THE FEASIBILITY STUDY REPORT

ON

ESTABLISHING A CEMENT PLANT

IN

MUARA, BRUNEI

FEB., 1983

JAPAN INTERNATIONAL COOPERATION AGENCY

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PREFACE

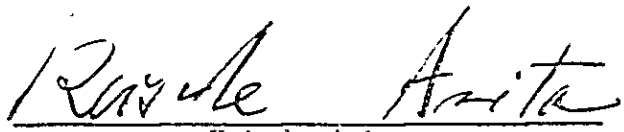
In response to the request of the Government of Brunei, the Government of Japan decided to conduct a feasibility study on establishing a cement plant in Muara, Brunei and entrusted the study to the Japan International Cooperation Agency (JICA).
The JICA sent to Brunei a study team headed by Mr. Chikai Ueda from October 3, 1982 to October 17, 1982.

The team exchanged views with the officials concerned of the Government of Brunei and conducted a field survey in Muara area, Brunei.
After the team returned to Japan, further studies were made and the present report has been prepared.

I hope that this report will serve for the development of economies in Brunei and contribute to the promotion of friendly relations between Brunei and Japan.

I wish to express my deep appreciation to the officials concerned of the Government of Brunei for their close cooperation extended to the team.

February, 1983



Keisuke Arita
President
Japan International Cooperation Agency

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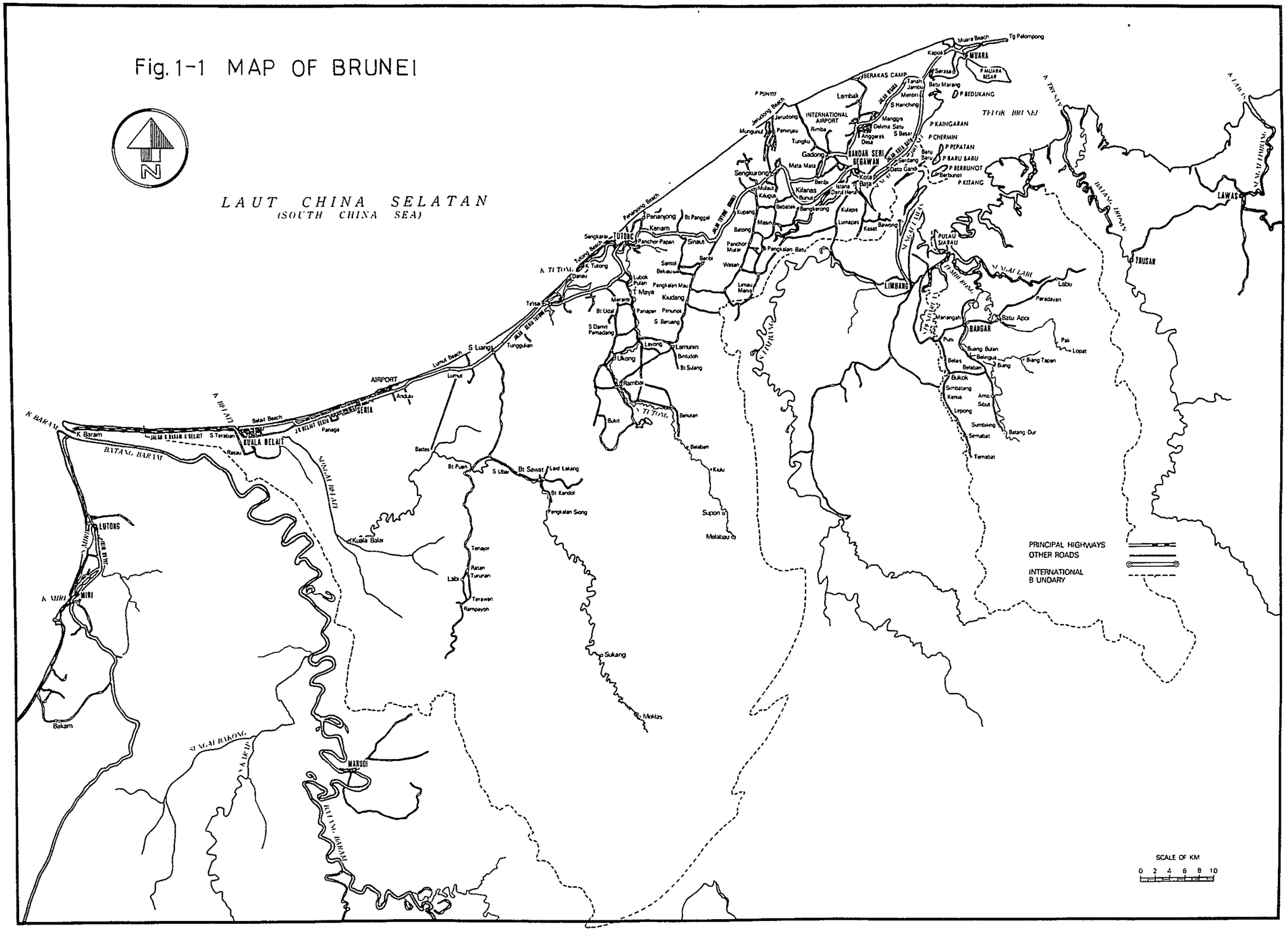
Fig. 1-1 MAP OF BRUNEI



CHAPTER 1 SUMMARY OF THE STUDY

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1.1 Outline of Brunei

1.1.1 General

Brunei is a nation with a total area of 2,226 sq.miles (5,765 km^2), located on the northwestern coast of Borneo. The country, bordering on Sarawak, consists of two detached territories, the Western (where the principal cities are located including the capital, Bandar Seri Begawan) and Eastern (Temburong District) sections. It has a tropical pluvial climate with high temperatures and humidity but having a clear distinction between the rainy and dry season.

Its population is estimated at 192,832, as of 1981, consisting of Malays (over 72%), Chinese (20%) and others.

1.2 Marketing

1.2.1 Economic condition of Brunei

Brunei has a rich economy, supported by a large income from petroleum. Gross Domestic Products (GDP) amounted to B$4162.7 million in 1980, or over B$20 thousand per capita, ranking high in the world. Trade balance has continuously shown a large surplus, reaching B$8,600 million in 1980. At present Brunei is taking a great interest in developing industries other than petroleum-related ones with a specialized bureau (Economic Development Bureau, EDB), established in 1976, endeavoring to promote and strengthen domestic industries.

1.2.2 Cement industry of Brunei

(1) Demand

The demand for cement shows a constantly increasing tendency. The total demand of 116 thousand tons consists of about 90,000 tons for Ordinary Portland Cement (OPC) and the balance for Oil Well Cement (OWC). This OWC sale is a marked characteristic in oil producing Brunei.

(2) Supply

The supply of cement to Brunei is entirely in the form of imported cement packed in bags. Principal suppliers include Japan, Philippines and Taiwan whose share has been increasing recently.

(3) Price

CIF price of imported cement in bags is currently B$114/ton for OPC and B$295/ton for OWC.

Adding to it port charges and hanling cost, the landed cost is B$122.8 for OPC and B$303.8 for OWC.

Current sales prices of cement delivered to the site through the hands of importers and distributors, are estimated to be as follows:

OPC: B$148.2/T at the capital
B$157.2/T at local spots

OWC: B$320.8/T at Seria

(4) Future demand forecast

The demand for OPC, estimated from the recorded figures after 1972, are as follows:

Year	1985	1990	1995	2000
Demand (1000 ton)	102	121	139	158

Although the demand for OWC varies from year to year, it is assumed in this report to be constant at 17,000 tons, on the basis of the recent actual figures, taking into consideration the fact that Brunei is an oil producing nation.

1.3 Plant and equipment

1.3.1 Bases for the plan

(1) There are two plans, one for a plant grinding imported clinker (Case 1) and another for a plant packing imported bulk cement (Case 2).

(2) The plant site is to be located within the industrial area, south of Muara, the largest port in Brunei. The site is close to the metropolitan area, the largest consuming area, accessible via good roads and is equipped with an adequate infrastructure.

(3) While all the cement imported in bag is unloaded at the existing port of Muara, in case 1, a new berth, 120 m long and 8 m deep, is to be constructed in front of the site, in view of the inadequate capacity of the existing port, the fact that Brunei has to import most of the materials and also the recent tendency toward unloading bulky/dirty cargo. This berth will contribute not only to the cement plant but also to the future industrial development of Brunei to a great extent. However, in case 2, a convenient dolphin type was employed because of unloading methods of exclusive bulk cement carrier.

1.3.2 Capacity of the plant equipment

Capacities of the plant and main machinery and equipment are as follows:

(1) Capacity of the plant: 156,000 tons/year (max.)

(2) Capacity of main machinery and equipment are shown below:

Item	Case 1	Case 2
a. Raw material unloading berth	120mL x 8mD	Dolphin type
b. Belt conveyor for incoming clinker and gypsum	300t/h x 1	-
c. OPC clinker silo	10,000ton x 1	-
d. OWC clinker silo	4,000ton x 1	-
e. Gypsum yard	1,500ton x 1	-
f. Cement mill	23t/h x 1	-
g. OPC cement silo	2,000ton x 2	14,000ton x 1

Item	Case 1	Case 2
h. OWC cement silo	2,000ton x 1	4,000ton x 1
i. Cement packer	45t/h x 2	45t/h x 2
j. Bulk cement loader	80t/h x 1	80t/h x 2
k. Transformer substation	2,000KVA	350KVA
i. Laboratory equipment	Physical/ chemical test x 1 set	-

1.3.3 Design policy for the plant

Special attention has been paid to the following points in designing the plant.

(1) Equipment has to be easy to handle, that is to say, mostly trouble-free, easy to maintain and well laid out.

(2) Man-power saving has to be achieved by automation.

(3) Consideration should be given to environmental protection with effective countermeasures against sources of dust and noise.

(4) Attention must be paid to the safety and health of employees.

1.3.4 Organization and personnel

(1) Organization

Plant organization calls for a plant with 2 sections in the administration department and 1 section in the production department under the plant general manager.

(2) Personnel

Plant personnel consists of the following, plus two directions.

	Case 1	Case 2
Plant general manager	1	1
Administration department	16	16
Production department	28	16
Total	45	33

1.3.5 Construction period

Construction period may be estimated as 18 months in Case 1 and 15 months in Case 2.

1.4 Financial Analysis

1.4.1 Capital requirement and financing scheme

Total capital requirements for this plant and its financing scheme may be assumed to be as follows:

Item	Amount (1,000 B$)	
Capital Requirement	Case 1	Case 2
(1) Machinery and equipment	11,354	2,231
(2) Construction and buildings	7,185	3,038
(3) New berth (or Dolphin)	4,538	3,576
(Sub Total)	(23,077)	(8,845)
(4) Land premium	60	60
(5) Pre-operation expenses	1,254	542
(6) Pre-operation interest	1,189	396
(7) Wages and others	650	560
(8) Initial working capital	2,609	2,896
Grand Total	28,839	13,299
Financing Scheme		
(1) Equity	11,400	4,400
(2) Long-term debt (Interest 9.2%)	9,651	1,896
(3) Short-term debt (Interest 10.5%)	7,788	7,003
Grand Total	28,839	13,299

(All costs are in 1982 constant price.)

1.4.2 Production and sales

(1) The plant will have an economic life of 15 years from the operation commencement in 1985. Sales quantity will cover 80% of the total demand in Brunei in the first year, 90% in the second year and 100% in the third and subsequent years. Production will cover the above sales quantity plus an inventory at the end of the year. Production, sales and inventory volume for 15 operation years are shown in the following table.

Table: Production, Sales and Inventories

(Unit: 1000 ton)

Year	Production		Sales		Inventory	
	OPC	OWC	OPC	OWC	OPC	OWC
1	85.1	18.0	81.6	17.0	3.5	1.0
2	95.2	17.0	95.2	17.0	3.5	1.0
3	109.4	17.0	109.4	17.0	3.5	1.0
4	113.2	17.0	113.2	17.0	3.5	1.0
5	116.9	17.0	116.9	17.0	3.5	1.0
6	120.6	17.0	120.6	17.0	3.5	1.0
7	124.3	17.0	124.3	17.0	3.5	1.0
8	128.0	17.0	128.0	17.0	3.5	1.0
9	131.8	17.0	131.8	17.0	3.5	1.0
10	135.5	17.0	135.5	17.0	3.5	1.0
11	139.0	17.0	139.0	17.0	3.5	1.0
12	139.0	17.0	139.0	17.0	3.5	1.0
13	139.0	17.0	139.0	17.0	3.5	1.0
14	139.0	17.0	139.0	17.0	3.5	1.0
15	139.0	17.0	139.0	17.0	3.5	1.0
Total	1,855.0	256.0	1,851.5	255.0	-	-

(2) Production cost

Production cost at 100% capacity utilization is shown below:

(B$/ton of cement)

Item	Case 1		Case 2	
	OPC	OWC	OPC	OWC
Variable cost:				
Bulk cement			103.2	175.2
Clinker	73.7	125.8		
Gypsum	2.1	2.1		
Paper bag	9.9	9.9	9.9	9.9
Power	1.9	1.9	0.1	0.1
(Total)	(87.6)	(139.7)	(113.2)	(185.2)
Fixed costs:				
Labor	4.0		3.2	
Repair and maintenance	1.1		0.3	
Land	0.2		0.1	
Water	-		-	
Overheads	2.9		2.5	
Depreciation	6.5		2.1	
(Total)	(14.7)		(8.2)	
Sub-Total	102.3	154.4	121.4	193.4
Interest (first year basi) first year basis	9.9		4.8	
Amortization (first year basis)	3.1 (13.0)		1.2 (6.0)	
Total	115.3	167.4	127.2	199.2

(3) Sales price (FOB Plant) is assumed to be equal to the landed cost of cement currently imported in bags as mentioned earlier, say $122.8 B$/T for OPC and B$ 303.8 B$/T for OWC.

1.4.3 Profitability

(1) Profit

Profit over a period of 15 years will be as follows.

Case 1 (Unit: 1,000 ton, Million B$)

	OPC		OWC		Total	
	Total amount	Amount per year	Total amount	Amount per year	Total amount	Amount per year
Sales volume	1,851.5	123.4	255.0	17.0	2,106.5	140.4
Sales revenue	227.3	15.1	77.5	5.2	304.8	20.3
Production cost	199.3	13.3	40.8	2.7	240.1	16.0
Profit before tax	28.1	1.9	36.7	2.4	64.8	4.3
Corporate tax	6.7	0.4	8.8	0.6	15.5	1.0
Profit after tax	21.3	1.4	27.9	1.9	49.2	3.3

Case 2 (Unit: 1,000 ton, Million B$)

	OPC		OWC		Total	
	Total amount	Amount per year	Total amount	Amount per year	Total amount	Amount per year
Sales volume	1,851.5	123.4	255.0	17.0	2,106.5	140.4
Sales revenue	227.3	15.1	77.5	5.2	304.8	20.3
Production cost	229.9	15.3	50.0	3.3	279.9	18.7
Profit before tax	-2.5	-0.2	27.4	1.8	24.9	1.7
Corporate Tax	-	-	6.2	0.4	6.2	0.4
Profit after tax	-2.5	-0.2	21.2	1.4	18.7	1.2

(2) Financial rate of return

Rate of return on investment was calculated by the Internal Rate of Return (IRR) method with the following results.

	ROI		ROE		Pay-out time
	B.T.	A.T.	B.T.	A.T.	
Case 1	18.26%	16.33%	19.95%	17.51%	(5.05 years)
Case 2	15.83%	13.92%	17.45%	14.83%	(6.05 years)

(B.T.: Before Tax, A.T.: After Tax)

From this results, the financial rate of return of Case 1 is higher be approximately 3% than that of Case 2 in both ROI and ROE.

(3) Sensitivity analysis

Sensitivity analysis was carried out for both Cases regarding changes in the interest rate of long term loan (from 9.2% to 10.5%) and in the sales price (+10%, -10%, OWC -20%). Furthermore, for Case 1, sensitivity for elimination of OWC sales, changes in depreciation method and exclusion of the cost of new jetty was analyzed. The results are;

a. Both Case 1 and 2 are not much affected by a change in the interest rate of long term loan.

b. Sales price influences considerably. Case 2, especially, is much more affected than Case 1, namely when 10% increase, it shows higher figures than Case 1 but on the contrary when 10% decrease, it shows minus (-) figures although Case 1 still gives a return of 11.07%(B.T.) and 9.54%(A.T.).

c. Elimination of OWC sales gives a great impact on ROI, driving it down to approx. 10% lower than those of the base cases in Case 1.

d. When the cost of new jetty is excluded from the Case 1, ROI and ROE shows approx. 4 - 5% higher than that of base case.

1.5 Economic analysis

The economic analysis was analyzed from two points which are the economic benefits and the economic financial rate of return.

1.5.1 Economic benefits

This project will bring about the following economic benefits to Brunei.

(1) Stable supply of high quality cement

(2) Simplification and rationalization of cement distribution segment

(3) Promotion of industrialization of Brunei

(4) Improvement of technical level

(5) Development of related industries

However, 1, 3, 4, and 5 items of above them are mainly brought by Case 1, but cannot be expected in Case 2. This has been already pointed out in the EDB(Brunei)'s Preliminary Report dated 30th Jan., 1982.

1.5.2 Economic financial rate of return

The economic financial rate of return is calculated as follows.

Case 1: 19.13% Case 2: 18.16%

Though Case 1 shows marginal 1% higher figures than Case 2, in terms of other economical benefits in 1.5.1, Case 1 is preferable.

1.6 Conclusion and recommendation

1.6.1 Conclusion

(1) There is no problem concerning the plant site, surrounding infrastructure, etc.

(2) A cement plant of 150 thousand tons/year can be operated, from the viewpoint of marketing in Brunei.

(3) Case 1 which is a plant for grinding imported clinker shows a little higher profitability than that for Case 2 a plant

for packing cement imported in bulk. Case 2 fluctuate in very wide range depending upon the sales price, which is not recommendable from the view point of stable management.

(4) If this plant is to produce and market both OWC and OPC, the plan is feasible economically and also technically, of course. But when OWC is excluded, the profitability of Case 1 is much lowered and the IRR of Case 2 becomes minus (-1) figures.

(5) There is no difficulty in securing a supply of raw materials.
Sources will be; Clinker: South Korea, Taiwan, Philippines, Japan
Gypsum : Thailand, Australia

1.6.2 Recommendation

Brunei, which will celebrate the anniversary of its independence, is in a position to proceed with its own national development for the future. It is noteworthy that it has directed its attention to the cement, one of the most important basic materials for the national development among other things.
Furthermore, the project is important not only as a produce of cement, an industrial material, but also as a forerunner of an technological industry, expected to bring about technological advancement, which will contribute to the future industrial development of Brunei.
It is, therefore, especially recommended to proceed with the followings.

(1) One of the feature of this project is that it is desirable from economic viewpoint to produce and market not only OPC but also OWC.
While no technical problem is anticipated in the production of OWC, success of this project should depend largely on whether OWC can satisfactorily be sold to Brunei Shell Ltd., the only user of OWC in Brunei.
Consequently, it is particularly recommended to find out the future trend of the drilling program which will affect the future demand and to commence negotiation soon with Shell about the sale of a product of this plant.

(2) The problem for OPC is that the advent of this plant may eventually result in a partial loss of business and interests for the leading Chinese companies, who, in effect, monopolize import and sale of cement in bags, and who may probaly struggle to compete desperately with this plant after the commencement of its operation by lowering the price of imported cement. As it may be difficult to expect an embargos or imposition of protection duty on cement import in view of nature of Brunei's import and its policy on international trade, the followings, among other things, may be the countermeasures for the competition.

a. To secure the market (especially that of public construction, which accounts for a large position of the entire demand).

b. To create an efficient distribution network of its own.

However, it should concurrently be studied to guide the Chinese companies toward maintenance of reasonable price market with a view to avoiding futile internecine competition and enabling the coexistence.

(3) As there is almost no accumulation of technology in cement production in Brunei, it is desirable to arrange a tie-up with or assistance from the government or firm of a country advanced in cement production technology, in respect of training of engineers, plant management, etc., in proceeding with this project. Also in this connection, it is recommended to send people to the plants now in operation for inspection, training, etc. with a view to acquiring required knowledge.

In addition to the foregoing, it will also be necessary for the implementation of this project to make a preliminary inquiry with regard to the supply of raw materials, and to start sounding the ideas of the authorities concerned in respect of dredging and construction of a berth and dolphin, specifications of, for example, the plant, equipment which must be stated in the tender(s) for the

project, among other things.
While realization of this project is, in any case, to be decided by the government of Brunei, it is desirable that the government will play a leading role in consideration of the importance of this project stated in beginning of this section.

(4) Although it is not directly related to this project, there was an oppotunity to visit the site at Temburong of mining saud and gravel, used for concrete in Brunei, during our stay for the survey of cement project. By sight there appears to be a considerable reserve in Brunei of sand and gravel, which constitute valuable resources, because they are required six times as much as cement in making concrete. While they look to be mined now at randam, it would be better if they are mined systematically. This has some reference on the cement project, as one of the reasons for construction of a new berth contemplated in the Case 1, for a crushing plant was the future unloading of the sand and gravel from Temburong at this berth.
It was because there is a considerable merit in unloading a large quantity of sand and gravel, using the new berth and the belt conveyor for intake of raw materials for the clinker grinding. Furthermore, it gives rise to a possibility for additional construction of a plant of ready mixed concrete, using cement and sand and gravel or a plant of products of cement and concrete.
As ready mixed concrete is expected to save labor at the civil and construction site, it is obviously expected to increase in future judging from the tendency in other countries including Japan.
And the increase of ready mixed concrete will also consequently entails an increase in demand for cement, a detailed study will be required.

1.7 Evaluation of Other Report made by Ube Industries Ltd., Japan (* As submitted to EDB(Brunei) by the Chairman of Sarawak Economic Development Corporation on 20th May, 1982)

Evaluation and comments are made on the report relating to the cement plant construction, already submitted to Brunei. The main points are as follows of which details are mentioned in Attachment 1 hereof:

(1) As the said report views Brunei as one of the market for a clinker crushing plant planned to be built in Sabah by another company, the objective of the survey is not properly set.

(2) While the report dose not refer to OWC, it is better for a survey to cover all the products marketable in the same country. The reason given for not referring to it is also ambignous.

(3) Some of its technical judgements including the adoption of an open circuit mill are not adequate.

(4) The price of bagged cement quoted in the report (CIF 72 US$) seems to be higher from current point of view.

CHAPTER 2 BACKGROUND INFORMATION FOR THE PROJECT

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2.1 General Information of Brunei

2.1.1 Location and geographical features

Brunei is located in the northwestern part of Borneo Island. The northwestern coast, almost 100 miles long, faces the South China Sea. Brunei borders on Malaysian Sarawak, to the west, south and also east and is divided into the western and eastern sections. Brunei, located between north latitudes 4.2° and 5.3°, and east longitudes 114.4° and 115.22°, occupies 2,226 sq. miles (5.765 km^2) of territorial land. The capital of Brunei is Bandar Seri Begawan, 20 kilometers up the River Brunei, at the mouth of which the port of Muara is located. Other principal cities are Kuala Belait, Seria and Tutong in the Western Section and Bangar in the Eastern Section (usually called Temburong Distric). (Fig. 1-1 shows a Map of Brunei.)

2.1.2 Climate

Brunei has a tropical climate, characterized by generally constant temperatures, high humidity and a heavy rainfall. The period from November to January of the following year when a northeastern wind blows is generally called the rainy season. As the rainfall, however, varies from year to year, rainy and dry seasons are not so clearly separated.
Table 2-1 shows the temperature and rainfall levels from 1977 to '81.

2.1.3 Population

The population of Brunei was 192,832 around the middle of 1981. The population in each of the administrative districts and population density (man/km^2) are shown below.

District	Population		Area	Population Density
Brunei/Muara	113,419	58.8%	561 km^2	202 man/km^2
Belait	51,437	26.7	2,685	19
Tutong	21,676	11.2	1,147	19
Tenb rong	6,300	3.3	1,282	5
Total	192,832	100.0	5,675	34

The rate of population increase over a ten-year period between 1971 and 80 is 35.8%, or 3.6% per year when simply averaged, of which 2.5% is due to a natural increase and the balance due to an influx of non-residential immigrants such as workers.
The nation of Brunei is not mono-racial but comprises Malayans, natives such as the Iban tribe, Chinese and others. The composition as of 1980 is shown below.

Malayans	72.9%
Chinese	20.7
Others	6.4

2.2 Infrastructure

2.2.1 Roads

Brunei has no railroad and is dependent mostly on roads for communication and partly on waterways for transportation.
A trunk road, traversing the country, stretches about 120 km from the capital, Bandar Seri Bagawan to Kuala Belait with local roads branching out from it. Considerably heavy traffic jams are seen during the rush hours in the morning and evening around Bandar Seri Bagawan. Apart from the trunk line, by-passes are under construction at several locations.

The extension of roads in kilometers in 1979 is shown below.

National Road	Regional Road	Private Road	Total
781	486	156	1,423 km

The condition of the road surface is as follows:

Permanent Pavement	Improved Road	Unpaved Road	Total
745	242	436	1,423 km

The number of automobiles as of 1980 was 54,507 (including taxis, buses, motorcycles, etc.)

2.2.2 Port

The port for ocean-going vessels in Brunei is located at Muara, facing the Brunei Bay, 20 km from the capital, Bandar Seri Begawan. It was constructed as one of the targets of the Second 5-Year Economic Development Plan of 1973 with the following details. 10,000 - 12,000 tonners are entering the port through the channel, traversing the Cape Muara.

1) Chart No. 2134

2) Location 114°5'2"E, 4°53'16"N

3) Length of Berth 420 m (except inner berth)

4) Draft Vessel of 10 m draft can take berth. (except inner berth)

5) Others
   a. Pilotage is compulsory.
   b. Shifting is not allowed from 12 p.m. to 6 a.m.
   c. While the Port Authority owns a crane which can be leased, the cargo must be unloaded by the vessel's derrick.

In addition to this port of Muara, another port is located at Kuala Belait at the western end of the country and serves the oil and gas fields of Shell and Seria. The capital, Bandar Seri Bagawan also has a small port for coasters. Furthermore, there are mooring systems for loading the crude oil of Shell, off Seria and for loading LNG of Brunei LNG Ltd., to be shipped to Japan, off Lumut.

2.2.3 Airport

Brunei International Airport, completed in May, 1974, is located in the vicinity of Bandar Seri Begawan.
The state-owned Royal Brunei Airline, established in 1975, operates B-737s serving the short distance routes to Kota Kinabalu and Kuching of Sarawak and the long distance routes to Hongkong, Singapore, Manila and Bangkok. 3,220 departures and arrivals and 110 - 120 thousand passengers were recorded in 1979. Airport expansion construction is currently under way.

2.2.4 Electric power

Electric power in Brunei is administered by Department of Electrical Services.
Power plants are located at Seria in the Western Section and at Godong near Bandar Seri Bagawan in the Eastern Section. There is an expansion plan for the power plant at Gadong.
Primary voltage is 11 KV, which is transformed at substations to 240 V, 50 Hz for use at households.
Electric power generated and consumed in 1980 is shown below.

Generating Capacity	Generated Power	Consumed Power (Million KWH)			
(1,000 KW)	(Million KWH)	Household Use	Industrial Use	Others	Total
148.2	469.35	228.8	174.6	10.0	413.4

2.2.5 Water

Water taken from rivers is sufficient for water supply in most of the distincts including Bandar Seri Begawan. This water is also used for industrial purposes. The quantity of water consumption in 1979 is approximately 40 million cubic meters.

2.2.6 Communication

Telephone calls to Japan can be instantly made by dialing direct.
International telex services are available at the capital.
Bandar Seri Begawan and other large cities.
At present the second satellite telecommunications relay station is under construction at Telisai to provide better international telecommunication services when completed.

Table 2-1 Temperature, Humidity and Rainfall in Brunei (1977 - 1981)

	Temperature (c°)		Humidity (%)	Rainfall (mm) at Air port	at Muara
	Max.	Min.			
1977	31.0	22.9	93.0 (Mean)	3230	3014
1978	31.7	22.8	93.0 (")	2249	2019
1979	31.5	22.9	94.0 (")	3126	2339
1980	30.5	23.3	92.9 (")	3297	4247
1981	30.5	23.5	-	3700	-
January	25.1 (Mean)			578	
February	26.0 (")			432	
March	26.9 (")			154	
April	27.3 (")		Data not	97	Data not
May	27.6 (")		available	253	available
June	27.0 (")			433	
July	26.5 (")			306	
August	27.0 (")			34	
September	26.6 (")			474	
October	26.3 (")			336	
November	26.4 (")			525	
December	26.6 (")			322	

CHAPTER 3 MARKETING

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3.1 A General View of Brunei's Economy

The economy and industry of Brunei are those, in short, supported by ample foreign exchange income obtained by the exports of crude oil, natural gas and related products.

The gross domestic product (GDP) in 1974 - 1980 (anticipated) is as per Table 3-1 and that of 1980 is 4,162.7 million B$. In GDP, production of crude oil and that of natural gas constitute the principal production, as a matter of course, but the ratio is gradually going down drom 89% in 1979 to 80.5% in 1980 and 76.5% in 1981, and public service inclusive of construction work is increasing in its place from 4.4% in 1974 to 12.5% in 1980. This signifies the enlargement of national projects and the repletion of public projects. The per capita GDP has exceeded 20,000 Brunei Dollars in 1977 which is not only the highest level in Asia but also reaches a prominent level in the world.

In terms of foreign trade, the balance is in much surplus owing to the exports of crude oil and natural gas.

The details are as per the Table 3-2, but the exports (including re-exports) in 1980 are 9,853 million Brunei Dollars, the imports (including re-imports) are 1,231 million Brunei Dollars, and the trade balance reaches as high as 8,622 million Brunei Dollars.

The ratio of exports of oil, gas and related products among the above figures is still very high, reaching 98.6% in 1980. Among the imported goods, on the other hand, machinery is the largest at 40.4%, then processed goods (24.2%) and food staff (11.9%).

No large industry other than oil gas related can be found in the manufacturing field, being blessed with great income owing to oil and related products.

The Government is promoting, however, agriculture, stock-breeding and fishing industries working out development plans, as priority measures, for fear of a worldwide food shortage and with the purpose of meeting the selfsufficiency of foods. The Investment Insentive

Enactment was promulgated in 1975 and the Economic Development Board (EDB) was instituted in 1976 for bringing up and strengthening domestic industries. EDB aims at technology introduction, bringing up and strengthening various industries, particularly light industries, mainly aiming at ridding themselves of dependence upon crude oil only.

3.2 Cement Industry in Brunei

3.2.1 General

All the required cement in Brunei is supplied completely by imports in bags without having any clinker grinding plant neither clinker manufacturing works at present. The records of imports from 1972 to 1981 are shown in the following table.

(In thousands of tons)

	Quantity of Imports		
Year	OPC	OWC	Total
1970	53	-	53
1971	64	-	64
1972	61	17	78
1973	60	-	60
1974	52	30	82
1975	67	53	120
1976	74	42	116
1977	66	72	138
1978	73	25	98
1979	56	9	65
1980	89	27	116
1981	105	5	110

As can be seen from the above table, a yearly variation is evident although the overall demand is a trend toward increase. This is mainly due to the fluctuation of OWC demand while the OPC shows an increasing trend, and the current demand shows briskness with various construction works beginning with the construction of the New Palace, with independence in 1983 just ahead. The use of OWC is a feature of Brunei.

3.2.2 Current status of cement supply/demand

(1) Demand:

The cement demand shows a trend towards increase though there are variations year by year. With time, the per capita consumption moves as per the following table:

Year	Cement consumption (1,000 tons)	Population (1,000)	Per capita consumption (kg/person)
1971	64	136	471
1976	116	162	716
1981	110	193	570

The per capita consumption has reached a reasonably high level already, but this is because of the small population and abundant oil income which is one of the features observed in other small oil producing countries. Per capita cement consumption of the main countries in the world in 1979 is quoted for reference purposes as below:

Non oil-producing country	Consumption per capita	Oil-Producing country	Consumption per capita
United Kingdom	272 kg	Kuwait	1,830 kg
France	518	Bahrain	2,172
West Germany	552	Qatar	1,752
United States	339	U.A.E.	1,740
Japan	705	Saudi Arabia	1,720
Taiwan	663		
Hong Kong	473		

(Source: CEMBUREAU, WORLD STATISTICAL REVIEW 1979 - 1980)

(2) Supply:

The cement supply in Brunei is being carried out entirely in bags as aforementioned. The quantity of supply and country of origin are as follows:

Kind	Year / Country	1978	1979	1980	1981	1982 (Jan-Jul)
OPC	Japan	10,512	22,436	22,065	5,589	375
	Phillippines	31,251	10,350	30,915	23,200	5,100
	Taiwan	29,162	18,611	31,857	76,180	50,234
	Indonesia	-	3,330	-	-	-
	Others	1,918	1,559	3,941	16	10
	Subtotal	72,843	56,286	88,778	104,985	55,719
OWC	Singapore	18,559	6,317	4,212	4,149	6,154
	West Germany	6,064	2,475	22,518	837	642
	Others	537	-	-	-	-
	Subtotal	25,160	8,792	26,730	4,986	6,796
Total		98,003	65,078	115,508	109,971	62,515

As is observed from the above, the ratio of OPC and OWC is 84% : 16% in the average between 1972 - July 1982, and the OPC occupies a big share. The supply sources in OPC are mainly Japan, Philippines and Taiwan, and the weight of Taiwan is increasing lately. (35.9% in '80, 72.6% in '81 and 90.2% in Jan-July '82). On the other hand, Singapore and West Germany are the main supply sources in relation to OWC, and most of the imports in '81 and '82 are from Singapore.

3.2.3 Sales and distribution

The cement supply to Brunei is completely unloaded in bags. The cement is carried on board 3,000 - 6,000 ton vessels, most of which are unloaded at Port Muara, and those of OPC are sotred in warehouses or delivered directly to the importers and then sold to each user through distributors. On the other hand, those of OWC are used by contractors of crude oil and gas well drilling, but the purchase is presumed to be carried out by Shell directly.

3.2.4 Price

According to the latest import statistics, the CIF price of imported bagged cement in Brunei is B$ 114 for OPC and B$ 295 for OWC the past trend of the CIF price for OPC from 1980 to July 1982 is estimated as follows.

(In US$)

Year	Taiwan	Philippines	Japan
1980 (average)	77	69	80
1981 (average)	72	68	80
1982 January	72	70	79
February	72	70	79
March	62	68	77
April	62	61	66
May	62	61	-
June	58	58	-
July	57	57	-

Then, the landed cost and the ex-sling price are estimated as follows;

Item	OPC	OWC
CIF Price	114	295
Port Charge	1.40	1.40
Handling Charge	7.40	7.40
Landed Cost	122.80	303.80
Dealers Margin (15%)	18.42	* -
Ex-sling	141.22	303.80

* OWC is sold directly to the customer, without any dealer.

Most of them are dealt with using the ex-sling base, and the retail prices, adding the transportation costs, are presumed to be as follows:

Item	OPC		OWC
	Bandar Seri-begawan	Kuala Belait & Seria	
Ex-sling	141.22	141.22	303.80
Transportation	7.00	16.00	16.00
Retail price	148.22	157.22	320.80

The above-mentioned landed costs are used in the financial analysis described in Chapter 6.

3.3 Demand Forecast of Cement in Brunei

There are various methods of forecasting the demand for cement in future. Although such methods as Gompertz Growth Curve, Logistic Curve. Index Curve etc. have been carried out for this study, but due to limitation of data like national economic development, large projects, public investment and private equipment investment, etc., and after a careful observance of the results obtained through various methods, the trend analysis method was adopted based upon the actual records for 10 years from 1972 to 1981 for OPC.

The formula obtained by this method is as follows:

$y = 49,938.3516 + 3,719,1563\ x$ (Correlation function 0.707)

where, y = Volume of cement demand (in 1,000 tons)

x = A year taking 1972 as 1.

It is presumed by this formula that the cement demand of OPC in Brunei would be 102 thousand tons in 1985, 121 thousand tons in 1985, 121 thousand tons in 1990, 139 thousand tons in 1995 and 160 thousand tons in 2,000. Further, Brunei will become independent in 1983, and national construction work will be promoted on a large scale particularly after the independence and there remains considerable room for the implementation of such social investment as roads, hospitals, sewerages, etc. Hence it is presumed that there is a good possibility for Brunei's cement demand in the future to exceed the above figures.

With regard to OWC, the oil-drilling will be continued hereafter also, being an oil-producing country and judging from the present situation that the oil occupies a major portion of the national economy, and it is presumed that the demand of the current level (16.5 thousand tons average from 1978 to 1981) will continue on the assumption that no such unexpected occurrence of events as the oil crisis (the demand for OWC increase sharply during an oil crisis) will take place in the future. As a conclusion, the total demand of OPC plus OWC in Brunei is presumed to be as follows:

(In thousands of tons)

Year	Cement demand		
	OPC	OWC	Total
1985	102	17	119
1990	121	17	138
1995	139	17	156
2000	158	17	175

The growth rate in the above period is thought to be as follows:

Year	Growth Rate (%)	
	OPC	OWC
1983 - 1985	3.9	-
1986 - 1990	3.6	-
1991 - 1995	3.1	-
1996 - 2000	2.7	-

Table 3-1 Gross Domestic Product by Kind of Economic Activity

(Million B$)

Kind of Economic Activity	1974	1975	1976	1977	1978	1979	1980*	1981*
Agriculture& Hunting	27.3	25.9	24.1	23.2	25.9	28.3	30.0	31.8
Forestry & Logging	3.1	4.3	5.3	5.7	4.8	5.5	5.1	7.9
Fishing	4.8	5.1	3.7	5.0	5.1	5.4	4.1	4.9
Mining, Quarrying Manufacturing	2,327.3	2,292.0	2,790.6	2,918.2	3,020.2	3,840.7	3,352.0	2,517.7
Electricity, Gas & Water	5.9	6.2	7.5	4.6	1.4	(-) 1.4	(-) 1.5	(-) 1.6
Construction	35.1	51.2	58.0	67.8	58.4	66.0	69.3	74.1
Wholesale Trade	10.7	11.5	9.9	132.6	245.2	258.5	259.0	187.0
Retail Trade	41.0	45.8	50.5	71.6	75.2	70.9	75.2	79.7
Restaurant & Hotels	6.5	9.8	10.5	10.8	12.2	12.1	12.8	13.6
Transport, Storage and Communication	14.1	21.3	25.5	30.6	38.9	37.9	40.2	42.6
Banking & Finance	12.8	21.5	22.0	32.1	34.3	54.0	57.2	60.7
Insurance	0.9	0.7	0.6	1.8	1.9	1.9	2.0	2.1
Real Estate & Business Service	12.3	17.3	21.9	32.1	40.0	32.9	34.9	37.0
Ownership of Dwellings	12.0	13.0	14.2	15.2	16.1	17.0	18.0	19.1
Community, Social & Personal Services	115.7	122.7	136.7	178.9	194.6	196.2	449.4	268.3
Less Bank Charges	(-) 13.3	(-) 22.5	(-) 27.2	(-) 31.1	(-) 37.9	(-) 46.6	(-) 49.4	(-) 52.3
Gross Domestic Product	2,616.2	2,625.6	3,154.8	3,499.1	3,736.3	4,579.3	4,162.7	3,292.6

* Provisional

Table 3-2 Exports, Imports and Balance of Trade

(1,000 B$)

Year	Exports	Imports	Total External Trade	Balance of Trade
1968	281,421	209,732	491,153	71,689
1969	270,140	222,035	492,175	48,105
1970	292,063	256,122	548,185	35,941
1971	323,636	456,554	780,190	(-)132,917
1972	497,379	300,206	797,584	197,173
1973	852,056	323,229	1,175,285	528,827
1974	2,388,313	450,897	2,839,210	1,937,416
1975	2,494,806	648,857	3,143,663	1,845,949
1976	3,293,151	642,530	3,935,681	2,650,621
1977	3,999,977	680,408	4,680,384	3,319,569
1978	4,195,210	639,246	4,834,456	3,555,964
1979	5,796,490	862,083	6,658,573	4,934,407
1980	9,852,936	1,230,595	11,083,532	8,622,341

CHAPTER 4 PLANT AND EQUIPMENT

CHAPTER 4 PLANT AND EQUIPMENT

4.1 Planning Conditions

4.1.1 Plans for plant

The present study deals with the plan to construct a grinding plant of imported clinker and the plant to build a packing plant by importing bulk cement. In this study, the two plans are compared in various respects, which are referred to as Case 1 and Case 2, respectively.

4.1.2 Plant site

The site is expected within the Muara industrial area located about 1.5 km south along the coast from the existing base of Muara Port. This district is near Bandar Seri Begawan which consumes cement a lot, and is sufficiently accessible. Besides, considering from the receiving of raw materials and provisions of utilities such as required electric power and water (there is already a beverage bottling plant in the district), the conditions are ideal for the construction site of the plant.

As further described later, the location is suited to construction of cement grinding plant from the view points that the aggregate center, ready-mixed concrete plant, cement and concrete product manufacturing plant and other related plants can be expected to be constructed in future by utilizing a new pier to be built, so that the efficiency of management may be improved.

See the map of Muara in Figs. 4.1, 4.2 for the location of the plant.

4.1.3 Determination of plant capacity

On the basis of the cement demand forecast in 3.3, the cement demand in Brunei is estimated as follows:

	OPC		OWC	
1985:	102,000 T	+	17,000 T	= 119,000 tons/year
1995:	139,000 T	+	17,000 T	= 156,000 tons/year
2005:	177,000 T	+	17,000 T	= 194,000 tons/year

The determination of capacity of principal equipment is based on the production in 1995, ten years after start of the plant operation, that is, 156,000 tons per year. The subsequent demand increases should be met by extending the facility. The types of cement to be manufactured should be OPC and OWC, which should be changed over depending on demands. The capacity of individual equipment has been determined on the basis of the above capacity and the local conditions.

4.1.4 Operating days and working hours

According to the regulations in Brunei, at least nine holidays are required yearly besides Sundays. And considering the three-shift work system of the plant, the yearly operating days of the plant should be 300, and the operation rate is, hence, 300/365 x 100 = 82%.

The operating days and working hours are as follows:

		shifts /day	hours /day	days /week	weeks /year	hours /year	days /year
Case 1	Cement mill department	3	24	6	50	7,200	300
	Cement discharge department	1	8	6	50	2,400	300
Case 2	Cement discharge department	1	8	6	50	2,400	300

4.1.5 Required amount of raw materials

The required amount of raw materials is as follows.

	Cement	Paper bag	Clinker (in total of OPC and OWC)	Gypsum
Case 1	156,000 tons/year 13,000 tons/month 520 tons/day	50 kg per bag, supposing breakage of 0.5%: $\frac{156,000}{2x0.05}$ x 1.005 = 1,567,800 bags/year; 5,226 bags /day	156,000 x 0.965 = 150,540 tons/year 12,545 tons/month 502 tons/day	156,000 x 0.035 = 5,460 tons/ year 455 tons/month 18 tons/day
Case 2	ditto	ditto	—	—

4.1.6 Construction of a New Jetty

(1) Case 1

According to our field survey, the present Muara Port is very crowded, and always several vessels are waiting for the turn of unloading. The unloading space is also narrow. Yet, because of the nature of bulk material handling and also from the viewpoint of global trend, dirty/bulky cargo should be handled in an independent jetty, not in the existing one.

Therefore, a new jetty of 120 m in length and 8 m in depth should be constructed in front off-shore the plant building site. This new jetty is intended for use not only by the clinker grinding plant and Muara industrial complex, but also by the future constructions of ready-mixed concrete plant using sand and

gravel and comprehensive building material center including cement, concrete product plants.
(See the map of Muara in Fig. 4.1.)

(2) Case 2

To import bulk cement, exclusive bulk cement carrier should be necessary. The imported cement will be unloaded by using the pneumatic transport equipment mounted aboard the ship, and charged into the cement silo through the pneumatic transporting pipe installed on the land.

The arrival position of the ship must be as close to the cement silo as possible. Therefore, a mooring dolphin is installed at a position 80 m from the coast of the plant site, and a new jetty of 9 m in depth is provided exclusively for cement ships. (See the map of Muara in Fig. 4.2.)

4.2 Capacity of Plant Equipment

4.2.1 Receiving equipment

(1) Case 1

The cement clinker may be obtained widely from the international market, and the carriers should be say timber ships with a capacity of about 7,000 tons, in consideration of economy, which could be hired from a wide charter market in a range of unspecified ships.

A 7,000-ton loading ship may measure, for example, 107 m in overall length, 8.3 m in height, and 6.6 m in draft, and should be equipped with four derrick cranes for cargo handling. Clinker is unloaded by using the derrick cranes mounted aboard the ship and the grab buckets prepared at the jetty are used. A full shipload should be generally unloaded in about 40 hours.

The unloading berth for clinker and gypsum should be extended 80 m from the coast, and measure 120 m in length, 20 m in width, and 8 m in depth.

(a) Hoisting load and operating capacity of derrick crane

The nominal hoisting capacity of derrick cranes usually mounted aboard 7,000-ton class ships is about 15 to 20 tons, but the actual working capacity is about 60 to 65%. Supposing the actual hoisting capacity to be 15 tons x 60% = 9 tons, ships having larger capacity should be chartered.

Besides, in the case of timber ships, considering that the operation of derrick boom be heavy in load and low in speed, the unloading speed is assumed to be 15 times/hour.

(b) Size of grab bucket used in unloading

Buckets with a grab capacity of 3.5 m^3 are used. The hoisting load consists of the clinker weight of 3.5 m^3 x 1.4 = 4.55 tons (1.4: clinker specific gravity) and bucket own weight of 3.6 tons, which totals to 8.15 tons. Since this is less than the crane capacity of 9.0 tons, the bucket size is reasonable.

(c) Crane operating capacity

3.5 m^3 x 1.4 x 15 times/hour x 0.7 (loading efficiency)
= 51.5 t/h

51.5 t/h x 4 (derrick cranes) = 206 t/h
Hence, the loading capacity is supposed to be 200 t/h.

(d) Belt conveyors are used as clinker receiving and transporting equipment. The capacity should be 300 t/h of clinker.

(e) Clinker unloading time

As compared with the all-night working calculation based on 20 hours/day in Japan (operators working on four shifts), the calculation in Brunei is estimated on the basis of 18 hours/day, and hence the unloading capacity is

18 hours/day x 200 t/h = 3,600 t/day.

Suppose a shipload of 7,000 tons, then complete unloading takes

7,000 tons/3,600 tons/day = approx. 2 days.

Or, it takes 47 hours.

(2) Case 2

As for the plan of importing bulk cement from the neighboring Sabah, since it has been pointed out in other report that it is less economical than the clinker import plan, the sources of bulk cement are searched widely from an international market in this comparison.

(a) Size and type of cement import ship

The range of import is assumed in a distance of 2,200 miles from Brunei, including Japan and Korea, and it is also supposed that bulk cement shipping equipment is already installed by supplier.

Estimating the navigation speed at 13 knots and the number of days for one navigation at 19, the number of possible navigations per year is

$$\frac{365 \times 0.95}{19} = 18.$$

In order to import 156,000 tons a year,

$$\frac{156{,}000 \text{ tons}}{18} = 8{,}500 \text{ tons/navigation}$$

one ship with a capacity of 8,500 tons is required.

Regarding the transportation and unloading of bulk cement, since it cannot be handled by an ordinary cargo ship like clinker, an exclusive bulk cement carrier is required. The unloading equipment on the ship should be of pneumatic system so as to be applicable to the receiving conditions at the Brunei plant, and the unloading capacity is to be 500 tons/hour.

In sum, one cement import ship of 8,500-ton capacity equipped with pneumatic unloader should be hired.

(b) Unloading equipment

A dolphin pier exclusive for cement loading should be constructed at a position 80 meters offshore the plant site, and it should be connected with the cement silo by way of pipe for pneumatic transportation. For piping, one line of 16-inch pipe may be installed.

At the cement receiving silo, a bag filter of 750 m^3/min capacity should be installed in order to treat the air for pneumatic transportation.

(c) Unloading schedule

Suppose the unloading capacity to be 500 tons/hour, one shipload may be unloaded in

$$\frac{8,500 \text{ tons}}{500 \text{ t/hour}} = 17 \text{ hours.}$$

Including the preparing and finishing time, the actual unloading time may be about 20 hours.

All unloading job should be carried out by the ship crew.

4.2.2 Storing Equipment

(1) Case 1

(a) Clinker silo

The clinker consumption is calculated in the following equation.

Clinker for OPC = 139,000 tons x 0.965 = 134,135 tons/year

Clinker for OWC = 17,000 tons x 0.965 = 16,405 tons/year

The silo capacity is calculated in the following formula.

$$Q = V + 2.5 \times A \times B;$$

where Q: silo capacity

V: ship capacity = 7,000 tons

A: average number of days of delay of ship arrival due to rough seas, etc. = 6 days

B: daily discharge output = 463 tons

Therefore, Q = 7,000 + (2.5 x 6 x 463) = 13,945 tons

This value may be considered as the total amount of clinker silo capacity and cement silo capacity, and the clinker silo should hold 10,000 tons and the cement silo 4,000 tons. Hence, one clinker silo for OPC with a capacity of 10,000 tons should be built.

Since the clinker for OWC is transported in mixed load by separate hatch together with the clinker for OPC, its silo capacity may be 4,000 tons.

(b) Gypsum yard

Natural gypsum is to be used because it is stable in quality and easy to handle. This material is imported from Thailand or Australia aboard 1,000-ton ship.

Gypsum is unloaded like clinker, and conveyed on belt conveyor and dropped into the gypsum yard, of which storing capacity should be 1,500 tons.

(c) Cement silo

1) The capacity of OPC cement silo should be, as mentioned in (1)-(a), 4,000 tons, but two silos of 2,000-ton capacity each should be installed for the convenience of maintenance.

2) The capacity of OWC cement silo should be 2,000 tons to coincide with the OPC silo capacity. Assuming the

average discharge output of OWC

17,000 t/year/300 days = 57 t/day,

this capacity provides a portion for 35 days, and it is flexible enough to cope with the demand fluctuations.

(2) Case 2

Only the cement silo is required. Reasoning from (1).(a), the silo capacity should be 14,000 tons for OPC, and 4,000 tons for OWC.

4.2.3 Grinding equipment

(1) Case 1

Supposing the cement mill may operate 300 days a year, the production may be calculated as follows:

Daily production: 156,000 t/year/300 days = 520 t/day
Hourly production: 520 t/day/24 hours = 21.7 t/hour(actual)

The production of OWC is 11% of the total cement production. That is, in 300 days a year, the cement mill will manufacture OPC for 267 days and OWC for 33 days.

Estimating from the theoretical average demand, OWC should be manufactured for about three days every month. Considering the losses due to switching of operation and other causes, the designed capacity of cement mill is determined at 23 tons/hour. This mill should be operated in three shifts.

The expected demand at the start of operation in 1985 is OPC + OWC = 120,000 tons/year, and this plant is supposed to occupy 80% of the market share. In this estimation, the production and operating hours are as follows:

120,000 tons/year x 0.8/300 days = 320 tons/day

320 tons/day/23 tons/hour = 13.9 hours/day

Hence, in the initial period, two-shift operation may be possible.

In three years, the market share will be 100%, and the individual values are:

(109,000 + 17,000) tons/year/300 days = 420 tons/day

420 tons/day/23 tons/hour = 18.2 hours/day

(2) Case 2

Grinding equipment is not required in Case 2.

4.2.4 Packing, discharging equipment

(1) Case 1

The calculation is based on the following conditions.

1 Operating days of discharging equipment: 300 days/year

2 Daily average output: 156,000 tons/year/300 days = 520 tons/day

3 Suppose the ratio of bagged cement and bulk cement to be 50:50. However, OWC should be wholly discharged in bag. Therefore, the bagged cement amounts to 260 tons/day, and bulk cement 260 tons/day.

4 The equipment should be operated only during daytime, and the actual working time should be 6 hours/day.

(a) Packing equipment

Since two(2) different types of cement should be discharged simultaneously, the storage tank and packer should be installed in two lines.

The capacity of packer is 45 tons/hour in three-tube type, and the daily capacity is

45 t/h x 6 h/day = 270 tons/day/unit.

Using two packers, the total capacity is 270 t/d x 2 = 540 tons/day.

Considering the truck shift time (9 minutes for loading into 6-ton truck and 3 minutes for exchanging trucks), when the operation rate is assumed to be 75%, the actual capacity is

540 t/d x 0.75 = approx. 400 tons/day.

Hence, the allowance in capacity is about 1.5 times (=400/260 tons/day), which seems reasonable in consideration of the fluctuations of discharge output due to weather conditions, and cement exchange time loss of packer bin for switching over OPC and OWC discharge.

Estimating the production at the start of operation in 1985 as follows:

120,000 t/year x market share 80% = 96,000 tons/year

suppose all products are discharged in bag:

Discharge output: 96,000t/year/300 days = 320 tons/day

Total capacity of two packers: 400 tons/day

Hence, the allowance in capacity is about 1.25 times (=400/320 tons/day). Fluctuations in demand may be met by varying the operating time.

(b) Bulk cement discharging equipment

Shipping form of cement is inclined toward bulk style, and this trend is also expected in Brunei.

In bulk discharging equipment, only OPC products shall be shipped in bulk form. Suppose 50% of the products

are discharged in bulk form, the daily bulk cement discharge output is 260 tons. Supposing the bulk discharging capacity to be 80 tons/hour,

80 t/h x 6 hours x 0.75 (operation rate considering truck exchange) = 360 tons/day

and the allowance in capacity is 360/260 tons/day = 1.4 times, which seems proper. Therefore, one bulk discharging equipment of 80 t/h capacity should be installed.

(2) Case 2

The same packing and discharging equipment as in Case 1 should be required.

4.2.5 Substation Equipment

(1) Case 1

The total equipment electric power of the motors used in this plant is 1,630 kW. Assuming the load factor to be 0.9, power factor to be 0.85 and efficiency to be 0.9, the required capacity of the principal transformer is

1,630 kW x 0.9/0.85/0.9 = 1,917 kVA = approx. 2,000 kVA.

(2) Case 2

The total power of the motors used in cement packing plant is 310 kW. Assuming the load factor to be 0.8, power factor to be 0.85, and efficiency to be 0.85, the required capacity of the main transformer is

310 kW x 0.8/0.85/0.85 = 324 kVA

= approx. 350 kVA.

4.3 Specifications of Principal Equipment and Facilities

4.3.1 Machinery

Equipment	Case 1	Case 2
Cement mill	Capacity: 1 set x 23 t/h Dimensions: 3.0 m dia. by 8.3 m long Type: Closed circuit compound tube mill Drive motor: 850 kW Accessories 1 set Air separator and circulation fan Model: Cyclone separator; 2.4 mø x 1.0 mø; 6 cyclones; motor 50 kW x 6P Circulation fan: 850 m^3/min x 300 mmAq; motor 80 kW x 6P 1 set Bag filter and I.D.F. Capacity: 460 m^3/min; motor 80 kW x 6P 1 set Water sprinkler	—
Packer	Capacity: 2 sets x 45 t/h Model: Stationary type 3 spouts	See left.
Bulk discharging equipment	Capacity: 1 set x 80 t/h Accessory: 1 set truck scale	See left.
Clinker, gypsum receiving belt conveyor	Capacity: 1 set x 300 t/h	—

4.3.2 Storing equipment

Equipment	Case 1		Case 2
OPC clinker silo	Capacity Dimensions Structure	1 set x 10,000 tons 20 mφ x 36 m high Reinforced concrete	-
OWC clinker silo	Capacity Dimensions Structure	1 set x 4,000 tons 14 mφ x 30 m high Reinforced concrete	-
Gypsum yard	Capacity Structure	1 set x 1,500 tons Lower part: reinforced concrete, upper part: steel frame; outer wall, roof: slate lining	-
OPC silo	Capacity Dimensions Structure	2 sets x 2,000 tons 11 mφ x 25 m high Steel plate	Capacity 1 set x 14,000 t Dimensions 22 mφ x 32 m high Structure Reinforced concrete
OWC silo	Capacity Dimensions Structure	1 set x 2,000 tons 11 mφ x 25 m high Steel plate	Capacity 1 set x 4,000 t Dimensions 14 mφ x 23 m high Structure Reinforced concrete

4.3.3 Electrical equipment

Equipment	Case 1	Case 2
Substation	1 set x 2,000 kVA	1 set x 350 kVA
Power distribution equipment	1 set	1 set
Instrumentation and control	1 set	1 set
Communication equipment	1 set	1 set

4.3.4 Port facilities

Item	Case 1	Case 2
Jetty size	Regular jetty: 120 m long x 20 m wide Communicating jetty: 60 m long x 10 m wide	Dolphin
Depth below sea level	8 m (to be dredged to 10 m in the future)	9 m
Vessel handled	7,000-ton class	8,500 tons
Principal equipment	Movable hopper for receiving clinker, gypsum Receiving belt conveyor	-

4.4 Technical Descriptions

4.4.1 General

Case 1 is a plant to grind imported cement clinker to produce cement, and discharge it as bagged or bulk cement. The clinker grinding mill is said to be one of the lowest efficient equipment, and it consumes considerable amount of electric power to grind clinker into fine cement. This power consumption occupies about 40% of the total electric power used in cement production. Therefore, to the contrary, to install such power consuming grinding process in Brunei where electric charge is low is both economical and rational.

Case 2 represents a plant to import bulk cement and discharge it as bagged or bulk cement. Bulk cement is imported by means of exclusive carrier.

Besides, characteristically in this country, OWC is demanded, and the domestic cement grinding plant should naturally produce OWC too, and the manufacturing equipment should be designed to produce both OWC and ordinary Portland cement.

The basic matters that should be taken into consideration in planning the plant must include the following:

1 The equipment must be easy to handle. Machines of low failure rate and easy maintenance should be selected and arranged rationally. The equipment with proper capacity should be selected according to the operating conditions.

2 Automatic and labor-saving equipment should be installed as far as possible.

3 Careful attention should be paid to the pollution control as long as economical. Hence, necessary countermeasures should be taken for the sources of dust and noise.

4 Safety and sanitation of workers should be sufficiently considered.

4.4.2 Process flow and mechanical descriptions

(1) Case 1

(a) Receiving of clinker and gypsum

Clinker and gypsum must be imported from a wide international market. Considering the economy, the clinker import ships must be mainly assumed to be timber ship type ranging from 5,000 to 7,000 tons in capacity.

As for gypsum, natural gypsum should be imported mainly from Thailand and Australia aboard 1,000-ton ships.

The raw materials should be unloaded from the ship by using the derrick cranes mounted aboard and the grab buckets installed at the jetty.

At the jetty also, four sets of receiving hopper measuring 6 m by 6 m by 3 m high are installed to receive the clinker from the ship. These hoppers should be movable in order to adjust with the position of the cranes aboard the ship. The clinker extracted from beneath the hoppers is placed on the belt conveyor installed at the jetty, and conveyed up to two clinker silos and gypsum yard.

The dust collector installed at the jetty will minimize the dust releasing. The belt conveyor must be provided with rain cover, and releasing of dust from the chutes at the head and tail part should be minimized by the dust collector.

(b) Clinker grinding mill

The clinker extracted through belt conveyor installed beneath the silo is transferred into the hopper in front of the cement mill. The gypsum is transferred from the yard to the discharging hopper by means of shovel loader, and is further conveyed into the hopper in front of the cement mill on the belt conveyor.

The clinker and gypsum collected in the hopper before the mill are individually extracted by remote-controlled C.F.W.s, and are supplied at a constant rate into the grinding mill.

When switching from OPC production to OWC production, after finishing the grinding of OPC clinker in the clinker hopper before the mill, it is changed to OWC clinker.

A desired finess may be easily obtained by adjusting the air separator by remote control. If the cement temperature rises too high during grinding process, the water inherent in the gypsum ($CaSO_4 \cdot 2H_2O$) is evaporated, $CaSO_4 \cdot 2H_2O \rightarrow CaSO_4 \cdot \frac{1}{2}H_2O$, which may invite a phenomenon extremely unfavorable for the cement called false setting. In this plant, since cement is air-cooled by air separator, such trouble may be prevented, but a water sprinkling system should be installed in the mill for safety precaution.

The product cement is sent into the cement silo by way of screw conveyor, chain conveyor, air slide, and bucket elevator.

To operate and control the plant, a central control room for the cement mill line and clinker and gypsum receiving

equipment should be installed beside the mill drive room.

(c) Cement packing/discharging equipment

Cement is extracted from two OPC silos and one OWC silo by means of aeration system installed in the silo and is sent into the cement tank of packer room by way of conveying line consisting of air slide, screw conveyor, bucket elevator and screen. The cement tank is divided into two rooms for storing OPC and OWC respectively. From the two cement tanks, cement is supplied into two packers. The packer operation is changed over to OPC or OWC as required.

Bags of cement are conveyed on the belt conveyor and discharged into the waiting truck from the chute, and are stacked up in the truck platform by the truck workers. One bag will be piled up every four seconds, and a 6-ton truck will be filled up in 8 minutes.

The truck loading chute is moved up and down by compressed air operation. Cement spilling over from the packer or from rare broken bags is placed on the return screw conveyor installed beneath the packer and is returned to the cement tank by way of cement screen.

On the other hand, bulk cement is extracted from the cement tank by the air slide and loaded into a bulk lorry. A truck scale is installed beneath the parking position of bulk lorry, and when a specified amount of cement is loaded, the extraction gate from the cement tank is automatically closed to finish loading.

In Brunei, at the present, bulk cement is not used at all. It is desired, economically and for the purpose of achieving 100% market share as soon as possible, to increase the use of bulk cement. It is hence necessary to publicize the knowledge of bulk cement from the beginning of the plant operation by preparing bulk lorries and installing bulk service tanks at the customers' locations.

The operation control room should be installed in the packer room, and the electrical equipment for packing and bulk loading should be installed all together.

(2) Case 2

(a) Receiving of bulk cement

Bulk cement is imported by exclusive carrier (8,500-ton capacity), and unloaded into the silo through the piping by means of the pneumatic unloader mounted aboard the ship.

A bag filter is installed at the cement receiving silo to treat the air used in cement pneumatic transportation.

(b) Cement packing/discharging equipment

Same as mentioned in (1).(c).

4.4.3 Electrical facilities and control

(1) Outline of electrical facilities

The electrical facilities and their arrangement should be designed on the basis of the following.

(a) The outdoor cubicle type unattended substation should be located within the plant site, and it should be monitored and controlled either locally (at the substation) or remotely from the monitor and control panel in the central control room.

(b) The electric equipment should be divided into following departments:

Case 1	Case 2
Clinker, gypsum receiving and discharging equipment	-
Finishing mill equipment	-
Cement storing and discharging equipment	Cement receiving, storing, discharging equipment

(c) These departments should be independently controlled by the central monitor and control panel, and each operation room should be divided into two sections:

i) Case 1

1 The facilities for clinker, gypsum receiving and discharging equipment and cement mill equipment are assembled in one division.

2 Only the facilities for cement storing and discharging equipment are set in one room.

ii) Case 2

All the equipment for receiving and discharging cement should be installed in one room.

(d) The power distribution room for each department (comprising power transformer, lighting transformer, low voltage motor control panel, etc.) should be installed individually in the field.

(e) Each department should be operated automatically, as far as possible, from the central operation room, and all motors should be interlocked.

(f) All the electrical facilities and electric works should conform to the standards in Brunei (British Standards).

(g) The electrical parts should withstand severe environmental conditions of Brunei (high temperature, high humidity), and resist cement dust, in particular.

(2) Electric power supply

The electric power required for this entire cement grinding plant will be obtained from the nearest substation of the local power supplier. The electric works to lead the power (11 kV) up to the receiving substation in the plant site are supposed to be executed by the power supplier. The responsibilities of the supplier should end at the secondary terminal of the plant substation. The capacity of receiving power should have a sufficient allowance for extending the plant in the future.

(3) Power distribution system

(a) Case 1

The receiving substation for obtaining 3.3 kV from the 11 kV line should be installed within the plant site. The incoming power source of 11 kV, 50 Hz is stepped down to 3.3 kV by the 2000 kVA main transformer, and is supplied to the high voltage motor, low voltage power transformer and lighting transformer.

The supply voltage of motors should be as follows:

Motor rated voltage	Motor capacity
3.3 kV	100 kW or more
415V	Less than 99 kW

The 415V is obtained from 3.3 kV line by means of the power transformer in each power distribution room, and is used as the power source of the low voltage motor. The capacity of power transformer in each power distribution board should be as follows:

i. For clinker, gypsum receiving and discharging equipment: 300 kVA

ii. For cement mill equipment: 200 kVA

iii. For cement storing and discharging equipment (including office, laboratory, warehouse): 250 kVA

(b) Case 2

The receiving substation of 11 kV/415V is installed within the plant site. The service power source of 11 kV, 50 Hz is stepped down to 415V by the 350 kV power transformer to be used as motor power source.

(4) Motor control

The motors are sequentially started and stopped by means of the buttons provided in the independent central monitor and control panels of the respective departments.

Each central monitor panel is provided with graphic panel for each department, so that the state of all motors can be checked at a glance. In case of motor failure, the pilot lamp for the defective motor flickers on the graphic panel and the annunciator sounds to notice the operator for quick

remedy so as to minimize the loss. Besides, for the ease of maintenance of the motors and machines, local switches are provided at all motors, and the motors may be independently operated or stopped regardless of the interlock.

The motor control system is sequentially controlled by the standard auxiliary relays with contacts. The power source circuit of motor is composed of assembly type electromagnetic contactors (with thermal relays).

(5) Instrumentation and control

The central monitor and operation panel is of panel/desk integral type, and the panel unit comprises graphic panel, annunciator, ammeter and recorder, while the desk unit contains regulator, rate setting meter, other instruments, pushbuttons for motor sequential start and stop, lamp test buttons and alarm reset button.

The operating staff should consist of one operator at the central operation room for clinker, gypsum receiving and discharging line and cement mill line, and another one at the central operation panel for cement storing and discharging line (this role should be usually played by the packer attendant, and resident operator is not necessary).

The instrumentation signals should be generally DC 4 to 20 mA, and noise resistance of signals should be increased.

The instrumentation process control systems should be composed of standard electronic analog instruments.

(6) Operation of substation facilities

The unmanned substation should be monitored and controlled remotely by the operator at the central operation room of the cement mill line.

(7) Internal communications system

Mutual communications systems connecting the central operation rooms and between each power distribution room and receiving substation should be installed (private telephones with paging bell) in order to operate and maintain the plant safely and smoothly.

(8) Power consumption of equipment

Case 1

The power consumption is assumed as follows.

	Clinker, gypsum receiving, discharging system	Cement mill system	Cement storing, discharging system	Miscellaneous power
High voltage motor equipment capacity (kW)		850 kW		
Low voltage motor equipment capacity (kW)	280 kW	210 kW	230 kW	27 kW
Power consumption (kWh/Mt cement)	0.8 kWh/t	42 kWh/t	2.2 kWh/t	0.17 kWh/t
Power consumption (kWh/Mt cement)	45.17 kWh/t			

Case 2

	Cement receiving system	Cement discharging system	Miscellaneous power
Low voltage motor equipment capacity (kW)	70 kW	230 kW	10 kW
Power consumption (kWh/Mt cement)	0.13 kWh/t	2.2 kWh/t	0.1 kWh/t
Power consumption (kWh/Mt cement)	2.43 kWh/t		

4.4.4 Civil Engineering Works

General

As a result of investigations of natural environmental conditions (location, geographical, meteorological and other conditions) as mentioned in 2.1.1 and 2.1.2, no technical problems for civil engineering works were found. The design foundations were calculated on the basis of BS, and the conceptual design was assumed as follows:

Wind velocity v = 50 m/sec
Horizontal earthquake intensity K = 0.05.

The site is a reclaimed land with a flat surface. The soil bed is slightly weak, and piling will be necessary for building heavy structures such as silos. The foundation work was designed in 20-meter piling.

(1) Case 1

1) Pier

Location:	80 m offshore from the plant site
Vessels to be handled:	7,000-ton class
Size:	Main pier — 20 m wide, 120 m long, 8 m deep (10 m in future).
	Communicating pier — 10 m wide, 60 m long.
Structure:	Upper part in reinforced concrete; foundation by steel tube piling (ϕ400 to 450).
	For the sake of multi-purpose use, the clinker receiving belt conveyor

is installed under surface, and only the receiving hopper (movable type) should be built on the surface. The communicating pier should be designed to permit passing of vehicles.

Dredging: A mild slope up to about 150 m offshore from the main pier should be dredged to a depth of 8 m. Since field survey disclosed tidal waves of 1.5 to 2 knots, a total volume of about 200,000 m^3 must be dredged for both starboard and port tying-up.

The dredged sand can be used for reclamation of the industrial area south of the proposed plant site.

2) Plant facilities

Since the site soil is weak, all structures should be built on pile foundation. Considering frequent rainfalls in the district, underground structures must be avoided as far as possible.

a. Clinker silo (reinforced concrete structure, roof beam in steel frame)

For OPC: 10,000-ton clinker silo: one unit (20 m dia., 36 m high)

For OWC: 4,000-ton clinker silo: one unit (14 m dia., 30 m high)

b. Suprastructure of clinker receiving belt conveyor (steel frame, outer wall and roof lined with slates) 27 m x 8 m x (5 m to 11 m high).

c. Gypsum yard (lower part in reinforced concrete, suprastructure in steel frame, outer wall and roof lined with slates)
30 m x 15 m x 14 m high (incl. discharging hopper, pit).

d. Finishing mill equipment

d-1 Mill foundation (reinforced concrete)
The foundation is extremely important for rotating and vibrating machines, and all possible measures should be taken to prevent propagation of vibration and unequal settling.

d-2 Buildings (reinforced concrete, hopper steel plate structure)
Enclosed type structure should be employed in consideration of prevention of noise and other pollutions.
31 m x 10.5 m x 21 m high (second floor for separator and bag filter, first floor for mill machines).

d-3 Finishing mill control room, switch room 5 m x 10.5 m wide x 9.5 m high.

e. Cement silo (lower part in reinforced concrete, main body in steel plate structure)
The above-ground cone type should be employed in consideration of airtightness.
For OPC: 2,000-ton silo: two units (11 m dia., 24 m high)
For OWC: 2,000-ton silo: one unit (11 m dia., 24 m high)

f. Packer room (reinforced concrete structure)
   8 m x 14 m x 12 m high (a steel plate made 200-ton tank is to be mounted atop; part of second floor is used as control room).

g. Suprastructure for bagged cement discharging equipment (reinforced concrete)
   8 m x 14 m x 12 m high (second floor for bag warehouse, first floor for vehicle passage).

h. Suprastructure for bulk cement discharging equipment (reinforced concrete)
   4 m x 14 m x 12 m high (second floor for bag warehouse, first floor for vehicle passage).

i. Substation (reinforced concrete structure)
   Outdoor type, no suprastructure; 20 m x 20 m.

j. Water reservoir (reinforced concrete structure)
   This is a tank for storing mill cooling water; fountains should be set for the both cooling and aesthetic effects.
   8 m x 15 m x 2 m high (effective capacity: 250 m^3).

l. Truck scale (reinforced concrete structure)
   3 m x 11 m x 1.5 m high; one set.

m. Office (reinforced concrete structure)
   18 m x 7 m x 4 m high.

n. Canteen (reinforced concrete structure)
   15 m x 7 m x 4 m high.

o. Warehouse, repair shop (reinforced concrete structure)
   20 m x 7 m x 4.5 m high.

p. Laboratory (reinforced concrete structure)
18 m x 7 m x 4.5 m high.

q. Locker room (reinforced concrete structure)
10.5 m x 7 m x 4 m high.

r. Water supply and discharge equipment (total length: 250 m)

s. Leveling, pavement, etc. (area: 4,500 m^2)

(2) Case 2

1) Dolphin

Location	80 m offshore from the plant site
Vessels to be handled	D/W 8,500-ton class
Size	Dolphin: 6 m x 6 m, 2 units
	Mooring post: 4 m x 4 m, 2 units
	Communicating pier: 2.5 m x 60 m long
	Net pier: 1.5 m x 40 m long, 2 units
	Pipe receiving pier: 2.5 m x 74 m long
Structure	Upper part in reinforced concrete; foundation by steel tube piping (ϕ800 to ϕ400)
Dredging	Depth of 9 m; approx. 260,000 m^3.

2) Plant facilities

a. Cement silo (reinforced concrete structure, roof beam in steel frame)
For OPC: 14,000-ton cement silo, 1 unit (ϕ22 m, 32 m high)
For OWC: 4,000-ton cement silo, 1 unit (ϕ14 m, 23 m high)

b. Packer room (reinforced concrete structure)
   8 m x 14 m x 11.5 m high (200-ton steel plate tank mounted on top, including pressure air room and switch room)

c. Suprastructure for bagged cement discharging equipment (reinforced concrete structure)
   8 m x 14 m x 11.5 m high (second floor for bag warehouse, first floor for vehicle passage)

d. Suprastructure for bulk cement discharging equipment (reinforced concrete structure)
   4 m x 14 m x 11.5 m high (second floor for warehouse, first floor for vehicle passage).

e. Substation (reinforced concrete structure)
   Outdoor type, no suprastructure; 10 m x 10 m.

f. Truck scale (reinforced concrete structure)
   3 m x 11 m x 1.5 m high.

g. Office (reinforced concrete structure)
   12 m x 7 m x 4.0 m high.

h. Canteen (reinforced concrete structure)
   12 m x 7 m x 4.0 m high.

i. Warehouse, repair shop (reinforced concrete structure)
   15 m x 7 m x 4.5 m high.

j. Water supply and discharge equipment
   Water supply: total length 180 m (white gas pipe)
   Drain: total length 260 m (concrete hume pipe)

k. Leveling, pavement, etc.
   Road: surface area 4,500 m^2 (concrete)

4.4.5 Auxiliary facilities

(1) Water supply equipment

Water necessary for this plant will be supplied from the public water service. Principal uses of water are as follows.

1) Machine cooling water

A water reservoir pond is provided in the plant side and water is circulated by pump.

2) Drinking water

Water is distributed to necessary places, and taps are provided.

3) Laboratory water

Water for cleaning and curing test pieces is distributed to the laboratory.

4) Fire extinguishing water

Fire extinguishing pumps are installed at the reservoir pond.

A daily water consumption including evaporation loss is estimated around 20 m^3.

(2) Compressed air system

Compressed air is required for operation of machines such as opening and closing of damper beneath the silo and hopper and for cleaning and other use, and necessary equipment must be installed.

(3) Laboratory

A laboratory is needed for controlling the quality. One of the essential advantages of providing clinker grinding plant in Brunei is to distribute the products of strictly controlled quality to all parts of the nation. Therefore, the raw materials, that is, clinker and gypsum, and the product cement

should be tested and inspected to assure a uniform, excellent quality. In addition, since OWC is also produced in this product, it requires strict quality control. The laboratory should be equipped with chemical analytic appliances, physical testing apparatus, OWC test equipment, and other instruments. The quality control regulations should conform to BS.

4.4.6 Antipollution measures

At the present, there is no legal restriction on pollution in Brunei. In order to protect the beautiful environments of the nation and in anticipation of legislation in the future because the site is located in the industrial complex, all possible means to prevent pollution are introduced in the plant plan.

(1) Cement dust measures

1) Bag filters having sufficient capacity are installed in the cement discharging, packing equipment, bulk loading equipment, and cement mill facility.

2) Also bag filters with sufficient capacity are installed in the clinker silo charging point, clinker extracting point beneath silo, and transferring point to belt conveyor in order to keep releasing of dust to minimum.

3) All clinker receiving belt conveyors are enclosed with covers to shut dust.

4) Complete dust collection from the clinker ship to receiving hopper is technically and economically difficult because of wide open space above the hopper, but releasing of dust is kept to minimum by installing dust collectors.

(2) Countermeasures against noise pollution

Sources of noise are cement mill and exhaust fan of bag filter.

Noise from the cement mill main body is about 100 phons as measured at a distance of one meter from the machine side. In order to prevent leak of noise as far as possible, the building is enclosed with concrete structure.

As a result, the noise measured outside the building is about 70 phons, and becomes much smaller at further distance.

Noise from the exhaust fan of bag filter may be suppressed by attaching a silencer to the exhaust port of the fan.

There is no particular vibration problem in this plant.

(3) Waste water hazard

Since natural gypsum are used, harmful matter is not melted and discharged together with waste water.

4.5 Organization and personnel arrangement

Labor force is not sufficient in Brunei, and the national labor largely depends on foreign workers.

In this plant, therefore, as the modern, labor-saving plant, operations and controls should be automated as far as possible.

In consideration of these circumstances, the organization and personnel arrangement of the plant should be as shown in Figs. 4.3 (Case 1) and 4.4 (Case 2).

The labor cost in this plan is calculated on the basis of the current wage level in Brunei and shown in Tables 4.1 (Case 1) and 4.2 (Case 2).

Besides, two directors will organize the board.

Table 4-1 Personnel Distribution (Case 1)

Personnel	Number of Personnel	Wages	
		Monthly Wage (B$/Man)	Annual Wage (B$)
General Manager	1	3,500	45,500
Administration/Accounting Manager	1	3,000	39,000
Sales Manager	1	3,000	39,000
Administration Clerk	1	1,700	22,100
Accounting Clerk	1	1,700	22,100
Sales Clerk	1	1,700	22,100
Administration Foreman	1	1,200	15,600
Store Keeper	1	1,200	15,600
Secretaries	2	800	20,800
Guards	3	500	19,500
General Workers	3	500	19,500
Driver	1	500	6,500
Sub-Total	(16)		(241,800)
Production Manager	1	3,000	39,000
Production Engineer	1	2,000	26,000
Maintenance Engineer	1	2,000	26,000
Laboratory Engineer	1	2,000	26,000
Mill Foremen	3	1,000	39,000
Laboratory Foremen	2	1,000	26,000
Mechanical Foremen	2	1,000	26,000
Electrical Foremen	2	1,000	26,000
Packing/Loading Foremen	1	1,000	13,000
Mill Workers	3	500	19,500
Laboratory Workers	2	500	13,000
Maintenance Workers	3	500	19,500
Packing/Loading Workers	6	500	39,000
Sub-Total	(28)		(338,000)
Total	45		625,300

Table 4-2 Personnel Distribution (Case 2)

Personnel	Number of Personnel	Wages	
		Monthly Wage (B$/Man)	Annual Wage (B$)
General Manager	1	3,500	45,500
Administration/Accounting Manager	1	3,000	39,000
Sales Manager	1	3,000	39,000
Administration Clerk	1	1,700	22,100
Accounting Clerk	1	1,700	22,100
Sales Clerk	1	1,700	22,100
Administrative Foreman	1	1,200	15,600
Store Keeper	1	1,200	15,600
Secretaries	2	800	20,800
Guards	3	500	19,500
General Workers	3	500	19,500
Driver	1	500	6,500
(Sub-Total)	(16)		(241,800)
Production Manager	1	3,000	39,000
Production Engineer	1	2,000	26,000
Maintenance Engineer	1	2,000	26,000
Mechanical Foremen	2	1,000	26,000
Electrical Foreman	1	1,000	13,000
Packing/Loading Foremen	2	1,000	26,000
Maintenance Workers	2	500	13,000
Packing/Loading Workers	6	500	39,000
(Sub-Total)	(16)		(208,000)
Total	33		495,300

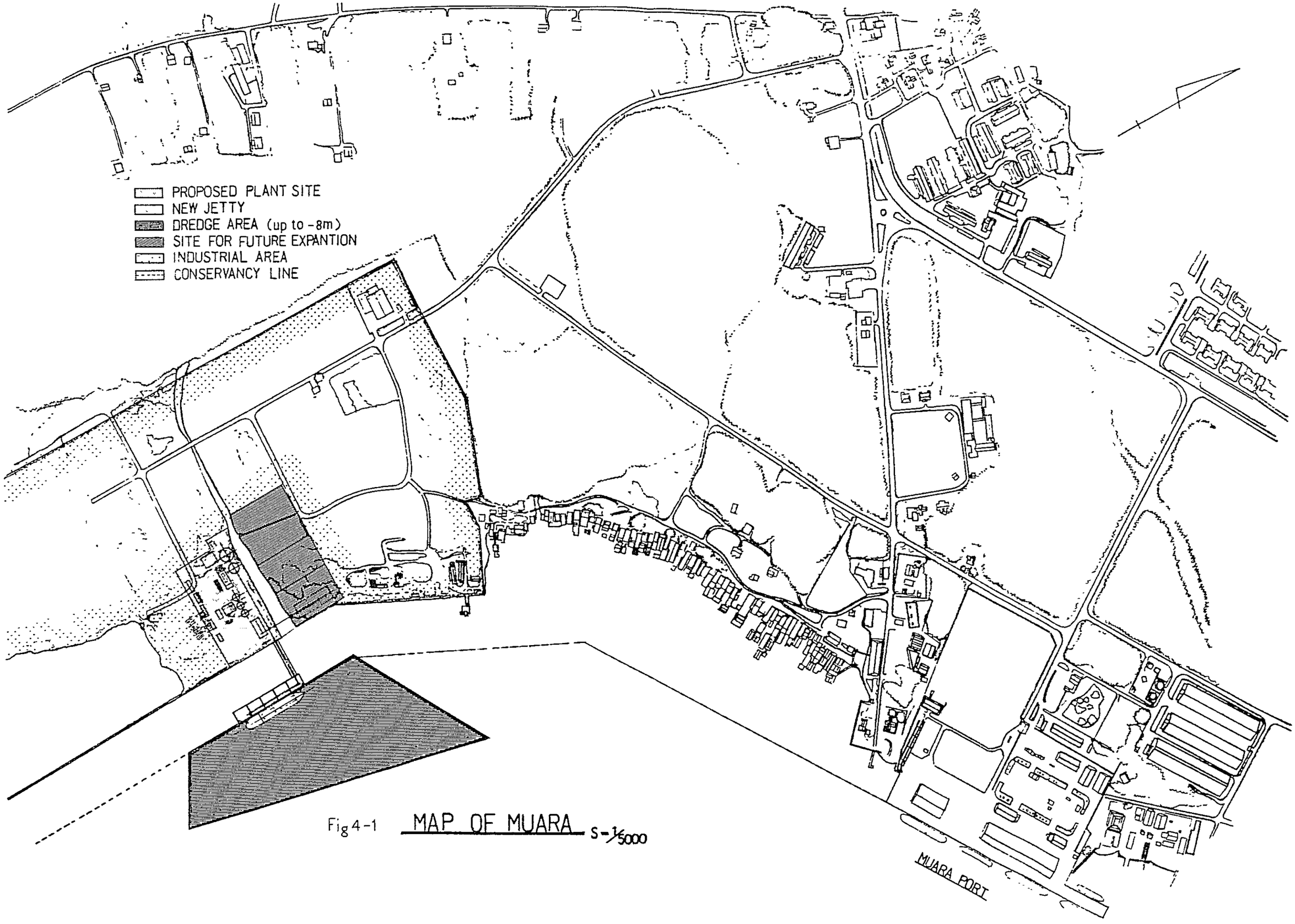


Fig 4-1 MAP OF MUARA S-1/5000

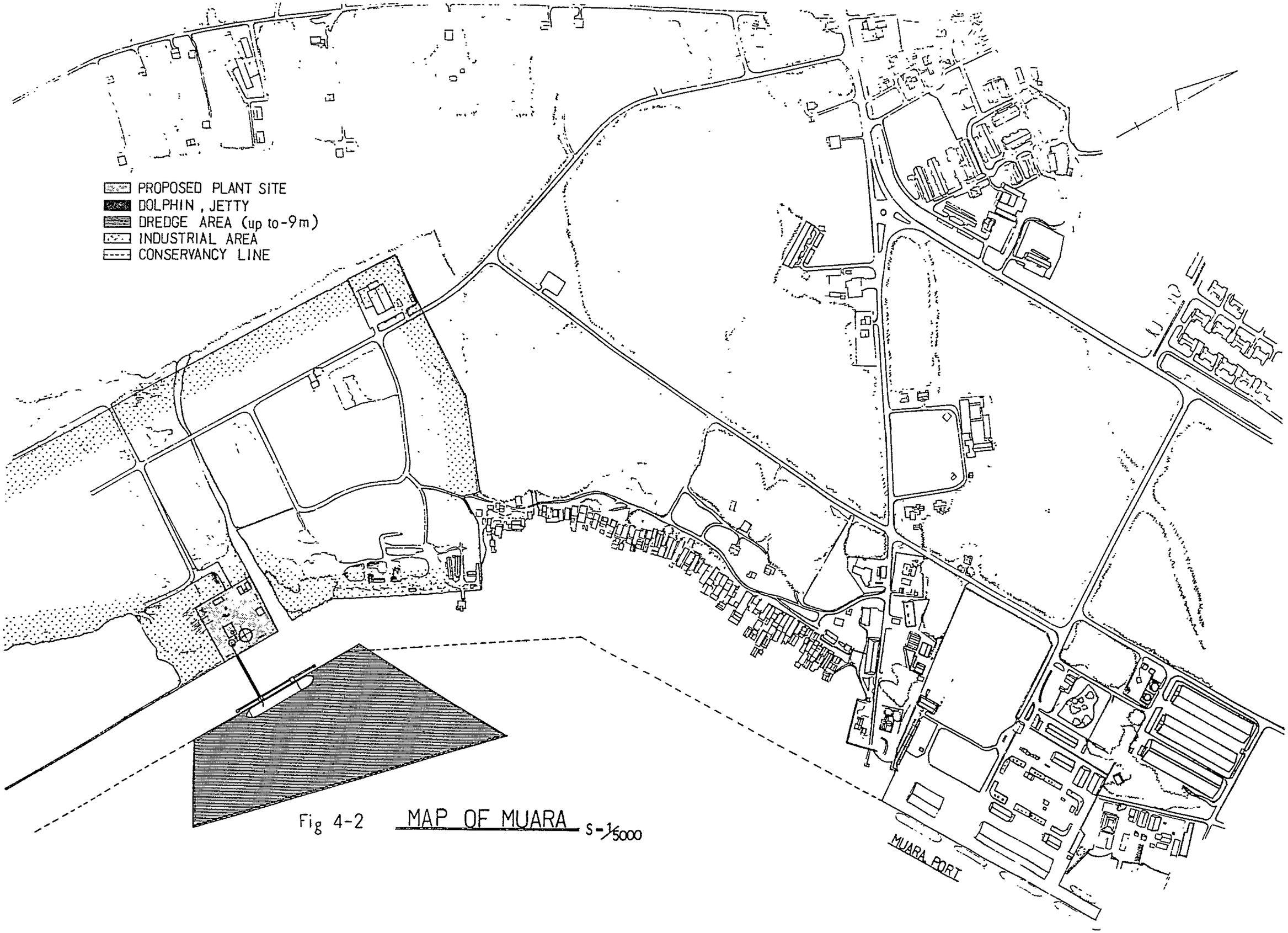
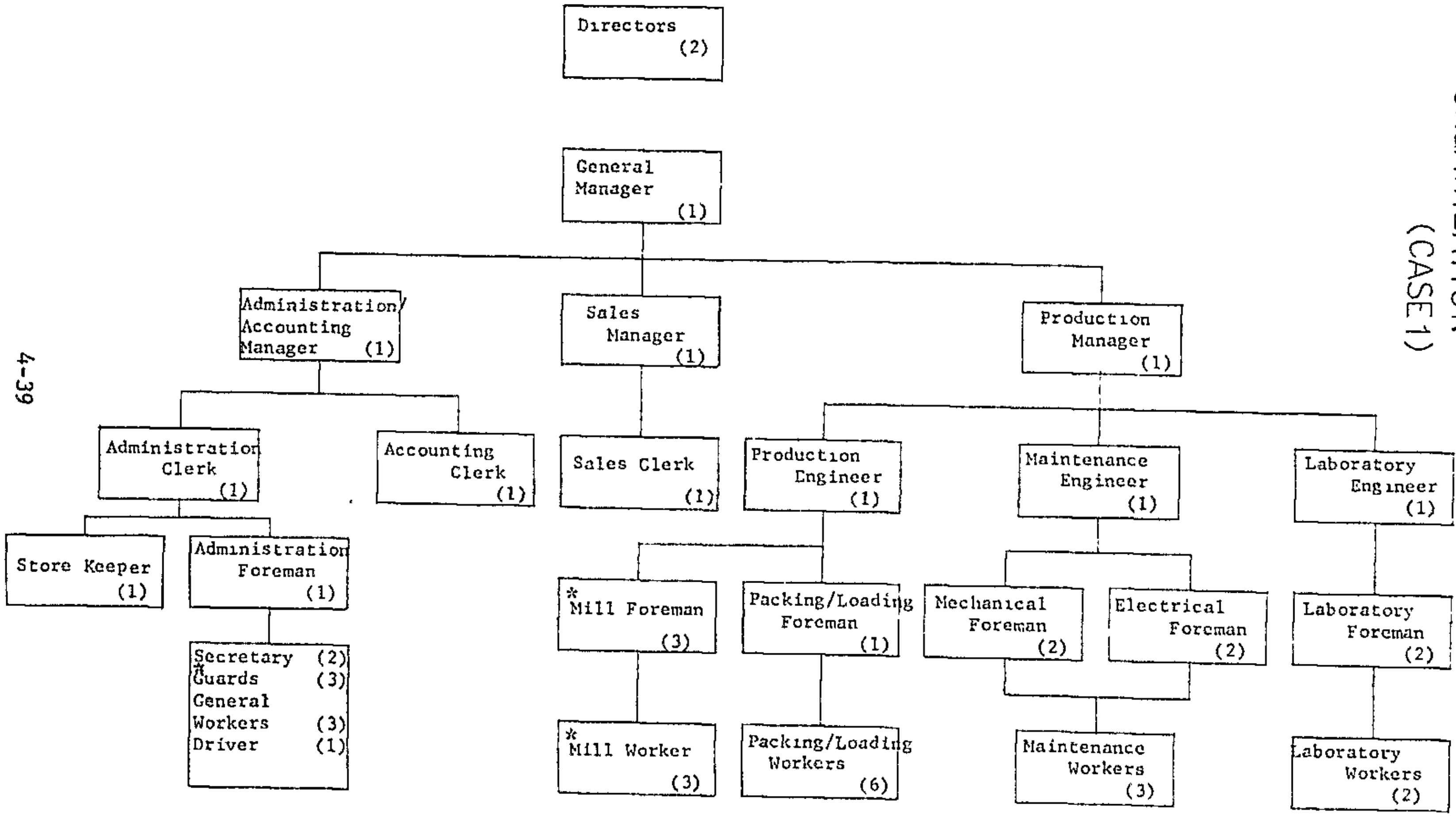


Fig 4-2 MAP OF MUARA S-1/5000

Fig.4-3 ORGANIZATION (CASE1)

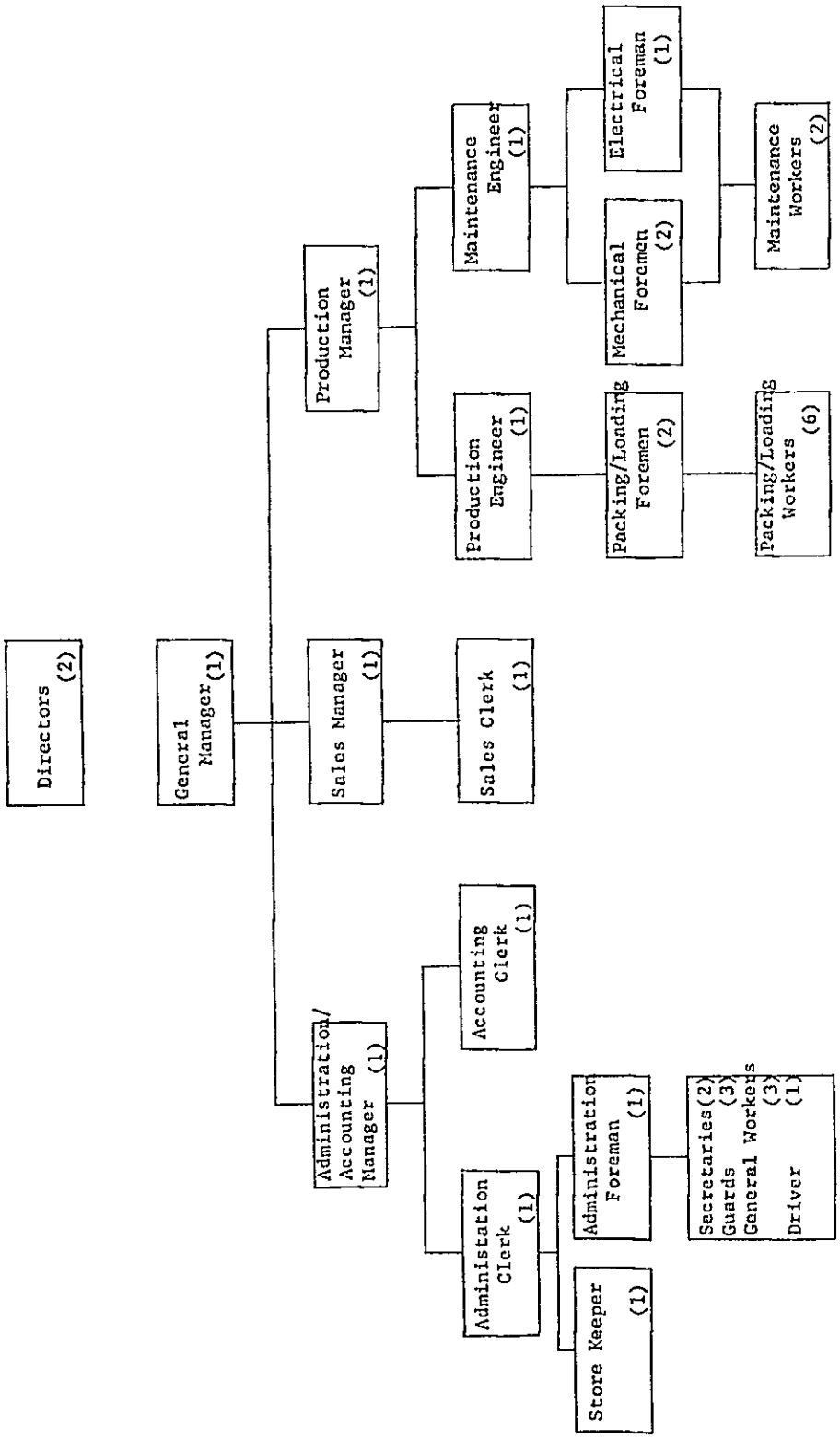


* means shift workers; 3 shift x 1 man

(Directors	2)
General Manager	1
Manager	3
Clerk/Engineer	6
Foreman	12
Worker	23
Total	45 (+2)

(Directors	2)
General Manager	1
Manager	3
Chief Clerk/ Engineer	5
Foreman	7
Workers	17
Total	33 (+2)

Fig 4-4 ORGANIZATION (CASE 2)



4.6 Construction Schedule

The clinker grinding plant will be constructed in 18 months after receiving order, and the packing plant in 15 months.

The construction schedule was planned under the conditions that the piers should be built in the first place so that the plant equipment and construction machinery could be unloaded by using the piers in Case 1.

The details are as shown in Figs. 4.5 (Case 1) and 4.6 (Case 2).

Fig 4-5 CONSTRUCTION SCHEDULE (CASE 1)

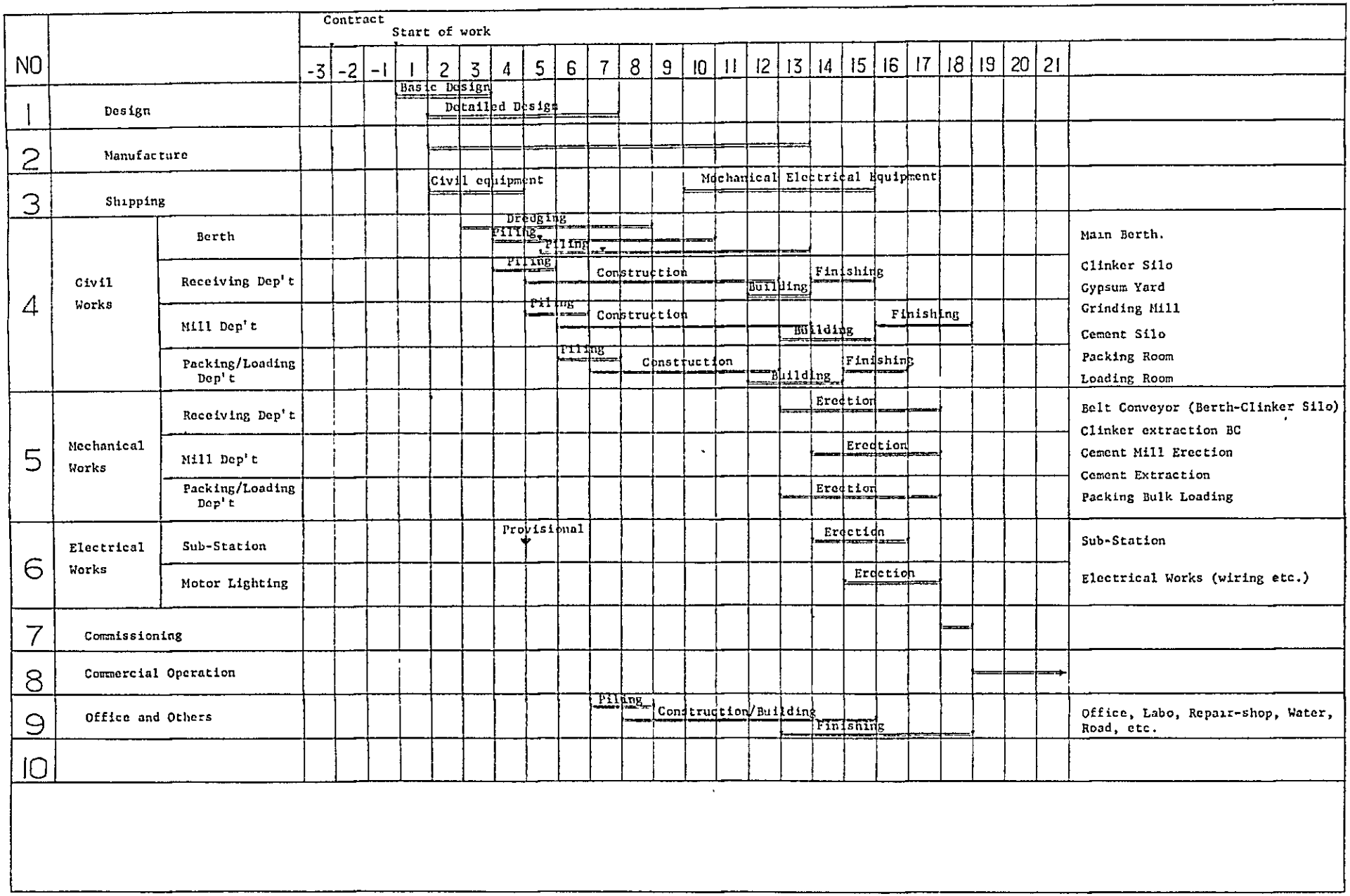
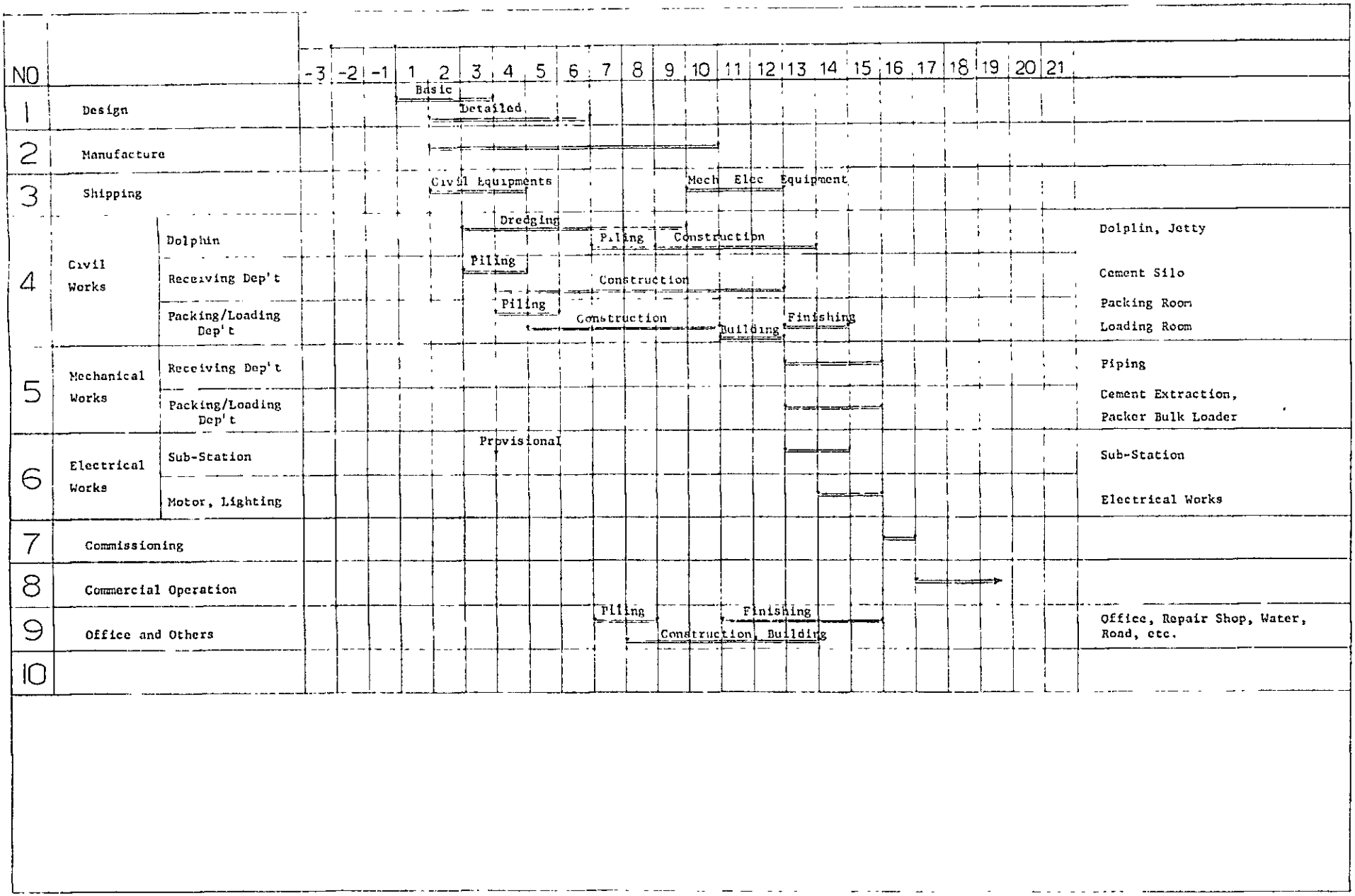


Fig 4-6 CONSTRUCTION SCHEDULE (CASE 2)



CHAPTER 5 CAPITAL REQUIREMENTS AND FINANCING PLAN

CHAPTER 5. CAPITAL REQUIREMENTS AND FINANCING PLAN

5-1. Capital Requirements

5-1-1 General

Capital requirements have been calculated based on the layout, specifications for equipment, etc. and the flow sheet mentioned in Chapter 4.

The following conditions have been assumed as the basis for this estimation.

(1) Base Price:

1982 constant prices

(2) Exchange Rates

U.S.$ 1.00 = ¥260.00
U.S.$ 1.00 = B$2.00

(3) Taxes:

Presuming that this plant will be designated as a "Pioneer Industry", and therefore, favored with the investment incentives, all import taxes and other levies have been assumed to be exempt.

5-1-2. Premises for Calculating the Capital Requirements

(1) Machinery and Equipment

This item covers all the equipment, mechanicals, electricals instruments and equipment, including marine transportation freight, insurance, erection costs, etc., as well as the normal costs for the training of engineers on the part of the manufacturers.

Case 1: 11,354 (Unit: B$1,000.00)
Case 2: 2,231 (Unit: B$1,000.00)

(2) Civil Engineering and Buildings

This item covers all civil engineering and building costs at the plant, with the exception of jetty costs.

Case 1: 7,185 (Unit: B$1,000)
Case 2: 3,038 (Unit: B$1,000)

(3) Jetty and Dolphin

Under this item, the costs of the new berth and dolphin to be contructed off the shore of the plant, and the dredging work of the front sea bed are included.

In case 1 the dredging will clear to a depth of eight(8) meters with a dredging volume of approx. 200,000m^3. Case 2 will have a depth of nine(9) meters and volume of approx. 260,000m^3.

Case 1: 4,538 (Unit: B$1,000)
Case 2: 3,576 (Unit: B$1,000)

(4) Land Premium:

An amount of B$60,000 has been appropriated as the Land Premium for a period of 30 years, in each case.

Case 1: 60 (Unit: B$1,000)
Case 2: 60 (Unit: B$1,000)

(5) Pre Operating Expenses

a. Consultant Fee

As the consultant fee for this project, a sum equivalent to 5% of the total amount of investments in machi-

nery, civil engineering, and the jetty, has been estimated.

This shall be amortizes within 5 years after the commencement of the operation.

Case 1: 1,154 (Unit: B$1,000)
Case 2: 442 (Unit: B$1,000)

b. Miscellaneous Expenses

A sum of B$100,000.00 has been appropriated for miscellaneous expenses, in each case.

Case 1: 100 (Unit: B$1,000)
Case 2: 100 (Unit: B$1,000)

(6) Pre Operating Interest

As for the Pre Operating Interest for the two years from 1983 through 1984, a following sum has been calculated from the financial plan.

Case 1: 1,189 (Unit: B$1,000)
Case 2: 396 (Unit: B$1,000)

(7) Wages and Overehead

a. Directors' Expenses

There shall be two(2) directors for each case. Following amount consists of B$96,000.00/directors as the annual wage, and also their overhead (50% of wage).

Case 1: 288 (Unit: B$1,000)
Case 2: 288 (Unit: B$1,000)

b. Employees' Expenses

A sum has been appropriated for employees' wages expenses for four (4) months, taking into consideration allowances for the training and commissioning periods, etc. and their overhead (50% of wages)

Case 1: 312 (Unit: B$1,000)
Case 2: 248 (Unit: B41,000)

c. Land Rental

The total land rental expenses for the two (2) year construction period, have been appropriated on the basis of B$2,500/Year.

Case 1: 50 (Unit: B$1,000)
Case 2: 24 (Unit: B$1,000)

The sum of a, b and c totals :

Case 1: 650 (Unit: B$1,000)
Case 2: 560 (Unit: B$1,000)

(8) Initial Working Capital

The initial working capital has been calculated as follows:

Case 1: 2,609 (Unit: B$1,000)
Case 2: 2,896 (Unit: B$1,000)

Details are shown in the following table:

(in B$1,000)

Item	Case 1	Case 2
Accounts receivable (1 month)	1,182	1,182
Inventories		
Products (OPC: 3,500t, OWC: 1,000t)	527	624
Raw Materials	797	1.017
Case 1: OPC clinker 6,000t		
OWC clinker 2,000t		
Gypsum 500t		
Paper bag 100,000bags		
Case 2: OPC bulk cement 6,000t		
OWC bulk cement 2,000t		
Paper bag 100,000bags		
Fixed Cost (1 month)	103	73
Except depreciation, interest		
Total	2,609	2,896

5-1-3. Capital Requirements

The Total Financial Requirements are estimated to be as follows:

(Unit: B$1,000.00)

Expense Item	Amount	
	Case 1	Case 2
Total Investments:		
(1) Machinery and Equipment	11,354	2,231
(2) Civil Engineering and Buildings	7,185	3,038
(3) Jetty	4,538	3,576
Construction cost total	23,077	8,845
(4) Land Premium	60	60
(5) Pre Operating Expenses	1,254	542
(6) Pre Operating Interest	1,189	396
(7) Wages and Overhead	650	560
(8) Initial Working Capital	2,609	2,896
Grand total	28,839	13,299

5-2. Financial Plan

5-2-1. Equity

As a rule, a 50% portion of the construction cost shall be taken care of by the equity; payment of half the amount thereof shall be made in the first year, and the remaining half in the second year.

5-2-2. Long Term Loan

The 85% portion of machinery (which is the balance, after deduction of the pre paid advances of 10% at the time of the contract, and 5% at the time of shipping) shall utilise the long term loan carrying interest of 9.2% annually, and the repayment term is 5 years from commencement of the operation for Case 1 and 2 years for Case 2.

5-2-3. Short Term Loan

The balance of the fund requirements for the pre operating interest, pre operating expenses, etc. shall be appropriated by short-term loans.
Although the financial source has not been decided as yet, and no detailed conditions have been made clear, it was assumed that the annual interest rate was 10.5% taking into consideration the current interest rate in Brunei.

5-2-4. Financing Plan

Summing above mentioned up, financing paln was estimated as follows;

Financial Sources:		
(1) Capital	11,400	4,400
(2) Long Term Loan (Annual Interest Rate: 9.2%)	9,651	1,896
(3) Short Term Loan (Annual Interest Rate: 10.5%)	7,788	7,003
Total	28,839	13,299

CHAPTER 6 FINANCIAL ANALYSIS

CHAPTER 6. FINANCIAL ANALYSIS

6-1. Main Conditions of Premise

(1) General

It is assumed that the operation commencement of this plant will be made in 1985, and the project life will be 15 years from the operation commencement for, the purpose of financial analysis.

(2) Production and Sales

The outlook for production and sales has been assumed as follows, as mentioned in Chapter 3:

Unit: 1,000 tons

Item / Year	Production Q'ty		Sales Q'ty		Inventories	
	OPC	OWC	OPC	OWC	OPC	OWC
1985	85.1	18.0	81.6	17.0	3.5	1.0
1986	95.2	17.0	95.2	17.0	3.5	1.0
1987	109.4	17.0	109.4	17.0	3.5	1.0
1988	113.2	17.0	113.2	17.0	3.5	1.0
1989	116.9	17.0	116.9	17.0	3.5	1.0
1990	120.6	17.0	120.6	17.0	3.5	1.0
1991	124.3	17.0	124.3	17.0	3.5	1.0
1992	128.0	17.0	128.0	17.0	3.5	1.0
1993	131.8	17.0	131.8	17.0	3.5	1.0
1994	135.5	17.0	135.5	17.0	3.5	1.0
1995	139.0	17.0	139.0	17.0	3.5	1.0
1996	139.0	17.0	139.0	17.0	3.5	1.0
1997	139.0	17.0	139.0	17.0	3.5	1.0
1998	139.0	17.0	139.0	17.0	3.5	1.0
1999	139.0	17.0	139.0	17.0	3.5	1.0

(3) Sales Prices

As described in 3-2-4 of this report, the exfactory selling prices shall be set at B$122.80/ton for OPC and B$303.80/ton for OWC (The current landed costs for bagged cement).

Possible declines in the prices due to competition from imported goods, shall be estimated by various sensitivity analyses.

(4) Taxes

Taxes have been assumed as follows:

a. Corporate Tax

This plant, as a pioneer industry, shall be exempt from taxes for five (5) years from operation commencement under the Investment Incentives Enactment, 1975. After that five year period, the corporate tax rate of 30% of taxable revenues shall be levied.

b. Sales Tax and Excise Duty

It shall be assumed to be exempt.

c. Import Duty

It shall also be assumed to be exempt.

6-2. Production Cost

As the Table 6-1 indicates, in the first year of full 100% production, the production costs combined with the initial expenses and interest costs (both first year basis) as follows.

	Case 1	Case 2
OPC	B$115.3/T	B$127.4/T
OWC	B$167.4/T	B$199.4/T

During the 15 years of the project life, the averaged production costs will be as follows.

	Case 1	Case 2
OPC	B$107.6/T	B$124.2/T
OWC	B$159.9/T	B$196.2/T

Details should be checked on the additional log sheet.

Table 6-1 Production Cost

ITEMS	Case 1		Case 2	
	OPC	OWC	OPC	OWC
Variable Costs				
Bulk Cement			103.2	175.2
Clinker	73.7	125.8		
Gypsum	2.1	2.1		
Paper Bags	9.9	9.9	9.9	9.9
Electricity	1.9	1.9	0.1	0.1
(Sub-total)	(87.6)	(139.7)	(113.2)	(185.2)
Fixed Costs				
Personnel	4.0		3.2	
Repairs and Maintenance	1.1		0.3	
Land Rental	0.2		0.1	
Water Expenses	-		-	
Operating Costs	2.9		2.5	
Depreciation	6.5		2.1	
(Sub-total)	(14.7)		(8.2)	
TOTAL	102.3	154.4	121.4	193.4
Interest (First year base)	9.9		4.8	
Amortization (First year base)	3.1 (13.0)		1.2 (6.0)	
Grand Total	115.3	167.4	127.4	199.4

6-2-1. Variable Costs

The various material units (or proportions) and unit prices, the constituent elements of variable costs, per 1 ton of cement are detailed as follows.

(Unit: B$/M.T.)

Item	Unit Price	Case 1			Case 2		
		Consumption	Cost/t.cement		consumption	Cost/t.cement	
			OPC	OWC		OPC	OWC
Bulk Cement (OPC)	103.2				1.0	103.2	
Bulk Cement (OWC)	175.2				1.0		175.2
Clinker (OPC)	76.4	0.965	73.7				
Clinker (OWC)	130.4	0.965		125.8			
Gypsum	60.4	0.035	2.1	2.1			
Paper Bags	0.47	21 bags	9.9	9.9	21 bags	9.9	9.9
Electricity	0.043	5.2 KWH	1.9	1.9	2.4 KWH	0.1	0.1
Total			87.6	139.7		113.2	185.2

(1) Bulk Cement

The price of bulk cement was calculated based on the International Market. The price of OPC was calculated at FOB B$72.00 considering its present export market situation. Althouth there is not so much OWC bulk cement exportation, the price of OWC was estimated to be FOB B$144.00. The CIF price was calculated by adding this FOB price onto the freight charge of B$31.20/T. Freight and insurance calculation are detailed as the following table:

Freight and Insurance Calculations

Assumption

Cargo capacity Constructution Expense	8,500 T B$17,000,000 (Pneumatic Unloader Included)
Size	
LOAD	124 m
LBP	115 m
Width	17.7 m
Depth	9.2 m
Draft	7.4 m
Main Engine	4,400 ps
Speed	13 Knots
Navigating time	19 days/navigating (eg. Japan, Taiwan, Korea)
Navigating/year	18.3 (365- 19x0.95)
Cargo Capacity/year	155,000 ton

Calculation of Freight and Insurance

(1) Fuel and Lubricating Oil	B$9.4/t	Fuel: 1,394.496p.s.h. x 0.17ℓ/p.s.h. x B$307/kℓ = B$72,778/sailing Lubricating Oil: 10% of the fuel = 7,278 ∴ (72,778 + 7,278) ÷ 8,500 = 9.4
(2) Cargo Insurance	0.25	(8,500t x B$72/t x 0.0035) ÷ 8,500 = 0.25 Bulk coment price Rate
(3) Personnel Costs	6.25	20staff x B$4,000/month x 12months : 155,000 = 6.2
(4) Repairing Costs	0.7	B$115,000 ÷ 155,000t = 0.7
(5) Vessel Insurance	1.1	B$17,000,000 x 0.01 ÷ 155,000 = 1.1
(6) Supplies, etc.	0.6	B$100,000 ÷ 155,000 = 0.6
(7) Depreciation and Interest (10%, 15 years)	12.9	B$17,000,000 x 0.9 x 0.13147 ÷ 155,000 = 12.9
TOTAL	31.2	

(2) Clinker

Clinker can be supplied from the international market. As a result of the calculation of the CIF Brunei clinker prices, made on the basis of the prevailing FOB export prices of the leading clinker suppliers in the world, they are estimated to be B$76.00/M.T. for OPC, and B$130.00/M.T. for OWC. Since the clinker will be unloaded at the new jetty, the costs including delivery to the plant are estimated at B$76.40/M.T. and B$130.40/M.T. respectively, for OPC and OWC. The addition of B$0.40/ton of clinker is the handling charge which must be combined with the respective CIF prices.

Therefore, the clinker cost per one ton of cement shall be B$73.70/M.T. for OPC and B$125.80/M.T. for OWC. This is because clinker consumption is 96.5% per ton cement.

(3) Gypsum:

Although Australia and Thailand are the two main suppliers of natural gypsum in the world, Thailand has temporarily been selected as the source of supply for this report. This is because it is not advisable to purchase a small quantity from Australia from the economical view point.

Since the CIF price of Thai gypsum is estimated to be B$60.00/M.T. and no port charge or transportation expense shall be required, as in the case of clinker, the cost of gypsum delivered to the plant should be B$60.40/M.T., including the handling charge of B$0.40/M.T. for unloading at the new jetty.

The cost of gypsum shall be B$2.10/M.T. of cement.

(4) Electricity Consumption:

As previously described in 4-4-3, (8), the total electricity consumption of the entire plant shall be 45.2 KWH/ton of cement, in case 1, and 2.4 KWH/ton of cement in case 2.

The unit cost of electricity has been set at 4.3¢/KWH based on the current rate in Brunei.

The cost of electricity shall therefore be B$1.90/ton of cement in case 1, and B$0.10/KHW in case 2.

(5) Paper Bags

The paper bags shall be of the "sewn gusseted valve type," which are popular throughout the world. The size shall be 762 x 419 x 76mm, with a volume of 50kg/bag.

The maximum monthly consumption is 260,000 bags, and no problem is foreseen with the supply of paper bags because many countries, including Japan, are currently manufacturing them.

The unit price is estimated to be B$0.47/bag CIF Brunei, and the unit cost shall be B$9.90/ton of cement, taking into consideration the breakage of one bag per ton of cement.

Also, as previously mentioned, the bulk shipment of cement shall become increasingly popular in the future, and the bag cost, in turn, will naturally be reduced.

6-2-2. Fixed Cost

The fixed costs of this plant are estimated to be as follows:

(Unit: B$1,000)

	Case 1		Case 2	
	Cost/year	Cost/unt	Cost/year	Cost/unit
Wages	625	4.0	495	3.2
Repairs and Maintenance	170	1.1	45	0.3
Land	25	0.2	12	0.1
Water	2	-	2	-
Overheads	457	2.9	392	2.5
Depreciation	1,020	6.5	327	2.1
Total	2,299	14.7	1,273	8.2

Note: The unit price is based on full production of the plant (156,000 T/year).

(1) Wages

On the basis of organization and personnel disposition described in Chapter 4.5, the wages expenses of this plant are calculated as follows:

	Number of Persons	Personnel Expenses (B$1,000/year)
Case 1:	45	625
Case 2:	33	495

The unit cost of personnel expenses has been calculated by multiplying by 13 (12 months/year plus 1 month for bonus allowances), the current estimated monthly wages for the various levels of employees in Brunei.

(2) Repairs and Maintenance:

An amount equivalent to 1.5% in Case 1, and 2% in Case 2, of the total machinery and equipment investment was calculated.

(in B$1,000/year)
Case 1: 170
Case 2: 45

(3) Land

Although the land cost consists of the land premium, an advance, and the annual rental fee, only the rental fee will be dealt with here. The land area required for this plant is 4.2 acres for case 1, and 2 acres for case 2. The annual rental fee is B$ 6,000/acre, or:

(in B$1,000/year)
Case 1: 25
Case 2: 12

The land premium is B$ 60,000.00 for 30 years, and this was calculated in the aforementioned capital requirement.

(4) Water

The total consumption is estimated to be about 20 m3 per day, including water for drinking and other miscellaneous purposes.
The unit price of industrial water in Brunei is B$1.50/1,000 gallons, and the total annual cost of water will therefore amount to B$ 2,500.00. This will be the same in Case 1 and Case 2.

(5) Overheads

Such operating costs as directors' wages and expenses, office expenses, communication expenses, traveling expenses, etc. was calculated.

(in B$1,000/year)
Case 1: 457
Case 2: 392

(6) Depreciiation

Depreciation shall be made in fixed amounts as shown in the following, where the 10% portion of the machinery and equipment investments shall not be depreciated, but kept as the scrap value:

Item	Case 1		Case 2	
	Number of years for depreci-ation	Value of money to be depre-ciated (B$1,000/ year)	Number of years for depreci-ation	Volue of maney to be depre-ciated (B$1,000/ year)
Machinery and Equipment	15	681	15	134
Civil Engineer-ing and Build-ing	35	205	35	87
Berth, Dolplin	35	130	35	102
Land Premium	15	4	15	4
TOTAL		1,020		327

6-2-3. Other Operating Expenses

(1) Interest:

The interest rates for loans have been set at 9.2% for long-term and 10.5% for short term loans. The long-term loans shall be repaid in five(5) years in Case 1, and two (2) years in Case 2, from the commencement of operations.

Even shortterm loan is not anticipated five(5) years after the operational commencement in case 1 (six years in Case 2). This is because there will be sufficient funds on hand. The payments for bank interest during this period shall be as follows:

(Unit: B$1,000.00)

	CASE 1			CASE 2		
TOTAL	Long-term Loan	Short-term Loan	TOTAL	Long-term Loan	Short-term Loan	TOTAL
1985	917	629	1,546	180	573	753
1986	733	640	1,373	90	709	799
1987	550	444	994	-	631	631
1988	367	166	533	-	473	473
1989	183	4	187	-	288	288
1990	-	-	-	-	95	95
TOTAL	2,750	1,863	4,633	270	2,769	3,039

(2) Amortization

The pre-operating expenses and pre-operating interest shall be depreciated in fixed amounts over a five(5) years period from the commencement of operations.

The amounts to be depreciated shall be as follows:

Item	Amount to be depreciated (B$1,000/year)	
	CASE 1	CASE 2
Preoperating Expenses	251	108
Preoperating Interest	238	79
Total	489	187

6-3. Profitability

6-3-1. Profit and Loss

The total profit and loss during the project life (15 years) may be summarized as follows, for details please refer to the attached log sheet:

A - Case 1

(Unit: 1,000 tons, B$ mil)

Item	OPC		OWC		TOTAL	
	Total	Yearly Average	Total	Yearly Average	Total	Yearly Average
Sales Volume	1,851.5	123.4	255.0	17.0	2,106.5	140.4
Sales Revenue	227.3	15.1	77.5	5.2	304.8	20.3
Production Cost	199.3	13.3	40.8	2.7	240.1	16.0
Profit before Tax	28.1	1.9	36.7	2.4	64.8	4.3
Corporate Tax	6.7	0.4	8.8	0.6	15.5	1.0
Profit after Tax	21.3	1.4	27.9	1.9	49.2	3.3

B - Case 2

(Unit: 1,000 tons, B$ mil)

Item	OPC		OWC		TOTAL	
	Total	Yearly Average	Total	Yearly Average	Total	Yearly Average
Sales Volume	1,851.5	123.4	255.0	17.0	2,106.5	140.4
Sales Revenue	227.3	15.1	77.5	5.2	304.8	20.3
Production Cost	229.9	15.3	50.0	3.3	279.9	18.7
Profit before Tax	-2.5	-0.2	27.4	1.8	24.9	1.7
Corporate Tax	-	-	6.2	0.4	6.2	0.4
Profit after Tax	-2.5	-0.2	21.2	1.4	18.7	1.2

The profit and loss per ton of product is as follows:

Case 1

Item	OPC	OWC	Total
Sales volume	1,851.5	255.0	2,106.5
Sales Revenue	122.8	303.8	144.7
Production Cost	107.6	159.9	114.0
Profit before Tax	15.2	143.9	30.7
Corporate Tax	3.6	34.5	7.4
Profit after Tax	11.5	109.4	23.4

Case 2

Item	OPC	OWC	Total
Sales volume	1,851.5	255.0	2,106.5
Sales Revenue	122.8	303.8	144.7
Production Cost	124.2	196.2	132.9
Profit before Tax	-1.4	107.6	11.8
Corporate Tax	-	24.3	2.9
Profit after Tax	-1.4	83.3	8.9

As can be seen from the above tables, profit of Case 1 is higher than that of Case 2. In case 2, only OPC produces a loss, however, viewed overall when combined with OWC, a profit results.

6-3-2. Cash Flow

For details please refer to the attached Cash Flow, however the total Cash-Inflow for the 15 years is as follows:

(Unit: B$1,000.00)
Case 1: 71,588
Case 2: 27,604

6-3-3. Financial Rate of Return

The rate of return on investments has been calculated in conformity with the "Internal Rate of Return", IRR.

The results are as follows:

	ROI		ROE	
	Before Tax	After Tax	Before Tax	After Tax
Case 1:	18.26%	16.33%	19.95%	17.51%
Case 2:	15.83%	13.92%	17.45%	14.83%

As seen from above, both ROI and ROE in Case 1 are higher than that of Case 2 by approx. 3%.

6-3-4. Sensitivity Analysis

Based on the results in 6-3-3 a sensitivity analysis was carried out in the following manners;

(1) Case 1

A sensitivity analysis has been conducted by varying the sales volume, interest, selling price, depreciation method and investment cost.

(a) Interest rate on Long-Term Loans

As previously mentioned in 6-2-3, (3), the financial analysis for the basic case was carried out with the interest rate of 9.2% for long term loans. However sensitivity analysis was done changing the interest rate into 10.5%, which is the same as short-term loan interest rate.

(b) Sales Price

1) The sales prices for OPC and OWC (the current landed costs of imported bagged cement) have been set at B$122.80/ton and B$303.80/ton, respectively in the basic case. A further sensitivity analysis was carried out on the basis of the above standard unit prices with fluctuations of +10% and -10% for both OPC and OWC.

2) Another analysis was conducted when the unit price for OWC was dropped by 20%.

(c) When OWC is neither produced nor sold

A further sensitivity analysis was conducted on the assumption that no OWC shall be produced and sold, although it is planned to have 17,000 tons/year of OWC produced and sold in the basic case.

(d) Method of Depreciation:

While in the basic cases a fixed amount depreciation method was adopted, sensitivity analysis has been carried out under the following condition;

* Machinery and Equipment:

20% in the first year and the balance in equal fixed amounts depreciated every year for a period of 15 years.

* Civil Engineering/Berth:

10% in the first year and the balance in equal fixed amounts depreciated every year for a period of 35 years.

(e) Exclusion of New Berth [Refer 5.1.2.(3), 6.3.5.(4)]

Considering the nature of the berth which are applicable to wide range of public use and considering that the berth might be constructed by the government separate from the plant, the sensitivity analysis was carrid out when construction cost of new berth is excluded.

(2) Case 2

Case 2 has a lower IRR than Case 1 in the basic case. Therefore, not all of the sensitivity analysis which were applied to Case 1, were necessarily applied to Case 2. The interest rates of the long term loans, and the fluctuations of the selling price, were similar. However the analysis for the non-production of OWC, was not carried out for Case 2, as it was realised in 6.3 profitability that it would not be profitable.

And further, dolphine in Case 2 is an exclusive use of the packing plant and is not applicable to other use, so the sensitivity of exclusion the dolphin is not analyzed.

6-3-5. Results of the Sensitivity Analysis

The details of the IRR obtained from the above mentioned sensitivity analysis are as follows:

CHANGES IN IRR THROUGH VARIOUS SENSITIVITY ANALYSIS

Item	Case 1				Case 2			
	ROI		ROE		ROI		ROE	
	B.T.	A.T.	B.T.	A.T.	B.T.	A.T.	B.T.	A.T.
Base Case	18.26	16.33	19.95	17.51	15.83	13.92	17.45	14.83
Interest Rast (L.T.L. 10.5%)	18.26	16.33	19.72	17.25	15.83	13.92	17.39	14.75
Sales Price								
1. +10%	24.58	22.64	27.96	25.62	29.82	27.85	34.81	32.65
2. -10%	11.07	9.54	10.64	8.40	-1.43	-1.43	-	-
3. OWC -20%	14.58	12.75	15.37	12.92	7.45	7.07	2.48	1.04
Without OWC (OPC only)	8.18	7.29	5.95	4.33				
Depreciation	18.15	16.16	19.83	17.28				
Construction Cost (Without Berth)	22.27	20.29	24.85	22.42				

(B.T.: Before Tax, A.T.: After Tax)

As seen from above;

(1) Changes of interest rate and depreciation method will not much affect the IRR in both Cases 1 and 2.

(2) If sales price change, IRR will be considerably affected.

Case 2, especially, will fluctuate in much wider range than Case 1.

If the sales price increase 10%, Case 2 shows high figures in IRR than Case 1, however if 10% decrease, IRR of Case 2 will turn minus (-) though IRR of Case 1 will still remain 11.07%(B.T.) and 9.54%(A.T.).

And if sales price of OWC decrease 20%, IRR of Case 1 will be lowered by approx. 3.5% but IRR of Case 2 will decrease as much as 8.2%.

Case 2, therefore, will not be recommendable from the view point of stable management.

(3) When OWC are excluded from the product of this plant, Case 2, as aforementioned, will not get the profit at all and Case 1 also will fall by 10% in IRR but still gives a return of 8.18%(B.T.).

(4) If the new berth of Case 1 is constructed by the government which means exclusion from the investmrnt cost of the Case 1, ROI and ROE will increase approx. 4% and 5% respectively.

CHAPTER 7 ECONOMIC ANALYSIS

CHAPTER 7: ECONOMIC ANALYSIS

7-1. Economic Benefits

The economic benefits to be brought about by this project have been analysed, particularly regarding effects on the national economy and the regional economy.

(1) Steady Supply of High-Quality Cement:

It goes without saying that cement is one of the most important fundamental materials for the solidification of the social capital, most needed by Brunei after its coming independence.

Upon the completion of the plant under this project, uniform quality cement with its quality strictly checked, shall be made readily available from this local single plant for use at any construction site. Tangible and intangible effects shall be considerable compared with the current situation, where various types of cement of different qualities are being imported from many different countries and manufacturers.

Uniform and high-quality cement shall mean both a reduced cement requirement (per m^3) for concrete, and reduced construction costs.

Besides, the importation of bagged cement is susceptible to price fluctuations on the international market and there are fears that this can affect the steady supply of cement, the completion of this plant will eliminate such anxiety.

(2) Simplification and Rationalization of the Cement Distribution System:

As mentioned previously, the current cement distribution system in Brunei is hold by several large firms with Chinese management, they have complicated distribution

channels involving importers, distributors and consumers, thus making the distribution expenses rather obscure.

The product to be produced in this plant, after completion, can be sold directly to consumers (including those for PWD), and should contribute to the rationalization of the distribution system.

(3) Promotion of Industrialization:

Although it is planned to construct this plant in the industrial area near Muara Harbor, this area has not yet been fully utilized, having only a beverage bottling factory. With the completion of this plant as a foothold, however, it can be expected to further promote the utilization of the industrial area through the consolidation of other industries.

(4) Improvement of Technological Level:

Except for petroleum development, no other big industry can be found in Brunei today.

With the completion of this plant, engineers in many fields related to chemistry, machinery, electricity, civil engineering, etc. can be trained during the actual operation of this plant, contributing to the improvement of the technological knowledge of Brunei.

It might also contribute to the improvement of the labor quality.

(5) Assistance for Related Industries:

A new berth is scheduled to be constructed on the front shore of the proposed plant site.

Although a further detailed survey will be necessary, it seems from the brief eye study conducted to date that abundant aggregate resources (sand, gravel, etc.) are

available at Temburong, and are currently being extracted at random.

It may be possible to utilize the new berth further by setting up an aggregate yard in an adjacent area of the plant site where those aggregate as exploited orderly will be stored after classification by particle size and will be distributed to all the work site in Brunei.

Furthermore, this project, if combined with the aggregate yard, may provide an opportunity to expand into a Ready-Mixed Concrete Plant and Cement Concrete Product Plant for the production of blocks, pipes, etc.

However, of the economical advantages mentioned above, point 1, 3, 4 and 5 are mainly related to the clinker grinding plant.
In Case 2, the packing plant is only a cement distribution terminal. Therefore there is no real benefit to the technical section.

The facilities are also quite simple. Also, the laboratory and berth which will play a great role in future can not be provided.

Therefore, very few economic advantages from such a Case 2 can be expected.

This aspect has already been pointed out in the EDB(Brunei)'s Preliminary Report dated 30th Jan., 1982.

7-2. Economical Internal Rate of Return

7.2.1 Assumption

The economic internal rate of return was calculated in accordance with the following conditions, in order to estimate the profitability from a national point of view.

(1) Cement production and sales volume as mentional in Chapter 6, 6-1, (2).

(2) Cement sales price

To be the sales price of the main plant, which was used for the financial analysis. Namely, OPC is B$122.8/ton, and OWC is B$303.8/ton.

(3) Economic Capital Cost

The following which excludes from the total investment amount, Initial Working Capital for the first year, and the interest during the construction period.
(Unit: B$1,000.000)

Case 1: 28,839 - (2,609 + 1,189) = 25,041
Case 2: 13,299 - (2,896 + 396) = 10,007

(4) Economic Operating Cost

The production costs of the projected plant, excluding deprecation and intereat.
(For details please see the Table 7-1 and 7-2)

7.2.2 Economic Internal Rate of Return

From the consideration of previous requiremants, the economic internal rate of return in 15 years was calculated.

Details are listed in table 7-3 and 7-4, and the summary is as follows:

Case 1: 19.13%
Case 2: 18.16%

From this data it is clear that both case 1 and case 2 will bring sufficient profit.

Table 7-1 Details of Economic Production Cost (Case 1)

	O P C			O W C		
	Consumption	Price	B$/t Cement	Consumption	Price	B$/t Cement
Variable Cost						
Clinker (OPC)	0.965 t	76.36 B$/t	73.7			
Clinker (OWC)				0.965 t	130.36 B$/t	125.8
Bulk Cement (OPC)						
Bulk Cement (OWC)						
Gypsum	0.035 t	60.38 B$/t	2.1	0.035 t	60.38 B$/t	2.1
Electric Power	45.2 KWH	0.043 B$/KWH	1.9	45.2 KWH	0.043 B$/KWH	1.9
Paper Bag	21 Bags	0.47 B$/Bag	9.9	21 Bags	0.47 B$/Bag	9.9
(sub total)			(87.6)			(139.7)
Fixed Cost		Annual Cost				
Labor		B$ 625,000	4.0			4.0
Maintenance & Repair		B$ 170,000	1.1			1.1
Land Cost		B$ 25,000	0.2			0.2
Overhead		B$ 457,000	2.9			2.9
Water		B$ 2,000	-			-
(sub total)			(8.2)			(8.2)
(TOTAL)			(95.8)			(147.9)

Note: Sales price quoted: OPC 122.8 B$/T, OWC 303.8 B$/T

Table 7-2 Details of Economic Production Cost (Case 2)

	O P C			O W C		
	Consumption	Price	B$/t Cement	Consumption	Price	B$/t Cement
Variable Cost						
Clinker (OPC)						
Clinker (OWC)						
Bulk Cement (OPC)	1.0 t	103.2 B$/t	103.2			
Bulk Cement (OWC)				1.0 t	175.2 B$/t	175.2
Gypsum						
Electric Power	2.4 KWH	0.043 B$/KWH	0.1	2.4 KWH	0.043 B$/KWH	0.1
Paper Bag	21 Bag/t	0.47 B$/Bag	9.9	21 Bag/t	0.47 B$/Bag	9.9
(sub total)			(113.2)			(185.2)
Fixed Cost		(Annual Cost)				
Labor		B$ 495,000	3.2			3.2
Maintenance & Repair		B$ 45,000	0.3			0.3
Land Cost		B$ 12,000	0.1			0.1
Overhead		B$ 392,000	2.5			2.5
Water		B$ 2,000	-			-
(sub total)			(6.1)			(6.1)
(TOTAL)			(119.3)			(191.3)

Note: Sales price quoted: OPC 122.8 B$/T, OWC 303.8 B$/T

Table 7-3 Economic Internal Rate of Return (Case 1)

	Economic Cost (A) Capital Cost	Operating Cost	Ecomomic Benefit (B)	Net Benefit (B)-(A)
1983	4,654			-4,654
1984	20,387			-20,387
1985		11,253	15,186	3,933
1986		11,994	16,849	4,855
1987		13,246	18,604	5,358
1988		13,572	19,061	5,489
1989		13,898	19,518	5,620
1990		14,224	19,975	5,751
1991		14,551	20,431	5,880
1992		14,877	20,888	6,011
1993		15,203	21,345	6,142
1994		15,528	21,801	6,273
1995		15,836	22,234	6,398
1996		15,836	22,234	6,398
1997		15,836	22,234	6,398
1998		15,836	22,234	6,398
1999		15,836	22,234	6,398
TOTAL	25,041	217,526	304,828	62,261

IRR = 19.13%

Table 7-4 Economic Internal Rate of Return (Case 2)

	Economic Cost (A) Capital Cost	Operating Cost	Ecomomic Benefit (B)	Net Benefit (B)-(A)
1983	1,870			-1,870
1984	8,137			-8,137
1985		13,913	15,186	1,273
1986		14,865	16,849	1,984
1987		16,484	18,604	2,120
1988		16,905	19,061	2,156
1989		17,325	19,518	2,193
1990		17,747	19,975	2,228
1991		18,167	20,431	2,264
1992		18,589	20,888	2,299
1993		19,010	21,345	2,335
1994		19,430	21,801	2,371
1995		19,830	22,234	2,404
1996		19,830	22,234	2,404
1997		19,830	22,234	2,404
1998		19,830	22,234	2,404
1999		19,830	22,234	2,404
TOTAL	10,007	271,585	304,828	23,236

IRR = 18.16%

ATTACHMENT 1 EVALUATION OF OTHER REPORT

ATTACHMENT 1. EVALUATION OF A REPORT PREPARED BY A THIRD COMPANY

Our comments are given hereunder regarding the report by UBE Industries Ltd., Japan and submitted to Brunei in May, 1982.

1. General

The former report presented the survey results for the proposed cement plant to be constructed in Brunei. This cement plant should be a customer for the proposed clinker grinding plant (CMS) to be constructed in Sabah, which would be following to the already-operating CMS plant in Sarawak. Therefore, this report viewed the rationality and profitability of the Sabah Plant construction Projec as being the main priority, rather than being a survey from the viewpoint of Brunei.

Next, the former report's description was confined to OPC, and almost no reference was made to OWC. In view of the fact that Brunei is a petroleum producing country where there is some demand for OWC, and that OWC cold have a great impact on a cement plant having a higher added value than OPC, the omission of OWC will not be justified.

As for the reasons for the omission, the former report stated, firstly, that OWC would not be produced in the Sabah Plant due to the above-mentioned back ground circumstances, and also, that there would be some problems with the production technology. However, on the basis of our survey results, there should be no particular problems with the manufacturing technology.

The actual purpose of the former report on a plant which deals with only one of the types of cement currently being used in Brunei, is

not clear. However seems it to insufficiently reflect the actual situation.

2. Estimation of Demand

Although we cannot comment on the estimated value, since there are various methods for estimating future demand, it may be justifiable to make the comment on, "Since per capita consumption in Brunei has already reached such a high level (more than 500 kg), not much expansion can be expected in the future". This may be misleading when compared to other petroleum-producing countries with relatively small populations. Although we should refrain from making definite comments on the estimated values due to the aforementioned reason, they seem to be rather low future when the social conditions and consolidation of social capital in Brunei are taken into consideration.

3. Stability of Supply

Altyough the supply source of cement in the former report was presumed to be Sabah, there could be problems in securing a steady supply of cement. Either when the production capacity and/or storage capacity of the Sabah grinding plant is small, or when there is any fluctuation in demand in Sabah, a steady supply of cement could be difficult to obtain.

4. Cement Plant and Equipment

Our technical coments are as follows:

(1) Although, in the former report, it was proposed to use the existing Muara Port in the case of a clinker grinding plant, the use of this port would be difficult. This is because it will be economically unfeasible to restrict the dusting to a minor degree at the time of clilnder unloading, and the general

cargo storage capacity of Muara Port will soon be insufficient to cope with the increasing volume of imports to Brunei, as previously foreseen in this report. Also environmental problems related to clinker transportation by trucks, can be foreseen.

(2) Although it was initially proposed to adopt an open circuit system with a cement cooling unit in the clinker grinding mill, many plants are following the global trend and adopting closed circuit grinding systems. Generally speaking, the following are the main comparisons between the close circuit grinding mill and the open circuit grinding mill.

(a) Because cyclone separator is used in the grinding process, the equipment becomes more expensive in the case of the closed circuit system.

(b) Because cyclone separator is used, it is easier to regulate the distribution of particle size and control fineness.

(c) The temperature of the cement is low during the grinding process. This should minimize the problem of false setting, which has a bad affect on cement quality, and also this means a cement coolling unit is not required after the grinding process.

(d) From the standpoint of electric power consumption for the total grinding equipment, closed circuit requires lower.

As a conclusion, better cement quality and economical power consumption, the closed circuit grinding system is considered preferable, although the equipment cost is slightly higher.

5. The previous report does not refer to the clinker unloading facilities at existing Muara Port. As explained in 4-(1) above, there is a possibility of a dust problem when unloading the clinker at the port.

   It is deemed necessary to take special countermeasures at the existing port where unloading work is to be carried out, due to the tight unloading schedule and activities of other ships. These points should have been included in the report.

6. From the standpoint of profitability, the CIF import price of bagged cement is set higher than that of the survey, however comment on this is not appropriate now due to the timing of the survey.

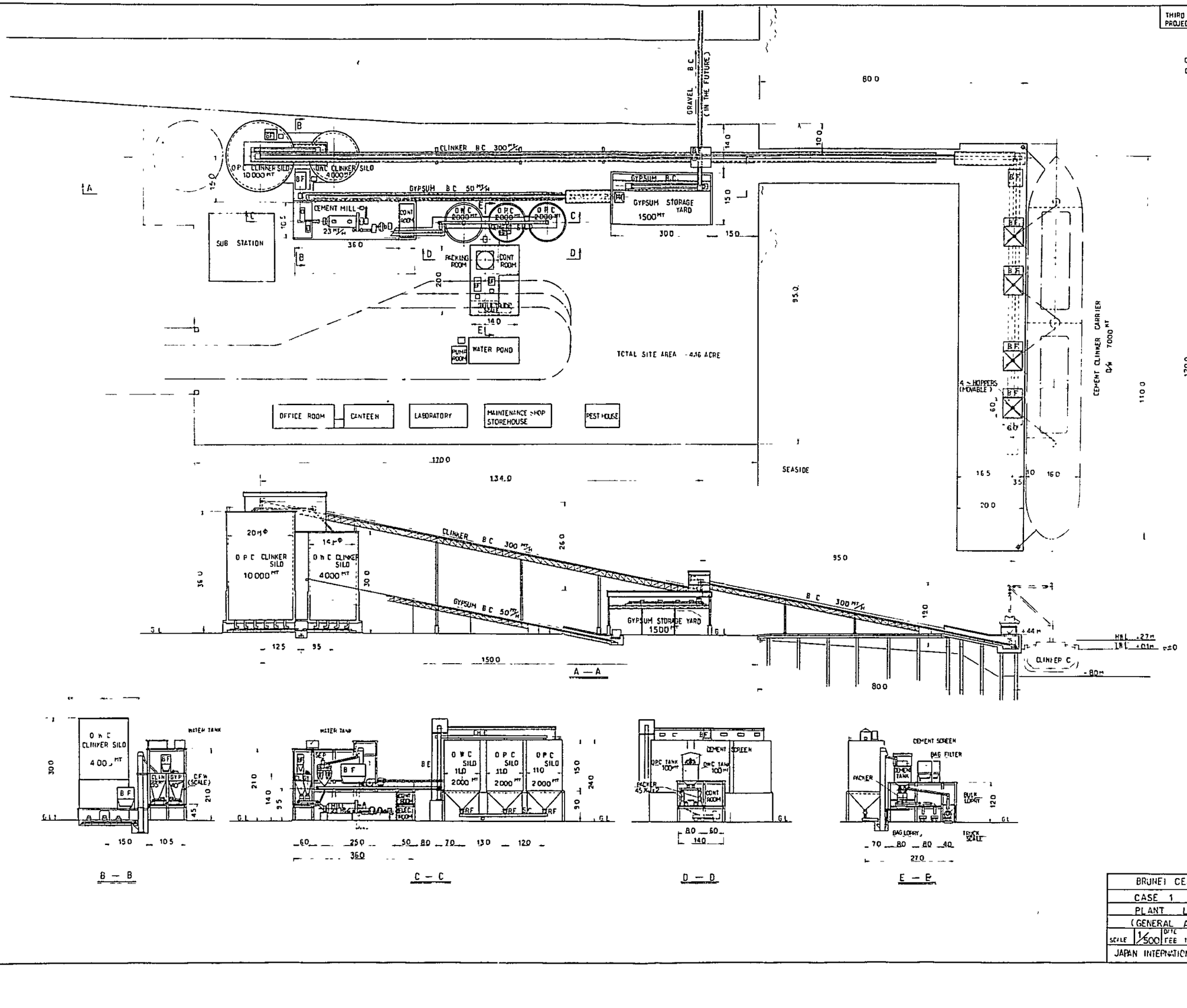
ATTACHMENT 2 PLANT DRAWINGS

THIRD ANGLE PROJECTION

PLAN RECORD

FIGURES IN METRIC SYSTEM (M)

O P C - ORDINARY PORTLAND CEMENT
O W C - OIL WELL CEMENT



BRUNEI CEMENT (GRINDING) PLANT	
CASE 1	
PLANT LAYOUT	
(GENERAL ARRANGEMENT)	
SCALE 1/500	DATE FEB 10 1983
JAPAN INTERNATIONAL COOPERATION AGENCY	A-1-1

THIRD ANGLE PROJECTION

PLAN RECORD

B C	BELT CONVEYER
B F	BAG FILTER
S C	SCREW CONVEYER
CH C	CHAIN CONVEYER
R F	ROTARY FEEDER
B E	BUCKET ELEVATOR
C F W	CONSTANT FEED WEIGHER

O P C :- ORDINARY PORTLAND CEMENT
O W C :- OIL WELL CEMENT

BAG FILTER
Ex FAN
B C
O W C CLINKER SILO 4 000 MT
O P C CLINKER SILO 10 000 MT
CLINKER B C 300 MT/H
BAG FILTER
Ex FAN
B C 300 MT/H
SCALE
Ex FAN
BAG FILTER
RESERVING HOPPER
CEMENT CLINKER CARRIER 5000~7000 MT
GRAVEL STORAGE YARD
READY MIXED CONCRETE PLANT
CONCRETE PILE PIPE BLOCK PLANT
BAG FILTER
Ex FAN
BAG FILTER
Ex FAN
GYPSUM B C 50 MT/H
BE
CLINKER
GYPSUM
CFW
CFW
B C
BYP B C
GYPSUM STORAGE YARD 1500 MT
BAG FILTER
Ex FAN
BE
O W C SILO 2000 MT
O P C SILO 2000 MT
O P C SILO 2000 MT
CH C
RF
RF
RF
S C
S C
A S
CEMENT SCREEN
Ex FAN
Ex FAN
B F
BF
O W C TANK
O P C TANK
BE 150 MT/H
S C
45 MT/H
PACKER
45 MT/H
B C
B C
S C
S C
A S
BULK CEMENT LORRY
BAG CEMENT LORRY
TRUCK SCALE
COOLING WATER HEAD TANK
Ex FAN
CYCLONE SEPARATOR
BAG FILTER (460 M³/H)
CI FAN
CH C
WATER COOLING SPRAY
PUMP
PUMP
WATER RESERVER PIT
WATER RESERVOIR 200 M³
B C
BE
CEMENT MILL 23 T/H
REDUCER
DRIVING MOTOR 850 KW

BRUNEI CEMENT (GRINDING) PLANT			
CASE 1			
FLOW SHEET			
SCALE	—	DATE FEB 10 1983	DWG NO. A-1-2
JAPAN INTERNATONAL COOPERATION AGENCY			

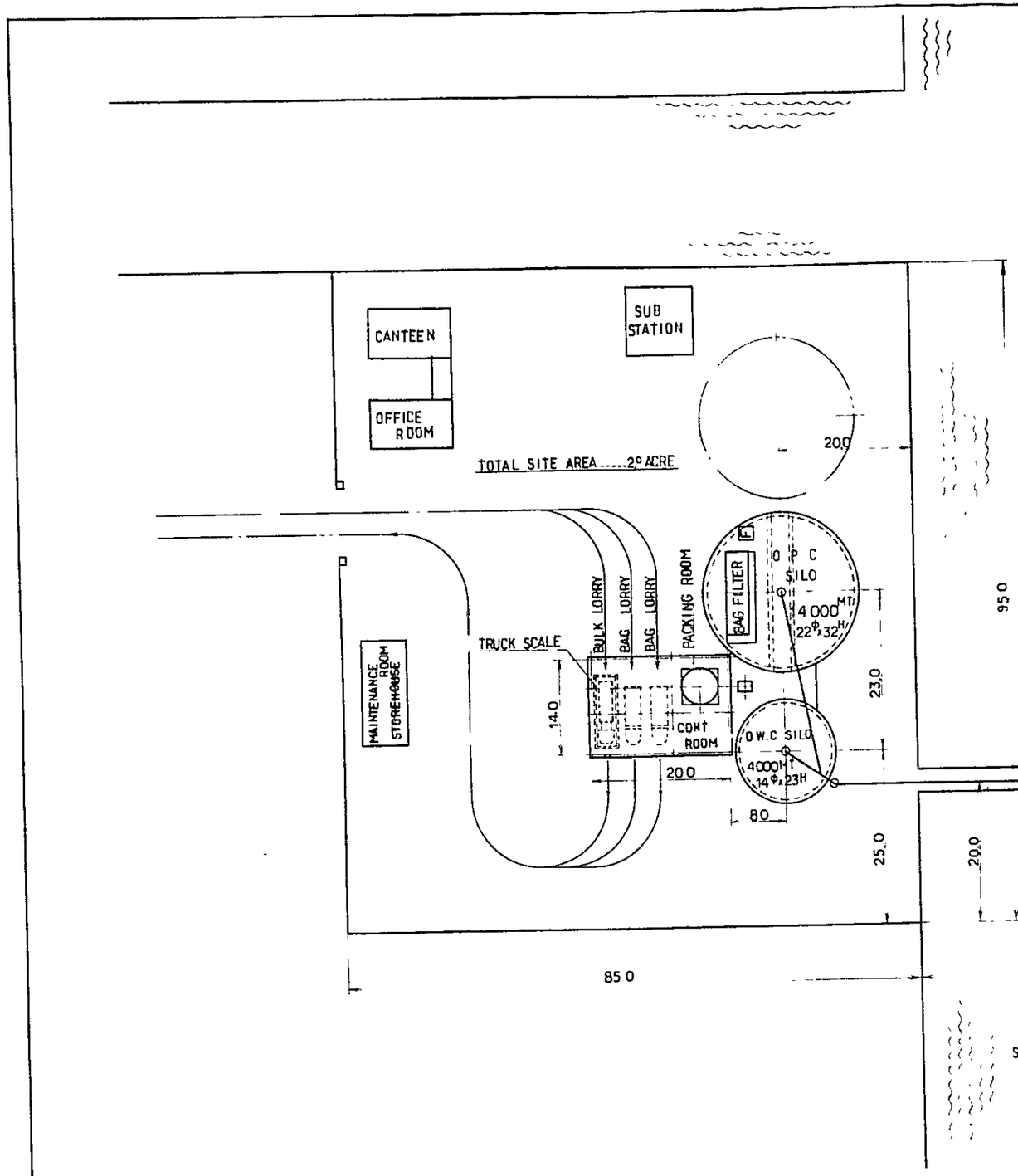
THIRD ANGLE PROJECTION

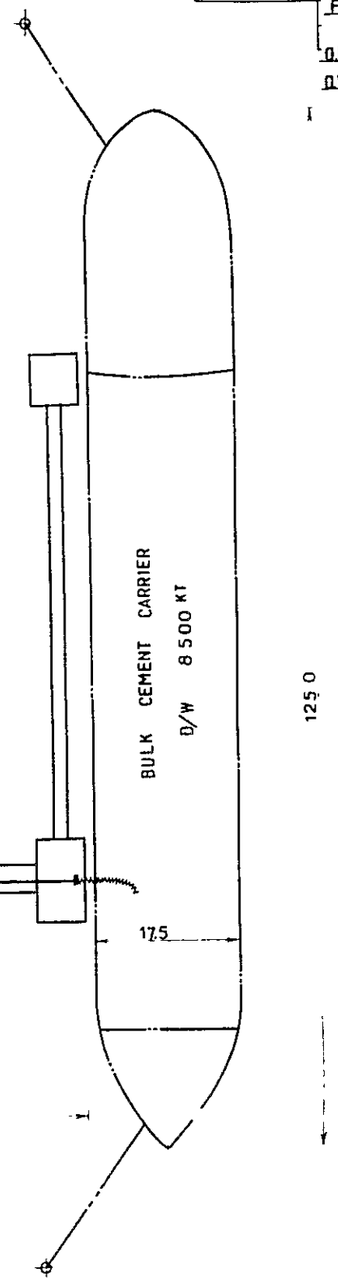
PLAN RECORD

FIGURES IN METRIC SYSTEM (M)

O.P.C. :- ORDINARY PORTLAND CEMENT

O.W.C. :- OIL WELL CEMENT





BRUNEI CEMENT (PACKING) PLANT

CASE 2.

PLANT LAYOUT

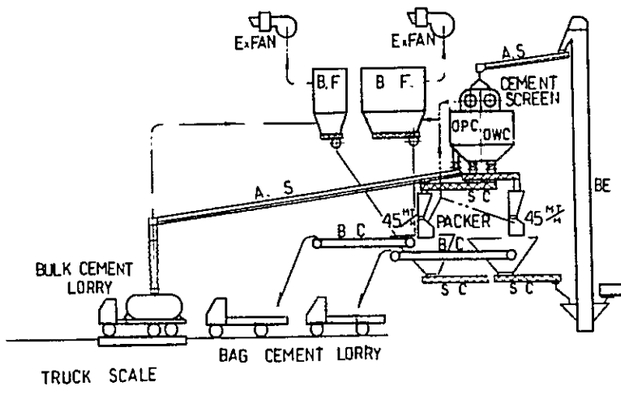
SCALE	DATE	DWG NO
1/500	FEB 10 1983	A—1—3

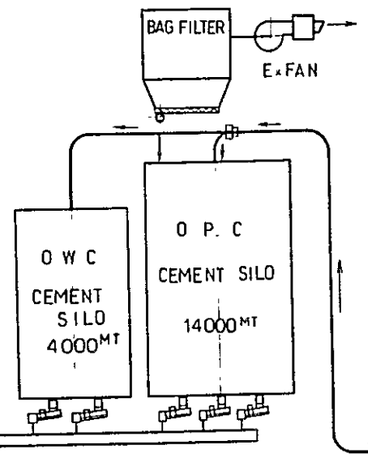
JAPAN INTERNATIONAL COOPERATION AGENCY

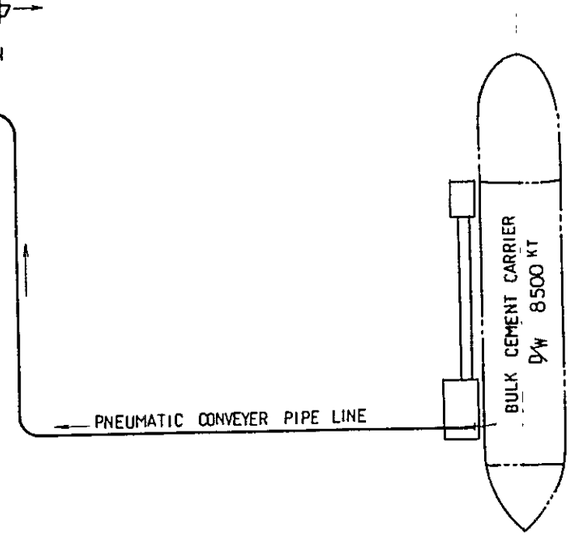
THIRD ANGLE PROJECTION	PLAN RECORD

O. P. C. :- ORDINARY PORTLAND CEMENT

O. W. C. :- OIL WELL CEMENT

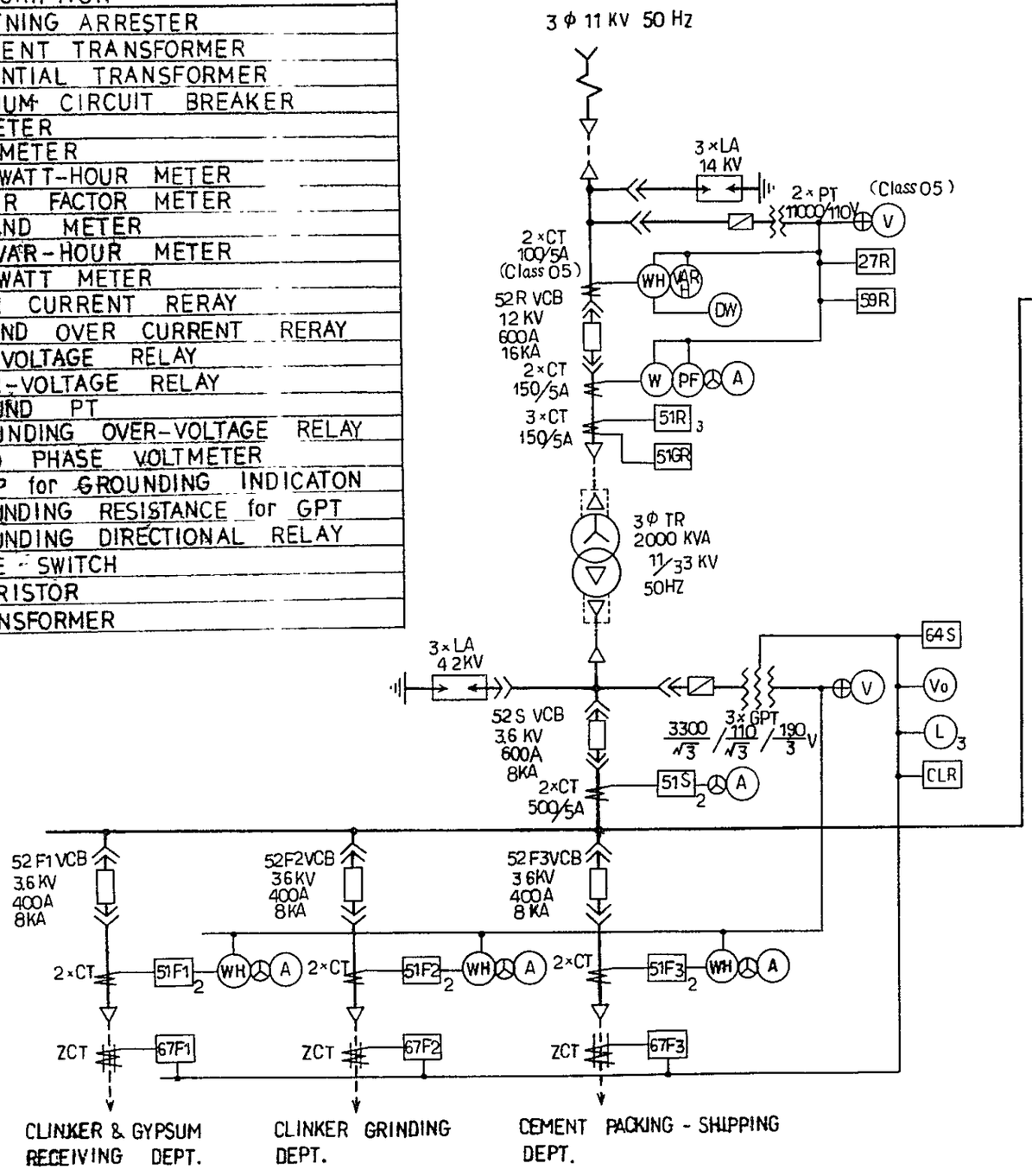


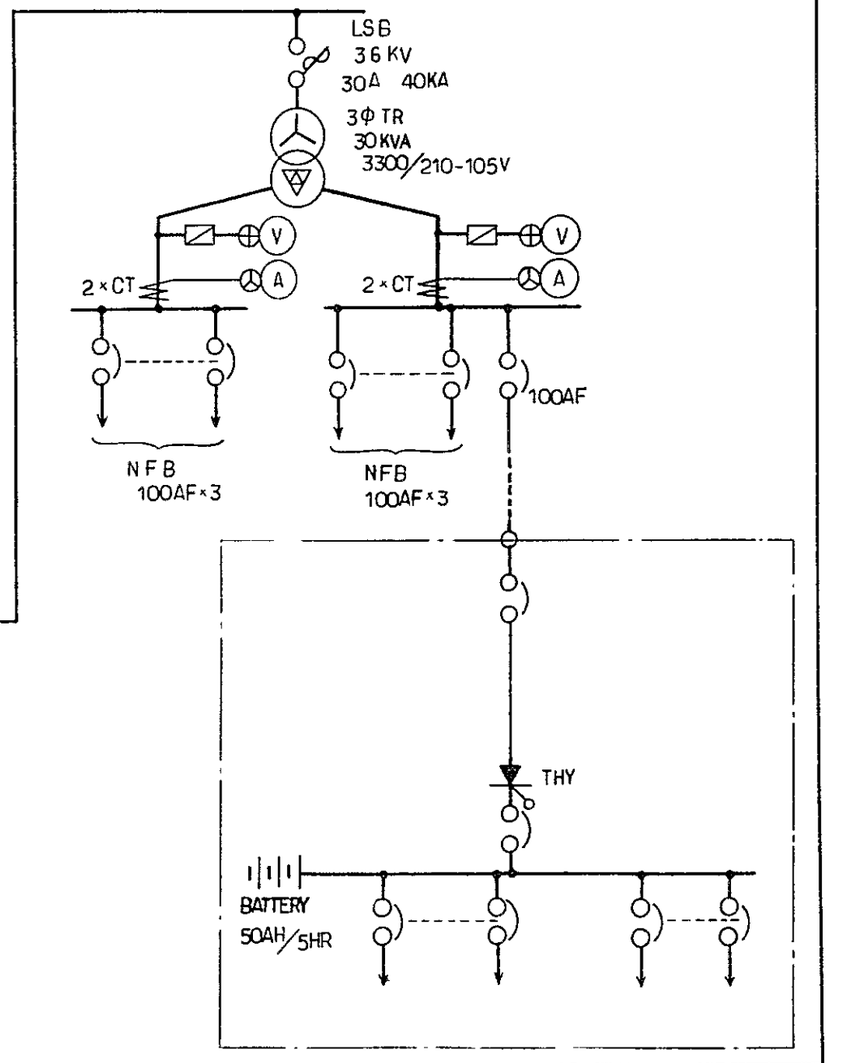




BRUNEI CEMENT (PACKING) PLANT			
CASE. 2.			
FLOW SHEET			
SCALE	—	DATE FEB 10 1983	DWG NO A—1—4
JAPAN INTERNATIONAL COOPERATION AGENCY			

SYMBOL	DESCRIPTION
LA	LIGHTNING ARRESTER
CT	CURRENT TRANSFORMER
PT	POTENTIAL TRANSFORMER
VCB	VACUUM CIRCUIT BREAKER
(A)	AMMETER
(V)	VOLTMETER
(WH)	KILOWATT-HOUR METER
(PF)	POWER FACTOR METER
(DW)	DEMAND METER
(VARH)	KILOVAR-HOUR METER
(W)	KILOWATT METER
51R,S,F	OVER CURRENT RERAY
51GR	GROUND OVER CURRENT RERAY
27R	LOW-VOLTAGE RELAY
59R	OVER-VOLTAGE RELAY
GPT	GROUND PT
64S	GROUNDING OVER-VOLTAGE RELAY
V_o	ZERO PHASE VOLTMETER
L	LAMP for GROUNDING INDICATON
CLR	GROUNDING RESISTANCE for GPT
67F	GROUNDING DIRECTIONAL RELAY
LSB	LINE SWITCH
THY	THYRISTOR
TR	TRANSFORMER



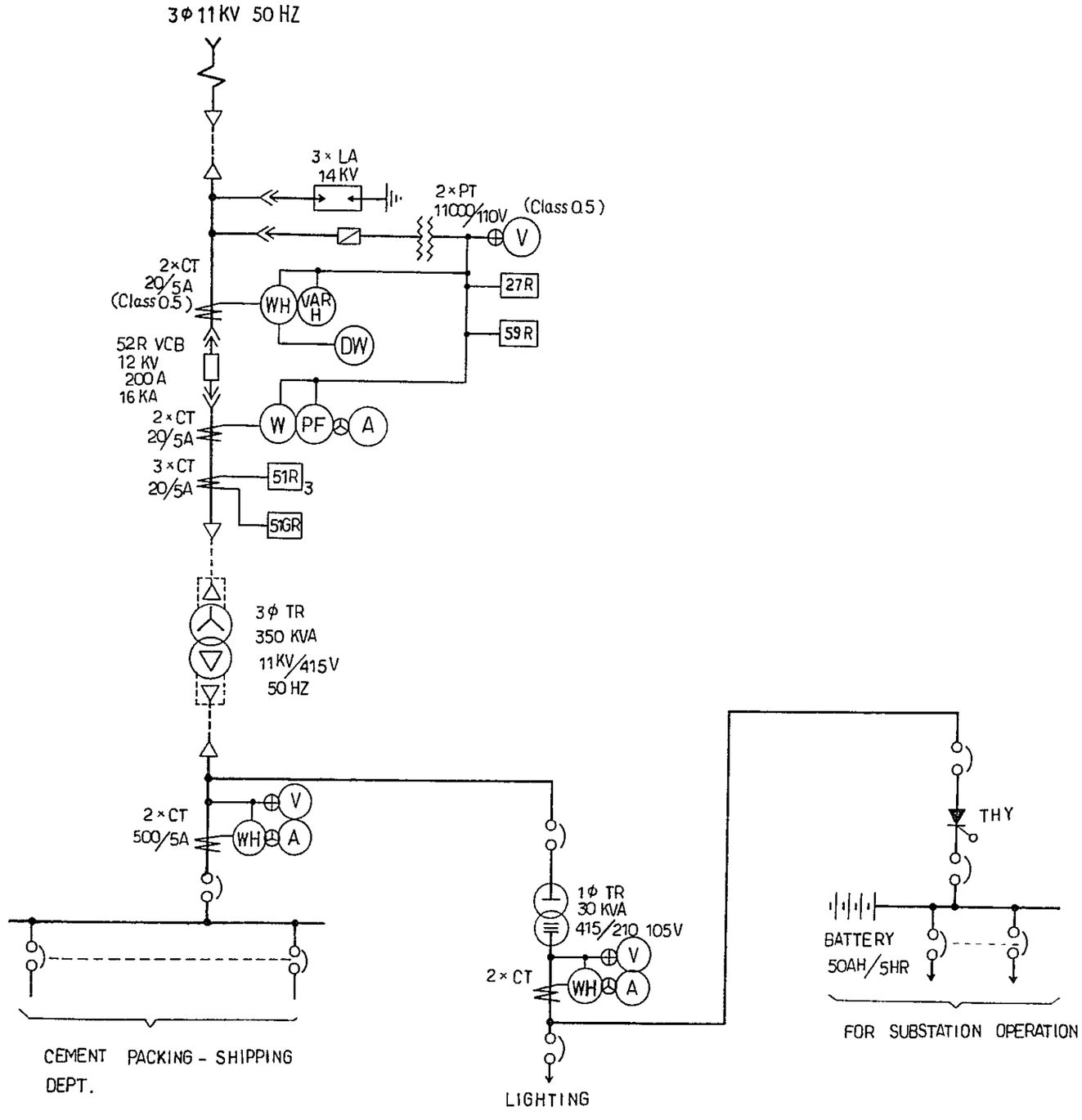


BRUNEI CEMENT (GRINDING) PLANT. CASE.1.

SINGLE LINE DIAGRAM OF MAIN SUBSTATION

FIG A-1-5

JAPAN INTERNATIONAL COOPERATION AGENCY



BRUNEI CEMENT (PACKING) PLANT CASE. 2.

SINGLE LINE DIAGRAM OF MAIN SUBSTATION

FIG A-1-6

JAPAN INTERNATIONAL COOPERATION AGENCY

ATTACHMENT 3 RESULTS OF FINANCIAL ANALYSIS (CASE 1)

ATTACHMENT 3 RESULTS OF FINANCIAL ANALYSIS (CASE 1)

Contents

COST ACCOUNTING

DATE : 82.12.23

PROJECT NAME : BRUNEI CEMENT PLANT
CASE NAME : MASTER-06

CURRENCY UNIT : 1000 BDLS
QUANTITY UNIT : 1 MT

(INDEX)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
*** MATERIALS ***										
MATERIALS - MAIN	0.	0.	6275.	7015.	8069.	8343.	8617.	8891.	9166.	9440.
- SUB	0.	0.	180.	201.	231.	239.	247.	255.	263.	271.
- OTHERS	0.	0.	843.	942.	1084.	1120.	1157.	1194.	1231.	1268.
** MATERIALS TOTAL (1) **	0.	0.	7297.	8158.	9384.	9703.	10022.	10340.	10659.	10978.
*** EXPENSES ***										
WAGES	0.	208.	516.	531.	541.	544.	546.	548.	550.	552.
UTILITIES	0.	0.	162.	181.	208.	215.	222.	229.	236.	243.
MAINTENANCE & REPAIRS	0.	0.	140.	144.	147.	148.	148.	149.	150.	150.
INSURANCES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LEASING EXPENSES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DUTY & TAXES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
OTHERS	25.	25.	23.	23.	24.	24.	24.	24.	24.	24.
** EXPENSES TOTAL (2) **	25.	233.	841.	879.	920.	930.	940.	950.	960.	970.
*** DEPRECIATION ***										
BUILDINGS	0.	0.	169.	174.	178.	178.	179.	180.	181.	181.
STRUCTURES	0.	0.	107.	110.	112.	113.	113.	114.	114.	114.
MACHINERIES - A	0.	0.	562.	578.	590.	592.	595.	597.	599.	601.
- B	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
- C	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
- OTHERS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
OTHER ASSETS	0.	0.	3.	3.	3.	3.	3.	3.	3.	3.
** DEPRECIATION TOTAL (3) **	0.	0.	842.	865.	883.	887.	890.	894.	897.	900.
COST OF GOODS MANUFACTURED	25.	233.	8979.	9902.	11186.	11519.	11852.	12184.	12516.	12848.
COST OF FINISHED GOODS MANU.	0.	0.	8979.	9902.	11186.	11519.	11852.	12184.	12516.	12848.
COST OF GOODS IN PROCESS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
INITIAL COST IN PROCESS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
QUAN.OF FINISHED GOODS MANU.	0.	0.	85106.	95153.	109445.	113164.	116883.	120602.	124321.	128041.
(UNIT COST)	0.0	0.0	0.11	0.10	0.10	0.10	0.10	0.10	0.10	0.10
*** SALES ***										
SALES	0.	0.	10021.	11685.	13440.	13897.	14353.	14810.	15267.	15723.
(SALES QUANTITY)	0.	0.	81606.	95153.	109445.	113164.	116883.	120602.	124321.	128041.
(UNIT PRICE)	0.0	0.0	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
COST OF GOODS SOLD	25.	233.	8610.	9907.	11193.	11521.	11853.	12186.	12517.	12849.
(INITIAL INVENTORY)	0.	0.	0.	369.	364.	358.	356.	355.	354.	352.
(INIT. INVENT.IN PROCESS)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
(COST OF GOODS MANU.)	25.	233.	8979.	9902.	11186.	11519.	11852.	12184.	12516.	12848.
(FINAL INVENTORY)	0.	0.	369.	364.	358.	356.	355.	354.	352.	351.
(FINAL INVENT.IN PROCESS)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GROSS PROFIT ON SALES	-25.	-233.	1411.	1777.	2247.	2376.	2500.	2624.	2749.	2874.
B.E.P. ON GROSS PROFIT	0.	0.	5093.	5469.	5581.	5597.	5620.	5642.	5663.	5682.
(FIXED COST)	25.	233.	1458.	1564.	1596.	1602.	1609.	1615.	1621.	1627.
(VARIABLE COST)	0.	0.	7152.	8343.	9597.	9919.	10245.	10571.	10897.	11223.

COST ACCOUNTING

PROJECT NAME : BRUNEI CEMENT PLANT
CASE NAME : MASTER-06

DATE : 82.12.23
CURRENCY UNIT : 1000 BDLS
QUANTITY UNIT : 1 MT

(INDEX)	1993	1994	1995	1996	1997	1998	1999
*** MATERIALS ***							
MATERIALS - MAIN	9714.	9988.	10248.	10248.	10248.	10248.	10248.
- SUB	279.	286.	294.	294.	294.	294.	294.
- OTHERS	1304.	1341.	1376.	1376.	1376.	1376.	1376.
** MATERIALS TOTAL (1) **	11297.	11616.	11918.	11918.	11918.	11918.	11918.
*** EXPENSES ***							
WAGES	554.	556.	557.	557.	557.	557.	557.
UTILITIES	250.	257.	264.	264.	264.	264.	264.
MAINTENANCE & REPAIRS	151.	151.	151.	151.	151.	151.	151.
INSURANCES	0.	0.	0.	0.	0.	0.	0.
LEASING EXPENSES	0.	0.	0.	0.	0.	0.	0.
DUTY & TAXES	0.	0.	0.	0.	0.	0.	0.
OTHERS	24.	24.	24.	24.	24.	24.	24.
** EXPENSES TOTAL (2) **	979.	988.	997.	997.	997.	997.	997.
*** DEPRECIATION ***							
BUILDINGS	182.	182.	183.	183.	183.	183.	183.
STRUCTURES	115.	115.	116.	116.	116.	116.	116.
MACHINERIES - A	603.	605.	607.	607.	607.	607.	607.
- B	0.	0.	0.	0.	0.	0.	0.
- C	0.	0.	0.	0.	0.	0.	0.
- OTHERS	0.	0.	0.	0.	0.	0.	0.
OTHER ASSETS	3.	3.	3.	3.	3.	3.	3.
** DEPRECIATION TOTAL (3) **	903.	906.	909.	909.	909.	909.	909.
COST OF GOODS MANUFACTURED	13179.	13510.	13824.	13824.	13824.	13824.	13824.
COST OF FINISHED GOODS MANU.	13179.	13510.	13824.	13824.	13824.	13824.	13824.
COST OF GOODS IN PROCESS	0.	0.	0.	0.	0.	0.	0.
INITIAL COST IN PROCESS	0.	0.	0.	0.	0.	0.	0.
QUAN.OF FINISHED GOODS MANU.	131760.	135479.	139000.	139000.	139000.	139000.	139000.
(UNIT COST)	0.10	0.10	0.10	0.10	0.10	0.10	0.10
*** SALES ***							
SALES	16180.	16637.	17069.	17069.	17069.	17069.	17069.
(SALES QUANTITY)	131760.	135479.	139000.	139000.	139000.	139000.	139000.
(UNIT PRICE)	0.12	0.12	0.12	0.12	0.12	0.12	0.12
COST OF GOODS SOLD	13180.	13511.	13825.	13824.	13824.	13824.	13824.
(INITIAL INVENTORY)	351.	350.	349.	348.	348.	348.	348.
(INIT. INVENT.IN PROCESS)	0.	0.	0.	0.	0.	0.	0.
(COST OF GOODS MANU.)	13179.	13510.	13824.	13824.	13824.	13824.	13824.
(FINAL INVENTORY)	350.	349.	348.	348.	348.	348.	348.
(FINAL INVENT.IN PROCESS)	0.	0.	0.	0.	0.	0.	0.
GROSS PROFIT ON SALES	3000.	3125.	3245.	3246.	3246.	3246.	3246.
B.E.P. ON GROSS PROFIT	5701.	5719.	5735.	5734.	5734.	5734.	5734.
(FIXED COST)	1632.	1637.	1642.	1642.	1642.	1642.	1642.
(VARIABLE COST)	11548.	11874.	12183.	12182.	12182.	12182.	12182.

(INDEX)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
*** MATERIALS ***										
MATERIALS - MAIN	0.	0.	2265.	2139.	2139.	2139.	2139.	2139.	2139.	2139.
- SUB	0.	0.	38.	36.	36.	36.	36.	36.	36.	36.
- OTHERS	0.	0.	178.	168.	168.	168.	168.	168.	168.	168.
** MATERIALS TOTAL (1) **	0.	0.	2481.	2343.	2343.	2343.	2343.	2343.	2343.	2343.
*** EXPENSES ***										
WAGES	0.	0.	109.	95.	84.	82.	79.	77.	75.	73.
UTILITIES	0.	0.	34.	32.	32.	32.	32.	32.	32.	32.
MAINTENANCE & REPAIRS	0.	0.	30.	26.	23.	22.	22.	21.	20.	20.
INSURANCES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LEASING EXPENSES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DUTY & TAXES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
OTHERS	0.	0.	5.	4.	4.	4.	3.	3.	3.	3.
** EXPENSES TOTAL (2) **	0.	0.	178.	157.	143.	140.	137.	134.	131.	129.
*** DEPRECIATION ***										
BUILDINGS	0.	0.	36.	31.	28.	27.	26.	25.	25.	24.
STRUCTURES	0.	0.	23.	20.	17.	17.	16.	16.	16.	15.
MACHINERIES - A	0.	0.	119.	103.	92.	89.	87.	84.	82.	80.
- B	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
- C	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
- OTHERS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
OTHER ASSETS	0.	0.	1.	1.	0.	0.	0.	0.	0.	0.
** DEPRECIATION TOTAL (3) **	0.	0.	178.	155.	137.	133.	129.	126.	123.	120.
COST OF GOODS MANUFACTURED	0.	0.	2837.	2655.	2623.	2616.	2610.	2603.	2597.	2592.
COST OF FINISHED GOODS MANU.	0.	0.	2837.	2655.	2623.	2616.	2610.	2603.	2597.	2592.
COST OF GOODS IN PROCESS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
INITIAL COST IN PROCESS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
QUAN.OF FINISHED GOODS MANU.	0.	0.	18000.	17000.	17000.	17000.	17000.	17000.	17000.	17000.
(UNIT COST)	0.0	0.0	0.16	0.16	0.15	0.15	0.15	0.15	0.15	0.15
*** SALES ***										
SALES	0.	0.	5165.	5165.	5165.	5165.	5165.	5165.	5165.	5165.
(SALES QUANTITY)	0.	0.	17000.	17000.	17000.	17000.	17000.	17000.	17000.	17000.
(UNIT PRICE)	0.0	0.0	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
COST OF GOODS SOLD	0.	0.	2680.	2656.	2625.	2617.	2610.	2604.	2598.	2592.
(INITIAL INVENTORY)	0.	0.	0.	158.	156.	154.	154.	154.	153.	153.
(INIT. INVENT.IN PROCESS)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
(COST OF GOODS MANU.)	0.	0.	2837.	2655.	2623.	2616.	2610.	2603.	2597.	2592.
(FINAL INVENTORY)	0.	0.	158.	156.	154.	154.	154.	153.	153.	152.
(FINAL INVENT.IN PROCESS)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GROSS PROFIT ON SALES	0.	0.	2485.	2508.	2539.	2548.	2555.	2561.	2567.	2573.
B.E.P. ON GROSS PROFIT	0.	0.	563.	518.	459.	446.	433.	422.	411.	400.
(FIXED COST)	0.	0.	304.	279.	248.	241.	234.	228.	222.	216.
(VARIABLE COST)	0.	0.	2376.	2377.	2377.	2376.	2376.	2376.	2376.	2376.

PROJECT NAME : BRUNEI CEMENT PLANT
CASE NAME : MASTER-06

COST ACCOUNTING

DATE : 82.12.23
CURRENCY UNIT : 1000 BDLS
QUANTITY UNIT : 1 MT

(INDEX)	1993	1994	1995	1996	1997	1998	1999
*** MATERIALS ***							
MATERIALS - MAIN	2139.	2139.	2139.	2139.	2139.	2139.	2139.
- SUB	36.	36.	36.	36.	36.	36.	36.
- OTHERS	168.	168.	168.	168.	168.	168.	168.
** MATERIALS TOTAL (1) **	2343.	2343.	2343.	2343.	2343.	2343.	2343.
*** EXPENSES ***							
WAGES	71.	70.	68.	68.	68.	68.	68.
UTILITIES	32.	32.	32.	32.	32.	32.	32.
MAINTENANCE & REPAIRS	19.	19.	19.	19.	19.	19.	19.
INSURANCES	0.	0.	0.	0.	0.	0.	0.
LEASING EXPENSES	0.	0.	0.	0.	0.	0.	0.
DUTY & TAXES	0.	0.	0.	0.	0.	0.	0.
OTHERS	3.	3.	3.	3.	3.	3.	3.
** EXPENSES TOTAL (2) **	126.	124.	122.	122.	122.	122.	122.
*** DEPRECIATION ***							
BUILDINGS	23.	23.	22.	22.	22.	22.	22.
STRUCTURES	15.	14.	14.	14.	14.	14.	14.
MACHINERIES - A	78.	76.	74.	74.	74.	74.	74.
- B	0.	0.	0.	0.	0.	0.	0.
- C	0.	0.	0.	0.	0.	0.	0.
- OTHERS	0.	0.	0.	0.	0.	0.	0.
OTHER ASSETS	0.	0.	0.	0.	0.	0.	0.
** DEPRECIATION TOTAL (3) **	117.	114.	111.	111.	111.	111.	111.
COST OF GOODS MANUFACTURED	2586.	2581.	2577.	2577.	2577.	2577.	2577.
COST OF FINISHED GOODS MANU.	2586.	2581.	2577.	2577.	2577.	2577.	2577.
COST OF GOODS IN PROCESS	0.	0.	0.	0.	0.	0.	0.
INITIAL COST IN PROCESS	0.	0.	0.	0.	0.	0.	0.
QUAN.OF FINISHED GOODS MANU.	17000.	17000.	17000.	17000.	17000.	17000.	17000.
(UNIT COST)	0.15	0.15	0.15	0.15	0.15	0.15	0.15
*** SALES ***							
SALES	5165.	5165.	5165.	5165.	5165.	5165.	5165.
(SALES QUANTITY)	17000.	17000.	17000.	17000.	17000.	17000.	17000.
(UNIT PRICE)	0.30	0.30	0.30	0.30	0.30	0.30	0.30
COST OF GOODS SOLD	2587.	2581.	2577.	2577.	2577.	2577.	2577.
(INITIAL INVENTORY)	152.	152.	152.	152.	152.	152.	152.
(INIT. INVENT.IN PROCESS)	0.	0.	0.	0.	0.	0.	0.
(COST OF GOODS MANU.)	2586.	2581.	2577.	2577.	2577.	2577.	2577.
(FINAL INVENTORY)	152.	152.	152.	152.	152.	152.	152.
(FINAL INVENT.IN PROCESS)	0.	0.	0.	0.	0.	0.	0.
GROSS PROFIT ON SALES	2578.	2583.	2588.	2588.	2588.	2588.	2588.
B.E.P. ON GROSS PROFIT	390.	380.	372.	372.	372.	372.	372.
(FIXED COST)	211.	205.	201.	201.	201.	201.	201.
(VARIABLE COST)	2376.	2376.	2376.	2376.	2376.	2376.	2376.

(INDEX)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
*** MATERIALS ***										
MATERIALS - MAIN	0.	0.	8540.	9154.	10208.	10482.	10757.	11031.	11305.	11579.
- SUB	0.	0.	218.	237.	267.	275.	283.	291.	299.	307.
- OTHERS	0.	0.	1021.	1110.	1252.	1289.	1325.	1362.	1399.	1436.
** MATERIALS TOTAL (1) **	0.	0.	9778.	10502.	11727.	12046.	12365.	12684.	13003.	13322.
*** EXPENSES ***										
WAGES	0.	208.	625.	625.	625.	625.	625.	625.	625.	625.
UTILITIES	0.	0.	196.	213.	240.	247.	254.	261.	269.	276.
MAINTENANCE & REPAIRS	0.	0.	170.	170.	170.	170.	170.	170.	170.	170.
INSURANCES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LEASING EXPENSES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DUTY & TAXES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
OTHERS	25.	25.	27.	27.	27.	27.	27.	27.	27.	27.
** EXPENSES TOTAL (2) **	25.	233.	1019.	1036.	1063.	1070.	1077.	1084.	1091.	1098.
*** DEPRECIATION ***										
BUILDINGS	0.	0.	205.	205.	205.	205.	205.	205.	205.	205.
STRUCTURES	0.	0.	130.	130.	130.	130.	130.	130.	130.	130.
MACHINERIES - A	0.	0.	681.	681.	681.	681.	681.	681.	681.	681.
- B	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
- C	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
- OTHERS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
OTHER ASSETS	0.	0.	4.	4.	4.	4.	4.	4.	4.	4.
** DEPRECIATION TOTAL (3) **	0.	0.	1020.	1020.	1020.	1020.	1020.	1020.	1020.	1020.
COST OF GOODS MANUFACTURED	25.	233.	11817.	12557.	13810.	14136.	14462.	14788.	15114.	15440.
COST OF FINISHED GOODS MANU.	0.	0.	11817.	12557.	13810.	14136.	14462.	14788.	15114.	15440.
COST OF GOODS IN PROCESS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
INITIAL COST IN PROCESS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
QUAN.OF FINISHED GOODS MANU.	0.	0.	103106.	112153.	126445.	130164.	133883.	137602.	141321.	145041.
(UNIT COST)	0.0	0.0	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
*** SALES ***										
SALES	0.	0.	15186.	16849.	18604.	19061.	19518.	19975.	20431.	20888.
(SALES QUANTITY)	0.	0.	98606.	112153.	126445.	130164.	133883.	137602.	141321.	145041.
(UNIT PRICE)	0.0	0.0	0.15	0.15	0.15	0.15	0.15	0.15	0.14	0.14
COST OF GOODS SOLD	25.	233.	11290.	12564.	13818.	14138.	14464.	14789.	15115.	15441.
(INITIAL INVENTORY)	0.	0.	0.	527.	520.	512.	510.	508.	507.	505.
(INIT. INVENT.IN PROCESS)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
(COST OF GOODS MANU.)	25.	233.	11817.	12557.	13810.	14136.	14462.	14788.	15114.	15440.
(FINAL INVENTORY)	0.	0.	527.	520.	512.	510.	508.	507.	505.	504.
(FINAL INVENT.IN PROCESS)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GROSS PROFIT ON SALES	-25.	-233.	3896.	4286.	4786.	4923.	5054.	5185.	5316.	5447.
B.E.P. ON GROSS PROFIT	0.	0.	5656.	5987.	6040.	6043.	6053.	6064.	6073.	6082.
(FIXED COST)	25.	233.	1762.	1843.	1844.	1843.	1843.	1843.	1843.	1843.
(VARIABLE COST)	0.	0.	9528.	10720.	11975.	12295.	12621.	12947.	13273.	13599.

PROJECT NAME : BRUNEI CEMENT PLANT
CASE NAME : MASTER-06

TOTAL COST ACCOUNTING

DATE : 82.12.23
CURRENCY UNIT : 1000 BDLS
QUANTITY UNIT : 1 MT

(INDEX)	1993	1994	1995	1996	1997	1998	1999
*** MATERIALS ***							
MATERIALS - MAIN	11853.	12128.	12387.	12387.	12387.	12387.	12387.
- SUB	314.	322.	330.	330.	330.	330.	330.
- OTHERS	1473.	1510.	1544.	1544.	1544.	1544.	1544.
** MATERIALS TOTAL (1) **	13641.	13959.	14261.	14261.	14261.	14261.	14261.
*** EXPENSES ***							
WAGES	625.	625.	625.	625.	625.	625.	625.
UTILITIES	283.	290.	296.	296.	296.	296.	296.
MAINTENANCE & REPAIRS	170.	170.	170.	170.	170.	170.	170.
INSURANCES	0.	0.	0.	0.	0.	0.	0.
LEASING EXPENSES	0.	0.	0.	0.	0.	0.	0.
DUTY & TAXES	0.	0.	0.	0.	0.	0.	0.
OTHERS	27.	27.	27.	27.	27.	27.	27.
** EXPENSES TOTAL (2) **	1105.	1112.	1119.	1119.	1119.	1119.	1119.
*** DEPRECIATION ***							
BUILDINGS	205.	205.	205.	205.	205.	205.	205.
STRUCTURES	130.	130.	130.	130.	130.	130.	130.
MACHINERIES - A	681.	681.	681.	681.	681.	681.	681.
- B	0.	0.	0.	0.	0.	0.	0.
- C	0.	0.	0.	0.	0.	0.	0.
- OTHERS	0.	0.	0.	0.	0.	0.	0.
OTHER ASSETS	4.	4.	4.	4.	4.	4.	4.
** DEPRECIATION TOTAL (3) **	1020.	1020.	1020.	1020.	1020.	1020.	1020.
COST OF GOODS MANUFACTURED	15766.	16092.	16400.	16400.	16400.	16400.	16400.
COST OF FINISHED GOODS MANU.	15766.	16092.	16400.	16400.	16400.	16400.	16400.
COST OF GOODS IN PROCESS	0.	0.	0.	0.	0.	0.	0.
INITIAL COST IN PROCESS	0.	0.	0.	0.	0.	0.	0.
QUAN.OF FINISHED GOODS MANU.	148760.	152479.	156000.	156000.	156000.	156000.	156000.
(UNIT COST)	0.11	0.11	0.11	0.11	0.11	0.11	0.11
*** SALES ***							
SALES	21345.	21801.	22234.	22234.	22234.	22234.	22234.
(SALES QUANTITY)	148760.	152479.	156000.	156000.	156000.	156000.	156000.
(UNIT PRICE)	0.14	0.14	0.14	0.14	0.14	0.14	0.14
COST OF GOODS SOLD	15767.	16093.	16401.	16400.	16400.	16400.	16400.
(INITIAL INVENTORY)	504.	502.	501.	500.	500.	500.	500.
(INIT. INVENT.IN PROCESS)	0.	0.	0.	0.	0.	0.	0.
(COST OF GOODS MANU.)	15766.	16092.	16400.	16400.	16400.	16400.	16400.
(FINAL INVENTORY)	502.	501.	500.	500.	500.	500.	500.
(FINAL INVENT.IN PROCESS)	0.	0.	0.	0.	0.	0.	0.
GROSS PROFIT ON SALES	5578.	5709.	5832.	5834.	5834.	5834.	5834.
B.E.P. ON GROSS PROFIT	6091.	6099.	6107.	6105.	6105.	6105.	6105.
(FIXED COST)	1843.	1843.	1843.	1842.	1842.	1842.	1842.
(VARIABLE COST)	13924.	14250.	14559.	14558.	14558.	14558.	14558.

PROJECT NAME : BRUNEI CEMENT PLANT
CASE NAME : MASTER-06

PROFIT AND LOSS STATEMENT

DATE : 82.12.23
CURRENCY UNIT : 1000 BDLS
QUANTITY UNIT : 1 MT

(INDEX)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
*** SALES ***										
SALES	0.	0.	15186.	16849.	18604.	19061.	19518.	19975.	20431.	20888.
SALES QUANTITY	0.	0.	98606.	112153.	126445.	130164.	133883.	137602.	141321.	145041.
(UNIT PRICE)	0.0	0.0	0.15	0.15	0.15	0.15	0.15	0.15	0.14	0.14
OTHER SALES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
COST OF GOODS SOLD	25.	233.	11290.	12564.	13818.	14138.	14464.	14789.	15115.	15441.
(INITIAL INVENTORY)	0.	0.	0.	527.	520.	512.	510.	508.	507.	505.
(COST OF GOODS MANUFACTURED)	25.	233.	11817.	12557.	13810.	14136.	14462.	14788.	15114.	15440.
(FINAL INVENTORY)	0.	0.	527.	520.	512.	510.	508.	507.	505.	504.
OTHER COST OF SALES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GROSS PROFIT ON SALES	-25.	-233.	3896.	4286.	4786.	4923.	5054.	5185.	5316.	5447.
*** OPERATING EXPENSES ***										
(SALARIES AND WAGES)	144.	144.	144.	144.	144.	144.	144.	144.	144.	144.
(SELLING EXPENSES)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
(DEPRECIATION)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
(FREIGHT & DELIVERY EXPENSE)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
(ROYALTIES)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
(DOUBTFUL RECEIV. RESERVE)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
(SALES TAX)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
(ENTERPRISE TAX)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
(OTHER OPERATING EXPENSES)	0.	104.	313.	313.	313.	313.	313.	313.	313.	313.
OPERATING EXPENSES TOTAL	144.	248.	457.	457.	457.	457.	457.	457.	457.	457.
OPERATING PROFIT	-169.	-481.	3439.	3829.	4329.	4466.	4597.	4728.	4859.	4990.
NON-OPERATING INCOME										
(INTEREST INCOME)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
(OTHERS)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NON-OPERATING INCOME TOTAL	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NON-OPERATING EXPENSES										
(INTEREST FOR L.T.LOANS)	0.	0.	917.	733.	550.	367.	183.	0.	0.	0.
(INTEREST FOR DEFER.PAYMENT)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
(INTEREST FOR S.T.LOANS)	0.	0.	629.	640.	444.	166.	4.	0.	0.	0.
(INTEREST FOR OTHER DEBTS)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
(OTHERS)	0.	0.	489.	489.	489.	489.	489.	0.	0.	0.
NON-OPERATING EXPENSES TOTAL	0.	0.	2035.	1862.	1483.	1021.	676.	0.	0.	0.
PROFIT B.EXTRAORDINARY ITEMS	-169.	-481.	1405.	1967.	2847.	3445.	3921.	4728.	4859.	4990.
EXTRAORDINARY PROFIT & LOSS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PROFIT BEFORE TAXES	-169.	-481.	1405.	1967.	2847.	3445.	3921.	4728.	4859.	4990.
CORPORATE INCOME TAXES	0.	0.	0.	0.	0.	0.	0.	1418.	1458.	1497.
NET PROFIT	-169.	-481.	1405.	1967.	2847.	3445.	3921.	3310.	3401.	3493.
CUMULATIVE NET PROFIT	-169.	-650.	755.	2722.	5568.	9013.	12934.	16244.	19645.	23138.
DIVIDEND RATIO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

PROJECT NAME : BRUNEI CEMENT PLANT
CASE NAME : MASTER-06

PROFIT AND LOSS STATEMENT

DATE : 82.12.23
CURRENCY UNIT : 1000 BDLS
QUANTITY UNIT : 1 MT

(INDEX)	1993	1994	1995	1996	1997	1998	1999
*** SALES ***							
SALES	21345.	21801.	22234.	22234.	22234.	22234.	22234.
SALES QUANTITY	148760.	152479.	156000.	156000.	156000.	156000.	156000.
(UNIT PRICE)	0.14	0.14	0.14	0.14	0.14	0.14	0.14
OTHER SALES	0.	0.	0.	0.	0.	0.	0.
COST OF GOODS SOLD	15767.	16093.	16401.	16400.	16400.	16400.	16400.
(INITIAL INVENTORY)	504.	502.	501.	500.	500.	500.	500.
(COST OF GOODS MANUFACTURED)	15766.	16092.	16400.	16400.	16400.	16400.	16400.
(FINAL INVENTORY)	502.	501.	500.	500.	500.	500.	500.
OTHER COST OF SALES	0.	0.	0.	0.	0.	0.	0.
GROSS PROFIT ON SALES	5578.	5709.	5832.	5834.	5834.	5834.	5834.
*** OPERATING EXPENSES ***							
(SALARIES AND WAGES)	144.	144.	144.	144.	144.	144.	144.
(SELLING EXPENSES)	0.	0.	0.	0.	0.	0.	0.
(DEPRECIATION)	0.	0.	0.	0.	0.	0.	0.
(FREIGHT & DELIVERY EXPENSE)	0.	0.	0.	0.	0.	0.	0.
(ROYALTIES)	0.	0.	0.	0.	0.	0.	0.
(DOUBTFUL RECEIV. RESERVE)	0.	0.	0.	0.	0.	0.	0.
(SALES TAX)	0.	0.	0.	0.	0.	0.	0.
(ENTERPRISE TAX)	0.	0.	0.	0.	0.	0.	0.
(OTHER OPERATING EXPENSES)	313.	313.	313.	313.	313.	313.	313.
OPERATING EXPENSES TOTAL	457.	457.	457.	457.	457.	457.	457.
OPERATING PROFIT	5121.	5252.	5375.	5377.	5377.	5377.	5377.
NON-OPERATING INCOME							
(INTEREST INCOME)	0.	0.	0.	0.	0.	0.	0.
(OTHERS)	0.	0.	0.	0.	0.	0.	0.
NON-OPERATING INCOME TOTAL	0.	0.	0.	0.	0.	0.	0.
NON-OPERATING EXPENSES							
(INTEREST FOR L.T.LOANS)	0.	0.	0.	0.	0.	0.	0.
(INTEREST FOR DEFER.PAYMENT)	0.	0.	0.	0.	0.	0.	0.
(INTEREST FOR S.T.LOANS)	0.	0.	0.	0.	0.	0.	0.
(INTEREST FOR OTHER DEBTS)	0.	0.	0.	0.	0.	0.	0.
(OTHERS)	0.	0.	0.	0.	0.	0.	0.
NON-OPERATING EXPENSES TOTAL	0.	0.	0.	0.	0.	0.	0.
PROFIT B.EXTRAORDINARY ITEMS	5121.	5252.	5375.	5377.	5377.	5377.	5377.
EXTRAORDINARY PROFIT & LOSS	0.	0.	0.	0.	0.	0.	0.
PROFIT BEFORE TAXES	5121.	5252.	5375.	5377.	5377.	5377.	5377.
CORPORATE INCOME TAXES	1536.	1575.	1613.	1613.	1613.	1613.	1613.
NET PROFIT	3584.	3676.	3763.	3764.	3764.	3764.	3764.
CUMULATIVE NET PROFIT	26723.	30399.	34161.	37925.	41689.	45452.	49216.
DIVIDEND RATIO	0.0	0.0	0.0	0.0	0.0	0.0	0.0

(INDEX)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
SALES INCOME	0.	0.	14004.	16725.	18473.	19027.	19484.	19940.	20397.	20854.
(CASH)	0.	0.	1002.	1168.	1344.	1390.	1435.	1481.	1527.	1572.
(MATURED NOTES & A/C RECE.)	0.	0.	13002.	15556.	17129.	17637.	18048.	18459.	18870.	19281.
OTHER SALES INCOME	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NON-OPERATING INCOME	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
** SALES INCOME TOTAL **	0.	0.	14004.	16725.	18473.	19027.	19484.	19940.	20397.	20854.
PAID UP CAPITAL	5700.	5700.	0.	0.	0.	0.	0.	0.	0.	0.
LONG TERM LOAN - A	0.	9651.	0.	0.	0.	0.	0.	0.	0.	0.
- B	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
- C	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
- OTHERS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DEFERRED & ACCRUED PAYMENT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SHORT TERM LOAN	0.	5179.	6805.	5378.	3076.	85.	0.	0.	0.	0.
** CAPITAL INCOME TOTAL **	5700.	20530.	6805.	5378.	3076.	85.	0.	0.	0.	0.
ASSET DEAL INCOME	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
OTHERS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
**** INCOME TOTAL (A) ****	5700.	20530.	20808.	22102.	21549.	19112.	19484.	19940.	20397.	20854.
MATERIALS & GOODS PURCHASED	0.	0.	10575.	10502.	11727.	12046.	12365.	12684.	13003.	13322.
OTHER COST MANUFACTURED	25.	233.	1019.	1036.	1063.	1070.	1077.	1084.	1091.	1098.
OTHER SALES EXPENDITURE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SELL.GENERAL & ADMINI. EX.	144.	248.	457.	457.	457.	457.	457.	457.	457.	457.
NON-OPERATING EXPENSES	0.	1189.	1546.	1373.	994.	533.	188.	0.	0.	0.
(INTEREST FOR LOAN)	0.	1189.	1546.	1373.	994.	533.	188.	0.	0.	0.
(OTHERS)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CORPORATE INCOME TAXES	0.	0.	0.	0.	0.	0.	0.	0.	1418.	1458.
DIVIDEND	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
OFFICERS BONUSES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
** SUB TOTAL (1) **	169.	1670.	13597.	13368.	14241.	14106.	14087.	14225.	15969.	16335.
REPAYMENT L.T.L. - A	0.	0.	1930.	1930.	1930.	1930.	1931.	0.	0.	0.
- B	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
- C	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
- OTHERS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
REPAYMT. DEFERRED & ACCRUED	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
REPAYMT. S.T.L.	0.	0.	5179.	6805.	5378.	3076.	85.	0.	0.	0.
** REPAYMENT TOTAL **	0.	0.	7109.	8735.	7308.	5006.	2016.	0.	0.	0.
LAND	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BUILDINGS & MACHINERIES	4425.	18652.	0.	0.	0.	0.	0.	0.	0.	0.
OTHER FIXED ASSETS	60.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DEFERRED ACCOUNT	0.	1254.	0.	0.	0.	0.	0.	0.	0.	0.
OTHERS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
** SUB TOTAL (2) **	4485.	19906.	0.	0.	0.	0.	0.	0.	0.	0.
****EXPENDITURE TOTAL(B)****	4654.	21576.	20705.	22102.	21549.	19112.	16103.	14225.	15969.	16335.
BALANCE (A-B)	1046.	-1046.	103.	0.	0.	0.	3380.	5715.	4428.	4519.
BALANCE BROUGHT FORWARD	0.	1046.	0.	103.	103.	103.	103.	3483.	9199.	13626.
BALANCE CARRIED FORWARD	1046.	0.	103.	103.	103.	103.	3483.	9199.	13626.	18145.
(CASH ON HAND)	0.	0.	103.	103.	103	103.	103.	103.	103.	103.
(IN BANK)	1046.	0.	0.	0.	0.	0	3380.	9096.	13523.	18042.

CASH FLOW

PROJECT NAME : BRUNEI CEMENT PLANT
CASE NAME : MASTER-06

DATE : 82.12.23
CURRENCY UNIT : 1000 BDLS
QUANTITY UNIT : 1 MT

(INDEX)	1993	1994	1995	1996	1997	1998	1999
SALES INCOME	21310.	21767.	22201.	22234.	22234.	22234.	22234.
(CASH)	1618.	1664.	1707.	1707.	1707.	1707.	1707.
(MATURED NOTES & A/C RECE.)	19692.	20103.	20494.	20527.	20527.	20527.	20527.
OTHER SALES INCOME	0.	0.	0.	0.	0.	0.	0.
NON-OPERATING INCOME	0.	0.	0.	0.	0.	0.	0.
** SALES INCOME TOTAL **	21310.	21767.	22201.	22234.	22234.	22234.	22234.
PAID UP CAPITAL	0.	0.	0.	0.	0.	0.	0.
LONG TERM LOAN - A	0.	0.	0.	0.	0.	0.	0.
- B	0.	0.	0.	0.	0.	0.	0.
- C	0.	0.	0.	0.	0.	0.	0.
- OTHERS	0.	0.	0.	0.	0.	0.	0.
DEFERRED & ACCRUED PAYMENT	0.	0.	0.	0.	0.	0.	0.
SHORT TERM LOAN	0.	0.	0.	0.	0.	0.	0.
** CAPITAL INCOME TOTAL **	0.	0.	0.	0.	0.	0.	0.
ASSET DEAL INCOME	0.	0.	0.	0.	0.	0.	0.
OTHERS	0.	0.	0.	0.	0.	0.	0.
**** INCOME TOTAL (A) ****	21310.	21767.	22201.	22234.	22234.	22234.	22234.
MATERIALS & GOODS PURCHASED	13641.	13959.	14261.	14261.	14261.	14261.	14261.
OTHER COST MANUFACTURED	1105.	1112.	1119.	1119.	1119.	1119.	1119.
OTHER SALES EXPENDITURE	0.	0.	0.	0.	0.	0.	0.
SELL.GENERAL & ADMINI. EX.	457.	457.	457.	457.	457.	457.	457.
NON-OPERATING EXPENSES	0.	0.	0.	0.	0.	0.	0.
(INTEREST FOR LOAN)	0.	0.	0.	0.	0.	0.	0.
(OTHERS)	0.	0.	0.	0.	0.	0.	0.
CORPORATE INCOME TAXES	1497.	1536.	1575.	1613.	1613.	1613.	1613.
DIVIDEND	0.	0.	0.	0.	0.	0.	0.
OFFICERS BONUSES	0.	0.	0.	0.	0.	0.	0.
** SUB TOTAL (1) **	16700.	17065.	17413.	17450.	17450.	17450.	17450.
REPAYMENT L.T.L. - A	0.	0.	0.	0.	0.	0.	0.
- B	0.	0.	0.	0.	0.	0.	0.
- C	0.	0.	0.	0.	0.	0.	0.
- OTHERS	0.	0.	0.	0.	0.	0.	0.
REPAYMT. DEFERRED & ACCRUED	0.	0.	0.	0.	0.	0.	0.
REPAYMT. S.T.L.	0.	0.	0.	0.	0.	0.	0.
** REPAYMENT TOTAL **	0.	0.	0.	0.	0.	0.	0.
LAND	0.	0.	0.	0.	0.	0.	0.
BUILDINGS & MACHINERIES	0.	0.	0.	0.	0.	0.	0.
OTHER FIXED ASSETS	0.	0.	0.	0.	0.	0.	0.
DEFERRED ACCOUNT	0.	0.	0.	0.	0.	0.	0.
OTHERS	0.	0.	0.	0.	0.	0.	0.
** SUB TOTAL (2) **	0.	0.	0.	0.	0.	0.	0.
****EXPENDITURE TOTAL(B)****	16700.	17065.	17413.	17450.	17450.	17450.	17450.
BALANCE (A-B)	4611.	4702.	4788.	4784.	4783.	4783.	4783.
BALANCE BROUGHT FORWARD	18145.	22756.	27458.	32247.	37030.	41814.	46597.
BALANCE CARRIED FORWARD	22756.	27458.	32247.	37030.	41814.	46597.	51380.
(CASH ON HAND)	103.	103.	103.	103.	103.	103.	103.
(IN BANK)	22653.	27355.	32144.	36927.	41711.	46494.	51277.

(INDEX)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
*** ASSETS ***										
CASH & DEPOSITS	-89.	0.	103.	103.	103.	103.	3483.	9199.	13626.	18145.
TRADE NOTES RECEIVABLE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ACCOUNT RECEIVABLE	0.	0.	1182.	1307.	1438.	1473.	1507.	1541.	1575.	1610.
FINISHED GOODS & MERCHANDISE	0.	0.	527.	520.	512.	510.	508.	507.	505.	504.
WORK IN PROCESS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RAW MATERIALS	0.	0.	797.	797.	797.	797.	797.	797.	797.	797.
OTHERS - 1	1135.	0.	0.	0.	0.	0.	0.	0.	0.	0.
- 2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
** CURRENT ASSETS TOTAL **	1046.	0.	2609.	2727.	2850.	2883.	6296.	12043.	16504.	21056.
TANGIBLE FIXED ASSETS	4425.	23077.	22061.	21045.	20028.	19012.	17996.	16980.	15964.	14948.
(LAND)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
(BUILDINGS & STRUCTURES)	4425.	11723.	11388.	11053.	10718.	10383.	10048.	9713.	9378.	9043.
(MACHINERIES)	0.	11354.	10673.	9992.	9310.	8629.	7948.	7267.	6585.	5904.
(OTHERS)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
INTANGIBLE FIXED ASSETS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
INVESTMENT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
OTHER FIXED ASSETS	60.	60.	56.	53.	49.	46.	42.	39.	35.	32.
** FIXED ASSETS TOTAL **	4485.	23137.	22117.	21098.	20078.	19058.	18038.	17019.	15999.	14979.
DEFERRED ASSETS	0.	2443.	1954.	1466.	977.	489.	0.	0.	0.	0.
**** ASSETS TOTAL ****	5531.	25580.	26680.	25290.	23905.	22429.	24334.	29062.	32503.	36035.
*** LIABILITIES ***										
TRADE NOTES PAYABLE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ACCOUNT PAYABLE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SHORT TERM LOAN	0.	5179.	6805.	5378.	3076.	85.	0.	0.	0.	0.
CURRENT PORTION OF L.T.L.	0.	1930.	1930.	1930.	1930.	1931.	0.	0.	0.	0.
ACCRUED LIABILITIES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ACCRUED INCOME TAXES	0.	0.	0.	0.	0.	0.	0.	1418.	1458.	1497.
OTHERS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
*CURRENT LIABILITIES TOTAL**	0.	7109.	8735.	7308.	5006.	2016.	0.	1418.	1458.	1497.
LONG TERM LOAN	0.	7721.	5791.	3861.	1931.	0.	0.	0.	0.	0.
DEFERRED & ACCRUED DEBTS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
OTHERS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
** NON-CURRENT LIAB. TOTAL**	0.	7721.	5791.	3861.	1931.	0.	0.	0.	0.	0.
RESERVE FOR SP. PURPOSES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
**** LIABILITIES TOTAL ****	0.	14830.	14526.	11169.	6937.	2016.	0.	1418.	1458.	1497.
*** EQUITY ***										
PAID UP CAPITAL	5700.	11400.	11400.	11400.	11400.	11400.	11400.	11400.	11400.	11400.
CAPITAL SURPLUS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LEGAL PROFIT RESERVE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
UNAPPRO.PROFIT FOR THE YEAR	-169.	-650.	755.	2722.	5568.	9013.	12934.	16244.	19645.	23138.
PROFIT BROUGHT FORWARD	0.	-169.	-650.	755.	2722.	5568.	9013.	12934.	16244.	19645.
NET PROFIT FOR THE YEAR	-169.	-481.	1405.	1967.	2847.	3445.	3921.	3310.	3401.	3493.
OTHERS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
****SHAREHOLDERS EQUITY ****	5531.	10750.	12155.	14122.	16968.	20413.	24334.	27644.	31045.	34538.
****LIAB. & EQUITY TOTAL****	5531.	25580.	26680.	25290.	23905.	22429.	24334.	29062.	32503.	36035.
ACCUMULATED DEPRECIATION	0.	0.	1016.	2032.	3049.	4065.	5081.	6097.	7113.	8129.
DISCOUNTED NOTES BALANCE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TANGIBLE FIXED ASSETS(B.DEP)	4425.	23077.	23077.	23077.	23077.	23077.	23077.	23077.	23077.	23077.

BALANCE SHEET

PROJECT NAME : BRUNEI CEMENT PLANT
CASE NAME : MASTER-06

DATE : 82.12.23
CURRENCY UNIT : 1000 BDLS
QUANTITY UNIT : 1 MT

(INDEX)	1993	1994	1995	1996	1997	1998	1999
*** ASSETS ***							
CASH & DEPOSITS	22756.	27458.	32247.	37030.	41814.	46597.	51380.
TRADE NOTES RECEIVABLE	0.	0.	0.	0.	0.	0.	0.
ACCOUNT RECEIVABLE	1644.	1678.	1711.	1711.	1711.	1711.	1711.
FINISHED GOODS & MERCHANDISE	502.	501.	500.	500.	500.	500.	500.
WORK IN PROCESS	0.	0.	0.	0.	0.	0.	0.
RAW MATERIALS	797.	797.	797.	797.	797.	797.	797.
OTHERS - 1	0.	0.	0.	0.	0.	0.	0.
- 2	0.	0.	0.	0.	0.	0.	0.
** CURRENT ASSETS TOTAL **	25699.	30434.	35254.	40037.	44821.	49604.	54388.
TANGIBLE FIXED ASSETS	13931.	12915.	11899.	10883.	9867.	8850.	7834.
(LAND)	0.	0.	0.	0.	0.	0.	0.
(BUILDINGS & STRUCTURES)	8708.	8374.	8039.	7704.	7369.	7034.	6699.
(MACHINERIES)	5223.	4542.	3860.	3179.	2498.	1817.	1135.
(OTHERS)	0.	0.	0.	0.	0.	0.	0.
INTANGIBLE FIXED ASSETS	0.	0.	0.	0.	0.	0.	0.
INVESTMENT	0.	0.	0.	0.	0.	0.	0.
OTHER FIXED ASSETS	28.	25.	21.	18.	14.	11.	7.
** FIXED ASSETS TOTAL **	13960.	12940.	11920.	10900.	9881.	8861.	7841.
DEFERRED ASSETS	0.	0.	0.	0.	0.	0.	0.
**** ASSETS TOTAL ****	39659.	43374.	47174.	50938.	54702.	58465.	62229.
*** LIABILITIES ***							
TRADE NOTES PAYABLE	0.	0.	0.	0.	0.	0.	0.
ACCOUNT PAYABLE	0.	0.	0.	0.	0.	0.	0.
SHORT TERM LOAN	0.	0.	0.	0.	0.	0.	0.
CURRENT PORTION OF L.T.L.	0.	0.	0.	0.	0.	0.	0.
ACCRUED LIABILITIES	0.	0.	0.	0.	0.	0.	0.
ACCRUED INCOME TAXES	1536.	1575.	1613.	1613.	1613.	1613.	1613.
OTHERS	0.	0.	0.	0.	0.	0.	0.
*CURRENT LIABILITIES TOTAL**	1536.	1575.	1613.	1613.	1613.	1613.	1613.
LONG TERM LOAN	0.	0.	0.	0.	0.	0.	0.
DEFERRED & ACCRUED DEBTS	0.	0.	0.	0.	0.	0.	0.
OTHERS	0.	0.	0.	0.	0.	0.	0.
** NON-CURRENT LIAB. TOTAL**	0.	0.	0.	0.	0.	0.	0.
RESERVE FOR SP. PURPOSES	0.	0.	0.	0.	0.	0.	0.
**** LIABILITIES TOTAL ****	1536.	1575.	1613.	1613.	1613.	1613.	1613.
*** EQUITY ***							
PAID UP CAPITAL	11400.	11400.	11400.	11400.	11400.	11400.	11400.
CAPITAL SURPLUS	0.	0.	0.	0.	0.	0.	0.
LEGAL PROFIT RESERVE	0.	0.	0.	0.	0.	0.	0.
UNAPPRO.PROFIT FOR THE YEAR	26723.	30399.	34161.	37925.	41689.	45452.	49216.
PROFIT BROUGHT FORWARD	23138.	26723.	30399.	34161.	37925.	41689.	45452.
NET PROFIT FOR THE YEAR	3584.	3676.	3763.	3764.	3764.	3764.	3764.
OTHERS	0.	0.	0.	0.	0.	0.	0.
****SHAREHOLDERS EQUITY ****	38123.	41799.	45561.	49325.	53089.	56852.	60616.
****LIAB. & EQUITY TOTAL****	39659.	43374.	47174.	50938.	54702.	58465.	62229.
ACCUMULATED DEPRECIATION	9146.	10162.	11178.	12194.	13210.	14227.	15243.
DISCOUNTED NOTES BALANCE	0.	0.	0.	0.	0.	0.	0.
TANGIBLE FIXED ASSETS(B.DEP)	23077.	23077.	23077.	23077.	23077.	23077.	23077.

PROJECT NAME : BRUNEI CEMENT PLANT
CASE NAME : MASTER-06
CURRENCY UNIT : 1000 BDLS
QUANTITY UNIT : 1 MT

* DCF RATE OF RETURN *

(1) RETURN ON INVESTMENT
(A) INTERNAL RATE OF RETURN : 16.33 %

(2) RETURN ON EQUITY
(B) NET WORTH BASE : 17.51 %

DISCOUNT RATE	P.V.S.	P.O.T.
0. %	55031.14	7.05
5. %	26371.09	8.06
10. %	10731.34	10.07
11. %	8528.04	11.03
12. %	6549.55	11.11
13. %	4769.68	12.10
14. %	3165.20	14.00
15. %	1716.34	15.08
16. %	405.75	16.08
17. %	-781.62	******
18. %	-1859.31	******
19. %	-2838.84	******
20. %	-3730.47	******
25. %	-7151.50	******
30. %	-9366.14	******

* DCF PROOF *

YEAR	INVESTMENT	WORKING CAPITAL	OTHERS	OUTFLOW TOTAL	NET PROFIT BEFORE TAX	TAX	DEPR. AMORT.	INTEREST	OTHERS	INFLOW TOTAL
1983	4485.	0.	0.	4485.	-169.	0.	0.	0.	0.	-169.
1984	19906.	0.	0.	19906.	-481.	0.	0.	1189.	-1189.	-481.
1985	0.	2609.	0.	2609.	1405.	0.	1508.	1546.	-0.	4459.
1986	0.	118.	0.	118.	1967.	0.	1508.	1373.	-0.	4848.
1987	0.	123.	0.	123.	2847.	0.	1508.	994.	-0.	5349.
1988	0.	32.	0.	32.	3445.	0.	1508.	533.	-0.	5486.
1989	0.	32.	0.	32.	3921.	0.	1508.	188.	-0.	5617.
1990	0.	33.	0.	33.	4728.	0.	1020.	0.	-0.	5748.
1991	0.	33.	0.	33.	4859.	1418.	1020.	0.	-0.	4460.
1992	0.	33.	0.	33.	4990.	1458.	1020.	0.	-0.	4552.
1993	0.	33.	0.	33.	5121.	1497.	1020.	0.	-0.	4643.
1994	0.	33.	0.	33.	5252.	1536.	1020.	0.	-0.	4735.
1995	0.	31.	0.	31.	5375.	1575.	1020.	0.	-0.	4820.
1996	0.	0.	0.	0.	5377.	1613.	1020.	0.	-0.	4784.
1997	0.	0.	0.	0.	5377.	1613.	1020.	0.	-0.	4783.
1998	0.	0.	0.	0.	5377.	1613.	1020.	0.	-0.	4783.
1999	-7834.	-3110.	0.	-10944.	5377.	3226.	1020.	0.	-0.	3170.
TOTAL	16557.	0.	0.	16557.	64766.	15549.	17738.	5822.	-1189.	71588.

* DCF RATE OF RETURN *

(1) RETURN ON INVESTMENT

(A) INTERNAL RATE OF RETURN : 18.26 %

(2) RETURN ON EQUITY

(B) NET WORTH BASE : 19.95 %

DISCOUNT RATE	P.V.S.	P.O.T.
0. %	70580.56	7.05
5. %	34888.98	8.05
10. %	15608.94	9.11
11. %	12912.40	10.04
12. %	10496.63	10.10
13. %	8328.50	11.05
14. %	6378.65	12.01
15. %	4622.13	12.12
16. %	3037.04	14.01
17. %	1604.38	15.08
18. %	307.18	16.09
19. %	-869.11	******
20. %	-1937.31	******
25. %	-6009.77	******
30. %	-8618.66	******

* DCF PROOF *

YEAR	INVESTMENT	WORKING CAPITAL	OTHERS	OUTFLOW TOTAL	NET PROFIT BEFORE TAX	TAX	DEPR. AMORT.	INTEREST	OTHERS	INFLOW TOTAL
1983	4485.	0.	0.	4485.	-169.	0.	0.	0.	0.	-169.
1984	19906.	0.	0.	19906.	-481.	0.	0.	1189.	-1189.	-481.
1985	0.	2609.	0.	2609.	1405.	0.	1508.	1546.	-0.	4459.
1986	0.	118.	0.	118.	1967.	0.	1508.	1373.	-0.	4848.
1987	0.	123.	0.	123.	2847.	0.	1508.	994.	-0.	5349.
1988	0.	32.	0.	32.	3445.	0.	1508.	533.	-0.	5486.
1989	0.	32.	0.	32.	3921.	0.	1508.	188.	-0.	5617.
1990	0.	33.	0.	33.	4728.	0.	1020.	0.	-0.	5748.
1991	0.	33.	0.	33.	4859.	0.	1020.	0.	-0.	5879.
1992	0.	33.	0.	33.	4990.	0.	1020.	0.	-0.	6010.
1993	0.	33.	0.	33.	5121.	0.	1020.	0.	-0.	6140.
1994	0.	33.	0.	33.	5252.	0.	1020.	0.	-0.	6271.
1995	0.	31.	0.	31.	5375.	0.	1020.	0.	-0.	6395.
1996	0.	0.	0.	0.	5377.	0.	1020.	0.	-0.	6396.
1997	0.	0.	0.	0.	5377.	0.	1020.	0.	-0.	6396.
1998	0.	0.	0.	0.	5377.	0.	1020.	0.	-0.	6396.
1999	-7834.	-3110.	0.	-10944.	5377.	0.	1020.	0.	-0.	6396.
TOTAL	16557.	0.	0.	16557.	64766.	0.	17738.	5822.	-1189.	87137.

FINANCIAL RATIO

PROJECT NAME : BRUNEI CEMENT PLANT
CASE NAME : MASTER-06

DATE : 82.12.23
CURRENCY UNIT : 1000 BDLS
QUANTITY UNIT : 1 MT

	(INDEX)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
	** PROFIT RATIO **										
1	NET PROF.R.TO LIAB.&WORTH	-6.11	-3.09	5.38	7.57	11.57	14.87	16.77	12.40	11.05	10.19
2	NET PROF.R.TO NET WORTH	-6.11	-5.91	12.26	14.97	18.31	18.43	17.52	12.74	11.59	10.65
3	GROSS PROFIT R. TO SALES	0.0	0.0	25.66	25.43	25.73	25.83	25.90	25.96	26.02	26.08
4	OPE-PROFIT R. TO SALES	0.0	0.0	22.65	22.72	23.27	23.43	23.55	23.67	23.78	23.89
5	NET PROFIT R. TO SALES	0.0	0.0	9.25	11.67	15.30	18.07	20.09	16.57	16.65	16.72
	** COST RATIO **										
6	MATERIALS TO PRODUCT.COST	0.0	0.0	82.75	83.63	84.92	85.22	85.50	85.77	86.03	86.28
7	WAGES TO PRODUCT.COST	0.0	89.27	5.29	4.98	4.53	4.42	4.32	4.23	4.14	4.05
8	INTEREST PAYABLE TO SALES	0.0	0.0	10.18	8.15	5.34	2.80	0.96	0.0	0.0	0.0
	** TURNOVER RATIO **										
9	TURNOVER R.TO LIAB.&WORTH	0.0	0.0	0.58	0.65	0.76	0.82	0.83	0.75	0.66	0.61
10	TURNOVER R.TO NET WORTH	0.0	0.0	1.33	1.28	1.20	1.02	0.87	0.77	0.70	0.64
11	TURNOVER R.TO CURR.ASSETS	0.0	0.0	11.64	6.32	6.67	6.65	4.25	2.18	1.43	1.11
12	TURNOVER R.TO RECEIVABLES	0.0	0.0	25.70	13.54	13.55	13.10	13.10	13.11	13.11	13.12
13	TURNOVER R.TO F.STOCK	0.0	0.0	57.64	32.18	36.04	37.29	38.32	39.35	40.38	41.41
14	TURNOVER R.TO RAW MAT.	0.0	0.0	38.11	21.14	23.35	23.92	24.49	25.06	25.64	26.21
15	TURNOVER R.TO FIXED ASS.	0.0	0.0	0.67	0.78	0.90	0.97	1.05	1.14	1.24	1.35
	** STABILITY **										
16	N.WOR.R.TO T.LIAB.& N.WOR	100.00	42.03	45.56	55.84	70.98	91.01	100.00	95.12	95.52	95.85
17	TOTAL LIAB.R.TO NET WORTH	0.0	137.95	119.51	79.09	40.88	9.88	0.0	5.13	4.70	4.33
18	CURRENT RATIO	0.0	0.0	29.87	37.32	56.94	142.98	0.0	849.06	1132.18	1406.56
19	QUICK CURRENT RATIO	0.0	0.0	14.71	19.29	30.79	78.15	0.0	757.15	1042.85	1319.68
20	FIXED ASSETS RATIO	81.09	215.23	181.97	149.40	118.33	93.36	74.13	61.56	51.53	43.37
21	FIXED ASS.R.TO L.T.CAP.	81.09	125.26	123.25	117.32	106.24	93.36	74.13	61.56	51.53	43.37
22	INT.PAYABLE R.TO LTL&STL	0.0	0.0	10.53	10.69	10.98	11.90	18.64	0.0	0.0	0.0
	** PRODUCTIVITY **										
23	TURNOVER PER EMPLOYEE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	T.LIAB. & NET WOR.PER EMP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25	TANGIBLE FIX.ASS.PER EMP.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	MACHINERIES PER EMPLOYEE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	** INCREASE RATIO **										
27	INCREASE R.OF NET SALES	0.0	0.0	0.0	10.95	10.42	2.45	2.40	2.34	2.29	2.24
28	INCREASE R.OF OPE-PROFIT	0.0	184.62	-814.99	11.32	13.08	3.17	2.93	2.85	2.77	2.69
29	INCREASE R.OF WORKING CAP	0.0	-100.00	0.0	4.53	4.52	1.14	1.13	1.12	1.11	1.10
	(WORKING CAPITAL)	-1135.00	0.0	2608.80	2727.08	2850.36	2882.75	2915.23	2947.81	2980.48	3013.25

PROJECT NAME : BRUNEI CEMENT PLANT
CASE NAME : MASTER-06

FINANCIAL RATIO

DATE : 82.12.23
CURRENCY UNIT : 1000 BDLS
QUANTITY UNIT : 1 MT

	(INDEX)	1993	1994	1995	1996	1997	1998	1999
	** PROFIT RATIO **							
1	NET PROF.R.TO LIAB.&WORTH	9.47	8.85	8.31	7.67	7.13	6.65	6.24
2	NET PROF.R.TO NET WORTH	9.87	9.20	8.61	7.93	7.35	6.85	6.41
3	GROSS PROFIT R. TO SALES	26.13	26.18	26.23	26.24	26.24	26.24	26.24
4	OPE-PROFIT R. TO SALES	23.99	24.09	24.18	24.18	24.18	24.18	24.18
5	NET PROFIT R. TO SALES	16.79	16.86	16.92	16.93	16.93	16.93	16.93
	** COST RATIO **							
6	MATERIALS TO PRODUCT.COST	86.52	86.75	86.96	86.96	86.96	86.96	86.96
7	WAGES TO PRODUCT.COST	3.97	3.89	3.81	3.81	3.81	3.81	3.81
8	INTEREST PAYABLE TO SALES	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	** TURNOVER RATIO **							
9	TURNOVER R.TO LIAB.&WORTH	0.56	0.53	0.49	0.45	0.42	0.39	0.37
10	TURNOVER R.TO NET WORTH	0.59	0.55	0.51	0.47	0.43	0.40	0.38
11	TURNOVER R.TO CURR.ASSETS	0.91	0.78	0.68	0.59	0.52	0.47	0.43
12	TURNOVER R.TO RECEIVABLES	13.12	13.12	13.12	13.00	13.00	13.00	13.00
13	TURNOVER R.TO F.STOCK	42.44	43.47	44.45	44.50	44.50	44.50	44.50
14	TURNOVER R.TO RAW MAT.	26.78	27.36	27.90	27.90	27.90	27.90	27.90
15	TURNOVER R.TO FIXED ASS.	1.48	1.62	1.79	1.95	2.14	2.37	2.66
	** STABILITY **							
16	N.WOR.R.TO T.LIAB.& N.WOR	96.13	96.37	96.58	96.83	97.05	97.24	97.41
17	TOTAL LIAB.R.TO NET WORTH	4.03	3.77	3.54	3.27	3.04	2.84	2.66
18	CURRENT RATIO	1672.89	1931.75	2186.09	2482.16	2778.71	3075.26	3371.80
19	QUICK CURRENT RATIO	1588.32	1849.38	2105.69	2401.78	2698.33	2994.88	3291.42
20	FIXED ASSETS RATIO	36.62	30.96	26.16	22.10	18.61	15.59	12.94
21	FIXED ASS.R.TO L.T.CAP.	36.62	30.96	26.16	22.10	18.61	15.59	12.94
22	INT.PAYABLE R.TO LTL&STL	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	** PRODUCTIVITY **							
23	TURNOVER PER EMPLOYEE	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	T.LIAB. & NET WOR.PER EMP	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25	TANGIBLE FIX.ASS.PER EMP.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	MACHINERIES PER EMPLOYEE	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	** INCREASE RATIO **							
27	INCREASE R.OF NET SALES	2.19	2.14	1.98	0.0	0.0	0.0	0.0
28	INCREASE R.OF OPE-PROFIT	2.62	2.56	2.36	0.02	0.0	0.0	0.00
29	INCREASE R.OF WORKING CAP	1.09	1.08	1.01	0.00	0.00	0.00	0.00
	(WORKING CAPITAL)	3046.07	3078.97	3110.18	3110.18	3110.19	3110.19	3110.20

PROJECT NAME : BRUNEI CEMENT PLANT
CASE NAME : V-601

COST ACCOUNTING

DATE : 82.12.23
CURRENCY UNIT : 1000 BDLS
QUANTITY UNIT : 1 MT

(INDEX)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
*** MATERIALS ***										
MATERIALS - MAIN	0.	0.	6275.	7015.	8069.	8343.	8617.	8891.	9166.	9440.
- SUB	0.	0.	180.	201.	231.	239.	247.	255.	263.	271.
- OTHERS	0.	0.	843.	942.	1084.	1120.	1157.	1194.	1231.	1268.
** MATERIALS TOTAL (1) **	0.	0.	7297.	8158.	9384.	9703.	10022.	10340.	10659.	10978.
*** EXPENSES ***										
WAGES	0.	208.	516.	531.	541.	544.	546.	548.	550.	552.
UTILITIES	0.	0.	162.	181.	208.	215.	222.	229.	236.	243.
MAINTENANCE & REPAIRS	0.	0.	140.	144.	147.	148.	148.	149.	150.	150.
INSURANCES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LEASING EXPENSES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DUTY & TAXES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
OTHERS	25.	25.	23.	23.	24.	24.	24.	24.	24.	24.
** EXPENSES TOTAL (2) **	25.	233.	841.	879.	920.	930.	940.	950.	960.	970.
*** DEPRECIATION ***										
BUILDINGS	0.	0.	169.	174.	178.	178.	179.	180.	181.	181.
STRUCTURES	0.	0.	107.	110.	112.	113.	113.	114.	114.	114.
MACHINERIES - A	0.	0.	562.	578.	590.	592.	595.	597.	599.	601.
- B	0	0.	0.	0.	0.	0.	0.	0.	0.	0.
- C	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
- OTHERS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
OTHER ASSETS	0.	0.	3.	3.	3.	3.	3.	3.	3.	3.
** DEPRECIATION TOTAL (3) **	0.	0.	842.	865.	883.	887.	890.	894.	897.	900.
COST OF GOODS MANUFACTURED	25.	233.	8979.	9902.	11186.	11519.	11852.	12184.	12516.	12848.
COST OF FINISHED GOODS MANU.	0.	0.	8979.	9902.	11186.	11519.	11852.	12184.	12516.	12848.
COST OF GOODS IN PROCESS	0.	0	0.	0.	0.	0.	0.	0.	0.	0.
INITIAL COST IN PROCESS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
QUAN.OF FINISHED GOODS MANU.	0.	0.	85106.	95153.	109445.	113164.	116883.	120602.	124321.	128041.
(UNIT COST)	0.0	0.0	0.11	0.10	0.10	0.10	0.10	0.10	0.10	0.10
*** SALES ***										
SALES	0.	0.	10021.	11685.	13440.	13897.	14353.	14810.	15267.	15723.
(SALES QUANTITY)	0.	0.	81606.	95153.	109445.	113164.	116883.	120602.	124321.	128041.
(UNIT PRICE)	0.0	0.0	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
COST OF GOODS SOLD	25.	233.	8610.	9907.	11193.	11521.	11853.	12186.	12517.	12849.
(INITIAL INVENTORY)	0.	0.	0.	369.	364.	358.	356.	355.	354.	352.
(INIT. INVENT.IN PROCESS)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
(COST OF GOODS MANU.)	25.	233.	8979.	9902.	11186.	11519.	11852.	12184.	12516.	12848.
(FINAL INVENTORY)	0.	0.	369.	364.	358.	356.	355.	354.	352.	351.
(FINAL INVENT.IN PROCESS)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GROSS PROFIT ON SALES	-25.	-233.	1411.	1777.	2247.	2376.	2500.	2624.	2749.	2874.
B.E.P. ON GROSS PROFIT	0.	0.	5093.	5469.	5581.	5597.	5620.	5642.	5663.	5682.
(FIXED COST)	25.	233.	1458.	1564.	1596.	1602.	1609.	1615.	1621.	1627.
(VARIABLE COST)	0.	0.	7152.	8343.	9597.	9919.	10245.	10571.	10897.	11223.

PROJECT NAME : BRUNEI CEMENT PLANT
CASE NAME : V-601

COST ACCOUNTING

DATE : 82.12.23
CURRENCY UNIT : 1000 BDLS
QUANTITY UNIT : 1 MT

(INDEX)	1993	1994	1995	1996	1997	1998	1999
*** MATERIALS ***							
MATERIALS - MAIN	9714.	9988.	10248.	10248.	10248.	10248.	10248.
- SUB	279.	286.	294.	294.	294.	294.	294.
- OTHERS	1304.	1341.	1376.	1376.	1376.	1376.	1376.
** MATERIALS TOTAL (1) **	11297.	11616.	11918.	11918.	11918.	11918.	11918.
*** EXPENSES ***							
WAGES	554.	556.	557.	557.	557.	557.	557.
UTILITIES	250.	257.	264.	264.	264.	264.	264.
MAINTENANCE & REPAIRS	151.	151.	151.	151.	151.	151.	151.
INSURANCES	0.	0.	0.	0.	0.	0.	0.
LEASING EXPENSES	0.	0.	0.	0.	0.	0.	0.
DUTY & TAXES	0.	0.	0.	0.	0.	0.	0.
OTHERS	24.	24.	24.	24.	24.	24.	24.
** EXPENSES TOTAL (2) **	979.	988.	997.	997.	997.	997.	997.
*** DEPRECIATION ***							
BUILDINGS	182.	182.	183.	183.	183.	183.	183.
STRUCTURES	115.	115.	116.	116.	116.	116.	116.
MACHINERIES - A	603.	605.	607.	607.	607.	607.	607.
- B	0.	0.	0.	0.	0.	0.	0.
- C	0.	0.	0.	0.	0.	0.	0.
- OTHERS	0.	0.	0.	0.	0.	0.	0.
OTHER ASSETS	3.	3.	3.	3.	3.	3.	3.
** DEPRECIATION TOTAL (3) **	903.	906.	909.	909.	909.	909.	909.
COST OF GOODS MANUFACTURED	13179.	13510.	13824.	13824.	13824.	13824.	13824.
COST OF FINISHED GOODS MANU.	13179.	13510.	13824.	13824.	13824.	13824.	13824.
COST OF GOODS IN PROCESS	0.	0.	0.	0.	0.	0.	0.
INITIAL COST IN PROCESS	0.	0.	0.	0.	0.	0.	0.
QUAN.OF FINISHED GOODS MANU.	131760.	135479.	139000.	139000.	139000.	139000.	139000.
(UNIT COST)	0.10	0.10	0.10	0.10	0.10	0.10	0.10
*** SALES ***							
SALES	16180.	16637.	17069.	17069.	17069.	17069.	17069.
(SALES QUANTITY)	131760.	135479.	139000.	139000.	139000.	139000.	139000.
(UNIT PRICE)	0.12	0.12	0.12	0.12	0.12	0.12	0.12
COST OF GOODS SOLD	13180.	13511.	13825.	13824.	13824.	13824.	13824.
(INITIAL INVENTORY)	351.	350.	349.	348.	348.	348.	348.
(INIT. INVENT.IN PROCESS)	0.	0.	0.	0.	0.	0.	0.
(COST OF GOODS MANU.)	13179.	13510.	13824.	13824.	13824.	13824.	13824.
(FINAL INVENTORY)	350.	349.	348.	348.	348.	348.	348.
(FINAL INVENT.IN PROCESS)	0.	0.	0.	0.	0.	0.	0.
GROSS PROFIT ON SALES	3000.	3125.	3245.	3246.	3246.	3246.	3246.
B.E.P. ON GROSS PROFIT	5701.	5719.	5735.	5734.	5734.	5734.	5734.
(FIXED COST)	1632.	1637.	1642.	1642.	1642.	1642.	1642.
(VARIABLE COST)	11548.	11874.	12183.	12182.	12182.	12182.	12182.

(INDEX)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
*** MATERIALS ***										
MATERIALS - MAIN	0.	0.	2265.	2139.	2139.	2139.	2139.	2139.	2139.	2139.
- SUB	0.	0.	38.	36.	36.	36.	36.	36.	36.	36.
- OTHERS	0.	0.	178.	168.	168.	168.	168.	168.	168.	168.
** MATERIALS TOTAL (1) **	0.	0.	2481.	2343.	2343.	2343.	2343.	2343.	2343.	2343.
*** EXPENSES ***										
WAGES	0.	0.	109.	95.	84.	82.	79.	77.	75.	73.
UTILITIES	0.	0.	34.	32.	32.	32.	32.	32.	32.	32.
MAINTENANCE & REPAIRS	0.	0.	30.	26.	23.	22.	22.	21.	20.	20.
INSURANCES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LEASING EXPENSES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DUTY & TAXES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
OTHERS	0.	0.	5.	4.	4.	4.	3.	3.	3.	3.
** EXPENSES TOTAL (2) **	0.	0.	178.	157.	143.	140.	137.	134.	131.	129.
*** DEPRECIATION ***										
BUILDINGS	0.	0.	36.	31.	28.	27.	26.	25.	25.	24.
STRUCTURES	0.	0.	23.	20.	17.	17.	16.	16.	16.	15.
MACHINERIES - A	0.	0.	119.	103.	92.	89.	87.	84.	82.	80.
- B	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
- C	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
- OTHERS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
OTHER ASSETS	0.	0.	1.	1.	0.	0.	0.	0.	0.	0.
** DEPRECIATION TOTAL (3) **	0.	0.	178.	155.	137.	133.	129.	126.	123.	120.
COST OF GOODS MANUFACTURED	0.	0.	2837.	2655.	2623.	2616.	2610.	2603.	2597.	2592.
COST OF FINISHED GOODS MANU.	0.	0.	2837.	2655.	2623.	2616.	2610.	2603.	2597.	2592.
COST OF GOODS IN PROCESS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
INITIAL COST IN PROCESS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
QUAN.OF FINISHED GOODS MANU.	0.	0.	18000.	17000.	17000.	17000.	17000.	17000.	17000.	17000.
(UNIT COST)	0.0	0.0	0.16	0.16	0.15	0.15	0.15	0.15	0.15	0.15
*** SALES ***										
SALES	0.	0.	5165.	5165.	5165.	5165.	5165.	5165.	5165.	5165.
(SALES QUANTITY)	0.	0.	17000.	17000.	17000.	17000.	17000.	17000.	17000.	17000.
(UNIT PRICE)	0.0	0.0	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
COST OF GOODS SOLD	0.	0.	2680.	2656.	2625.	2617.	2610.	2604.	2598.	2592.
(INITIAL INVENTORY)	0.	0.	0.	158.	156.	154.	154.	154.	153.	153.
(INIT. INVENT.IN PROCESS)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
(COST OF GOODS MANU.)	0.	0.	2837.	2655.	2623.	2616.	2610.	2603.	2597.	2592.
(FINAL INVENTORY)	0.	0.	158.	156.	154.	154.	154.	153.	153.	152.
(FINAL INVENT.IN PROCESS)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GROSS PROFIT ON SALES	0.	0.	2485.	2508.	2539.	2548.	2555.	2561.	2567.	2573.
B.E.P. ON GROSS PROFIT	0.	0.	563.	518.	459.	446.	433.	422.	411.	400.
(FIXED COST)	0.	0.	304.	279.	248.	241.	234.	228.	222.	216.
(VARIABLE COST)	0.	0.	2376.	2377.	2377	2376.	2376.	2376.	2376.	2376.

PROJECT NAME : BRUNEI CEMENT PLANT
CASE NAME : V-601

COST ACCOUNTING

DATE : 82.12.23
CURRENCY UNIT : 1000 BDLS
QUANTITY UNIT : 1 MT

(INDEX)	1993	1994	1995	1996	1997	1998	1999
*** MATERIALS ***							
MATERIALS - MAIN	2139.	2139.	2139.	2139.	2139.	2139.	2139.
- SUB	36.	36.	36.	36.	36.	36.	36.
- OTHERS	168.	168.	168.	168.	168.	168.	168.
** MATERIALS TOTAL (1) **	2343.	2343.	2343.	2343.	2343.	2343.	2343.
*** EXPENSES ***							
WAGES	71.	70.	68.	68.	68.	68.	68.
UTILITIES	32.	32.	32.	32.	32.	32.	32.
MAINTENANCE & REPAIRS	19.	19.	19.	19.	19.	19.	19.
INSURANCES	0.	0.	0.	0.	0.	0.	0.
LEASING EXPENSES	0.	0.	0.	0.	0.	0.	0.
DUTY & TAXES	0.	0.	0.	0.	0.	0.	0.
OTHERS	3.	3.	3.	3.	3.	3.	3.
** EXPENSES TOTAL (2) **	126.	124.	122.	122.	122.	122.	122.
*** DEPRECIATION ***							
BUILDINGS	23.	23.	22.	22.	22.	22.	22.
STRUCTURES	15.	14.	14.	14.	14.	14.	14.
MACHINERIES - A	78.	76.	74.	74.	74.	74.	74.
- B	0.	0.	0.	0.	0.	0.	0.
- C	0.	0.	0.	0.	0.	0.	0.
- OTHERS	0.	0.	0.	0.	0.	0.	0.
OTHER ASSETS	0.	0.	0.	0.	0.	0.	0.
** DEPRECIATION TOTAL (3) **	117.	114.	111.	111.	111.	111.	111.
COST OF GOODS MANUFACTURED	2586.	2581.	2577.	2577.	2577.	2577.	2577.
COST OF FINISHED GOODS MANU.	2586.	2581.	2577.	2577.	2577.	2577.	2577.
COST OF GOODS IN PROCESS	0.	0.	0.	0.	0.	0.	0.
INITIAL COST IN PROCESS	0.	0.	0.	0.	0.	0.	0.
QUAN.OF FINISHED GOODS MANU.	17000.	17000.	17000.	17000.	17000.	17000.	17000.
(UNIT COST)	0.15	0.15	0.15	0.15	0.15	0.15	0.15
*** SALES ***							
SALES	5165.	5165.	5165.	5165.	5165.	5165.	5165.
(SALES QUANTITY)	17000.	17000.	17000.	17000.	17000.	17000.	17000.
(UNIT PRICE)	0.30	0.30	0.30	0.30	0.30	0.30	0.30
COST OF GOODS SOLD	2587.	2581.	2577.	2577.	2577.	2577.	2577.
(INITIAL INVENTORY)	152.	152.	152.	152.	152.	152.	152.
(INIT. INVENT.IN PROCESS)	0.	0.	0.	0.	0.	0.	0.
(COST OF GOODS MANU.)	2586.	2581.	2577.	2577.	2577.	2577.	2577.
(FINAL INVENTORY)	152.	152.	152.	152.	152.	152.	152.
(FINAL INVENT.IN PROCESS)	0.	0.	0.	0.	0.	0.	0.
GROSS PROFIT ON SALES	2578.	2583.	2588.	2588.	2588.	2588.	2588.
B.E.P. ON GROSS PROFIT	390.	380.	372.	372.	372.	372.	372.
(FIXED COST)	211.	205.	201.	201.	201.	201.	201.
(VARIABLE COST)	2376.	2376.	2376.	2376.	2376.	2376.	2376.