

5. Construction Programme

5-1 Responsibilities of Both Governments

The following are the construction works and procedures for CIAST, to be undertaken by the Governments of Japan and Malaysia under the condition that both agree upon the implementation of the Japanese economic cooperation in grant form.

Measures to be Taken by Both Governments

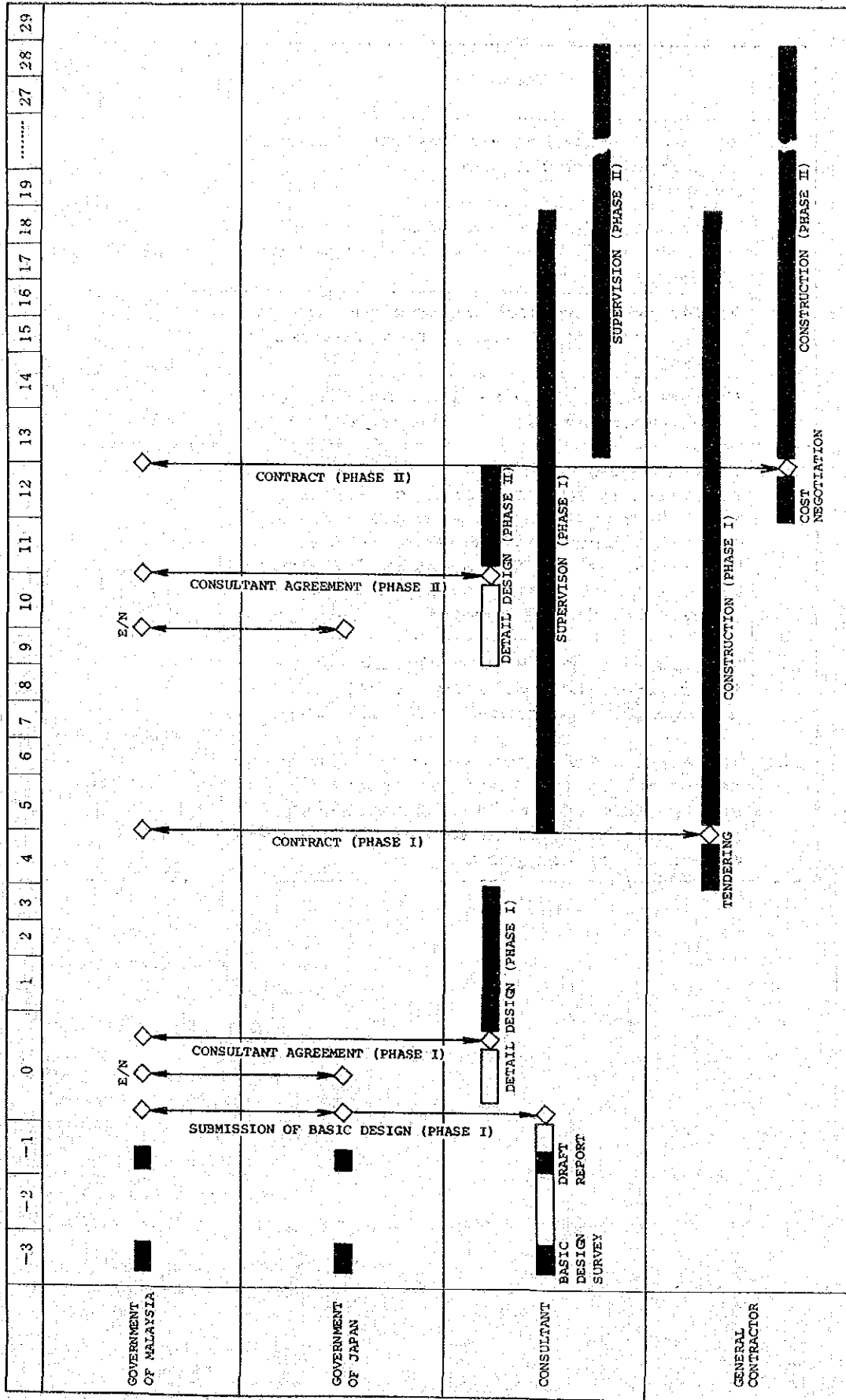
No.	Items	Japanese Side	Malaysian Side
1.	To secure a lot of land		⊙
2.	To clear, level and reclaim the site when needed		⊙
3.	To construct the gate and the fence in and around the site		⊙
4.	To construct the parking lot		⊙
5.	To construct the road		
	1) Outside the site		⊙
	2) Within the site	⊙	
6.	To construct the building		
	Main building		
	Workshops for following departments,		
	- Automotive Dept.		
	- Test and Inspection Unit		
	- Machine Operation and Die-making Dept.		
	- Heavy-shop Dept.	⊙	
	- Electrical and Electronic Dept.		
	- Instrument and Automatic Control Dept.		
	- Fabrication Dept.		
	Student Housing for ASEAN Trainee		
	Dining Facility		
	Power Substation		
	Covered Walk		
	Student Housing except for ASEAN Trainee		
	Staff Housing		
	Worker's Quarter		⊙
	Watch House		

No.	Items	Japanese Side	Recipient Side
7.	To provide facilities for distribution of electricity, water supply, drainage and other incidental facilities		
	1) Electricity		
	a. The distribution line to the site		⊙
	b. The drop wiring and internal wiring within the site	⊙	
	c. The main circuit breaker and transformer	⊙	
	2) Water Supply		
	a. The city water distribution main to the site		⊙
	b. The supply system within the site (receiving and elevated tanks)	⊙	
	3) Drainage		
	a. The drainage city main (for storm, sewer and others) to the site		⊙
	b. The drainage system (for toilet sewer, ordinary waste, storm drainage and others) within the site	⊙	
	4) Telephone System		
	a. The telephone trunk line to the main distribution frame/panel (MDF) of the building		⊙
	b. The MDF and the extension after the frame/panel	⊙	
	5) Furnitures and Equipment		
	a. General furnitures (carpet, curtain, table, chair and others)		⊙
	b. Project equipment	⊙	
8.	To pay the following commissions to the Japanese foreign exchange bank for the banking services based upon B/A*		
	1) Advising commission of A/P*		⊙
	2) Payment commission		⊙

* B/A = Banking arrangement
A/P = Authorization to pay

No.	Items	Japanese Side	Recipient Side
9.	To ensure unloading and customs clearance at port of disembarkation in recipient country		
	1) Marine (Air) transportation of the products from Japan to the recipient country	◎	
	2) Tax exemption and custom clearance of the products at the port of disembarkation		◎
	3) Internal transportation from the port of disembarkation to the project site	◎	
10.	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under verified contract such facilities as may be necessary for their entry into recipient country and stay therein for the performance of their work.		◎
11.	To maintain and use properly and effectively that the facilities constructed and equipment purchased under the Grant		◎
12.	To bear all the expenses, other than those to be borne by the Grant, necessary for construction of the facilities as well as for the transportation and the installation of the equipment		◎

5-2 Schedule for Design and Construction



5-3 Construction

5-3-1 Background of Construction Procedure

(1) Contractors

Most construction companies in Malaysia are firms of several to 10-odd people and normally organize their labor force by gathering fellow workers according to the amount of work. They do not have the overall field control of the larger Japanese contractors who, with their efficient organization and fund availability, can accomplish complicated work in a short time. Local workers are available in considerable numbers by their respective trades; however, skilled workers are in short supply. Work done by workers in different trades is often unsatisfactory due to inadequate control of contractors. This can be explained by the fact that the main job of a local contractor is to gather workers and pass out drawings issued by the architect and the consultant. He usually leaves the work in the hands of workers and the responsibility is dispersed because the organization normally uses a nominated sub-contract system (a system where the client nominates his sub-contractors such as utilities sub-contractors and waterproofing sub-contractors). Lately, there have been cases where the Government of Malaysia has awarded contracts to Japanese contractors by the turnkey system to have a large project completed within a short time. At the same time, the Government of Malaysia seems to hope the stimulation of the Malaysian construction industry as a whole.

(2) Architect and Consultant

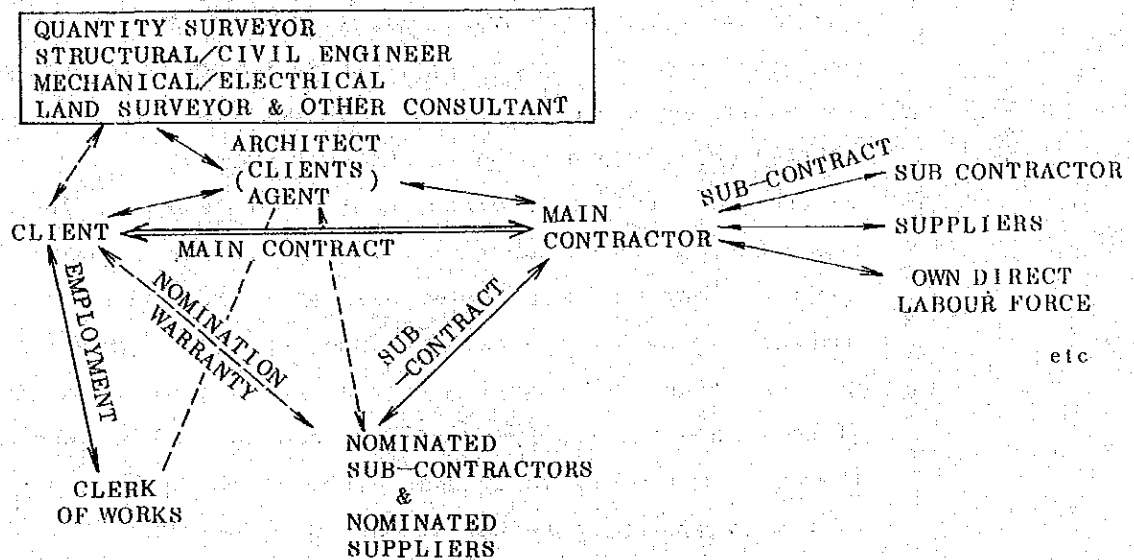
An architect, being an agent of the client, is to control other experts in his design team and is always responsible for design, procedure and contracting, and supervision, as a professional.

In Malaysia, an architect and a consultant run an office independently. There are few instances of multi-disciplinary practice. The position of architects as professionals and

the minimum fee are guaranteed by law. The relationship between client, design team and construction team resemble those in Britain and are as indicated below.

A clerk of works, who is usually employed by the client, is a field caretaker that assists the architect; however, he does not have the authority to supervise the work.

(3) Diagram Showing Relations between Design/Construction team



(4) Procedure for Planning and Building Approval

For this Project, the submission for the Planning Approval and Building Approval to the Municipality of Shah Alam can be done simultaneously. In order to obtain both Planning and Building Approvals, application forms and drawings must also be submitted to the Fire Department, Water Works Department, Telecommunications Department, and the Electricity Board. Ordinarily, approvals are granted in three months; however, at times may take as long as six months because each of the Departments evaluate specific projects and give various demands accordingly. Hence, meetings with the various authorities must be done prior to submitting

the application forms. According to the Uniform Building By-Laws, the application forms and drawings for submission must be signed by architects and consultants registered in Malaysia.

(5) Contracting

The British standard contract form is used for contracts. The architect and the quantity surveyor play a vital part concerning the procedure and assessment relative to the construction period and cost. Regarding types of contracts, the lump-sum contract with a fixed construction cost is used for small work, for example, a house. The lump-sum contract with a bills of quantities is common practice for large work.

There are two critical points to be noted at the time of contracting. One, the cost written in the lump-sum contract with bills of quantities is not fixed. The construction cost will be re-calculated at the end of construction; thus, the total construction cost may differ from the one written in the contract. Two, the construction period written in the contract may vary, because the contractor reserves the right to request postponement in construction due to inclement weather; however, the architect is to make the final decision.

In order to complete the building within a limited time and cost, not only is the management of the contractor important, but the management of the architect is important as well. Furthermore, the British standard contract should be modified with the client to enable the work to be completed within a certain cost and time since the contractor is Japanese.

5-3-2 Construction and Supervision

Japanese contractor either having sufficient experience in Malaysia or having conducted sufficient preliminary survey will be selected as the main contractor.

In performing work, cooperation with appropriate local sub-contractors and efficient organization are the keys to the success of the project.

Regarding supervision, the Japanese consultants must, from the stage of designing, cooperate with the Ministry of Labor, the Municipality of Shah Alam and other Malaysian government agencies concerned.

At the stage of supervision, the resident architect will be despatched to arrange and coordinate schedules and procedures with the Ministry of Labour and the Municipality of Shah Alam. Further, he will supervise quality control and the progress schedule for the construction. He will be sufficiently assisted by other professionals hired locally and despatched from Japan.

5-4 Procurement

Construction materials are mostly produced in Malaysia, but such items as steel frames and finishing materials which are not locally procured, will be imported from Japan or from other countries.

Equipment, instruments, and training apparatus, will be imported mainly from Japan, because they are rarely produced in Malaysia.

As for labor, there are many big projects undergoing in Kuala Lumpur now. When these projects are at their peak, there may be some shortage of labor; however, this is unlikely to affect CIAST project seriously.

5-5 Maintenance and Management

5-5-1 Maintenance and Repair of Facilities

In workshops for machine operation, die making, automotive, heavyshop, and heat treatment, where floors, walls and ceilings tends to get soiled for dust and oil. These buildings require regular cleaning at least twice a year in addition to routine cleaning of dust and oil. This cleaning not only keeps the buildings clean, but also prevents them from rusting and corrosion. It also prevents the deterioration of paints on walls and eventually prolongs the durability of the buildings. Further, training equipment includes heavy, long, and large items, which are frequently moved about and in doing so may damage the buildings too. These damage may occur frequently, and for this purpose, a group of workers has to be assigned regularly.

The buildings of CIAST may be affected by soil setting because they will stand on filled earth of about two and a half metre. The buildings themselves will be directly supported by piles on the hard ground that is twenty metres below from the surface but its outer structures, such as roads, training yards, and storm drains, will suffer from subsidence or damage due to ground settlement. But in four

or five years, ground settlement will stop therefore, the ground will stabilize and there will hardly be any consequences.

Under these circumstances, the facility must be constantly manned by such maintenance crew as carpenters, plumbers, and electricians, as well as guardmen and workers in order to maintain it.

5-5-2 Maintenance Staff

The maintenance staff at ITI Kuala Lumpur is composed of twenty-nine persons: six guardmen (three shifts, 24 hour basis), 13 maintenance men, and 10 workers. CIAST is on the same scale as this ITI and its maintenance staff must be similarly composed.

• Guardmen (3 shifts, 24-hour basis):	6
• Maintenance men (carpenters, plumbers and electricians)	: 9 ~ 12
• Workers	: 10
Total	: 25 ~ 28

5-5-3 Operation Cost

A building require little repair while it is new, but when it gets old, it require more. The durability of a building varies by the quality of its materials and it is not necessary to repair all buildings at the same time, yet a sizable sum must be invested once in several years.

Generally, durability expressed in terms of life, from both physical and economic considerations, is sixty years for reinforced concrete office buildings and fifteen years for their interior equipment. In recent examples from surveys, repair cost increases at about tenth year after completion. Then, a sizable repair cost is necessary in the fifteenth, twentieth, to the twenty-third year. Cost necessary for the maintenance and repair of office buildings in general is about 0.12% of the construction cost annually and about 0.41% for equipment until about the fifteenth year.

The following set of values are necessary from this fact and from the characteristics of this facility:

Example of maintenance and repair cost against construction cost.

Year	Until 5th year after completion	Until 10th year	Until 14th year	15th year
Building	0.36 %	0.48 %	0.48 %	0.95 %
Equipment	0.62 %	0.82 %	1.26 %	2.85 %

The cost for CIAST may be calculated, based on the construction cost, as follows:

Year	Until 5th year	Until 10th year	Until 14th year	15th year
Cost	87.500 M\$	116.200 M\$	149.400 M\$	318.900 M\$

In comparison with the budget of the building maintenance and control of ITI Kuala Lumpur for 1981 and 1982 which were M\$115,200 and M\$80,000 respectively, the estimation of the maintenance cost for CIAST seems to be reasonable.

5-5-4 Utilities Cost

The annual cost for electricity, water, and gas (LPG), necessary to operate this facility are as follows:

(1) Electricity

Basic cost: $1,000\text{kw} \times \text{M}\$12.00 \times 12 \text{ months} = \text{M}\$144,000$

High voltage cost*: $500\text{kw} \times \text{M}\$2.00 \times 12 \text{ months} = \text{M}\$12,000$

Use cost: $800,000\text{kw} \times \text{M}\$0.19 = \text{M}\$152,000$
(up to 800,000kw)

$562,000\text{kw} \times \text{M}\$0.21 = \text{M}\$118,020$
(more than 800,000kw)

Total M\$426,020

* High voltage is for welding power.

(2) Water

$$38,700 \text{ m}^3 \times \text{M}\$0.27 = \text{M}\$10,449$$

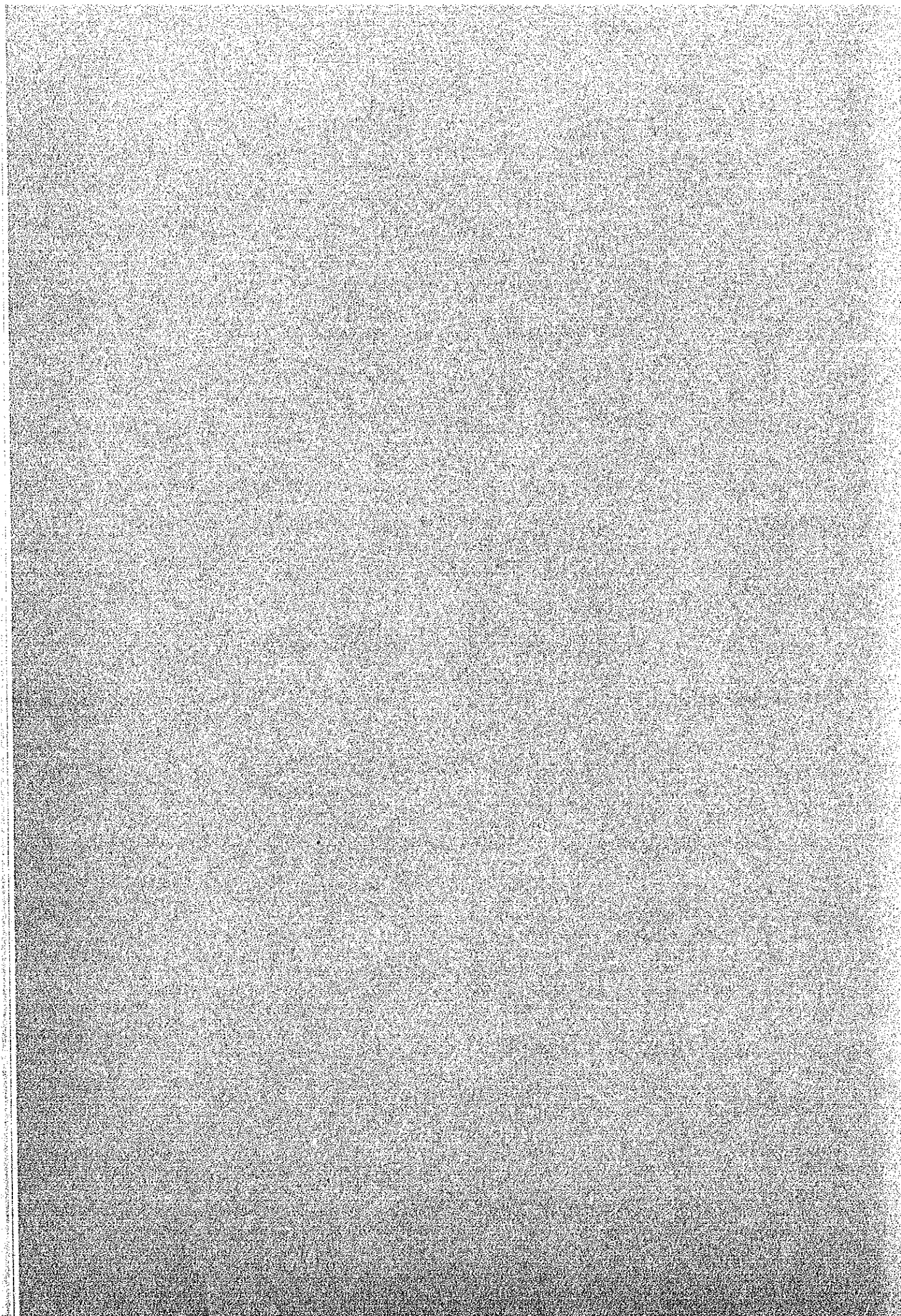
(3) Gas (LPG) gas used for kitchen.

$$7,200 \text{ kg} \times \text{M}\$1.16 = \text{M}\$8,352$$

From the above, (1) + (2) + (3) = M\$444,821. These cost based on the rate of the time of basic design survey and should be more when the facility is in full operation. The average rate of price increase from 1977 to 1981 was 5.9% which amounts to about M\$538,000 including an increase of

$$\text{M}\$444,821 \times (5.9\% \times 43 \text{ months}/12) = \text{M}\$93,412.$$

6. Evaluation of the Project



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As stated in 2. Background of the Project, needs for the labor market have greatly changed, both qualitatively and quantitatively, in the Malaysian industry which has begun to outgrow monocultural dependence on primary industries. First, the numerical increase of demand for technical workers may be mentioned as a change of the quantitative needs.

According to FMP, the Malaysian employment will increase by 860,000 people to 5,950,000 in five years. Of the 860,000 increase, about a half (420,000 -- after subtracting clerical, service and agricultural workers) are workers engaged in productive activities. This means that, by the simple annual average, there will be an increase of about 84,000 workers every year.

In the proposal requesting aid from the World Bank, 25,000 of these are technical workers who must be trained at training facilities every year. In 1981 the number trained in public training institutions was around 15,000. During the FMP it is expected to increase the annual output steadily to around 25,000 in 1985.

Accordingly, the Ministry of Labour, specifically the Manpower Department, is now requesting World Bank loans concerning the establishment of five new training institutes (ITIs). These five institutes will yearly train about 2,300 apprentices, about 28,000 trainees from PTC and about 3,000 other advanced technical trainees. For this purpose, fresh supply of more than 360 instructors is necessary.

With this demand, CIIAST is intended primarily to function as the center of vocational training rendering such services as the training or re-training of instructors and the development of teaching materials for training facilities under the control of all agencies -- the Ministry of Labour, the Ministry of Culture, Youth and Sports, MARA, the Ministry of Agriculture, etc. -- other than the Ministry of education.

As the change of qualitative needs, one may mention the necessity of improving technical levels and developing control techniques for such purposes as production control and quality control.

With these needs, the proposed secondary function of CIAST is to serve as a training agency designed to re-train -- and improve the level of -- technical workers already in the employ of public agencies and private firms.

By these two functions, CIAST can be expected to variously contribute toward the solution of many problems in the Malaysian industry of today including the qualitative improvement of labor, the increase of productivity of manufacturing industry and the dissemination of the techniques of quality control.