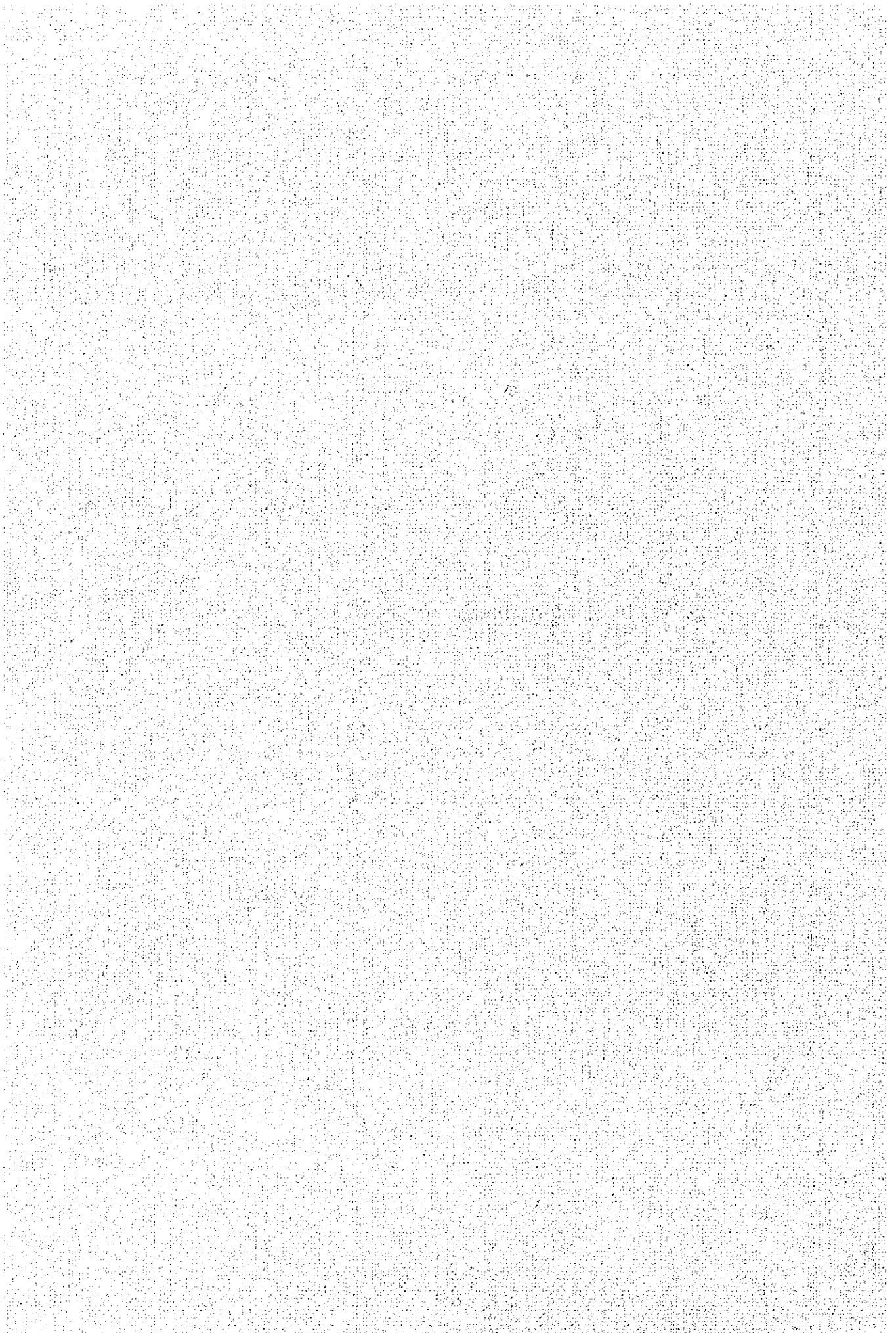


関係資料

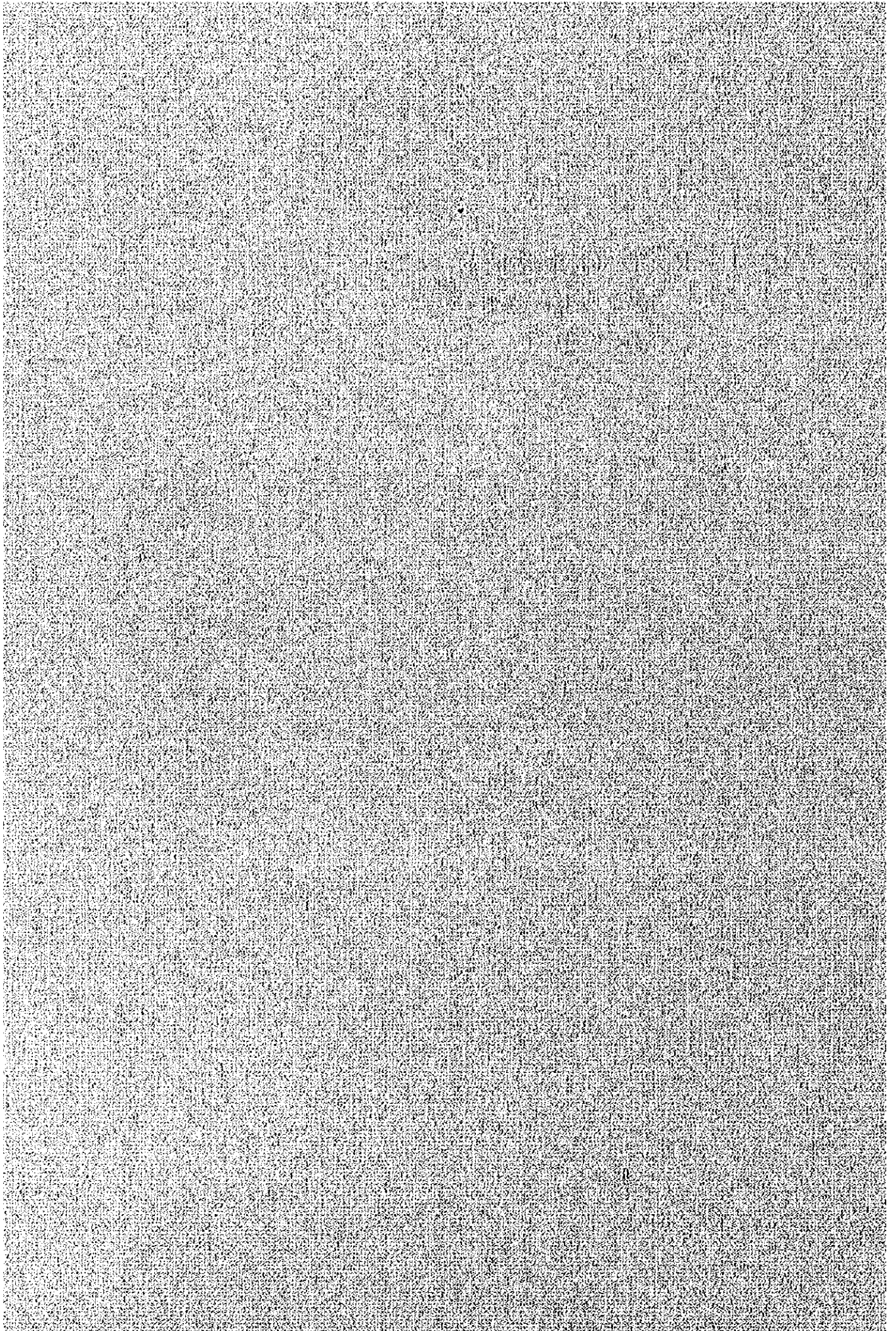
フェーズⅢ（鉱工業分野）

I. R/D（討議議事録）	
1. 金属加工・機械工業開発振興	225
2. 天然ゴム品質改善	245
II. その他関係資料	
1. 質問表	255
2. M I D I 関連企業訪問記録	260
3. 図表	264



I. R/D (討議議事録)

1. 金属加工・機械工業開発振興	225
2. 天然ゴム品質改善	246



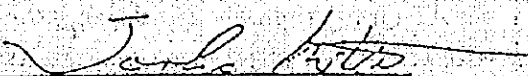
THE RECORD OF DISCUSSIONS
BETWEEN THE JAPANESE IMPLEMENTATION SURVEY TEAM
AND THE AUTHORITIES CONCERNED OF
THE GOVERNMENT OF THE KINGDOM OF THAILAND
ON THE JAPANESE TECHNICAL COOPERATION
FOR THE METALWORKING AND MACHINERY INDUSTRIES
DEVELOPMENT INSTITUTE

The Japanese Implementation Survey Team (hereinafter referred to as "the Team") organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Mr. Toshio Kitamura visited the Kingdom of Thailand from July 22 to July 30, 1986 for the purpose of working out the details of the technical cooperation program concerning the Project on the Metalworking and Machinery Industries Development Institute in the Kingdom of Thailand.

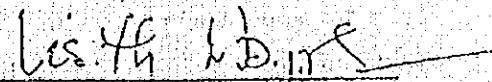
During its stay in the Kingdom of Thailand, the Team exchanged views and had a series of discussions with the Thai authorities concerned in respect to the effective measures to be taken by both Governments for the successful implementation of the above-mentioned project.

As a result of the discussions, both parties agreed to recommend to their respective Governments the matters referred to in the document attached hereto.

Bangkok, July 29, 1986



Mr. Toshio Kitamura
Leader,
Implementation Survey Team,
Japan International
Cooperation Agency, JICA
JAPAN



Mr. Visith Noiphan
Director General,
Department of
Industrial Promotion
Ministry of Industry
The Kingdom of Thailand

Witness:



Mr. Wanchai Sirirattana
Director General,
Department of Technical and
Economic Cooperation
The Kingdom of Thailand

THE ATTACHED DOCUMENT

I. COOPERATION BETWEEN BOTH GOVERNMENTS

1. The Government of Japan and the Government of the Kingdom of Thailand will cooperate with each other in implementing the Project on the Metalworking and Machinery Industries Development Institute (hereinafter referred to as "the Project") for the purpose of promoting the improvement of industrial technology and managerial techniques of the metalworking and machinery industries and thus contributing to the industrialization of the Kingdom of Thailand.

2. The Project will be implemented in accordance with the Master Plan which is given in ANNEX (I)

II. DISPATCH OF JAPANESE EXPERTS

1. In accordance with the laws and regulations in force in Japan, the Government of Japan will take necessary measures through JICA to provide at its own expense services of the Japanese experts as listed in ANNEX (II) through the normal procedures under the Colombo Plan Technical Cooperation Scheme.

2. The Japanese experts referred to in 1 above and their families will be granted in the Kingdom of Thailand the privileges, exemptions and benefits no less favourable than those accorded to the experts and their families of third countries working in the Kingdom of Thailand under the Colombo Plan Technical Cooperation Scheme.

III. PROVISION OF MACHINERY AND EQUIPMENT

1. In accordance with the laws and regulations in force in Japan, the Government of Japan will take necessary measures through JICA to provide at its own expense such machinery, equipment and other materials (hereinafter referred to as "the Equipment") necessary for the implementation of the Project as listed in ANNEX (III) through the normal procedures under the Colombo Plan Technical Cooperation Scheme.

2. The Equipment will become the property of the Government of the Kingdom of Thailand upon being delivered *c.i.f.* to the Thai authorities concerned at the ports and/or airports of disembarkation, and will be utilized exclusively for the implementation of the Project in consultation with the Japanese experts referred to in ANNEX (III).

IV. TRAINING OF THE PERSONNEL IN JAPAN

1. In accordance with the laws and regulations in force in Japan, the Government of Japan will take necessary measures through JICA to receive at its own expense Thai personnel connected with the Project for technical training in Japan through the normal procedures under the Colombo Plan Technical Cooperation Scheme. The procedures shall be carried out in coordination and consultation with Japanese experts as listed in ANNEX (II).

2. The Government of the Kingdom of Thailand will take necessary measures to ensure that the knowledge and experience acquired by the Thai personnel from technical training in Japan will be utilized effectively for the implementation of the Project.

V. SERVICES OF THE THAI COUNTERPART PERSONNEL AND ADMINISTRATIVE PERSONNEL

1. In accordance with the laws and regulations in force in the Kingdom of Thailand, the Government of the Kingdom of Thailand will take necessary measures to provide at its own expense the necessary services of the Thai counterpart personnel and administrative personnel as listed in ANNEX (IV).

2. The Government of the Kingdom of Thailand will allocate the necessary number of suitably qualified personnel corresponding to each Japanese expert to be dispatched by the Government of Japan as specified in ANNEX (II) for the effective and successful transfer of technology under the Project.

VI. MEASURES TO BE TAKEN BY THE GOVERNMENT OF THE KINGDOM OF THAILAND

1. In accordance with the laws and regulations in force in the Kingdom of Thailand, the Government of the Kingdom of Thailand will take necessary measures to provide at its own expense:

(1) Land, buildings and facilities as listed in ANNEX (V);

(2) Supply or replacement of machinery, equipment, instrument, vehicles, tools, spare parts and any other materials necessary for the implementation of the Project other than those provided through JICA under III above;

- (3) Transportation facilities and travel allowance for the official travel of Japanese experts within the Kingdom of Thailand;
- (4) Suitably furnished accommodations for the Japanese experts and their families.

2. In accordance with the laws and regulations in force in the Kingdom of Thailand, the Government of the Kingdom of Thailand will take necessary measures to meet:

- (1) Expenses necessary for the transportation of the Equipment within the Kingdom of Thailand as well as for the installation, operation and maintenance thereof;
- (2) Customs duties, internal taxes and any other charges, imposed on the Equipment in the Kingdom of Thailand;
- (3) All running expenses necessary for the implementation of the Project.

VII. ADMINISTRATION OF THE PROJECT

1. The Director General of the Department of Industrial Promotion, Ministry of Industry, will assume overall responsibility for the implementation of the Project.
2. The Director of the Metalworking and Machinery Industries Development Institute, as the Head of the Project, will be responsible for the administrative, managerial and technical matters of the Project.
3. The Japanese Team Leader will provide necessary recommendation and advice on technical and administrative matters concerning the implementation of the Project to the Head of the Project and will provide suggestion to the Director General of the Department of Industrial Promotion, if necessary..
4. The Japanese experts will give necessary technical guidance and advice to Thai counterpart personnel on matters pertaining to the implementation of the Project.
5. For the effective and successful implementation of the Project, a Joint Committee will be established with the function and composition as referred to in ANNEX (VI.)

6. The organization chart for the implementation of the Project will be established as shown in ANNEX (VII).

VIII. CLAIMS AGAINST JAPANESE EXPERTS

The government of the Kingdom of Thailand will undertake to bear claims, if any arises, against the Japanese experts engaged in the Project resulting from, occurring in the course of, or otherwise connected with the discharge of their official functions in the Kingdom of Thailand except for those arising from the willful misconduct or gross negligence of the Japanese experts.

IX. MUTUAL CONSULTATION

There will be mutual consultation between the two Governments on any major issues arising from, or in connection with this Attached Document.

X. TERM OF COOPERATION

The duration of the Technical Cooperation for the Project under this Attached Document will be five (5) years from October 1st, 1986.

ANNEX (I) Master Plan

1. Objective of the Metalworking and Machinery Industries Development Institute.

The objective of the Metalworking and Machinery Industries Development Institute (hereinafter referred to as "the MIDI") is to support the improvement of industrial technology and managerial techniques, in particular, of small and medium scale industries which contribute to the industrialization of Thailand.

For the purpose of the above, the MIDI will undertake the following activities:

- (1) To hold seminars and training courses and to provide extension and consulting services to the private sectors in order to support and assist in technological and managerial improvement,
- (2) To provide services on testing, inspection and trial production for the private sectors,
- (3) To undertake research and development of appropriate technology to Thailand,
- (4) To play a role as a technical information center and as a center for coordination of cooperative activities among relevant organizations.

2. Objective of the Japanese Technical Cooperation

The objective of the Japanese Technical Cooperation is to provide the technical guidance and advice to Thai counterpart personnel in conducting their activities of the forementioned item (1) and (2) in Article 1 by means of the combination of dispatch of Japanese experts, training of Thai counterpart personnel in Japan and provision of equipment. Technological subjects to be cooperated are as follows:

Main items

1. Casting
2. Heat treatment
3. Material Testing and Inspection
4. Machining
5. Precise Measuring and inspection
6. Machinery Design

Sub-items

1. Educational and training system
2. Educational material and information system
3. Welding and sheetmetal works
4. Electroplating
5. Managerial and control technology
6. Forging

ANNEX (U) Japanese Experts

1. Team Leader
2. Coordinator
3. Long-term experts in the fields of
 - o Casting
 - o Heat treatment
 - o Machining and Precise measuring
 - o Machinery design of Machine tool and Tool and die
4. Short-term experts in the fields of
 - o Educational materials and information system
 - o Material testing and inspection
 - o Welding and sheetmetal works
 - o Electro plating
 - o Managerial and control technology
 - o Machinery design, general
 - o Low cost automation
 - o Agricultural machinery design
 - o Pump and valve design
 - o Casting (Specific)
 - o Heat treatment (Specific)
 - o Machining and Precise measurement (specific)
 - o Forging

Note: Short-term experts (of metalworking technology and for other subjects may be dispatched when necessity arises, for the smooth implementation of the Project.

ANNEX (III) Equipment

The equipment necessary for implementation of the Project will be provided as follows:

1. Equipment and materials mutually agreed upon as necessary
2. Spare parts of machinery and equipment

Note: The decision of specification and selection of the above-mentioned equipment will be made in due course through mutual consultation.

ANNEX (IV) Thai Counterpart personnel and Administrative personnel

1. Head of the Project
2. Technical staff in the field of :
 - (1) Educational and training system
 - (2) Educational material and information system
 - (3) Casting
 - (4) Heat treatment
 - (5) Material testing and inspection
 - (6) Machining
 - (7) Precise measuring and inspection
 - (8) Welding and sheetmetal work
 - (9) Machinery maintenance and repair
 - (10) Electro plating
 - (11) Machinery design and engineering
 - (12) Managerial and Control technology
 - (13) Forging
3. Administrative staff
 - (1) Secretaries
 - (2) Accounters
 - (3) Clerks
 - (4) Typists
 - (5) Drivers
4. Other personnel mutually agreed upon as necessary, such as secretaries, typists and drivers for the Japanese experts.

ANNEX (V) Land, Building and Facilities

1. Land

Sufficient space of land for the implementation of the Project.

2. Main Building

- (1) Director's room
- (2) Administration room
- (3) Teaching staff rooms
- (4) Chief advisor's room
- (5) Advisor's room
- (6) Seminar room
- (7) Lecture rooms
- (8) Meeting rooms
- (9) Testing and inspection room
- (10) Audio-visual room
- (11) Design room
- (12) Low-cost automation training room
- (13) Library
- (14) Others

3. Work Shops

- (1) Casting shop
- (2) Heat treatment shop
- (3) Machining shop
- (4) Welding and sheetmetal work shop
- (5) Electro plating shop
- (6) Wood pattern making shop
- (7) Sand testing room
- (8) Precise measurement room
- (9) Staff rooms
- (10) Others

4. Facilities

- (1) Canteen
- (2) Dormitory
- (3) Storage houses
- (4) Utility house
- (5) Parking spaces
- (6) Others

Note 1: The above buildings and facilities are to be provided under the grant aid of the Government of Japan.

2: Other facilities for the Institute should be provided by Thai side, if necessary.

ANNEX (VI) Joint Committee

1. Functions

The Joint Committee meeting will be held at least once a year and whenever necessity arises.

- (1) To formulate the Annual Work Plan of the Project in line with the Tentative Schedule of Implementation formulated under the framework of this Record of Discussions;
- (2) To review the overall progress of the technical cooperation program as well as the achievements of the above-mentioned Annual Work Plan;
- (3) To review and exchange views on major issues arising from or in connection with the technical cooperation program.
- (4) Other functions.

2. Composition

(1) Thai side

Chairman, Director General of Department of Industrial Promotion

Members • Director of MIDI

• 2 or 3 members from relevant organizations designated by the chairman

• 3 or 4 Thai counterparts designated by the chairman

• Representative from Department of Technical and Economic Cooperation

(2) Japanese side

• Team Leader

• Coordinator

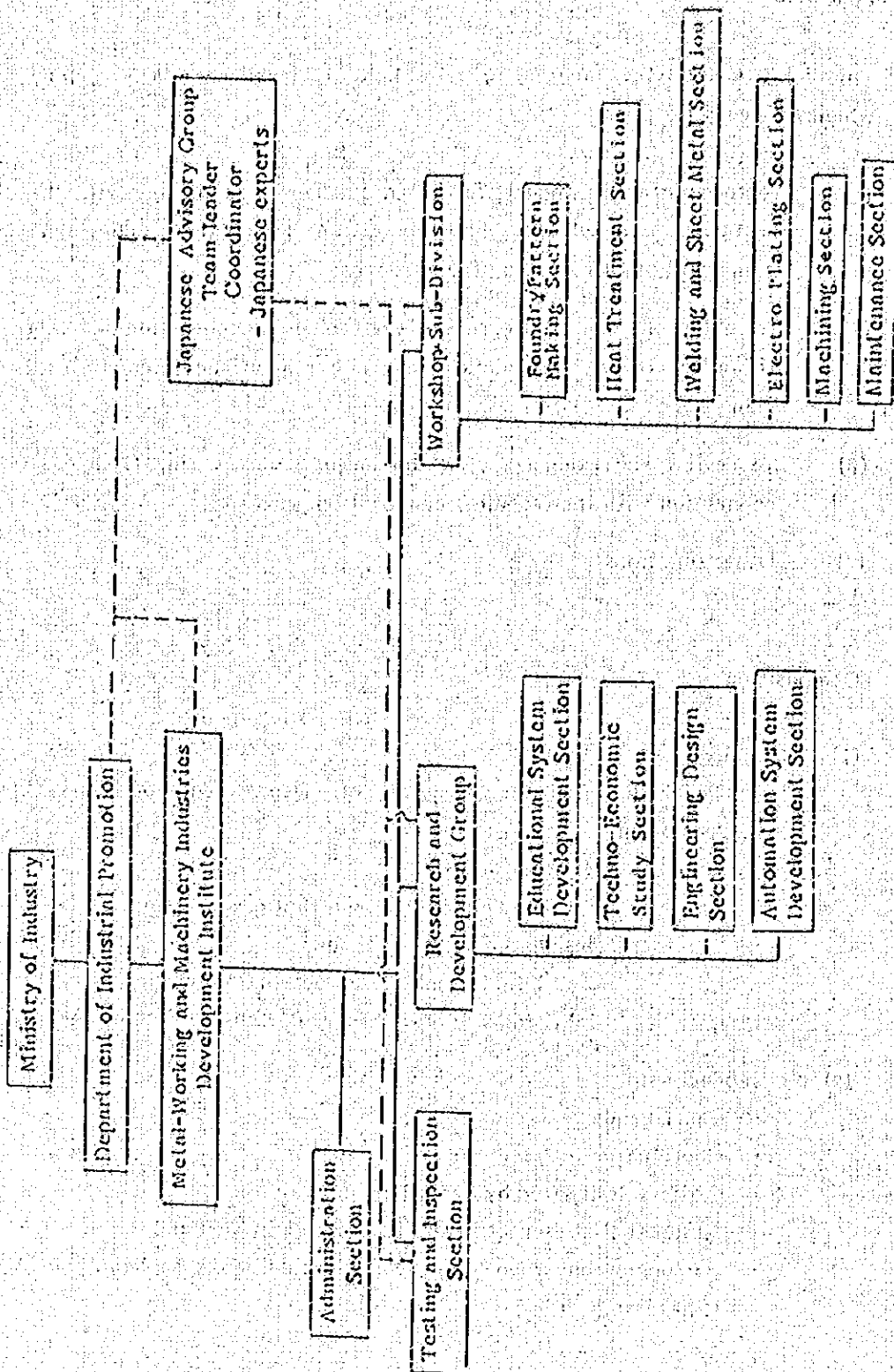
• Experts designated by Team Leader

• Resident Representative of JICA Office in Thailand

• Personnel concerned with the Project to be dispatched by JICA, if necessary

NOTE: Official of the Embassy of Japan may attend the Joint Committee meeting as an observer.

Organization Chart of the Project



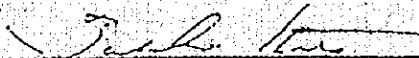
暫定実施計画書 (T S I)

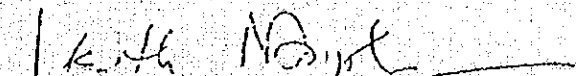
TENTATIVE SCHEDULE OF IMPLEMENTATION
AND
ANNUAL WORK PLAN FROM JULY 1986 TO DECEMBER 1987
FOR
THE METALWORKING AND MACHINERY INDUSTRIES
DEVELOPMENT INSTITUTE IN THE KINGDOM OF THAILAND

The Japanese Implementation Survey Team and the representatives of the Department of Industrial Promotion, Ministry of Industry have jointly formulated the Tentative Schedule of Implementation and the Annual Work Plan from July 1986 to December 1987 as annexed hereto.

These documents have been formulated in connection with Article I, Paragraph 2 of the Attached Document of the Record of Discussions signed between the Japanese Implementation Survey Team and the Department of Industrial Promotion, Ministry of Industry for the Technical Cooperation of the Metalworking and Machinery Industries Development Institute in the Kingdom of Thailand on condition that necessary budget will be allocated for the implementation of the Project, and are subject to change within the framework of the Record of Discussions when necessity arises in the course of implementation of the Project.

Bangkok, July 29, 1986


Mr. Tosnio Kitamura
Leader,
Implementation Survey Team,
Japan International Cooperation
Agency, JAPAN


Mr. Visith Noinan
Director General,
Department of
Industrial Promotion,
Ministry of Industry,
Kingdom of Thailand

I. TENTATIVE SCHEDULE OF IMPLEMENTATION

The technical cooperation period of five years will be phased in consideration of the situation and effectiveness of technology transfer.

First Stage (Basic Establishment)

In this period, the equipment and educational materials for technology transfer will not entirely available, so that theoretical education and training will be mainly conducted.

Second Stage (Development)

In this period, the equipment, facilities and Japanese experts will be almost available, so that the technical cooperation program will be intensively implemented.

Stage	Basic Establishment						Development									
	1986		1987		1988		1989		1990		1991					
Calendar Year	1	4	7	10	1	4	7	10	1	4	7	10	1	4	7	10
Item	1	4	7	10	1	4	7	10	1	4	7	10	1	4	7	10
Grant Aid Project Phase I	→															
Phase II					→											
Term of Cooperation					→											
<u>Thai Side.</u>																
Preparation of counter-part personnel and Administrative staff	→															
Allocation of operational budget for implementation	→															
Preparation and maintenance of necessary facilities for implementation	→															

Stage	Basic Establishment				Development																			
	Calendar Year				Calendar Year																			
	1986				1987				1988				1989				1990				1991			
Item	1	4	7	10	1	4	7	10	1	4	7	10	1	4	7	10	1	4	7	10	1	4	7	10
Japanese Side																								
Long-term Survey Mission	H																							
Implementation Survey Mission	H																							
Mutual consultation team					H																			
Technical guidance team									H				H											
Equipment repair team																	H							
Evaluation team																	H							
Dispatch of Long-term Expert																								
• Team Leader					←→				←→				←→				←→							
• Coordinator					←→				←→				←→				←→							
• Casting Engineer					←→				←→				←→				←→							
• Technician					←→				←→				←→				←→							
• Heat Treatment					←→				←→				←→				←→							
• Machining Engineer					←→				←→				←→				←→							
• Technician					←→				←→				←→				←→							
• Machine Tool Design					←→				←→				←→				←→							
• Tool and Die design					←→				←→				←→				←→							
Dispatch of Short-term Expert																								
• Information & A/V					←→																			
• Production					←→				←→				←→				←→							
• Casting specific					←→				←→				←→				←→							
• Heat Treatment specific					←→				←→				←→				←→							
• Forging					←→								←→											
• Material Testing	←→				←→				←→				←→				←→							
• Machining & Measuring	←→				←→				←→				←→				←→							
• Machine Design & LCA	←→				←→				←→				←→				←→							
• Managerial Technology	←→				←→				←→				←→				←→							
• Welding & Sheetmetal					←→				←→				←→				←→							
• Electro Plating					←→				←→				←→				←→							

Stage	Basic Establishment			Development		
	Calendar Year			Calendar Year		
	1986	1987	1988	1989	1990	1991
Item	1 4 7 10	1 4 7 10	1 4 7 10	1 4 7 10	1 4 7 10	1 4 7 10
Training of Thai Trainees in Japan						
Provision of Equipment						

- Note 1. This schedule is subject to conditions that necessary budget and counterpart personnel will be allocated for the implementation of the project.
2. Technological fields and periods of short-term experts and trainees will be finally decided in accordance with the consultation of the Joint Committee.
3. This schedule is subject to change within the scope of the Record of Discussion.

II. ANNUAL WORK PLAN FROM JULY 1986 TO DECEMBER 1987

	1986						1987												
	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1
1. THAI SIDE																			
(1) Preparation of offices of Japanese experts																			
(2) Preparation of workshop																			
(3) Preparation for acceptance Japanese experts (A1, A2, A3, FORM)																			
(4) Staff recruitment																			
(5) Preparation for the training of counterpart																			
(6) Selection of equipment (A4 FORM)																			
2. JAPANESE SIDE																			
(1) Dispatch of long-term experts																			
a. Team Leader																			
b. Coordinator																			
c. Casting Engineer																			
d. Heat treatment Eng.																			
e. Machining Engineer																			
f. Machining Technician																			
(2) Dispatch of short-term experts																			
a. A/V production																			
b. Physical testing																			
c. Metallography																			
d. Mold & die production																			

	1986						1987												
	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1
e. Welding & sheetmetal																			
f. Machinery design, general																			
g. L.C.A.																			
(3) Training Thai Counterpart																			
e. Planning																			
b. Education system																			
c. Educational material																			
d. Non-destructive test																			
e. Metallography																			
f. NC machining																			
g. Gear machining and measuring																			
h. Machinery design																			
(4) Provision of Equipment																			

- Note 1. This schedule is subject to conditions that necessary budget and counterpart personnel will be allocated for the implementation of the project.
2. Technological fields and periods of short-term experts and trainees will be finally decided in accordance with the consultation of the Joint Committee.
3. This schedule is subject to change within the scope of the Record of Discussion.

RECORD OF DISCUSSIONS BETWEEN THE JAPANESE IMPLEMENTATION SURVEY TEAM
AND THE AUTHORITIES CONCERNED OF THE GOVERNMENT OF THAILAND ON
THE TECHNICAL COOPERATION FOR THE TECHNOLOGICAL DEVELOPMENT OF
NATURAL RUBBER PROCESSING

The Implementation Survey Team, organized by the Japan International Cooperation Agency and headed by Mr. Koji Ota, visited Thailand from March 20th to April 1st for the purpose of working out the details of the technical cooperation programme to implement the Technological Development Project for Natural Rubber Processing (hereinafter referred to as the "Project") between the Government of Japan and the Government of Thailand.

During its stay in Thailand, the team conducted a survey and had a series of discussions with the Thai authorities concerned with regard to a number of points in question for the implementation of the Project, in order to meet the request for the extension of technical cooperation concerning natural rubber made by the Association of South-East Asian Nations to the Government of Japan.

As a result of the survey and discussions, both parties agreed to recommend to their respective Governments the immediate implementation of the technical cooperation for the Project as specified in the Record of Discussions attached hereto.

Bangkok, April 1, 1977.

Koji Ota
Head
Japanese Implementation Survey
Team
Japan International Cooperation
Agency

Prakob Kanjanasoon
Director-General
Department of Agriculture
Ministry of Agriculture and
Cooperatives

in the presence of

Wanchai Siriratta
Deputy Director-General
Department of Technical and
Economic Cooperation

M.R. Thep Devakul
Director-General
ASEAN Thailand
Ministry of Foreign Affairs

RECORD OF DISCUSSIONS

I. Objectives of the Project

The Government of Thailand aims at the technological development of natural rubber processing. In order to implement the objectives, the Project with Japan's technical cooperation has been planned, by making transfer of technology successful from Japan to Thailand, in such ways as the capability of the Quality Control in the Rubber Research Centre at Hat Yai (hereinafter referred to as the "RRC") is strengthened and the manpower in the field of natural rubber processing technologies is developed.

II. Outline of the Project

The Project is carried out in RRC, and consists of the following three functional activities:

1. Improvement of System and Techniques for the Quality Control;
2. Technical Advice and Guidance for Natural Rubber Producers such as Smallholders, Estates, Packers and Crumb Rubber Factories;
3. Training of Manpower.

III. Japanese Experts

1. In accordance with laws and regulations in force in Japan, the Japanese authorities concerned will take necessary measures to provide at their own expense the services of Japanese experts as listed in Annex I through the normal procedures under the Colombo Plan Technical Cooperation Scheme.
2. The Japanese experts referred to in (III.1) above, and their families, will be granted in Thailand the privileges, exemptions and benefits no less favourable than those accorded to experts of third countries working in Thailand under the Colombo Plan Technical Cooperation Scheme.

IV. Japan's Provision of Equipment, Machinery, Instrument and other Materials

1. In accordance with laws and regulations in force in Japan, the Japanese authorities concerned will take necessary measures to provide at their own expense such equipment, machinery, instrument and other materials as listed in Annex II, which are required for the implementation of the Project through the normal procedures under the Colombo Plan Technical Cooperation Scheme.
2. Articles referred to in (IV. 1) above will become the property of the Government of Thailand upon being delivered c.i.f. to the Thai authorities concerned at the ports and/or airports of disembarkation, and will be utilized exclusively for the implementation of the Project in consultation with the Japanese chief adviser referred to in Annex I.

V. Training and Studies for Thai Personnel in Japan

1. In accordance with laws and regulations in force in Japan, the Japanese authorities concerned will take necessary measures to receive the Thai personnel engaged in the activities of the Project for technical training and/or observational study in Japan through the normal procedures under the Colombo Plan Technical Cooperation Scheme.
2. The Government of Thailand will take necessary measures to ensure that the knowledge and experience acquired by the Thai personnel from technical training and/or study in Japan will be effectively utilized for the implementation of the Project.

VI. Measures to be taken by the Government of Thailand

1. In accordance with laws and regulations in force in Thailand, the Government of Thailand will take necessary measures to provide at its own expense:
 - i) services of the Thai counterpart personnel and administrative personnel as listed in Annex III;
 - ii) land, buildings and facilities as listed in Annex IV;

- iii) supply or replacement of equipment, machinery, instruments, vehicles, tools, spare parts and any other materials necessary for the implementation of the Project other than those provided by the Japanese authorities concerned under (IV. 1);
- iv) transportation facilities and the payment of travel allowance for the Japanese experts for official travel within Thailand;
- v) suitable furnished housing accommodation for the Japanese experts and their families;
- vi) expenses necessary for the transportation within Thailand of the articles referred to in (IV. 1) as well as for the installation, operation and maintenance thereof;
- vii) customs duties, internal taxes and any other charges, imposed in Thailand in respect of the articles referred to in (IV. 1);
- viii) all the running expenses necessary for the implementation of the Project.

VII. Responsibility for the Project

The Director-General of the Department of Agriculture will bear the overall responsibility for the implementation of the Project.

VIII. Claims against Japanese Experts

The Government of Thailand will undertake to bear claims, if any arises, against the Japanese experts engaged in the implementation of the Project, resulting from, occurring in the course of, or otherwise connected with, the discharge of their official functions in Thailand, except for those claims arising from willful misconduct or gross negligence of the Japanese experts.

IX. Mutual Consultation

There will be close consultation between both authorities concerned for the successful implementation of the Project.

X. Terms of Cooperation

The period of the technical cooperation mentioned in this Record of Discussions will be three (3) years from the date of signature and may be extended by mutual agreement between the authorities concerned of both Governments.

ANNEX I. List of Japanese Experts

1. Chief Adviser
2. Expert On Quality Control

Note: If necessary, additional short-term experts will be assigned to the Project.

ANNEX II. List of the Articles to be provided by the Japanese Authorities Concerned

1. Machinery and Equipment for Experimental Works.

- Akron abrasion machine
- Go drich flexometer
- Monsanto rheometer
- Dunlop resilience tester
- Ozone resistance tester
- Densimeter
- Aging oven
- Analytical balance
- Tensile testing machine
- Automatic mooney viscometer
- Shore hardness tester
- pH meter
- Hardness tester for foam goods
- Extruder (experimental)
- Various types of specimen cutters

2. Ancillary Research Equipment:

- Laboratory-size internal mixer
- Mixing mill
- Steam curing press
- Air compressor
- Water distiller
- Boiler
- Centrifugal machine
- Ball mill (chemical dispersion)

3. Others:

- Vehicle and other necessary materials.

Note: The above articles will be selected on the following criteria:

1. To exclude the equipment which is locally produced in Thailand;
2. To exclude the equipment which requires extremely high level of technology.
3. To exclude the accessories of lesser importance which are not vital to the performance of the equipment.

ANNEX III. List of Thai Counterpart Personnel and Administrative Personnel

1. Counterpart personnel
 - (i) Project Leader
 - (ii) Expert on natural rubber
2. Administrative personnel
 - (i) Administrative Officer
 - (ii) Secretary
 - (iii) Clerk
 - (iv) Typist
 - (v) Driver

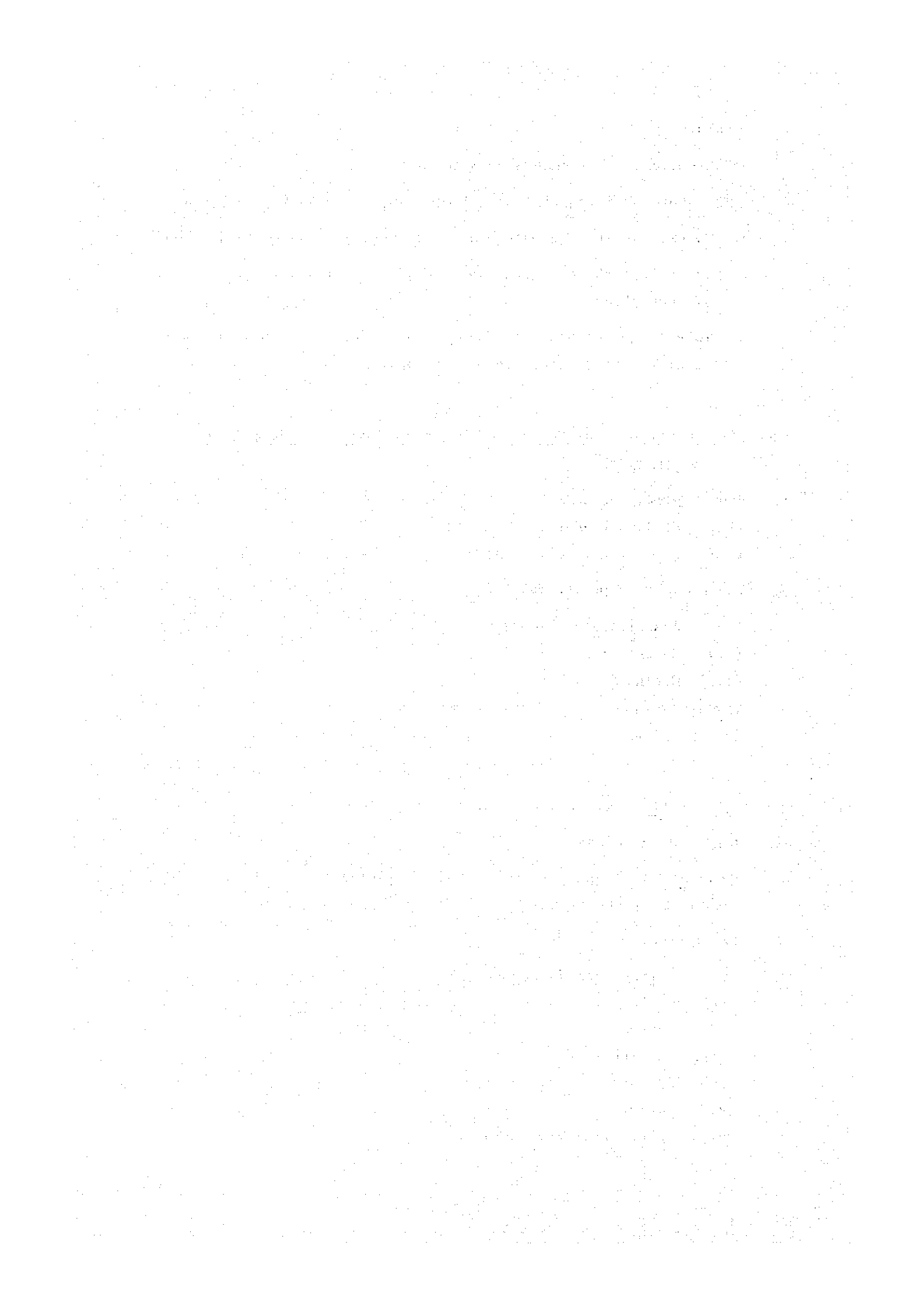
ANNEX IV. List of Land, Buildings and Facilities

1. Land and buildings:

Necessary land and buildings for the implementation of the Project will be provided in the area of the Rubber Research Centre.

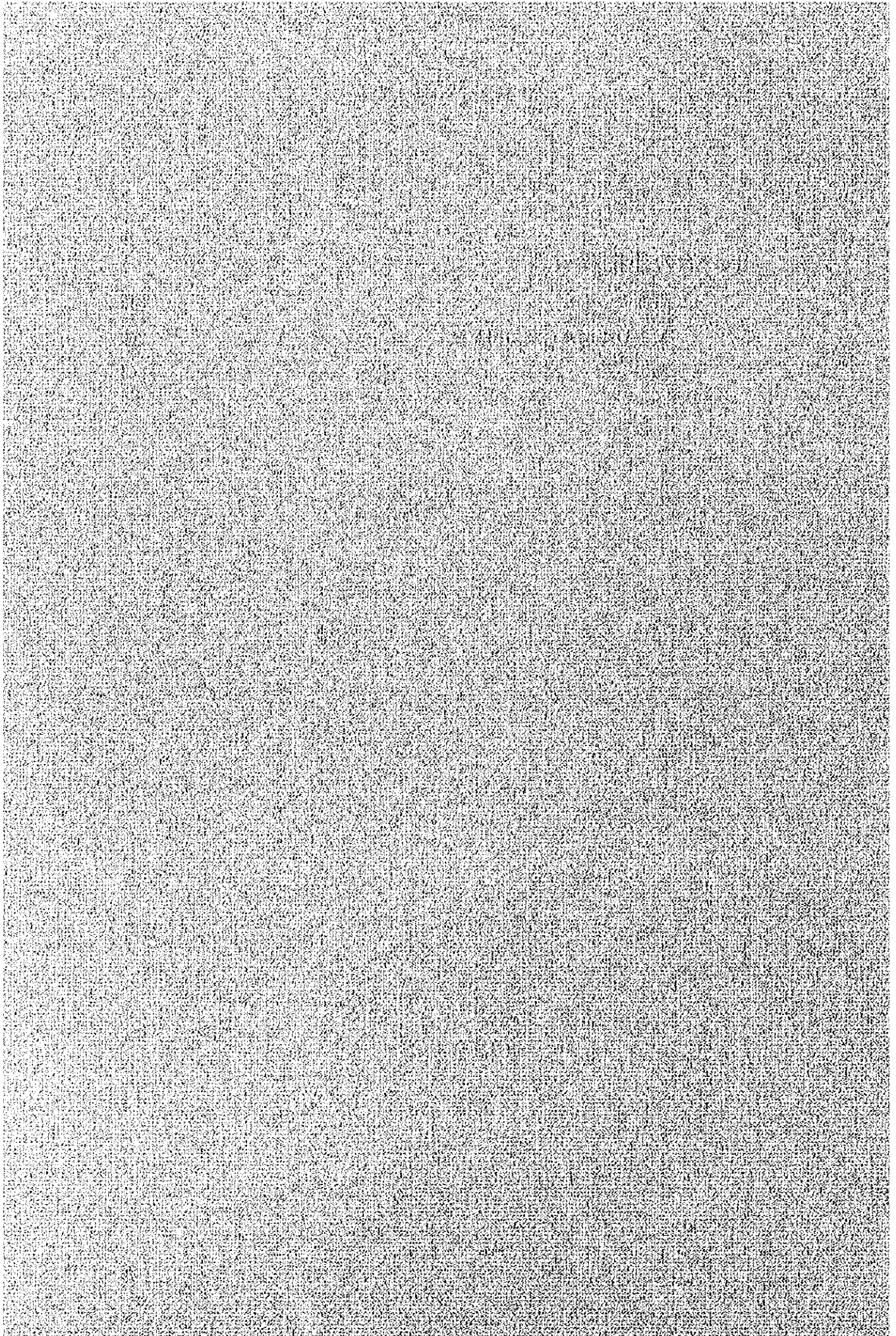
2. Facilities:

- (i) Offices for Japanese experts
- (ii) Offices for Thai counterpart personnel and administrative personnel
- (iii) Meeting room
- (iv) Lecture and seminar room
- (v) Library
- (vi) Other necessary facilities



Ⅱ. その他関係資料

1. 質問表	255
2. M I D I 関連企業訪問記録	260
3. 図表	264



質問表

QUESTIONNAIRE

on

Metalworking and Machinery Industries Development Institute

Ministry of Industry

Overall Goal

- Statistics on machinery and electronics industries
Production, Export; from 1985 to latest
- Statistics on small and medium scale industries
Numbers, Production; from 1985 to latest

Department of Industrial Promotion

Activities

- Organization of the Department and the status of MIDI
- Personnel and budget for the Department and the status of MIDI

Project Purpose

- Were technical fields assisted by the project relevant to Thai economic circumstances?
- Prospect of machinery and electronics industries
- Do you see any other problems besides technology among the small and medium scale enterprises in metalworking and machinery industries? (such as finance, personnel, etc.)

UNDP, UNIDO, USAID, CIDA, GTZ

Overall Goal

- Their policies and projects on industrial development and small and medium scale industries
- Opinions about MIDI

MIDI

Activities

- Personnel and budget
- Usage of equipment and machinery supplied, opinions
- Usage of building and facilities, opinions
- Reputation (evaluation) of Japanese Experts' activities
- Reputation (evaluation) of trainings in Japan and other countries

Outputs

- How successful was technology transfer to MIDI personnels in each (26) technology field?
- Numbers of seminars and/or training courses, number of participants and evaluations of effectiveness
- Numbers of advisory service activities and evaluations of effectiveness
- Numbers of testing and/or inspection services and evaluations of usefulness
- Numbers of trial manufacturing services and evaluations of usefulness
- Numbers of research and development and results
- Numbers of publications on technical information and other subjects; how many copies being distributed (bought? given free of charge?)
- Other information dissemination activities, if any
- Numbers of 'forums' organized; membership and their activities
- Has any of the MIDI staff left? If so, what were the reasons?
- Did the prerequisite for absorbing technologies exist among the participants of seminars and factory employees? (such as basic education, job experience, etc.)
- Do they also have enough incentive to upgrade their technological skills?
- Are the technological levels of MIDI appropriate for enterprises in the industry?

Project Purpose

- Value-added, defect ratio, and productivity of small and medium scale firms in metalworking and machinery industries
- Opinions on the following points about MIDI
 - 1) Strength
 - 2) Weakness
 - 3) Opportunities
 - 4) Threats

Seminar/Training Participants

Outputs

- How did you get to know about MIDI?
- Was the seminar/training course you attended useful?
- Would you like to attend another seminar or training course at MIDI?
- Would you recommend the seminars and training courses to others? Why?
- What other seminars or training courses would you like to attend?
- Have you attended any other seminars or training courses by other organizations, either private or public? How do you compare them with the ones at MIDI?

Project Purpose

- Are the sales and profits of your company increasing?
- Did the seminar(s)/training course(s) help you raise the productivity and/or quality of your products?

User of MIDI services: 1) advisory service, 2) testing & inspection service, and 3) trial manufacturing service

Outputs

- How did you get to know about MIDI?
- Was the service useful?
- Would you like to use the service again?
- Would you recommend the service to others? Why?
- Have you used similar service by other organizations, either private or public? How do you compare them with the ones at MIDI?

Project Purpose

- Are the sales and profits of your company increasing?
- Did the MIDI service help you raise the productivity and/or quality of your products?

Forums

Output

- Membership and other statistics
- What was the role of MIDI in forming your forum?
- What kind of activities does your forum do?
- What are the future prospects of business for your member companies?

Project Purpose

- What is the role of your forum in raising productivity and quality of products of your member companies?
- What are your opinions about MIDI?

Other industry organizations (such as Federation of Thai Industries)

Project Purpose

- What are your opinions about MIDI?

Buyers (or customers) of products manufactured by those firms that utilized MIDI services

Project Purpose

- How did you get to know about MIDI?
- What are your opinions about them?

- Did your supplier (who utilized MIDI service) raise the quality of their products?
- What kind of service would you like MIDI to provide (either for your supplier(s) or for yourselves)?

Those small and medium scale firms that belong to metalworking and machinery industry but did not utilize any of the MIDI services

Project Purpose

- What are your opinions of MIDI?
- What are opinions of other firms in the same type of business?

QUESTIONNAIRE
on
Technological Development of Natural Rubber Processing

Ministry of Agriculture and Cooperatives

Overall Goal

- Statistics of natural rubber production, export; from 1975 to latest

Department of Agriculture

Activities

- Organizations responsible for natural rubber
- Personnel and budget for the above

Project Purpose

- Prospect of demand for higher quality natural rubber
- Prospect of rubber products manufacturing industry in Thailand

UNDP/FAO, World Bank, ESCAP, EEC, USAID, CIDA, GTZ

Overall Goal

- Their policies and projects on natural rubber processing
- Opinions about Rubber Research Institute
- Opinions about Rubber Research Center at Hat Yai

RRC

Activities

- Personnel and budget
- Usage of equipment and machinery supplied, opinions
- Reputation (evaluation) of Japanese Experts' activities
- Reputation (evaluation) of trainings in Japan and other countries

Outputs

- Degree of improvement of systems and techniques for the quality control (pre-project and post-project)
- Organization of RRC and number of personnel
- Technological level of RRC staff
- Has any of the RRC staff left?
- Number of technical advice and guidance provided for natural rubber producers, evaluation of usefulness
- Numbers of trainings and participants, evaluation of effectiveness

Project Purpose

- Degree of attainment in strengthening of RRC in quality improvement of natural rubber processing
- Number of technical advice and guidance provided for natural rubber producers, evaluation of usefulness
- Numbers of trainings and participants, evaluation of effectiveness
- Use of equipment provided by the project
- Activities of RRC since the end of the project period
 - 1) How many trainings provided? How many participants?
 - 2) How many technical advice and guidance provided?
- Opinions on the following points about RRC
 - 1) Strength
 - 2) Weakness
 - 3) Opportunities
 - 4) Threats
- Has the quality of natural rubber produced in the area improved? How?

Rubber stations personnels

Outputs and Project Purpose

- Opinions about the activities at RRC in the area of the quality control

- Opinions about the technical advice and guidance for their work
- Opinions about the training at RRC

Natural rubber producers

Outputs

- Have you received any technical advice and/or guidance from RRC or rubber stations?
- Did you find them useful?
- Has the quality of your products improved?

Project Purpose

- Do you think that RRC and/or rubber stations have helped in improving the quality of natural rubber in the area?

Rubber products manufacturers

Project Purpose

- Has the quality of natural rubber in this area improved?
- What are your opinions about RRC?
- What kind of service would you like RRC to provide (either for natural rubber producers or for yourselves)?

MIDI関連企業訪問記録

企業訪問記録

その1. MIDIを利用した企業(1.2社)

<p>設立 設立 売上 従業員 製品</p>	<p>1. P.S. Tools Ltd. 1987年 6~7百万パーツ 15人 Parts for synthetic fiber machines <小></p>	<p>2. U.I. Engineering Co., Ltd. 1982年 9.6百万パーツ 35人 バイク、自動車、電気部品 <小></p>	<p>3. Auri-Flora Corp. Ltd. 1975年 100百万パーツ 1,000人 プラスチックの果物や野菜、造花 <大></p>	<p>4. Sani Karn Chang Ltd. 1974年 8百万パーツ 35人 びん製造用の型 <小></p>
<p>技術分野</p>	<p>溶接、熱処理、メッキ</p>	<p>熱処理</p>	<p>鍛造、メッキ</p>	<p>機械加工</p>
<p>悩み</p>	<p>・ 入出不足 (technical school卒はこの様な小企業に来てくれないと。)</p>	<p>・ 熱処理</p>	<p>・ プラスチックの射出成形用の型をつくる際に、技術指導を受けた。</p>	<p>・ 従業員の教育レベルが低く、技術を向上させる意欲に欠ける。</p>
<p>MIDIとのつながり</p>	<p>・ I S I 時代から知っている。 MIDIで講師を勤めていたこともある。 ・ トレーニングコース - 溶接 - 今年、熱処理、メッキの予定 - 技術情報源</p>	<p>・ トレーニングコース - 熱処理 - 測定 ・ 委託加工 (パーツ) - 設計 - 試験 - スタディーツーム - フォーラム</p>	<p>・ トレーニングコース - メッキ - 鍛造</p>	<p>・ 委託加工 ・ 技術指導</p>
<p>MIDIへの意見</p>	<p>○ I S I 時代比べて格段にレベル向上。 ○ レクチャーのできるスタッフも増え、コース数も増加した。 ○ 忙しいのか、対応が遅い。 ○ いろいろな分野が有るので、一か所でも多くの問題が解決する。 ○ 設備、テキスト、知識も良い。 ○ 講師も充分おり、毎年内容が向上している。 ○ コースで材料の使い方が不十分。 ○ スタッフのレベルは、他の機関に引けをとらない。 ○ もっと工場に来るべき。 ・ 中小企業には、特別の制度が必要。</p>	<p>○ 機材は I S I 時代比、良い。 ○ 製品を安く製造できる。 ○ 知識が豊富。 × 機材・技術を更新しないとかつての I S I の様になってしまおうおそれがある。</p>	<p>○ MIDIで得た知識が、そのまま役立っている。非常に有用。 ○ また参加したい。他社にも勧めたい。 ○ MIDIのおかげで会社の業績も伸びている。</p>	<p>× スタッフは忙しいことはわかるが、委託加工を迅速化して欲しい。 ○ MIDIのスタッフは、サービスを提供する意欲が高い。 ○ 基礎知識は充分に持っている。 ・ 納入先との力関係で、(品価が上がっても)利益率は上がらない。</p>

<p>設立 売上 従業員 製品</p>	<p>5. Phan Fah Engineering Ltd. Part. 1972年 420百万バーツ 190人 トラクター部品</p>	<p>6. Lamthong Alloy Products Co., Ltd. 1981年 40百万バーツ 70人 ドラム、トイレ用品、自動車・バイク部品</p>	<p>7. Lard Kra Bang Tools & Die Co., Ltd. 1979年 64百万バーツ 80人 農業機械の部品</p>	<p>8. Federal Electric Co., Ltd. 1984年 600百万バーツ 1,050人 家庭用電化製品</p>
<p>技術分野</p>	<p>鑄物(鑄鋼)、機械加工</p>	<p>ダイキャスト、機械加工</p>	<p>Mold & die、鑄造、熱処理、機械加工</p>	<p>鑄造、メッキ等</p>
<p>悩み</p>	<p>・鑄型の設計 ・コストをいかに抑えるか。</p>	<p>・従業員が長続きしないこと。 (“Hard work and dirty.”)</p>	<p>・人の確保 ・技術</p>	<p>・エンジニア不足</p>
<p>MIDIとのつながり</p>	<p>・セミナー ・トレーニング ・材料試験 かつては週一回程度利用。 現在は機器を購入したので、自社にて実施。 ・新技術の指導 ・スタディーツアー ・フォーラム(鑄物)</p>	<p>・トレーニングコース ・材料試験(4-5年前、2-3回) ・フォーラム(mold & die、鑄物) ・スタディーツアー ・(JICAではないが、)ダイキャストの日本人専門家を連れて来てくれ、技術アドバイスを受けた。</p>	<p>・ISI時代から有る。 ・スタディーツアーに参加 ・毎回のようにセミナー、トレーニングコースを利用。 ・熱処理 ・die-making ・材料試験 2-3年前は良く利用したが、今は自社で可能。 ・JODCの専門家 ・フォーラム結成(Mold & Die)</p>	<p>・試験: 0-2回/月 ・セミナー: 1回/月 ・鑄造 ・メッキ ・技術指導</p>
<p>MIDIへの意見</p>	<p>×鑄鋼(steel casting)に関するセミナーが少ない。 ×鑄物セクシヨンの機材は既に陳腐化している。 ○今後も、熱処理などのセミナーへ参加の予定。 ×予算不足ではないか。 ・今後当社では、技術向上が重要。</p>	<p>×ダイキャストの機材が無い。 ×“Center of technology”(特に新技術)となるべき。</p>	<p>○試験機材は非常に良い。 ×マシニングセンターのアクセサリーが全て揃ってはいない。 ○工業省の中で最も良い機関だと思う。民間企業と積極的に協力しようとしている。</p>	<p>○セミナーの資料が有用。 ×テキストや資料は、日本語でなくタイ語か英語にして欲しい。 ×政府機関なので、技術者の確保が難しい様子。 ×予算上の制約。 ○トレーニングの題材は良い。 ×もう少し応用的なものも内容に入れて欲しい。 ○資料室が良い。</p>

<p>設立 売上 従業員 製品</p>	<p>9. Okamoto (Thailand) 1988年 360百万バーツ 454人 Precision surface grinding machines 〈大〉</p>	<p>10. Jor Charoenchai Tractor Ltd., Part. (在アユタヤ) 1982年 30百万バーツ 100人 ハンドトラクター 〈中〉</p>	<p>11. Vorravan Metal Co., Ltd. 1967年 70百万バーツ 120人 家庭用品、自動車部品 〈中〉</p>	<p>12. Ruam Patana Alai Co., Ltd. 1968年 700百万バーツ 160人 バイク部品、自動車部品 〈中〉</p>
<p>技術分野 悩み</p>	<p>機械加工、鋳造 材料試験 ・トレーニング ・鋳造 鋳造工程の設立時(1989年) に世話になった。</p>	<p>機械加工、溶接 人材 技術指導 ・委託設計 ・試験 ・"Special machine"の製造 ・親密</p>	<p>ダイキャスト 金型のskilled manpower不足 ・ISIより20年前に技術指導 ・スタディーツアーに参加 ・トレーニングコース：年3-4回 一回につき1-2人 ・スタディーツアー (APO)</p>	<p>ダイキャスト、moldmaking、メッキ 人材 下請企業の納期、品質 市場 ・トレーニング ・熱処理、メッキ、 ・Moldmaking、-CAD/CAM ・セミナー：ダイキャスト ・スタディーツアー (APO) ・月報(タイ語で技術情報が得られる。) ・コンサルティングサービス</p>
<p>MIDIへの 意見</p>	<p>×日本人専門家にもっと権限を与えるべき。 ×JICAから運営予算も出せないうらうか。</p>	<p>○機材が他の機関より充実している。製造のみならず試験機材があること。 ×人員、予算共に不十分。 ×時間がかかる。 ×もっと自分から積極的にテーマを見つけて研究をすべき。 ×アユタヤから近い地区、例えばRansit通りに在ると便利。</p>	<p>○"Most useful." 活動(トレーニング)が盛ん。 ○ダイキャストについて、機械は無いが、知識は豊富。 ×土地も人材も足りない。 ×トレーニング用に機材を増やすべき。</p>	<p>○他の政府機関と比べて非常に活動的で、「民間企業の様に働く」。 ×機材が不足 ・メッキ (Ni)、-水処理、 ・鉄鋼用の硬さ試験機 ×メッキのトレーニングでもっと上級のもの希。 ×専門家のゲスト講師を希望。 ○情報、知識源(国内外) ○他の会社を紹介してくれた。 ×場所が狭い。 ×新分野が欲しい(QC等) ×在タイ日系企業へのスタディーツアーを希望。(従業員教育の為)</p>

その2. 中小企業の商品を購入している親会社（2社）

<p>設立 売上 従業員 製品</p>	<p>1. Thai Glass Industries Ltd. 1956年 1,200人 ビール、清涼飲料水その他のガラスビン製造</p>	<p>2. Nissan Diesel (Thailand) Co., Ltd. 1987年 142人 トラック製造</p>
<p>特記事項 および 下請け企 業の状況 等</p>	<p>・金型の約7割はベルギー、米国、英国、シンガポール（日系）、オーストラリア、メキシコといった海外からの輸入で、技術的に平易な残りの3割を国内で調達している。 ・MIDIとは、1990年に開催された“Heat Treatment for Steel”というセミナーに参加してからの縁。 ・特殊な鋳造技術ができる会社を探していたが、できるところがなかった。そこで、MIDIで電気炉を使って共同で何度か試作し、acceptableなものができた。それ以来、もう一社の民間企業とMIDIとそれぞれにガラスビン製造のための金型を注文している。 ・トレーニングコースには従業員を送っている。（今年は3人。来年は増やす予定。） - 熱処理、- 鋳造 - Instrumentation and drawing ・MIDIは政府組織よりも民間組織化した方が、より自由な活動ができるのではないかと。 ・コースは毎年同じ物で、もっと新しい分野が必要。 ・機械は良いものだが、あまり使われていない様子。 ・スタッフの能力についてはコメントするのは難しい。但し、もし民間企業ならもっと効率的に仕事を。（現在でも急ぐときはMIDIでなく、多少割高でも民間企業に頼む。） ＜Sanit Kam Chang Ltd.社について＞ ・他にも金型のメーカー有り。 ・スベックに「鋳造は、MIDIに依頼すること」としてある。 （MIDIでつくったものをSanur社が機械加工する。） ・鋳造の部分についてはMIDIの物を使っていて進歩したが、機械加工については全くレベルが落ちていない。これは従業員の問題で、教育レベルが低いため、品質についてあまり気にしない為だと思う。他の会社についても同じ状況である。</p>	<p>・部品の35%は日本の日産ディーゼルからCKDとして輸入し、残り65%はタイ国内で調達している。タイでの下請け企業は約60社有る。 ・タイのトラック市場で当社は第3位（1:日野、2:いすゞ、4:三菱）。 （- 下請け企業の納入製品の品質管理はしっかりデータをとり行われている。） ＜Lai Krabang Steel 社について＞ ・今年（1992年）の1～7月に納入された12,696件の内、9件のクレーム品有り（0.07%）。5月のみ、不良率が0.32%で許容範囲の0.25%を上回った。原因は、スベックの変更に対応しきれなかったこと、塗装工程の品質管理が不足していたことの2つの様である。 ・同じ様な部品を製造している他社と比較すると、同社には満足している。（4社中2位） ・同社は、品質と言うものに注意を払っており、ここ2年間の間に品質は向上している ・しかし、塗装については、同社から更に下請けに出していることもあり、品質管理に問題のあることが有る。 ・経営スタイルは古いスタイルと言えらる。</p>

表1: 金属加工・機械工業セクターの推移

	(単位: billion baht)			
	1980	1988	1989	1990
Metal products (excl. machinery)	1.2	2.2	2.6	3.0
Nonelectrical machinery	2.2	4.3	6.1	7.4
Electrical machinery and supplies	1.9	4.0	4.7	5.6
Transport equipment	5.1	8.1	9.7	12.2

表2: 同 成長率

	1980	1988	1989	1990
Metal products (excl. machinery)	-	7.9%	19.3%	13.2%
Nonelectrical machinery	-	9.0%	41.0%	20.4%
Electrical machinery and supplies	-	9.7%	18.6%	19.2%
Transport equipment	-	6.1%	19.7%	25.9%
製造業全体	-	7.9%	14.9%	13.7%

注) 1988年の成長率の欄は、1980年から1988年までの年平均を示した。

出典: "Thailand: Standing Out in Asia", the Board of Investment, Office of the Prime Minister, September 1991.

表3: 製造業部門別付加価値額の推移

(at 1972 prices), 1980 and 1984-88

	(単位: million baht)					
	1980	1984	1985	1986	1987	1988
Fabricated metal products	1,201	1,471	1,488	1,611	1,839	2,088
Non-electrical machinery	2,174	3,551	2,994	3,215	3,624	4,126
Electrical machinery	1,901	2,709	2,415	2,720	3,247	3,776
Transport equipment	5,054	4,755	3,175	3,780	4,677	5,929
Total MVA	64,984	81,962	81,463	89,305	101,414	114,038

表4: 製造業部門別付加価値額の成長率

	1980	1984	1985	1986	1987	1988
Fabricated metal products	-	5.2%	1.2%	8.3%	14.2%	13.5%
Non-electrical machinery	-	13.1%	-15.7%	7.4%	12.7%	13.9%
Electrical machinery	-	9.3%	-10.9%	12.6%	19.4%	16.3%
Transport equipment	-	-1.5%	-33.2%	19.1%	23.7%	26.8%
Total MVA	-	6.0%	-0.6%	9.6%	13.6%	12.4%

注) MVA = manufacturing value-added (製造業付加価値額)
1984年の成長率欄には、1980年から1984年までの年平均成長率を示した。

出典: "Industrial Development in Thailand in the 1990s", UNIDO, November 1990.

表5： MIDI活動状況

	1987	1988	1989	1990	1991	1992
コース実施回数	20	18	26	42	61	55
技術指導回数	40	120	120	72	120	110
受託試験件数	112	466	150	451	329	332
受託加工件数	67	100	120	111	56	80

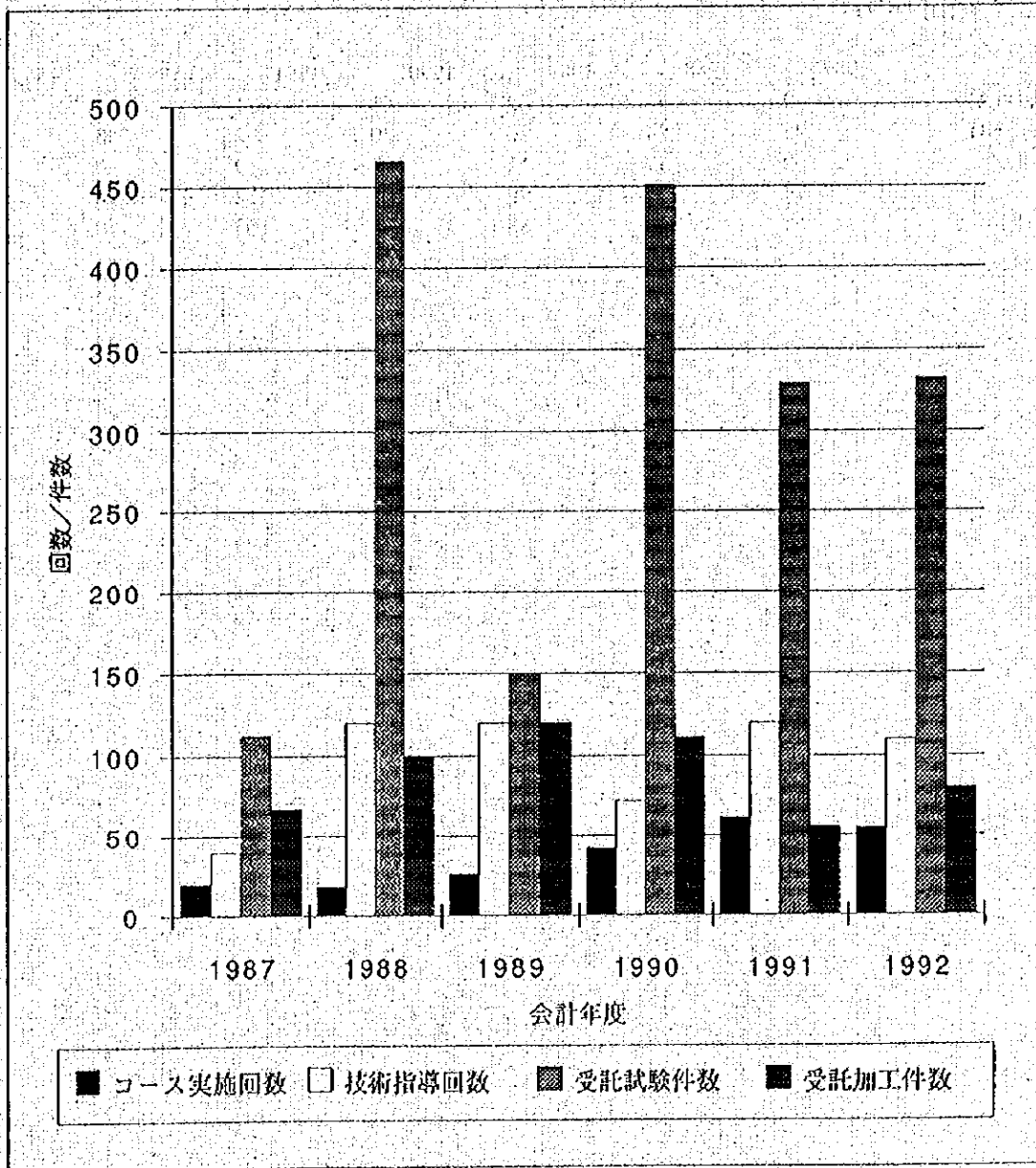


表6： MIDI 予算確保状況

	(単位：パーツ)						
	1987	1988	1989	1990	1991	1992	1993
MIDI	1,625,700	6,392,200	7,539,400	10,481,600	11,339,900	13,625,600	21,313,200
工業振興局	93,988,800	117,537,300	126,373,200	174,779,700	280,672,100	314,595,400	

表7： MIDI 職員数

	1987	1988	1989	1990	1991	1992	1993
Officials (A)	40	56	62	61	71	77	
Workers (B)	25	24	26	30	32	33	
Temporary	9	17	11	9	9	0	
Total	74	97	99	100	112	110	
(A) + (B)	65	80	88	91	103	110	

図1. ゴム製造工程

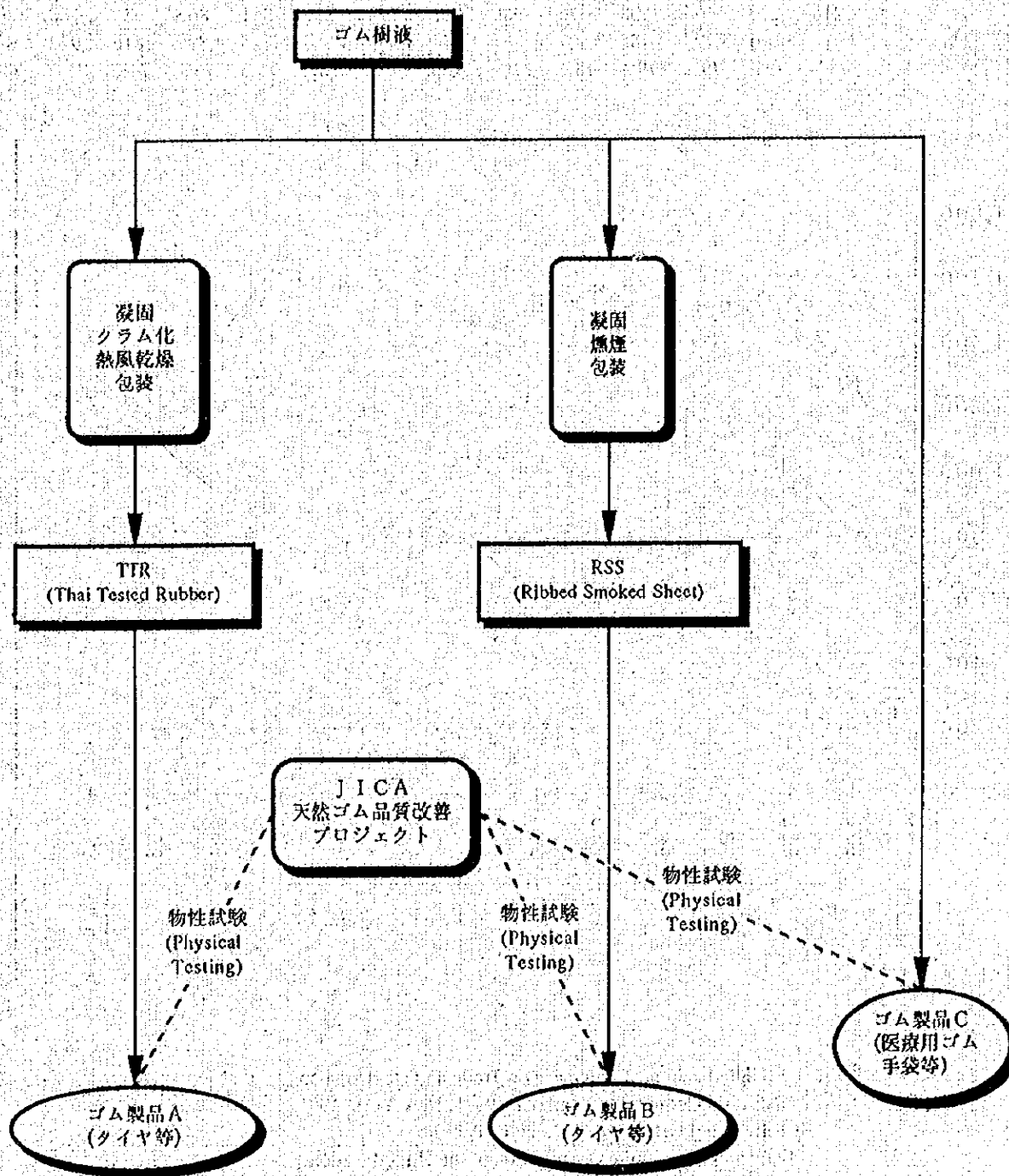
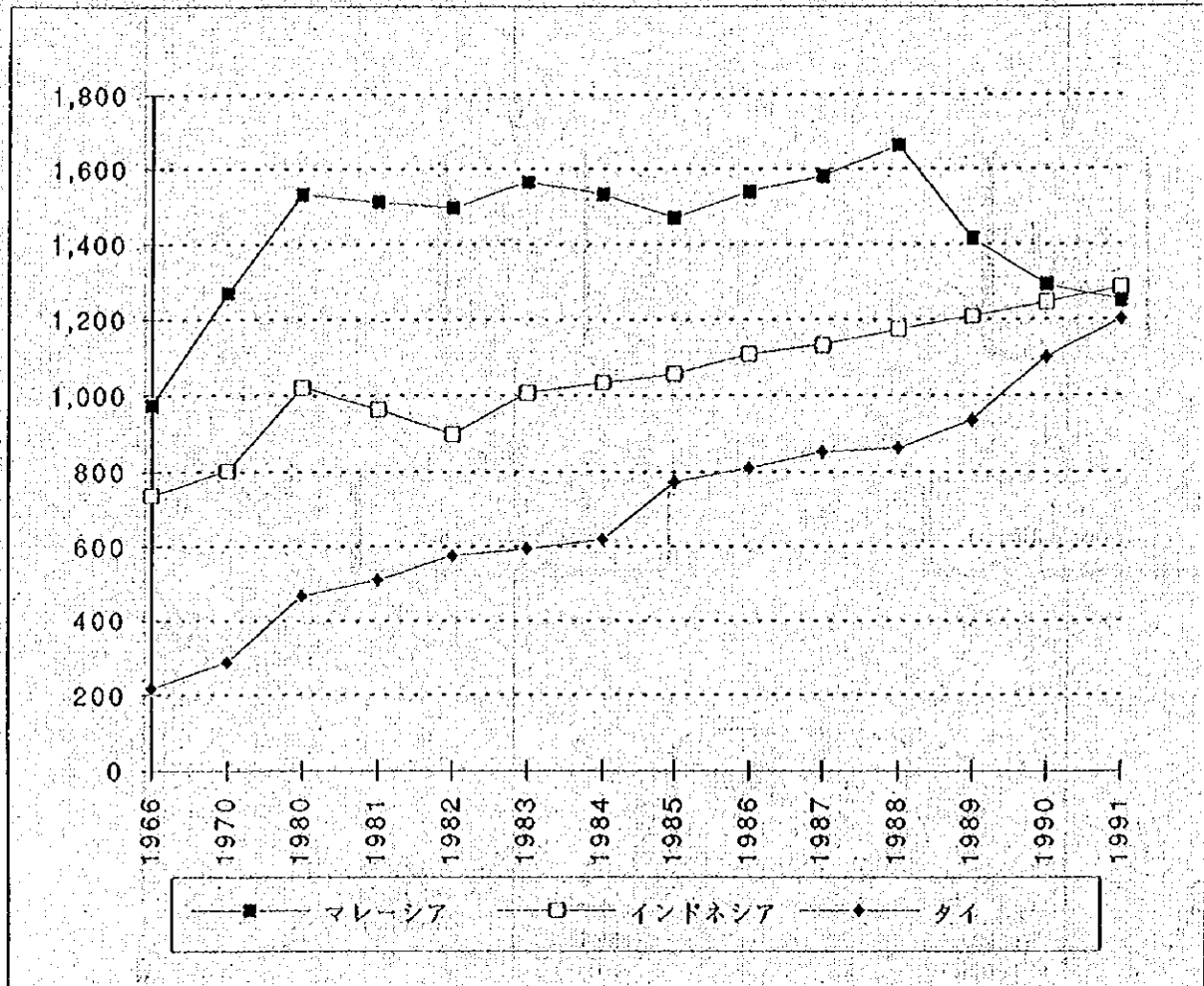


表 8： 主要三ヶ国の天然ゴム生産高

(単位：千トン)

	1966	1970	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
マレーシア	973	1,269	1,530	1,510	1,494	1,564	1,531	1,469	1,538	1,579	1,662	1,415	1,292	1,250
インドネシア	737	802	1,020	963	899	1,007	1,032	1,055	1,109	1,132	1,173	1,209	1,246	1,284
タイ	218	287	465	508	576	594	617	773	811	851	862	936	1,100	1,200
全世界合計	2,471	3,001	3,797	3,785	3,807	4,110	4,184	4,339	4,555	4,725	4,899	4,816	4,922	5,092
上記三ヶ国の割合	78%	79%	79%	79%	78%	77%	76%	76%	76%	75%	75%	74%	74%	73%

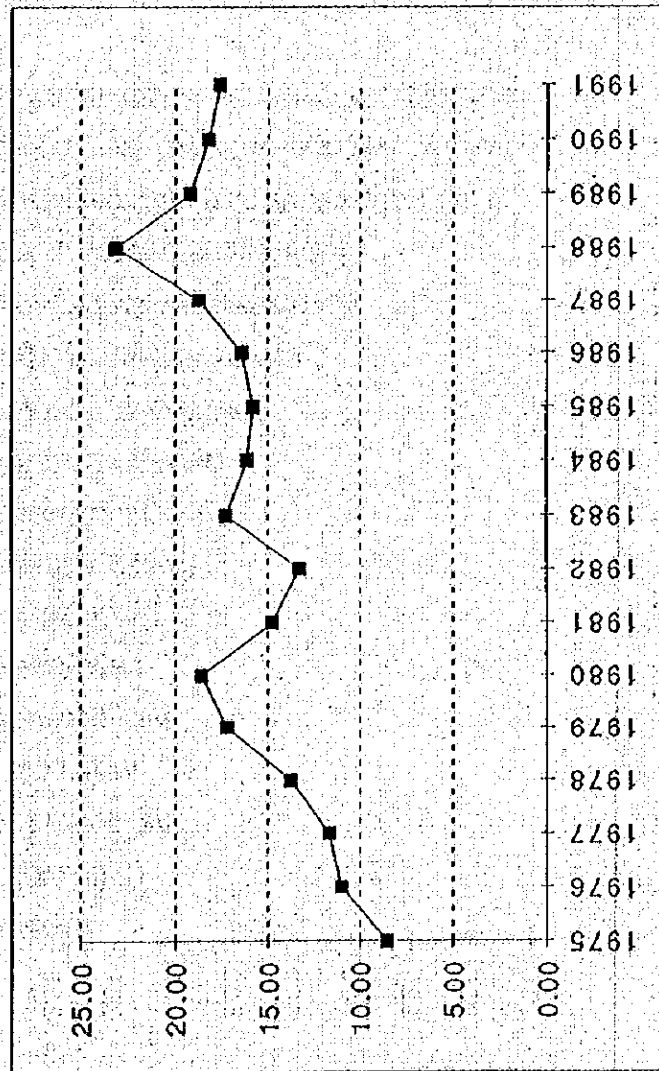


出典： 1) United Nations Conference on Trade and Development, "UNCTAD Commodity Yearbook 1991", New York, 1991.
 2) Regional Office for Asia and the Pacific, Food and Agriculture Organization of the United Nations, "Selected Indicators of Food and Agriculture Development in Asia-Pacific Region, 1981 - 91", Bangkok, 1992.

表9： R.R.S3の年平均価格（ハジャイ市場）

(単位：パーツ/kg)

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
R.S.S 3	8.50	11.02	11.70	13.77	17.22	18.58	14.79	13.33	17.24	16.13	15.82	16.44	18.72	23.15	19.18	18.21	17.57



天然ゴム
表10: タイプ別輸出生量

(単位:千トン)

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
RSS	264	286	392	338	393	344	370	434	445	480	555	609	707	692	909	938	977
TTR	32	49	64	70	94	90	76	80	74	76	94	102	114	118	129	130	159
その他	38	38	-52	34	31	23	30	33	33	40	36	44	52	96	63	83	95
合計	334	373	404	442	518	457	476	547	552	596	685	755	873	906	1,101	1,151	1,231

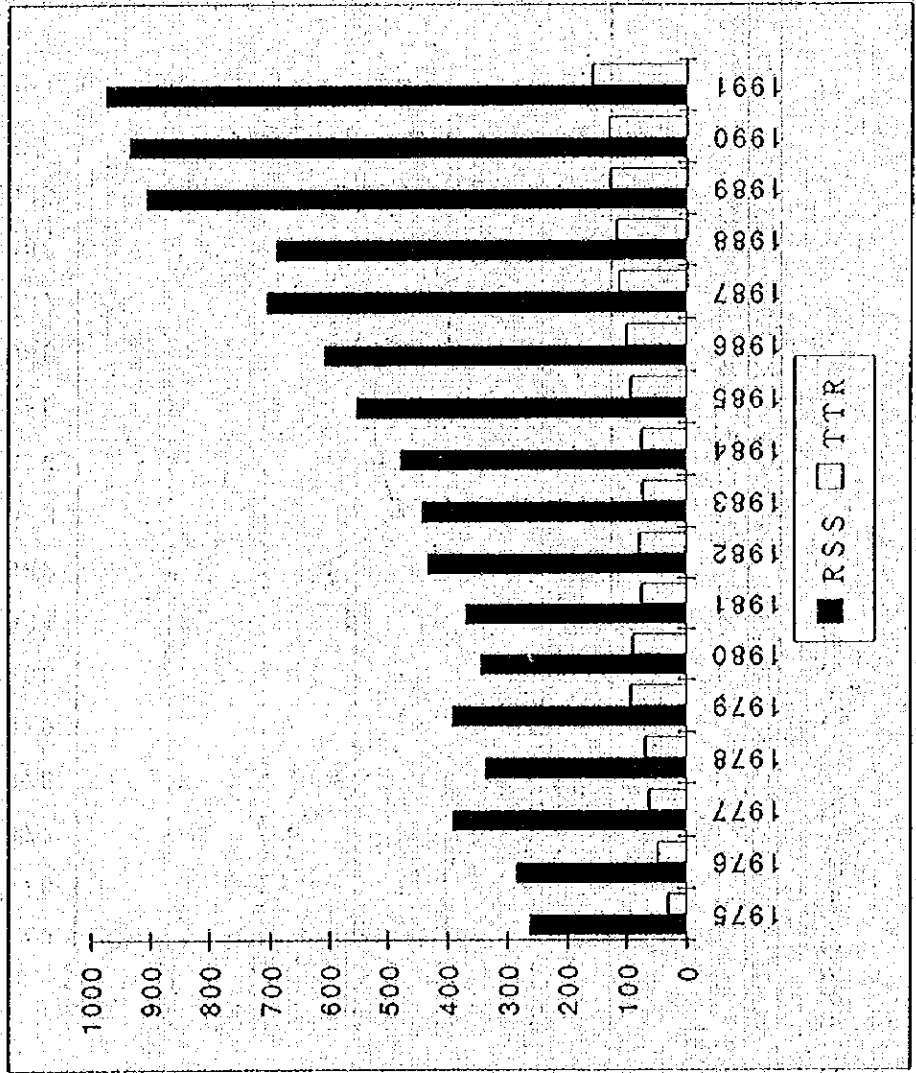


表11: TTR等級別輸出量

(単位: トン)

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
5 L	2,311	2,424	1,485	1,994	2,349	1,687	3,762	2,294	508	2,086	2,939
5	80	330	615	380	264	157	270	160	30		100
1-0				375	480	1,187	134	212			
2-0	72,606	76,216	71,758	73,016	89,847	98,650	108,372	115,137	128,170	128,184	144,075
5-0	775	738	30	240	592	610	1,100	321		39	
合計	75,772	79,708	73,888	76,005	93,532	102,291	113,638	118,124	128,708	130,309	147,114

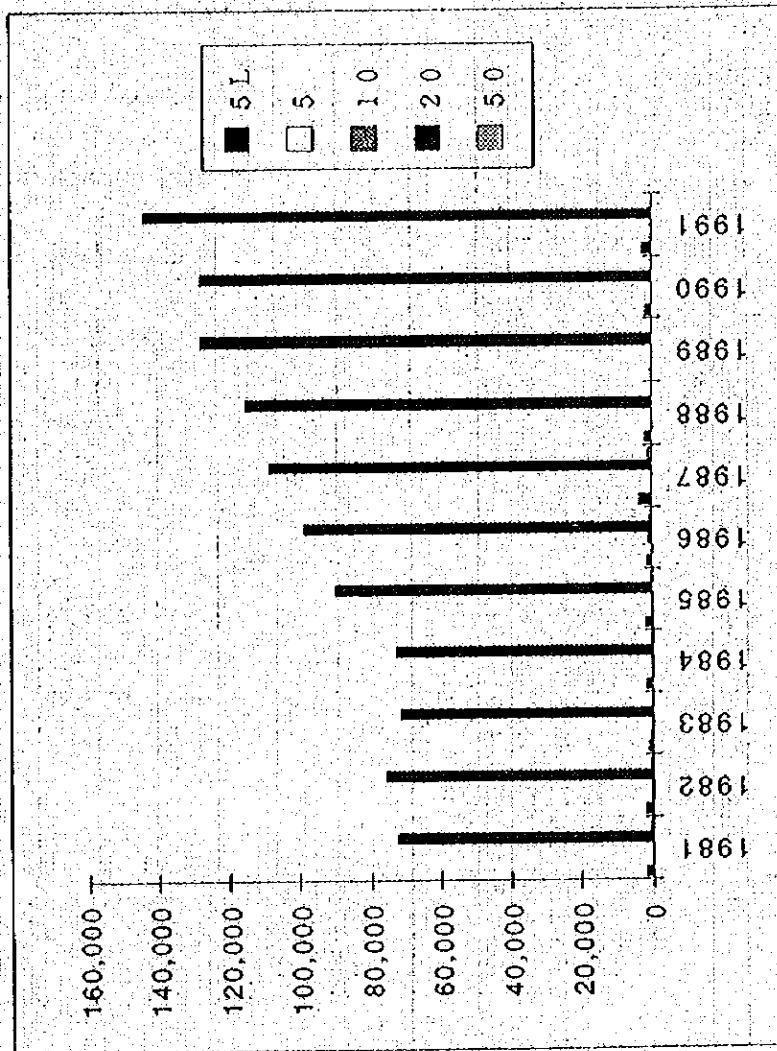


表12: R S S等級別輸出货量

(単位: トン)

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
1 X				1,743	1,648	2,165	1,445	409	663		
1	10,365	12,827	6,490	6,558	17,743	15,005	14,111	6,907	9,006	18,005	17,179
2	31,119	40,233	40,942	42,441	49,220	55,651	66,973	29,160	50,254	47,121	22,587
3	209,456	277,788	292,090	329,877	385,214	433,282	512,080	544,776	711,341	686,416	748,681
4	104,213	86,521	88,550	85,894	84,213	87,731	90,515	93,630	114,608	152,761	156,909
5	14,364	16,683	16,918	13,668	16,958	15,573	21,478	17,434	23,523	33,722	31,717
合計	369,517	434,052	444,990	480,181	554,996	609,407	706,602	692,316	909,395	938,025	977,075

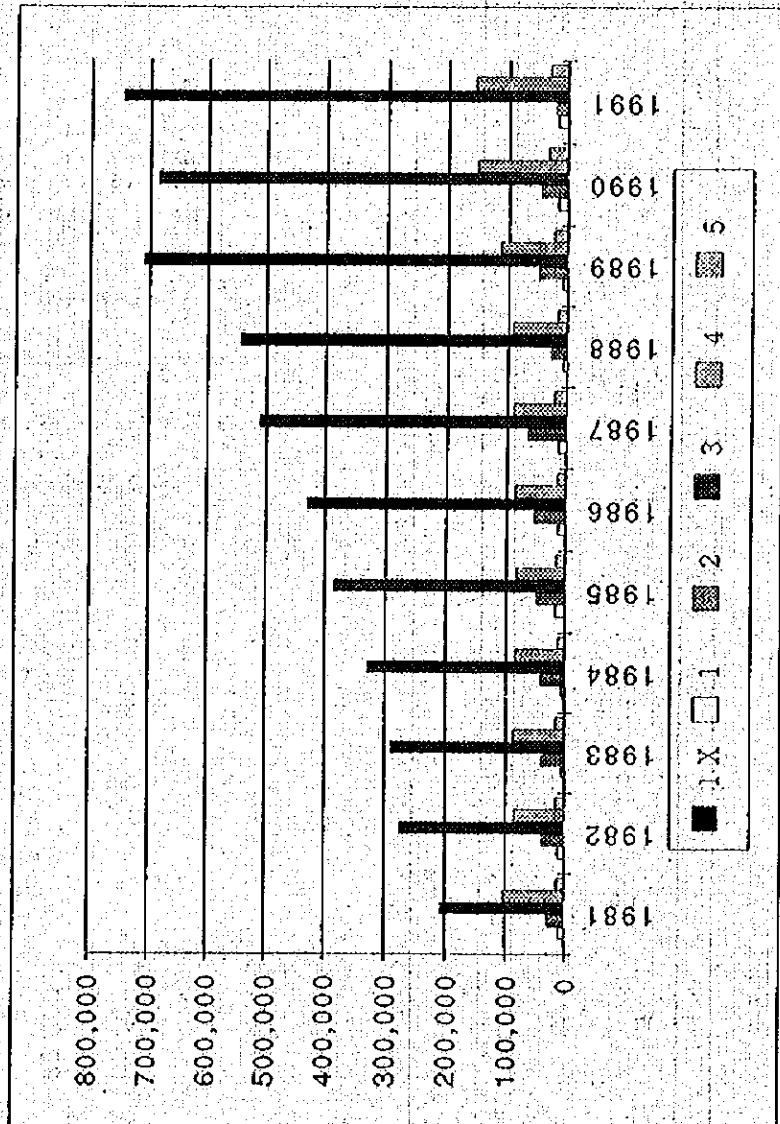


表13: タイ天然ゴム生産・輸出量

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
生産量	502	562	588	629	722	782	922	975	1178	1275	1341
輸出量	476	547	552	596	685	755	873	906	1101	1151	1232

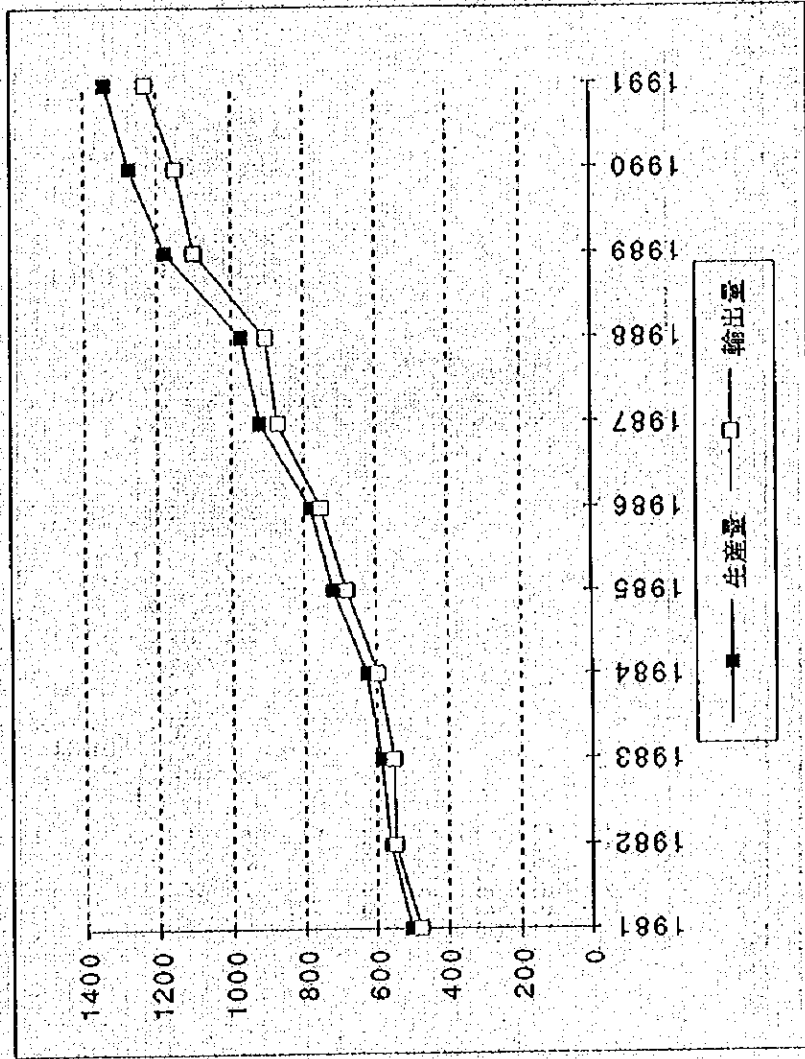


表 14: 物性試驗實施狀況

	1986	1987	1988	1989	1990	1991
物性試驗料收入	5,905	10,015	13,065	35,975	12,545	12,460

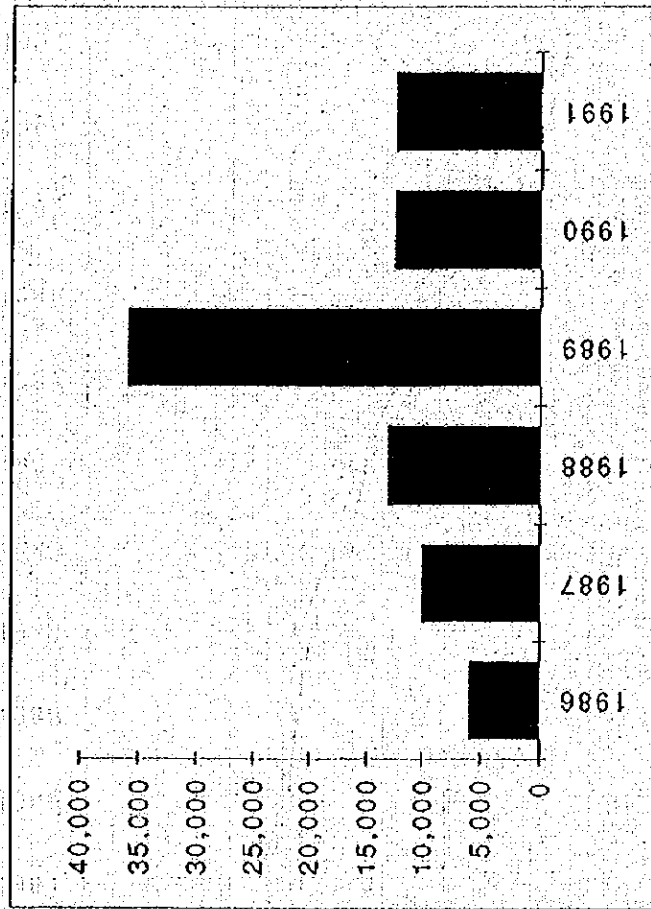
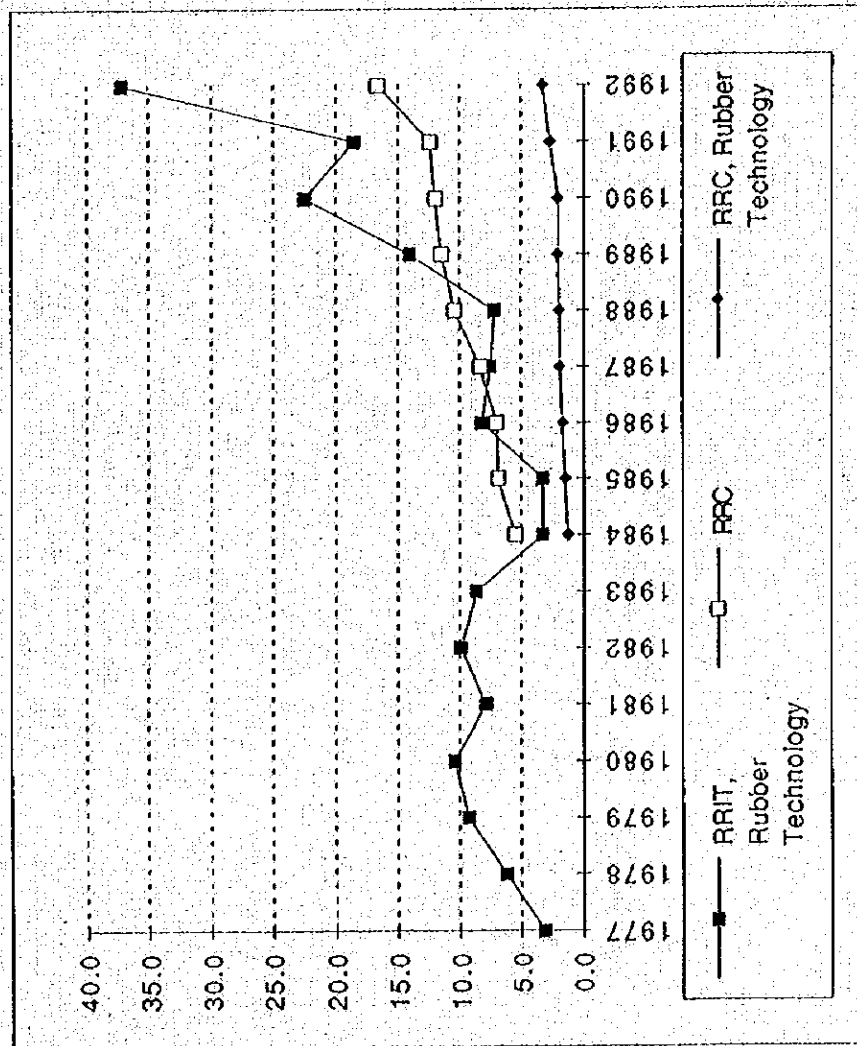


表15: 天然ゴム関係予算額

(単位: 百万バーツ)

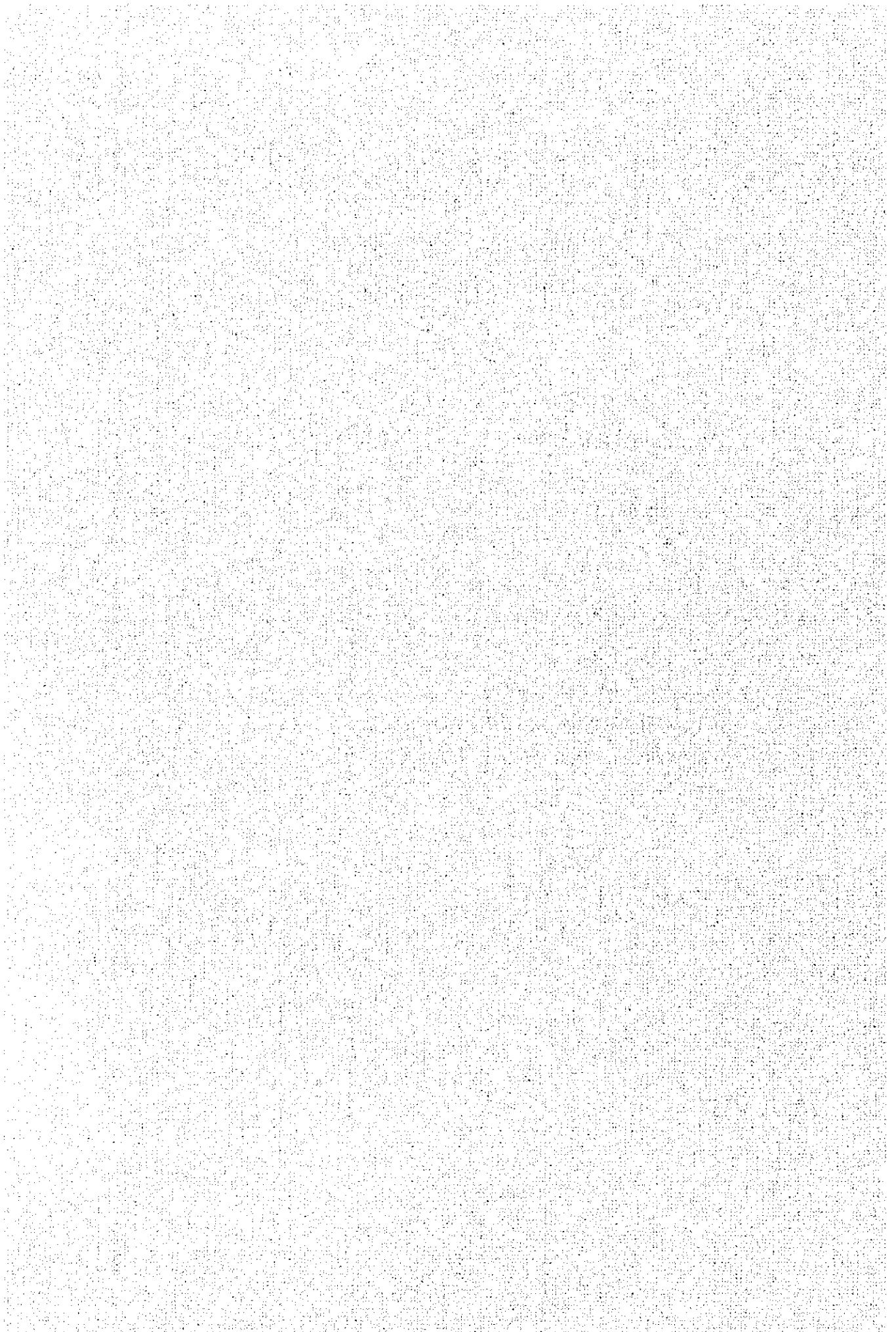
	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	
RRIT, Rubber Technology	3.1	6.2	9.3	10.4	7.9	9.9	8.7	3.2	3.2	8.2	7.5	7.2	14.0	22.5	18.5	37.2	
RRC								5.5	6.9	7.0	8.4	10.4	11.5	12.0	12.4	16.6	
RRC, Rubber Technology								1.2	1.4	1.6	1.8	1.9	2.0	2.0	2.0	2.6	3.2



関係資料

フェーズIV (社会開発分野)

I. モンクット王工科大学ラカバン	
1. R/D (討議議事録)	281
2. 調査データ	304
3. 卒業生インタビュー	319
II. 労災リハビリテーションセンター	
1. R/D (討議議事録)	327
2. 調査データ	349
3. 在校生・卒業生・雇用主インタビュー	358
4. 専門家派遣、研修受入れ、機材供与	364
5. G I R C 回答メモ	368



I. モシグット王工科大学ラカバン

1. R/D (討議議事録)	281
2. 調査データ	304
3. 卒業生インタビュー	319

