〔参考資料３〕　ＭＩＲＤＣがまとめた鋳造工業の促進計画

PROMOTION PLANS FOR THE FOUNDRY INDUSTRY

Aware of the metal-based sector's important role in the country's march towards industrialization, the National Economic and Development Authority has outlined the government's program geared to support this particular sector in the next eight years. From the year 1978 to 1987, the government foresees intensified vertical integration and mining exploration activities backed up by sufficient mineral processing required.

Within the next three years or until 1982, the mining industry is expected to recover from the previous year's slumps. By the end of the five-year period, the industry will register a 1.8 percent share of total net domestic product. Three-fourths or 75 percent of the country's total mineral output will come from the metallic sector particularly gold, nickel, copper and chromite. Processing of metals during that time will be done mostly in the country not only for domestic consumption but for export as well.

Construction activities are likewise expected to accelerate in the next eight years. With the boom in construction, the use of metal-based products is expected to benefit the local industry. The government's thrust towards infrastructure program will result into the increased utilization of locally made iron and steel products and other construction materials.

Another on-going project envisioned to depend heavily on the country's metals industry is the Board of Investments' Progressive Car Manufacturing Program. The local content ratio requirement will evidently assure the metal-casting and metalworking sectors of a market for fabricated local automotive parts. With the extension of the local contents ratio requirement to meet the ASEAN member countries' industrial complementation program, locally produced care has now an average local content of a least 62.5 percent. Annual automobile production under the progressive manufacturing program will grow by about eight percent. Presently, the local manufacturers are turning out not less than 30,000 units per year.

Under two other progressive manufacturing programs, automotive parts and components are expected to supply not only the local market for such commodities but also foreign countries. The Progressive Truck Manufacturing Program which started in 1977 has been instrumental in banning the importation of second hand trucks. The scheduled targets under this program with regard to local content requirement and truck parts exportation will be accomplished in

the next five years. In a related development, the diesel engine manufacturing program which was recently launched by the Board of Investments is foreseen to use not only local raw materials but also the enhancement of the metal-casting knowhow of local craftsmen.

One of the biggest metal users in the next several years will be the country's shipyards. When local shipbuilding activies go on full swing, a large chunk of the metal market will eventually be eaten by this sector. Presently shipbuilding activities in the country's shipyards and docks are concentrated in shiprepairing and building of barges, tugboats, small ships, etc.

Recently, however, with the drafting of the 10-year maritime industry development program, the government has scheduled the construction of some 112 interisland vessels of various types. These vessels will have a combined tonnage of 1,079,107 gross tons of barges, lighters and tugboats; 211,707 gross tons of interisland passenger and cargo vessels; and 399,500 gross tons of ocean-going ships. Except for the larger ocean-going vessels, the entire fleet requirement will be built locally since the country's shipyards are capable of building such types and tonnages.

The local electronic industry will likewise implement its local content program. This sector is expected to be rationalized to avoid overcrowding within the industry which could hamper growth. Yearly increases in local content will eventually limit vertical expansion of end-product manufacturers. This will allow small and medium-sized component manufacturers to thrive and attain economies of scale.

Another metal-based sector which will be supported by the government in the next several years will be the manufacture of machine tools such as lathes, drill presses, milling machines, radial drills and mechanical presses. Presently, there are two firms which are producing such tools with combined production capacity of around 3,000 lathes and drill presses per year. Before 1980, the government expects the machine-tool manufacturers to meet the local industry's demand.

With the soaring prices of metals in the world market, the Philippines will intensify new mining explorations in the next several years. Those existing are expected to expand operations in order to meet the increasing demand for metals. The country's leading mineral export, copper, is envisioned to grow by about nine percent per annum in output. By 1982, copper production

will be 480,000 metric tons.

With regard to gold which is currently experiencing its highest price quotations in the world metal market, the rise in operating costs of local producers is expected to be offset by the government's subsidy particularly to primary producers. Other metals such as nickel and chromite are predicted to perform better in the next several years. The increases in prices and the expected annual production growth of these metals will eventually alleviate the conditions brought about by the rising investment costs of new plants.

All in all and in addition to the above, the government has given high priority to a number of engineering industries which include transportation equipment manufacture like cars and trucks, motorcycles, and interisland vessels; agriculture and food processing; basic process machinery and equipment; basic machine tools; and standard electrical machinery and equipment. In all the above products, castings are important components.

〔参考資料４〕　フィリピンにある金属工業関係の教育指導機関

I. EDUCATIONAL INSTITUTIONS IN THE PHILIPPINES (AS OF 1979) OFFERING ENGINEERING AND/OR TECHNICAL/VOCATIONAL COURSES RELEVANT TO THE METALS AND ENGINEERING INDUSTRIES:

	No.	Courses Offered
A. Universities	51	Engineering Degree
B. Technical Colleges/Institutes	89	Engineering Degree
C. Vocational Schools	116	Industrial Technician and Trade Certificates (2 to 3 years)
Total	256	

II. INFORMATION ON EDUCATION AND TRAINING INSTITUTIONS FOR METALLURGY AND FOUNDRY TECHNOLOGY IN THE PHILIPPINES:

A. There are two university level institutions offering degree courses in Metallurgical Engineering in the University of the Philippines and the Mapua Institute of Technology, both graduating approximately 40 metallurgical engineers/year.

B. One of the three Polytechnic Institutes (Technician Training Institutes), the Iligan Institute of Technology in Lanao del Norte Province, gives a three year course in Metallurgical Technology.

C. At least 10 Trade Schools (Vocational Schools) offer 2 to 3 year course in Foundry Technology.

NOTE: High School diploma is needed to enter the University, Colleges or Technician and Vocational Schools. High School diploma - obtained after 6/7 year of elementary education and 4 years of High School.

〔参考資料５〕　ＭＩＲＤＣの人材養成，訓練計画

参考資料５－１

I. INTRODUCTION TO THE INTERNAL TRAINING PROGRAM

Rationale

By the year 2000, the metals, engineering and allied industries would require the employment of approximately three million workers, where at least half a million have to be highly skilled technicians, craftsmen and engineers.

Graduates from our universities, colleges, technical and vocational schools are not ready for this manpower demand of the industry. They need to go through an apprenticeship program which will provide them with specialized practical training, supplemented by theory and related courses geared towards the development of disciplined, highly skilled and technically competent production force.

The MIRDC, in line with its goal of developing and expanding the metals, engineering and allied industries, is spearheading this training of technicians, craftsmen and engineers.

Training is a very expensive endeavor, hence admission to this program is limited. Many quality for the program but only a few can be accommodated. Getting admitted to the MIRDC training program is a rare opportunity because the MIRDC trainee graduates have a big role to play: they are inevitably the future leaders and trainers of the production force in the industry.

Aim

To develop in the metals, engineering and allied industries, highly skilled and technically competent technicians, craftsmen and engineers who are first of all men -- disciplined, responsible, and morally upright -- imbued with a strong sense of dedication and commitment to work, to their fullest capacity, towards the fulfillment of our national aspirations for development.

II. THE INTERNAL TRAINING PROGRAM

Internal Training Program - An Apprenticeship

The MIRDC internal training program is basically an apprenticeship because it is a well-balanced combination of theory learning and practical shop work, with about 25% of theory and 75% practical shop work in the first two years

and 5% theory and 95% practical shop work in the second two years.

Training in the MIRDC is focused on helping the trainees to acquire knowledge and practical skills in five areas, namely: conceptualization, diagnosis, design, implementation and evaluation.

Intensive classroom learning includes case study work, simulation and group work. Practical shop work is direct exposure to real work situations wherein the trainee learns by "doing" but with tutorial guidance from workshop supervisors.

The MIRDC internal training program, however, is not only training in trade or craft theory and practical skills. It is also training which involves the development of a disciplined, responsible and morally upright individual who can perform a specific occupation competently and confidently and at the same time pursue his own self development continuously.

Qualification and Selection of Trainees

Filipino citizens, male or female, who are not less than 16 or more than 23 years of age, are admitted into the internal training program if they pass the examinations and interviews and are found to be physically fit for training activities.

Recruitment of trainees is done annually. Written examinations are conducted in schools and in the MIRDC. Applicants are thoroughly screened through a series of examinations and interviews before they are required to submit papers necessary for admission into the program. Trainees are hired only once a year; this is in the first semester or the second week of May.

The specific educational requirements for trainee applicants are as follows: high-school graduate for a technician level; technical-school graduate or its equivalent for craftsman A level; high school graduate for craftsman B level; MIRDC technician course graduate for craftsman C level and engineering/chemist/physics graduate for the engineer level.

Organization and Management

The internal training program consists of three levels, namely:

level 1 - technician;
level 2 - craftsman; and
level 3 - engineer.

The input for the technician level is a high-school graduate and the period of training is four years. Specializations for level 1 are in five areas: foundry, heat treatment, pattern making, material testing and inspection and mechnical maintenance.

Level 2 or the craftsman level is of three categories: craftsman A, craftsman B and craftsman C. The input for craftsman A level is a technical school graduate and the period of training is four years while the input for craftsman B level is a high-school graduate and the period of training is six years. A graduate of level 1 or technician level can undergo an additional training of two years to qualify him for a craftsman C certificate.

Specializations for level 2 are as follows:

Craftsman A

1. Foundry
2. Heat Treatment
3. Pattern Making
4. Electrical Maintenance
5. Tool & Die Making
6. Toolroom Machining
7. Machine & Tool Design
8. Metrology & Quality Control
9. General Machining
10. Instrumentation

Craftsman B

1. General Machining
2. Tool & Die Making
3. Toolroom Machining
4. Instrumentation

Craftsman C

1. Foundry
2. Heat Treatment
3. Materials Testing & Inspection
4. Mechanical Maintenance
5. Pattern Making

The input for the engineer level is an engineering/physics/chemist graduate and the period of training is three years. Specialization in this level are in thirteen (13) areas, namely:

1. Foundry
2. Metal Treatment
3. Metalworking
4. Tool and Die Manufacturing
5. Tool & Machine Design
6. Metrology and Quality Control
7. Mechanical Maintenance
8. Electrical Maintenance
9. Production Planning and Control
10. General Engineeing
11. Materials Testing and Inspection
12. Instrumentation
13. Chemical Analyses of Metals

In the first two years of training, a technician or craftsman trainee has ten (10) hours per week of classroom lecture in engineering materials, technical drawing, workshop theory, communications arts and skills and integrative studies and thirty (30) hours per week in practical shop work.

In the second two years of training, he has two (2) hours per week of classroom lecture: specialized subject (one per semester for four semesters) and integrative studies (one per semester for four semesters).

In the first and second semesters of training, and engineer trainee has eight (8) hours of classroom lecture per week: materials technilogy (2 hours per week), engineering design and calculation (2 hours per week), production management and supervision (1 hour per week), production technology (2 hours per week) and integrative studies (1 hour per week). He spends 38 hours per week in practical shop work.

In the third semester of training, an engineer trainee has five (5) hours per week of classroom work: production management and supervision (1 hour per week), production technology (2 hours per week), specialized subject (1 hour per week) and integrative studies (1 hour per week). He spends 35 hours per week in practical shop work.

In the second half of his training program (3rd, 4th and 5th semesters), an engineer trainee has only two (2) hours per week of classroom work: specialized subject (one per semester) and integrative studies (one per semester). Thirty-eight (38) hours per week is devoted to practical shop work.

Trainees in all levels are responsible to their respective workshop heads in matters related to their employment status and job responsibilities. They are, however, under the direct supervision and control of their instructors while attending related subjects.

Scheduling of classes, assignment of instructors, and overall coordination of the internal training program is the responsibility of the manager of the Information and Training Department whose implementing arm is a training staff headed by a training supervisor.

Instructors in the related subjects and practical shop/laboratory work are senior technical staff. Communications arts and skills are handled by instructors of English under the training staff while the integrative studies, which are basically for the development of mature, disciplined and responsible individuals, are handled by the managers, the asst. executive directors and the executive director.

Training Certificate

A trainee is awarded a training certificate upon satisfactory completion of the requirements of the training program which include, among others, passing a comprehensive examination, both in theory and practical shop work, and series of interviews conducted by the Committee on Training at the end of the last semester's period of training.

Code of Discipline

Trainees are bound by the MIRDC Code of Discipline, the full text of which is in the MIRDC Employee Manual. It is the responsibility of each trainee to abide by the provisions of the Code of Discipline otherwise he shall be dealt with accordingly.

The MIRDC Code of Discipline prescribes, among many other things, wearing of identification cards and official uniforms while within the MIRDC premises and prohibites:

1. smoking in no-smoking areas;
2. carrying of firearms and other deadly weapons within the MIRDC premises; and
3. drinking liquor/drug in MIRDC work areas and/or reporting for work under the influence of drug/liquor.

Attendance

Trainees are required to attend theoretical and practical courses punctually and regularly.

A trainee is required to attend at least 75% of the total number of meetings required of a subject to enable him to get a passing grade.

A written excuse for a trainee's absence from class is required before he can attend the next meeting. This excuse has to be duly signed by the department head concerned.

Academic Calendar

The academic calendar consists of two semesters: the first semester starts second week of May and ends third week of October, while the second semester starts second week of November and ends third week of April.

A two-week break is provided every semester. The first semestral break

falls on the fourth week of October and the first week of November. The second semestral break falls on the fourth week of April and the first week of May.

Class periods for the technical subjects are two hours per week while those of the general subjects, like communications arts and skills and integrative studies, are one hour per week or 2 hours per two weeks.

Library Privileges and Training Materials

An extension of the MIRDC library is located at Pilot Plant No. 1 (Tool and Die Shop). Trainees in all levels can use the facilities in the extension and must observe all library rules and regulations otherwise the offender shall lose his privilege of using the library.

Books and other materials in the main library may be requested by the department head concerned if the same are needed by the trainee in the extension.

Books and other materials borrowed from the library must be returned on time otherwise corresponding fees for overdue books have to be paid. Borrowers should report immediately the loss of borrowed materials so that arrangements for replacement can be made, or the cost of the material or book shall be subtracted from his pay check.

Certain books and training materials are loaned to trainees for one semester but they have to be returned at the end of the semester otherwise the cost of the material shall be deducted from the loser's pay check.

Trainee Performance Appraisal

Trainee performance in the technical and general subjects, as well as in practical shop/laboratory work, is submitted at the end of each semester to the Training Division. It is expressed as outstanding (o), highly satisfactory (s+), fully satisfactory (s), low satisfactory (s-), fair (F), or unsatisfactory (u).

The Committee on Performance Evaluation, headed by the Executive Director, reviews the performance of trainees on a semesteral basis. A warning of unsatisfactory progress is issued to a trainee if he is in danger of failing to comply the minimum requirements of the program. He is, however, given the opportunity for improvement prior to the end of the semester.

Trainee Counsel

Trainees who encounter problems related to their academic classroom work are urged to seek counsel from the manager of the Information and Training Department, the training supervisor or the training officer assigned in each workshop or laboratory. The training officer assigned in each shop/laboratory acts as liasion between the shops and the Training Division; hence, trainees are urged to seek their assistance in relaying problems to the supervisors and to the training staff.

Trainee Records

Each workshop/laboratory maintains trainee logbooks containing a detailed description of trainee performance in the practical shop/laboratory work.

The Training Division maintains the following trainee records:

1. Trainee Report Card. This contains the grades of each trainee in the theory and practical shop work per semester. This record is used as an internal control record to assure that the trainee is progressing in accordance with the ettablished curriculum he is specializing on. This record is also one of the bases for recommending the trainee for graduation.

2. Trainee Performance Rating Report. This form contains the performance appraisal of the trainee per semester which includes factors on behavior, attitude, attendance, shop performance and grades in theory. This gives an overall picture of the trainee progress not only as a trainee but also as an employee of the Center.

3. Trainee Attendance in Academic Classes and Calisthenics Exercises. This record is furnished the Department Heads and the Executive Director weekly, monthly, quarterly and semestrally to give them a continuous feedback on the trainee's compliance with established rules and regulations. Trainees with excellent attendance are given merit points while those with very poor attendance are given demerit points in accordance with a table of merits and demerits.

III. CONCLUSION

The Philippine Government, through the MIRDC, has a large investment in the internal training program. Once an applicant is chosen to undergo training, it is the joint responsibility of the trainee and those involved in the training to make the program as functional and worthwhile as the plant conditions will permit.

A trainee who is accepted in the internal training program but for certain reasons fails to complete it, has not only wasted a large amount of the Philippine Government money but also has prevented one of his countrymen from having the rare opportunity to develop oneself into a competent and confident technical man whose skills and knowledge are urgently needed by industry.

Admission Requirements

I. General Requirements
   1. Filipino citizenship.
   2. Passing grade on placement examinations and interviews.
   3. Physically fit for training activities.
   4. No derogatory records.

II. Specific Requirements
   A. Technician Level
      1. Completion of a secondary course.
   B. Craftsman Level

      Craftsman A:
      1. Completion of a two-year technical course or a two-year college course in engineering.

      Craftsman B:
      1. Completion of a secondary course.

      Craftsman C:
      1. Completion of a four-year MIRDC technician training course.

   C. Engineering Level
      1. Completion of bachelor's degree in engineering/chemistry/physics.

Level 1 – Technician
Course Structure:

SUBJECTS	SEMESTERS							
	1	2	3	4	5	6	7	8
Theory Courses								
EM	2	2	2	2	–	–	–	–
TD	2	2	2	2	–	–	–	–
TM	2	2	2	2	–	–	–	–
WT	2	2	2	2	–	–	–	–
SS	–	–	–	–	1	1	1	1
General Courses								
CAS	1	1	1	1	–	–	–	–
IS	1	1	1	1	1	1	1	1
Hrs/week	10	10	10	10	2	2	2	2
Practical	30	30	30	30	38	38	38	38
Total Hrs/week	40	40	40	40	40	40	40	40

EM – Engineering Materials
TD – Technical Drawing
TM – Technical Mathematics
WT – Workshop Theory
SS – Specialized Subject
CAS – Communication Arts & Skills
IS – Integrative Studies
No. of Sessions/Subject/Sem. = 20

Specializations.
1. Foundry
2. Heat Treatment
3. Materials Testing and Inspection
4. Pattern Making
5. Mechanical Maintenance

Level 2 – Craftsman
Course Structure

Craftsman A

SUBJECTS	SEMESTERS							
	1	2	3	4	5	6	7	8
Theory Courses								
EM	2	2	2	2	–	–	–	–
TD	2	2	2	2	–	–	–	–
TM	2	2	2	2	–	–	–	–
WT	2	2	2	2	–	–	–	–
SS	–	–	–	–	1	1	1	1
General Courses								
CAS	1	1	1	1	–	–	–	–
IS	1	1	1	1	1	1	1	1
Hrs/week	10	10	10	10	2	2	2	2
Practical	30	30	30	30	38	38	38	38
Total Hrs/week	40	40	40	40	40	40	40	40

Specializations:
1. Foundry
2. Heat Treatment
3. Electrical Maintenance
4. Instrumentation
5. Tool and Machine Design
6. Tool and Die Making
7. Toolroom Machining
8. General Machining
9. Pattern Making
10. Metrology and Quality Control

Course Structure: **Craftsman B**

SUBJECTS	SEMESTERS							
	5	6	7	8	9	10	11	12
Technical.								
Specialized Subjects	2	2	2	2	1	1	1	1
General:								
Integrative Studies	1	1	1	1	1	1	1	1
Hours/week	3	3	3	3	2	2	2	2
Practicum:	37	37	37	37	38	38	38	38
Total Hours/week	40	40	40	40	40	40	40	40

*First to fourth semesters are under the MIRDC Craftsman A Program

Specializations:
1. General Machining
2. Tool and Die Making
3. Toolroom Machining
4. Instrumentation

Course Structure **Craftsman C**

SUBJECTS	SEMESTERS			
	9	10	11	12
Theory Course				
SS	2	2	2	2
General Course				
IS	1	1	1	1
Hrs/week	3	3	3	3
Practical	37	37	37	37
Total Hrs/week	40	40	40	40

*First to eight semesters are under the MIRDC Technician Program.

Specializations:
1. Foundry
2. Heat Treatment
3. Materials Testing and Inspection
4. Mechanical Maintenance
5. Pattern Making

Level 3 – Engineer/Chemist
Course Structure:

SUBJECTS	SEMESTERS					
	1	2	3	4	5	6
Theory Courses						
MT	2	2	—	—	—	—
EDC	2	2	—	—	—	—
PMS	1	1	1	—	—	—
PT	2	2	2	—	—	—
SS	—	—	1	1	1	1
General Course						
IS	1	1	1	1	1	1
Hrs/week	8	8	5	2	2	2
Practical	32	32	35	38	38	38
Total Hrs/week	40	40	40	40	40	40

MT — Materials Technology
EDC — Engineering Design and Calculation
PMS — Production Management and Supervision
PT — Production Technology
SS — Specialized Subjects
IS — Integrative Studies

Specializations:
1. Foundry
2. Metal Treatment
3. Metal Cutting
4. Tool & Die Manufacturing
5. Tool & Machine Design
6. Material Testing and Inspection
7. Instrumentation
8. Chemical Analyses of Metals
9. Metrology and Quality Control
10. Mechanical Maintenace
11. Electrical Maintenence
12. Metalworking
13. Production Planning & Control
14. General Engineering

〔参考資料６〕技術協力要請内容の詳細

FIELDS OF EXPERTISE FOR PROJECT:

	Total Man-Years	Second Year	Third Year	Fourth Year
1. Project Manager (Production Engineer)	3	12 mos.	12 mos.	12 mos.
2. Shell Molding and Coring Expert	2	6 mos.	12 mos.	6 mos.
3. Die Casting Expert	2 1/2	6 mos.	12 mos.	12 mos.
4. Metal Molds and Die Designer	2 1/2	6 mos.	12 mos.	12 mos.
5. Investment Casting Expert	2	6 mos.	12 mos.	6 mos.
6. Foundry Testing and Evaluation Expert	1	6 mos.	6 mos.	-
7. Alloy Design Expert	2	6 mos.	12 mos.	6 mos.
	15 man-year			

FIELDS OF TRAINING OF PHILIPPINE COUNTERPARTS:

		Second Year	Third Year	Fourth Year
1.	Shell Molding and Shell Coring	2	-	-
2.	Die Casting	2	1	-
3.	Metal Mold and Die Designing	1	1	1
4.	Investment Casting	1	1	1
5.	Special Melting and Alloy Techniques	1	1	-
6.	Materials and Product Testing	1	1	-
7.	Alloy Design and Heat Treatment of Castings	1	1	1
		9	6	3

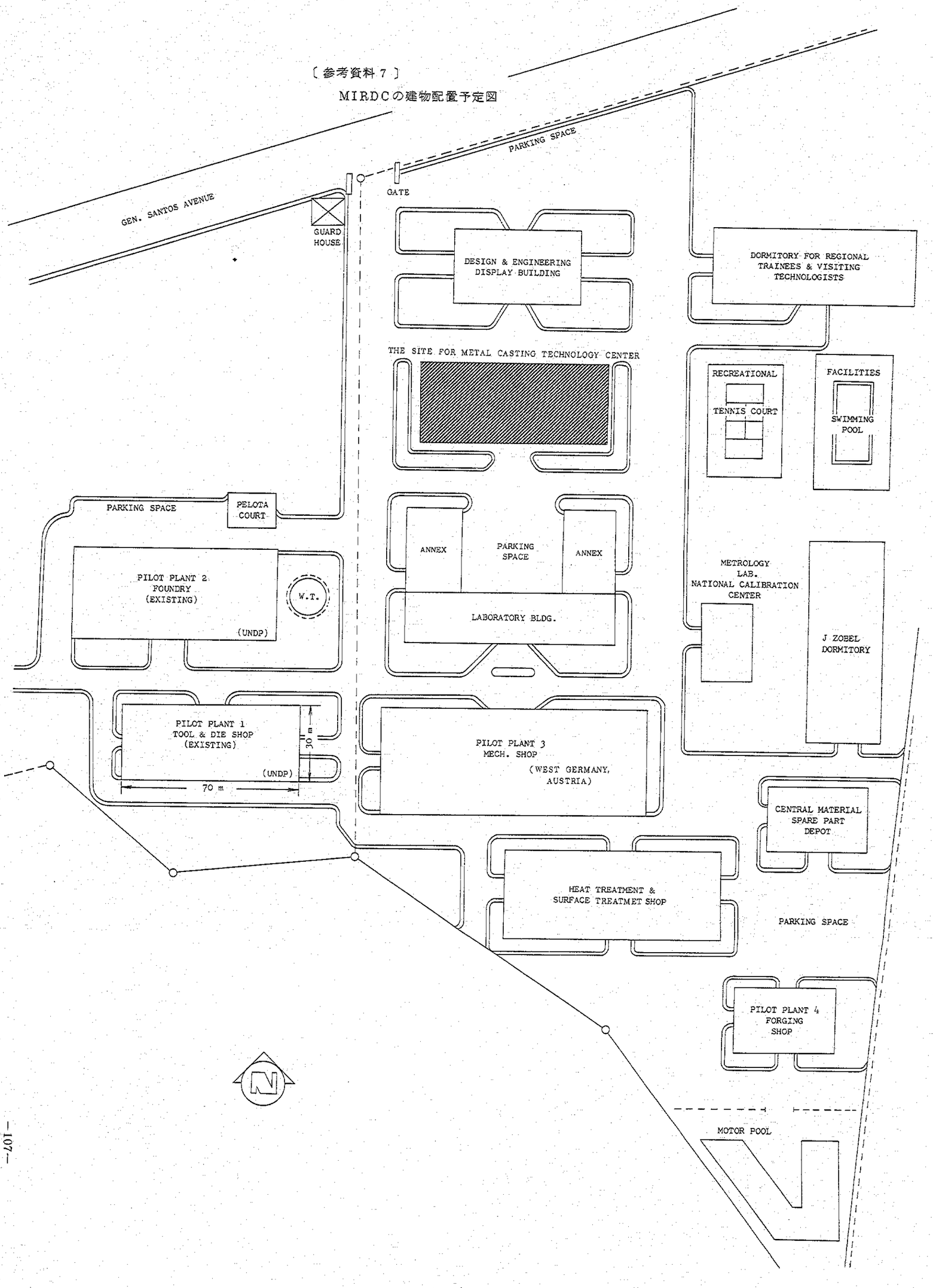
LIST OF NECESSARY EQUIPMENT TO BE PROVIDED BY JICA FOR THE COMPLETION ON THE MIRDC METAL CASTING TECHNOLOGY CENTER

Quantity	Description
1 unit	Cold Chamber Die Casting Machine
1 unit	Horizontal Hot Chamber Die Casting Machine
1 unit	Low-Pressure Die Casting Machine
1 unit	Induction Melting Furnace, 500 KW
1 unit	Induction Vacuum Melting Equipment
1 unit	Electroslag Refining Furnace
1 unit	Double-Hearth Induction Furnace for Non-Ferrous Melting
1 unit	Oil-fired Crucible Furnace - with automatic temperature and fired controls
1 set	Vacuum Heat Treatment Furnace for Hardening
1 unit	Annealing Furnace for Castings - oil fired with temperature recorders and controllers
1 unit	Trimmer Press (hydraulically operated) for trimming gates and flashes from a cluster of small die castings
1 unit	Belt Sand-Paper Polishing Machine
1 unit	Shell Molding Machine
1 unit	Shell Core Machine
1 unit	Shell Bonding Machine - complete with adhesive liquid dispenser
1 unit	Shell Molding Sand Mixer
1 unit	Sand Muller - 5 tons per hour capacity
1 unit	Sand Blender - mobile type
1 set	Facilities for Investment Casting
2 units	Double-Ended Pedestal Grinder
1 unit	Swing Frame Grinder
1 unit	Swing Frame Cut-Off Machine
1 unit	Forklift - 3 tons capacity
1 set	Vacuum Molding Facilities - Sintokogio
1 unit	Overhead Crane - 3 tons capacity
1 unit	Air Compressor - 300 CFM
1 unit	Hot Sand Dilatometer
1 unit	X-Ray Diffraction Equipment
1 unit	X-Ray Machine NDT, 1000 KV
1 unit	Rapid C & S Analyzer (automatic)

Quantity	Description
1 unit	Gases in Metals Analyzer (H_2 and N_2)
variable No.	Process Control Equipment
	a) Temperature Measurement Devices - optical, thermocouple and radiation
	b) Humidity Recorders
	c) Gas Recorders for Furnace Atmosphere Control
	d) Vacuum Measurement Equipment and Recorders

〔参考資料７〕

MIRDCの建物配置予定図



〔参考資料８〕　当調査団が持参したTalking paper及びQuestionnaire

Talking Paper

July 1, 1979

To : The Authorities concerned of the Government of the Republic of the Philippines

From : The Preliminary Survey Team sent by the Japan International Cooperation Agency

Project: Technical Cooperation on the Establishment of the Metal Casting Technology Center in the Republic of the Philippines

I. Objective of the Preliminary Survey Team

In response to the proposal of the Government of the Republic of the Philippines, dated August 6th, 1976, the Government of Japan has decided to make a study to find out the possibility of the Japanese Technical Cooperation on the project.

Japan International Cooperation Agency (hereinafter referred to as "JICA") which is an agency of the Japanese Government, will take up and execute her technical cooperation program within its best possible methods and range of activities.

The Team aims (1) to identify the outline of the project proposal, (2) to clarify the problems to be solved, if any, and (3) to formulate an appropriate plan for Japan's cooperation. The Team consisting of experts in specialized fields intends to discuss and exchange frank opinions on how to best implement the project with the authorities concerned of the Government of the Republic of the Philippines.

II. Information Required for Implementing the Project

The information required by the Preliminary Survey Team is categorized in four groups:

A. Administrative Information
B. Background Information
C. Principal Information
D. Supplementary Information

A and B may be furnished by the Philippine side, while C will be the Major topics for the Japanese Team with the help of the Philippine side. Detailed items of each group of information are described as follows:

A. Administrative Information

1. Names and functions of the organization in charge of budgeting, including followings;

   a. Information on national budget and its amount in the past several years, including budget of Ministries and Agencies concerned;

   b. Budget system;
      Procedure, method and time of compilation, approval, actual disbursement, etc.

2. Name and activities of the Ministry of the Government of the Republic of the Philippines which is responsible for administrating the implementation of the project and the program

3. Name and activities of the implementing agency directly responsible for planning and implementation of the project

4. Name and activities of organizations of the Philippine Government related to the implemntation and operation of the project

B. Background Information

1. Importance of the project in the national and sectoral economies
2. Urgency (priority) of the project
3. Any problems involved in the project
4. Effects of the project, if implemented, on metal casting industry

C. Principal Information

1. Concept plan of the Philippine side

   (1) Objectives of the project

   (2) Outline of the project

      a. Organization and institution to be established and/or utilized;

      b. Functions and activities of the above organization and institution;

      c. Necessary machinery and equipment to be installed;

      d. Staffing plan in administration, instruction, training and R&D;

      e. Building construction plan

(3) Critical difficulties, if any

(4) Extent and contents of the foreign coopeation required

(5) Availability and timing of local budgetary allocation

2. Alternative projects, if any

(1) Merit of each alternative project

(2) Demerit of each alternative project

D. Supplementary Information for Reference

1. State of industrialization of the Republic of the Philippines

2. Present state or previous experiences of similar projects both in public and private sectors

3. Present state of technological level in question which are put into practical use

4. Effects of the project if implemented

5. Names and activities of the Universities;
Institutes of Technology and Technical High Schools related to the field of metal casting

III. Responsibility of the Governments

The Governments of Japan and the Republic of the Philippines share the following responsibilities in implementing the project.

A. The Government of Japan

Through JICA, the Government of Japan will cooperate with the Government of the Republic of the Philippines in implementing the project.
The cooperation will take the following four forms:

1. To conduct the implementation study which aims to make up concrete action program for implementation
2. To appoint Japanese experts who will assist the implementation of the programs in specialized fields
3. To supply equipment, machinery and materials required for the program
4. To receive the counterparts in Japan for training and/or observational study

B. The Government of the Republic of the Philippines will take the primary responsibility for implementing the program.

The following twelve specific responsibilities are also to be borne by the Philippine side at its own expenses.

1. To provide buildings as well as incidental facilities and land required
2. To supply equipment, machinery and materials which are necessary for the operation of the program but are not provided by the Japanese side
3. In respect to the equipment, machinery and materials supplied by the Japanese side, to bear expenses for transportation within the Philippines as well as for the installation, operation and maintenance thereof in the operation of the program
4. To bear running expenses necessary for the maintenance and operation of the institutions, organizations involved in running the programs
5. To appoint Philippine technical and administrative staffs required for operating the program
6. To bear any other expenses occurred in the operation of programs
7. To provide the Japanese experts with privileges, exemptions and benefits and no less favorable than those granted to the experts of the third countries under similar circumstances
8. To issue Residence Permits to the Japanese experts and their families
9. To provide accommodations for the Japanese experts and their families
10. To provide transportation facilities for the Japanese experts in their course of duties
11. To exempt custom duties, internal taxes and similar charges, if any, imposed on equipment, machinery and material which are provided by the Japanese side
12. To undertake to indemnify the experts in respect of damages awarded against them for actions performed in the course of their official duties

IV. Sequence of Japan's Technical Cooperation

Japan's technical cooperation is provided in the following order:

Preparatory Stage: (1) Preliminary Survey Team
(2) Implementation Survey Team
(Signing of Record of Discussions)

Implementation Stage: (1) Appointment of Japanese Experts

(2) Provision of Equipment, Machinery and Material

(3) Receiving of Counterparts to Japan for training and/or observational study

(4) Evaluation Team

Self-reliance Stage: Transfer to and operation by the Philippine Side

V. Tentative Schedule for Implementing the Program

The following are the important points for further studies and discussions for the implementation of the project:

1. Fields and areas of technical cooperation
2. Identification of fields and numbers of Japanese experts required
3. Identification of fields and numbers of counterparts personnel to be trained in Japan
4. Identification of equipment, machinery and materials required
5. Buildings and incidental facilities
6. Cost estimate (Domestic and Foreign Portions)

参考資料８－２

Questionnaire

I. General Information on the Philippine Casting Industry

1. Statistics of Casting Industry

(1) Export and Import

(2) Number of Factories
classified by scale, production method, production amount and number of employees

(3) Main Products
Parts for motorcycle, automobile, agricultural machine, household electrics, sawing machine, outboard motors, etc.

2. The Present State and Perspective of Casting Industry

(1) Demand and Supply of Raw Materials (Including Export and Import)

a. Shell Molding; Rig Iron, Cokes, Iron and Steel Scrap, Ferro-alloy (F-Mn, F-Si, F-Cr)

b. Investment Casting; Zircon Flour, Zircon Sand, Chamotte Sand, Fused Silica Flour, Fused Silica Sand, Colloidal Silica Binder, Master Heat Ingot, Wax

c. Die Castings; Aluminium (Purity 99.5%), Aluminium Iron Mother Alloys, Aluminium Copper Mother Alloys, Aluminium Base Alloy in Ingot (Virgin Ingot), Secondary Aluminium Base Alloy in Ingot (Secondary Ingot), Aluminium Scrap, Zinc Alloy Ingot. Brass for Copper Alloy (40%-Zinc 60%-Copper)

(2) Demand of Products (Including Export and Import) and Amount of Production

a. Shell Molding; Cast Iron, Casting, Steel Casting, Copper Alloy Casting, Aluminium Alloy Casting

b. Investment Casting; Cast Iron, Alloy Steel, Copper Alloy, Aluminium Alloy, Other Non-Ferrous Alloys

c. Die Castings; Copper Alloy, Aluminium Alloy, Zinc Zlloy

(3) Manufacturing Cost and Profitability

	Shell Molding	Investment Casting	Die Castings
a. Manufacturing Cost			
b. Management Cost			
c. Selling Price			
d. Net Profit			

(4) Present State of Utility

Electric Power, Fuel, Water, etc.

(5) Present State of Producting Engineering

a. Shell Molding b. Investment Casting c. Die Castings

(6) Present State of End-User

a. Shell Molding b. Investment Casting c. Die Castings

3. Proposed Project

(1) Necessity of Marketing Research

a. Shell Molding b. Investment Casting c. Dis Castings

(2) Selection of Necessary Equipment and Machinery to be Installed in the Proposed Center

a. Shell Molding b. Investment Casting c. Die Castings

(3) Selection of Production Method

a. Shell Molding b. Investment Casting c. Die Castings

(4) Procurement of Raw Materials

a. Shell Molding b. Investment Casting c. Die Castings

(5) Procurement of Utility

a. Shell Molding b. Investment Casting c. Die Castings

II. Detailed Information to be Collected from Metal Casting Industry

1. Investment Casting

(1) Size of Products

a. 100 g b. 500 g c. 1 Kg d. 5 Kg e. 10 Kg

(2) Products

a. General product b. Heat-resist product

c. Spinning product (low speed, high speed)

(3) Objects

a. Airplane b. Internal Combustion Engine c. Business Machine
d. Electric Telecommunication Machine e. Food Processing Machine
f. Chemical Machine g. Textile Machine h. Pump
i. General Machines

(4) Materials To be Used

Nickel base Alloy, Copper, Stainless Steel, Titanium Alloy, Aluminium Alloy, Magnesium Alloy, Copper Alloy, Tool Steel, Steel, Cobalt base Alloy

(5) Strength of Materials (Kg/mm^2)

(6) Ductility of Metals

(7) Trade Name of Materials of Wax Pattern (Percentage of Paraffin)

(8) Melting Point of Wax Material

(9) What Kind of refractory is available?

(10) Capacity of Used Wax Injection Machine

(11) Size of Dies

(12) Price of Dies

(13) Kinds of Die Material

(14) Divided Numbers of Dies

(15) Kinds and percentage of casting defects and their cases inclusion, Misrun, Blow hole, crack shrinkage, etc.

(16) Machine tools for die-making

(17) Dimensional accuracy of the die's size

(18) What Kind of Measurement Tools is available?

(19) Kinds of Heat-resist Binder

(20) How do you get the Heat-resist Binder;
by importation, by domestic production?

(21) Kinds of de-Waxing process

(22) Kinds of melting method

Vacuum Furnace, High Frequency Furnace, Arc Furnace

(23) Temperature of Pouring (Do you have a Temperature Control System?)

1,200°C, 1,400°C, 1,600°C

(24) Way of Heat Treatment

(25) How many products do you make from one cluster?

(26) dimensional accuracy of Size of the product

0 - 10 mm

11 - 50 mm

51 - 100 mm

101 - 200 mm

(27) Roughness on the Surface of Products

(28) Thickness of Products

(29) Shape of products

2. Die Castings

(1) Kind of Materials

Zinc Alloy, Lead Alloy, Copper Alloy, Aluminium Alloy, Tin Alloy, Magnesium Alloy

(2) Size of Dies

(3) Size of Products

(4) Tolerance of Products

(5) Object of products ---- Automobile, Motorcycle, Camera, Household Electric Appliance, Sawing Machine

(6) Kinds of Die Castings Method ---- Cold-Chamber, Hot-Chamber, etc.

(7) Capacity of Die Casting Machines and their Numbers

(8) How do you pour themelted alloy;

automatically or manually (1 person, 2 people, 3 people)?

(9) How many products do you, manufacture a day? (per 1 machine)

(10) Kinds of defects and their countermeasures

(11) Price of Dies

(12) Machine Tools for die-making

3. Shell Molding

(1) Use for core or mold

(2) Kinds of shell molding machine

(dump type m. blowing type m.)

(3) Pattern Size

(4) Kinds of materials (pattern)
(FC, FCD, C-Steel, Al Alloy, Cu Alloy)

(5) Objects of casting products

(6) Kinds of sand and sand mixture

(7) Resin coated sand or mixed sand

(8) Metal Pattern (machine tools)

(9) Productivity per one machine per day

(10) Kinds of defects

(11) Quality control

参考資料 9

今回調査団が表敬交渉した主要相手国政府機関名と会談した人名のリスト

1. 国家経済開発庁 (NEDA)

Mr. Bienvenido Villiavicencio, Director, External Assistance Staff

2. 工業省 (Ministry of Industry)

Mr. Agapito Karingking, Director, Metal Industry Div., BOI

Mr. Emmanuel. O. Almonte, Officer in Charge, CSMI

3. 国家科学開発庁 (NSDB)

Dr. Segundo Roxas, Deputy Minister

4. 金属工業研究開発センター (MIRDC)

Dr. Antonio V. Arizabal, Executive Director

Atty. Jose. Bautista, Assistant Executive Director for Administration

Mr. Benjamin Damian, Assistant Executive Director for Technology

Mr. Jose.Sason, Metal Casting & Treatment Div.

Mr. Antonio Lazo, Foundry Div.

Mr. Florentino Cuasay

Mrs. Rosa Tejada, Information Exchange & Training Dept.

Mrs. Melba M. Valdex

Miss Sonia Salazar

5. フィリピン鋳物協会 (Philippine Foundry Society)

Mr. J. Hermes D. Bautista, President

Mrs. Melba M. Valdex, Secretary

Mr. Herman T. Laurel, Treasurer