

VI

FINANCIAL AND ECONOMIC ANALYSIS

VI. Financial and Economic Analysis

VI-1 Financial Analysis

(1) Principles for the financial analysis

When development works are made on the existing designated factories and the effect of them are to be judged, it is normally difficult to identify the effect of the new investment since effects of both the old and new investments are overlapped. Accordingly, evaluations are made in the study as follows:

- 1) Total capital requirement is calculated in cases that development works are realized in the designated factories.
- 2) Reviews are made for the year-to-year profit/loss of the existing plant facilities assuming that no development works are performed.
- 3) Reviews are made for the year-to-year profit/loss of the existing plants assuming that development works are performed and compared with the result of the reviews as made in the preceding clause 2).
- 4) In order to clarify the effect of the development works, internal rate of return (IRR) is calculated on the assumption that the difference between the case where the development works are performed and the case where not. In the calculation, only the costs for construction for the renovation are treated as investment.
- 5) Reviews are made for overall year-to-year financial statements in order to clarify the financial situation of designated companies in case that investment in construction for development works is made.
- 6) All of the prices, costs and expenses employed in the financial analysis are the 1984 constant price base. Accordingly, the capital requirement for the calculation of financial evaluation is the requirement excluding price contingency. Product price, production costs, etc. are calculated at 1984 price.

(2) Total capital requirement

The major premises for the calculation of total capital requirement are described below.

1) Exchange rate of currencies (as of August, 1984)

Y1 = 4.31 Rupiah

US\$1 = 1,035 Rupiah

2) Base of prices

The total capital requirement in this part is calculated on the base of with-escalation. This means that price contingency is incorporated in the calculation of total capital requirement. On the other hand, the capital requirement used financial analysis is that excluding price contingency, since the base is without-escalation.

3) Price contingency

Price contingencies are set at 2% annually for foreign currency portion and 10% annually for local currency portion.

4) Tax

Import duties are considered to be free. Sales tax is considered to be 10% for the contracted price.

5) Additional working capital before operation

Cash on hands of the designated companies are met to the additional working capital.

6) Debt equity ratio and loan condition

The source of funds is not fixed yet, however, the total capital requirement is calculated using premises described below:

Debt equity ratio:	65:35
Long term loan condition:	Interest rate 10%/y
	Repayment 10 years
	Installment 10 times
	Grace period 2 years after commissioning

The summary of total capital requirement with-escalation base is shown in Table VI-1.

Table VI-1 Total Capital Requirement

(Unit: million Yen)

	BARATA		BBI		BOMA STORK		TOTAL					
	Foreign	Domestic	Foreign	Domestic	Foreign	Domestic	Foreign	Domestic				
	Total	Total	Total	Total	Total	Total	Total	Total				
Base Project Cost	17,287.5	8,501.0	25,788.5	8,173.1	5,181.5	13,354.6	1,894.8	485.3	2,380.1	27,555.4	14,167.8	41,523.2
Contingencies												
- Physical	518.5	594.9	1,113.4	245.1	362.7	607.8	56.3	34.0	90.8	830.4	991.6	1,812.0
- Price	1,146.7	2,734.6	3,881.3	583.1	1,742.9	2,326.0	118.7	285.3	324.0	1,848.5	4,682.8	6,531.3
<u>Project Cost</u>	<u>18,952.7</u>	<u>11,830.5</u>	<u>30,783.2</u>	<u>9,001.3</u>	<u>7,287.1</u>	<u>16,288.4</u>	<u>2,070.3</u>	<u>724.6</u>	<u>2,794.9</u>	<u>30,024.3</u>	<u>19,842.2</u>	<u>49,866.5</u>
Tax and Duties	-	3,078.3	3,078.3	-	1,628.8	1,628.8	-	279.5	279.5	-	4,986.6	4,986.6
Marketing Training (incl. Contingencies)	159.8	76.6	236.4	79.9	38.3	118.2	79.9	38.3	118.2	319.8	153.2	472.8
<u>Total Project Cost</u>	<u>19,112.5</u>	<u>14,985.4</u>	<u>34,097.9</u>	<u>9,081.2</u>	<u>8,954.2</u>	<u>18,035.4</u>	<u>2,150.2</u>	<u>1,042.4</u>	<u>3,192.6</u>	<u>30,343.9</u>	<u>24,982.0</u>	<u>55,325.9</u>
Interest During Construction	2,287.0	2,103.3	4,390.3	934.6	1,171.8	2,106.4	278.5	98.4	376.9	3,500.1	3,373.5	6,873.6
<u>Total Capital Requirement</u>	<u>21,399.5</u>	<u>17,088.7</u>	<u>38,488.2</u>	<u>10,015.8</u>	<u>10,126.0</u>	<u>20,141.8</u>	<u>2,428.7</u>	<u>1,140.8</u>	<u>3,569.5</u>	<u>33,844.0</u>	<u>28,355.5</u>	<u>62,199.5</u>

Current Price Base

(3) Premise of financial analysis

1) Analysis for the cases where development works are not made

Tables VI-2 through VI-4 show the forecast of income statement in the case where the development works are not made in the designated companies. The financial forecasts without development works are made based on the realization in 1983 and the budget in 1984 of the designated companies. The sales and costs will be at the same level of those in 1983 and 1984.

2) Analysis for the cases where development works are made

Tables VI-5 through VI-7 show the forecast of income statement in the case where the development works are made in the designated companies.

① Production plan

Table VI-8 shows the Production Plan prepared on the basis of the production capacity of each factory and the size of the markets.

② Finished and half-finished products inventory

Inventories for the finished and half-finished products are set on the basis of the current level of each factory. However, as the inventory of the products for B.B.I. is considerably large, the inventory is limited to the same level before the development works are conducted.

③ Decrease of production during construction

There shall presumably be some decrease in production during the construction period. However, the decrease can be minimized by some means or another. In the study, an assumption is made that the decrease, if any, of production due to suspension of the production activities will be covered by sub-contracting and there will be no

④ Sale prices

Sale price varies greatly depending on the kind and/or grade of the products. In the study, sale prices are estimated based on the current market situations and costs of production in Indonesia.

Table VI-8 Production Plan

(Unit : Ton)

	BARATA				BBI		BOMA STORK	TOTAL
	Surabaya	Gresik	Jakarta	Tegal	Indra	Wahana		
<u>1989</u>								
Structure	-	7,076	5,260	1,420	8,445	75	8,520	25,416
Plate	90	8,329	5,568	1,510	783	9,432	10,215	31,897
Machine	3,277	-	-	1,104	1,493	-	1,493	6,558
Total	3,367	15,405	10,828	4,034	10,721	9,507	20,228	63,871
<u>1994</u>								
Structure	-	9,435	7,013	1,520	11,260	100	11,360	32,468
Plate	159	11,105	7,424	1,610	1,044	12,576	13,620	41,298
Machine	4,964	-	-	1,744	1,990	-	1,990	9,407
Total	5,123	20,540	14,437	4,874	14,294	12,676	26,970	83,173
<u>1999</u>								
Structure	-	9,435	7,013	1,730	11,260	100	11,360	32,678
Plate	164	11,105	7,424	1,890	1,044	12,576	13,620	41,583
Machine	5,094	-	-	1,853	1,990	-	1,990	10,561
Total	6,258	20,540	14,437	5,473	14,294	12,676	26,970	84,922

⑤ Cost elements

i) Variable costs

Variable costs consist of the raw and bought-out materials, consumables, utilities and other variable costs. The raw materials consist chiefly of thick plates, thin plates, structural steels, piping materials and others, while bought-out materials consist of the machine parts, electrical/instrumental equipment and others. Main items of consumables are welding rods and lubricating oils. Utilities are electricity, water and fuels. Other variable costs include inside orders, subcontract, outside orders for installation, transportation, jigs and tools, packing and painting less sale of scraps.

ii) Fixed costs

Fixed costs consist of wages for the direct workers, factory overhead expenses, maintenance and repairs, and insurance. Wages for the direct workers are calculated by multiplying the average labor cost per hour by the man-hours. Factory overhead expenses are calculated on an assumption that these correspond to the 100% of the labor costs for the direct workers. This assumption is based on information obtained in Indonesia. Maintenance and repairs consist of maintenance and repairs of buildings, facilities and machinery and replacement of tools. In this connection, the costs are calculated based on information obtained in Indonesia and experiences in Japan.

iii) Depreciation

Depreciation is calculated based on the new taxation system.

Method: Declining balance method

Machinery: 10% per annum at 0 salvage value

Automobiles, Office equipment: 50% per annum at 0 salvage value

Amortization: 25% per annum at 0 salvage value

⑥ Marketing and administration expenses

Marketing and Administration expenses are calculated with the basis that 50% of them are fixed and remaining 50% are in proportion to the sale of the products.

⑦ Interest and repayment

In the financial analysis, debt equity ratio to total project cost is 65% and 35% respectively. The loan of 65% is met by the long term loan.

If the cash position runs short during the commercial operation period, the cash requirement shall be met by the short term loan. The terms and conditions for the loan are as set forth below.

i) Long term loan

Interest rate: 10% per annum

Repayment period: 10 years

Installment: 10 times, once in every year

Grace period for Repayment:

2 years after commissioning

ii) Short term loan

Interest: 18% per annum

Repayment: Every year. Loans shall be obtained whenever necessity arises.

⑧ Tax

Corporate income taxes are set forth as follows according to the new tax system:

Up to 2.3 million yen:	15% of profit before tax
Up to 11.6 million yen:	25% of profit before tax
Over 11.6 million yen:	35% of profit before tax

⑨ Project life

The project life shall be for 20 years as investment and commercial operation period.

(4) Results of the financial analysis

Tables VI-9 and VI-10 show the Financial Internal Rate of Return (FIRR) assuming that the effect of investment can be represented by the difference between the case where development works are made and the case where the works are not made.

Table VI-9 FIRR on Investment (1984 Constant Price Base)

Unit: %

	BARATA	BBI	BOMA STORK
Before Tax	15.5	15.3	35.5
After Tax	10.6	10.2	25.1

Table VI-10 FIRR on Equity After Tax (1984 Constant Price Base)

Unit: %

	BARATA	BBI	BOMA STORK
DER 65 : 35 Long Term Loan Interest Rate 10%	13.6	12.7	39.1
DER 50 : 50 Long Term Loan Interest Rate 10%	12.5	11.8	33.7
DER 65 : 35 Long Term Loan Interest Rate 5%	17.5	16.5	41.4

VI-2 Economic Analysis

Economic analysis is to be made using economic prices instead of the market prices to measure economic viability of the project.

The premise for economic analysis is as follows:

Items	Economic Price
Product Sale Price	Same as Market Price
Raw & Bought-out Materials, Consumables	85% of Market Price
Utilities	Same as Market Price
Labor Cost	Same as Market Price
Maintenance & Repair	90% of Market Price
Others	Same as Market Price

Transfer items are taxes, insurance and interest.

Shadow exchange rate equals to market exchange rate.

The result of calculation on the consolidated Economic Internal Rate of Return (EIRR) is 23.8% which is projected on the basis of the incremental comparison with the case where the development is not realized.

Table VI-2

*** BABI80 DEVELOPMENT PROJECT ***
 INCOME STATEMENT
 < EXISTING PLANT WITHOUT DEVELOP. >

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
(UNIT:MMY) BARATA										
Revenues										
Net Sales	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627
Other Net	0	0	0	0	0	0	0	0	0	0
Sub-Total	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627
Costs & Expenses										
Cost of Goods Sold	2095	2098	2100	2101	2104	2105	2107	2109	2110	2112
Initial Product Inventory	28	28	28	28	28	28	28	28	28	28
Production Cost	2095	2098	2100	2101	2104	2105	2107	2109	2110	2112
Final Product Inventory	28	28	28	28	28	28	28	28	28	28
Selling Expenses	93	93	93	93	93	93	93	93	93	93
General Administ. Expense	258	258	258	258	258	258	258	258	258	258
Interest on Long Term Loan	0	0	0	0	0	0	0	0	0	0
Interest on Short Term Loan	0	0	0	0	0	0	0	0	0	0
Sub-Total	2446	2449	2451	2452	2455	2456	2458	2460	2461	2463
Income Before Income Tax	181	179	176	175	172	171	169	167	166	164
Income Tax	82	61	60	60	59	58	58	57	57	56
Income After Income Tax	119	117	116	115	113	112	111	110	109	108

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Revenues										
Net Sales	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627
Other Net	0	0	0	0	0	0	0	0	0	0
Sub-Total	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627
Costs & Expenses										
Cost of Goods Sold	2113	2114	2116	2117	2118	2119	2121	2122	2123	2123
Initial Product Inventory	28	28	28	28	28	28	28	28	28	28
Production Cost	2113	2114	2116	2117	2118	2119	2121	2122	2123	2123
Final Product Inventory	28	28	28	28	28	28	28	28	28	28
Selling Expenses	93	93	93	93	93	93	93	93	93	93
General Administ. Expense	258	258	258	258	258	258	258	258	258	258
Interest on Long Term Loan	0	0	0	0	0	0	0	0	0	0
Interest on Short Term Loan	0	0	0	0	0	0	0	0	0	0
Sub-Total	2464	2465	2467	2468	2469	2470	2472	2473	2474	2474
Income Before Income Tax	163	162	160	159	158	157	155	154	153	153
Income Tax	56	55	55	54	54	53	53	52	52	52
Income After Income Tax	107	106	106	105	104	103	102	102	101	101

Table VI-3

*** BABIQU DEVELOPMENT PROJECT ***
 INCOME STATEMENT
 < EXISTING PLANT WITHOUT DEVELOP. >

(UNIT:MM¥) 8B)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Revenues										
Net Sales	1812	1812	1812	1812	1812	1812	1812	1812	1812	1812
Other Net	0	0	0	0	0	0	0	0	0	0
Sub-Total	1812	1812	1812	1812	1812	1812	1812	1812	1812	1812
Costs & Expenses										
Cost of Goods Sold	1536	1536	1537	1539	1539	1540	1542	1543	1544	1546
Initial Product Inventory	1594	1594	1594	1594	1594	1594	1594	1594	1594	1594
Production Cost	1536	1536	1537	1539	1539	1540	1542	1543	1544	1546
Final Product Inventory	1594	1594	1594	1594	1594	1594	1594	1594	1594	1594
Selling Expenses	45	45	45	45	45	45	45	45	45	45
General Administ. Expense	98	98	98	98	98	98	98	98	98	98
Interest on Long Term Loan	0	0	0	0	0	0	0	0	0	0
Interest on Short Term Loan	120	119	118	118	118	118	119	120	120	121
Sub-Total	1799	1798	1798	1799	1799	1801	1803	1806	1807	1810
Income Before Income Tax	13	14	14	14	13	11	9	6	5	2
Income Tax	0	0	1	4	3	2	2	1	1	0
Income After Income Tax	13	14	14	11	10	8	7	5	4	2

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Revenues										
Net Sales	1812	1812	1812	1812	1812	1812	1812	1812	1812	1812
Other Net	0	0	0	0	0	0	0	0	0	0
Sub-Total	1812	1812	1812	1812	1812	1812	1812	1812	1812	1812
Costs & Expenses										
Cost of Goods Sold	1547	1549	1550	1551	1552	1554	1555	1556	1557	1558
Initial Product Inventory	1594	1594	1594	1594	1594	1594	1594	1594	1594	1594
Production Cost	1547	1549	1550	1551	1552	1554	1555	1556	1557	1558
Final Product Inventory	1594	1594	1594	1594	1594	1594	1594	1594	1594	1594
Selling Expenses	45	45	45	45	45	45	45	45	45	45
General Administ. Expense	98	98	98	98	98	98	98	98	98	98
Interest on Long Term Loan	0	0	0	0	0	0	0	0	0	0
Interest on Short Term Loan	123	125	128	131	134	139	145	152	160	170
Sub-Total	1813	1817	1820	1824	1829	1836	1843	1851	1860	1871
Income Before Income Tax	-1	-5	-8	-12	-17	-24	-31	-39	-48	-59
Income Tax	0	0	0	0	0	0	0	0	0	0
Income After Income Tax	-1	-5	-8	-12	-17	-24	-31	-39	-48	-59

Table VI-4

*** BABIBO DEVELOPMENT PROJECT ***
 INCOME STATEMENT
 < EXISTING PLANT WITHOUT DEVELOP. >

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
(UNIT:MMY) BOMA										
Revenues										
Net Sales	1337	1337	1337	1337	1337	1337	1337	1337	1337	1337
Other Net	0	0	0	0	0	0	0	0	0	0
Sub-Total	1337	1337	1337	1337	1337	1337	1337	1337	1337	1337
Costs & Expenses										
Cost of Goods Sold	1084	1085	1088	1087	1089	1090	1092	1093	1094	1096
Initial Product Inventory	33	33	33	33	33	33	33	33	33	33
Production Cost	1084	1086	1087	1087	1089	1090	1092	1093	1094	1096
Final Product Inventory	33	33	33	33	33	33	33	33	33	33
Selling Expenses	11	11	11	11	11	11	11	11	11	11
General Administ. Expense	68	68	68	68	68	68	68	68	68	68
Interest on Long Term Loan	8	7	5	4	3	1	0	0	0	0
Interest on Short Term Loan	86	82	77	72	66	60	54	42	28	13
Sub-Total	1257	1252	1248	1242	1237	1231	1224	1213	1201	1186
Income Before Income Tax	80	85	89	95	100	106	113	124	136	149
Income Tax	27	28	30	32	34	36	38	42	46	51
Income After Income Tax	53	56	59	63	67	70	75	82	90	98
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Revenues										
Net Sales	1337	1337	1337	1337	1337	1337	1337	1337	1337	1337
Other Net	0	0	0	0	0	0	0	0	0	0
Sub-Total	1337	1337	1337	1337	1337	1337	1337	1337	1337	1337
Costs & Expenses										
Cost of Goods Sold	1097	1098	1099	1100	1102	1103	1104	1105	1106	1107
Initial Product Inventory	33	33	33	33	33	33	33	33	33	33
Production Cost	1097	1098	1099	1100	1102	1103	1104	1105	1106	1107
Final Product Inventory	33	33	33	33	33	33	33	33	33	33
Selling Expenses	11	11	11	11	11	11	11	11	11	11
General Administ. Expense	68	68	68	68	68	68	68	68	68	68
Interest on Long Term Loan	0	0	0	0	0	0	0	0	0	0
Interest on Short Term Loan	0	0	0	0	0	0	0	0	0	0
Sub-Total	1176	1177	1178	1179	1181	1182	1183	1184	1185	1186
Income Before Income Tax	161	160	159	158	156	155	154	153	152	151
Income Tax	55	55	54	54	53	52	51	52	52	52
Income After Income Tax	106	105	105	104	103	102	101	101	100	100

Table VI-5

*** BABIRO DEVELOPMENT PROJECT ***
 INCOME STATEMENT
 < EXISTING PLANT WITH DEVELOPMENT >

	(UNIT:MMY) BARATA									
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Revenues										
Net Sales	2627	2627	2627	2627	15796	17998	19255	20501	21737	21754
Other Net	0	0	0	0	0	0	0	0	0	0
Sub-Total	2627	2627	2627	2627	15796	17998	19255	20501	21737	21754
Costs & Expenses										
Cost of Goods Sold	2095	2098	2100	2101	12583	13946	14216	14504	14838	14671
Initial Product Inventory	28	28	28	28	28	170	186	190	193	198
Production Cost	2095	2098	2100	2101	12725	13962	14200	14508	14842	14668
Final Product Inventory	28	28	28	28	170	186	190	193	198	196
Selling Expenses	93	93	93	93	326	365	387	409	431	432
General Administ. Expense	258	258	258	258	905	1013	1074	1136	1196	1197
Interest on Long Term Loan	0	0	0	0	2273	2273	2273	2046	1818	1591
Interest on Short Term Loan	0	0	0	0	0	146	0	0	0	0
Sub-Total	2446	2449	2451	2452	16087	17743	17950	18095	18283	17891
Income Before Income Tax	181	179	176	175	-291	255	1805	2406	3454	3863
Income Tax	62	61	60	60	0	0	443	841	1208	1351
Income After Income Tax	119	117	116	115	-291	255	862	1565	2247	2513
Revenues										
Net Sales	21754	21754	21754	21754	22843	22857	22857	22857	22857	22857
Other Net	0	0	0	0	0	0	0	0	0	0
Sub-Total	21754	21754	21754	21754	22843	22857	22857	22857	22857	22857
Costs & Expenses										
Cost of Goods Sold	14456	14271	14112	13973	14307	14261	14162	14074	13996	13925
Initial Product Inventory	196	193	190	188	186	191	190	189	188	187
Production Cost	14453	14269	14109	13971	14311	14260	14161	14073	13995	13924
Final Product Inventory	193	190	188	186	191	190	189	188	187	186
Selling Expenses	432	432	432	432	451	451	451	451	451	451
General Administ. Expense	1197	1197	1197	1197	1251	1251	1251	1251	1251	1251
Interest on Long Term Loan	1364	1136	909	682	455	227	0	0	0	0
Interest on Short Term Loan	0	0	0	0	0	0	0	0	0	0
Sub-Total	17449	17037	16550	16284	16463	16190	15864	15776	15698	15627
Income Before Income Tax	4305	4717	5104	5470	6380	6667	6993	7081	7159	7330
Income Tax	1505	1650	1785	1913	2232	2332	2446	2477	2504	2529
Income After Income Tax	2800	3068	3319	3557	4148	4335	4547	4604	4655	4701

Table VI-6

*** BABI DO DEVELOPMENT PROJECT ***
 INCOME STATEMENT
 < EXISTING PLANT WITH DEVELOPMENT >

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
(UNIT: MKY) BBI										
Revenues										
Net Sales	1812	1812	1812	1812	8097	9177	9717	10256	10796	10796
Other Net	0	0	0	0	0	0	0	0	0	0
Sub-Total	1812	1812	1812	1812	8097	9177	9717	10256	10796	10796
Costs & Expenses										
Cost of Goods Sold	1536	1536	1536	1537	6575	7183	7300	7426	7578	7483
Initial Product Inventory	1594	1594	1594	1594	1594	1594	1594	1594	1594	1594
Production Cost	1536	1536	1537	1537	6575	7183	7300	7426	7578	7483
Final Product Inventory	1594	1594	1594	1594	1594	1594	1594	1594	1594	1594
Selling Expenses	45	45	45	45	121	134	141	147	154	154
General Administ. Expense	98	98	98	98	263	292	306	321	335	335
Interest on Long Term Loan	0	0	0	0	1166	1166	1166	1050	933	816
Interest on Short Term Loan	120	119	118	118	247	247	34	0	0	0
Sub-Total	1799	1798	1798	1798	8243	9022	8947	8543	9000	8789
Income Before Income Tax	13	14	14	14	-146	155	770	1313	1796	2007
Income Tax	0	0	1	4	0	2	268	458	627	701
Income After Income Tax	13	14	14	11	-146	153	502	855	1169	1306

Revenues										
Net Sales	10796	10796	10796	10796	10796	10796	10796	10796	10796	10796
Other Net	0	0	0	0	0	0	0	0	0	0
Sub-Total	10796	10796	10796	10796	10796	10796	10796	10796	10796	10796
Costs & Expenses										
Cost of Goods Sold	7383	7222	7157	7157	7101	7046	6996	6953	6913	6878
Initial Product Inventory	1594	1594	1594	1594	1594	1594	1594	1594	1594	1594
Production Cost	7383	7222	7157	7157	7101	7046	6996	6953	6913	6878
Final Product Inventory	1594	1594	1594	1594	1594	1594	1594	1594	1594	1594
Selling Expenses	154	154	154	154	154	154	154	154	154	154
General Administ. Expense	335	335	335	335	335	335	335	335	335	335
Interest on Long Term Loan	700	583	466	350	233	117	-0	-0	-0	-0
Interest on Short Term Loan	0	0	0	0	0	0	0	0	0	0
Sub-Total	8571	8368	8177	7996	7823	7651	7485	7442	7402	7367
Income Before Income Tax	2225	2428	2619	2800	2973	3145	3311	3354	3394	3429
Income Tax	777	848	915	979	1039	1098	1157	1173	1186	1199
Income After Income Tax	1447	1579	1704	1822	1934	2046	2153	2182	2207	2230

Table VI-7

*** BABIBO DEVELOPMENT PROJECT ***
 INCOME STATEMENT
 < EXISTING PLANT WITH DEVELOPMENT >

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
(UNIT:MMY) BOMA										
Revenues										
Net Sales	1337	1337	1337	1337	4580	4850	5022	5194	5366	5371
Other Net	0	0	0	0	0	0	0	0	0	0
Sub-Total	1337	1337	1337	1337	4580	4850	5022	5194	5366	5371
Costs & Expenses										
Cost of Goods Sold	1084	1085	1086	1087	3096	3166	3172	3191	3218	3192
Initial Product Inventory	33	33	33	33	33	95	96	96	96	97
Production Cost	1084	1085	1086	1087	3159	3166	3172	3191	3218	3191
Final Product Inventory	33	33	33	33	95	96	96	96	97	96
Selling Expenses	11	11	11	11	25	26	27	27	28	28
General Administ. Expense	68	68	68	68	151	158	162	166	171	171
Interest on Long Term Loan	8	7	5	4	211	210	209	188	167	146
Interest on Short Term Loan	86	82	77	72	66	153	37	0	0	0
Sub-Total	1257	1252	1248	1242	3550	3713	3606	3572	3584	3537
Income Before Income Tax	80	85	89	95	1030	1137	1416	1622	1782	1834
Income Tax	27	28	30	32	359	397	494	565	622	640
Income After Income Tax	53	56	59	63	671	741	922	1056	1160	1193

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Revenues										
Net Sales	5371	5371	5371	5371	5380	5381	5381	5381	5381	5381
Other Net	0	0	0	0	0	0	0	0	0	0
Sub-Total	5371	5371	5371	5371	5380	5381	5381	5381	5381	5381
Costs & Expenses										
Cost of Goods Sold	3169	3150	3133	3118	3071	3059	3049	3041	3033	3026
Initial Product Inventory	96	96	95	94	94	93	92	92	92	91
Production Cost	3169	3149	3132	3118	3070	3059	3049	3040	3033	3026
Final Product Inventory	96	95	94	94	93	92	92	92	91	91
Selling Expenses	28	28	28	28	28	28	28	28	28	28
General Administ. Expense	171	171	171	171	171	171	171	171	171	171
Interest on Long Term Loan	125	104	83	63	42	21	-0	-0	-0	-0
Interest on Short Term Loan	0	0	0	0	0	0	0	0	0	0
Sub-Total	3493	3453	3415	3380	3312	3279	3248	3240	3232	3225
Income Before Income Tax	1878	1918	1956	1991	2068	2102	2133	2141	2149	2156
Income Tax	656	670	683	695	722	734	745	748	751	753
Income After Income Tax	1222	1248	1273	1296	1346	1368	1388	1393	1398	1403

VII

TECHNICAL CONCLUSION AND RECOMMENDATION

VII Technical Conclusion and Recommendation

VII-1 Barata Surabaya Machine Shop

(1) Sales possibility of products

- 1) Market competitiveness after the renovation shall be enhanced remarkably as a result of the improved production capacity, economized production cost, improved delivery promptness and quality as shown in Chapter V-1.
- 2) In short, the marketing share and the amount of orders to be increased depends on the sales policy and system and the product engineering.
- 3) In order to reinforce the product engineering, the materialization of the technology transfer and fostering the engineering staff is an urgent necessity. The conclusion of license agreement especially for cement plant to which Gresik Branch is in charge is a matter of priority.
- 4) It must be noted that the effect of the staff training can be evaluated only through the efforts by the trainee (i.e. Barata Surabaya workshop). In another word, the production capacity and productivity and the quality of the products can obtain their improvement depending on how the new facilities and the machine tools are made use of. So that staff training must be understood not to go beyond the guideline on the usage of the facilities and the machine tools.

(2) Selection of the production facility

- 1) The selection study of the production facilities is made on the basis of the main line products of P.T. Barata Indonesia, which are based on the guideline of Indonesian government and the demand of the market.

- 2) We are likely to believe in the facility automation and the numerical control in terms of the enhancement of the productivity. But it is recommended that the facility equipments should be introduced step-by-step by studying the necessary control system and the skill in relation to the quality, repeatability and the required accuracy of the fabricated products.

It shall also be kept in mind that the drastic renewal of the fabrication technique always accompanies the teething troubles. Following attention were especially paid to this renovation plan.

- ① Numerical control mainly for the position control shall be arranged in the large boring machine.
 - ② Special configuration work by the five axles control shall be incorporated into the large vertical lathe.
- 3) It is best to use the special purpose machinery for the products of high repeatability.

The followings describe the above mentioned special purpose machineries.

- ① Special lathe for the cane mill roll
 - ② Bevel gear shaper for the water gate winch
- 4) Lack of the special facility equipments has caused the inefficiency in the manufacturing process leading to the minus factor in various related policies. Those particular facility equipments are essential and should be installed, even by sacrificing the economical point against its operation rate.

The above mentioned facility equipments in this renovation plan are as follows.

- ① Hobbing machine: For the time being products to be machined are gears for the sugar plant.

- ② High frequency hardening equipment: Products for the meantime are the parts for the sugar plant machineries. In future the orders from steel mills or others are to be filled.

(3) Material availability

- 1) Even if the facility equipments are provided and the technique is relivant, when there exists any problem in material supply, any order cannot be regarded as a fabricational objective. The materials must meet the required quality standard (physical & chemical properties and dimension). From this viewpoint, the following parts for Surabaya Machine Shop are subject to reconsideration.

- ① An example under the casting capacity limit in Indonesia

- o 4,000 T/D sugar mill cheek (cast steel):

Against the required casting capacity of 10 tons approximately (weight of the finished products: 7.2 tons), Barata Gresik Foundry can yield four tons. The maximum capacity at other foundry is up to nine tons only.

- ② Examples requiring high quality or special materials.

- o Cement mill trunnion cover, trunnion journal
- o LBC and white metal as bearing materials

- 2) It is thus recommended that as a general problem in Indonesia the situation of the steel and casting materials should be given an exclusive and thorough feasibility study. And the countermeasure and the scope of the import dependency should be studied newly as well. Especially importing the cast and forged material is not advisable in terms of the quality check and the shipping cost.

- 3) At present Surabaya machine shop executes most fabrications and the manufacturing within the workshop without ordering to any other special

workshops. It is considered that it necessary to promote the specialization in some genre of fabrication and in the manufacturing of general parts and to foster the specialized workshops. The situation in which each workshop is equipped with large machineries and special facilities only to be subjected to the low operating rate (load factor) should be avoided. For example, some companies in Jakarta have the same high frequency hardening equipment as Surabaya machine shop is going to equip.

Now each company should refrain from further installation of the said equipment. In this respect the government administrative guidance is to be awaited.

VII-2 Barata Gresik

(1) Sales possibility of products

- 1) The customers who buy the company's products require good quality products with economical price and short delivery times. Satisfaction of this requirement improves customers' reliability on company's products and expands the sales share.

A good quality product must be well designed and manufactured both in terms of function and quality. It satisfies the specifications required by customers. To satisfy customers' requirement, it is necessary to understand surely the needs of customers and to have the engineering capability for designing and drawing. The technology to manufacture a product, and the ability to inspect are also required.

Economical price means to manufacture a product which can endure the competition in the market at a low cost and to obtain a proper profit. For this purpose, the cost control of products is required. "Short delivery" means the delivery of products at a required date as far as possible and delivery faster than that of other competitive companies and for this purpose, the production control system is required. As a matter of fact, the improvement of consciousness of employees who participate in manufacture and the improving of the technological level of employees, are required.

- 2) Intensification and improvement of engineering capability

It is the optimum way to study the special technology required for the special kind of products. It is better to achieve the technology transfer by means of a technological cooperation agreement or a technical license for the sake of the introduction of the advanced technology.

- 3) Improvement of production control ability and quality control ability

To achieve the renovation plan, it is necessary to intensify and improve the hardware and the software. The hardware consists of equipment and

the software consists of the production control ability and the quality control ability.

The measure of it is shown in the summary of this report. Training under supervision promotes improvement.

(2) Selection of equipment

1) The product models are selected in accordance with the governmental policy and special feature of the product mix. The kind and the number of machinery and equipment are decided by considering the working procedure in addition to the aforementioned selection.

2) On the other hand, the forecast of demand in the future is also examined.

3) Therefore, concerning the plate works and steel structure, the process is sufficiently examined and designed from the acceptance of materials to the delivery of products. The equipment which is not examined is a plating equipment. Plating of material should be done by subcontractors.

4) Concerning the function of equipment, a special equipment is needless, because there exist no products to be manufactured with repeated process and no massproduction products.

On the other hand, concerning the numerically controlled equipment, the highest NC machine including CAD/CAM is excluded.

5) The arrangement of equipment was considered to facilitate the productivity improvement, quality control improvement and delivery period reduction.

(3) Raw materials

The stable quality of raw materials is required, because it will have a great influence on the quality, cost and delivery time of the products. Especially, the material to be used as the plate work is important. A system to easily obtain the mill sheet is desirable.

Especially, the pressure vessel and heat exchanger are required in accordance with codes such as JIS and ASME.

VII-3 Barata Jakarta

(1) Sales possibility of products

- 1) The customers who buy the company's products require good quality products with economical price and short delivery times. Satisfaction of this requirement improves customers' reliability on company's products and expands the sales share.

A good quality product must be well designed and manufactured both in terms of function and quality. It satisfies the specifications required by customers. To satisfy customers' requirement, it is necessary to understand surely the needs of customers and to have the engineering capability for designing and drawing. The technology to manufacture a product, and the ability to inspect are also required.

Economical price means to manufacture a product which can endure the competition in the market at a low cost and to obtain a proper profit. For this purpose, the cost control of products is required. "Short delivery" means the delivery of products at a required date as far as possible and delivery faster than that of other competitive companies and for this purpose, the production control system is required. As a matter of fact, the improvement of consciousness of employees who participate in manufacture and the improving of the technological level of employees, are required.

- 2) Intensification and improvement of engineering capability

It is the optimum way to study the special technology required for the special kind of products. It is better to achieve the technology transfer by means of a technological cooperation agreement or a technical license for the sake of the introduction of the advanced technology.

3) Improvement of production control ability and quality control ability

To achieve the renovation plan, it is necessary to intensify and improve the hardware and the software. The hardware consists of equipment and the software consists of the production control ability and the quality control ability.

The measure of it is shown in the summary of this report. Training under supervision promotes improvement.

(2) Selection of equipment

- 1) The product models are selected in accordance with the governmental policy and special feature of the product mix. The kind and the number of machinery and equipment are decided by considering the working procedure in addition to the aforementioned selection.
- 2) On the other hand, the forecast of demand in the future is also examined.
- 3) Therefore, concerning the plate works and steel structure, the process is sufficiently examined and designed from the acceptance of materials to the delivery of products. The equipment which is not examined is a plating equipment. Plating of material should be done by subcontractors.
- 4) Concerning the function of equipment, a special equipment is needless, because there exist no products to be manufactured with repeated process and no massproduction products.

On the other hand, concerning the numerically controlled equipment, the highest NC machine including CAD/CAM is excluded.

- 5) The arrangement of equipment was considered to facilitate the productivity improvement, quality control improvement and delivery period reduction.

(3) Raw materials

The stable quality of raw materials is required, because it will have a great influence on the quality, cost and delivery time of the products. Especially, the material to be used as the plate work is important. A system to easily obtain the mill sheet is desirable.

Especially, the pressure vessel and heat exchanger are required in accordance with codes such as JIS and ASME.

VII-4 Barata Tegal Workshop

(1) Sales possibility of products

1) The following policy is considered based on the present situation of the Tegal work shop in P.T. Barata Indonesia.

- ① Expansion of the market share by supplying the spare parts for sugar plants.
- ② Acception of an order of machinery for irrigation or related products thereto.

These are necessary as an urgent matter and the intensification of the competitive cost is important. From this viewpoint, emphasis is placed upon the cost saving equipment and improvement of productivity. The investment to the needless equipment must be avoided.

- 2) At present, for this work shop, it is not a good policy to possess the brand products of the self work shop, because the plant scale is small and the location of the plant seems to be not proper. The emphasis must be placed on the production planning how to reduce the production cost of the present products.
- 3) The content of training concerns a renovation of consciousness of the entire work shop in connection with quality control, however, the ultimate purpose is the improvement of productive technology and productivity through the quality of products. This is also the basic necessity when the Tegal work shop will produce the unique brand products in the future.

(2) Selection of the production facility

- 1) The selection of the equipment is made so that Tegal work shop might yield the principal products and the products may accord with the governmental guidance, thus, they may accord with the demand of the market.

- 2) For a long time, the Tegal work shop has been familiar with the conventional production means, and, the abrupt change-over to the modernized equipment will cause a great teething trouble in the near future. Therefore, a moderate load ratio floor type boring/milling machine and the vertical lathe are selected as the numerically controlled equipment. At the same time, one set of the automatic welding equipment is introduced. It is the preparation for the future when the numerically controlled equipment and the automation equipment will be introduced in a large quantity and further, the next investment to equipment will start.
- 3) A specialized equipment is more efficient than the copying machine for the working of the products having same type and different sizes. It is easy to change-over on the variation of load.
- 4) The inspection equipment and measuring instruments were made rather luxurious to improve the consciousness to the quality control. It means not to invest to the needless equipment or machine tools, but to adopt one more step intermediately up to the specifications level.
- 5) The increase of handling equipment such as the overhead traveling crane and others is to improve the productivity and to rationalize the operation. Accordingly, one man operation system overhead traveling crane controlled by radio is partially adopted, however, considering the abundant man power in the present Indonesia, anxiety for safety may be possible. However, cost competition with the neighbouring countries will come to Indonesia in the near future, therefore, a partial start as a test run to the future rationalization time seems to be necessary.
- 6) For the assembling and shrinkage fitting of the roll for 4000 TON/Day cane mill, 2 units of 15 TON overhead traveling cranes are, as stated under Chapter IV and V hereabove, sufficient. Even though a specially larger sized cane roll is required to be assembled, such a manner to handle with 2 units of 15 TON cranes is applicable. However, in accordance with the strong request of P.T. Barata Indonesia, an alternative estimation in case that C-D bay is reinforced to install 2 units of 20 TON cranes is tried

and the comparison with proposed plan is also enumerated on Table VII-4-1. The cost increase against proposed plan is estimated approximately 50 million yen.

The restudy and final decision if above alternative is adopted may be made at the stage of detailed design together with the selection of financial source whether additional finance or within a budget by way of rearrangement of the specification and cost indicated in Table V-4-1 hereabove.

In any case, the influence to the result of the economic analysis is deemed to be negligible small.

- 7) The basic facility plan is made in principle to concentrate all the gear manufacturing in P.T. Barata Indonesia to Surabaya machine shop. The installation of a bevel gear shaper in Tegal workshop for the manufacturing of gate lifting device for irrigation plant is deemed to be unavoidable as well as the self-propelling equipment workshop possessing the own hobbing machines. It is also pointed out that the investment cost for this small sized bevel gear shaper is not big amount and the load to this bevel gear shaper in Tegal workshop is expected to be considerably sufficient. Thus the possession of this bevel gear shaper by Tegal workshop is not considered to be a duplicate investment or scattering of gearing techniques.

Therefore it is repeatedly advised to install a bevel gear shaper in Tegal workshop, provided that the final decision on this matter may be made at the stage of detailed design.

(3) Material availability

- 1) There is no problem of materials at the present product mix in Tegal workshop. The condition of Surabaya foundry itself should be re-examined concerning the quality of cast iron material supplied by the Surabaya foundry and the internal defect including the supply state.
- 2) The problems of material transporting cost and the delivery period will come to the front in the future when the quantity of steel material in use will increase and the special specification steel material will be used.

For this, the problem of steel manufacturing capacity in Indonesia and the problems of consolidation and expansion of port and harbor facilities of Semarang Port and transportation road shall be studied, respectively.

Table VII-4-1 Comparison of Alternative Plan on the Bigger Crane Capacity for C-D Bay

(1) Comparison on plans

	Proposed plan	Alternative plan
(1) Over head crane	1 unit×15 ton OHC(existing) 1 unit×15 ton OHC(newinvest)	2 units×20ton(new investment)
(2) Building, girders & rails	As it is only the columns on D-line are reinforced resulted from the modification of D-E bay.	To be reinforced on foundation and columns, substituted with new girders both of C-line and D-line.
(3) Trolley	As it is	Substitution with new trolley on C- line or D-line

Note : Electric power required is within the allowance of capacity.

(2) Comparison on investment cost

	Proposed plan	Alternative plan	Balance(Increase)
(1) Over head crane	Foreign : 9 mil.yen Domestic: 1 mil.yen Total : 10 mil.yen only for 1 unit ×15 ton over head crane.	Foreign : 25 mil.yen Domestic: 3 mil.yen Total : 28 mil.yen only for 2 units×20 ton over head cranes.	Foreign : 16 mil.yen Domestic: 2 mil.yen Total : 18 mil.yen
(2) Building, girders & rails	Cost required : 0	Foreign : 6 mil.yen Domestic: 22 mil.yen Total : 28 mil.yen only the rails and clamps, stoppers are imported.	Foreign : 6 mil.yen Domestic: 22 mil.yen Total : 28 mil.yen
(3) Trolley	Cost required : 0	Domestic: 4 mil.yen All materials are procured in local.	Domestic: 4 mil.yen
TOTAL	Foreign : 9 mil.yen Domestic: 1 mil.yen Total : 10 mil.yen	Foreign : 31 mil.yen Domestic: 29 mil.yen Total : 60 mil.yen	Foreign : 22 mil.yen Domestic: 28 mil.yen Total : 50 mil.yen

Note : Cost for the detailed design is included in the above item (1) and (2).

(1) Sales possibility of products

- 1) The customers who buy the company's products require good quality products with economical price and short delivery times. Satisfaction of this requirement improves customers' reliability o company's products and expands the sales share.

A good quality product must be well designed and manufactured both in terms of function and quality. it satisfies the specifications required by customers. To satisfy customers' requirement, it is necessary to understand surely the needs of customers and to have the engineering capability for designing and drawing. The technology to manufacture a product, and the ability to inspect are also required.

Economical price means to manufacture a product which can endure the competition in the market at a low cost and to obtain a proper profit. For this purpose, the cost control of products is required. "Short delivery" means the delivery of products at a required date as far as possible and delivery faster than that of other competitive companies and for this purpose, the production control system is required. As a matter of fact, the improvement of consciousness of employees who participate in manufacture and the improving of the technological level of employees, are required.

- 2) Intensification and improvement of engineering capability

It is the optimum way to study the special technology required for the special kind of products. It is better to achieve the technology transfer by means of a technological cooperation agreement or a technical license for the sake of the introduction of the advanced technology.

- 3) Improvement of production control ability and quality control ability

To achieve the renovation plan, it is necessary to intensify and improve the hardware and the software. The hardware consists of equipment and

The measure of it is shown in the summary of this report. Training under supervision promotes improvement.

(2) Selection of equipment

1) The product models are selected in accordance with the governmental policy and special feature of the product mix. The kind and the number of machinery and equipment are decided by considering the working procedure in addition to the aforementioned selection.

2) On the other hand, the forecast of demand in the future is also examined.

3) Therefore, concerning the plate works and steel structure, the process is sufficiently examined and designed from the acceptance of materials to the delivery of products.

4) Concerning the function of equipment, a special equipment is needless, because there exist no products to be manufactured with repeated process and no massproduction products.

On the other hand, concerning the numerically controlled equipment, the highest NC machine including CAD/CAM is excluded.

5) The arrangement of equipment was considered to facilitate the productivity improvement, quality control improvement and delivery period reduction.

(3) Raw materials

The stable quality of raw materials is required, because it will have a great influence on the quality, cost and delivery time of the products. Especially, the material to be used as the plate work is important. A system to easily obtain the mill sheet is desirous.

(1) Sales possibility of products

- 1) The customers who buy the company's products require good quality products with economical price and short delivery times. Satisfaction of this requirement improves customers' reliability on company's products and expands the sales share.

A good quality product must be well designed and manufactured both in terms of function and quality. It satisfies the specifications required by customers. To satisfy customers' requirement, it is necessary to understand surely the needs of customers and to have the engineering capability for designing and drawing. The technology to manufacture a product, and the ability to inspect are also required.

Economical price means to manufacture a product which can endure the competition in the market at a low cost and to obtain a proper profit. For this purpose, the cost control of products is required. "Short delivery" means the delivery of products at a required data as far as possible and delivery faster than that of other competitive companies and for this purpose, the production control system is required. As a matter of fact, the improvement of consciousness of employees who participate in manufacture and the improving of the technological level of employees, are required.

- 2) Intensification and improvement of engineering capability

It is the optimum way to study the special technology required for the special kind of products. It is better to achieve the technology transfer by means of a technological cooperation agreement or a technical license for the sake of the introduction of the advanced technology.

3) Improvement of production control ability and quality control ability

To achieve the renovation plan, it is necessary to intensify and improve the hardware and the software. The hardware consists of equipment and the software consists of the production control ability and the quality control ability.

The measure of it is shown in the summary of this report. Training under supervision promotes improvement.

(2) Selection of equipment

- 1) The product models are selected in accordance with the governmental policy and special feature of the product mix. The kind and the number of machinery and equipment are decided by considering the working procedure in addition to the aforementioned selection.
- 2) On the other hand, the forecast of demand in the future is also examined.
- 3) Therefore, concerning the plate works and steel structure, the process is sufficiently examined and designed from the acceptance of materials to the delivery of products. The equipment which is not examined is a plating equipment. Plating of material should be done by subcontractors.
- 4) Concerning the function of equipment, a special equipment is needless, because there exist no products to be manufactured with repeated process and no massproduction products.

On the other hand, concerning the numerically controlled equipment, the highest NC machine including CAD/CAM is excluded.

- 5) The arrangement of equipment was considered to facilitate the productivity improvement, quality control improvement and delivery period reduction.
- 6) Wahana unit is planned to be equipped with the same types of ordinary

machine tools such as turning lathes as those to be installed in the machinery shop of Indra unit. The reasons for it are as follows.

- ① In the plate work, many of the materials are to be machined after gas-cutting, welding and other hot working. This machining works should be carried out in the plate work shop to minimize material handling. This arrangement will contribute to saving the manufacturing costs and time.
- ② Since small quantities of multi-type products are manufactured by the plate work, it is important to rigidly control the drawings and production. If the related machining work is carried out in a separate shop, a difference in the control of the drawings and production and a lack of communication between the two shops can increase the possibility of mis-machining and a resultant delay in delivery. From the viewpoint of production control, it is advisable to carry out the related machining work in the same shop where the plate work is performed.

(3) Raw materials

The stable quality of raw materials is required, because it will have a great influence on the quality, cost and delivery time of the products. Especially, the material to be used as the plate work is important. A system to easily obtain the mill sheet is desirable.

Especially, the pressure vessel and heat exchanger are required in accordance with codes such as JIS and ASME.

VII-7 Boma Stork, Pasuruan

(1) Sales possibility of products

- 1) As for the palm oil plant, T.P. Boma Stork does not have total engineering capacity. So engineering tie-up or engineering cooperation contract including the sub-contract is necessary.
- 2) As for the boiler, although the production is going on at present by the technology tie-up and the development within the company, it is necessary to introduce newer designs or to develop its own so as to increase the market share in Indonesia, since new boilers with high efficiency is being developed in the international market.
- 3) P.T. Boma Stork has its original engineering base for the civil and construction engineering, so it shall be advisable for the company to reinforce the system covering the fabrication and installation in its specialized department within the company.

In such case, enhancement of the purchasing control over the fabrication by the subcontractors and the material purchase, as well as the site fabrication and installation work are important. The substantial in-shop production capacity excluding the fabrication by subcontractors and the site fabrication is judging from the limited working floor area of the workshop, to be estimated 7,000 tons/year approximately.

(2) Selection of the production facility

- 1) Since the main products of P.T. Boma Stork are the boiler and the pressure vessels, installation of the flanging machine or the machine or the special press for processing the end plate is necessary. But from the following viewpoints, this facility investment has been decided to be postponed for the meanwhile.

① The end plate size varies even among the products of P.T. Boma Stork only. It means the press work requires many kinds of metallic molds. So it is believed difficult to depreciate judging from the

operation rate of the above mentioned equipment.

- ② The fact that the steel plates for the end plates are imported from abroad advises us to import the end plates from the specialize makers abroad, this has more merit in terms of the cost and the quality stability.
- 2) With the present condition of P.T. Boma Stork Pasuruan workshop in consideration, it is extremely inefficient to produce in the workshop the cane mill stands and regulators for the sugar plant and the facility investment has been decided to be postponed for the meanwhile from the following view points.
- ① Along with the enlargement of the sugar plant in future, the weight and the required assembly area for the mill stand is sure to be increased to cope with the only ten mill stands a year requires the modification of the buildings and the crane capacity. P.T. Boma Stork should rather make use of the limited working floor for more efficient fabrications.
 - ② The fabrication of regulators requires the large hobbing machines and the high frequency hardening apparatus together with the high degree of skill of operate them. There shall be no merit for each company to invest in these machineries judging from the present market in Indonesia.
 - ③ From these viewpoints, P.T. Boma Stork shall commission the other companies to produce the items for the sugar plant, and in return, shall accept orders from the other companies for the production of the down stream equipment.
- 3) Generally the Indonesian Ministry of Industry is seeking after the well balanced renovation plan which can avoid the above mentioned facility overlapping by the plural companies, as in 1) and 2). The proposition of this renovation plan lies in the same point. The Indonesian government also considers it necessary to extend the guidance over the detailed design and the execution process.

VII-8 Comprehensive Recommendation

(1) On foundry

The foundry is an important section to take charge of the supply of materials for machine parts. It is the guarantee for the quality of plant processing equipment as a product, the cost and the delivery period to supply the good quality casting to machine shops surely and economically in proper time.

On the other hand, it is an indispensable condition for the running of foundry to manufacture successively. Therefore, the successive acceptance of an order of stable quantity is the most important for the foundry. As seen in the examples in Japan, a great majority of castings is for automobile and cast iron pipes, and each belongs to the production type of the small kind and large quantity. The products of the many king-small quantity production such as parts for industrial machinery are only a part of the entire castings.

The production of castings in Japan is shown in the following table.

(1000 T)

Year	1981	1982	1983
Cast iron (Pig)	4227	3926	3804
Cast iron pipe	796	911	915
Maleable iron	299	284	280
Steel castings	683	613	519
Total	6005	5734	5518

The production of crude steel in Japan remains in the same level and the automobile industry is in a favorable trend, while the production of steel castings is steadily decreasing. In other words, the production of casting material for industrial machinery is sharply decreasing. This decreasing tendency is more drastic in the steel casting field. The following table shows the transition of the production of steel casting in Japan.

(1000 T)

Year	1973	1982	1983	1983/1973 (Ratio)
Wt	907	613	519	57.1%

The drastic decrease of steel casting is due to many products replaced by the welded plate work and the globular graphite cast iron. According to the present survey, foundry is out of scope, however, considering from the above statement, the following is commented.

- 1) The foundries in Indonesia to manufacture the plant processing equipment shall be operated by integrating them into some plant where a stable successive production is feasible after a sufficient market survey in the whole country.
- 2) At the same time, technical study to convert castings into welded matter or pressed matter having the freedom of designing and the high reliable quality shall be advanced.

(2) Phased investment

As it is clear from the financial analysis, the investment required for this plan is a large sum.

The principal target of this plan is the advancement of basic technology and the saving of foreign currency resulted from the development of the plant processing equipment manufacturing industry as the basic industry. In order to achieve this purpose, the execution of the equipment investment of a scale planned by the present study is required by all means. We believe that the best plan has been offered considering the present technological level of Indonesia and the future market of the same country.

But we want to recommend an actual phased investment considering the large sum of investment and the existence of an optimum time for investment. Since the object plants of the present survey consist of seven (7) plants of three (3) public corporations, it is possible to consider several kinds of combination of investment sequence by corporations and by plants. This plan is formed on the premise that all plants will be

completed at the same time when the fourth five year plan is completed. An actual investment will be feasible by adjusting the completion time by plants, for example, construction is divided into the first period and the second period.

This plan calculates the investment sum by corporations and by plants, therefore, it is possible to select various kinds of investment combination at rough estimate. We wish that the Indonesian governmental authorities will give a sufficient study of it in order to establish the plant processing equipment manufacturing industry which is the real basic industry of a modern state.