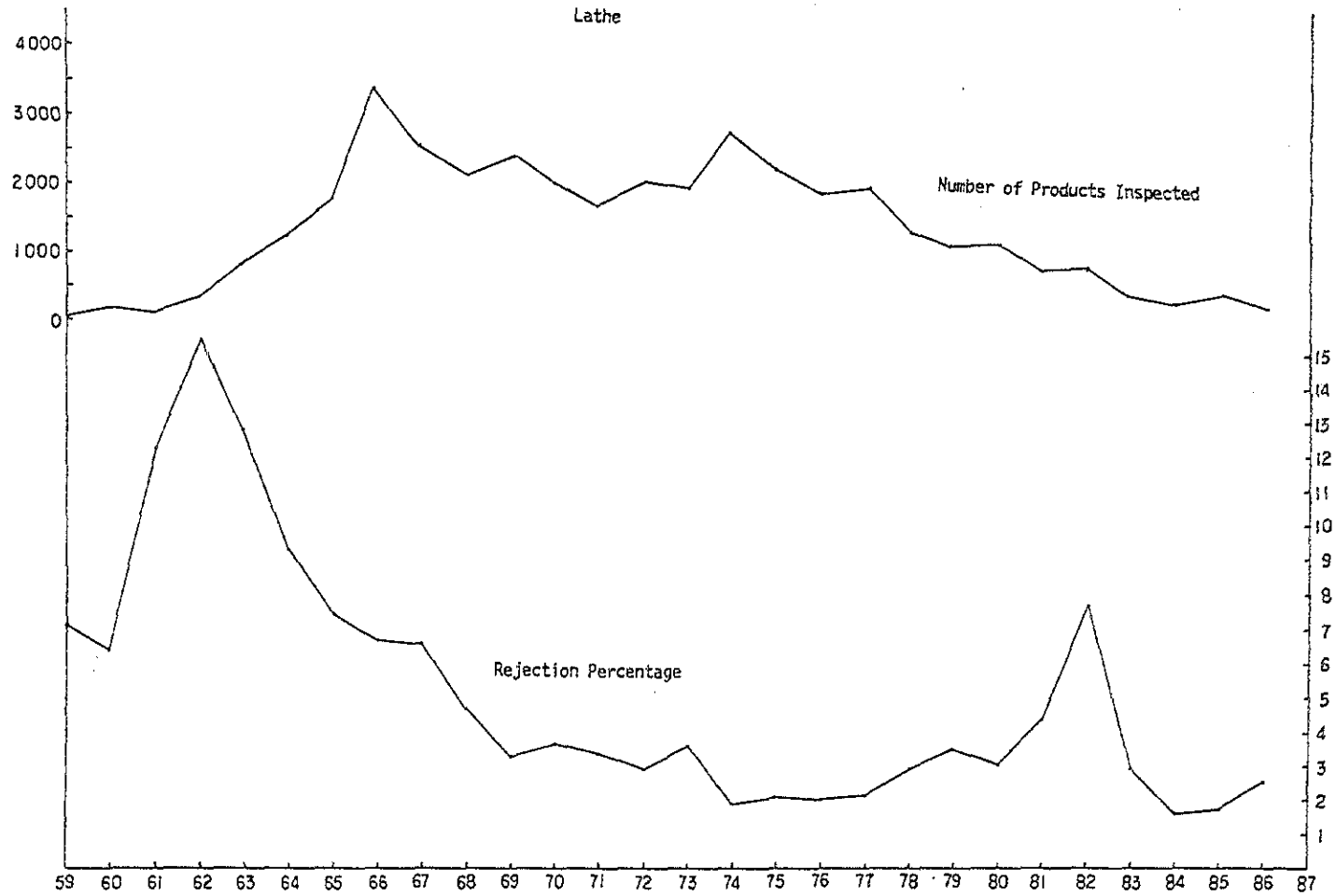


Figure 5-1-3 CHANGES IN REJECTION RATE AND NUMBER OF PRODUCTS INSPECTED IN JAPAN: LATHE

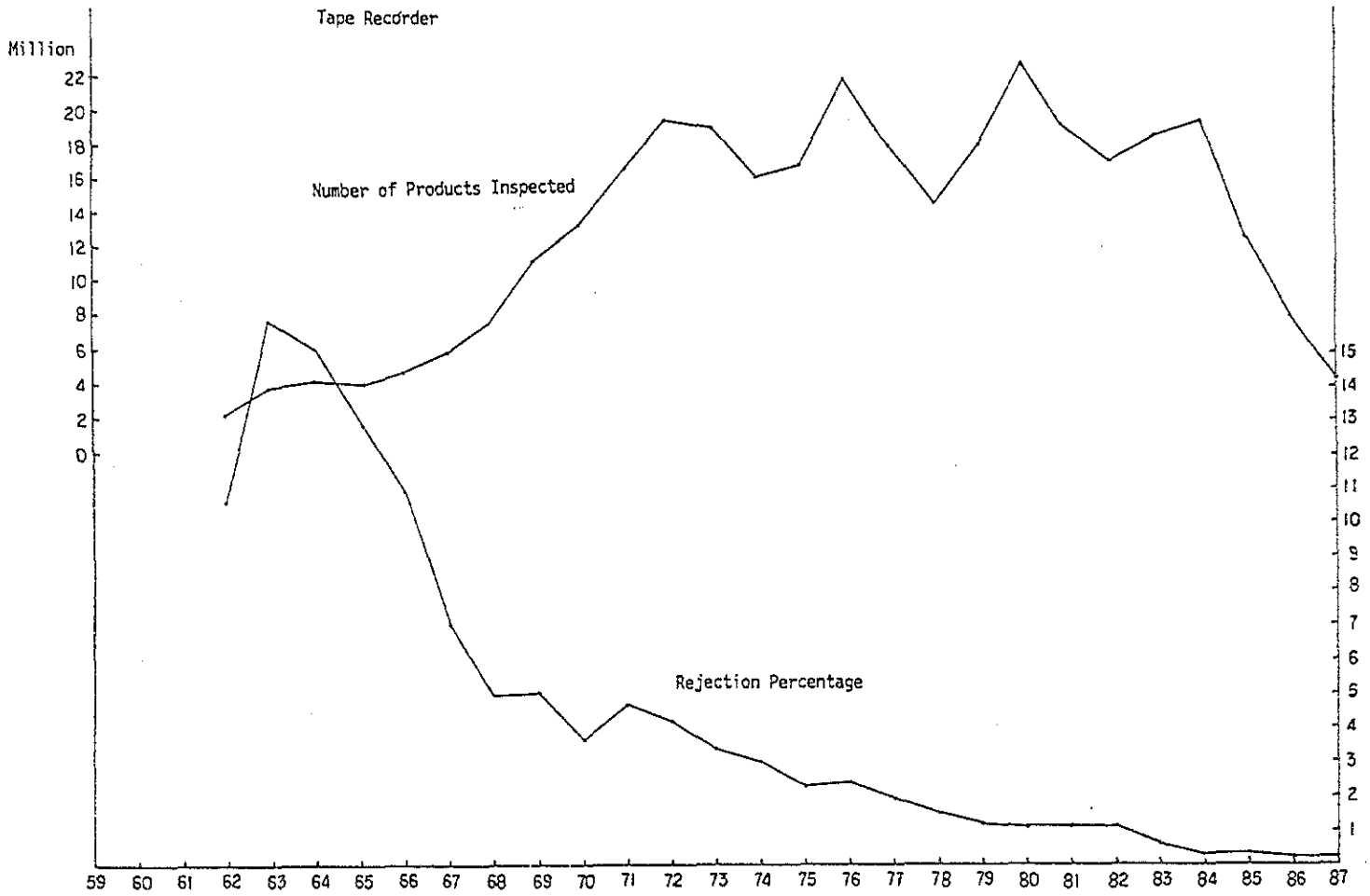


Figure 5-1-4 CHANGE IN REJECTION RATE AND NUMBER OF PRODUCTS INSPECTED IN JAPAN: TAPE RECORDER

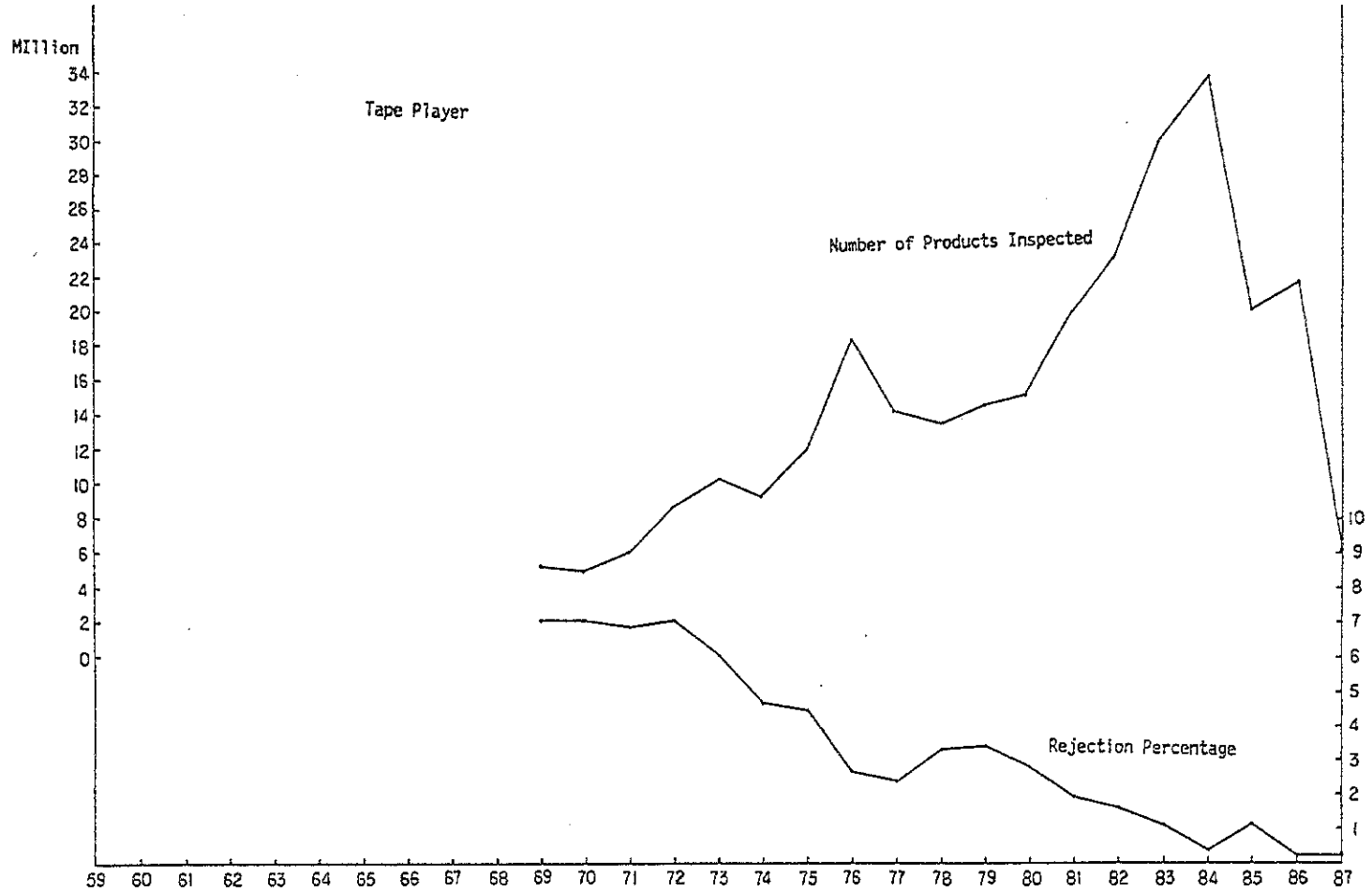


Figure 5-1-5 CHANGE IN REJECTION RATE AND NUMBER OF PRODUCTS INSPECTED IN JAPAN: TAPE PLAYER

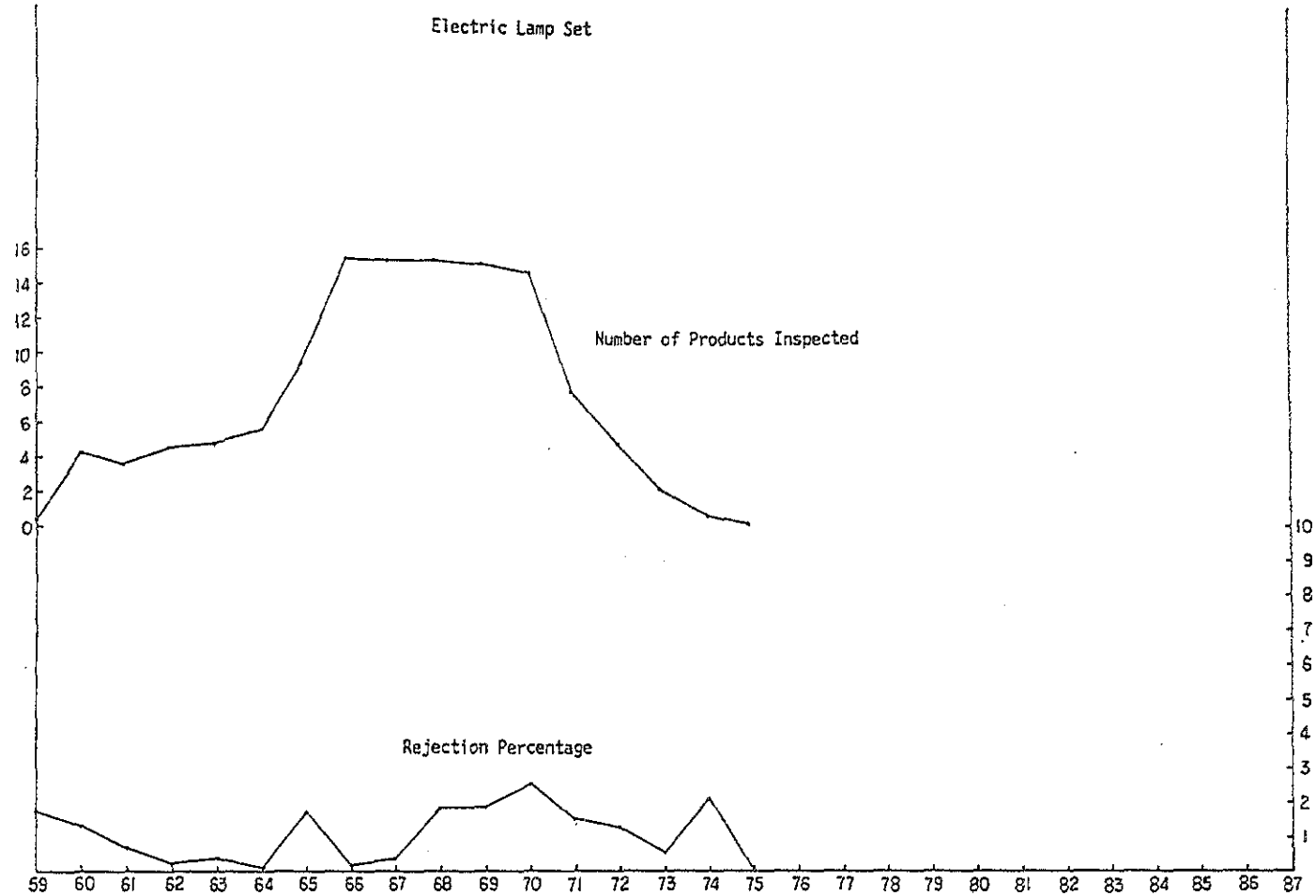


Figure 5-1-6 CHANGE IN REJECTION RATE AND NUMBER OF PRODUCTS INSPECTED IN JAPAN: ELECTRIC LAMP SET

future, but also such activity as joint development with the technical centers of the respective industrial associations relating to quality control techniques particularly applicable to that industry including the encouragement of such development activity. The envisaged contents of undertaking of this organization are as follows:

1. Research on the methodology to disseminate the quality control: Maintaining a staff of researchers of quality control, including professors and assistant professors, etc. establish research courses and engage in the research and education, considering the industrial structure, the employment structure, and the behavior pattern of the people of the Philippines. The establishment of such research courses as the following are conceivable:

   - Statistical quality control
   - Industrial standardization
   - Application of quality control

2. Educational courses for quality control leaders: It will include education courses for the public and for the students. This organization will conduct the planning and operation of such education courses including the formulation of curriculum, in efficiently utilizing other organizations and professional individuals. In both courses, the curriculum on 1) the historical background and the concept of quality control, 2) the method of quality control, and 3) the method of evaluating the results of quality control will be given. The persons who completed the course will be given the qualification for quality control leader in accordance with ISO9000 series. For students, the attendants of these courses will be given credits in quality control. There will also be organizational support for their subsequent activities such as the alumni meeting rendered to the quality control leaders. Educational courses will be established as follows:

   - Courses for undergraduates and graduates
   - Quality control leaders course for the public
     - Main course
     - TV lecture course
     - Radio lecture course

3. Establishment of the theme for national quality control activity, and its development: In formulating the central themes for national quality control activity, and developing the activity, QMI will act as the core organization. For example, inviting representatives of the quality control promotion organizations and the industrial associations of the country, hold symposiums to establish the theme of national quality control activity. They will also perform the role of the secretariat to develop the central theme set forth. The activities include the activity to induce the quality control in the industry, and the activity to improve the quality consciousness through the school education. The former activity includes such activ-

ities as organization of national conventions of quality control, and rewarding the quality control activity organizations in their excellent activities.

4. Diffusion and general publicity of the quality control consciousness among the enterprises and the people: This includes sales of books on quality control practiced overseas, publishing of the results of the research conducted by this organization, and campaign through mass media.

5. Collection and dissemination of information relating to quality control and standardization in and out of the country: It includes the collection of information and data on quality control in and out of the country including the theory of quality control, the theory of practical application, and various case data relating to quality control, and the perusal service of such information, and also the provision of information relating to services rendered by the test and inspection organizations of the country.

b) Implementation of the program

This organization will be established in Manila, and regional offices of DTI or the regional Chambers of Commerce will act as the regional representative offices. In the future if a large demand is identified in the regions, the establishment of regional branches will be studied.

In implementation, the promotion committee is recommended to be established consisting of the representative from BPS, PHILSA, PSQC, PDC-PPM, and PCCI, etc. to undertake the preparation activities.

c) Financial projection of the program

The required initial investment is estimated as follows (Including the construction of the building):

(For detail, see Supplementary Information 5.)

	(Unit: million yen)
Buildings and civil works	384.5
Interior works	13.7
Training equipment	103.2
(Sub-total	501.4)
Engineering & management expenses	61.7
Total	563.1

The projected cashflow in the 3rd year of operation is as follows:

	(Unit: million yen)
Total cash inflow	54.9
Revenue form operation	54.9
Total cash outflow	73.1
Operation costs	57.2
Materials cost	26.0
Direct labor cost	11.1
Other operation cost	2.2
Administration cost	17.9
Interest of loan	7.0
Repayment of loan	8.9
Balance	-18.2

Note: The operation costs exclude depreciation estimated as 24.0 million yen per annum.

The largest cost factor in this program is the cost for spaces such as conference room and seminar rooms, etc. The revenue from operation consists of the annual member fee and the fees from seminars and lectures. The annual revenue is almost equivalent to the annual operation costs, but it can not cover the costs for spaces (interest, repayment and depreciation). The rental fee of the buildings are extremely high in Manila and it is not appropriate to implement this kind of project on rented buildings. Actually, the difficulty in securing the spaces for conferences has been the impediment factor for quality control promotion activities in the past both in terms of scheduling and costing. The fact that the existing quality control promotion organizations have felt the difficulty in securing the meeting spaces, and that it caused the stagnation of their activity, is one of the reason for strong expectation for this program expressed by the relevant organizations.

d) Social and economic costs and benefits of the program

The economic cost factors of this program are the same as that of the financial cost factors. The economic benefit of this program, on the other hand, is the expected improvement of the quality as a result of the activity of the organization, which may be quantified as the amount of fee to be paid to the organization by the participants by appreciating the activity of the organization.

The major part of the benefit from the program expected socio-economically is the benefit expected indirectly from the quality improvement. The fee paid by the participants for the organization is equivalent to the benefit they feel that they can get from the activity. However,

the amount of the fee they are willing to pay is limited to the amount they are sure to get as the benefit. The extent of the fee they are willing to pay may be lower than the benefit actually produced by the activity, especially in such country as the Philippines where the quality consciousness is still poor. Thus, there are benefits unpaid by the fee, or not recognized by the participants. However, such benefit is difficult to be quantified. Nevertheless, it would be reasonable to say that the benefit estimated in the financial projection was underestimated compared with the economic benefit.

(4) Standards Development Scheme in the Strategic Industry Fields

1) Organization in charge: BPS

2) Contents of the program

In the strategic industry fields selected in the previous chapter, urgent development of the standards indicated in Supplement Information 6 are recommended. All of these are fields in which the technology is rapidly progressing and an adequate technical base rooted in the industry in the Philippines is not established. On the other hand, in the countries where industry is expected to expand in the future, standards do not remain simply as a follow-up of technology existing in the country but must also have the function of indicating the direction of the progress of technology in the future. It is, however, very difficult to assemble a technical staff versed in these fields within the Philippines at the present time. This program is the scheme by which the Technical Committee can be supported in the development of standards. The scheme is to invite from abroad, according to a definite schedule, experts versed in the standards and specifications and technology of the respective type of industry.

3) Implementation of the program

The schedule of expert engagement needs to be set forth according to the schedule of the Technical Committee to develop standards. In engaging a number of experts from abroad, it is necessary to define the direction of the policy of the development of standards, and the technical or development basis. On the basis of such direction the experts should be engaged. Should experts be engaged without such standards, there is fear of contradictions and confusion among the respective standards. It is necessary for BPS to fulfill the task of preparing such a schedule and standards and to fix the engagement schedule.

5-2 Establishment and Improvement of Supporting Facilities for Standardization and Technology/Quality Improvement

(1) Establishment of Central Testing Laboratory

1) Organization in charge: BPS

2) Contents of the program

a) Function and organizational structure

Improvement of the facilities relating to the testing and inspection of quality is required in various areas of testing and inspection as follows:

1. Testing and inspection related to the PS Certification Mark System
2. Testing and inspection related to the execution of the mandatory standards and the quality regulating law which are to be enacted.
3. Testing and inspection for the Export Inspection System proposed by this Program
4. Testing and inspection for Import Commodity Clearance
5. Testing required in research and development and technical guidance
6. Contract testing and inspection requested by manufacturers, export import traders and others

The Central Testing Laboratory proposed to be established will have the primary objective of satisfying functions 1 through 4 above which are indispensable in maintaining the system relating to standards and quality regulation. The functions 5 and 6 will be covered when there is extra capacity.

This laboratory is proposed to be started as a part of the laboratory of BPS for the time being, but it is recommended to be converted to a non-profit and the third party organization independent from BPS in the future with enactment of law for the organization. However, BPS or other appropriate government agency should maintain the supervision of the testing and inspection relating to quality regulation and its governing, including the determination of the operating policies of the Central Laboratory and coordination with the existing test and inspection laboratories.

The function of the Central Testing Laboratory is necessary to be organize first of all to be able to perform the testing and inspection relating to the standards enforced at present as mandatory standards. Conformity of the mandatory standards will be administrated by the respective regulatory agencies in charge, but the testing and inspection required by the respec-

tive agencies will be undertaken primarily by this Central Testing Laboratory. That is, the existing testing and inspection laboratories will conduct the testing and inspection under the supervision of this Central Testing Laboratory and according to a commission of this Laboratory.

The Central Testing Laboratory is also responsible to conduct factory assessment under PS Certification Mark System and inspections under ICC and Export Inspection System, in addition to testing services. In order for the functions of Central Testing Laboratory to be distinguished clearly from that of BPS and other relevant government offices, and to be made good of, in execution of these systems, the followings are recommend to be furnished to the functions of the Central Testing Laboratory.

1. The standard regulation and administration function should be established separately from testing and inspection function, and the function of this laboratory should be limited to the latter function,
2. the function to accumulate the testing and inspection results and to develop them to the basis of standardization and quality improvement, should be assigned to the center, and
3. the testing and inspection system to be able to respond to the increase in the demand should be established,

in the case of PS Certification Mark System,

1. the initial assessment of the factories for the PS Mark license, is undertaken by BPS or regional offices of DTI, and accompanying testing and inspection are carried out by the Central or Regional Testing and Inspection Laboratories. In all events the certification will be issued by BPS, and
2. the follow-up assessment of the licensed factory including on-the-site inspection and accompanying testing will be mandated to the Central and Regional Testing Laboratories by BPS, while BPS might undertake it directly in some cases.

In the case of ICC and export inspection system,

1. the Central and Regional Testing and Inspection Laboratories undertake the inspection, and they report to BPS in the case of Manila and to regional offices of DTI in the case of out of Manila, and
2. BPS in the case of Manila, and regional offices of DTI in the case of regions, will issue the certificate based on the report.

b) Facilities and equipment to be installed

These testing and inspection laboratories, in general, should have the testing capacity and

coverage maintained at an internationally acceptable level. In the long run the accredited laboratories should be confined to public and neutral specialized testing and inspection organizations though use of the facilities in the private sector may be acceptable while the capacity is not sufficient. The testing and inspection laboratories belonging to DOST, as mentioned before, are mainly used for research and development and technical guidance and the testing and inspection functions for quality regulation and administration are recommended to be concentrated in the Central and Regional Testing and Inspection Laboratories so as to be able to maintain the nature of impartiality. The existing BPS Laboratory will be merged with the Central Testing and Inspection Laboratory but the required equipment will be the same as that of new installation because their testing and inspection equipment are quite negligible.

3) Implementation of the program

The execution body is proposed to be BPS, and the Central Testing Laboratory is regarded as the extension of BPS laboratory for the time being. The Central Testing Laboratory is recommended to be operated as a non-profit and the independent third party organization which shall be established under the relevant law. It will be under the supervision of BPS, in such case, but operated by the Board of Directors consisting the representative of relevant government organizations and professionals assigned by the Secretary of DTI. At the same time, an advisory committee is recommended to be organized by the representatives from industrial associations, PCCI, professionals, and the existing testing and inspection organizations.

For preparation of the establishment, the advisory committee is proposed to be organized by the representatives from relevant government organizations, professionals, industrial associations, PCCI, and testing and inspection organizations. Under the guidance of this committee, BPS and DOST organize a project team and undertake the followings:

1. Basic design
2. Detail design
3. Establishment of the organization
4. Formulation of operation guideline

4) Financial plan of the operation

a) Initial investment requirement

The initial investment requirement is estimated as follows:

(For detail, see Supplement Information 7.)

(Unit: million yen)

	Case 1	Case 2
Buildings and civil works	558.2	443.9
Interior works	46.7	41.8
Testing equipment	1,663.9	847.3
(Sub-total	2,268.7	1,332.9)
Engineering & management expenses	667.2	334.5
Total	2,936.0	1,667.5

The Cases 1 and 2 are set with the difference in assumption on the role of 23 accredited laboratories. The Case 1 assumes that the Central Testing Laboratory handles all the required testing and inspection with abolishing any testing and inspection by the accredited laboratories, whereas the Case 2 assumes that the existing public laboratories will continue their function in the testing and inspection as it is, but that of private sector will not handle the testing and inspection for the certification system any more.

The breakdown of the initial investment cost of the facilities and equipment by testing field is as follows:

(Unit: million yen)

	Case 1	Case 2
Testing facilities and equipment for:		
Mechanical testing	611.5	326.7
Electrical testing	651.7	300.8
Chemical testing	400.6	219.6
Total	1,663.9	847.3

b) Projected cashflow

The projected cashflow in the 3rd and 5th year of operation is as follows:

(Unit: million yen)

	Case 1		Case 2	
	3rd year	5th year	3rd year	5th year *1
Total cash inflow	102.2	120.2	102.2	120.3
Revenue form operation	102.2	120.2	102.2	120.3
Total cash outflow	360.3	334.2	197.5	184.0
Operation costs	24.9	25.9	21.6	22.6
Materials cost	3.2	3.7	3.2	3.8
Utility cost	2.5	3.0	2.1	2.5
Direct labor cost	5.9	5.9	5.9	5.9
Other operation cost	6.0	6.0	3.1	3.1
Administration cost	7.3	7.3	7.3	7.3
Interest of loan	108.7	81.5	57.2	42.7
Repayment of loan	226.5	226.5	118.7	118.7
Balance	-258.1	-213.9	-95.3	-63.7
(Depreciation *2	304.5	304.5	155.8	155.8)

Notes: *1 3rd year or 5th year of operation

*2 The operation costs exclude depreciation.

The annual revenue can cover the annual operation cost with sufficient surplus, but can not cover the costs incurred from the initial investment which is assumed to be financed by long term loan. Around 25% of the depreciation can be met by the annual balance (surplus) if the interest and the repayment are neglected. In other words, if the burden of the initial investment is reduced, the operation is financially possible including maintenance and small scale renewal of the equipment. However, this projection assumes that all the annual revenue are consumed for the operation of the Central Testing Laboratory, in other words, the annual revenue will not be transferred to the National Treasury.

5) Social and economic cost and benefit expected from the implementation the program

The direct benefit expected from the implementation of this program is the benefit from the testing and inspection, which may be quantified by the fee paid by the client appreciating the effect of the test and inspection. However, in the case of the Philippines, due to 1) the backwardness in quality consciousness, and 2) low income level, the fee has to be set at the lower level than otherwise expected. Thus, the benefit quantified by the fee revenue may be undervalued than the expected. With respect to the price level of the Philippines, for example, the shadow price coeffi-

cient is estimated by NEDA at 1.2, which means the fee is undervalued by 20% with this factor alone.

In addition, with the improvement of the testing and inspection system, the overall quality improvement effect may be expected as the indirect benefit through development of certification system, and increase in the chance of material testing, etc.

(2) Establishment of Regional Testing Laboratories with Technical Center Function

1) Organization in charge: BPS

2) Contents of the program

It is necessary that the functions of the Central Testing Laboratory are fully installed not only in the national center (Manila) but also the regions. In Cebu, in particular, where industry is newly developing at present, it is expected that the demand for testing and inspection will increase rapidly hereafter. In the Mindanao region, no remarkable increase in the demand for testing and inspection is conceivable now or in the near future, but as the use of the testing laboratories located in Manila and Cebu is difficult and the need for such to turn on industrial development hereafter is high, establishment of Regional Testing Laboratories is necessary. In the case of Mindanao, it is desirable to establish laboratories in Davao and Cagayan de Oro, respectively, because of the insufficient and expensive transportation facilities between the southern and the northern areas. It is necessary to determine the types and capacities of the testing and inspection equipment required so as to meet the demand of each region. The testing and inspection facilities and equipment in these regions will be determined not only to cover those listed 1 through 4 above but also to meet the demand of 5 and 6 in the region, considering the small size of demand in the region and the lack of the existing testing facilities and equipment. Also, considering difficulty of access to the testing and research organizations and technical extension organizations in the capital area, each Regional Testing Laboratory is recommended to have a technical extension function attached to it. The technical extension department is recommended to be a branch of the central technical extension organizations or organized to hold close linkage with such technical extension organizations. The operation of the testing laboratories was discussed in the foregoing section of the Central Testing Laboratory.

3) Financial plan of the operation

a) Initial investment requirement

The initial investment requirement is estimated as follows:

(For detail, see Supplement Information 7.)

(Unit: million yen)

	Cebu	Davao	Cagayan De Oro
Buildings and civil works	211.5	145.8	145.8
Interior works	28.2	22.7	22.7
Testing equipment	175.6	148.4	148.4
Engineering & management expenses	84.9	63.0	63.0
Total	500.2	379.9	379.9

The land is assumed to be furnished by the local industries for all the cases, and excluded in the above estimates. The test to be carried out by each testing laboratory was assumed to be limited to the basic testing items only of mechanical, electrical, and chemical fields. The special testing items will be undertaken by the Central Testing Laboratory. In the case of Cebu, the chemical testing, especially of processed food was assumed to be carried out at sufficient level due to the existence of the demand for this field.

b) Projected cashflow

The projected cashflow in the 3rd and 5th year of operation is as follows. The required number of staffs in each laboratory was estimated as two each for mechanical, electrical, and chemical fields, assuming that the laboratories will carry out the technology guidance to factories, and training. In the case of the laboratory in Cebu, the additional number of staffs is included; one for mechanical testing mainly for furniture and wood products, and two for chemical testing mainly for food processing. The additional is included for chemical testing area, one each for Davao and Cagayan de Oro.

(Unit: million yen)

	Cebu		Davao		Cagayan De Oro	
	3rd year	5th year	3rd year	5th year	3rd year	5th year *1
Total cash inflow	25.7	28.9	21.8	25.4	10.8	12.7
Revenue form operation	25.7	28.9	21.8	25.4	10.8	12.7
Total cash outflow	47.4	44.4	38.1	35.7	37.7	35.2
Operation costs	7.2	7.4	5.2	5.5	4.8	5.0
Materials cost	0.8	0.9	0.6	0.7	0.3	0.4
Utility costs	1.0	1.1	0.7	0.9	0.6	0.7
Direct labor cost	2.2	2.2	1.2	1.2	1.2	1.2
Other operation cost	0.7	0.7	0.6	0.6	0.6	0.6
Administration cost	2.5	2.5	2.1	2.1	2.1	2.1
Interest	13.0	9.8	10.7	8.0	10.7	8.0
Repayment	27.2	27.2	22.2	22.2	22.2	22.2
Balance	-21.7	-15.6	-16.3	-10.3	-26.9	-22.5
(Depreciation *2	37.4	37.4	29.7	29.7	29.7	29.7)

Notes: *1 3rd year or 5th year of operation
*2 The operation costs exclude depreciation

The annual revenue can cover the annual operation costs sufficiently, but can not cover the cost incurred from the initial investment which is assumed to be financed by loan. Of the required depreciation, 50% can be covered by the revenue assuming no interest and no repayment in the case of Cebu, while this percentage is 55% for Davao and 20% for Cagayan de Oro. In other words, if the burden of the initial investment is reduced, the operation is financially possible with covering the maintenance cost and small scale renewal of their equipment. However, it should be noted that this estimate is assuming the revenue being utilized in their operation, instead of transferred to the National Treasury.

(3) Improvement of Calibration Service System for Measuring Instruments in the Industrial Field

1) Organization in charge: BPS

2) Contents of the program

This program is to improve the organization and facilities and equipment required for the metrological calibration service in the industrial field, assuming that BPS shall shoulder the central role

in the metrological calibration service in connection with the industrial standardization. The BPS Testing Laboratory is considered appropriate as the implementing organization until the Central Testing Laboratory is established. The calibration service in the regions will be appropriate to be conducted by the Central Testing Laboratory until the demand in the regions will increase, and after that by the regional laboratories.

It is thought that the improvement of the National Metrology System which forms the basis of the Metrology Calibration Service for the industrial sector will be promoted by DOST (ITDI is already studying the Improvement Program and are at a stage ready to present a proposal). The Program is premised on such improvement of the national system, and assumed to improve the metrological calibration system at a minimum level required by the industrial sector. Assuming the case of delay in Improvement Program by DOST, however, this program includes all the facilities and equipment required for the calibration service so as to be operated even in case of delay in the DOST program. Transfer of a part of the equipment should be examined to avoid duplication when the improvement of the National Metrological System is implemented in the future.

3) Financial plan of the operation

a) Initial investment requirement

The initial investment requirement is estimated as follows:

(For detail, see Supplement Information 7.)

	(Unit: million yen)
Buildings and civil works	183.3
Interior works	12.5
Metrological equipment	502.2
Engineering & management expenses	236.5
Total	934.5

The building construction cost was included in the above estimate, but it is a part of the building cost for the Central Testing Laboratory, because it is built in the Central Testing Laboratory.

b) Projected cashflow

The projected cashflow in the 3rd and 5th year of operation is as follows.

(Unit: million yen)

	3rd year of operation	5th year of operation
Total cash inflow	1.2	1.6
Revenue form operation	1.2	1.6
Total cash outflow	112.5	104.2
Operation costs	6.7	7.0
Materials cost	0.2	0.3
Utility costs	0.5	0.7
Direct labor cost	1.2	1.2
Other operation cost	1.8	1.8
Administration cost	3.0	3.0
Interest of loan	34.3	25.7
Repayment of loan	71.5	71.5
Balance	-111.3	-102.6
(Depreciation *1	98.8	98.8)

Note: *1 The operation costs exclude depreciation.

The annual revenue is not sufficient to enable the operation with covering only the variable cost for the operation. This is due to the fact that it is necessary to have the minimum number of staffs and facilities and equipment covering for each metrological area despite the insufficient demand for the calibration at present. Metrology system, however, is the prerequisite as the infrastructure for industry, and should be improved even if the operation is subsidized. It is necessary, especially, that the budget for maintenance of facilities and equipment, and procurement of spare part should be secured to maintain the accuracy of the facilities and equipment to be installed.

4) Social and economic benefit expected from implementation of the program

As examined in the case of benefit of the Central Testing Laboratory, the benefit quantified by the fee is undervalued. Further, the expected indirect benefit from improvement of the metrology system is estimated to be high, and therefore, the program is recommended to be implemented even if it is found difficult to be operated based on their fee alone. The improvement of quality

caused by improvement of accuracy is expected to be conspicuous, and the government expenditure as a subsidy may be justified from this viewpoint.

(4) Research for Formulation of the Plan to Strengthen and Build-up the Capability for R&D and Technology Extension Services

1) Organization in charge: BOI and the testing and research organizations under DOST

2) Relationship with other plans

There are many similar plans proposed in the past, but most of them remain unrealized yet. It is necessary to make a full study of the relationship with such plans and the priority in this survey.

3) Implementation of the program

The functions of R&D and technological guidance which are expected to be strengthened urgently for the improvement of technology and quality of the strategic industry sector selected previously are as follows. The existing organizations handle some of these functions but insufficiently, and no organizations are in charge for others. In the implementation of the program, it is recommended to organize the steering committee mainly by BOI for plan formulation and implementation coordination. The committee will formulate the overall implementation program and execute it with the cooperation with DOST. The organization to handle the similar programs is necessary to be integrated, and the action should be taken with cooperation with relevant organizations and industrial associations to decide priority of implementation. The following points are necessary to be examined and included in the overall implementation plan:

1. The final terms of reference and implementation schedule of each research item taking into account the relationship with other related programs in the respective industries
2. Organization in charge for each research item
3. Budgeting for the costs and expenses required for conducting each item of research, and arrangement for inviting foreign experts as necessary

4) Contents of the program

a) Metalworking sector: Study to formulate a plan to strengthen the research and development and the technical guidance function of MIRDC

MIRDC played a central role in the testing and inspection function of the metalworking sector of the Philippines. But, in terms of technical guidance they were very inadequate. Although the future tendency is towards increased demand for contract testing and inspection, the basic function of MIRDC should place importance on technical development and technical

guidance that matches the conditions of the Philippines. With respect to testing and inspection to be performed by MIRDC, the weight of testing and inspection relating to quality regulation and administration will be transferred mainly to the Central Testing and Inspection Laboratory and the testing and inspection which MIRDC performs will be the analytical and research oriented tests required by the advancement of the technology and quality. From this viewpoint, a direction different from testing and inspection function of the Central Testing Laboratory should be pursued. It is necessary that MIRDC should study a system to respond to such a demand and at the same time strengthen the equipment and manpower to produce testing samples which is a bottleneck of testing and inspection service.

With respect to technical guidance, what is expected of MIRDC are the solving of the technical problems arising in the existing equipment of the manufacturers and the introduction of advanced technology, since the basic technical training of technicians is carried out also at the National Manpower and Youth Council (NMYC). Further, MIRDC is requested to strengthen the technical guidance relating to die making and machinery maintenance from not only the machine fabricating industry but also many machinery using industries. But the present situation is that MIRDC has no extra time to do technical guidance because they are fully occupied in manufacturing dies commissioned to them, while being fully occupied in the maintenance of their own machine tools.

In view of the above, the study is needed to formulate a plan for strengthening the following functions of MIRDC. It is especially necessary to make a study on the specific needs of the industries and the optimum guidance system to cope with it:

1. Introduction of equipment necessary to meet the technical problems of the existing plants, for example, the introduction of cupola equipment, forging and press equipment into the foundry
2. A system that will allow continuous opening of seminars and workshops inviting foreign experts
3. Strengthening of equipment and manpower in the die manufacturing development
4. Strengthening of equipment and manpower in the technical guidance department for machinery maintenance technology

b) metalworking, and plastic processing: Study to formulate a plan to install a die and mold technology center function

There are enterprises that own a die and mold manufacturing department with excellent die and mold manufacturing technology and equipment among the large enterprises both in the metalworking sector and the plastics processing sector, but these are for their internal and there, generally, is nothing made to order. Therefore, for the other small and medium enterprises, dies and molds are either imported or contracted out to domestic die and mold manu-

facturers, but the state of both the technical level and the manufacturing equipment of those die and mold manufacturer who are engaged in manufacturing to order and not satisfactory. The primary objective of the die and mold technology center should be the training of engineers and technicians for die and mold manufacturing. However, as the small and medium manufacturers of die and mold are situated in difficulty in acquiring modern die and mold making machines because the users since they can get only a limited number of order due to low quality of dies and molds manufactured by them. The center, for the time being, will have to have the functions of manufacturing, repairing and reconditioning of dies and molds commissioned by the users. On the other hand, however, if they concentrate on manufacture, it will conversely, obstruct the development of the die manufactures. Therefore a system should be studied so that the center will sub-contract the orders for dies received gradually to the outside manufacturers and perform technical guidance at the same time.

Whether this center functions should be established independently of the existing organizations or made into a section of MIRDC or a section of the plastic processing center as will be discussed later is also necessary to be studied in drawing up the Program.

c) Plastic processing: Study on a plan to establish a research and development center function to apply advanced technology and new technology

As mentioned before, the plastic processors in the Philippines can respond only to simple molded articles except for a part of the large enterprises. The large users who require good quality molded articles with respect to plastic processing, manufacture the dies in-house. As the consumers living standard is improved in the future, the demand for various plastic containers is expected to increase, and furthermore, if the assembling of electrical appliances and automobiles becomes active, the development of the parts manufacturers may be expected and the demand for plastic molding requiring precision will increase. It is conceived that the demand for knowledge and molding technology relating to plastic materials to meet such a situation will increase. For the Philippines collection of information relating to application technology and the field of technical guidance based on such information are required. Even the industry has not grasped adequately the specific details of their requirement. Therefore, the program formulation study is necessary to be undertaken especially with respect to what area the research and development should be targeted to, and what kind of technical transfer is necessary through public channel.

d) Furniture and woodworking: Study to formulate the plan of establishment of technical guidance center function for improvement of the accuracy and repair of tools, maintenance and adjustment of machines

As mentioned before, in the furniture and wood building components sector, improvement of the accuracy of the products to respond to the specialization is increasing in importance. But,

at almost all plants except for a part of the large enterprises, old machines and tools are used without repair and adjustment, resulting in no improvement in the accuracy of the products.

Study is required as to what sort of instruction curriculum is appropriate, whether a permanent center is necessary for such a technical guidance center, and whether the existing center or a continuous seminar workshop can fulfill such demand,etc.

e) Furniture and woodworking: Study to formulate a plan to strengthen the guidance function relating to the marketing research and design development

The furniture industry of the Philippines has conducted exports mainly to North American market. Japan and Europe which are the large importers of furniture remains almost untouched. In order to expand the exports to Japan, there is need to develop designs for Japan and to improve accuracy and quality. This Program will study the possibility of strengthening of a guidance center function in these aspects. PITC at present conducts such market-oriented technical guidance and PDDCP is the center for design development. CITEM has extended the support for marketing research. This program is to bring into full play of these functions in an integrated manner, and extend technical guidance to the industry in which small and medium business account for the majority.

In this study, the basic points should be examined with respect to such questions as "whether the furniture and woodworking industry of the Philippines is appropriate for its development for exports ?", or "should they specialize in components export and orient themselves toward marketing to meet such ?", and "what measure should be taken to bring into full play in an integrated manner of the functions of such organization as PTTC, PDDCP and CITC, etc.

f) Garments: Study to formulate a plan to establish a center for marketing research and design development

The garments sector of the Philippines is mainly engaged in exports under consignment contract and the designs are also provided by the buyers. But in order to ensure future growth in the sector, development of the general exports is necessary. Also, major portion of the exports in the past was directed to the North American market, and advances to Japan and other markets were inadequate. In order to develop new markets and expand general exports in this way, marketing research and design development are considered necessary, as in the case of furniture and woodworking sector.

g) Food processing: Study to formulate a plan to strengthen the functions of marketing research and dissemination of information on new technology

The manufacturers involved in the processed food export are mainly the large-scale firms, and have well developed sales network and sufficient capability of market research and technology development. However, in the case of small and medium manufacturers, they lack all of these functions, and have limitation in collecting the information required and introduction of technology. The FDC has a consulting function in addition to the testing and inspection function, and is expected to play an important role in the food processing sector. Further, the FDC has an intention to strengthen its market research function if fund is available. PTTC has extended the technology guidance from the viewpoint of marketing. Thus, if these functions of marketing research and supply of new technology information by FDC is fully brought into play, the required functions in the food processing sector will be almost fulfilled. However, there are some issues as to how to cope with the fund shortage of FDC, and the future operation of PTTC after termination of the aid from Japan. The program is necessary to tackle these issues before these will occur.

h) Packaging material and technology : Study to formulate a plan to establish a research and development and technical guidance center function for packaging material and technology

There is no organization in charge of R&D and technical guidance of packaging materials and technologies. PIP, Package Institute of the Philippines, organized by those who are engaged in packaging business in the large-scale manufacturers is the organization exists, but it has the characteristics of research society. Since packaging plays an important role in marketing, the guidance in this field is indispensable for export promotion. With respect to the guidance of packaging materials and technology, there are three fields to be tackled, namely, 1) guidance of design and printing of packaging as a part of marketing, which is now undertaken by PTTC for some industrial sectors, 2) guidance and information supply from the stand point of package development as a part of product development, 3) guidance of packaging method and materials in view of product protection. There are organizations such as FDC, PTTC, and PDDCP, which have undertaken the guidance for their relevant industries, and there are some organizations which have conducted the research and development in view of individual material aspects like glass, plastics, metal, wood, and paper,etc. The study is necessary to find out the optimum system for integrated guidance taking into account the fact that the needs is especially significant in general package and sealed package for food in the Philippines.

5-3 Support of Individual and/or Joint Investment on Technology/Quality Improvement

(1) Support of Investment for Improvement of Technology and Quality by Individual Manufacturers

1) Organization in charge: BOI and Bureau of Small and Medium Business Development (BSMDB)

2) Implementation of the program

Many projects are under implementation related to the small- and medium-scale industries by the government, UNDP and other organizations. These projects are often modified and added. In order to implement this program efficiently in an organized manner with these projects, the steering committee is recommended to be organized among the relevant government organizations and industrial associations. It is recommended to unite the responsible organizations into one and study the priority of implementation, monitor the operation situation and its effectiveness at the implementation stage.

(2) Support of Joint Investment for Technology and Quality Improvement

1) Organization in charge: BSMBD

2) Implementation of the program

It is proposed to organize the steering committee by the representatives from the relevant government organizations, technical guidance organizations, and industrial associations. The committee will formulate the program, and at the implementation stage, undertake the monitoring and improvement of implementation program.

This program is not only support the joint investment but also to aim the modernization of management and technical aspects through establishment of joint venture and its operation. Therefore, the applicants are requested to provide the feasibility study report, and the implementation organization is recommended to organize the ad hoc project team for each application so as to study the management and technical aspects, and extend the recommendation for improvement as necessary.

3) Contents of the program

With respect to the strategic industrial sectors selected previously, support of the investment in the following joint business is necessary. Various applicable cases are conceivable for other industrial fields too, but it is recommended to start with priority industries when the fund available for financing is limited.

1. Facilities for purchasing raw materials and supplies, warehousing and sizing for metal working sector

   In the case of the small- and medium-scale metalworking industry, the raw material steel is purchased individually at present, but because of the small size of lots used, purchases of the required volume at the required time is not possible. As a result, the delivery schedule control is not well executed, and a great deal of loss is involved in the purchased steel. Furthermore, because of the small lot purchase, the quality check of the purchased steel is inadequate too.

   In order to improve such, it is desirable for the cooperative business to collectively purchase the raw material steel and to maintain a proper level of inventory. By having the quality inspection equipment and the sizing equipment as jointly owned equipment, the individual enterprises would be able to secure steel of reliable quality, in the required quantities, at the required time.

2. Facilities for treatment and recovery of waste water related to the plating operation in the metalworking sector

   Almost all of the plating enterprises are small and medium industries who do not have waste water treating facilities at present. As the metalworking sector grows in the future, pollution problems are expected to emerge, and the installation of waste water treatment and recovery facilities are urgently required as an advance measure. As the plating enterprises do not form an estate and are scattered at present, facilities for operations including the collection, the treatment of waste water and the recovery of metals are necessary. By such facilities, recovery of metals which have been discarded in the past become recoverable. The obstruction to any expansion and modernization of the plants that the plating enterprises may plan will be removed. Incidentally, this plan is under study by the plating industry (PPIA) too.

3. Facilities for cooperative business in the furniture, woodworking and builders' woodwork sector

   One of the major problems in the development of the furniture, woodworking and builders' woodwork sector is that many enterprises are cottage, small or medium scale industries, as a result of which no autonomous activity was possible and they had to handle the orders from the exporters in a passive way. On the other hand, from the exporters' viewpoint, there were the problems that the quality of the products from the individual enterprises varied and the delivery was uncertain. Again, in the area of improvement of technology and quality, the moisture content of the product was high because of lack of a kiln dryer, causing warping and cracking or the processing technology could not be fully used because of the lack of the finishing equipment, thus the product had to receive a low evaluation in the market. Again, because

of the small-scale of production, the plant did not keep tools that are not used frequently, which obstructed the improvement of the accuracy. This Program attempts to resolve these problems on the marketing side and the technology and quality side by establishing a cooperative business. As equipment for the cooperative business, kiln dryers, finishing equipment and rental tools are included and by the cooperative business, for example, use of a unified brand, cooperative order receiving, use of common design, rendering it possible to structure a system which is able to adhere strictly to the delivery commitments and to produce products according to standard.

4. Cooperative sizing equipment for garments sector

Delivery at the date designated by the buyer is an extremely important condition in the clothing industry. As the time from the order to the time of delivery is short, a vast amount of producers' inventory is carried, which is a cause of the deterioration of the profitability. Thus, the attempt aims to modernize the sizing operation which takes time, by cooperative operation and to reduce the time required by the process. The sizing equipment will be installed in the bounded warehouse and by sizing the imported fabric, the fabric is delivered to the individual mills, evading the cost pressure from taxation on imported fabric that is not needed.

5. Facilities and equipment for landing, marketing and refrigeration at the regional fishing ports, in the fishing products processing sector

Almost all of the processed marine product is exported through Manila and the processing industry is concentrated in the Manila area. In order to maintain freshness of the processed marine products, maintenance of freshness at the site is required prior to transporting to Manila, which requires immediate treatment for freshness at the port of landing.

As seen above, in each case, it is not a simple financing, but there is a need for simultaneous implementation of cooperative operation, modernization of operation and improvement of technology. For this, the designated financing institution is recommended to form a cooperative team with the technical center that is in charge of the respective type of business, and make the Program in a form incorporating the promotion of the cooperative operation, the technology, and the managerial guidance.

5-4 Technological Support in Technology/Quality Improvement

(1) Seminars and Workshops for Improvement of Technology and Quality

1) Organization in charge: BOI, DOST, and BSMBD

2) Implementation of the program

The overall implementation schedule is proposed to be formulated by the Steering Committee organized for research program for strengthening and build-up the capability for R & D and technology extension services functions, as described in the previous section. This implementation plan should consists of mid-term plan for the coming three years and annual plan. In formulating the plan it is necessary to examine the way to implement it in an organized manner with the similar projects proposed by UNDP, and other foreign aid agencies, etc. The responsible organization should be united into one if possible, to avoid the inefficiency. The committee will act as the secretariat in:

1. Selection of implementation body of each seminar and workshop
2. Budgeting
3. Engagement of foreign experts for lecturer as necessary
4. Raising the participants through the industrial associations

3) Contents of the program

Following seminars and workshops are effective in technological and quality improvement in the strategic industries selected previously.

a) Seminars and workshops for improvement of the technology to adjust various machinery (woodworking and metalworking)

The machinery in many types of industry are old and renovations are needed to improve the accuracy. But there are included those that can be improved in accuracy to a certain degree by proper repair and adjustment. Also, when a new or used machinery should be introduced in the future, adjustments are needed according to the respective usage, and the repair and adjustments must be made while in use, otherwise the accuracy would be difficult to maintain. The objective of this Program is to extend the training for the engineers of the various related industries to require such technology of adjusting and repairing machinery.

(The detail is shown in Supplementary Information 8 in Annex 1.)

The implementing body will be MIRDC, and seminars and workshops using the various technical centers will be held. It is considered that almost all work is enable to be implemented by the technical staff of MIRDC. When it is necessary to engage foreign engineers for new machinery, the technology transfer will be made by the foreign engineers to the engineers of MIRDC first, and the engineers of MIRDC who received the transfer will hold further seminars and workshops.

b) Seminars and workshops relating to understanding of the technology of the whole process from raw material, quality, manufacturing process of the metalworking sector

In the metalworking industry of the Philippines at present, the fundamental knowledge on the relationship between the composition of the raw material and the subsequent metalworking processes such as melting, smelting, casting, rolling, forging, heat treatment, welding, etc. is lacking, and because of such, the understanding of the composition of the raw material, etc. is not adequate, which forms a bottleneck in the improvement of the quality in the subsequent process. Therefore, the seminars and workshops will cover not only the technical guidance of a part of the process but also the composition of the raw material and the effects of the composition on the quality of the subsequent products and intermediates. The engagement of foreign expert is considered necessary.

c) Seminars and workshops on the fundamental technology relating to designing and handling of molds in the plastics processing sector

The large plastics processors manufacture their own plastics molds at present. But, the small and medium manufacturers lack fundamental knowledge on such a subject as how to design a mold to produce a proper one and how to make corrections on them, and there is a strong demand for seminars and workshop relating to plastics processing. There is no institute for technical guidance or plastic processing in the Philippines, and it is desirable that this should be advanced by ITDI acting as the core for the time being.

When the metalworking and the plastics mold technology centers which are proposed in this Program are established, these seminars are to be treated as one of the permanent seminars of the centers. The technical personnel specializing in these fields belong to the manufacturers in the Philippines and it is considered necessary to engage foreign experts.

d) Seminars on the high level technology and new technology trend in the plastic processing sector

The technology of injection molding is standardized and the technical information relating to the subject is relatively easy to obtain from literature and other sources, but information on molding is lacking. The large manufacturers send people abroad to obtain such information.

It is appropriate that the seminar is conducted by ITDI for the time being. Engagement of foreign experts is considered necessary.

When the plastics technology center which is proposed by this Program is established, the seminar should be treated as one of the permanent seminars of the center. The technical personnel specializing in this field belong to the manufacturers and it is necessary to engage foreign experts.

e) Seminars and workshops on the technology to improve the accuracy in the furniture and woodwork manufacturing sector

In the furniture, woodwork and wood building components manufacturing sector, it is conceived that specialization and division of labor will be promoted. In such case each plant will manufacture the parts of furniture or a part of the building components, which will be exported in such form or assembled and finished in the assembly plants. In such case, it is an essential condition that the individual parts fit in the assembling stage. Therefore, for the furniture and woodwork manufacturing plants to develop in the future, enhancement of the accuracy of the products manufactured will be demanded. These are seminars and workshops to meet such requests.

Some seminars and workshops have been conducted already by CITC and JETRO, but development of continuous seminars and workshops with follow-up seminars will be required. These seminars will formulate the basis of the "Improvement of furniture and woodwork standards" discussed before and the "Scheme to standardize the manufacturing processes of furniture and woodwork" to be discussed later.

As specialization and division of labor have been promoted early in the advanced industrial countries, it is desirable to engage foreign experts to absorb such experiences of them. The sample contents of the seminars and workshops are indicated in Supplementary Information 8.

f) Seminars on information relating to new technology and market for the furniture and woodwork manufacturing sector

As the technology for colors, designs, materials, etc. is progressing rapidly in the furniture, woodwork and building components manufacturing sector, it is desirable from the marketing viewpoint that seminars on new technology and the market are held periodically.

(The detail is shown in Supplementary Information 8 in Annex 1.)

It is recommended to formulate the joint theme with CITC, DDCP, PTTC, etc., and conduct it periodically and continuously. The workshop may be held either at CITC, DDCP, or PTTC depending on the theme set.

g) Seminars and workshops on the quality control of the purchased cans and the canning process in canned products manufacturing

With respect to the manufacture of cans for canning, some of the large food processing enterprises manufacture good quality cans for captive use using imported material but the cans for canning in general distribution are manufactured by small and medium scale enterprises using domestic products. There have been bad effects on the quality of canned food caused by corrosion of metals due to uneven coating. The material for the cans for canning and cans pass from the material manufacturer to the can manufacturer and then to the cannery but, no proper inspection of the quality is done in the course. Thus, the checking of such uneven coating is impossible, and complaints are made by the distributors or users of canned foods only after the canned products reach the market. The seminars and workshops are targeted at the canneries.

Although FDC will plan and implement the seminars and workshops, the cooperation of MIRDC is necessary. There is no need for continuous implementation but implementation of the follow-up workshops is desirable.

It is necessary that the following subjects are included as the themes:

1. Essential conditions of the quality standards of cans.
2. Method of quality inspection at acceptance of cans.
3. Points of precaution in the canning process and the method of quality control.

(2) Scheme for Improvement of Technology and Quality

(2)-1 Scheme to prepare GMP by sub-sector of the food processing sector

There are many cottage enterprises in the food processing industry and even the fundamental understanding of hygiene control is inadequate. FDC prepared for some sub-sectors GMP which will be called a common company standards for the food processing industry and they have guided the manufacturing according to the GMP, producing results in improvement of the technology and quality. For most of the types of industry, nothing has been done and they hope to expand the target sub-sectors. This scheme aims to prepare the GMP intensively and contribute to the improvement of technology and quality of the foods processing industry.

1) Organization in charge: FDC

2) Linkage to other programs

When purchase of equipment is required to manufacture according to the GMP (Good Manufacturers Practice) prepared, the "Preferential taxation and institutional financing for investment in equipment to improve the technology and quality of individual enterprises" mentioned earlier will be applied.

3) Specifications and the outline of the implementation

This Scheme is to prepare the GMP by organizing an advisory committee constituted by FDC, PTTC, BFD, BPS, etc., formulating a schedule, organizing a counterpart team according to this constituted by the representatives of the industry, etc. The committee will engage consultants from abroad according to the schedule prepared and extend and encourage the manufacturing based on the GMP.

In the dissemination of GMP and encouragement of use of GMP, a GMP certification system is recommended to be established. This system authorizes the manufacturers that manufacture according to the GMP for attachment of the certification mark on their products.

(2)-2 Scheme to standardize the manufacturing process of the furniture and woodwork sector

As mentioned earlier, it is expected that specialization and division of labor will progress in the furniture, woodwork and building components manufacturing sector. To meet such a situation it is necessary to render it possible to manufacture identical quality standard products by standardization of the process as well as to establish the quality and standards of the products and to acquire the technology to improve the accuracy.

1) Organization in charge: CITC

2) Linkage to other programs

Along with the "Improvement of the standards for furniture and woodwork" and the "Seminars and workshops on technology to improve the accuracy" mentioned before, effects of improving the technology and quality of the furniture and woodwork manufacturing sector may be expected.

3) Specifications and the outline of the implementation

This scheme is to investigate and study the standard manufacturing process to match the meteorological conditions and the actual situation of the manufacturing plant, establish target standards to follow to improve the manufacturing process, and encourage the use of such standards.

It is recommended to establish the certification system so that the manufacturers who manufacture according to the standards will be authorized to attach the certification mark on their products for the purpose of dissemination of the standards and encouragement of use.

(As for the major points for standardization, see Supplementary Information 9 in Annex 1.)