2-3 High-class Decorativeware Manufacturers.

Two high-class decorativeware manufacturers presently operating in Malaysia are both wholly-owned subsidiaries of U.S. firm and Japanese firm, respectively. All of their products are exported.

2-3-1 Production process and specifications:

Their major products are statuettes or animal figurines which are finely designed. Formings are all made by the slip casting method. After forming, biscuit firing, decoration and glaze firing follow. Superior design is the key area which decides the value of this high-class decorativeware. In both firms, the designs of the products and the specifications for production are both decided in the headquarters of their parent companies overseas.

2-3-2 Technical level:

In order to maintain their products, high brand image in the world market, quality controls are conducted based on the very strict standards designated by their parent companies. Based on the designs and specifications instructed from their parent companies, Malaysian factories are presently producing very high quality products fully competitive in the overseas markets. Both of them are making best use of skillful handworks of Malaysian workers.

2-3-3 Product development:

Most of the R & D activities especially in the field of new product development, are conducted in their headquarters overseas. Accordingly, the efforts of Malaysian firms are confined to areas as productivity increase on of quality control. Some efforts are also directed for the higher percentage use of local clay materials.

2-3-4 Business administration and sales strategies:

In each of these two firms, the Malaysian firm is operated as one of the production centers of their parent company, and has no particular administrative problem. All of their sales activities are also conducted by their parent companies.

2-3-5 Relationship with periphery industries:

In order to achieve a strict quality standard, almost all of their raw materials including clay minerals are imported. One of the firms presently uses a limited volume of domestic kaoline clay in combination with imported clay materials. However, the volume is still limited because of the lack of domestic sources which could supply a sufficient quality of clay material fit for porcelain production.

2-4 General Decorativeware Manufacturers in W. Malaysia

There is a relatively large number of ceramic decorativeware manufacturers in W. Malaysia. They are mostly very small in scale, but produce a wide range of products. Their products include not only decorativeware but also tableware of earthenware or clay pipes. Many of them sell their products also to the export market. The average number of employees of firms interviewed was about 60. One of them was a joint venture with a Japanese firm.

2-4-1 Production process and specifications:

The major method of forming is slip casting, but jigger forming is also used. Most of the products are fired only one time, but some are finish fired after biscuit firing. The usual temperature for finish firing is around 1,200°C. Most of the firms use 100% local ball clay, but some firms combine some 10% of feldspar into local ball clay. Most of the factories have a long history of over 50-60 years. And due to the repeated expansion of factory buildings and equipment, the lay-out of factories is not well-organized, and many facilities are already obsolete.

2-4-2 Technical level:

The technical level of decorativeware manufacturers in W. Malaysia is judged to be still inferior compared to those of major competing countries such as China, Taiwan or Thailand. The products made in Malaysia are still at the level of earthenware, while those of major competing countries are of porcelain. The major cause of this inferior product quality is the unavailability of high-quality clay materials. Therefore, technical improvement in the areas of kiln temperature control, of raw material combination or of design development would have to be achieved. In the field of design development, particularly, most of the firms have no capability to develop their own design, and could not go beyond the stage of imitation.

2-4-3 Product development:

Except for one firm which has an established sales route to the export market, all other companies interviewed have very weak sales capability. As such, their first concern is to concentrate on sales at the expense of product development, although they understand the necessity to make further improvement in their production technology and to modernize their production facilities.

2-4-4 Business administration:

Almost all of the firms are managed as family businesses. Together with their weak and unstable sales achievement, the recruitment of funds for facility up-grading from commercial banks seems to be rather difficult.

2-4-5 Sales strategies:

One company has a high export ratio. This company sells 60% of their products overseas. They have a sales subsidiary in the U.S., and actively participate in the various trade shows overseas. For domestic sales, this firm has a large retail shop beside the factory, which is also used as a show-room for the foreign buyers or sightseers. Other companies sell most of their products at their own retail shops operated beside their factories, and have no other established sales network. Although they export some portion of their products, these transactions are infrequent. They export their products based on ad-hoc inquiries from overseas buyers which are received through MEXPO or other sources.

2-4-6 Relationship with peripheral industries:

Because all firms are small in scale, it seems to be very difficult for them to up-grade their product quality to an exportable level without support from outside supporting industries or organizations. For one, they need ball clay and other mineral material suppliers who could supply higher and more consistent quality of materials. Two, they need a technical institution to test and analyze the material and product quality. Three, they need a financial institution which can supply funds to up-grade their production facilities with short term loans. Finally, but most importantly, they need support for increasing their marketing capability both for the domestic and export markets.

2-5 Decorativeware Manufacturers in Sabah and Sarawak

The decorativeware manufacturers in Sabah and Sarawak mainly produce a traditional type of pottery called "Sarawak pottery". Most of them produce not only pottery but also various kinds of artware such as light fittings, ashtrays or figurines. Some also produce such clay products as clay pipes, flowerpots or sanitaryware.

2-5-1 Production process and specifications:

Most of the factories follow the same traditional production process. After forming by slip casting, products are dried naturally. At the stage that the water content ratio has dropped to around 6-7%, they are glazed and decorated by knife carving. After being naturally dried, they are fired either in traditional kilns making use of fire wood or in shuttle kilns making use of oil or LPG.

2-5-2 Technical level:

The production technology of these firms is wholly dependent on the personal skill of each factory manager based on his experience. There are no systematic production control or quality control measures taken.

2-5-3 Product development:

For the production of traditional Sarawak pottery, no product development efforts would be required. For the production of other artware some modernization efforts are observed, but these efforts are mainly directed into the direct import of foreign technology. Some firms make use of pre-combined clay materials imported mainly from Taiwan, in spite of the availability of domestic clay resources.

2-5-4 Business administration and sales strategies:

Almost all decorativeware manufacturers in Sabah and Sarawak are family firms. Their factories are usually built alongside the main roads, and products are all sold as souvenirs at the shops beside the factories. Most of them have no other sales network nor any experience in exports.

2-5-5 Relationship with periphery industries:

Except for some firms using mostly imported clay materials, most of the firms are independent from other industries. They use such easily available raw materials as ball clay or rice husks effectively. Their sales are, however, heavily dependent on the development of the tourist industry.

2-6 Raw Material

2-6-1 General

The basic raw materials used in the chinaware production are kaolin, clay, feldspar, limestone and silica sand. Malaysia is rich in most of these raw materials except for feldspar. At present, feldspar is fully imported, as well as a small amount of chemicals used as glazes and decoration pigments.

2-6-2 Kaolin

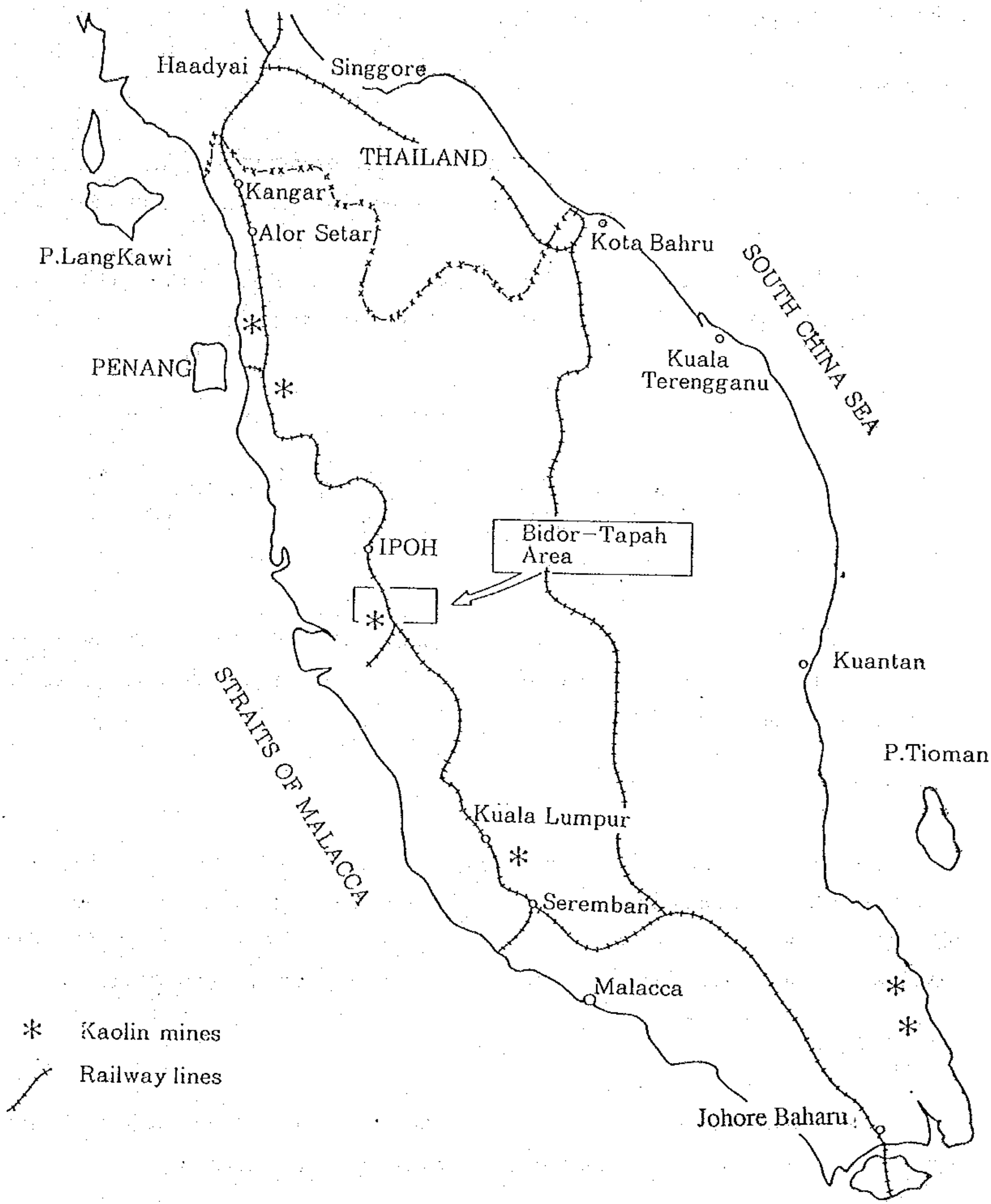
The present major production areas of kaolin in Malaysia are the Bidor-Tapah area in Perak State and the Jemaluang area in Johore state. A relatively large volume of kaolinite clay suitable for ceramic products is reported to be found in Sarawak. (Refer to Fig. VI. 2-1)

Kaolin in Bidor-Tapah: There are two sedimentation refining plants of kaolin in Bidor-Tapah. The products of these two plants are mainly used in such industries as paper-manufacturing, emulsion paints, pesticides or rubber products. Only about 10% of the products are directed to ceramic manufacturers. According to a manufacturer using the material, the product quality of kaolin presently produced is not satisfactory for the production of high-class decorativeware of porcelain. According to the chemical analysis results of kaolin from Bidor reported in "Investment Opportunities in the Claybased Industry" published by MIDA, the contents of major items are; Al_2O_3 29.06%, Fe_2O_3 3.74% and TiO_2 0.78%. With this quality level, the kaolin from Bidor would not be appropriate for the production of high-grade tableware or decorativeware of porcelain. Further investigation would be needed for the possibility of producing a higher grade of kaolin from the area.

Kaolin in Johore: According to the same MIDA report described above, the major chemical contents of kaolin from Johore are as follows: Al_2O_3 36.10%, Fe_2O_3 0.70% and TiO_2 0.24%. The kaolin of this level of quality is judged to be useful for the production of high-grade tableware.

Kaolin in Sarawak: According to the data presented from the Geological Survey Department, Kuching, the chemical analysis results of kaolin produced from Sarawak is as follows; Al_2O_3 22-25%, Fe_2O_3 0.6-0.7% and TiO_2 0.6-0.8%.

Fig. VI.2-1 Kaolin Reserves in Peninsula Region of Malaysia



According to the chemical analysis data mentioned above shown, the kaolin produced from Johore shows the highest quality. In order to evaluate the quality of kaolin, not only chemical analysis but also the tests for plasticity have to be conducted. Further, these various kinds of factors that would become essential for the feasibility of economic production would have to be examined such as reserve volume, transportation condition or exploitation concession terms.

2-6-3 Ball Clay

Malaysia is rich in clay material. Though some firms import ball clay, most of the ceramic manufacturers in Malaysia use clay materials produced in the area near their factories.

According to the data obtained from a ceramic manufacturer, the chemical analysis result of the clay from their presently used clay reservoir is as follows:-

(Unit: %)

	SiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	U_2O	Na_2O	Ig. Loss (850°C)
Upper Layer	63.6	21.8	1.44	0.86	0.06	1.42	0.66	9.37
Lower Layer	70.6	18.1	0.62	0.65	0.05	1.95	0.24	7.11

According to the factory manager of the firm presenting the above data, the quality of clay presently produced is unstable, which is very common to clay materials when they are used in as-mined condition.

2-6-4 Feldspar

At present, feldspar is not produced in Malaysia and has to be imported. According to the Geological Survey Department in Sabah and Sarawak, the existence of oligoclase in Sabah and that of feldspathic clay in Sarawak has been confirmed. The possibility of the economic level of production is, however, estimated to be rather low.

2-6-5 Silica

A massive deposit of silica exists in Malaysia, and there is no problem for the supply of silica to chinaware manufacturers both in volume and in quality.

3. Cost Analysis

3-1 Production Cost Structure and Production Unit Cost in Malaysian Chinaware Manufacturing

3-1-1 Production Cost Structure

The production cost structure of chinaware would vary largely according to such diverse factors as the types of products, product quality, production volume, production facilities or production process. For the purpose of very rough analysis, the production cost structure of some Malaysian chinaware manufacturers was obtained from the field interview survey and compared with that of average Japanese chinaware manufacturers.

Table VI. 4-1: Chinaware Production Cost Structure Comparison

(Unit: %)

	Wholly-owned subsidiary operating in Malaysia		Local decorativeware manufacturer in Malaysia		Average chinaware manufacturer in Japan
	A	B	C	D	E
Raw materials	21.0	20.3	15.0	15.0	35.5
Labour	49.0	19.5	50.0	35.0	33.5
Fuel	8.0	4.2	15.0	10.0	4.8
Depreciation	5.0	22.1			3.3
Sales & general administration	12.0	25.0	20.0	40.0	20.4
Interest	5.0	9.0			2.5
Total	100.0	100.0	100.0	100.0	100.0

Source: Field interviews
"Production Unit Cost Index of Japanese Medium and Small-scale Industries"
Japan Medium and Small-scale Industry Agency

Generally, Malaysian manufacturers enjoy the benefit of cheap raw materials, while they suffer from high interest payments for outside borrowing. In spite of the availability of the cheap labour force, the labour cost ratio is not necessarily high in Malaysian manufacturers compared with the ratio in Japan. This is due to the difference of the product unit sales value and partly due to the difference in production volume.

3-1-2 Unit Production Cost

The unit costs of major items needed for the production of chinaware were investigated through field interviews, the results of which are briefly summarized as follows:

Initial Investments

Factory building construction--M$500-800/$m^2$
(steel-frame structure, slate-roofed)
Kiln construction ---M$1.5 million/unit
(continuous kiln of 90m^2 fully equipped)

Operation costs

Factory worker wage
General worker--- M$10-20/day
Supervisor -- M$30/day
Senior-technician--M$75-150/day
Raw material
Local clay -- M$5-10/ton
Imported ball clay---M$650-900/ton
Feldspar, imported--M$130-150/ton

3-2 Comparison of Net Production Costs of Chinaware in Malaysia and Japan

Comparison of the net costs between the two countries is not easily done for the following reasons.

1. The many varieties of chinaware products and large difference of types of products between the two countries make the comparison difficult.
2. Even the products using the same raw materials and produced in the same production process differ in their quality and prices.
3. Technique and brand image of long years which are difficult to reflect in the production costs result in the large difference in the sales prices in the two countries.

Despite the above difficulty, in order to roughly compare the difference in their production cost levels, a certain specified product with the following premises was assumed.

1. Product: Mugs
2. Type of product: Stoneware
3. Weight: 250g
4. Minimum size of order: 100,000 pcs./order
5. Mixed materials as principal raw materials would be imported from Japan.

The results of the comparison are shown in Table VI. 4-2

Table VI. 4-2 Comparison of Net Production Cost of Mugs

Premises:

Size of Orders: 100,000 pcs/order

Product Item: Stoneware

Raw Materials: Mixed materials imported from Japan

(Unit: J¥/piece, %)

Japan			Malaysia		
Materials	J¥15	(12.5)	Materials	J¥18	(26.9)
Personnel	J¥50	(41.7)	Personnel	J¥15	(22.4)
Utilities	J¥15	(12.5)	Utilities	J¥12	(17.9)
Depreciation	J¥ 5	(4.2)	Depreciation	J¥5	(7.5)
Others	J¥10	(8.3)	Others	J¥5	(7.5)
Production cost	J¥95	(79.2)	Production cost	J¥55	(82.1)
Administration	J¥25	(20.8)	Administration	J¥12	(17.9)
Ex-factory	J¥120	(100.0)	Ex-factory	J¥67	(100.0)

Packages & transportation	J¥8
Ocean freight & Insurance	J¥10
CIF Japan	J¥85

Source: Field Interview

First, the Malaysian level of net production cost is approximately 58% of that in Japanese, (M$ 1.10/ea in Malaysia VS. M$1.90/ea in Japan)

Second, that of ex-factory cost which is net-production cost plus sales & administration cost is approximately 56% of the Japanese level (M$1.34/ea in Malaysia VS. M$2.4/ea in Japan).

Third, the CIF price level of the Malaysia product in case of exporting to Japan would be M$1.70/ea which is about 70% of Japanese production cost. The result of the comparison indicates that Malaysian products could be competitive enough, even utilizing principal materials imported from Japan if technology transfer from Japanese firms to Malaysian manufacturers should be complete.

The foreign exchange ration used in the cost analysis is as follows:

1 M$ = J¥50

1 US$ = J¥130

3-3 Feasibility Study on Construction of High-class Tableware Plant in Malaysia

3-3-1 General View

In order to evaluate the adaptability of Malaysia for an industrial site of the chinaware industry, a quite rough analysis of investment feasibility was conducted: on the assumption that a plant is to be newly constructed in Malaysia.

General outline of the plant
* Products: High class ceramic tableware
* Production volume: 4.25 million pcs./yr (fully capacity -1,200 ton/yr)
*Employees: Approx. 200
*Area of plant: 7,416m^2 (including office building)
*Initial investment: M$23.5 million

Major factors in assumption are as follows:

1. Economic project life: 20 years

2. Prices: Fixed price as of March, 1988

3. Investment incentives: Exemption from import tax for equipment and raw materials. Five (5) year exemption from corporate tax.

As indicated in the detailed analysis shown in the following paragraph, the Financial Internal Rate of Return during this project is about 8.5% which is almost the level of profitability.

At the relatively early stage of two years after the start of operation, ordinary profit would be attained as indicated hereunder.

The five year forecast after the start of operation is summarized in Table VI. 4-3.

Table VI. 4-3 Summarized Flow of Profit and Loss Forecast

(Unit: M$1,000)

	1st yr.	2nd yr.	3rd yr.	4th yr.	5th yr.
Sales Value	8,640	12,960	14,400	14,400	14,400
Production Cost	7,253	9,136	9,764	9,764	9,764
(Materials)	(3,222)	(4,833)	(5,370)	(5,370)	(5,370)
(Labour)	976	(976)	(976)	(976)	(976)
Administration	645	836	899	899	899
Operating Profit	742	2,988	3,737	3,737	3,737
Interest	1,565	1,689	1,492	1,126	939
Ordinary Profit	-823	1,299	2,245	2,611	2,798

Source: Table VI. 4-9

3-3-2 Initial Investment Value

In order to evaluate the funds necessary for initial investment, the following premises were assumed.

1. The plant would be located in the Kampon Acheh Industrial complex in the state of Perak. Though not based on strict survey, the selection of this site was made just for the purpose of the assumption in cost calculation.
2. The factory and the stock house were assumed to be of simplified structure such as slate roofed or open air type, while the office or the laboratory building would be air-conditioned and steel frame blocked type.
3. Most of the major equipment and materials would be imported from Japan. Transportation cost was calculated as ocean freight from Nagoya port in Japan to Port Klang in Malaysia.

The results of the cost estimation related to the investment were shown in Table VI. 4-4, which can be summarized as follows.

1. Land	M$ 444,288
2. Construction	M$ 3,056,800
3. Machinery & equipment	M$ 15,863,320
4. Vehicle, stationery	M$ 220,000
5. Contingency (1+2+3+4) x 20%	M$ 3,916,882
Total	M$ 23,501,290

Meanwhile the annual depreciation cost for the investment is shown as follows:

1. Building	M$ 152,840
2. Machinery & equipment	M$ 1,586,332
3. Vehicle, stationery	M$ 44,000
Annual Costs (first 5 years)	M$ 1,783,172

Table VI. 4-4 Estimate of Initial Investment

(1) Initial Investment

a.	Land 19,200m^2 @ M$23.14/m^2	M$444,288
b.	Factory Construction	M$3,056,800
	Factory Stockhouse (slate roofed, open air type) 6,384m^2 @ M$350/m^2	5,234,400
	Office Building and Laboratory 1,032m^2 @ M$700/m^2	722,400
	Guarantee for Outside and Water Supply etc.	100,000
c.	Machinery and Equipment	M$15,863,320
	Imported Machinery (FOB)	12,474,360
	Transportation (Nagoya-Port Klang)	388,960
	Machinery Locally Procured	3,000,000
d.	Vehicle Stationery	M$220,000
	Two Trucks @ M$100,000/ea	200,000
	Stationery 1 set	20,000
e.	Contingency (a+b+c+d)x20%	M$3,916,882
	Total	M$23,501,290

(2) Depreciation

Building	20 years straightline depreciation	M$152,840
Machinery/equipment	10 years straightline depreciation	M$1,586,332
Vehicles Stationery	5 years straightline depreciation	M$44,000
Annual Depreciation (First 5 years)		M$1,783,172

Source: Study team calculation based on factory design shown in Fig. VI. 4-1 through Fig. VI. 4-3.

Fig. VI.4-1 Architectual Design for Chinaware Factory

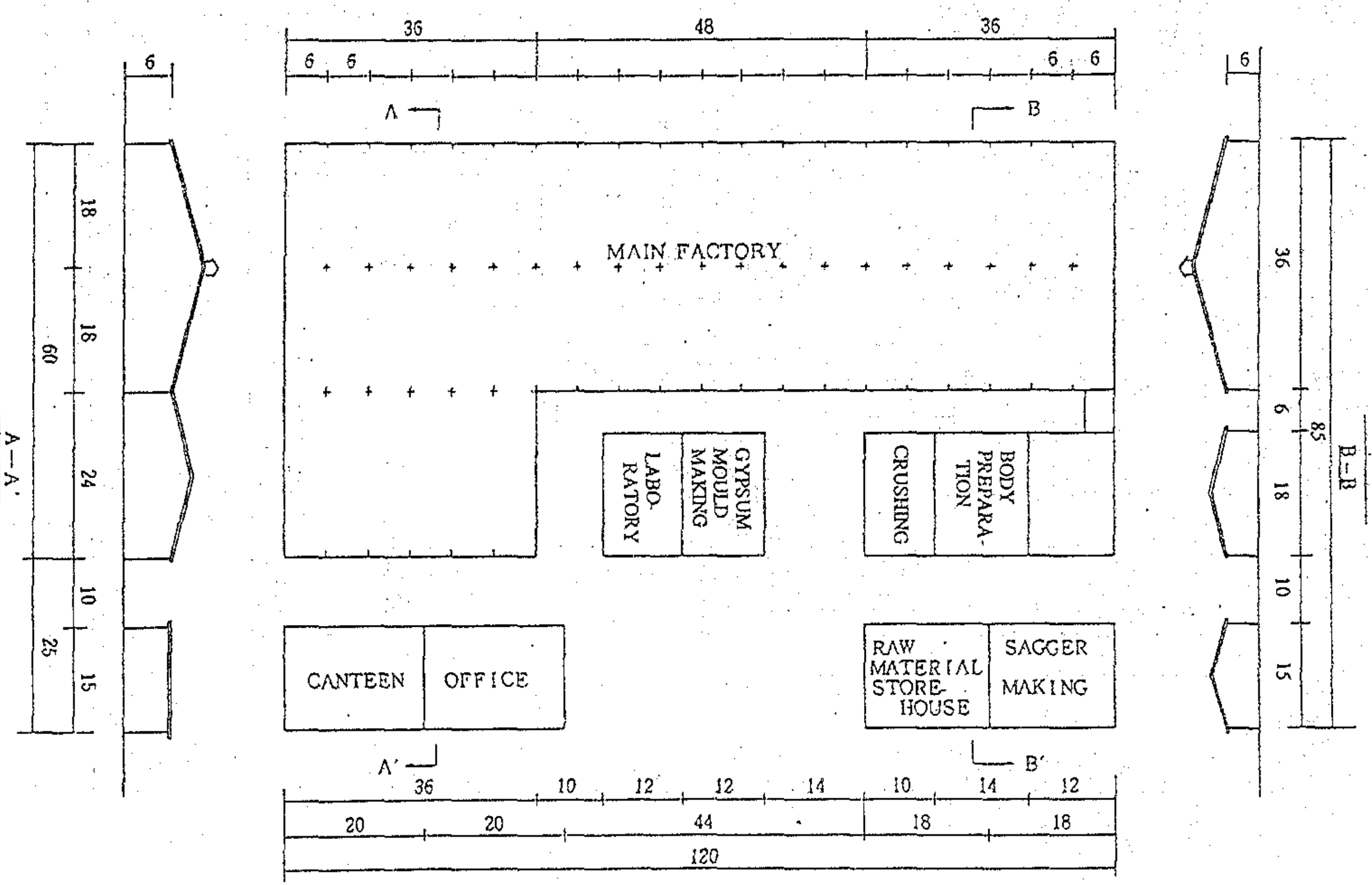


Fig. VI.4-2 Layout for Chinaware Factory (Conception)

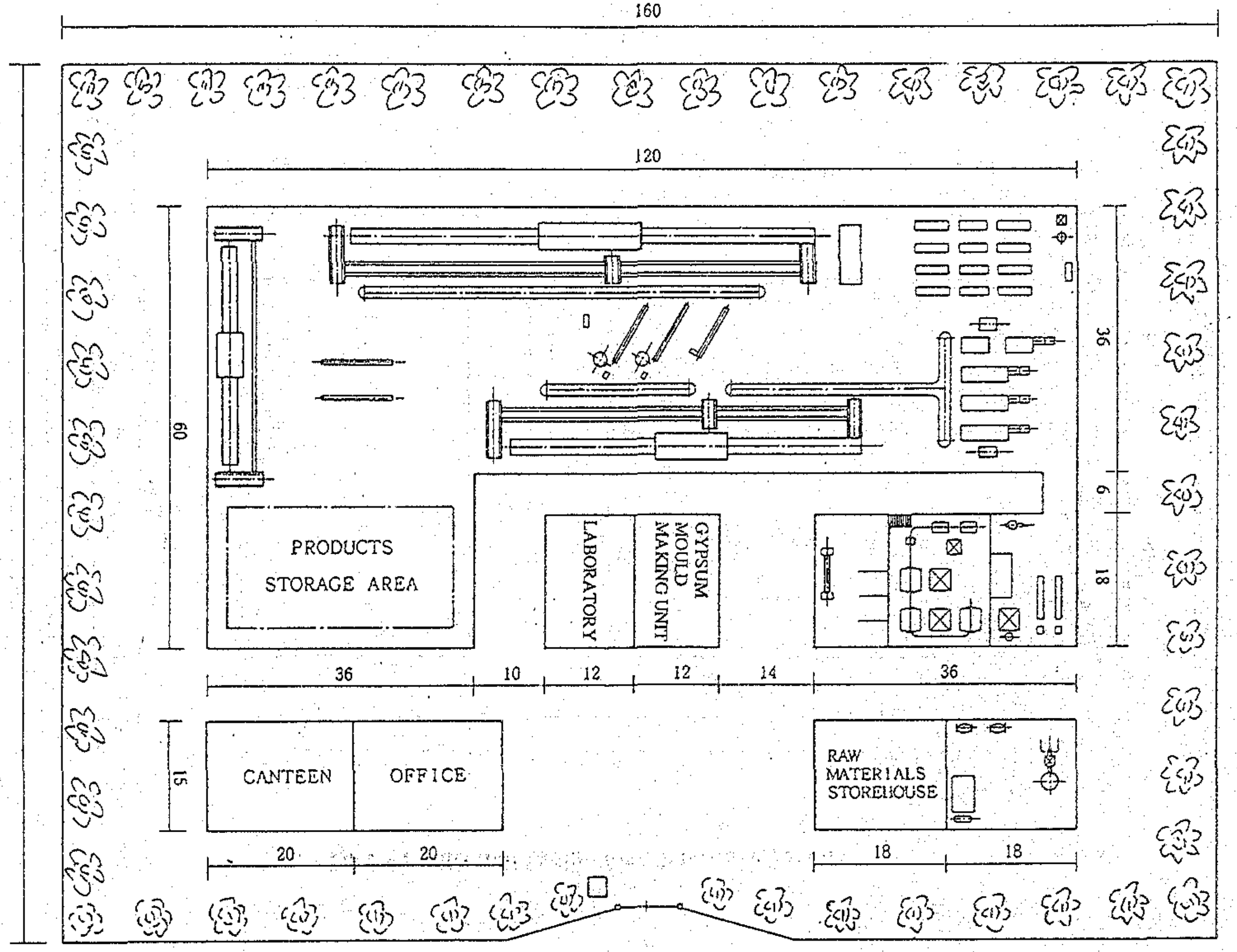
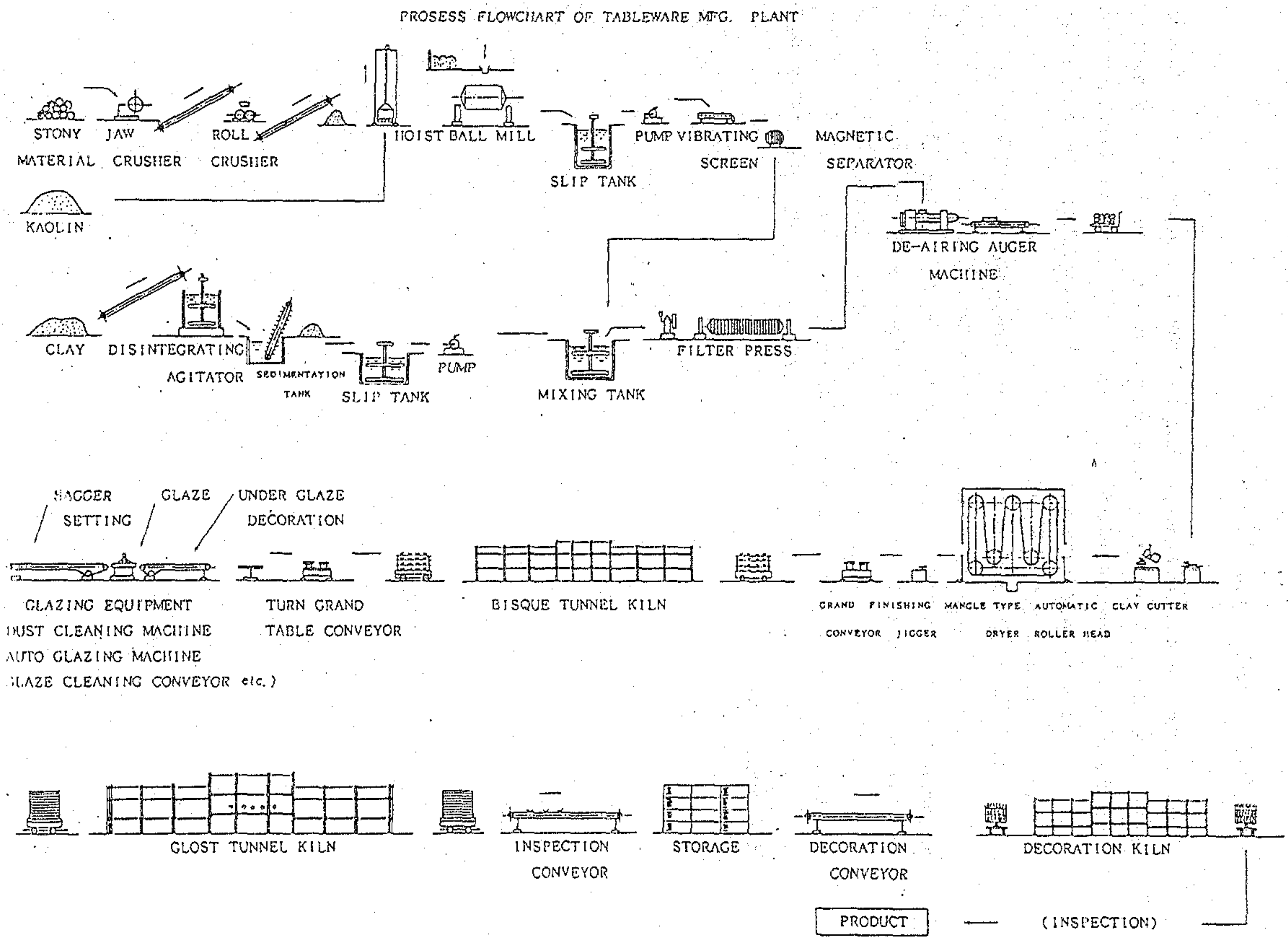


Fig. VI.4-3 Production Process Flowchart for Chinaware Factory



3-3-3 Raw Materials and Utilities

All the raw materials except silica sand would be imported from Japan in consideration of the consistency of grade and quality in the products. Raw materials would be pre-mixed materials which are packed in bags would be pre-mixed materials which are packed in bags in the compressed and dehydrated state to be shipped from Nagoya port in Japan to Port Klang in Malaysia.

The result of cost estimation of raw materials is shown in Table VI. 4-5.

The total estimated cost of M$5,369,949 is composed of domestic cost of raw materials, M$11,830 and that of imported raw materials, M$5,358,119. The total cost is calculated as such to meet the full production capacity of 1,200 tons per annum.

In relation to utilities, heavy oil as fuel is assumed to be used for kilns, while electric power is assumed for other power requirements and lighting.

As shown in detail in Table VI. 4-5, an estimated annual cost of M$728,400 is calculated for utilities.

Table VI. 4-5 Estimated Annual Cost of Raw Materials and Utilities

(1) Raw Materials (Full operation)

	Annual Consumption Volume	Annual Raw Materials Cost
Imported Raw Materials		
Feldspar	775 tons	M$ 320,850
Plastic clay	500 tons	527,000
Talc	15 tons	39,390
Kaolin	523 tons	676,762
Saggar material	130 tons	249,600
Sodium silicate	35 tons	73,290
Plaster of paris	60 tons	240,840
Alumina	68 tons	156,808
Liquid gold	100 tons	1,068,000
Transfer paper	200 thousand	1,600,000
	Sub total	4,952,540
Transportation (Nagoya-Port Klang)		405,579
Total of Annual Imported Raw Materials		M$5,358,119

(2) Utility Costs

a. Fuel (heavy oil)	1,280	kl	@300/kl	384,000
b. Machine oil	2000	l	@ 3/1	6,000
c. Lubricating oil	150	kg	@16/kg	2,400
d. Electricity	1,600,000	kwh	@0.21/kwh	336,000
Annual Utility Costs				M$ 728,400

Source: Study team calculation

3-3-4 Programmes of Production and Sales

(1) Production Capacity

The kiln capacity would be a decisive factor in the production capacity of the chinaware factory. In this project, utilization of high quality continuous kilns which are in ordinary use in Japan is assumed because of the good performance in energy saving effect and consistent results of burning. The economical minimum volume of production for this type of kiln is about 1,200 tons per annum.

(2) Kinds of Products

In this project, production of high class ceramic products mainly consisting of dinner sets (81 pcs./set) and tea sets (21 pcs./set) is assumed. Annual production at full operation for each of the items is assumed as follows.

Plates	2,250 thousand pcs.	800 tons/yr
Large plates	(9-10")	
Medium plates	(7-8")	
Small plates	(4-8")	
Cups/Bowls	1,590 thousand pcs.	300 tons/yr
Coffee cups		
Tea cups		
Bowls		
Pots/Platters	144 thousand pcs.	100 tons/yr
Platters		
Coffee pots		
Tea pots		

(3) Unit Sales Prices

Unit sales price of the product is a very influential factor in judging the feasibility of a project. For reference in assuming the unit sales price, Japanese export unit sales prices were investigated, the result of which is shown in Table VI. 4-6.

Table VI. 4-6 Unit Export Sales Prices of Japanese Ceramic Tableware

	Export Volume	Export Value	Unit Sales Price
	(tons)	(FOB J¥1,000)	(J¥1,000/ton)
1985			
Tea sets, coffee sets	10,980	8,796,472	808
Other tableware over 32 sets	5,270	4,128,420	783
Other tableware under 32 sets	34,070	27,838,040	817
Total	50,230	40,762,932	812
1986			
Tea sets, coffee sets	8,993	6,562,069	730
Other tableware over 32 sets	4,358	2,760,445	633
Other tableware under 32 sets	28,159	21,364,047	759
Total	41,510	30,688,561	739
1987			
Tea sets, coffee sets	7,373	5,699,917	773
Other tableware over 32 sets	4,828	2,892,810	599
Other tableware under 32 sets	26,650	19,509,815	732
Total	38,351	28,102,542	723

Source: Japan Exports and Imports, Dec. 1985, 1986, 1987 MOF

The result of the investigation shows that the FOB unit export price for Japanese ceramic tableware is J¥758,000/ton (about M$15,000/ton). Based on the result, unit sales price in this project was assumed as M$12,000/ton, that is, 20 percent lower than the Japanese unit export price.

(4) Sales Forecast

Sales forecast was made taking into consideration the production capacity, the unit sales price and the operation rate at the start. The flow forecast of sales is shown in Table VI. 4-7.

Table VI. 4-7 Forecast of Sales Value

	1st yr.	2nd yr.	3rd yr. and after
Production capacity (tons/yr)	1,200	1,200	1,200
Operation rate (%)	60	90	100
Production volume (tons/yr.)	720	1,080	1,200
Sales value (thousand M$)	8,640	12,960	14,400

3-3-5 Personnel Costs

According to each job category, the number of personnel necessary for the operation of this project was investigated. The result indicates the necessity of a total of 200 persons, composed of 20 persons for administration and 180 persons for manufacturing. Average personnel costs in each job category are assumed based on the result of field interviews or various statistics materials available in Malaysia. In this calculation of personnel cost, not only the basic salary but also various fringe benefits and bonuses were included to assume an aggregate unit cost of personnel. Thus, as shown in Table VI. 4-8, annual cost of personnel in this project was assumed as M$1,241,400.

Table VI. 4-8 Annual Personnel Costs

	Number	Unit monthly cost (M$)	Monthly cost (M$)	Annual cost (M$)
Manufacturing				
Factory manager	1	2,800	M$2,800	M$33,600
Engineers	2	1,500	M$3,000	M$36,000
Assistant Engineers	2	1,000	M$2,000	M$24,000
Foremen	12	650	M$7,800	M$93,600
Skilled workers	100	500	M$50,000	M$600,000
Unskilled workers	63	250	M$15,750	M$189,000
Sub total	180	--	M$81,350	M$976,200
Administration				
President	1	3,500	M$3,500	M$42,000
Administration manager	1	2,000	M$2,000	M$24,000
Accounting manager	1	2,000	M$2,000	M$24,000
Sales manager	1	2,000	M$2,000	M$24,000
Clerical workers	4	1,500	M$6,000	M$72,000
Businessmen	2	1,500	M$3,000	M$36,000
Typists	1	500	M$500	M$6,000
General servants	2	250	M$500	M$6,000
Drivers	2	550	M$1,100	M$13,200
Others	5	300	M$1,500	M$18,000
Sub total	20	-	M$22,100	M$265,200
Grand Total			M$103,450	M$1,241,400
				(J¥621 million)

3-3-6 Fund Recruitment Programme

The initial investment value necessary in this project was assumed to be procured from paid-up capital (1/3), long-term borrowing (2/3) and short-term borrowing which would cover other working costs.

Fund Recruitment Programme

Paid-up capital	-	M$ 7,850,000
Long-term borrowing	-	M$ 15,650,000
Short-term borrowing	-	working costs

Procurement conditions for borrowing were assumed as follows:

Long-term borrowing -
10 years average reimbursement interest 10.0%
Short-term borrowing -
within one year reimbursement interest 10.0%

3-3-7 Projection of Long Term Profit and Loss

Projection of long term profit and loss in this project based on the estimated sales volume and other various costs was assumed as shown in Table VI. 4-9. The various costs not specified in the production cost were assumed to be 6.3% of the production unit cost index of Japanese industries. The other costs in the sales administration cost were assumed to be 3.6% of the production unit cost index of Japanese industries.

The structure of production cost of Japanese chinaware (tableware) manufacturers is shown in Table VI. 4-10 which was used as the basis of the calculation of other miscellaneous costs.

Long term fund recruitment flow is projected as shown in Table VI. 4-11 which is based on the assumed conditions of fund procurement and borrowing in the Funds Recruitment Programme. The value of payment of interest based on the long term fund recruitment flow (Table VI. 4-11) is fed back as the value of non-business expenses in the long-term profit and loss projection (Table VI. 4-9).

Table VI. 4-9 Long Term Flow of Profit and Loss Projection

	1st yr.	%	2nd yr.	%	3rd yr	%	4th yr.	%	5th yr.	%
Sales Value	8,640	100.0	12,960	100.0	14,400	100.0	14,400	100.0	14,400	100.0
PRODUCTION COST										
Materials	3,222	37.3	4,833	37.3	5,370	37.3	5,370	37.3	5,370	37.3
Labours	976	11.3	976	7.5	976	6.8	976	6.8	976	6.8
Utilities	728	8.4	728	5.6	728	5.1	728	5.1	728	5.1
Depreciation	1,783	20.6	1,783	13.8	1,783	12.4	1,783	12.4	1,783	12.4
Other expenses (1)	544	6.3	816	6.3	907	6.3	907	6.3	907	6.3
Sub-total	7,253	83.9	9,136	70.5	9,764	67.8	9,764	67.8	9,764	67.8
SALES & GENERAL ADMINISTRATION										
Personnel	265	3.1	265	2.0	265	1.8	265	1.8	265	1.8
Packages & Transportation	78	0.9	117	0.9	130	0.9	130	0.9	130	0.9
Other expenses (3)	302	3.6	454	3.5	504	3.5	504	3.5	504	3.5
Sub-total	645	7.5	836	6.4	899	6.2	899	6.2	899	6.2
Operational Profits	745	8.6	2,988	23.1	3,737	26.0	3,737	2.6	3,737	2.6
Non-business expenses (4)	1,565	18.1	1,689	13.0	1,492	10.4	1,126	7.8	939	6.5
Ordinary Profit	-823	-9.5	1,299	10.0	2,245	15.4	2,611	18.1	2,798	19.4

(1) 6.3 % of average sales cost in Japanese chinaware industry.
(2) 0.9 % of average sales cost in Japanese chinaware industry.
(3) 3.5 % of average sales cost in Japanese chinaware industry.
(4) Total of interest shown in Table VI 4-11 (Cash Flow Estimate).

Table VI. 4-10 Production Cost Structure of Japanese Chinaware Industry

	Average Production Cost [1]	
	(J¥1,000)	Composition (%)
Average Product Sales [2]	756,809	100.0
Production Costs		
Materials	251,169	33.2
Labour-outside	237,444	31.4
Depreciation	19,658	2.6
Utilities	33,821	4.5
Rents	4,579	0.6
Others	47,872	6.3
Sub total	594,543	78.6
Sales-General Administration		
Personnel	52,242	6.9
Packaging-transportation	7,156	0.9
Interest payable	18,056	2.4
Depreciation	3,377	0.4
Taxes	5,834	0.8
Others	26,718	3.5
Sub total	113,383	14.9
Sales Profit	48,883	6.5

[1] Average of 12 good Companies

[2] Average sales value - buying Cost (J¥783,017 thousand) - (J¥26,208 thousand)

Source: "Production Unit Cost Index of Japanese Medium and Small-scale Industries", Japan Medium and Small-scale Industry Agency

Table VI. 4-11 Cash Flow Estimates

(Unit: M$1,000)

	Before operation	1st yr.	2nd yr.	3rd yr	4th yr.	5th yr.
Carry-over from Previous Year	0	0	35	72	75	2,604
Capital Payment	7,850	0	0	0	0	0
Sales Revenue	0	8,640	12,960	14,400	14,400	14,400
Cost of Products	0	7,253	9,136	9,764	9,764	9,764
Administration	0	645	836	899	899	899
Total Costs	0	7,898	9,972	10,663	10,663	10,663
Operating Balance	0	742	2,988	3,737	3,737	3,737
Working Capital	0	0	2,160	3,240	3,600	3,600
Working Capital for this yr.	0	2,160	3,240	3,600	3,600	3,600
Working Capital Balance	0	-2,160	-1,080	-360	0	0
Investment	0	1,783	1,783	1,783	1,783	1,783
Machinery and Equipment	23,500	0	0	0	0	0
Investment Balance	-23,500	1,783	1,783	1,783	1,783	1,783
Long-term Borrowing	15,650	0	0	0	0	0
Principal	0	1,565	1,565	1,565	1,565	1,565
Interest	0	1,565	1,409	1,252	1,096	939
(Amount Borrowed)	(15,650)	(14,085)	(12,520)	(10,955)	(9,390)	(7,825)
Balance	15,650	-3,130	-2,974	-2,817	2,661	-2,504
Short-term Borrowing	0	2,800	2,400	300	0	0
Principal	0	0	2,800	2,400	300	0
Interest	0	0	280	240	30	0
(Amount Borrowed)	0	(2,800)	(2,400)	(300)	(0)	(0)
Balance	0	2,800	-680	-2,340	-330	0
Financing Balance	15,650	-330	-3,654	-5,157	-2,991	-2,504
Total Balance	0	35	37	3	2,529	3,016
Carry-over for Next Year	0	35	72	75	2,604	5,620

3-3-8 Evaluation of the Results of the Feasibility Study

Financial Internal Rate of Return (FIRR) is calculated based on the long-term profit and loss projection through the period of this project. FIRR is the discount rate at which the net present value of the investment and the net present value of the return would balance. The result in detail of FIRR calculation is shown in Table VI. 4-12 in which FIRR is calculated as 8.49%, not such a high rate but a rate which makes this project tolerably viable.

In order to increase the rate, the first measure to be taken is to raise the unit sales price by improvement of the product quality. On assumption that the unit sales price could be raised 10% more the FIRR of this project would be about 12%.

As the second measure to raise the FIRR, the change of the raw materials from domestic to imported ones would be recommended. If clay and kalion, for example, were replaced from imported to domestic, cost savings of approximately M$1,000,00 per annum could be achieved.

This cost saving would have nearly the same effect as the 10% raise of the unit sales price resulting in a rate of 12% in FIRR.

Table VI. 4-12 Projection of Cash Flow and FIRR

(Unit: M$1,000)

Year	Ordinary profit	Depreciation	Corporate Tax	Profit after tax, before depreciation	Investment	Cash flow
0	-	-	-	-	23,501	-23,501
1	742	724	-	1,470	-	1,470
2	2,988	728	-	3,716	-	3,716
3	3,737	728	-	4,465	-	4,465
4	3,737	728	-	4,465	-	4,465
6	3,737	728	1,329	3,316	220	2,916
7	3,737	728	1,400	3,065	-	3,065
8	3,737	728	1,470	2,995	-	2,995
9	3,737	728	1,541	2,924	-	2,924
10	3,737	728	1,611	2,854	-	2,854
11	3,737	728	1,682	2,783	16,083	-13,300
12	3,737	728	1,682	2,783	-	2,783
13	3,737	728	1,682	2,783	-	2,783
14	3,737	728	1,682	2,783	-	2,783
15	3,737	728	1,682	2,783	-	2,783
16	3,737	728	1,682	2,783	220	2,563
17	3,737	728	1,682	2,783	-	2,783
18	3,737	728	1,682	2,783	-	2,783
19	3,737	728	1,682	2,783	-	2,783
20	3,737	728	1,682	2,783	-	2,783

FIRR = 8.49%

V. GLASSWARE

V. GLASSWARE

1. Overview of the Industry

1-1 Glassware Production in Malaysia

There are only four manufacturers in Malaysia which are presently producing glass products from mineral raw materials. Among them, one is a sheet glass manufacturer and the other three are glass container manufacturers. A small volume of glass tableware is also produced by the glass container manufacturers.

From the results of the field interview survey, the total annual production volume of glassware (excluding sheet glass) is estimated at around 112.8 thousand tons (metric tons) in 1987, of which about 33.0 thousand tons are exported.

Glass Containers

At present there are the following three local manufacturers which are producing glass bottles of various sizes:

- Malaya Glass Bhd.
- Kuala Lumpur Glass Manufactures Co. Sdn. Bhd.
- Jg Containers Sdn. Bhd.

With total production capacity of 415 tons per day, they produce glass bottles used for soft drinks, breweries or processed foods. Bottles are supplied on a contractual basis in flint (colorless), amber (dark brown) or green color. All the domestic requirements of these glass bottles are presently met by the above three local manufacturers with imports supplementing a small volume of the requirement for sizes not produced locally.

Glass tableware

Their are no manufacturers exclusively producing glass tableware in Malaysia. The three local manufacturers of glass containers are, however,producing a small volume of glass tableware. The production volume of their glass tableware production in 1987 is estimated at around 2,750 tons.

Other glass products

Other glass products except for containers and tableware in Malaysia are not produced from raw mineral resources but are processed from semi-finished glass products. They are:

Optical glass: A joint venture between Malaysia and a German firm is producing optical glass in Malaysia and exporting 100% of their products abroad. Presently, their activity is confined to grinding and polishing imported blanks.
Pharmaceutical glass: The same firm above mentioned produces small sizes of glass containers for pharmaceutical use making use of imported glass tubes.
Chemistry, general laboratory glassware: Such glassware as flasks or measurement cylinders is produced by the same firm mentioned above. The work in Malaysia is confined only to such finishing work as scale-making on imported semi-finished products.
Electrical glassware: There are three firms currently producing incandescent and fluorescent lamps in Malaysia, but most of the raw materials including the glass tubes and bulbs are imported.
Mirrors: A subsidiary firm of the domestic sheet glass manufacturer started the production of high-standard mirrors in 1987 making use of domestically produced float glass. 80% of this output is exported mainly to the U.S.

1-2 Export and Import

Malaysia was still a net importer of glassware in 1987. The trade imbalance in glassware has been improved considerably due to the rapid increase of exports in recent years.

The total export value of glassware in 1987 was M33,9 million showing a rapid average annual increase rate of 17.6% during 1983-87. The major export item was glass containers occupying up to 84% of the total export. Major export markets were Singapore and Hong Kong.

Table VII. 1-1 Export Flow of Glassware in Malaysia

(Unit: M$1,000)

	1983	1984	1985	1985	1987
Glass containers	12,552	10,225	22,357	24,854	25,568
Glassware for office/house use	2,504	2,280	2,086	1,269	1,366
Laboratory/hygienic/ Pharmaceutical glassware	2,632	3,337	5,241	3,287	4,658
Decorative glassware, blinds and beads	7	27	75	3	9
Others	0	1	272	35	292
TOTAL	17,695	15,870	30,004	29,448	33,892

Source: Malaysian Annual Statistics of External Trade 1983-1987

The total import value of glassware in 1987 was M$39.2 million. The major import item was glassware for office and household use, occupying about 65% of the total import.

Table VII. 1-2 Import Flow of Glassware in Malaysia

(Unit: M$1,000)

	1983	1984	1985	1986	1987
Glass containers	4,612	2,857	3,604	1,730	5,102
Glassware for office/house use	32,328	26,781	33,802	29,179	25,253
Laboratory/hygienic/ pharmaceutical glassware	3,623	4,414	4,890	4,639	4,298
Decorative glassware, blinds and beads	1,532	450	867	430	718
Others	100	59	64	92	3,874
TOTAL	42,195	34,562	43,257	36,070	39,246

Source: Malaysian Annual Statistics of External Trade 1983-1987

1-3 Supply and Demand

Glass Containers

The total market size of glass containers in Malaysia (at manufacturers and importers' sales value) is estimated at around MS57,0 million in 1987. Compared with the production capacity of the three domestic manufacturers, the market size is still small.

Table VII. 1-3 Estimated market size of Glass Containers in 1987.

(Unit: M$ Million)

Domestic Production	76.0	a)
Imports	7.4	b)
Export	27.5	c)
Size Estimated	55.9	

a) Estimate based on the field interview survey

b) Estimate based on Trade Statistics, 30% of import duty and 15% of importer's margin are taken into consideration

c) Estimate based on Trade Statistics

The glass container market is in an oversupply condition not only in Malaysia but also in Asian nations as a whole and the competition in the major export markets is very severe.

Glass Tableware

The market size of glass tableware in Malaysia is estimated at around M$43.5 million. Most of the market demand is presently fulfilled by imported products. The locally produced products are limited items of rather low-end products. They are all produced by glass container manufacturers.

Table VII. 1-4 Estimated Market Size of Glass Tableware in 1987

(Unit: M$ Million)

Domestic Production	1.8	a)
Imports	41.7	b)
Market Size Estimated	43.5	

a) Estimate based on the field interview survey

b) Estimate based on Trade Statistics. A 50% of import duty and a 15% of import's margin are added.

A plan to start production of glass tableware in Johore from September 1988 has been announced.

Other Glass Products

All of the other glass products are processed in Malaysia making use of semi-finished glass products. Except for electric lamps, most of the products thus finished in Malaysia are exported.

2. Present State of Production

2-1 Production Process and Specifications

Because the glassware industry is a highly capital intensive industry, there exist a small number of world-widely known glassware processing machine manufacturers. By them the production process is mostly standardized internationally. All of the three local glassware manufacturers in Malaysia are also following this standardized production process. That is; raw material selection --> purchase and storage --> batch preparation --> melting --> forming --> annealing --> single line inspection --> casing or packaging.

As for the computer control system, one of the firms has already installed 3 sets of control computers of forming machines which were very recently developed. Another firm is also planning to introduce a new computer control system. From the cost advantage, however, some manual operation processes are left in all of the firms. Along with the very modernized equipment, models of machines which are already obsolete are still in use.

2-2 Technical Level

Glass containers: Each of these local manufacturers of glass containers has a continuous technical tie-up with one of the world's leading glassware manufacturers, and each of them has sufficiently high level of technology. Taking the seed counts, for example, the average standard in Japan is said to be around 20 pcs/ounce. In one company in Malaysia seed counts of about 5pcs/ounce are reported, while in another, 50pcs/ounce. In general, however, all of the domestically produced products are well accepted in the local market.

Glass tableware: At present, there are no exclusive manufacturer of tableware in Malaysia. One of the glass container manufacturers produces glass tableware making use of a 12-head press-machine. The production capacity of the press-machine is around 7-8 tons per day. Other glass container manufacturers are producing tableware by the same IS machines which are used for bottle forming. Because of the machine constraint the production items are limited to such products as tumblers, jugs or cups. Because all of these firms produce tableware from the same melted glass used for glass bottles, the product quality for glass tableware is not high.

2-3 Product Development

As for the production of glass containers, all of the local firms believe that this product quality level is mostly satisfactory. Further, they are all in a condition such that all of the modern production technologies are obtainable mainly from their technical tie-up partners. A relatively recent new product development was one-way bottles. At present, however, most of the firms have already acquired the production technology for one-way bottles.

Although the quality level of glass tableware is still inferior it is considered to be not because of their technology level, but mainly of their passive attitude toward the production of tableware.

2-4 Sales Strategies and Business Administration

From the nature of their products, all of the local glass container manufacturers sell their products directly to industry users as soft drink manufacturers, breweries or food processing firms. They also export a considerable share of their products. But the major market is mostly confined to Singapore. Exports are made directly by the manufacturers.

Due to very severe competition both in domestic and in export markets, the financial achievement of local manufacturers is not necessarily good. Except for one firm which has a relatively strong sales route to their parent companies, other firms recorded financial losses continuously for the past 4-5 years. The major factors which induced these unsatisfactory financial achievements are reported as follows:

1) Due to the very small domestic market size, the production volume per order is small, which requires frequent job changes and reduce productivity; and
2) In order to compete in the very competitive markets, additional capital investments are often required, the financial burden for which is very heavy.

2-5 Relationship with Periphery Industries

Except for some minor points, no big problem was raised from any glass container manufacturer for their relationship with periphery industries. Major raw materials are locally available. Although some materials as soda-ash or lubricant oil are imported, there are no problems with their supply.

The major problems are as follows:

1. The expansion speed of domestic bottle demand is unsatisfactory.
2. The distribution channel for the domestic tableware market is more complicated compared with that for glass containers.
3. In the past, the trade imbalance of container cargo between Malaysia and Hong Kong created a problem for regular shipping.

2-6 Raw Materials

2-6-1 General

For the production of glassware, a variety of mineral resources are used. Among them, the most important mineral material is silica sand, which abound in Malaysia. Beside silica, lime-stone and dolomite are also locally available. The rest of raw materials are mostly imported, of which soda ash is the largest item. Other raw materials are imported in small quantities.

2-6-2 Silica Sand

Silica sand deposits which have a high silica and low iron content are found in abundant quantities in Malaysia. Such deposits are found around the coast of Trengganu (districts of Jambu Bangkok, Dungun and Marang), the east coast of Johore from Mersing to Pengerang, Sarawak (Bintulu, Roban) and Perak. In addition, there are large deposits of mining sand in the ex-mining areas, particularly in Perak and Selangor.

Deposit at Trengganu: The biggest known reserves of silica sand in Peninsular Malaysia exist in the state of Trengganu. These deposits are as yet untapped. According to the chemical analysis results conducted by the Geological Survey department, the grain size distribution and chemical composition of the silica sand in Trengganu are very consistent. With the low Fe_2O_3, content ranging from 0.02-0.05%, the quality of silica sand is judged to be satisfactory for the production of various kinds of glass products such as flint glass bottles, or tableware.

Table VII. 2-1 Major Chemical Composition of Silica Sand in Trengganu

(Unit: %)

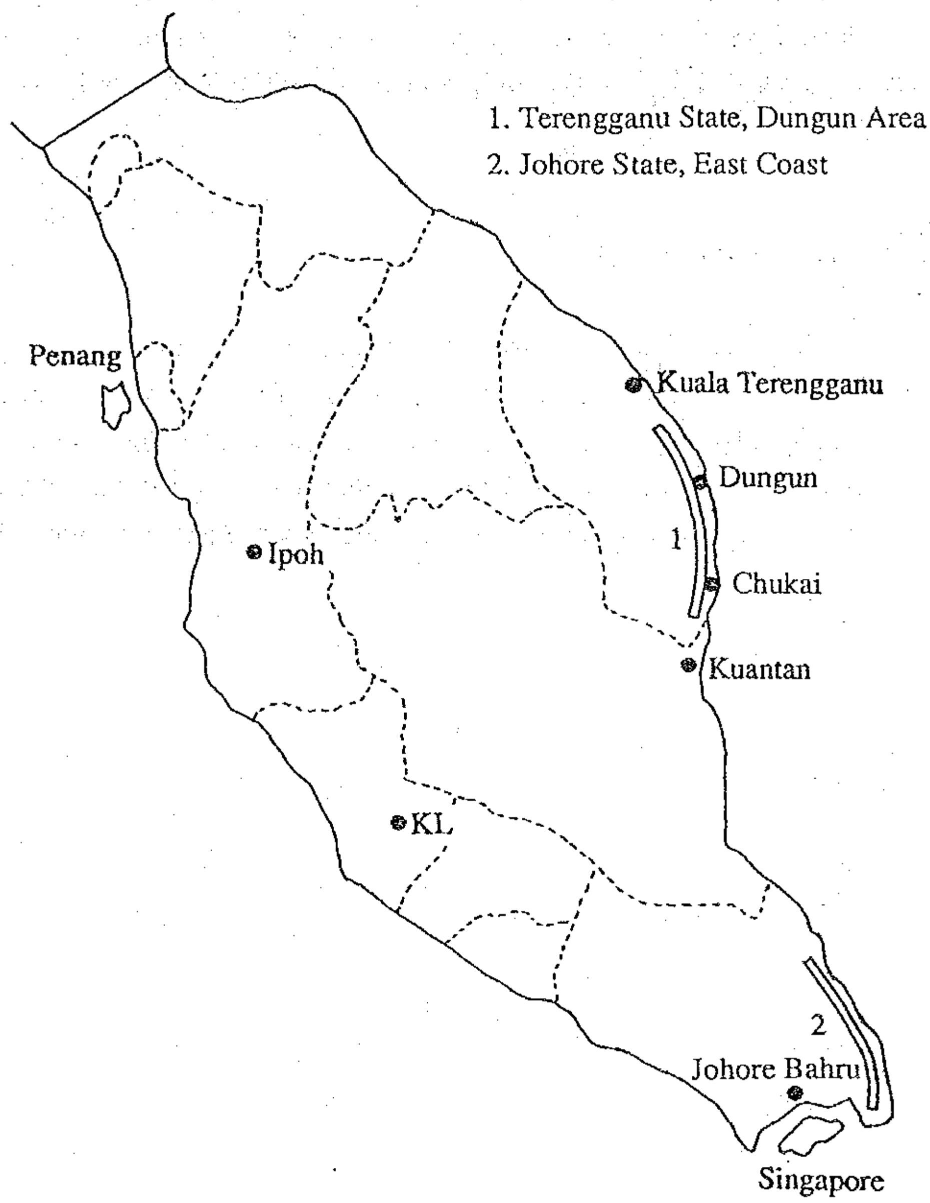
(Kampong Rantau Abang Area)	
SiO_2	98.99 - 99.77
Fe_2O_3	0.03 - 0.02
(Bukit Senyamok Area)	
SiO_2	99.5 - 99.30
Fe_2O_3	0.037 - 0.047
(Bukit Rantau)	
SiO_2	99.30 - 99.50
Fe_2O_3	0.025 - 0.029

Source: Geological Survey Department

The total volume of silica sand reserves in Trengganu is very roughly estimated at 1.0-3.0 million tons. This silica sand exists in a relatively a long and narrow area along the seas coast. The thickness of the sand layer is only 0.5-2.9m. Because of this layer state of the silica sand and the inconvenient location for transport, the export of silica sand in Trengganu as unprocessed mineral raw material would be difficult.

Deposit in Johore: In the south-eastern region of Johore exists a large and worked area of silica sand deposits. It covers an area of approximately 10,000 acres and is currently worked on a joint venture basis by the Johore State Economic Development Corporation. According to the investigation results conducted by the Geological Survey Department, the volume of silica sand reserves in Kuala Jemaluang is estimated at around 0.3 million tons and that in Tanjong Penawar at around 0.1 million tons. The Fe_2O_3 content varies between 0.1-0.7%. Because of this wide difference in iron content, the sand from Tanjong Penawar could be used for a wide variety of glass products including both flint glass containers and glassware but that from Kuala Jemaluang could be used only for a limited use such as colored bottles.

Fig. VII 2-1 Locality Map of Silica Sand Deposit in Peninsular Malaysia



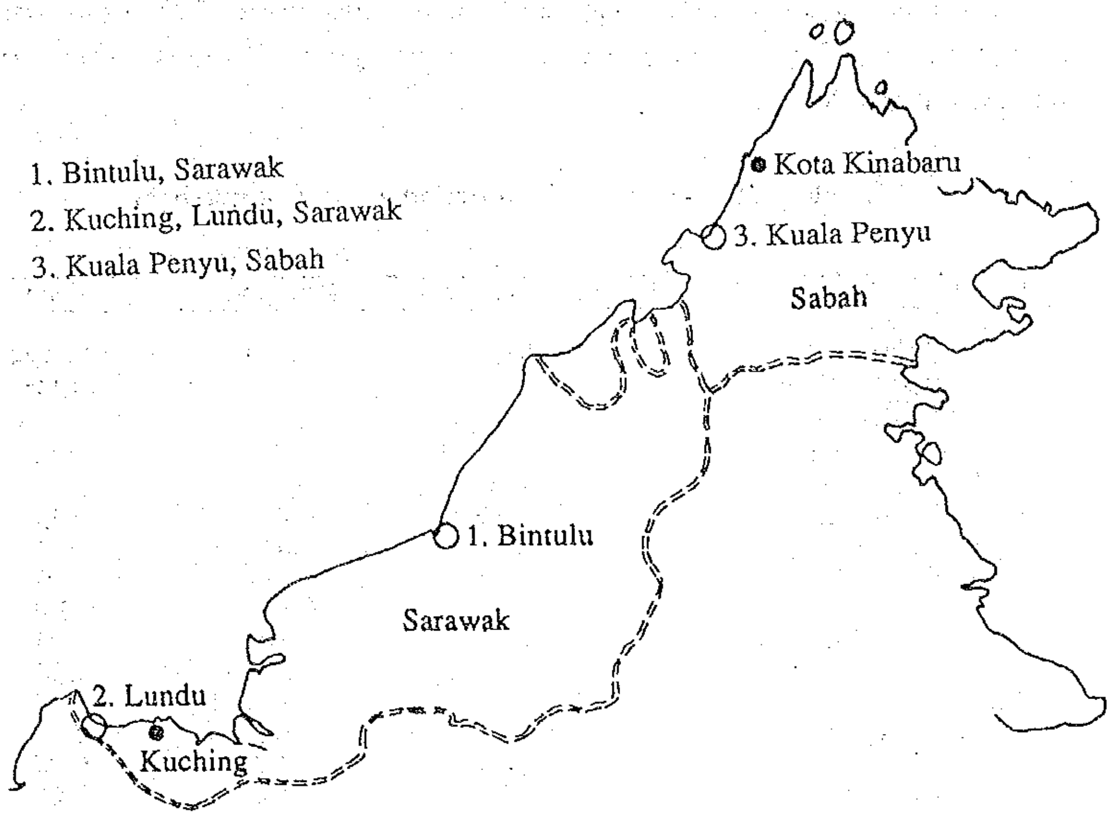
Deposits in Sarawak: Deposits of silica sand suitable for glass manufacture are located north of Bintulu, near Sematan, Lundu, Santubong, Roban and in the Baram Valley.

The most important deposit is located near Kidurong, Bintulu where a total reserve of 3 million tonnes of excellent quality silica sand is available. A joint venture company among the Bintulu Development Authority (BDA) and local manufacturers is now exploiting silica sand and exports 100% of these products to Japan after refining. Product quality is reported to be very high with the SiO_2 content 99.3-99.6% and the Fe_2O_3 content 0.004-0.017%.

2-6-3 Limestone and Dolomite

In Peninsular Malaysia, major limestone occurrences are in the west coast, especially in the state of Perak and Batu Caves in Selangor. The bulk of limestone production is being sourced by the construction, cement and glass industries, with the remainder being shared by the iron and steel industry and the chemical and allied industries. For the glass industry, high purity deposits of limestone and dolomite are readily available.

Fig VII 2-2 Locality Map of Silica Sand Deposit in East Malaysia



3. Cost Analysis

3-1 Unit Production Cost Comparison

The unit costs of major items used for the production of glassware both in Malaysia and in Japan were investigated and compared. The results are briefly summarized as follows:

Table VII. 4-1 Unit Production Cost Comparison

(Unit: M$)

Item	(Unit Volume)	Malaysia	Japan
A. Raw Material			
1) Silica sand	(ton)	30-40	124-144
Fe_2O_3; 0.1%			(124)
Fe_2O_3; 0.03%		(144)	
2) Limestone	(ton)	40	112
3) Aluminum hydrate	(ton)	400	n.a.
4) Iron oxide	(ton)	50	108
5) Soda ash	(ton)	447	684
6) Carbon	(ton)	1,622	810
7) Cromite	(ton)	3,850	4,240
8) Mirabilite	(ton)	530	600
9) Cullet	(ton)	120	280
B. Fuel			
1) Heavy oil	(kl)	300	580
2) LNG	(kg)	0.82	0.82
3) Gasoline	(l)	0.92	2.60
C. Water & Power			
1) Industrial water	(m^3)	Pumping from well	0.46
2) Power	(kwh)	0.21	0.30
D. Labour			
1) Unskilled	(Monthly salary)	250-350	4,000
2) Skilled	(Monthly salary)	350-450	8,350
3) Foreman	(Monthly salary)	450-500	10,850
4) Technician	(Monthly salary)	800	25,050
E. Transportation			
1) Truck-shorter	(720ml bottle)	0.01	0.03
than 20 km	(360ml bottle)	0.005	0.016
2) Truck-between	(720ml bottle)	0.04	n.a.
KL & Johore	(360ml bottle)	0.02	n.a.
F. Moulds			
1) Moulds for 6 section	(set)	25,000-30,000	n.a.
2) doubled-gob application			

Source: Field interviews

The above comparison results show that the raw materials costs of silica sand, limestone and cullet are low in Malaysia, while other material costs in Malaysia are relatively high compared with those in Japan. In fuel and utility costs, the costs of such items as gasoline or heavy oil are low in Malaysia, while the electricity costs in Malaysia have not such a large price advantage compared to those in Japan. In those unit costs such as labor or truck transportation, Malaysia has an obvious price advantage to Japan.

3-2 Manufacturing Cost Comparison between Malaysian and Japanese Products

3-2-1 Cost Comparison by Type

In order to evaluate the approximate level of production costs of glass containers in Malaysia, a type of product was selected and its production costs both in Malaysia and in Japan were investigated. The results are as follows:

Production Cost Comparison

Type of Product	Manufacturer	Production Cost (Ex-factory price)
One-way bottle for soft drink content 300 ml, weight 175 - 180g; bottle before film sealing	Malaysian firm A	M$0.19/bottle
	Malaysian firm B	M$0.15/bottle
	Japanese firm C	M$0.26/bottle

Further comparison was conducted for some other types of products. In most types of glass bottles, the present production costs in Malaysia were found to be much lower than those in Japan.

Type of Product	Malaysian Firm A	Japanese Firm C
(1) M$0.48/bottle Small size, amber(weight 260g)	Beer bottle	M$0.22/bottle
(2) M$0.49/bottle Film sealed (weight 175g)	Bender 300 PII	M$0.45/bottle
(3) M$0.83/bottle Orange juice (weight 397.5g)	Soft drink bottle	M$0.40/bottle

The film application cost in Malaysia for the above film sealed bottle Bender 300 PII is estimated at around M$0.19/bottle for the material and M$0.01/bottle for processing.

3-2-2 Manufacturing Cost Structure Comparison

As an approach to analyze the factors which create the difference of production costs between Malaysia and Japan, the manufacturing cost structure among Malaysian glassware manufacturers and an average Japanese manufacturer was investigated and compared. Because of the lack of data publicly available, many items were estimated from the results of the field interview survey. Thus, the comparison results are not very accurate.

Table VII. 4-2 Comparison of Glassware Production Cost Structure

(Unit: M$/ton)

Cost Item	Malaysian firm A. Co.		Malaysian firm B. Co.		Japanese firm Average of 7 firms	
Direct production costs						
Raw materials	152	(26.7)	167	(23.2)	300	(30.4)
Direct labor	182	(32.0)	201	(27.9)	365	(36.9)
Utilities	46	(8.1)	57	(7.9)	72	(7.3)
Depreciation	46	(8.1)	61	(8.4)	19	(1.9)
Other direct cost	30	(5.3)	46	(6.4)	61	(6.2)
Sales & administration costs						
Labor	38	(6.7)	34	(4.7)	65	(6.6)
Packing & transportation	11	(1.9)	11	(1.9)	27.	(2.7)
Interest payment	15	(2.6)	87	(12.1)	30	(3.0)
Others	49	(8.6)	57	(7.9)	49	(5.0)
Total Production Costs	569	(100.0)	721	(100.0)	988	(100.0)

Source: Field interviews
"Cost Structure Index of Small-and-medium Scale Industries", Small-and-medium Scale Industry Agency, Japan

Table VII. 4-2 shows that Malaysia glassware manufacturers have a cost advantage over Japanese manufacturers both in raw materials and direct labour costs. Due to the difference in production volume, however, Japanese firms have an advantage in the cost burden of depreciation expenses for the production of one ton of glassware products. In a Malaysian firm, the share of interest expenses to the total production cost exceeds 12%, which badly affects their cost competitiveness.

The raw material costs which are needed for the production of one ton of glassware products both in Malaysia and in Japan were estimated and compared. The results are shown in Table VII. 4-3 and Table VII. 4-4:

Table VII. 4-3 An Example of Unit Raw Material Cost in Malaysia

Name of Raw Material	(A) Input Volume (ton)	(B) Glass Conversion (%)	(C) Unit Cost (M$/ton)	(D) Glass Produced (ton)	(E) Raw Material Costs (M$)
Silica	100	95	40	95	4,000
Soda ash	32	58.5	447	18.7	14,304
Limestone	23	56	40	12.9	920
Mirabilite	1.0	43.7	530	5.3	530
Carbon	0.2	0	1,622	5.3	324
Total	156.2	-	-	137.2(F)	20,078 (G)

Raw material costs per ton (G) ÷ (F) = M$148.50

Table VII. 4-4 An Example of Unit Raw Material Cost in Japan

Name of Raw Material	(A) Input Volume (ton)	(B) Glass Conversion (%)	(C) Unit Cost (M$/ton)	(D) Glass Produced (ton)	(E) Raw Material Costs (M$)
Silica	100	95	124	95	12,400
Soda ash	32	58.5	684	18.7	21,888
Limestone	23	56	112	12.9	2,576
Mirabilite	1.0	43.7	600	5.3	600
Carbon	0.2	0	810	5.3	162
Total	156.2	-	-	137.2(F)	34,626 (G)

Raw material costs per ton (G) ÷ (F) = M$256.85

In labour costs, the average monthly salary of general workers in Malaysia is at the level of M$350 - 450, while that in Japan would be around ¥200,000 (M$4,000), which is about 10 times higher compared to Malaysia.

In productivity per worker, there also exist a large gap of around 4 - 5 times between that in Malaysia and in Japan, as is shown in Table VII. 4-5.

Table VII. 4-5 Comparison of Annual Sales Value per Worker

(Unit: M$/ton)

Cost Item	Malaysian firms A. Co.	Malaysian firms B. Co.	Japanese firm Average of 7 firms
Annual Sales (M$1,000)	25,901	14,994	28,880
Number of Employees	420	300	108
Annual Sales/Worker (M$1,000)	61	50	267

As a result, the difference in the weight of direct labour costs to the total production cost would become smaller than that in the absolute wage rates in comparing Malaysia and Japan.

In utilities, major cost items would be heavy oil costs and electricity costs. As was shown in the previous section, the unit cost of heavy oil in Malaysia is around half of that in Japan. Unit electricity costs in Malaysia are also much lower than those in Japan. Due to the obsolescence of the furnaces presently used by existing Malaysian manufacturers, the thermal efficiency in Malaysian factories is inferior to that in Japanese factories. This fact makes the cost advantage of Malaysian manufacturers lower than the actual difference in unit costs. However, the present Malaysian manufacturers plan to upgrade their furnace efficiency.

In such cost items as depreciation on interest payments, the cost burden is heavier in Malaysia than in Japan. This is because of the fact that most Malaysian manufacturers have made relatively large capital investments in recent years in order to compete in the very competitive market of Malaysia.

3-3 Sea Transportation Costs of Glassware

3-3-1 General

For the export of glassware, the heavy burden of sea transportation costs is considered to be one of the largest cost factor. Due to the wide fluctuation of sea transport costs, however, it is difficult to identify the exact figures. The following are the major factors which would cause the fluctuation of sea transport costs:

1. Freight rate fluctuation
2. Packaging requirements from customers
3. Ports to be used

In this section, the general sea transportation costs of glassware were calculated based on various assumptions, and the approximate level of the transportation cost on glassware exports to Japan was measured.

4-3-2 Sea Transportation Costs of Container Cargos

For the exports of container cargos, Malaysian exporters use either Port Klang, Penang or Singapore port. In cost, it is generally cheaper to use Port Klang rather than to use Singapore port. For the export of glass products which require a lot of inventory space and where regular shippings are required from customers, Malaysian exporters often use Singapore port rather than Port Klang.

The sea transportation costs calculated based on the assumption that a Malaysian firm exports a container cargo from Malaysia to Japan through Singapore port are shown in Table VII. 4-6. In this cost estimate, the packaging cost of products and the inland transportation costs from factory to container yards are not included.

Table VII. 4-6 Sea Transportation Costs of Container Cargo

(Unit: M$/Container)

		20 ft.	40 ft.
(1)	Stuffing & terminal charge	1,152	1,184
	(Stuffing)	(168)	(336)
	(Dragging)	(912)	(1,440)
	(Terminal charge)	(72)	(108)
(2)	Custom clearance & inspection	264	300
	(Custom clearance)	(168)	(168)
	(Handling charge)	(60)	(96)
	(Inspection)	(36)	(36)
(3)	Sea freight	1,860	3,420
	Total	3,276	5,604

(1) Packaging and inland transportation costs are excluded.

(2) Insurance fee would be added at 2% of invoice value.

Source: A forwarding firm in Singapore

Further, a comparative study has been conducted on the following two cases: a Singapore firm would export a 20 ft.-container cargo to Japan through port Singapore, and a Malaysian firm would export the same size of container cargo to Japan making use of port Singapore. The results are briefly summarized as follows:

Table VII. 4-7 Comparison of Sea Transportation Cost of 20 ft. Containers

(Unit: M$/Container)

	Malaysia	Singapore
(1) Stuffing & terminal charge	1,152	444
(Stuffing)	(168)	(192)
(Dragging)	(912)	(180)
(Terminal charge)	(72)	(72)
(2) Custom clearance & inspection	264	132
(Custom clearance)	(168)	(36)
(Handling charge)	(60)	(60)
(Inspection)	(36)	(36)
(3) Sea freight	1,860	1,860
Total	3,276	2,436

Source: Same as Table VII. 4-6

The analysis results show that Malaysian firms would have to pay around 35% higher sea transportation costs compared to Singapore firms, even excluding inland transportation costs from factories to port.

4-3-3 Effects of Sea Transportation Costs on Malaysia Glass Products

In order to measure the extent of the effect of sea transportation costs on the export of Malaysian glass products, the unit transportation cost per empty bottle was calculated, based on the assumption that a Malaysian manufacturer exports their glass containers, as a container cargo, to Japan through Singapore port.

In order to calculate the unit cost per bottle, the number of empty bottles loaded into a 20 ft.-container was investigated, and the results are as follows:

Type of product :	Empty glass bottle for soft drinks Content 200 ml
Container capacity :	1,071 cases/20 ft.-container
	24 bottles/cases
	25,704 bottles/20 ft.-container

From the above, the unit sea transportation cost of empty bottles from Malaysia to Japan is estimated at around M$0.13 per bottle.

Based both on the above calculated sea transportation costs and on the unit production costs reviewed in the previous section, the Malaysian glass containers exported to Japan, except for those of very cheap prices, are judged to have enough price competitiveness with those produced by Japanese manufacturers in the Japanese market.

In practice, however, the present level of price differences is considered still insufficient for Malaysian products to compete with Japanese products in the Japanese market.

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