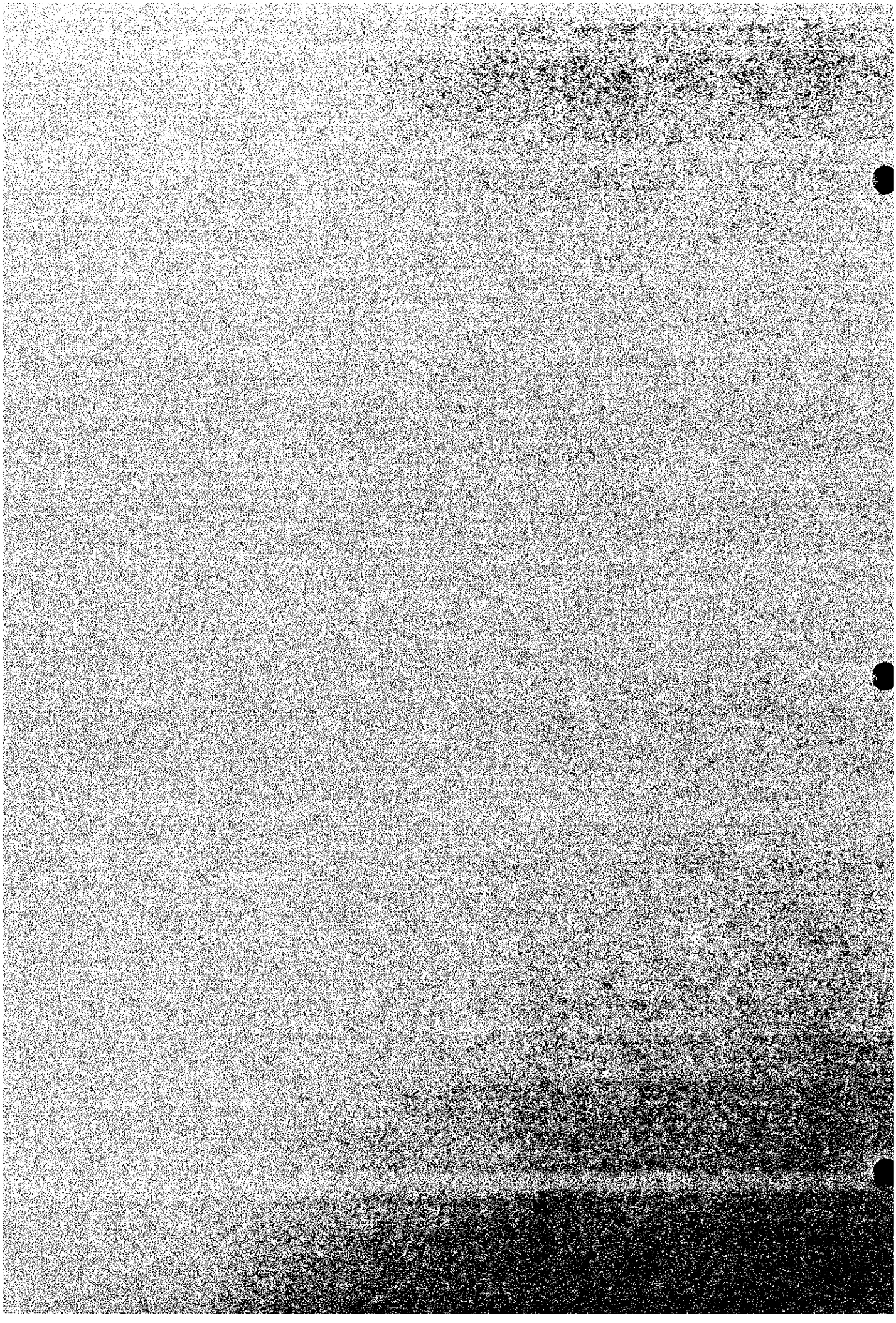
ANNEX

ANNEX–I

REVIEW OF INDUSTRIAL SECTOR DEVELOPMENT STUDY RECOMMENDATIONS



ANNEX-I Review of Industrial Sector Development Study Recommendations

1. History

In 1987, following formulation of its master plan for cooperation for promotion of industry in 1986, JICA began a study of promising industrial sectors and made recommendations on measures for industrial promotion by sector and in general, including the transfer of Japanese expertise in industrial policies and export promotion policies. The following industrial subsectors were studied: the mold and die and toy industries in the first year (Jan. – Sep., 1988); textiles and garments and wooden furniture in the second year (Oct., '88 – Aug., '89), and plastic processing and ceramic tableware in the third year (Oct., '89 – Nov., '90). Since the late 1980s, the Thai economy has undergone sustained growth, and the industrial sectors studied have enjoyed expansion. Many of the recommendations have been implemented by the Government of Thailand, and some are ready to be realized. A review of progress in implementing industrial policy recommendations for the mold and die and plastic processing sectors would be meaningful, since these two sectors are key members of the supporting industries for the auto industry and electrical and electronic appliances industry.

2. Summary of Industrial Sector Study and Main Recommendations

(1) Molds and Dies

Many small and medium scale manufacturers are behind in modernizing their operations and are immature when it comes to design, processing technology and process control. Their facilities are old fashioned and antiquated, so they are not in a position to supply high quality and precision molds and dies, for which demand has been rapidly rising.

Therefore, it was recommended that effective use be made of MIDI, newly established with Japanese cooperation, to set up an industry association and build close cooperation between MIDI and the industry association, and that duties on metalworking machinery be reduced.

(2) Plastic Processing

In the past, a large number of small and medium enterprises developed producing mostly household equipment, but the investment of set manufacturers into electronics, automotives, and other sectors has resulted in a surge of demand for industrial products. The immature state of processing technology, the insufficiency of knowledge on materials, etc. make it impossible to meet this demand. There had been no section in charge of this industry in the Ministry of Industry, nor had there been any coordination with other industry associations.

It was recommended that a new policy section be established in the Ministry of Industry and closely liaise with industrial associations, etc., that training facilities for plastic processing be set up, and that duties on processing machinery and molds and dies be lowered. Further, it was recommended for home electrical appliances that design and development capabilities be improved and that activities be coordinated with the DEP to promote exports.

(3) Industrial Policy

Up until now, Thailand has promoted industrial development by devising incentives such as duty and tax abatement for individual investment projects in export industries. This was very effective in promoting investment, including foreign investment, and led to the development of a wide range of export industries. This type of industrial development, however, also causes imbalances such as delayed development of small and medium sized enterprises and supporting industries and delayed formation of linkage among industries and therefore is becoming a factor inhibiting future industrial growth.

To deal with this, it was pointed out that the Ministry of Industry, which has direct contact with the industrial world, could effectively develop sectoral industrial policies and small and medium enterprise policies in addition to the investment promotion of the individual project type and that this would require strengthening of policy functions in the government, promotion of industry associations, and stronger coordination between the

government and industry.

3. State of Progress

(1) Industrial Policy as a Whole

- Duties – Reduction of import duties on machinery was emphasized in the recommendations. Import duties on all products in Chapter 84 of the tariff schedule and 36 products in Chapter 85, for a total of 420 products, were lowered starting October 1990 (from 40 percent to 5 percent). Starting July, 1991, import duties on computers, related accessories, and components were lowered from 20%, 40%, and 10% to 5%, 5%, and 1%). In August, 1993, the duties on molds and dies, steel pipe, and agricultural machinery were lowered (from 25%, 35%, and 30% to 10%, 5%, and 0%). Further, in January, 1992, the business tax was abolished and a value-added tax introduced.

- Investment promotion – The limits to the Investment Promotion Act, pointed out from the start of the survey, became strongly recognized by the Thai government as well in the 1990's and so incentives were focused on promotion of regional industries. The BOI (Board of Investment) also established sections for each industrial sector and is working to speed up procedures. At the same time it is strengthening its information service functions and otherwise pressing forward with reforms of the organization.

- Industrial policy – The Ministry of Industry has been moving in the direction of establishing sectoral industrial policies pointed out in the report. In 1991, the Industrial Economics and Planning Division of the Office of Secretary to the Minister was reorganized into the Office of Industrial Economics (OIE) and raised to a bureau level organization in charge of industrial policy as a whole. In the OIE, the Industrial Economic Division I is in charge of basic industries and Division II other industries.

Also, the Ministry of Industry is otherwise positively tackling the recommendations made, such as the promotion of industry associations and

the introduction of the principle of the beneficiary bearing the burden of payment for services received at public service organizations.

- Industrial standards – With assistance from Japan, an Industrial Standardization, Testing and Training Centre was established as part of the Thai Industrial Standards Institute of the Ministry of Industry in 1989. Eight long-term experts have been dispatched from Japan and are providing technical guidance in the preparation of industrial standards and the improvement of quality control techniques, etc.

- Investment promotion – Since October, 1987, the BOI has had a Japan desk. Experts were dispatched from JETRO and cooperated in promoting investment in Thailand. Since 1990, the problem of the underdeveloped state of supporting industries surfaced, so to strengthen the linkage between venture companies and related local companies, BUILD (BOI Unit for Industrial Linkage Development) was established and a matching service and information service were started. In October, 1993, it was announced that investments made in molds and dies, jigs and fixtures, forgings, castings and induction furnaces would [1] be exempted from income taxes for eight years, [2] be located in any zone, and [3] equity be fully owned by the foreign sides in a venture.

(2) Molds and Dies (see table A-1)

- MIDI was established with Japanese economic assistance. Since 1989, MIDI has been providing technical training and engaging in various activities.

- Based on the recommendations, in 1989, the Thai Tool and Die Industry Forum was established. The initial membership was about 100 companies. The Forum was elevated in 1992 to a government approved official industry association. Right now, its membership has grown to about 400, including Japanese ventures.

- The industrial association is publishing directories and quarterly journals and information is being provided from JETRO Bangkok.

- AOTS seminars are being conducted making use of MIDI.

- Assistance is being given to the organization and stimulation of local industries through JETRO's program for cooperation in promoting domestic industries of developing countries.

(3) Plastic Processing (see Table A-2)

- The Ministry of Industry designated the EIPC (Eastern Industrial Promotion Centre) in 1992 as a unit in charge of the industry.

- A plastic training workshop was newly set up in the EIPC. At the present time, a training building is being constructed.

- An investment mission was received under JETRO's AC program.

- Assistance is being given to the association through JETRO's program for cooperation in promoting domestic industries of developing countries.

A-1 REVIEW OF RECOMMENDATIONS OF MOULD AND DIE INDUSTRY (1/2)

Mold and Die Industry

Action Package	Comprehensive Program	State of Progress on Recommendations of Industrial Sector Development Study
Private sector oriented service activities by government organizations to raise level of skills and production and management	Use of MIDI functions Positive use of functions of MIDI (metalworking center) in direction leading to organization of industry and improvement of level of private small and medium sized enterprises	· A total of ten experts were dispatched under JETRO's cooperation program. Five leaders were also invited to Japan. The Thai Tool and Die Industry Association was established and received formal approval in September, 1992. Its secretariat was set up in MIDI. The director of the secretariat was appointed from among the department heads of MIDI. In this way, MIDI is providing full cooperation and assistance. · The technical training provided by MIDI to private companies consists of seminars and training courses. A look at the state of implementation of seminars in the five years since 1989 shows since 1989 shows that six were run in 1989 drawing 435 participants, five in 1990 drawing 430, seven in 1991 drawing 369, eight in 1992 drawing 262, and six in 1993 (January to October) drawing 400. For molds and dies, the themes in 1993 were CAD/CAM and graphic progressive dies and molds. As for the training courses, taking 1992 as an example, 46 courses were run in the metropolitan area drawing 1,148 participants and 12 in regional areas drawing 398. · Information is provided to private companies through publications and periodicals. Members of the industrial association are allowed a discount. · No academic society has been formed, but related parties are kept in touch with by MIDI, for example, becoming its advisors.
Activities for raising level of skills and management through organization of industry	Establishment and activities of Mold and Die Industry Association · technical training for member companies using MIDI facilities · Promotion of on-the-job training using MIDI facilities · Publication and distribution of "Mold and Die Journal"	· In 1989, the Thai Tool and Die Industry Forum (TDIF) was established with the participation of about 100 companies. This evolved into a tool and die industrial association in the middle of 1992 with the help of JETRO. In September, it received approval and was formally registered. At the present time, it has grown to a membership of about 400 companies and has joined the Federation of Asian Die and Mold Associations. The secretariat consists of four persons, two of which are staff of MIDI. The members pay a registration fee of 500 baht and an annual fee of 1,500 baht. · The main activities include technical training, seminars, consulting services, publication of a quarterly, preparation of a directory, and hosting of exhibitions (Intermold). The member companies consist of 20 percent large corporations, including 20-odd Japanese ventures, 20 percent medium sized enterprises, and 60 percent small businesses. · JETRO cooperation such as technical guidance and seminars by technical experts and the arrangement of visits of Thai industrialists to Japan has led to new approaches toward improvement of production control and quality control among member companies, led to better understanding of the experiences and achievements of Japan in the organization and stimulation of its industry associations, and provided the driving force behind the formal establishment of the TDIA.

A–2 REVIEW OF RECOMMENDATIONS OF PLASTIC INDUSTRY (2/2)

Collection and dissemination of overseas information relating to household use plastic products and export promotion	DEP program for promotion of exports of household use plastic products · Survey of trends in key overseas markets for household use plastic products (including collection of samples and and catalogs) · Publication of survey findings · Development of new products · Participation in overseas trade fairs by superior products · Dispatch of export missions	· The DEP has been engaged in marketing, seminars, and dispatch of missions for the plastic industry. Examples of programs in 1991 to 1993 include one for plastic products to the U.S. (April, 1993), a study mission to Germany (1992/1993), and a study mission to Japan (May, 1993) (received by JETRO through its AC program). DEP missions include 30 members/year. In February 1994, seminars are scheduled through joint sponsorship with JETRO. For product development (1991 to 1993), there was the program of German experts on design of plastic products. Also, a Design Service Centre and an Information Service Centre were established in the DEP. · The Plastic Journal is published six times a year by the TPIA.
Establishment of technical training organization relating to processing of plastic	Establishment of plastic training sector in EIPC (Eastern Industrial Promotion Center) · Establishment of function for training in plastic molding and processing skills · Function for training in technology for testing and analysis of plastic materials · Function of information center Collection of outside technical information, accumulation of internal technical information, and publication of results · Introduction of principle of beneficiaries paying for services	· A plastic processing workshop is scheduled to be set up in the EIPC. A training building is under construction in Cholburi (scheduled for completion in 1994). The training course will accommodate 20 students, the management course 30 to 50, and the entrepreneur course 30. The offices will be 570 square meters in size, and the workshop will be a four-story building of 600 square meters (including the Machinery Centre). The cost of the building will be 3.69 million baht. · A processing workshop is also scheduled to be set up. The building for this was to have been completed by November, 1993, but this has been delayed. The inside equipment and materials are the question. A list of the required equipment, etc. has been asked for from the private sector as well. Studies are being conducted through meetings and advisors of Chulalongkorn University, etc. and deliberations are underway in the Ministry of Industry (application to DIP in September, 1993). Estimates are being prepared primarily by consultants of Chulalongkorn University with an emphasis on inspection equipment. There is a possibility of a delay in the establishment of the Workshop. It is thought that official support would be effective in this respect. · Research has been commissioned to Chulalongkorn University. Note that the Plastic Centre building now under construction is being paid for 100 percent by the government (90 million baht already earmarked in the budget, however, funds for purchasing inside materials and equipment not included). · The Director of the EIPC stated that the idea of having the beneficiaries of services bear the cost for them is not being given much consideration.

A-2 REVIEW OF RECOMMENDATIONS OF PLASTIC INDUSTRY (1/2)

Plastic Industry

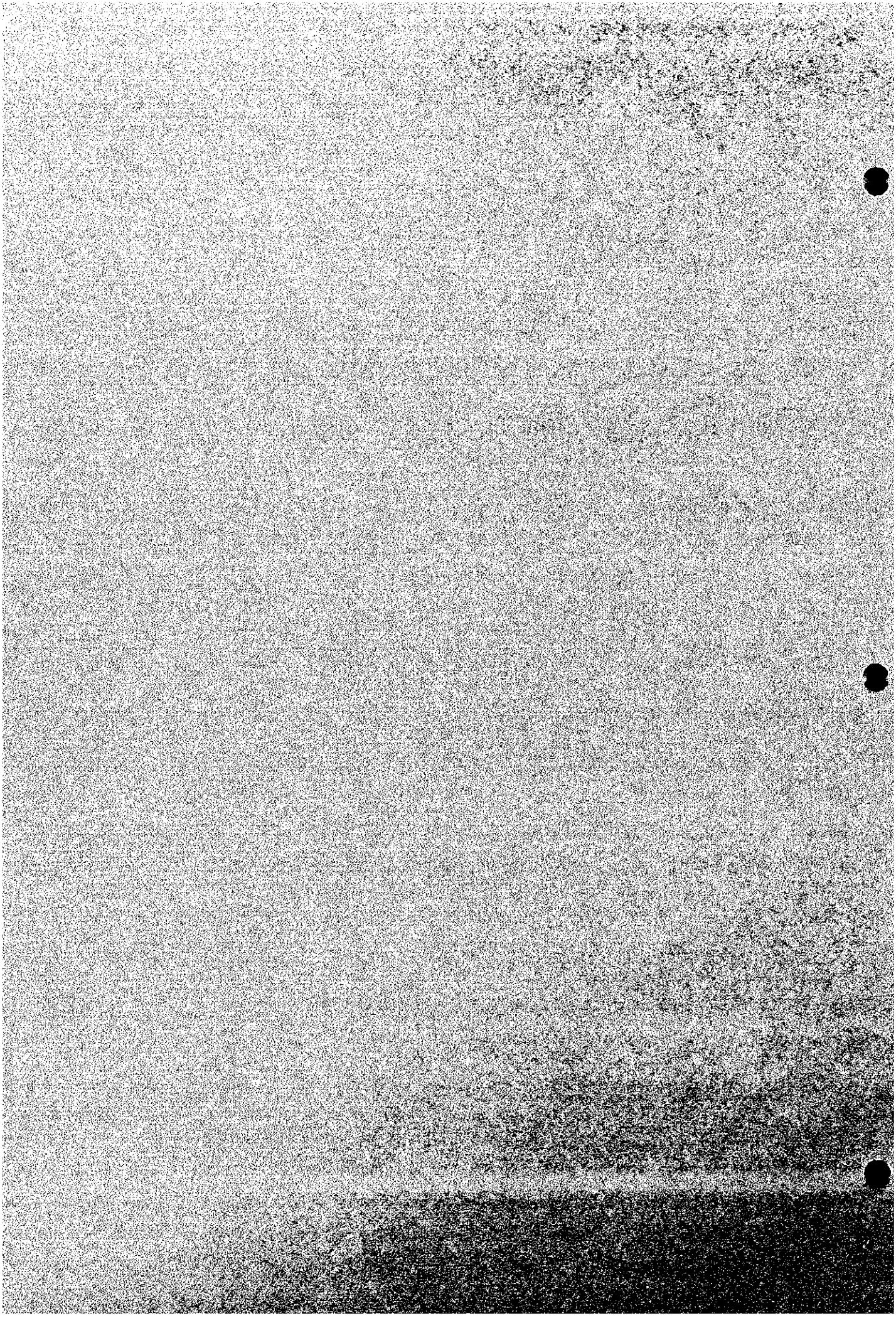
Action Package	Comprehensive Program	State of Progress on Recommendations of Industrial Sector Development Study
New establishment of function for drafting and promoting policies relating to the plastic industry	Establishment of policy unit for plastic · Preparation and implementation of promotional measures · Joint work with private bodies related to plastic · Coordination with other ministries · Compilation of plastic information (statistics, industrial information, technology)	· The establishment of the EIPC (Eastern Industrial Promotion Centre) was legally and officially realized (1992). This covers not only the Eastern region but the entire country in promoting the plastic industry. A workshop for plastic processing was newly established. The training building is under construction at Cholburi and is scheduled for completion in October 1994. Its main function is training. There were three directors and 20 staff as of November 1993 (10 DIP experts stationed there since 1992). · A Plastic Industry Club was established in the FTI with cooperation from the TPIA. · 300 members of the TPIA have joined. A secretariat office has been set up. · The EIPC has commissioned research to Chulalongkorn University. · Starting from 1994, the EIPC is scheduled to set up a general affairs department, a planning and PR department, a small industrial engineering promotion department, a factory level department, and a technology department. · No periodic meetings of the EIPC have been organized. Meetings are held at the MIDI hall as needed.
Promotion of industrial organization and establishment of system of cooperation among related organizations	Establishment of Plastic Industry Liaison Committee	· The EIPC is used as the center for this (irregular, three to four times a year, using MIDI facilities for meeting hall). · Official meetings for the Plastic Industry Forum were held in October, 1992 and March, 1993 with the TPIA, EIPC, DIP, and MIDI as C/P. Seminars are held (each with about 100 participants) as part of the JETRO assistance in establishment of an industry association. At the same time, technical guidance is given by visits to factories.
Formulation and implementation of preferential measures for promotion of plastic processing industry	Program for promotion of plastic processing industry · Encouragement of indirect exports and investment by small and medium sized enterprises · Promotion of specialized mold and die, secondary processing, compound industries · Reduction of import tariffs on plastic processing machines and plastic use molds	· Match-making schemes started by BOI BUILD. · BOI Announcement (October, 1993) results in emphasis on metalworking industry. · The industry side does not consider this a fundamental reduction. · Prices and import duties of materials continue to be one of the major issues in view of their compatibility with each other. · The system of institutional financing (SIFO) was reorganized and privatized as the SIFC. The SIFC started business in 1993.

A-1 REVIEW OF RECOMMENDATIONS OF MOULD AND DIE INDUSTRY (2/2)

Improvement of level of production, technology, and management through entry of foreign companies	Promotion of establishment of joint ventures · In particular, matching between foreign mold and die manufacturers and Thai mold and die users · Use of BOI scheme · Establishment of mold and die industrial estate in accordance with need	· BUILD (BOI Unit for Industrial Linkage Development) was established in the BOI in 1992 for the purpose of matching companies in the supporting industries, including molds and dies. BUILD engages in the following: [1] matching, [2] BUILD PR, [3] managerial training, [4] dispatch of missions overseas, and [5] information services. It has had four successes in matching as of November, 1993. · In October, 1993, the following were announced for investments in five subsectors, including molds and dies: [1] eight years of exemption from income tax, [2] easing of site restrictions, and [3]easing of restrictions on foreign ownership. Twenty-one industrial estates were set up, but none was meant solely for metalworking.
Implementation of joint projects for training skilled workers	Implementation of emergency program for training of mold and die workers In consideration of urgency of training of skilled workers, implementation of emergency training program by joint effort of MIDI and King Monkhut Institute of Technology (cooperation by Mold and Die Industry Association as well)	· While the necessity was fully recognized, there are great limitations in both facilities and staff at MIDI and King Monkhut University.
Financial, tax, and tariff incentives for modernizing facilities	Establishment of policy scheme for promotion of mold and die industry. Strengthening of policy functions of MIDI	· Among the industries for which the BOI is promoting investment, mention is made of metalworking machinery or tools (4.10), but not molds and dies. In October, 1993, the BOI announced the following for molds and dies, jigs and fixtures, forgings, castings, and induction furnaces: [1] eight years of exemption from income tax, [2] easing of site restrictions (location anywhere), and [3] easing of restrictions on foreign ownership (allowing 100 percent foreign investment). · Tariffs were reduced on 420 types of machinery in October, 1990. In August, 1993, duties were further reduced for five types of machinery, including molds and dies and related equipment. · The system of institutional financing (SIFO) was reorganized and privatized. · The business tax was abolished in 1992 and a value-added tax was introduced.
Training of engines and skilled workers	Augmentation of education of engineers at university and college levels In addition to the above-mentioned emergency training program, there is a need for hurrying the augmentation of education.	· The number of science and technology university graduates will be increased to 5,600 in 1995 from 3,400 in 1991. This will be achieved through the expansion of private technology universities and other facilities.

ANNEX–II

PROFILE OF TECHNICAL ASSISTANCE INSTITUTIONS



Ser. No. 1

THE METAL-WORKING AND MACHINERY INDUSTRIES DEVELOPMENT INSTITUTE (MIDI)

Address	Soi Trimit, Kluay Nam Thai, Rama 4 Rd, Bangkok 10110, Thailand Tel: 381-1051-6 Fax: 381-1812		
Status	Government (MOI/DIP)	Established: 1985	Staff: 98
Facilities available for services to supporting industries (SIs): Attached			

Main roles

1) To raise the technological level of metal-working industries.
2) To develop industrial and metal-working products.

Major activities available for SIs

1) To conduct seminars and technical training courses
2) To provide advisory service on either general advisory service or firm-by-firm basis
3) To offer metallurgical testing and inspection service
4) To make techno-economic study
5) To conduct experimental research works and to construct prototype machinery
6) To provide technical and technological information

Recent achievement

	1991	1992	1993
1) Training/Seminar			
No. of training/seminar	71	68	71
No. of participants	2,188	1,660	1,799
2) Advisory consultancy service			
No. of firms	120	121	246
3) Inspection/testing service			
No. of workpieces	1,287	1,225	1,338
No. of firms	329	335	126

Limitations and advantages in services for SIs

Limitations

1) Shortage of technical staff.
2) Long period of lime required for testing/inspection services.
3) Regional limitation for providing services to local SIs.

Advantages

1) Well equipped with high grade machinery and advanced instruments.

1) [x] Seminar/workshop	2) [ ] Vocational training	3) [x] Extension services
4) [x] Technical consultation	5) [x] R&D services	6) [x] Inspection/Testing
7) [ ] Calibration	8) [ ] Industrial standardization	9) [ ] Consultation for investment/management
10) [x] Technical information supply	11) [ ] Credit/Loan	

ATTACHMENT: MAJOR FACILITIES AVAILABLE FOR SIs

Items	Q'ty	Items	Q'ty
Foundry equipment			
High frequency induction furnace	1 set	Ro-tap sieve shaker	1 set
Cupola	1 set	Moisture teller	1 set
Crucible furnace	1 set	Universal sand tester	1 set
Green sand molding unit	1 set	Mold hardness tester	1 set
CO_2 molding unit	1 set	Wood lathe	1 set
Chemical binder sand molding unit	1 set	Router	1 set
Shell molding unit	1 set	Band saw	1 set
Sand rammer	1 set	Spindle sander	1 set
Permeability tester	1 set	Handfeed planer	1 set
Forging equipments			
Heating furnace	1		
Heat treatment equipments			
Heating furnace	1 set	Soft nitriding furnace	1 set
Tempering furnace	1 set	Salt bath (High temp)	1 set
Quenching oil bath	1 set	Salt bath (Low temp)	1 set
Quenching water bath	1 set	Spark test booth	1
Gas atmosphere furnace	1 set	Rockwell hardness tester	1
Tempering furnace	1 set	Shore hardness tester	1
Wash cleaning bath	1 set	Brinell hardness tester	1
Wash cleaning bath	1 set		
Materials testing and inspection equipment			
Vacuum emission spectrometer	1	Scanning microscope	1
Universal testing machine	1	Modularity detector	1
Micro vickers hardness tester	1	Pure water generator	1

Items	Q'ty	Items	Q'ty
Vickers hardness tester	1	Bench type grinder	1
Brinell hardness tester	1	Cut grinder	1
Rockwell hardness tester	1	Resin belter	1
Shore hardness tester	1	Universal precision laboratory cut-off machine	1
Charpy impact tester	1	High speed precision cut-off machine	1
Magnetic flaw detector	1	Pregrinder	1
Ultrasonic detector	1	Polishing machine	1
Microscope	4		
Material testing and inspection equipment			
Portable X-ray apparatus	1		
Welding equipment			
AC arc welder	10 sets	Spot welder	1 set
DC CO_2 welder	2 sets	Semi-auto gas cutter	1 set
TIG welder	2 sets	Manual gas cutter	3 sets
MIG welder	2 sets	Plasma cutting machine	1 set
Submerged arc welder	1 set	Engine welder	1 set
Machining equipment			
Gear hobbling machine	1 set	Vertical lathe	1 set
Gear grinder	1 set	Hob sharpener	1 set
Horizontal machine center	1 set	Universal grinder	1 set
Profile die milling machine	1 set	Tool grinder	1 set
Jig milling machine	1 set	Carbide tool grinder	1 set
Electric discharge machine	1 set	Floor grinder	2 sets
Wire cut EDM	1 set	Surface grinder	1 set
Planer	1 set	High speed lathe	1 set
Horizontal boring machine	1 set	Engraving machine	1 set
NC lathe	1 set		

Items	Q'ty	Items	Q'ty
Mold testing equipment			
Plastic injection machine	1	Multi-purpose press	1
Precision measuring and inspection equipment			
Involute & helix tester	1 set	Screen projector	1
Pitch tester	1 set	Surface roughness tester	1
Hob tester	1 set	Measuring microscope	1
Three dimension coordinate measuring machine	1 set	Dynamic balancing machine	1
Roundness tester	1 set		
Plating equipment and waste water treatment system			
Waste water treatment system	1 set	PH meter	2
Supersonic washing tank	1	Thickness tester	1
Ion exchanger	1	Pin hole tester	1
Hull cell tester	1 set		
Low cost automation training equipment			
Portable pneumatic training kit	1 set	Pneumatic sequence programmer	2
Additional equipment to existing unit	4 sets	Air compressor	2
Hydraulic-electric training unit	4 sets	Sensors	1 set

Ser. No. 2

THAILAND MANAGEMENT DEVELOPMENT AND PRODUCTIVITY CENTRE
DEPARTMENT OF INDUSTRIAL PROMOTION, MINISTRY OF INDUSTRY (TMDPC)

Address	1193 Boonpong Tower 18th Fl, Phahonyothin Rd, Bangkok 10400, Thailand Tel: 2781788, 2781798, 2781685-8 Fax: 2714968		
Status	Government (MOI/DIP)	Established: 1962	Staff: 80
Facilities available for services to supporting industries (SIs):			

Main roles

To conduct numerous training courses, extension and advisory services on business management for improving of productivity and management development in manufacturing industry.

Major activities available for SIs

1) Seminar/Training Programes
2) Technical Consultation services
3) Information and publication services
4) Small Industry Training Effort (SITE) Scheme
5) QC contest
6) Extension services
7) Productivity Assistance Programme (from July 1994)

Recent achievement

1) Seminar/Training
   80 training program courses (of which 40 courses are held at some provinces). About 5,000 persons attended to the courses in 1992.
2) Information Consultation services
   Publication of bimonthly magazine "TMDPC Productivity Journal".
3) Small Industry Training Effort (STE) Scheme
   TMDPC has authorized about 4,000 Industry Trainee Officer in total.
4) QC contest
   A national contest, many regional contest.
5) Number of TMDPC membership companies: 800

Limitations and advantages in services for SIs

Limitations

1) Difficulty of employing new staff, or limitation of manpower in the center.

Advantages

1) Providing various range of training programs at lower tuition fee.
2) Well equipped with many education tools such as audiovisual equipment.

1) [x] Seminar/workshop	2) [ ] Vocational training	3) [x] Extension services
4) [ ] Technical consultation	5) [ ] R&D services	6) [ ] Inspection/Testing
7) [ ] Calibration	8) [ ] Industrial standardization	9) [x] Consultation for investment/management
10) [x] Technical information supply	11) [ ] Credit/Loan	

Ser. No. 3

REGIONAL INDUSTRIAL PROMOTION CENTERS ((R) IPC)
DEPARTMENT OF INDUSTRIAL PROMOTION, MINISTRY OF INDUSTRY

Address	Five Centers are located at major regional cities Northern Industrial Promotion Center at Chiang Mai Northestern Industrial Promotion Center at Khon Kane Southern Industrial Promotion Center at Songkhla Western Industrial Promotion Center at Supanburi Eastern Industrial Promotion Center at Chonburi
Status	Government (MOI/DIP)

Facilities available for services to supporting industries (SIs):

Main roles

1) Main roles of these centers are to identify needs and coordinate training, extension, advisory and other services for mainly handicraft and cottage industries in each region.
2) To identify investment opportunities and to develop technology appropriate for unique to the region.

Major activities available for SIs

1) To conduct seminars and training on technology and management.
2) Providing technical consultation and extension services.
   Providing a credit for cottage industry.

Recent achievement

1) No. of seminar participants (Oct. 1, 1992 – Sep. 30, 1993)

	on industrial technologies		on management productivities	
North	463 persons	/16 times	441 persons	/8 times
Northeast	405	/16	27	/1
South	162	/ 8	63	/2
West	145	/ 7	153	/3
East	134	/ 3	140	/2

2) No. of providing consultancy services
   8,313 times in all.
3) No. of application for small credit
   East 50 (approved)

Limitations and advantages in services for SIs

Limitations

Advantages

1) Providing services based on regional industrial character.
2) Providing confessional credit for cottage industry.

1) [x] Seminar/workshop	2) [ ] Vocational training	3) [x] Extension services
4) [x] Technical consultation	5) [ ] R&D services	6) [ ] Inspection/Testing
7) [ ] Calibration	8) [ ] Industrial standardization	9) [x] Consultation for investment/management
10) [x] Technical information supply	11) [ ] Credit/Loan	

Ser. No. 4

THE INDUSTRIAL STANDARDIZATION, TESTING AND TRAINING CENTRE (ISTTC)			
Address	Bangpoo Industrial Estate, Km. 34, Sukhumvit Rd., Samutprakarn 10280 Tel: 324-0720, 324-0710-9, 323-0661-2 Fax: 323-9598		
Status	Government (MOI/TISI)	Established: 1988	Staff: 40
Facilities available for services to supporting industries (SIs): Attached			

Main roles

1) To enhance testing efficiency necessary for TISI's standards development and certification and to provide testing services for private sector related to quality control of raw materials and products designated for export.
2) To promote implementation of standards and quality control systems through both theoretical and practical training as a means to improve and develop product quality up to standards level.

Major activities available for SIs

1) Conducting tests to serve TISI's standards preparation and certification scheme.
2) Providing industrial product testing services to both the public and private sectors, and especially to industrial factories.
3) Providing theoretical as well as practical training on standardization, testing and quality control to TISI officials as well as to other departments.
4) Conducting research on criteria appropriate for determining standard requirements.
5) Applying new technology to improve testing techniques as well as testing equipment.
6) Offering advice on standard testing techniques and introducing quality control systems in production as well as providing technical information on standardization.

Recent achievement

Not available due to short history of the centre. The ISTTC started to provide testing service to TISI and other agencies on May, 1991.

Limitations and advantages in services for SIs

Limitations

1) Shortage of technical staff.
2) Regional limitation for providing services to local SIs.

Advantages

1) Well equipped with advanced equipment and instrument.

1) [x] Seminar/workshop	2) [ ] Vocational training	3) [ ] Extension services
4) [ ] Technical consultation	5) [ ] R&D services	6) [x] Inspection/Testing
7) [ ] Calibration	8) [x] Industrial standardization	9) [ ] Consultation for investment/management
10) [x] Technical information supply	11) [ ] Credit/Loan	

ATTACHMENT: MAJOR FACILITIES AVAILABLE FOR SIs

- height gauge, 3D coordinate measuring machine, roundness measuring machine, surface roughness tester, toolmakers microscope, metallographical microscope, profile projector, tension gauge, torquemeter, thread gauge
- universal testing machine, autograph, Charpy impact testing machine, Vickers hardness testing machine, Brinell hardness testing machine, Rockwell hardness testing machine
- testing machine for coil & leaf spring balance testing machine for tire
- X-ray inspection apparatus, ultra-sonic flaw detector, magnetic-particle testing equipment, leak testing apparatus
- UV-visible spectrometer, X-ray fluorescence spectrometer, inductively couple plasma spectrometer, emission spectrometer, atomic absorption spectrometer

Ser. No. 5

INDUSTRIAL METROLOGY AND TESTING SERVICE CENTER (MTC) (BANGPOO BRANCH)			
Address	Bangpoo Industrial Estate Soi 1, Muang District, Samut Prakarn 10280 Tel: 323-1672-80 Fax: 323-9165		
Status	Government (MOSTE/TISTR)	Established: 1990	Staff: 40
Facilities available for services to supporting industries (SIs): Attached			

Main roles

To support the industrial development and to serve as centre for testing industrial products, metrology and measurement system of the country.

Major activities available for SIs

1) To provide testing and analysis services of industrial products and certify standards to commodities and industrial products as required by TISI.
2) To provide standards calibration services to industrial equipments, measuring apparatus, and laboratory instruments.
3) To provide consulting services for the improvement of production process and quality control in the manufactures.
4) To provide inspection services on quality assurance system in the manufactures.
5) To represent as an inspection organization to the foreign government agencies and the private sector to procure commodities for export.

Recent achievement

Not available due to short history of the centre.
The centre was completed on Nov. 1990.

Limitations and advantages in services for SIs

Limitations
1) Shortage of technical staff.
2) Regional limitation for providing services to local SI.

Advantages
Well equipped with advanced equipment and instruments.

1) [ ] Seminar/workshop	2) [ ] Vocational training	3) [ ] Extension services
4) [×] Technical consultation	5) [ ] R&D services	6) [×] Inspection/Testing
7) [×] Calibration	8) [×] Industrial standardization	9) [ ] Consultation for investment/management
10) [ ] Technical information supply	11) [ ] Credit/Loan	

ATTACHMENT: MAJOR FACILITIES AVAILABLE FOR SIs

Measuring instruments for calibration services:

- mechanical, electrical and analytical balances, standard weights
- deadweight force standards, force gauges, loop dynamometers, proving rings, loadcells, universal testing machines, die shear testers, pull testers, tension testers, push–pull scales, compression testers
- torque testers, torque meters, torque drivers, torque gauges, torque wrenches
- piston gauges, deadweight pressure gauge testers, test gauges precision, pressure gauges, aneroid barometer, manometers, forting barometer
- gauge block, pin gauge, plug gauge, test indicators, digital linear indicator, high gauge, caliper checkers, profile projector, thickness meter, Vernier caliper, reading scale
- laser collimator, precision level, angle gauge
- Vickers, Rockwell, Brinell hardness testers, durometers
- standard tank, water meter, hydrometer, volumetric glasswares
- gas meter, master meter

Ser. No. 6

NATIONAL INSTITUTE FOR SKILL DEVELOPMENT (NISD) DEPARTMENT OF SKILL DEVELOPMENT, MINISTRY OF LABOUR AND SOCIAL WELFARE			
Address	Mitmaitree Rd., Bangkok 10400, Thailand Tel: 2479422 Fax: 2470300		
Status	Government (MLSW/DSD)	Established: 1968	Staff:
Facilities available for services to supporting industries (SIs): Attached			

Main roles

1) Control of Regional Institutes for Skill Development
2) Training/seminar
   - Providing pre-employment training for out of school youths between 15-25 years of age
   - Providing up-grading training courses for skilled workers
   - Providing foreman and trainers courses
   - Other 10 training courses

   Future plan
3) National Technology Standard Test

Major activities available for SIs

1) 10 regional institutes for skill development
2) 13 provincial institutes for skill development

Recent achievement

1) Training/seminar

Pre-employment Training Courses	1,230 trainees (for 1994)
Up-grading training courses	2,270 trainees (for 1994)
Special training courses	1,520 trainees (for 1994)

Total number of graduates from NISD's courses for recent years is about 10,000 persons on average.

2) National Technology Standard Test

Skill testing	1,350 trainees (for 1994)

Limitations and advantages in services for SIs

Limitations

1) Insufficient of theoretical knowledge lesson
2) Shortage of accommodation facilities for students

Advantages

1) The Cabinet has approved the NISD's plan setting up more Regional Institutes and 59 provincial center as of the regional network comprising the expansion of instructor development center.
2) A tuition fee is cheaper than private vocational school

1) [x] Seminar/workshop	2) [x] Vocational training	3) [ ] Extension services
4) [ ] Technical consultation	5) [ ] R&D services	6) [ ] Inspection/Testing
7) [ ] Calibration	8) [ ] Industrial standardization	9) [ ] Consultation for investn.ent/management
10) [x] Technical information supply	11) [ ] Credit/Loan	

Ser. No. 7

TECHNOLOGICAL PROMOTION ASSOCIATION (THAI-JAPAN) (TPA)			
Address	5-7 Sukhumvit Road Soi 29, Klongton Klongteoy, Bangkok 10110, Thailand Tel: 258-0320, 259-9160 Fax: 258-6440, 259-9116		
Status	Non-Profit Association (NGO)	Established: 1973	Staff: 80
Facilities available for services to supporting industries (SIs): Attached			

Main roles

To promote and support technological progress and advances among its members and the public through the introduction of advanced technology from Japan to Thailand.

Major activities available for SIs

1) To conduct seminars and training on technology and management
2) To offer calibration service for industrial instruments
3) To provide correspondence education course
4) To operate language school
5) To publish technology books in Thai
6) To provide technological information service by publishing Journal monthly

Recent achievement

	1991	1992	1993
1) Training/Seminar			
No. of participants	14,800	15,700	15,500
No. of courses			500 (approx.)
2) Amount of calibrated units	1,962	2,498	3,329
No. of customer			300 (approx.)
3) Language school			
No. of students	3,400	4,289	4,751
No. of courses			
Japanese courses	165	128	174
Thai courses	30	35	46
4) Correspondence education			
No. of students	2,430	2,018	2,356
5) Technological books			
Cumulative printing No. of text book and reprint	648,000	765,000	911,000

Limitations and advantages in services for SIs

Limitations

1) Limitation on scope and range of calibration service due to limited instruments.

Advantages

1) Convenient location of TPA to utilize it's facilities for SIs.
2) Provisions of services adapted to the public needs.
3) Quick response for providing services.

1) [x] Seminar/workshop	2) [x] Vocational training	3) [ ] Extension services
4) [ ] Technical consultation	5) [ ] R&D services	6) [ ] Inspection/Testing
7) [x] Calibration	8) [ ] Industrial standardization	9) [ ] Consultation for investment/management
10) [x] Technical information supply	11) [ ] Credit/Loan	

ATTACHMENT: MAJOR FACILITIES AVAILABLE FOR SIs

Calibration equipment list for undermentioned scope & range

Scope of Calibration	Capability Range
1. Calibration Temperature Detectors (Thermometer, Thermocouple, Resistance Temperature Detector, etc.)	-40 to 700°C Every Standard
2. Calibration of Temperature Indicator/Recorder/Controller	Every Range Type & Standard
3. Calibration of Pressure Measuring Instruments	0 to 2.0 kg/cm^2 (Air pressure) 0 to 500 kg/cm^2 0 to 10,000 PSI 0 to 50 Bar
4. Calibration of Vacuum Measuring Instruments	0 to 760 mmHg
5. DC Voltmeter Calibration DC Voltage Source Calibration DC Ammeter Calibration DC Current Source Calibration	0 to 1,000V 0 to 1,000V 0 to 2A 0 to 2A
6. AC Voltmeter Calibration AC Voltage Source Calibration AC Ammeter Calibration DC Current Source Calibration	0 to 1,000V 0 to 700V 0 to 50A 0 to 2A
7. Resistance Measuring Instruments Calibration Resistors, Resistance Box	0 to 10 MΩ 0 to 20 MΩ
8. Oscilloscope Calibration Frequency Amplitude Time Mark	0 to 250 MHz 100V to 100V (Peak to Peak) 5s to 1 ns
9. Calibration of Frequency Generator Calibration of Time Generator	0 to 125 MHz 0.1 μs to 10^7s
10. Length and Dimension Calibration	(Range: 0.5 mm – 300 mm)
11. Mass Calibration	(Range: 1 mg – 16 kg)
12. Weighing Machine	(Range: 1 mg – 18 kg)

Ser. No. 8

KING MONGKUT'S INSTITUTE OF TECHNOLOGY NORTH BANGKOK (KMITNB)			
Address	Pibulsongkram Road, Bangkok 10800, Thailand Tel: (662)5858541-9 Fax: (662)5874350		
Status	State University	Established	in 1986 as KMITNB with the Chronology below.
Chronology	1959 Thai-German Technical School, 1964 Thai-German Institute, 1971 King Mongkut's Institute of Technology (North Bangkok Campus)		
Staff	Total 1,039 staff in 1993 (Academic staff 432, Permanent supporting staff 508, Temporary employees 99)		
Facilities available for services to supporting industries (SIs): Attached			

Main roles

To provide a wide range education from vocational training (Vocational Certificate) upto high education (Doctoral degree). The basic concept of vocational training of KMITNB is the dual system, an industrial-university cooperation, including non-formal education and training.

Major activities available for SIs

1) Non-formal or short-course vocational training.
2) Seminars/workshops for QC, industrial standardization, new technology, etc.
3) Testing and secondary calibration services, and R&D under the dual system.
4) Promotion and coordination for set-up of vocational training centers in industrial estates.
5) Promotion and coordination of new job creation program or "Technoprenuer Development Project" under assistance of German government.

Recent achievement

1) Participants in In-Service programs for vocational/technical personnel (TGTAC).
(1989) 365 (1990) 113 (1991) 211 (1992) 133 (1993) 200
2) Students from industries for the normal course.

	1991	1992	1993
Master's Degree	162	171	117
Bachelor's Degree	1,133	1,360	1,228
Vocational certificate	181	168	161
	1,476	1,699	1,506

3) A vocational training center was established in 1993 at Hi-Tech Industrial Estates with 400 trainees.
4) Technoprenuer Development Project started in 1993.

Limitations and advantages in services for SIs

Limitations

1) Daily services directly to SI's operation utilizing the existing KMITNB's laboratories and facilities will be difficult because those are provided for education & training of students.

Advantages

1) Due to the historical background, KMITNB will contribute SIs development in the field of vocational training and fostering trainers/technical teachers.
2) KMITNB also can play a key role for SIs as a promoter and a coordinator for the new program formulation in the field of the manpower development.

1) [x] Seminar/workshop	2) [x] Vocational training	3) [ ] Extension services
4) [x] Technical consultation	5) [x] R&D services	6) [x] Inspection/Testing
7) [x] Calibration	8) [ ] Industrial standardization	9) [ ] Consultation for investment/management
10) [ ] Technical information supply	11) [ ] Credit/Loan	

ATTACHMENT: MAJOR FACILITIES AVAILABLE FOR SIs

Institute of Technological Development for Industry

1) Automation Center
2) Instrumentation and Measurement Center
3) Non-detective Testing Center
4) Plastic Technology Center
5) Welding Technology Center

Ser. No. 9

AYUTTHAYA TECHNICAL TRAINING CENTER(ATTC)			
Address	Hi-Tech Industrial Estate, Asia Rd, Moo 5 Banwa, Bangpa-in, Ayutthaya 13160, Thailand Tel: 035-350136 Fax: 035-350138		
Status	A branch school of King Mongkut Institute of Technology North Bangkok	Established: 1992	Staff: 24
Facilities available for services to supporting industries (SIs): Attached			

Main roles

1 To facilitate recruitment of skilled staff for industries on the Hi-Tech Estate and in nearby areas.
2) To provide training in the latest modern technologies to upgrade existing staff.
3) To prepare highly competent technicians for all industries.

Major activities available for SIs

1) To provide training for technicians
2) Information center concerned with all aspects of industrial staff development
Future plan
3) Apprenticeship Program with KMITNB College of Industrial Technology and the Mongkut Sapha Foundation

Recent achievement

1) Short training courses for 5 days~6 months
-Metal Working, -Electrician, -CNC, -Factory Automation, -Mould making
21~22 students per year
2) Permanent course for 5 years
72 students in all, Tuition fee 30,000 Baht/year/person
Apprentices who complete the Permanent course will be awarded a Certificate of Degree by KMITNB

Limitations and advantages in services for SIs

Limitations

1) Limitation of number of courses and training facilities

Advantages

1) Advanced training courses in electronics field
2) Using more practical method
3) Programs prepare for future master craftsman and foremen

1) [x] Seminar/workshop	2) [x] Vocational training	3) [x] Extension services
4) [ ] Technical consultation	5) [ ] R&D services	6) [ ] Inspection/Testing
7) [ ] Calibration	8) [ ] Industrial standardization	9) [ ] Consultation for investment/management
10) [x] Technical information supply	11) [ ] Credit/Loan	

ATTACHMENT: ATTC

1. Permanent Course

All aprentices are required to take 10 modules over a five period. Each module covers a 16 week term and includes 32 days of theory and 64 days of practical work. The course is taught during the normal school terms.

There are three successive stages for the programme:

(1) Modules 1 & 2
Training at the Center 4 days/wek
Theory at college 2 days/week

(2) Modules 3 to 7
In–company training 4 days/week
Theory at college 2 days/week

(3) Modules 8 to 10
In–company training with support from college 6 days/week

Apprentices who complete all three stages will also be awarded a certificate (equivent to an Associate Degree) by KMITNB. Courses are currently available in the fields of Machine Mechanics, Idustrial Electronics and Furniture & Decorating.

All apprentices are sponsored and during their training receive an allowance as agreed upon with their sponsor.

2. Short Training Courses

Metal Working
- Mechanical drawing
- Precision measurement
- Use of hand tools
- Use of machines
- Industrial materials
- Workshop safety

Electrician
- Electrical drawing
- Use of measuring instruments
- Use of hand tools
- Power and lighting systems
- Control systems
- Industrial materials
- Electrical safety

CNC
- Machine components
- Tools & control systems
- Co-ordinate systems for 2/3 drives
- Programming CNC machines
- Practical experience with CNC machines

Automation
- Main features
- Principles of pneumatic control
- Principles of electronic control
- Programming
- Practical experience with automated equipment

Mould Making
- Reading design drawings
- Making moulding parts
- Assembly of injection moulds and dies
- Mould installation on injection and compression machines
- Making moulding parts

Other short courses
- Pneumatic Control Systems
- Hydraulic Control Systems
- Quality Assurance & ISO 9000
- Mechanical Maintenance
- Electrical Maintenance

Ser. No. 10

CHOONHAVAN TECHNOLOGY TRAINING CENTER (CTTC) RAJAMANGALA INSTITUTE OF TECHNOLOGY NORTHEASTERN CAMPUS			
Address	199Mu3 SURANAREE INDUSTRIAL ZONE KM.7 Ratchasima Chokchaird Rd., Nongbuasala, a Muang, Nakhonratchasima, 30000 Thailand Tel: 044-212742 Fax: 044-212741		
Status	Non-Profit (NGO-Gov. Univ)	Established: 1991	Staff: 25
Facilities available for services to supporting industries (SIs): Attached			

Main roles

To provide lecture and training in the basic and latest modern technologies to upgrade company employee of Mitsubishi Motor group.

Major activities available for SIs

1) To provide training for technicians
2) Extension services (traveling consultation service for the company of Mitsubishi Motor group

Recent achievement

1) 65 students (2 years boarding school course)
   - machine
   - chassis assembly & maintenance
   - metal & welding
   - engine assembly & maintenance
2) 120 apprentices
   completed two years course (as of 1994)

Limitations and advantages in services for SIs

Limitations

1) Legal status of the center is not clear
2) Lack of text written in Thai

Advantages

1) One year training in Japan
2) In principle, no entrance examination (only for arithmetic)
3) Extension services for the companies of apprentices sponsor

1) [ ] Seminar/workshop	2) [x] Vocational training	3) [x] Extension services
4) [ ] Technical consultation	5) [ ] R&D services	6) [ ] Inspection/Testing
7) [ ] Calibration	8) [ ] Industrial standardization	9) [ ] Consultation for investment/management
10) [ ] Technical information supply	11) [ ] Credit/Loan	

ATTAHMENT: CTTC

BASIC SKILL TRAINING

Machine
1. Lathe
2. Milling Machine
3. Radial Drilling Machine
4. Machining Center

Metal & Welding

Automobile Assembly & Maintenance
1. Chassis
2. Engine

Basic Maintenance

Finishing

Grindering

Craning

BASIC TECHNICAL LECTURE

Technical Lecture
1. Mechanical Engineering
2. Production Control
3. Quality Control
4. Materials
5. Strength of Materials
6. Drawing
7. Electrical Engineering

General Lecture
1. Japanese Language
2. Safety and Health
3. Physical Training
4. Home Room

Ser. No. 11

KING MONGKUT'S INSTITUTE OF TECHNOLOGY LADKRABANG (KMITL)			
Address	Chalongkrung Road, Ladkrabang, Bangkok 10520, Thailand Tel: 662-3267332, 3269157 3269964, 3266052 Fax: 326-7333		
Status	State University	Established: 1986	Staff: 1,070
Facilities available for services to supporting industries (SIs): Attached			

Main roles

To provide education and to promote research and development in science and technology for industrial and economic progress of Thailand.

Major activities available for SIs

There were few cases of activities served for SIs.

Recent achievement

Not available.

Limitations and advantages in services for SIs

Limitations

It is difficult for SIs to get daily services utilizing laboratory facilities in KMTTL, because those are principally provided for education & training of students.

Advantages

Convenient location of KMTTL to utilize it's laboratory facilities for SIs.

1) [x] Seminar/workshop	2) [ ] Vocational training	3) [ ] Extension services
4) [ ] Technical consultation	5) [ ] R&D services	6) [x] Inspection/Testing
7) [ ] Calibration	8) [ ] Industrial standardization	9) [ ] Consultation for investment/management
10) [ ] Technical information supply	11) [ ] Credit/Loan	

ATTACHMENT: MAJOR FACILITIES AVAILABLE FOR SIs

Material testing machinery and equipment

10 ton Universal testing machine	1 set
Rotary bending fatigue testing machine	1 set
Rockwell hardness tester	2 sets
Vickers hardness tester	1 set
Micro Vickers hardness tester	1 set
Optical microscope	10 sets

Dimensional measurement equipment

3D coordinate measuring machine	

Ser. No. 12

DEPARTMENT OF VOCATIONAL EDUCATION (DOVE)

Address	Rachadamnem Nok Rd., Bangkok 10300, Thailand Tel: 280-2945 Fax: 280-4487		
Status	Government (MOE)	Established: 1941	Staff:
Facilities available for services to supporting industries (SIs): Attached			

Main roles

DOVE take charge of all formal and institutional vocational training programs throughout the country

Major activities available for SIs

Programmes in vocational, technical and career training are classified into three categories.

1) Formal system programme.
   Admissions are through entrance examinations.
2) A special continuing education programmes to upgrade working young farmers between 15-25 years of age.
3) Short course training programmes offered both out-of-school and in schools for the general public.

Recent achievement

Number of Students under DOVE 1989-1993

Year	Formal system	Non-form & short courses	Total
1989	210,370	192,426	402,796
1990	218,674	193,730	412,404
1991	236,163	195,177	431,340
1992	258,896	221,132	480,028
1993	287,751	229,250	517,001

Limitations and advantages in services for SIs

Limitations

1) Shortage of teaching staff

Advantages

1) Providing a wide range of vocational training programmes.

1) [x] Seminar/workshop	2) [x] Vocational training	3) [ ] Extension services
4) [ ] Technical consultation	5) [ ] R&D services	6) [ ] Inspection/Testing
7) [ ] Calibration	8) [ ] Industrial standardization	9) [ ] Consultation for investment/management
10) [x] Technical information supply	11) [ ] Credit/Loan	

ATTACHMENT: Number of Vocational Institutions of DOVE (in 1993)

1.	Under Agricultural College Division		
	1.1	Agricultural Colleges	43
	1.2	Agricultural Engineering Training Center	1
	1.3	Phayao Agricultural Training Center	1
	1.4	Fishery Colleges	2
2.	Under Technical College Division		
	2.1	Technical Colleges	77
	2.2	Industrial and Shipbuilding Colleges	3
3.	Under Vocational College Division		
	3.1	Vocational Colleges	33
	3.2	Commercial/Business Administration Colleges	5
	3.3	Arts and Crafts Colleges	2
4.	Under Industrial and Community Education Division		
	4.1	Polytechnic Colleges	34
	4.2	Industrial and Community Education Colleges	27
TOTAL			228

Ser. No. 13

INDUSTRIAL DEVELOPMENT DIVISION (IDD)

Address	3rd Fl. ISI Building, Soi Treemit, Kluay Nam Thai Rama 4 Rd, Prakanong, Bangkok 10110, Thailand Tel: 381-1602 Fax: 381-1601		
Status	Government (MOI/DIP)	Established:	Staff:
Facilities available for services to supporting industries (SIs): Attached			

Main roles

IDD is a division of the Department of Industrial Promotion, Ministry of Industry. IDD has main responsibility to promote the creation of investment by expanding existing industries and establishing new industries especially for small and medium industries in the target provinces. IDD is organized of the following three sub-divisions;

1) Project and Entrepreneurship Development Sub-Division
2) Investment Service Sub-Division
3) Industrial Information Services Center

Major activities available for SIs

1) Programme on entrepreneurship development, investment clinic and information services. This is the total supporting programmes for rural entrepreneurs from training until making final decisions to invest.
2) Joint-venture arrangement
   This is including the following activities;
   - disseminating of Thai interesting projects to foreign countries
   - introducing foreign interesting projects to Thai investors
   - conducting seminars to set match-making between Thai and foreign investors
   - organizing industrial mission tour to abroad
3) Publishing monthly and bimonthly news letters

Recent achievement

1) No. of accumulated participants 1160 (as of Nov. '93)
   No. of materialized projects 222 (as of Nov. '93)
2) No. of match-making 74 (1991)
3) Monthly news letter 3000 copies, bimonthly 600 copies

Limitations and advantages in services for SIs

Limitations

1) Limitation of activities as a division organizationally as well as budgetary
2) IDD has not any training facilities
3) Shortage of technical staff

Advantages

1) IDD's programmes are directly connected with regional industries

1) [x] Seminar/workshop	2) [ ] Vocational training	3) [x] Extension services
4) [x] Technical consultation	5) [ ] R&D services	6) [ ] Inspection/Testing
7) [ ] Calibration	8) [ ] Industrial standardization	9) [x] Consultation for investment/management
10) [x] Technical information supply	11) [ ] Credit/Loan	

Ser. No. 14

NATIONAL METAL AND MATERIAL TECHNOLOGY CENTER (MTEC)			
Address	18th Fl. Gypsum Metropolitan Building, Sri-Ayudhya Rd, Bangkok 10400, Thailand Tel: 248-7541 Fax: 248-7549		
Status	Government (MOSTE/NSTDA)	Established: 1987	Staff: n.a.
Facilities available for services to supporting industries (SIs): Attached			

Main roles

1) To promote and duct research development and engineering in the fields of material in support of the metal, ceramic and polymer industries.
2) To develop and strengthen human resource in the fields of metal and materials by organizing short courses and conferences, and providing scholarships.
3) To promote and coordinate collaboration among local research institutes, universities and industries.

Major activities available for SIs

The activities of MTEC are complementary and supplementary to other organizations such as MIDI and universities. MTEC's R&D projects are aimed mostly at supporting and promoting small and medium scale industry, particularly supporting industries.

Major Programme:

1) R&D Programmes (Group)

Metals	– Metal Powder	– Material Degradation
	– Mechanical Processing	– Extraction and Recycling
	– Surface Engineering	– Solidification Processing
	– Welding and Adhesion	– Special Metals
Design and Manufacturing of Machinery		
	– Agricultural Machinery	– CAD/CAM
	– Industrial Machinery	– Modern Manufacturing Technology
Ceramics	– Traditional Ceramics	– Structural Ceramics
	– Electronic Ceramics	– Bioceramics
Polymers	– Industrial Polymers	– Special Polymers
	– Polymer Composites	– Polymers and Environment
	– Natural Polymers	

Recent achievement

1) No. of R&D Projects	Metals		14 Projects
	Design and Manufacturing of Machinery		7 Projects
2) No. of Scholarship students	5 (1993)		
3) MTEC's annual budget for 1993	for Metal field		32.4 million Baht
	for Ceramic field		17.7 million Baht
	for Polymer field		29.1 million Baht
	Total		79.2 million Baht

Limitations and advantages in services for SIs

Limitations

1) Shortage of budget

1) ☐ Seminar/workshop	2) ☐ Vocational training	3) ☐ Extension services
4) ☐ Technical consultation	5) ☒ R&D services	6) ☐ Inspection/Testing
7) ☐ Calibration	8) ☐ Industrial standardization	9) ☐ Consultation for investment/management
10) ☒ Technical information supply	11) ☐ Credit/Loan	

Ser. No. 15

TECHNOLOGY TRANSFER CENTRE (TTC)

Address	Rama VI Road, Rajthewi, Bangkok 10400, Thailand Tel: 245-0746 Fax: 246-8106		
Status	Government (MOSTE)	Established: 1979	Staff: 25
Facilities available for services to supporting industries (SIs): Attached			

Main roles

TTC is responsible for developing and transferring all technologies as well as to be the core organization in co-ordinating the international technology transfer.

Major activities available for SIs

1) To recommend technology transfer policy to the Government
2) To provide service on technology transfer promotion
3) To promote technology development include administrating the revolving fund for research and development
4) To approve tax reduction for imported machineries

Recent achievement

1) 10-30 projects per month for tax reduction scheme. Imported machineries or new machineries, materials and equipments which will be used for energy saving or environment conservation can be allowed to apply tax reduction scheme.
2) Total fund amount is 200 million Baht, accumulated project number is 20, however about 30 projects have been applied yearly.
   Loan condition:
   A. Max. 5 million Baht for R&D projects with 4% fixed interest, 8 years payment period.
   B. Max. 10 million Baht for production improvement project, with 6% fixed interest, 7 years payment period.

Limitations and advantages in services for SIs

Limitations

1) Shortage of a revolving fund
2) Shortage of number of staff

Advantages

1) Providing a concessional loan with low interest

1) [x] Seminar/workshop	2) [ ] Vocational training	3) [ ] Extension services
4) [x] Technical consultation	5) [ ] R&D services	6) [ ] Inspection/Testing
7) [ ] Calibration	8) [ ] Industrial standardization	9) [x] Consultation for investment/management
10) [x] Technical information supply	11) [x] Credit/Loan	