

**Feasibility Study
for
the Plant Renovation
Basuki Rachmat Pulp and Paper Mill
in
the Republic of Indonesia**

Oct. 1984

Japan International Cooperation Agency

**Feasibility Study for the Plant Renovation Basuki Rachmat
Pulp and Paper Mill in the Republic of Indonesia**

Oct. 1984

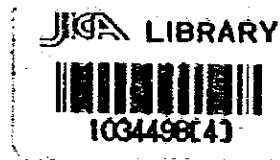
**Japan
Cooper**



**108
695
MPI**

LIBRARY

**FEASIBILITY STUDY
FOR
THE PLANT RENOVATION
BASUKI RACHMAT PULP AND PAPER MILL
IN
THE REPUBLIC OF INDONESIA**



OCTOBER, 1984

JAPAN INTERNATIONAL COOPERATION AGENCY

国際協力事業団	
受入 月日 61.3.08	108
	69.5
登録No 15066	MPI

PREFACE

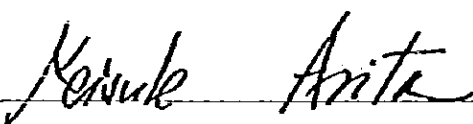
In response to the request of the Government of the Republic of Indonesia, the Government of Japan decided to conduct a feasibility study on the Project for Renovation of the Padalarang Pulp and Paper Mill and the Basuki Rachmat Pulp and Paper Mill and entrusted the study to the Japan International Cooperation Agency (JICA). The JICA sent to Indonesia a survey team headed by Mr. Tadao Kano from February 26 to March 27, 1984.

The team conducted a field survey in the Padalarang and Banjuwangi areas with the cooperation of the officials concerned of the Government and the above-mentioned two mills. 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 the Project and contribute to the promotion of friendly relations between our two countries.

I wish to express my deep appreciation to the officials concerned of the Government of the Republic of Indonesia and the two mills for their close cooperation extended to the team.

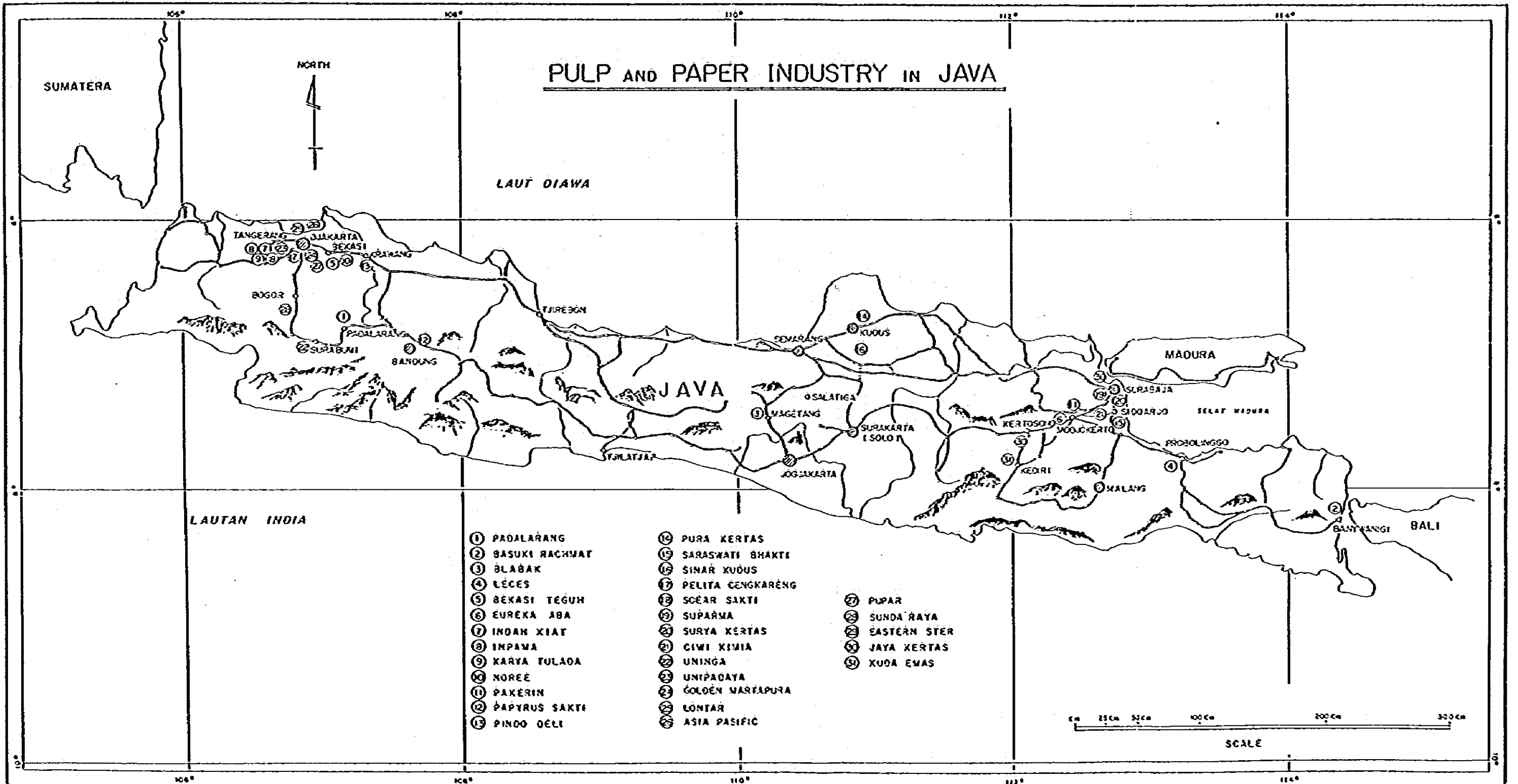
October 1984

A handwritten signature in black ink, reading "Keisuke Arita", is written over a horizontal line.

Keisuke Arita
President

Japan International Cooperation Agency

PULP AND PAPER INDUSTRY IN JAVA



- | | | |
|------------------|---------------------|----------------|
| ① PADALARANG | ⑭ PURA KERTAS | ⑳ PUPAR |
| ② BASUKI RACHMAT | ⑮ SARASWATI BHAKTI | ㉑ SUNDA RAYA |
| ③ BLABAK | ⑯ SINAR KUUS | ㉒ EASTERN STER |
| ④ LÉCES | ⑰ PELITA CENGKARENG | ㉓ JAYA KERTAS |
| ⑤ BEKASI TEGUH | ⑱ SCAR SAKTI | ㉔ KUDA EMAS |
| ⑥ EUREKA ABA | ㉑ SUPARMA | |
| ⑦ INDAH XIAT | ㉒ SURYA KERTAS | |
| ⑧ INPAMA | ㉓ CIWI KIMIA | |
| ⑨ KARYA TULAOA | ㉔ UNINGA | |
| ⑩ NOREÉ | ㉕ UNIPADAYA | |
| ⑪ PAKERIN | ㉖ GOLOEN MASTAPURA | |
| ⑫ PAPHYRUS SAKTI | ㉗ LONTAR | |
| ⑬ PINDO OELI | ㉘ ASIA PASIFIC | |

0 25 50 100 200 300
 km
 SCALE

CONTENTS

SUMMARY

CONCLUSIONS AND RECOMMENDATIONS

CHAPTER 1 INTRODUCTION

1-1	Background and Circumstances of Investigation	1
1-2	Purpose of Investigation	2
1-3	Scope of Investigation	2
1-4	Implementation Method and Contents of Investigation	3
1-4-1	Basic Policy of Investigation Implementation	3
1-4-2	Implementation Method of Investigation	4
1-4-3	Investigation Contents	4
1-5	Words of Appreciation	8

CHAPTER 2 PAPER AND PULP INDUSTRIES IN INDONESIA

2-1	Outline of Paper and Pulp Industries in Indonesia	9
2-2	Position of Paper and Pulp Industries in Indonesia	10
2-3	General Policies on BRPP and PPM	10

CHAPTER 3 MARKET

3-1	Policy of Market Research	13
3-2	Demand and Supply of Paper in Indonesia	14
3-2-1	Actual Production in 1982 and 1983	14
3-2-2	Export and Import in 1982 and 1983	14
3-2-3	Consumption in 1982 and 1983	14
3-2-4	Government Plans for 1984	15
3-2-5	Related Governmental Reference Materials	15
3-3	Estimation of Demand by Grades	20
3-3-1	Basis for Demand Estimation	20

3-4 Sales Activities.....	23
3-4-1 Distribution	23
3-4-2 Supply-demand and Mill Location.....	24
3-4-3 Major Consumption Areas and Consumption per Capita.....	24
3-4-4 Sales Organization and Training of Salesmen	28
3-5 Quality	31
3-6 Prices	35
3-7 Trading and Tariff	39
3-7-1 Export	39
3-7-2 Import	39
3-7-3 Tariff.....	39
3-8 BRPP Evaluated from Viewpoint of Sales.....	42
3-8-1 Product Grades	42
3-8-2 Locational Conditions	42
3-8-3 User Configuration	42
3-8-4 Equipment and Cost.....	43
3-8-5 Quality Evaluation in the Market	43
3-8-6 Recommendable New Production Items	43
3-9 PPM Evaluated from Viewpoint of Sales	44
3-9-1 Product Types	44
3-9-2 Locational Conditions	45
3-9-3 User Configuration	45
3-9-4 Equipment and Cost.....	46
3-9-5 Quality Evaluation in Market and Selling Price	46
3-9-6 New Products Recommended for the Time Being	48
3-10 Investigation of Specialty Paper.....	48
3-10-1 Computer Form Paper	48
3-10-2 Base Paper for Lamination.....	48
3-10-3 Oil-proof Paper (Similar Grease-proof Paper)	49
3-10-4 NCR	50

CHAPTER 4 CURRENT SITUATION OF BRPP MILL

4-1 History	53
4-2 Location	53
4-3 Area of Mill.....	53
4-4 Sales Amount	53

4-5	Number of Employees and Management System	54
4-5-1	Number of Employees	54
4-5-2	Management System	54
4-6	Major Equipment	54
4-6-1	Bleaching Plant	54
4-6-2	Papermaking and Finishing Plant	54
4-6-3	Chemical Recovery Plant.....	54
4-6-4	Auxiliary Facilities	54

**CHAPTER 5 CURRENT SITUATION AND MAJOR PROBLEMS
OF PLANT MANAGEMENT ..**

5-1	Situation of Income	57
5-2	Mill Management	58
5-2-1	Production Management = Mass Balance Control.....	58
5-2-2	Quality Control	59
5-2-3	Cost Control	59
5-2-4	Finished Products Control and Sales Control.....	59
5-2-5	Maintenance Management	60
5-2-6	Purchasing Management	60
5-3	Logs for Self-Made Pulp.....	61
5-3-1	Consumption	61
5-3-2	Quality of Logs	61
5-4	Production Capacity and Actual Production.....	62
5-4-1	General	62
5-4-2	Actual Production of Existing	63
5-4-3	Paper Production	65
5-4-4	Efficiency of Paper Machine	67
5-5	Utility Unit.....	67
5-5-1	Utility Unit of Existing Operation.....	67
5-5-2	Estimation of Unit Consumption for Each Process.....	67
5-5-3	Problems.....	68
5-6	Paper Quality	68
5-6-1	68
5-6-2	Problems on HVS.....	68
5-6-3	Countermeasures	69
5-6-4	Others	69

CHAPTER 6 CURRENT SITUATION AND PROBLEMS OF PULP DEPARTMENT

6-1	General	77
6-2	Wood Preparation Plant	77
6-2-1	Capacity	77
6-2-2	Compounding Ratio of Chip and Material Volume Control	81
6-2-3	Details of Pulp Log	81
6-2-4	Use of Mangrove Logs	82
6-2-5	Quality of Log and Purchasing Chips	84
6-2-6	Purchased Chips	86
6-2-7	Working System	87
6-3	Cooking Facilities	90
6-3-1	Actual Production	90
6-3-2	Current Cooking Conditions	92
6-3-3	Pulp Quality	96
6-3-4	Quantity of Generated Black Liquor	99
6-3-5	Cooking Chemicals	101
6-3-6	Steam Consumption	104
6-3-7	Proposal for Improvements on Operation	107
6-3-8	Facility Improvements	110
6-4	Unbleached Pulp Washing Equipment	111
6-4-1	Existing Washing Equipment	111
6-4-2	Dilution Factor and Actual State of Chemical Loss	112
6-4-3	Actual Values of Chemical Loss and Chemical Recovery Rate	116
6-4-4	Composition of Cooking Chemical Solution	121
6-4-5	Study of How to Improve Washing Efficiency	121
6-5	Bleaching Equipments	122
6-5-1	Outline	122
6-5-2	Processing Capacity	123
6-5-3	Quality	125
6-5-4	Chemicals	128
6-5-5	Screening Equipments	129
6-5-6	Recommendation on Improvement	130
6-6	Evaporator	133
6-6-1	Existing Situation	133
6-6-2	Current Evaporator Capacity and Proposal	133
6-6-3	Measures on Scale Trouble	136
6-6-4	Black Liquor Consistency and Burning in Recovery Boiler	137
6-6-5	Proposal on Improvements	139

6-7	Boilers	141
6-7-1	Outline	141
6-7-2	Consumption of Black Liquor	142
6-7-3	Fuel Oil Consumption of Recovery Boiler	145
6-7-4	Steam Generation	147
6-7-5	Feed Water	149
6-7-6	Equipment Improvement Plan	152
6-7-7	Proposal on Improvement of Operation	154
6-8	Recausticizing Equipment	155
6-8-1	Outline of Process	155
6-8-2	Processing Capacity	156
6-8-3	Calcium Oxide (CaO)	158
6-8-4	Lime Mud	158
6-8-5	Quantity of Cooking Chemicals Addition	160
6-8-6	Causticizing Efficiency	161
6-8-7	Calcium Oxide	162
6-8-8	Improvement of Facilities	164

CHAPTER 7 OPERATION AND EQUIPMENT OF STOCK PREPARATION AND PAPER MACHINE

7-1	Operation and Facilities of Stock Preparation and Problems	165
7-1-1	General	165
7-1-2	Record of Pulp Processing	165
7-1-3	Refiner Capacity	167
7-1-4	Pulp Furnish Combination	169
7-1-5	Freeness	171
7-1-6	Equipment for Chemicals Additions and Control	172
7-1-7	Stabilization of Broke (Waste Paper) Furnish Combination	175
7-1-8	Paper Quality	175
7-2	Operation and Facilities of Paper Machine and Problems	184
7-2-1	General	184
7-2-2	Approach Equipment	184
7-2-3	Wire Part Equipment	188
7-2-4	Press Part Equipment	190
7-2-5	Dryer Part Equipment	191
7-2-6	Calender Part Equipment	192
7-2-7	Pope Reel Equipment	193
7-2-8	Clothing Materials	193
7-2-9	Current Situation and Problems of Finishing Equipment	195

CHAPTER 8 EXISTING SITUATION AND PROBLEMS ON MAINTENANCE CONTROL

8-1 Maintenance Control (Mechanic)	199
8-1-1 Repairing Cost	199
8-1-2 Mechanical Trouble	199
8-1-3 Number of Existing Equipments to Control	199
8-1-4 How to Improve Maintenance Control in BRPP	200
8-1-5 Quality of Maintenance Control	201
8-1-6 References	201
8-2 Electric Section	209
8-2-1 General	209
8-2-2 Present Situation of Electric Equipments	209
8-2-3 Analysis of Electric Trouble	211
8-2-4 Points of Maintenance and Control for Electric Installations	215
8-2-5 Unit Ratio of Power Consumption and Energy Saving	219
8-2-6 Efficiency and Cost of Diesel Engine	219
8-2-7 Summary of Points to be Improved	220
8-2-8 Measures for Power Source Accompanied with Renovation Works	222
8-2-9 Presumption of Increased Power Consumption after Renovation Works	224
8-3 Instrumentation	257
8-3-1 General	257
8-3-2 Failures	258
8-3-3 Present Problems of Instrument Equipment	258
8-3-4 Problems of Maintenance Control for Instrument Equipment	261
8-3-5 Provisions for Basis Weight Stabilization	263
8-3-6 Improvements	265

CHAPTER 9 SPECIAL REMARKS FROM TECHNICAL VIEWPOINT

9-1 Optimum Quantity of Pulp Production	279
9-1-1 Trend of Raw Materials for Pulp	279
9-1-2 Raw Material Acquisition Plan and Price Delivered to Mill	279
9-1-3 Capacity of Chemical Recovery Department	280
9-1-4 Proper Pulp Quality	281
9-1-5 Self-made Pulp Cost and Profitability	281
9-1-6 Optimum Production Quantity	282
9-2 The NCR	287
9-2-1 Trend of the NCR	287
9-2-2 Key Points for NCR Base Papermaking	287
9-2-3 Future Considerations on the NCR	288

9-2-4	Formation of Coloring Mechanism of the NCR and the Method of Processing	289
9-2-5	Applicator	290
9-2-6	Other Conditions	290
9-2-7	Proposals and Future Countermeasures	290
9-3	Installation of No. 2 Paper Machine	291
9-3-1	License for Producing 6,000 tons of Specialty Paper a Year	291
9-3-2	BRPP's Studies on Installation of No. 2 Paper Machine	291
9-3-3	Basic Plan of BRPP (Production and Sales Plans)	292
9-3-4	Basic Plan of BRPP (Facilities)	292
9-3-5	Progress	293
9-3-6	Review Results of BRPP Plan	294
9-3-7	Relationship with this Renovation Project	295

CHAPTER 10 FACILITY RENOVATION PLAN

10-1	Basic Policy	297
10-2	Selection of Kind of Paper	297
10-3	Capacity Balance of Existing Plant	297
10-4	Basic Policy on Planning of Equipment Renovation	298
10-5	Production Plan	298
10-5-1	Production Plan	298
10-5-2	Pulp Preparation Plan	298
10-5-3	Chemical Adding Rate	299
10-6	Unit Consumption	299
10-7	Details of Equipment Renovation	299
10-8	Boiler	300
10-9	Electrical Plant	300
10-9-1	Power Consumption	300
10-9-2	Generator	301
10-9-3	Transformer for Each Equipment	301
10-10	Mill Water	301
10-11	Paper Quality	302
10-12	Forecast of Paper Selling Prices	302

CHAPTER 11 TRAINING

11-1 Purpose and Outline	327
11-2 Overseas Training	327
11-3 Training in Indonesia (Supercalender)	328
11-4 Guidance on Operation and Operation Control	328

CHAPTER 12 IMPLEMENTATION OF RENOVATION PROJECT

12-1 General	331
12-2 Details of Control	332
12-3 Implementing Schedule	332
12-4 Fund	332
12-5 Annual Investment Plan	333
12-6 Machinery and Equipment List	333
12-7 Other Advice for Construction	333
12-7-1 Design of Machinery Foundation	333
12-7-2 Steel Construction Works	333
12-7-3 Machineries	334
12-7-4 Selection of Contractors	334
12-7-5 Transportation	334
12-8 Training for Operation Start-up	334
12-9 Personnel Plan	335

CHAPTER 13 FINANCIAL EVALUATION

13-1 Basic Policy	339
13-2 Production and Sales Plan	340
13-2-1 Conditions	340
13-2-2 Production and Sales Plan	340
13-3 Daily Production by Grades	342
13-3-1 Method for Deciding the Daily Production by Item	342
13-3-2 The Total Efficiency, Operating Efficiency, Reeling Efficiency, and Finishing Yield in the Case of not Carrying out the Renovation Plan	342

13-3-3	The Total Efficiency, Operating Efficiency, Reeling Efficiency, and Finishing Yield in the Case of Carrying out the Renovation Plan	343
13-3-4	Daily Production, Total Efficiency, Operating Efficiency, Reeling Efficiency, and Finishing Yield.....	343
13-4	Annual Operating Profits by Grades Produced	343
13-4-1	Outline of the Operating Profits	343
13-4-2	Factors that Influence the Variable Cost per kg of Paper	345
13-4-3	Production Cost of Self-made Pulp	345
13-4-4	Steam Cost after Renovation of the Boiler	247
13-4-5	Operating Profit by Grades Produced	347
13-4-6	Annual Operating Profit	347
13-5	Other Items Contributing to Increased or Decreased Profits.....	349
13-5-1	Profit Accruing from Price Recovery.....	349
13-5-2	Loss Due to Reduced Production During the Period of Renovation Work	349
13-6	Other Matters to be Taken into Consideration in the Process of Calculating Year-to-Year Operating Profit.....	350
13-6-1	The Loss Due to Reduced Production	350
13-6-2	Rate of Achieving Operating	350
13-6-3	Total Amount of Increased Operating Profit	350
13-7	Fixed Costs	350
13-7-1	Basic Conditions	350
13-8	Total Funds Required	351
13-8-1	Plant Cost	352
13-8-2	Construction Work Cost	353
13-8-3	Pre-operation Cost	353
13-8-4	Initial Operating Funds	355
13-8-5	The Costs (Interest) Required for Capital Procurement during the Renovation Plan Period	355
13-9	Funds Procurement	356
13-10	Interest for Long-term Loan.....	356
13-10-1	Interest Rate for Long-term Loan	356
13-10-2	Interest for Long-term Loan in Each Year	356
13-11	Repayment Method for Long-term Borrowings	356
13-11-1	Equal Annual Repayment for a Period of 10 Years after 2 Years Grace Period ...	356
13-11-2	Repayment Plan	356
13-12	Depreciation Method	358
13-12-1	Number of Years for Depreciation	358

13-12-2	After the Depreciation on the Fixed Installment Method is Completed, the Book Value will Become Zero	358
13-12-3	Amount of Depreciation	358
13-13	Corporation Taxes	358
13-14	Annual Profit and Loss Statement	358
13-15	Break-even Point by Grades and by Machines	358
13-16	Calculation of I.R.R.O.I.	358
13-17	Sensitive Analysis in Varied Conditions	359
13-17-1	Sales Prices	359
13-17-2	Total Amount of Investment	359
13-18	Financial Indicators	359

CHAPTER 14 ECONOMIC EVALUATION

APPENDIX

Appendix 1	Itinerary	379
Appendix 2	Members of JICA Study Team	382
Appendix 3	Members of the Counter Team in the Directorate General of Basic Chemical Industries Ministry of Industry	383
Appendix 4	Members of the Cooperation Team in the Basuki Rachmat Pulp and Paper Mill	384
Appendix 5	Members of the Cooperation Team in the Padalarang Pulp and Paper Mill	385
Appendix 6	List of Machineries and Equipments	386
Appendix 7	Cooking Plant (Item B-1, B-2, B-3, Item C-1)	395
	Washer Plant (Item C-2, C-3)	396
	After Bleaching Plant (Item D-3, others)	397
	Stock Preparation Plant (Item E-1, E-2, E-3)	398
	Paper Machine Approach Flow System (Item F-1)	399
	Renovation Plan, Reference Side View	400
	Wood Chip Storage and Discharge System	
	Layout of Basuki Rachmat Pulp & Paper Mill	
	Existing Side View	

TABLE LIST

Chapter 3

Table	3-2-1	Production, Import, Export and Consumption by Grades	16
	3-2-2	Supply-Demand Forecast (1983 – 1990)	17
	3-2-3	Development of Pulp and Paper Industry in Indonesia	18
	3-2-4	Statistics of Imported Pulp and Waste Paper	19
	3-3-1	Forecast of Demand for Paper (1984 – 1990)	22
	3-4-1	List of Indonesian Dealers in Paper (Mill Representatives Included)	25
	3-4-1	List of Distributor/Agents	26
	3-4-2	Regional Distribution of Population	27
	3-4-3	Each Firm's Paper Production & Productivity	30
	3-5-1	Printing Paper Quality Test Results	32
	3-5-2	Litho Paper Quality Test Results	33
	3-6-1	Trend of Prices of Major Paper Products	36
	3-6-2	Woodfree Paper Prices	37
	3-6-3	Specialty Paper Prices	38
	3-7-1	Main Paper Import Tariff Table	41
	3-9-1	Sales Price of PPM (1984 Budget)	47

Chapter 4

Table	4-5-1	Organization Chart as of March 1984, BRPP	55
-------	-------	---	----

Chapter 5

Table	5-1-1	Income, Production, Selling Price and Major Costs	58
	5-3-1	Logs Consumption	61
	5-4-3-1	Actual Paper Production	70
	5-4-3-2	Detail of Actual Paper Production	71
	5-4-4-1	Total Efficiency and Actual Operation Days	72
	5-4-4-2	Detail Actual Down Time Analysis in Paper Machine Operation	73
	5-6-1	Comparison of Printing/Writing Paper Quality	74
	5-6-2	Comparison of Cyclo Paper Quality	75

Chapter 6

Table	6-2-1	Log Consumption (by Chippers)	78
	6-2-2	Chipper Performance	79
	6-2-3	Actual Chipper Operating Time	80
	6-2-4	Standard of Compounding Ratio of Chip (%)	81

6-2-5	Ratio of Bark in Log Chips and Procured Chips (%)	84
6-2-6	Influence of Chips with Bark to Yield	85
6-2-7	Chip Size Distribution after Screen (%)	86
6-2-8	Consumption of Purchasing Chips	86
6-3-1	Actual Annual Production of Pulp	90
6-3-2	Recent Actual Production	91
6-3-3	Actual Cooking Time	91
6-3-4	Current Cooking Conditions (Dec. '83 – Feb. '84)	94
6-3-5	Quantity of Generated Black Liquor	99
6-3-6	Actual Quantities of Generated and Received Black Liquor	100
6-3-7	Actual Consumption (Dec. '83 – Feb. '84) and Planning of Chemicals Consumption	102
6-3-8	Actual and Planning of Chemicals Consumption as 100% Sold and Rate of Na ₂ SO ₄	102
6-3-9	Sulfidity and Adding Chemicals	103
6-3-10	Actual Consumption of Steam	104
6-3-11	Steam Consumption When Separate Cooking N and L-Wood is Made	104
6-3-12	Digester Temperature	105
6-3-13	Comparison of Mixed and Separate Cooking	107
6-3-14	Estimated Yield of Pulp after Improvement	107
6-3-15	Estimated Cooking Conditions after Improvement	108
6-4-1	Annual Processing Quantity of Unbleached Pulp	111
6-4-2	Monthly Processing Quantity of Unbleached Pulp	112
6-4-3	Actual Values of Dilution Factor	114
6-4-4	Weak Black Liquor Sent from Washing Section to Evaporator Section	115
6-4-5	Total Alkali Quantity (as Na ₂ O) in Digesting Solution	116
6-4-6	Total Alkali Quantity (as Na ₂ O) in Adding Chemicals	116
6-4-7	Rate of Chemical Loss	117
6-4-8	Sodium Oxide (Na ₂ O) in Pulp Sheet	117
6-4-9	Rate of Actual Chemical Recovery	118
6-4-10	Estimation of Rate of Chemical Recovery after Renovation	118
6-4-11	Chemical Recovery Cycle (as kg-Na ₂ SO ₄ /1 BDI.BKP)	119
6-4-12	Composition of Cooking Chemical Consumption (as Na ₂ O)	121
6-4-13	Comparison of Washer Efficiencies	121
6-5-1	Major Bleaching Facilities	122
6-5-2	Bleaching Conditions	123
6-5-3	Actual Processing (December 1983 – February 1984)	123
6-5-4	Actual Processing (Average of 1983)	124
6-5-5	Maximum Processing Capacities of Major Facilities	124
6-5-6	Consumption of Bleached Pulp Washing Water	125
6-5-7	Brightness and Tearing Strength	125

6-5-8	Consumption of Bleaching Chemicals (kg/BDt) (December 1983 – February 1984)	128
6-5-9	Centri-cleaner	129
6-5-10	Material Balance of Centri-cleaners	130
6-6-1	Evaporator Capacity (Actual and Nominal)	134
6-6-2	Evaporator Capacity	135
6-7-1	Outline of Boiler Specifications	141
6-7-2	Actual Consumption of Black Liquor	142
6-7-3	Actual Operation of Boiler (one week in Feb. '83 – Feb. '84), Nominal Capacity and Estimated Values after Renovation	143
6-7-4	Furnace Thermal Load	144
6-7-5	1983 Main Boiler/Recovery Boiler Actual Operation	146
6-7-6	Actual Steam Generation (December 1983 to February 1984)	148
6-7-7	Condensate Recovery Rate	150
6-7-8	Soft Water Production	150
6-7-9	Boiler Water Standards and Analysis Results	151
6-7-10	Stopping Time of Cottrell Precipitator	152
6-7-11	Consistency of Received Black Liquor	154
6-7-12	Blowing Pressure of Combustion Air	155
6-8-1	Causticizing Facilities	156
6-8-2	Actual Quantity of Causticizing	156
6-8-3	Causticizing Quantity	157
6-8-4	Estimation of Green Liquor Generation	157
6-8-5	Quantity of CaO Necessary for Causticizing	158
6-8-6	Quantity of Generated Lime Mud	159
6-8-7	Estimated Quantity of Lime Mud Generated	159
6-8-8	Quantity of Chemicals Actually Added	160
6-8-9	Quantity of Salt Cake (Na ₂ SO ₄) Added	160
6-8-10	Estimated Quantity of Chemicals to Add	161
6-8-11	Causticizing Efficiency	162

Chapter 7

Table	7-1-1	Comparison of Pulp Consumption	166
	7-1-2	Theoretical Quantity of Pulp Refined	167
	7-1-3	Refiner Capacity	168
	7-1-4	Annual Pulp Consumption	169
	7-1-5	Freeness & Sheet Break Times	170
	7-1-6	Ratio of Self-made Pulp (%)	169
	7-1-7	Breakdown of Actual Self-made Pulp Furnish Combination (%)	171
	7-1-8	Standard of BRPP & Recommendation	176
	7-2-1(a)	Operating Condition of Paper Machine	197
	(b)	Operating Condition of Paper Machine	198
	7-2-2	Problem of Selectifier Screen	186

7-2-3	Actual State and Recommendation of Consistency in Flow Box	187
7-2-4	Comparison of Wire Part Dewatering Equipment	188
7-2-5	Comparison of One-pass Retention Rates	189
7-2-6	Current Situation of Nip Pressure and Moisture Content (HVS 45 g/m ²) (HVS 45g/m ²)	190

Chapter 8

Table	8-1-1	Repairing Cost	202
	8-1-2	Analysis of Paper Machine Stopping Time for Causes Attributable to Maintenance Department	203
	8-1-3	Information Sheet (Job Card) Flow Chart in BRPP	207
	8-2-1	Statistic of Accident and Problem of Electric	230
	8-2-2	Total of Accidents (1981 – 1983).....	231
	8-2-3	Histogram of Accident of Paper Machine.....	232
	8-2-4	Pareto Diagram of Number of Accidents by Part	234
	8-2-5	Pareto Diagram of Time of Occurrence by Part	235
	8-2-6	Trouble Analysis of Sectional Drive	236
	8-2-7	Sectional Drive Trouble Analysis (1)	238
	8-2-7	Sectional Drive Trouble Analysis (2)	239
	8-2-8	Sectional Drive Trip under Operation	240
	8-2-9	Max. Load of Actual	241
	8-2-10	Test Instrument & Tool Set –Existing–	242
	8-2-11	Unit Ratio of Power Consumption Transition Table	243
	8-2-12-1	Generating Cost of Diesel Engine in Feb. 1984.....	244
	8-2-12-2	Load Factor of Diesel Engine Generator	245
	8-2-13-1	Niigata: Data of Fuel Consumption Rate of Diesel Engine Generator	233
	8-2-13-2	Niigata (latest): Fuel Consumption Rate of Diesel Engine Generator	233
	8-2-13-3	MBL Fuel Consumption Rate of Diesel Engine Generator Made in 1975 (Theoretical Value)	233
	8-2-14	Efficiency of Diesel Engine Generator.....	246
	8-2-15	Operation Data of Sectional Drive.....	247
	8-2-16	Sectional Drive Modification Plan	248
	8-2-17	Estimated Load at Speed up	249
	8-2-18	Expectation of Increase/Decrease of Load after Reconstruction	250
	8-2-19	Expectation of Power Consumption by Kind of Paper after Renovation	251
	8-2-20	Expectation of Increase of Consumption of Electric Energy after Renovation	252
	8-2-21	Reference Data on Power Generation and Load.....	253
	8-2-22	Reference Data on Actual Load of Feeder	254
	8-2-23	Comparison the Fuel Oil Consumption Rate of Diesel Engine.....	255

8-2-24	Calculation of Merit Case of Static Type DC Power Supply Unit for Selectional Drive in Paper Machine Instead of Existing MG Set	256
8-3-1	Instrument Failure List (Influenced on the Operation of Paper Machine) Paper Machine)	268
8-3-2	Instrument Trouble Analysis	269
8-3-3	Test Instrument & Tool Set -Existing-	270
8-3-4	Compressed Air Device and Dryer System for Instrument	271
8-3-5	Renewal Instruments (Provisions against Deterioration and Failure).....	273
8-3-6	Instruments for New Installation and Renovation	275
8-3-7	Panels for Model Change	276
8-3-8	Recommendatory Maintenance Instruments/Tools	277

Chapter 9

Table 9-1-1	List of: Purchasing of Raw Material 1981 – 1983 Estimation of Purchasing Raw Material 1984 – 1985	283
9-1-2	Estimation of Available Raw Material Quantity in Near BRPP	284
9-1-3	Raw Material Cost (unit Rp/SM)	285

Chapter 10

Table 10-3-1	Comparison of Productivity in Existing Plant, BRPP	303
10-5-1	Comparison of Paper Production	304
10-5-2	Estimate Daily Production in 1983.....	305
10-5-3	Production Plan after Renovation	306
10-5-4	Furnish Combination in 1983	307
10-5-5	Furnish Combination after Renovation.....	308
10-5-6	Comparison of Self-made Pulp Production and Purchased Pulp	309
10-5-7	Pulp Requiring Plan per Day after Renovation.....	310
10-5-8	Comparison of Cooking Condition	311
10-5-9	Comparison of Chemical Consumption	313
10-6-1	Comparison of Utility Consumption	314
10-6-2	Comparison of Utility Consumption	316
10-6-3	Utility Consumption in Dec. 1983	317
10-7-1	Details of Improvement of Major Equipment	318
A	Wood preparation	318
B	Cooking	318
C	Washer.....	319
D	Bleaching	319
E	Stock preparation	320
F	Paper machine	320
G	Finishing equipment	323
H	Finishing equipment	323
I	Finishing plant.....	323
J	Recovery boiler	324

10-8-1	Estimation of Mill Water Consumption	301
10-9-1	Desirable Quality Control	325
10-10-1	Estimate Sales Price after Renovation	326

Chapter 12

Table	12-3-1	Renovation Project Schedule Plan	336
	12-4-1	Budgetary Price & Break Down for BRPP Renovation Project	337
	12-4-2	Total Funds Required (Excluding Interest Rate during Construction)....	338

Chapter 13

Table	13-2-1	Sales Plan	341
	13-3-1	List of Daily Production and Efficiencies.....	344
	13-4-1	Production Cost of Self-made Bleached Pulp	346
	13-4-2	Operation Profit for Every Grade of Paper	348
	13-8-1	Total Funds Required (Exclude Interest during Construction)	352
	13-8-2	Plan of Total Funds Required	354
	13-10-1	Repayment Schedule of Foreign Loan and Interest	357
	13-12-1	Depreciation Expenses	360
	13-14-1	Annual Statement of Profit and Loss	361
	13-15-1	Break-even Point for Every Kind of Paper	362
	13-16-1	Internal Earning Rate Statement of Profit and Loss Profit and Loss Statement for Internal Rate of Return on Investment (I.R.R.O.I.)	363
	13-16-2	Internal Rate of Return on Investment I.R.R.O.I.	364
	13-17-1	Sensitivity Analysis (Variation of +5% base selling price) Profit and Loss Statement for I.R.R.O.I.	365
	13-17-2	Sensitivity Analysis (Variation of +5% base selling price) I.R.R.O.I. ...	366
	13-17-3	Sensitivity Analysis (Variation of -5% base selling price) Profit and Loss Statement for I.R.R.O.I.	367
	13-17-4	Sensitivity Analysis (Variation of -5% base selling price) I.R.R.O.I. ...	368
	13-17-5	Sensitivity Analysis (Variation of +5% base investment cost) Profit and Loss Statement for I.R.R.O.I.	369
	13-17-6	Sensitivity Analysis (Variation of +5% base investment cost) I.R.R.O.I.	370
	13-17-7	Sensitivity Analysis (Variation of -5% base investment cost) Profit and Loss Statement for I.R.R.O.I.	371
	13-17-8	Sensitivity Analysis (Variation of -5% base investment cost) I.R.R.O.I.	373
	13-18-1	Financial Indicators.....	374

FIGURE LIST

Chapter 3

Fig.	3-5-1 Comparison of Test Results of Various Manufacturers' Products	34
------	---	----

Chapter 5

Fig.	5-6-1 Profile of Basis Weight (CD)	76
------	--	----

Chapter 6

Fig.	6-2-1 Consumption of Logs and Bamboo	83
	6-2-2 Pulp Flow Sheet	89
	6-3-1 Numbers of Cooking Batches	93
	6-3-2 Fluctuation of Roe No. of Unbleached Pulp	97
	6-3-3 Average Roe No. and Individual Difference.....	98
	6-3-4 Cooking Curve	106
	6-4-1 Saltcake Loss and Dilution Factor Relationship	113
	6-5-1 Fluctuation of Roe No. of Received Pulp.....	126
	6-5-2 Brightness and Tearing Strength at No. 5 Tower Outlet in February 1984 .	127
	6-5-3 Hypo Solution Settling Storage Tank	132
	6-6-1 Quantity of Black Liquor Received and Processed by Evaporator.....	138
	6-6-2 Flow Sheet after Changing Black Liquor Condenser Drain Piping	140
	6-8-1 Comparison of Data between Sodium Carbonate (Na_2CO_3) and Calcium Oxide (CaO) Contained in White Liquor	163

Chapter 7

Fig.	7-1-1 Freeness HVS 80 g/m ²	177
	7-1-2 Freeness HVS 60 g/m ²	178
	7-1-3 Freeness HVS 45 g/m ²	179
	7-1-4(a) Actual Chemical Add. HVS 45 g/m ² '84-MAR-7	180
	7-1-4(b) Actual Chemical Add. HVS 45 g/m ² '84-MAR-7	181
	7-1-5 Freeness & Sheet Break Times.....	182
	7-1-6 Basis Weight Variation per Paper Roll at Reel	183

Chapter 8

Fig. 8-1-1	Organization in Maintenance Department, BRPP	208
8-2-1	Skeleton Diagram	225
8-2-2	Illustration of Sectional Drive Draw Control Mechanism -Existing-	226
8-2-3	Skeleton of Sectional Drive	227
8-2-4 (1)	Reconstruction Paper Machine Power Plan 1	228
8-2-4 (2)	Reconstruction Paper Machine Power Facility Plan 2	229
8-2-5	Diesel Engine Generator Characteristic Curve	233
8-3-1	Paper Machine Approach Flow System	267

Chapter 13

Fig. 13-7-1	I.R.R.O.I. & Payout Period vs. Variation of Selling Price	372
13-7-2	I.R.R.O.I. & Payout Period vs. Investment Cost	375

ABBREVIATIONS

DGBCI	The Directorate General of Basic Chemical Industries, Ministry of Industry
IPPA	Indonesian Pulp and Paper Association
BRPP	Basuki Rachmat Pulp and Paper Mill
PPM	Padalarang Pulp and Paper Mill
JICA	The Japan International Cooperation Agency
JETRO	Japan External Trade Organization

ABBREVIATIONS

A.D	Air Dry
B.D	Bone Dry
B K P	Bleached Kraft Pulp
B L	Black Liquor
B.O.D	Biochemical Oxygen Demand
C.D	Cross Direction (Paper Machine)
C.I.F	Cost, Insurance and Freight
C.O.D	Chemical Oxygen Demand
C.S	(Himeotype) Stencil Paper
C.S.F	Canadian Standard Freeness
C.T.M.P	Chemithermo Mechanical Pulp
D.C.F	Discounted Cash Flow
E.I.R.R	Economical Internal Rate of Return
F.O.B	Free on Board
G L	Green Liquor
H V O	Printing Paper
H V S	Writing Paper
I.R.R	Internal Rate of Return
I.R.R.O.E	Internal Rate of Return on Equity
I.R.R.O.I.	Internal Rate of Return on Investment
J.I.S	Japanese Industrial Standards

ABBREVIATIONS

CaCO_3	Calcium Carbonate
Ca-Hypo	Calcium Hypochlorite
CaO	Caustic Lime
H_2SO_4	Sulphuric Acid
NaCl	Sodium Chloride
Na_2CO_3	Sodium Carbonate
NaOH	Caustic Soda
Na_2S	Sodium Sulphide
Na_2SO_4	Salt Cake (Sodium Sulfate)

ABBREVIATIONS

K P	Kraft Pulp
L. BKP	hard Wood Bleached Kraft Pulp
L. UKP	Hard Wood Unbleached Kraft Pulp
Max.	Maximum
Min.	Minimum
M.D.	Paper Machine Direction
N. BKP	Soft Wood Bleached Kraft Pulp
N. UKP	Soft Wood Unbleached Kraft Pulp
S B L	Strong Black Liquor
S S	Suspended Solid
TAPPI	Technical Association of Pulp and Paper Institute
T. MP	Thermomechanical Pulp
T S	Total Solid
U K P	Unbleached Kraft Pulp
U.S.A.	United States of America
W B L	Weak Black Liquor
W L	White Liquor
W W	White Water
W W L	Weak White Liquor

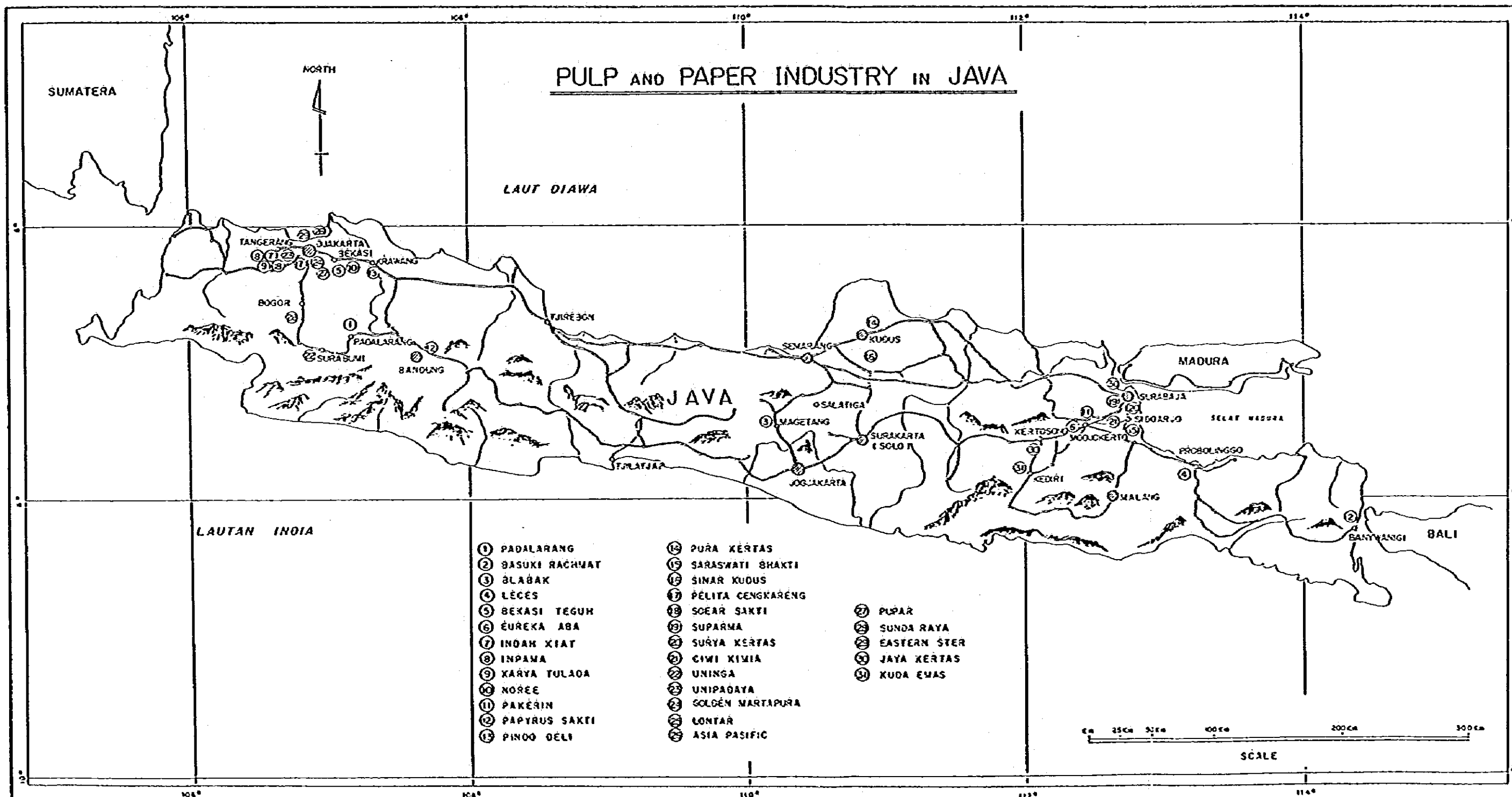
ABBREVIATIONS

bb1	Barel
cc	Cubic Centimeter
cft	Cubic Feet
cm ²	Square Centimeter
°C	Degree Centigrade
d	Day
ft ²	Square feet
°F	Degree Fahrenheit
g	Gramme
gf	Gravity force
gal	Gallon
h	Hour
ha	Hectare
hp	Horse power
Hz	Hertz
∑H	Brightness by Hunter
Kg	Kilo Gramme
Klit	Kilo Liter
Km	Kilo Meter
Km ²	Square Kilo Meter
KV	Kilo Volt
KVA	Kilo Volt Ampere
kWh	Kilo Watt Hour

ABBREVIATIONS

lbs	Ponds
lit	Liter
M	Month
m	Meter
m ²	Square Meter
m ³	Cubic Meter
mA	Mili Ampere
mℓ	Mili Liter
mm	Mili Meter
mm ²	Square Mili Meter
MW	Mega Watt
min	Minute
ppm	Perts per Milion
Roe No.	Roe Chlorine Number
sec	Second
S. M	Stere Measure
t	Ton
V	Voltage
y	Year
Z	Percent
US\$	United States Dollar
Rp	Rupiah
Y	Yen

SUMMARY



INDEX

Map

Exchange Rates Applied

Major Data on Basuki Rachmat Mill (current status vs. after renovation)

Introduction-Background, Circumstances, Purpose and

Scope of Investigation S-1

Chapter 1. Summary of the Renovation Plan

1-1 Future Prospects S-2

1-2 Basic Policy of Renovation Plan S-3

1-3 Equipment Renovation Plan S-4

1-4 Education and Training S-6

1-5 Implementation of Renovation Project S-7

1-6 Financial Analysis and Economic Evaluation S-8

Chapter 2. Summary of Investigation Results

2-1 Government Policy of Indonesia toward Pulp and Paper Industry S-14

2-2 Market S-15

2-3 Current Situation of Mill S-19

2-4 Review of Managerial and Control Problems S-20

2-5 Review of Various Technical Problems S-22

2-6 Economical Quantity of Pulp Production S-26

2-7 Review of BRPP's Plan for No. 2 Paper Machine S-27

2-8 N.C.R. S-29

Conclusion and Recommendations S-31

In this report the following currency exchange rates are used:

Values up to Oct. 1978	US\$1 = Rp425
Values from Nov. 1978 to Feb. 1983	US\$1 = Rp625
Values from Mar. 1983 to Feb. 1984	US\$1 = Rp1,000

When calculating new investment and others for financial analysis

US\$1 = Y230

US\$1 = Rp1,000

Major Data on Basuki Rachmat Mill
(current status vs. after renovation)

<u>Item</u>	<u>Unit</u>	<u>Current status</u>	<u>After renovation</u>	
A General				
-1 Construction work/Builder		1962/Japan		
-2 Renovation work/Executer		1975/Japan		
-3 Number of employees		735	735	
-4 Distance from Jakarta	km	1,100	1,100	
Distance from Surabaya	km	300	300	
B Status of business				
-1 Annual production	ADt/y	11,791	14,245	
-2 Annual sales	1,000 Rp/y	6,788,550	10,645,408	
-3 Total production cost	1,000 Rp/y	7,809,508	9,476,111	
-4 Profit aft. tax	1,000 Rp/y	-1,334,063	203,222	
-5 Major sales terr.		Surabaya, Semarang	Surabaya, Semarang	
-6 Main products		Printing & writing Litho. paper	Same as present plus high added value papers	
C Status of production of main equipment				
-1 Self-made pulp	BDU-BKP/y	(8,862.6)	8,426.0	
Recovery rate of cooking liquor	%	65 ± 6	90.0	
-2 Paper production		Current grades	Current grades	New grades
Daily production	ADt/d	34.1	44.8	31.3
Total efficiency	%	76.3	85.0	80.0
Pulp yield	%	95.0	95.0	
D Status of utilities				
-1 Power generating capacity	kW	9,920.0	9,920.0	
-2 Power consumption	MWh/y	19,670.4	24,686.0	
-3 Steam generating capacity	t/d	384.0	384.0	
-4 Steam consumption	t/d	308.6	313.5	
-5 Water consumption	m ³ /d	14,215.8	13,862.3	

INTRODUCTION

1. Background and Circumstances of Investigation

- (1) In compliance with the request of the Government of Japan who had received a request from the Government of Republic of Indonesia, the Japan International Cooperation Agency determined to dispatch an investigation team to the Republic of Indonesia to evaluate the feasibility of the plant (pulp and paper) renovation project of Padalarang Pulp and Paper Mill (hereinafter called PPM) and Basuki Rachmat Pulp and Paper Mill (hereinafter called BRPP).
- (2) The preliminary survey team, which had been dispatched prior to this investigation team, conferred with the Indonesian party during the period of December 21 to 28, 1983 as to the scope of investigation to be made and the preliminary survey team and the Indonesian party signed an agreement on December 26, 1983.
- (3) Based on the said agreement, this investigation team conducted the field investigation during the period of February 26 to March 27, 1984 and reviewed the investigation results in detail. This writing reports the investigation results.

2. Purpose of Investigation

The purpose of this investigation is to make a diagnosis of BRPP and PPM and to study the feasibility of renovating the two mills, as well as to prepare a renovation program with the main target set on the higher efficiency of production and improvement of the product quality.

3. Scope of Investigation

In order to accomplish the purpose as described above, the investigation team confirmed the policy of the Ministry of Industry, Indonesia, surveyed the market conditions and investigated both mills on their operations, facilities and management practices. The investigation team integratedly evaluated the investigation results from the technical and financial viewpoints.

CHAPTER 1 SUMMARY OF THE RENOVATION PLAN

1-1 Future Prospects

Basuki Rachmat Pulp and Paper Mill manufactures commodity type of printing and writing paper on an integrated basis from pulp to paper.

However, their production scale is small and the labor productivity is low. The mill location has a distance from the markets, which is one of the disadvantages held by the mill.

If the mill is to continue the operation as it is, it may be difficult for the mill to come out of the operation in deficit. On the other hand, the mill has a social commitment to contribute toward the development of the local area where the mill is located and to stabilize the employment in the area as the only pulp and paper mill in this part of the country.

Hence, the following measures are considered for the future development of the mill:

- a. Shifting of the products to more highly added value products.
- b. The mill should proceed to the integrated operation from papermaking to the secondary processing of paper such as the making of notebooks as done already.
- c. The mill should establish the capability of competing with the foreign products in the international market both in price and quality, whereby the export of paper should be encouraged.

In either case, the prime importance is to be placed on the reduction of production cost of the current products and the recovery of prices. The buildup of the competing ability is critically needed. In addition, it is necessary for the mill to establish production system capable of producing high added value products.

As the basis of the consolidation of the mill ability, the accumulation of the higher level of technology and strengthening of the marketing ability are very important in parallel to the improvement and renovation of the production facilities.

In addition, the better utilization of the pulp making equipment should be taken into consideration from the strategic viewpoint.

1-2 Basic Policy of Renovation Plan

(1) Problem with the present status

This mill is located at the eastern end of Java Island, having one paper machine to produce 12,000 tons of printing and writing paper. The mill has pulp producing facilities for self-use, allowing integrated operation from pulp to paper. The earnings of the mill are getting worse in recent years rapidly as shown below.

	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>
Profit & loss (Rp 1,000)	721,160	53,105	-502,642	-1,574.93
Annual production (t)	12,873	12,702	12,595	11,787

Increased production cost due to the hike in oil price and the sluggish market price of paper are the main reasons for the worsened earnings. Besides, the following matters are pointed out as the problems peculiar to the mill:

- a. Due to the unstable quality of the products the sales prices are usually 10 to 20% lower than those of the similar products made by the other manufacturers.
- b. The recovery rate of cooking chemicals at the pulp plant is as low as 66%, which is an abnormal figure.
- c. The total efficiency of the paper machine is extremely low at 76.3%.
- d. The grades manufactured are limited to printing and writing, which is an unprofitable item due to the over-supply.
- e. Generally speaking, the mill is well managed and controlled. However, further efforts should be made toward the introduction of new technique on operational control for the betterment of the mill management.

(2) Measures for improvement

To cope with the problems as mentioned above, the following measures should be taken for the betterment of profitability. However, it is thought that the change to the black account will be achievable from the year of 1991 (profit in the amount of Rp304,957,000) onwards.

- a. Improvement should be made so that L-wood and N-wood can be cooked separately. In addition, all the processes throughout the mill should be more stabilized. By all means, the quality of products should be stabilized, whereby the sales price is to be improved by 7%.
- b. The chemicals recovery plant should be improved, aiming at the recovery rate up to 90% from the present 66%. Thereby, the variable costs of pulp can be lowered (from Rp306 to Rp261/kg). This measure will contribute, at the same time, to the lowering of contamination of the effluent.

- c. The speed of the paper machine is to be increased from the present level of 230 to 240m/min. up to 280m/min. The total efficiency should also be upped from 76.5% to 85%.

Thereby, the daily production should be raised from the present 34ADI to 45ADI.

- d. Renovation will be made to enable partial production of specialty paper in the amount of 2,400tons a year.

(3) Education and training

In order to achieve the renovation plan most effectively, the level-up of operating techniques and management know-how are indispensable in parallel to the renovation of equipment.

Under this renovation plan, education and training of the employees abroad as well as at the mill site by foreign technical experts are scheduled so as to transfer the technology in every possible manner.

1-3 Equipment Renovation Plan

(1) Wood preparation

- a. Investment: Rp295,652,000
- b. Two units of chip silo are additionally installed so that N-wood and L-wood can be cooked separately, whereby it is expected that pulp quality can be improved.

(2) Pulp cooking

- a. Investment: Rp171,304,000
- b. One additional blow tank is installed for separate cooking of N and L-wood. Thus, pulp quality can be improved.

(3) Washing

- a. Investment: Rp337,826,000
- b. The three washers are replaced with new ones to improve the chemical recovery rate. Thus, the quality will be much stabilized and the cost of production will be reduced. At the same time the contamination of the effluent will also be reduced.

(4) Bleaching

- a. Investment: Rp28,696,000
- b. The number of shower pipes is increased to stabilize the quality.

(5) Stock preparation

- a. Investment: Rp173,913,000
- b. Two DDR are newly installed as the main investment to improve the pulp quality and to increase the production.

(6) Papermaking

- a. Investment: Rp2,053,478,000
- b. The following renovations are made to improve the paper quality, increase the production and to improve various efficiencies:
 - Approach equipment renovation
 - Flow box replacement
 - Wire part remodelling
 - Press part replacement
 - Drainage improvement
 - Reel improvement
 - Sectional drive system renovation
 - Cutter replacement
 - Winder replacement

(7) Supercalender

- a. Investment: Rp1,782,609,000
- b. Installation of a supercalender to improve the paper quality and to produce new grades which will have higher profitability.

(8) Recovery boiler

- a. Investment: Rp86,957,000
- b. Minor renovation of the dust discharging device for the electric precipitator to improve the chemical recovery rate and to contribute to the pollution control.

(9) Spare parts

- a. Investment: Rp1,004,348,000
 - For renovated equipment: Rp230,435,000
 - For existing equipment: Rp773,913,000

1-4 Education and Training

Education and training of employees to give them ability to solve various problems related to the management and control of the mill operations are very important in parallel to the renovation of equipment. The following programs are planned:

(1) Education and training abroad

- a. Number of persons to be dispatched: 7 persons for a total of 17 man-month
- b. Subjects for education and training
Papermaking technology and mill management as a whole (quality control, equipment control, operation control and market control).

(2) Education and training in Indonesia

The training of operators on the supercalender is to be carried out at an Indonesian paper company, for example, at Gowa Paper Mill. (13 persons × 2.5 months)

(3) Education and training at the site of BRPP

In this renovation plan, the technical assistance is to be rendered by foreign technical experts. Those experts dispatched to BRPP should make use of every opportunity to transfer the appropriate technology to the employees of BRPP. Incidentally, the number of foreign technical engineers dispatched to BRPP is 7 persons with a total of 17 man-month.

(4) Education and training programs to be continued

The following methods should be taken:

- a. Opening of a course to give the employees the common sense of papermaking as a whole.
- b. By classifying the employees into several ranks, an education system should be established to hold several courses for freshmen, group leaders, superintendents, middle management class, etc.
- c. Circle activities by jobsites and proposal systems should be introduced and the OJT (on the job training) should be actively pursued.
- d. Establishment of overseas training system.

1-5 Implementation of Renovation Project

(1) We recommend that the overall scheme to secure the profit consistently and to contribute to the development of the area, where the mill is located, should be carried out, dividing it into short-term, middle-term and long-term plans.

a. **Short-term plan**

Improvement items pointed out by the investigation team during the field investigation and any items that can be started among the items described in this report are put into practice.

b. **Middle-term plan**

This renovation project is implemented as a major project in the fourth 5-year plan (1984–1988). The project is to start its work in 1985 and the whole work is to be completed in two years and two months.

c. **Long-term plan**

A new paper machine is installed as a project the fifth 5-year plan (1989–1993) depending on the situation of fund availability, trend of the domestic market and results of the middle-term plan. In order to implement the plan, further study and review of the plan will be required.

(2) **Implementation system**

a. Since this renovation project is essentially a renovation project of the existing plant, we recommend that the control system that the plant possesses is fully utilized and at the same time, a renovation project execution team is organized.

b. In order to complete this project successfully, we recommend that BRPP receives assistance of engineers of a foreign consultant or foreign papermaking company, who have experience in such renovation work as this project.

(3) **Project implementation schedule**

a. The project should be started in 1985, and should be completed within a period of two years and two months.

b. The shutdown of the paper machine for the renovation work is scheduled for 60 days.

(4) Total funds for investment

a. Total funds required for the implementation of the middle-term plan follow:

Unit: Rp1,000

A. Equipment cost	6,840,578
B. Engineering fee	403,478
C. Construction work	684,566
D. Operation supervision	180,570
E. Training fee	260,869
F. Overhead	340,409
G. Contingency	680,834
Total	9,391,304
H. Interest during the construction	1,186,434
I. Repayment	217,826
J. Initial working capital	234,870
Grand total	11,030,434

b. Procurement of funds

Equity : 30% Long-term loan : 70%
(The terms and conditions for the loan are not decided yet. The above percentages are used provisionally for the purpose of financial calculations)

Unit : Rp 1,000

	<u>Foreign cur.</u>	<u>Local cur.</u>	<u>Total</u>
Equity	—	3,309,130	3,309,130
Long-term loan	7,552,174	169,130	7,721,304
Total funds	7,752,174	3,478,260	11,030,434

1-6 Financial Analysis and Economic Evaluation

(1) Basis for financial analysis

- a. Conversion rate: US\$1 = Rp1,000
US\$1 = Y230
- b. Fiscal year: Jan. to Dec.
- c. Rate of achievement of renovation work: 1987 (50%), 1988 (80%)
1989 and thereafter (100%)
- d. Total funds invested and funds procurement
Equity 30%, Long-term loan 70%

	Unit : Rp 1,000		
	<u>Foreign cur.</u>	<u>Local cur.</u>	<u>Total</u>
Equity	—	3,309,130	3,309,130
Long-term loan	7,552,174	169,130	7,721,304
Total funds	7,552,174	3,478,260	11,030,434

e. Interest rate for long-term loans

Foreign: 12%

Local: 16%

(The terms and conditions for the loan are not decided yet. The above interest rates are used provisionally for the purpose of financial calculations. Incidentally, the use of the provisional figures will not affect the I.R.R.O.I. substantially.)

f. Terms of repayment for long-term loan

After 2-year grace period, repayment in 10 years on an even installment basis (once a year).

g. Depreciation	:	Machinery and equipment	10 years
		Civil and building works	30 years
		Vehicles	5 years

h. Corporation tax

Profit ≤ Rp 10 million : 15% of profit

Rp 10 million < Profit ≤ Rp 40 million : 25% of profit

Rp 40 million < Profit : 35% of profit

(2) Results of financial analysis

a. Profit and loss calculation by years

As shown in the table attached, the account in the red figure will continue until the year of 1990, and the account will turn to the black in the year of 1991 and thereafter. For the time being, difficult years will continue to exist for BRPP.

There will be a shortage of funds until 1988. The shortage of funds will disappear finally in 1989 and thereafter. Until then, the situation will be serious for BRPP.

b. Profit and loss break-even point is shown in the table attached. The operating ratio to correspond the break-even point is now as high as 157%. After completion of the renovation work, this percentage will come down to 97%. Although this is an improvement, the situation is still critical. As regards the existing grades, the loss in sales will continue to exist, even after the completion of the renovation work.

- c. I.R.R.O.I. and the payout period will be 22.61% and 3.55 years respectively.
- d. The sensitivity analysis is given in the following tables:

Plus or minus 5% in the selling price

	<u>-5%</u>	<u>0</u>	<u>+5%</u>
I.R.R.O.I. (%)	18.58	22.61	26.29
Payout period (yr.)	4.05	3.55	3.17

Plus or minus 5% in the total investment

	<u>-5%</u>	<u>0</u>	<u>+5%</u>
I.R.R.O.I. (%)	23.93	22.61	21.47
Payout period (yr.)	3.40	3.55	3.70

The figures justify that the proposed investment is a worthwhile investment.

- e. The following are the various indexes calculated:

- Aft. Tax. Profit – to – Sales Revenue (%)

$$\frac{\text{Net profit aft. tax}}{\text{Total sales}} \times 100$$

- Bef. Tax Profit – to – Investment (%)

$$\frac{\text{Net profit bef. tax.}}{\text{Total investment}} \times 100$$

- Debt Service Ratio

$$\frac{\text{Depreciation} + \text{Interest payable (long term)} + \text{Net profit aft. tax}}{\text{Repayment of long-term loans} + \text{Interest payable (long term loans)}}$$

	<u>Net profit aft. tax agst. total sales</u>	<u>Net profit bef. tax agst. investment</u>	<u>Debt service ratio</u>
	<u>%</u>	<u>%</u>	<u>%</u>
1 (1987)	-15.8	-12.9	65.6
2 (1988)	-8.3	-7.5	100.8
3 (1989)	-3.8	-3.7	128.6
4 (1990)	-0.7	-0.6	136.0
5 (1991)	1.9	2.8	136.8
6 (1992)	2.4	3.5	143.4
7 (1993)	2.9	4.3	150.9
8 (1994)	3.4	5.0	159.6
9 (1995)	3.9	5.8	169.7
10 (1996)	4.4	6.5	181.5

The financial ability to repay the loans will be improved to a certain extent from the year of 1988. However, the financial position will still be serious. The accumulation of own equity will be difficult to do.

From the year of 1991, the mill will get into the black figure. Still the profitability will be at a low level.

(3) Economic evaluation

- a. Basuki Rachmat Mill will be able to turn to a black-ink balance from the year of 1991, securing a fairly sound financial position from that year onwards. Thus, the company will become able to contribute to the development of the area, where the mill is located, and to serve as a source of employment of the local residents.
- b. BRPP will expand sales of new products which had not been manufactured domestically and their technical capability will be much improved.

Table 13-14-1 Annual Statement of Profit and Loss

Items	Present	(1985) - 2	(1986) - 1	(1987) 1	(1988) 2	(1989) 3	(1990) 4	(1991) 5	(1992) 6	(1993) 7	(1994) 8	(1995) 9	(1996) 10	Remarks
Sales	6,796,330	6,796,330	5,857,120	9,012,158	9,992,108	10,643,408	10,643,408	10,643,408	10,643,408	10,643,408	10,643,408	10,643,408	10,643,408	
(OTA) ()	(11,791)	(11,791)	(9,826)	(13,700)	(14,245)	(14,245)	(14,245)	(14,245)	(14,245)	(14,245)	(14,245)	(14,245)	(14,245)	
Production cost	4,297,182	4,297,182	3,540,945	4,742,774	5,216,067	5,533,093	5,533,093	5,533,093	5,533,093	5,533,093	5,533,093	5,533,093	5,533,093	
Variable cost	1,018,954	1,018,954	1,018,954	1,018,954	1,018,954	1,018,954	1,018,954	1,018,954	1,018,954	1,018,954	1,018,954	1,018,954	1,018,954	
Personnel expense	548,430	548,430	548,430	548,430	548,430	548,430	548,430	548,430	548,430	548,430	548,430	548,430	548,430	
Depreciation (current)	0	0	0	979,122	979,122	979,122	979,122	979,122	979,122	979,122	979,122	979,122	979,122	
Depreciation (new)	918,572	918,572	918,572	918,572	918,572	918,572	918,572	918,572	918,572	918,572	918,572	918,572	918,572	
Other fixed cost	6,793,138	6,793,138	6,066,941	8,207,856	8,682,043	8,998,171	8,743,932	8,449,741	8,449,741	8,449,741	8,449,741	8,449,741	8,449,741	
Total	5,612	5,612	- 409,816	1,026,370	1,310,065	1,647,237	1,991,476	2,193,667	2,193,667	2,193,667	2,193,667	2,193,667	2,193,667	
Operating income	244,419	244,419	244,419	244,419	244,419	244,419	244,419	244,419	244,419	244,419	244,419	244,419	244,419	
Selling expense	777,951	777,951	777,951	777,951	777,951	777,951	777,951	777,951	777,951	777,951	777,951	777,951	777,951	
Administrative expense	1,026,370	1,026,370	1,026,370	1,026,370	1,026,370	1,026,370	1,026,370	1,026,370	1,026,370	1,026,370	1,026,370	1,026,370	1,026,370	
Total cost	7,809,508	7,809,508	7,093,311	9,234,220	9,708,415	10,234,541	9,770,302	9,476,111	9,476,111	9,476,111	9,476,111	9,476,111	9,476,111	
Interest payable	110,695	110,695	110,695	110,695	110,695	110,695	110,695	110,695	110,695	110,695	110,695	110,695	110,695	
Current (Longterm loan)	202,410	202,410	202,410	202,410	202,410	202,410	202,410	202,410	202,410	202,410	202,410	202,410	202,410	
(Shortterm loan)	0	0	0	880,122	798,594	716,004	633,622	551,235	468,848	386,461	304,074	221,687	159,304	
New (Longterm loan)	0	0	0	6,244	0	0	0	0	0	0	0	0	0	
(Shortterm loan)	313,105	313,105	313,105	1,199,471	1,111,301	1,029,109	946,727	864,340	781,955	699,566	617,179	534,792	452,409	
Total	- 1,334,063	- 1,334,063	- 1,749,291	- 1,421,359	- 827,408	- 408,242	- 71,621	304,937	387,344	469,731	552,118	634,505	716,888	
Profit before tax	0	0	0	0	0	0	0	101,735	136,570	159,406	184,241	217,077	245,911	
Corporation tax	- 1,334,063	- 1,334,063	- 1,749,291	- 1,421,359	- 827,408	- 408,242	- 71,621	203,222	256,774	310,325	363,877	417,424	470,977	
Profit after tax	- 745,633	- 745,633	- 1,200,861	- 1,046,013	- 699,744	- 408,242	- 201,692	1,182,344	1,233,898	1,289,447	1,342,999	1,396,350	1,450,099	
A = B	34,400	34,400	681,046	686,592	686,592	686,592	686,592	686,592	686,592	686,592	686,592	686,592	686,592	
Loan repayment														

Table 13-15-1 Break-even Point for Every Kind of Paper

Kinds	Fixed				
	Daily production	Operation profit	Fixed cost	Break-even point	Ratio of operation
	¢/day	Rp/day	Thousand Rp/day	¢/day	%
HVS 45g	25.76	182.87	11,661	69.99	219
HVS 50g	31.00	255.11	11,661	83.46	185
HVS 60g	36.64	307.90	11,661	93.33	165
HVO 60g	36.54	173.22	11,661	64.81	175
HVSO 80g	33.87	244.63	11,661	85.33	134
CS 70g	34.58	219.44	11,661	50.48	146
Sub total	34.18	211.30	11,661	52.48	154
Oil Proof Paper 40g					
Base Paper Linotype 40g					
Form Paper 60g					
Sub total					
Total	34.18	211.30	11,661	52.48	154

Input					Results	
Daily production	Operation profit	Fixed cost	Break-even point	Ratio of operation		
¢/day	Rp/day	Thousand Rp/day	¢/day	%		
35	263.11	14,565	53.76	154	(1) Annual fixed cost (before)	
40	347.43	14,565	61.70	192	Payroll expenses	1,011,354
50	254.75	14,565	52.79	176	Depreciation	543,439
50	290.54	14,565	62.51	178	Other fixed cost	918,572
50	299.45	14,565	63.44	97	Selling expenses	248,419
50	234.69	14,565	61.43	134	Administrative expenses	777,951
44.75	291.12	14,565	63.82	111	Interest payable	313,365
14	356.96	14,565	63.83	254	Total	3,825,431
25	658.36	14,565	90.77	83	(1900 Rp)	(1900 Rp)
50	763.18	14,565	110.81	58	3,825,431 - 545 (Rp) = 3,280,886	
31.73	681.14	14,565	71.29	64	(2) Annual fixed cost after improved	
41.65	554.43	14,565	61.41	97	(Average for 10 years)	
					Payroll expenses	1,010,354
					Depreciation	1,173,870
					Other fixed cost	918,572
					Selling expenses	248,419
					Administrative expenses	777,951
					Interest payable	433,765
					Total	4,569,971
					(1,900 Rp)	(1,000 Rp)
					4,569,971 - 341,000 = 4,228,971	

CHAPTER 2 SUMMARY OF INVESTIGATION RESULTS

2-1 Government Policy of Indonesia toward Pulp & Paper Industry

2-1-1 Policies Given to Pulp and Paper Industries

- (1) The Indonesian Government sets a policy of completing three major expansion and new installation projects in the fourth 5-year plan (1984 – 1988), satisfying the domestic demand for newsprint paper, kraft paper and kraft liner, as well as developing the paper industry into an export oriented industry.**
- (2) The existing paper mills are still far from being competitive in the international market both on the quality and cost, and these mills require protection by means of tariff and others.**
- (3) For this reason, the Indonesian Government takes measures to encourage optimization and rational enlargement of the existing paper mills for the purposes of establishing the foundation as an export industry as far as it is possible.**

2-1-2 General Policies toward Basuki Rachmat Pulp and Paper Mill and Padalarang Pulp and Paper Mill

- (1) The Indonesian Government has set the major policies as follows:**
 - a) Optimization of production scale**
 - b) Production of grades that the internationally competitive**
 - c) Effective use of domestic raw materials and import restrictions**
 - d) Activation and stabilization of employment as regional industries**
 - e) Switch to an export-oriented industry**
 - f) Raising of equipment efficiencies with relatively small investment**
 - g) Change to an energy saving industry**
 - h) Utilization of secondhand equipment will be permissible**
 - i) Necessity for education of all the employees**

2-2 Market

2-2-1 Demand and Supply of Paper in Indonesia (Government Statistics)

(1) Production, import, export and consumption

	Production t/y		Export/Import t/y		Consumption	
	Actual	Capacity	Export	Import	t/y	Kg/capita
1982	329,688		5,200	306,955	631,483	4.20
1983	374,379	505,000	10,706	267,105	630,778	4.10
1984		676,000		228,850	670,000	4.30

(2) According to the statistics of production, import, export and consumption of paper in Indonesia during the period from 1976 to 1983, printing and writing paper is in the status of over-supply while the most part of specialty paper, and cigarette paper are dependent upon imports.

In addition, the demand and supply forecast in the future until the year of 1990 indicates that the printing and writing paper will continue to be in the status of over-supply.

2-2-2 Estimated Requirement of Specialty Paper

Official statistics on individual items of specialty paper are not available. The investigation team made their own survey, getting information from private sources and so on. Demand estimate thus obtained is shown in the table attached.

Selection of some promising grades for future production is to be made out of various grades listed on the table.

The prices of various types of specialty paper are kept much higher than printing and writing paper owing to the tariff protection at a higher rate.

Table 3-3-1 Forecast of Demand for Paper (1984 - 1990)

Unit: ton

Kind	1983	Growth rate %	1984	1985	1986	1987	1988	1989	1990
Glassine paper	1,700	0	1,700	1,700	1,700	1,700	1,700	1,700	1,700
Greased-proof paper	1,200	1	1,212	1,224	1,236	1,248	1,260	1,273	1,286
Carbon base paper	2,000	2	2,040	2,080	2,120	2,160	2,203	2,247	2,292
N.C.R.	2,400	3	2,430	2,466	2,778	2,917	3,063	3,216	3,377
Base paper for lamination	2,000	9.5	2,190	2,398	2,626	2,875	3,148	3,448	3,776
Manifold	7,500	5	7,875	8,269	8,682	9,116	9,572	10,051	10,554
Ribbed kraft paper	7,500	9.5	8,213	8,993	9,846	10,782	11,807	12,928	14,136
Onion skin	150	2	153	156	160	162	165	169	172
Soap wrapper	1,500	3	1,575	1,654	1,736	1,823	1,914	2,010	2,111
Tracing paper	100	9.5	110	120	131	144	157	172	188
Cigarette paper	15,000	7	16,050	17,174	18,376	19,662	21,036	22,511	24,086
Computer paper	3,600	20	4,320	5,184	6,221	7,465	8,958	10,750	12,900
Transfer paper	240	2	245	250	255	260	265	270	275
W/P pap. (incl. coated paper)	160,000	5	168,000	176,400	185,220	194,481	204,205	214,415	225,136
Newsprint	120,000	5	126,000	132,300	138,915	145,860	159,154	160,811	168,852
Kraft liner	250,000	9.5	273,750	299,976	328,233	359,415	393,560	430,945	471,885
Corrugated medium	105,000	9.5	114,975	125,898	137,838	150,954	165,295	180,998	198,193
White board	45,000	5	47,250	49,613	52,093	54,698	57,433	60,304	63,319
Total	724,890		778,178	836,035	898,185	965,722	1,038,897	1,118,218	1,204,258
Population (estimation): mil.	158.1		161.6	165.2	168.7	172.2	175.6	179.1	182.7
Consumption per capita	4.6		4.8	5.1	5.3	5.6	5.9	6.2	6.6
ITPA'S ANNOUNCEMENT	630,778		709,000	790,000	864,000	949,000	1,140,000	1,270,000	-
Consumption per capita	4.0		4.4	4.8	5.1	5.5	6.5	7.1	-

2-2-3 BRPP Characteristics from Market Viewpoint

(1) Types of products

- The entire products manufactured by BRPP are in the category of printing and writing paper.
- No distinctive products are found among their products.

However, the switch of production to specialty paper in a large quantity involves a great risk since the market size is not large enough and BRPP lacks the facilities and experiences in the making of specialty paper.

(2) Location

The products are sold in the Surabaya district (70%). BRPP is apparently handicapped in its location when compared with private paper mills.

(3) Users

Printing and writing paper sold by BRPP is for general use. No major users are found. BRPP has a notebook processing plant. The ratio of secondary processing should be raised in order to put added value to the products. At the same time, efforts should be made to have direct connections with the end users. Such will be a clever selection to go ahead.

(4) Production facilities and production cost

- a. Printing and writing paper for general use is in over-supply as mentioned earlier. Production facilities should be remodelled so that the mill will become able to produce certain types of specialty paper.
- b. On the other hand, efforts should be made to reduce the production cost for printing and writing paper for general use in order to compete with other manufacturers.

(5) Evaluation of quality in the market

The quality of the products of BRPP is less evaluated in the market as compared with the products of the competitors. The market price of BRPP products is cheaper by 10 to 23% than the price given to the competitors' products. The price difference corresponds to about Rp100 per kg.

It is most urgent that the quality is stabilized and the price is raised to the level of the price of the competitors.

(The terms and conditions for the loan are not decided yet. The above interest rates are used provisionally for the purpose of financial calculations. Incidentally, the use of the provisional figures will not affect the I.R.R.O.I. substantially.)

- (6) New production items recommendable for the present
- a. As a result of the study on the types of specialty paper now imported into Indonesia and in consideration of the market size, the degree of renovation to be given to the existing facilities and the technical level of the mill thus far accumulated, we recommend that the three items, namely, computer paper (form paper), grease-proof paper and base paper for lamination should be chosen as the new grades to be produced.
 - b. Although glassine paper is one of the promising items, all-out renovation of the existing facilities will be required for the production of this paper. So, we will drop it from the production items.
 - c. Production of carbonizing paper and onion skin paper is much more risky than the production of glassine paper.

2-2-4 Market of the Three New Items to be Produced

a. Computer paper

The demand for computer paper in 1983 is estimated at 3,600 tons. The growth rate is estimated at 20% per year.

The tariff rate is 70%, and the prevailing price in the market is Rp1,700/kg.

b. Base paper for lamination

The demand for this item is estimated at 2,000 tons in 1983, with growth rate of 9.5%. The tariff rate is 70%, and the prevailing price in the local market is Rp1,500/kg.

c. Grease-proof paper

The demand for this paper is estimated at 1,700 tons in 1983. The growth rate will be about 1%.

The tariff rate is 70%, and the prevailing price in the local market is Rp1,260/kg.

2-3 Current Situation of Mill

(1) History

BRPP was constructed for production of printing/writing paper in a scale of 30t/d out of bamboo pulp based on Japanese reparations of World War II and the plant started the operation in 1969.

In 1976, the paper machine was renovated to increase the production (from 30t/d to 45t/d) and at the same time electrolytic facilities were newly installed. The bamboo resources became short since about 1974, and at present about 90% of the materials are pine and broadleaved trees.

(2) Location: Banyuwangi City, Eastern Java

(3) Plant site area: 50ha

(4) Actual sales amount: (1983)

Paper: 10,431tons/y

Notebooks: 1,461tons/y

(5) Number of employees: 735 persons (as of 1984)

(6) Main facilities

a. Bleached pulp manufacturing equipment: 30AD1/d as designed

Chipper (4units), Vertical digester (2units),

Washing screen (1set), Bleaching tower (5-stage, 1 line)

b. Papermaking and finishing equipment

Paper machine

30AD1/d as designed, Printing/writing paper, wire width 2,850mm

Finishing equipment

Double cutter (1unit), Winder (1unit)

c. Chemical recovery equipment

1set each of evaporator, recovery boiler and causticizer

d. Auxiliary facilities

Electrolytic equipment (1set), Power boiler (1unit)

Diesel power generator (5units)

2-4 Review of Managerial and Control Problems.

2-4-1 Plant Management

There are ample management data on the operation, facilities, financial state and materials, and the plant is well controlled.

However, the data are not effectively used and the practice of analyzing the data from the viewpoints of why and how must be adopted and we recommend that causes for troubles are thoroughly pursued and countermeasures are established and executed firmly.

2-4-2 Production Control

The production is fairly well controlled, but reviews of the following are desired.

- a) How to correctly grasp the quantity of wood for self-made pulp
- b) Accuracy of pulp consistency meter and pulp flow meter
- c) Calculation method of various efficiencies of paper machine
- d) Check method of daily production of paper machine
- e) Analysis and arrangement of data by types and purposes

2-4-3 Quality Control

(1) SQC (Statistic Quality Control) has been introduced under the guidance of the top management as the first step of TQC (Total Quality Control). We recommend that the following items are sequentially introduced to combine the quality control activities with concrete effects.

- a. Introduction of proposal system
- b. Introduction of circle activities

(2) Thorough penetration of "Quality First" concept

At present, a rewarding system is enforced based on the production quantity, and the system is contributing to increasing the productivity.

However, the use of the production quantity only as the basis tends to invite the attitude of neglecting the quality. We recommend that the aspect of quality is given consideration in the rewarding system.

2-4-4 Cost Control

- (1) Although there is plenty of data for financial analysis, this data is not used directly connected with cost control. Therefore, we recommend reviews are given to the following points for the effective use of the data for cost reduction and profitability increase within the plant.
 - a) Simplification of in-process cost calculation
 - b) Clarification of in and out notebooks and self-made chemicals
 - c) Alteration of the standard from on-reel system to product system
- (2) Data of such items as various efficiencies and yields that are in the hand of operation people should be utilized directly for the control of cost.

2-4-5 Product Control and Sales Control

- (1) The products are being stored and shipped properly.
- (2) Whether or not this renovation project will be successful depends on the ability of selling the new products recommended by this project.
- (3) The sales organization must be improved as quickly as possible, and at the same time, new talents should be added to strengthen the sales force.

2-4-6 Equipment Control

Generally, all equipments are well maintained.

The repair expenses, according to the record, occupy about 8% of the total sales amount, which is a very high rate. Also, the number of facilities that one person of the maintenance department takes care is 21 and this is rather small.

We recommend that the following improvement steps are taken immediately and the maintenance practice is shifted from Breakdown Maintenance to Preventive Maintenance.

- a) Thorough investigation of trouble causes
- b) Control of repair expenses
- c) Improvement of repair techniques
- d) Implementation of periodical repairs

The repair expenses and mechanical troubles should be reduced by taking these measures.

2-5 Review of Various Technical Problems

We pointed out the matters to be improved in regard to the operations, supervisions and equipment controls in detail. It is recommended that any matters pointed out be put into practice wherever possible so that such improvements may contribute to the stabilization of quality and the betterment of profitability.

2-5-1 Pulp Division

(1) General

- a. L-wood and N-wood are now cooked in a mixture. Renovation will be made to enable separate cooking of N and L-wood.
- b. The furnish ratio of LBKP to NBKP should be set constant.
- c. Chemical recovery rate should be improved.

(2) Wood preparation

- a. There must be a stock for three-month production on both of N and L-wood.
- b. Two additional units of silo are to be installed so that N and L-wood are cooked separately.
- c. Stop of using mangrove is recommended.
- d. N-wood must be debarked.
- e. On L-wood, the chip screen must be improved.
- f. The mesh of chip screen at the bottom should be altered.

(3) Cooking

- a. The current production is 32.76BDt-UKP/d but the capacity can be increased to 50BDt/d without large scale renovation.
- b. The standard value of Roe No., which indicates the degree of cooking, is 4.0 ± 0.3 . However, only 25 to 40% of the pulp in all batches are within the standard range and more than two thirds are outside of the standard range.
It is required that L and N-wood be cooked separately and the individual differences by operators in the way of cooking be eliminated.
- c. The rate of make-up chemicals at KP plants is usually 20 to 60kg/BDt-BKP, which is thought to be a standard rate. At BRPP the rate is as high as 400kg/BDt-BKP. This abnormally high rate is due to the defect in construction of unbleached pulp washing system, in particular, at the recovery section.

- d. The digesters are being corroded partially and a countermeasure should be taken as early as possible.

(4) Unbleached pulp washing

- a. The existing washer has a structural defect in the air-seal mechanism and it cannot retain the vacuumness necessary for washing. In addition, the washer is operated exceeding the designed capacity by 27%.
- b. The dilution factor is minus. The weak black liquor is sent to the evaporator in a quantity exceeding the standard. This means that a large amount of water is added from outside of the line, irrelevant to the water for washing.
- c. Because of these, the chemical loss is as high as 28 to 40%, greatly exceeding the standard value of 5 to 3% of KP plants.
- d. The washer must be completely renovated.

(5) Bleaching

- a. The bleaching is processed in five stages of C-E-H-E-H with the maximum capacity of 40ADt/d, and there is no fundamentally defective part in the bleaching process.
- b. The inlet pressure of bleaching screen must be raised to obtain higher dust removing effect.
- c. Impurities in the hypo-solution must be removed.

(6) Evaporator

- a. The nominal capacity of solid to be treated is 1.84t/h, but the quantity being treated actually is 2.29t/h, and it will be 2.22t/h after the renovation.
This is an excess of about 20% over the nominal capacity, but this much of excess can be managed.
- b. For the increased production of pulp, the existing capacity of the evaporator is a bottleneck. A large-scale investment will be required for upraising of its capacity.
- c. In this renovation project, in order to maintain the pulp production at the optimum quantity and to stabilize the operation, a weak black liquor tank is installed anew.

(7) Boiler

- a. The current treatment quantity of black liquor solids is 107% of the nominal value and the rate of heat generation per furnace volume is 120% of the nominal value. On both of these, the treatment quantity is beyond the nominal value, but we do not consider this will create a problem.

- b. The capacity of recovery boiler is a problem to increase the pulp production. To increase this capacity, a large amount of money must be invested.
- c. In this renovation project, the pulp production is kept to the optimum quantity.

(8) Causticizing

- a. The designed capacity is 122m³/d of white liquor for cooking and actual quantity processed is 122.8m³/d, which means that the operation is normal.
- b. About 10% increase of calcium oxide for causticizing is recommended.
- c. The purity of calcium oxide to be used should be slightly higher.

2-5-2 Stock Preparation, Papermaking and Finishing Divisions

(1) Stock preparation

- a. The refiners are very efficiently used. However, the desirable paper strength property is unobtainable if a super-refiner is used for primary refining and a deluxe refiner for secondary refining. We recommend using DDR as the primary refiner and super refiner as the secondary refiner.
- b. If the pulp cooking section is improved, the pulp furnish combination is stabilized. However, the consistency must be stabilized by a consistency regulator.
- c. The concentration and adding place of chemicals must be changed.
- d. A paper strength improving agent and yield raising agent must be used.
- e. Broke containing much ash and broke containing less ash must be separately controlled.

(2) Papermaking

- a. The maximum speed at the current operation is 250m/min, but when the paper machine is partially renewed and strengthened, the speed can be increased to 300 to 350m/min basically.
- b. Sheet break occurs frequently and the sheet making efficiency is poor.
- c. The formation is good but the quality is not stabilized.
- d. The pump is to be renewed and an appropriate differential pressure is to be maintained to increase the dust removing efficiency. Also, these facilities should be controlled better.
- e. The flow box must be replaced to make thin papers since the slice lip adjuster does not function properly.
- f. Measures to reduce the initial dewatering must be established.

- g. The dandy roll must be renovated.
- h. The press part needs large scale renovation.
- i. The drainage must be renovated.
- j. The method of threading the paper through the calender part must be changed.
- k. The paper clothing materials must be reviewed.

(3) Finishing

The cutter should be replaced with a new one.

2-5-3 Equipment Control

(1) Machinery

The machinery is well maintained. The key points of the equipment control are minimization of downtime of the paper machine by accidents and reduction of repair cost.

Downtime of the machine by mechanical accidents now reaches 135 hours per year on the average. The target should be set at 80 hours.

The cost of repair works now represents about 8% of the total sales. The target should be set at 4 to 5%.

In order to achieve the said targets, "breakdown maintenance" should be changed to "preventive maintenance".

(2) Electric equipment

- a. Electrical facilities are cleverly operated and maintained. There is no equipment that must be replaced soon because of deterioration.
- b. The power needed by the plant is generated by five diesel generators and the capacity of power generation is large enough. The power generating efficiency is normal.
- c. Sectional drive system
Since this system is old, the speed fluctuates frequently, and for this reason the paper machine had to be stopped 22 times in 1983. The frequency of the sheet break is thought to be very high. For solving these troubles, a thorough renovation of the system is required.
- d. The power distribution facilities must be reinforced due to the increased load at stock preparation and papermaking divisions with the execution of the renovation plan.

- e. The power distribution lines have no problem.
- f. Induction motor
Some of these motors vibrate. We recommend giving re-centering again.
- g. DC motor
Deterioration of insulation on the field winding may be occurring. Step-by-step overhauling of the stator side is recommended.
- h. Electrolytic equipment has no problem.
- i. The change from the breakdown maintenance to preventive maintenance is required.

(3) Instrumentation

- a. All meters and gauges related to pulp cooking, washing, bleaching and causticizing have greatly deteriorated because of the bad atmospheric conditions.
- b. The pulp consistency meter and pulp flow meter, which are directly related with the quantitative control, have deteriorated, besides more number of these must be installed.
- c. Introduction of the latest instruments like basis weight-moisture content meter can be thought of, but in this renovation project, stabilization of consistency is taken up as the first step.
- d. Instrument tools and measuring gauges should be sufficiently provided.
- e. Preparing more spare parts.
- f. The levelling up of the techniques of the persons in charge of instrumentation is critically needed.

2-6 Economical Quantity of Pulp Production

(1) Production scale from the viewpoint of raw material collection

- a. BRPP started the pulp production in 1969 using bamboo only as the pulp material. Since then, the ratio of bamboo gradually decreased, arriving at 10% in the 1984 plan, and no bamboo will be used in 1989.
- b. The decreased portion of bamboo has been filled by coniferous and broadleaved trees, and at present the cooking and bleaching are conducted with a mixture of bamboo, softwood and hardwood.
- c. The quantity of raw materials that can be collected steadily for a long period in areas close to the mill at low prices is the key factor to determine the economical production of pulp in quantities. This quantity is estimated to be 32ADt-BKP/d.

- (2) Production scale viewed from the capacity of chemical recovery plant (washer, evaporator, recovery boiler, causticizer)
- a. The current production of bleached pulp is 28.7 BDT/d and a low figures of chemical recovery rate of 60 to 70%. On this renovation project, the washer is completely renovated, aiming at a chemical recovery rate of 90% with a daily production of 27.0 BDT bleached pulp.
 - b. To obtain a larger daily production of bleached pulp and a greater chemical recovery rate, Rp4,000,000,000 or more must be invested to improve the evaporator, recovery boiler and causticizer.
- (3) Under this renovation plan, the economical pulp production scale is set at 27.0BDT/d.

2-7 Review of BRPP's Plan for No. 2 Paper Machine

- (1) License for producing 6,000tons of specialty paper a year

Printing/writing paper is an item that is produced in Indonesia in an excessive quantity at present and in the future. If BRPP remains as a producer of this type of paper with a paper machine of 40t/d capacity, the operation of BRPP will not be sound in the future. For this reason, BRPP being given the license for production of 6,000tons of specialty paper is very meaningful.

- (2) BRPP's basic plans (production and sales) related to installation of No. 2 paper machine.

- a. Pulp plant Increase of production from 43.2BDT-UKP/d to 52BDT-UKP/d
- Paper plant Installation of a paper machine having a capacity of producing 20ADt/d or 6,200ADt/y of thin papers

- b. Sales plan

Manifold paper	30%	1,860 t
Glassine paper	25%	1,550 t
Onion skin paper	20%	1,240 t
Litho paper	10%	620 t
Grease-proof paper	15%	930 t
Total	100%	6,200 t

- (3) BRPP's basic plan (facilities)

- a. Pulp plant Renovation and reinforcement of existing facilities
- b. Paper machine New installation

(4) Progress

BRPP proposed their plan twice, in 1980 and 1982.

The total investment and IRR (Internal Rate of Return) of the 1982 plan are as follows:

Loan	Rp9,413 million (US\$15.06 million)
Equity	7,673 million (US\$12.28 million)
<hr/>	
Total	Rp17,086 million (US\$27.34 million)
IRR	11.8%

(5) Result of reviewing BRPP plan

- a. It is practically difficult to aim at an increased production of pulp. BRPP will have to depend upon purchased pulp.
If BRPP dares to increase pulp production the expansion of chemical recovery plant will be required. Yet, it is difficult to compete with pulp producers in the international market.
- b. Even the machine is for making thin paper or specialty paper, daily production of 20 tons should be the minimum capacity of such a machine.
- c. Specialty papers have a wide variety, each lot being rather small. It is practically difficult to expect a bulk sale with a single item.
- d. The water saving measures must be put in practice for the existing facilities as the first thing to do.
- e. The technical ability to produce specialty papers and sales ability to sell them out must be accumulated.

(6) Relationship with this renovation project

- a. Under this renovation project, the existing paper machine will be renovated to enable it to produce a part of the specialty paper grades in the amount of 2,400 tons a year. The switching of production from commodity type of paper to specialty paper should be stepped up gradually even after the completion of the renovation work. In so doing, the profitability should be improved and the technical and sales abilities are to be accumulated.
- b. The installation of PM2 in an easy going way will not serve as an effective measure to write off the huge deficit now encountered with PM1.
- c. The problem of PM2 should be taken up as a long-term plan.

2-8 NCR

2-8-1 NCR Reviewed from the Market

Annual requirement in 1982 in Indonesia is estimated at 2,400 tons. For 10 years to come, annual growth of demand is estimated at 5%. Until 1982, all the NCR has been imported in the processed and completed form. P.T. Pusakarya commenced secondary processing of NCR in 1983 with the use of the base papers imported. In addition, P.T. Civi Kimia and P.T. Pakerin have been planning integrated production from base paper to secondary processing of NCR. The over-supply of NCR is foreseen in the near future. It will be difficult to enter into the NCR market.

2-8-2 NCR from Technical Viewpoint

- (1) The base paper is mainly 40g/m²**
 - a. Free from pin-holes
 - b. Free from dirt and foreign matter
 - c. Dimensional stability
- (2) Conditions for production of base paper**
 - a. Chemical woodpulp, thorough removal of dirt is required.
 - b. Paper machine should be equipped with pin-hole and dirt detector.
- (3) Coloring agent (micro capsule) and developing agent are patented chemicals. Licensing of the patents is required.**
- (4) Air-knife coater is generally used for coating the coloring agent in capsule. In case of resin type of coloring agent, high consistency coating is applied with the use of roll coater or blade coater. The installation is very expensive.**
- (5) Cautions to be paid for processing and for finished products**
 - a. Any dirt or foreign matter contained in the base paper will cause sheet break in the coating process, low coating efficiency and the loss of paper and coating chemical.
 - b. Any dirt on the paper will cause confusion with the dots typed.
 - c. Any pin-holes in the base paper will cause strike-through of the coloring agent resulting in serious troubles.
 - d. Caution must be paid for handling the products. Improper handling will cause coloring of the products and the value as the product will be lost.

2-8-3 As mentioned above, the manufacture of the base paper of NCR involves various technical problems. This renovation project will not include NCR as the item to be developed. However, the plan to manufacture NCR should not be given up totally. The mill should plan to manufacture the base paper on the trial basis some day and have it test coated on the test coater to be installed at the training center. In so doing, the mill should learn how to make the base paper and how to cost it to complete the finished product.

CONCLUSIONS AND RECOMMENDATIONS

CONFIDENTIAL AND TECHNOLOGICAL INFORMATION

CONCLUSIONS AND RECOMMENDATIONS

1. This investigation has been made to take a form of renovation of the existing facilities of BRPP as the first step to consolidate the foundation of the company, which may include installation of an additional machine some day in the future. The immediate target of the renovation plan is to find the ways and means for BRPP to eliminate the serious losses now incurred in the plant operation and to contribute toward the development of the area, where BRPP is located.

2. The best available plan is summarized below:

(1) Measures to reduce the production cost

- a. Production cost of self-use bleached pulp is to be reduced by Rp44.68/BDkg. In addition, production scale is to be set at the reasonable level of 25.8BDt from 28.9BDt. This will realize a cost reduction of Rp24–36 per kg.
- b. Unit consumption rate of steam and the cost of steam are to be lowered, whereby the production cost of paper could be lowered by Rp6 per kg.
- c. For the improvement of quality, there are some elements which push up the cost such as the change in pulp furnish, increased power required for the operation of the super-calender, etc.
- d. Summing up various factors as mentioned above, production cost of the existing grades could be lowered by Rp12 to Rp42 per kg.

(2) Measures for increased production

- a. Machine speed should be increased from 235m/min. to 280m/min. Total efficiency should be increased from the present 76% up to 85%. Thus, daily production can be raised.
- b. By means of raising daily production, surplus capacity can be obtained. With this capacity, three new grades of specialty paper are to be produced in the amount of 2,400tons a year.

(3) Price recovery

With quality of paper improved, the sales price is expected to be recovered by 7%.

(4) Improvement of managerial and operational technique

Education and training of the employees for a total of 17 man-month.

- (5) Total funds required: Rp11,030,434,000 (of which foreign currency Rp7,552,174,000)
- (6) Period of time required for renovation work: 26 months
- (7) Total employment: no change

3. Market

Products scheduled for increased sale are aimed at the replacement of the imported items, thus, the sale can be performed without disturbing the domestic market of Indonesia.

Such sales will contribute to the saving of foreign currency.

4. Raw materials for self-use pulp

Raw materials are collectible from the vicinity of the mill.

5. When the best available plan is implemented.

- (1) I.R.R. (O.I.) after tax is 22.61%. Pay-out period is 3.55 years.
- (2) The loss in 1983 is so big as Rp1,300,000,000, whereby the situation of the account in the red will continue well into the year of 1990. However, we foresee the turnabout to the favorable balance from 1991 onwards.
- (3) During the course of the renovation work, no shortage of the funds is foreseen except for the year of 1987. The repayment of the long-term loans will have no problem. It can be said that the financial position of BRPP is relatively sound.
6. As is clear from the results of our investigation, this renovation plan is feasible. An early implementation of the project is recommended.
7. In order to achieve this renovation project successfully, the following matters are recommended:

- (1) Stabilization and improvement of quality and reduction of cost are fundamental needs for any enterprise to survive. In our survey report, we pointed out various matters to be improved or corrected in regard to operational, managerial and equipment control problems. Some of those advices and suggestions are rather easy to put into practice. It is hoped that BRPP people will actively carry out the countermeasures proposed, wherever and whichever possible, for the betterment of quality and profitability of their plant.**
- (2) Both the improvement of hardware and software are important for the effectuation of the project, the two phases being inseparable as if both wheels of a cart. A good balance between them should be kept.**
- (3) For the smooth implementation of the renovation work, it is desirable that technical guidance be received from a foreign consultant and/or foreign pulp and paper manufacturers having matured experiences in engineering services.**
- (4) The successful production and sales of the three new grades recommended are most important. In order to get confidence in own ability to produce and sell the new items, it is hoped that the study on this problem be started as early as possible.**

CHAPTER 1 INTRODUCTION

CHAPTER 1 INTRODUCTION

1-1 Background and Circumstances of Investigation

- (1) In developing countries, especially in the countries of ASEAN, many plants have been constructed with the economic cooperation of Japan, but as these facilities are getting old, the rate of operation is dropping and the cost is increasing in many cases.**

Under such circumstances, requests for the cooperation of Japan to reactivate these plants are increasing, and on the occasion of visiting these countries in late April, 1983, the prime minister of Japan, Mr. Nakasone, made his intention clear to satisfy these requirements.

- (2) Through the three 5-year development plans, (1969 to 1973), (1974 to 1978) and (1979 to 1983), the paper and pulp industries in Indonesia have been developed to the current scale (as of 1981) of 31 mills with a paper and paperboard production capacity of 370,000 tons a year, and a pulp production capacity of 75,000 tons a year. However, the industries still need protection.**

The government of the Republic of Indonesia has decided, as the next step, to newly construct or expand some paper and pulp mills on a large scale, as well as to encourage the optimization and rational expansion of existing mills, thereby establishing a firm foundation for the paper and pulp industries to become export-oriented industries.

- (3) With this as the background, the government of the Republic of Indonesia made a request to the government of Japan in December, 1983, for the implementation of technical cooperation for the plant (paper and pulp) renovation plan of three mills; Basuki Rachmat, Padalarang and Blabak out of the five paper and pulp mills owned by the Indonesian government.**
- (4) Upon receiving this request, the government of Japan consigned the implementation of investigation of two mills, Basuki Rachmat and Padalarang, out of the three mills, to the Japan International Cooperation Agency.**

The Japan International Cooperation Agency dispatched a preliminary survey team, headed by Yukio Harada of the Agency, to the Republic of Indonesia for the period of December 21 to 28, 1983.

The team conducted a preliminary survey for the feasibility study of the project with the related offices of the Indonesian government as well as at the said two mills.

The preliminary survey team conferred in detail with the Directorate General of Basic Chemical Industries, Ministry of Industry, the counterpart of this project on the Indonesian side, with regard to the basic content of the investigation to be conducted by the main survey team,

and on December 26, 1983, they both concluded and signed the document called "Scope of Work, for the Study on the Renovation of Basuki Rachmat Pulp and Paper Mill and of Padalarang Pulp and Paper Mill in the Republic of Indonesia" (hereinafter referred to as Scope of Work).

- (5) This survey team is to implement the feasibility study of this project based on the Scope of Work.

1-2 Purpose of Investigation

The purpose of investigation by this survey team is to make a diagnosis of the Basuki Rachmat Pulp and Paper Mill and the Padalarang Pulp and Paper Mill and to study the feasibility of renovating these two mills from the technical, financial and economic viewpoints, as well as to prepare a renovation program to achieve a higher production efficiency and quality improvement of the products of these mills.

1-3 Scope of Investigation

(1) Mills to be investigated

Investigation of the renovation plans of the Basuki Rachmat Pulp and Paper Mill and Padalarang Pulp and Paper Mill in the Republic of Indonesia.

(2) Products to be analyzed

The following products which are produced mainly for domestic consumption:

- 1) Current products of the two mills
- 2) Products that the two mills desire to produce in the future

(3) Scope of investigation

The following items as agreed upon in the Scope of Work:

- 1) Current situation and policies of the paper and pulp industries in Indonesia
- 2) Plant management and control system
 - a. Operation and quality control
 - b. Maintenance of machinery and auxiliary equipment
 - c. Cost control
 - d. Management organization
 - e. Employee training

- 3) Technical investigation of mill machinery and equipment
 - a. Pulp section
 - b. Stock preparation section
 - c. Paper making section
 - d. Finishing section
 - e. Chemical recovery section
 - f. Utility section
- 4) Investigation of raw materials
- 5) Investigation of market demand in Indonesia
- 6) Preparation of renovation program
 - a. Renovation plan
 - b. Employee training and necessary investment
 - c. Execution plan
- 7) Financial analysis
- 8) Economic evaluation
- 9) Conclusion and recommendation

1-4 Implementation Method and Contents of Investigation

1-4-1 Basic Policy of Investigation Implementation

The background and purpose of this investigation are as described in the above.

The investigation was conducted based on the background and purpose and the agreement concluded between the two governments.

In conducting the investigation, consideration was given to the fact that the two mills have contributed to regional development in Indonesia (as well as noting the restrictions that accrue from the necessity of contributing to the regional development).

In addition, we intended to realize a technology transfer as much as possible even at the investigation stage, and to balance the assistance between aspects of software and hardware, and to accomplish this the survey team conducted the following:

1. Review of previously acquired data and investigation of new data
2. Sufficient exchange of opinions with the related parties in both governmental and industrial circles
3. Close observation studies at the site

1-4-2 Implementation Method of Investigation

During the period of field investigation (Note 1), the survey team (Note 2) presented an initial report to the counterpart team of DGBCI (Note 3) on the Indonesian side, the cooperation team of BRPP (Note 4), and the cooperation team of PPM (Note 5), and discussed with them measures for executing this survey repeatedly and in detail.

At the same time, the survey team obtained various data from the Indonesian side and analyzed them.

The survey team spent time at both mills, during which the survey team conducted close observation, investigation, analysis and repeatedly conferred with the operation and management departments in addition to working closely with the cooperation teams of the two mills.

During this period, the survey team tried to realize as much technology transfer as possible. The survey team members in charge of marketing engaged in market research independently and with persons responsible for sales at these two mills, and their survey covered almost all major consumption areas on the island of Java.

Towards the end of the field survey period, the survey team presented an intermediate survey report to DGBCI, BRPP and PPM, and discussed the field survey results with the Indonesian side in detail.

Minutes of these meetings were prepared and exchanged between both parties with respective signatures thereon.

(Note 1) The field investigation schedule is shown in Appendix 1-1.

(Note 2) The survey team members are listed in Appendix 1-2.

(Note 3) The members of the DGBCI counterpart team are listed in Appendix 1-3.

(Note 4) The members of the BRPP cooperation team are listed in Appendix 1-4.

(Note 5) The members of the PPM cooperation team are listed in Appendix 1-5.

1-4-3 Investigation Contents

The items that the survey team investigated to achieve the aforementioned goals and the range of the investigation are shown in the following broad classifications:

(1) Current situation and policies of the paper and pulp industries in Indonesia

The survey team visited DGBCI (Directorate General of Basic Chemical Industries, Ministry of Industry) and confirmed the national policies on the paper and pulp industries.

(2) Investigation of plant management and control system

1) Operation and quality control

- a. The following data was reviewed:
 - Data related to operations
Production plans, production records, monthly operation reports, etc.
 - Data related to quality control
Test results on raw materials, intermediate products and final products, and others
 - Data related to standards
Quality standards, technical standards, etc.
- b. The following items were investigated:
 - Yield, unit consumption and efficiency at various production stages
 - Testers
Maintenance and management of measuring equipment
Maintenance and management of measuring methods
- c. The survey team observed the technical skills and abilities of employees.
- d. The survey team observed how a sense of management is effected in daily work.

2) Maintenance of machinery and auxiliary equipment

- a. The survey team reviewed the following data and investigated how the data is kept as records:
 - Machinery records, preventive maintenance plans, preventive maintenance records, accident investigation records
 - Status of performance of maintenance
 - Status of storing spare parts
- b. The survey team observed the technologies and skill of employees.

3) Cost management

- a. The survey team reviewed the following materials:
Budget tables, statements of accounts, tables related to costs, tables of financial reports
- b. The survey team investigated the earning status from the following materials:
Monthly and annual profit and loss figures, profitability by main grades manufactured, profitability by main sections.
- c. The survey team observed the extent of cost consciousness of management and employees.

4) Management organization

- a. The survey team heard the explanation of management on basic policy, targets and measures being taken.
- b. The survey team reviewed the current organization of the plant.

5) Employee education and training

- a. The survey team heard the explanation of management on the policy of employee education and training.
- b. The survey team observed the technologies and technical level of employees.
- c. The survey team observed employee morale.

(3) Technical investigation of mill machinery and equipment

- a. The survey team investigated the state of wear and tear of mill machinery and equipment.
- b. The survey team investigated the performance of each machine and piece of equipment.

The relationship between performance and the following points was kept in consideration when conducting the performance investigation:

Quality, yield, unit consumption, efficiency, productivity, easiness of control and maintenance, environmental protection and safety.

- c. The survey team reviewed the flow sheets.
- d. The survey team investigated and studied expansion and improvement plans.

(4) Investigation of raw materials

1) Padalarang Pulp and Paper Mill

- a. The survey team conducted a field survey on the hemp supply situation.
- b. The survey team reviewed the data on straw.

2) Basuki Rachmat Pulp and Paper Mill

- a. The survey team reviewed the samples of bamboo, coniferous trees and broadleaved trees currently used.

(5) Market research

- 1) The survey team acquired data from DGBCI (Directorate General of Basic Chemical Industries, Ministry of Industry) and IPPA (Indonesian Paper and Pulp Association) on the supply-demand situation. The market prices and distribution channels were investigated mainly through existing sales organizations.
- 2) The survey team visited the major consumers of the current products of the two mills and major consumers of the products within the scope of investigation, and investigated their evaluation of the quality and product prices of the two mills.
- 3) The survey team checked the current situation through discussions with persons responsible for marketing in the two mills.

4) The survey team obtained samples of competing products and ran comparison tests after returning to Japan.

(6) Preparation of renovation program

The survey team prepared a renovation program, in line with the background and purpose of the investigation, based on the analysis results of the field survey, results of reviewing existing materials, and referencing the opinions of related parties in and outside of the country. The renovation program covers aspects of both hardware and software.

When preparing the renovation program, an environmental improvement of the mill sites was taken into consideration.

(7) Financial analysis

1) Investigation of manufacturing costs

The survey team calculated the raw material cost for each type of product from the quantities of raw materials, chemicals, utilities and operation materials necessary for production. The survey team also investigated personnel expenses, administration expenses, distribution expenses necessary for sales, such as transportation costs and warehouse charges, various taxes and interests.

2) Financial analysis

The survey team prepared various tables based on the data obtained through the field investigation, by comparing the profit and loss calculation for the case of continuing the operation as it is with an estimated profit and loss calculation after implementing the renovation project. The difference in income between the two cases was regarded as the profit of this renovation project, and the internal rate of return (IRR) and the time required for the return on investment were calculated based on the estimated investment.

(8) Economic evaluation

The economic evaluation is made qualitatively only. The survey team made no quantitative evaluation.

(9) Conclusion and recommendation

The survey team studied the investigation results in terms of national policies, socio-economics, market situation, raw materials, manufacturing equipment and technologies, conducted financial and economic analysis and evaluation on individual subjects, and evaluated the results from an overall viewpoint.

Furthermore, the survey team pinpointed problems that are expected to occur in the course of implementation of this project and are making recommendations for countermeasures.

(10) Items of special attention

- 1) The survey team studies the economics of the expansion plan based on the investigation results of the market, raw materials, technologies and equipment, and clarified how it would favorably affect the reactivation of the existing mills and improvement of the profitability of the mills.
- 2) In the study of new products, the survey team reviewed profitability in comparison with that for the current products.

Particular care was paid to the study on the base paper for processing like NCR (copying paper) to the extent of making a good balance between existing paper-making machines and processing machines (coaters and others) that must be newly installed, in addition to investigating profitability and market situation.

- 3) The survey team studied the necessity of technical cooperation and technology transfer to enable the two mills to cultivate software (ability to solve problems) so that they can adapt themselves to changes that might occur in the future.
- 4) The survey team concurrently studied measures to be taken for environmental protection when considering expansion and improvement plans.

1-5 Words of Appreciation

During the investigation work, the survey team was given much in the way of cooperation, facilities and opinions by their counterparts, to name a few, Directorate General of Basic Chemical Industries, Ministry of Industry, the cooperation team of the Basuki Rachmat Pulp and Paper Mill and the cooperation team of the Padalarang Pulp and Paper Mill, public organizations like IPPA, Statistics Bureau, JETRO and others, and a number of private enterprises. The survey team wishes to express sincere appreciation for such cooperation and support rendered by all of them.

CHAPTER 2 PAPER AND PULP INDUSTRIES IN INDONESIA

THE UNIVERSITY OF CHICAGO PRESS
530 N. Dearborn St., Chicago, Ill. 60610
U.S.A. and Canada
0022-0191/82/0000-0000\$02.00
© 1982 Cambridge University Press
Printed in Great Britain

CHAPTER 2 PAPER AND PULP INDUSTRIES IN INDONESIA

2-1 Outline of Paper and Pulp Industries in Indonesia

The first paper mill was constructed in 1922 in Padalarang by the Dutch Colonial Government. A small paper machine producing several tons a day started the production of bond paper, typewriting paper and writing paper used by the colonial government in 1924. The second paper machine in Padalarang started production in 1932. The second paper mill was established in Proporingo in 1939. This is the present Lece Mill.

Twenty-two years later, including the period of World War II, the Blabak Mill was constructed in 1962, the Gowa Mill in 1967, and the Basuki Rachmat Mill in 1969 by Japanese reparations, etc., and these mills started the paper production in succession. These five mills are national paper mills having integrated production facilities from pulp making to papermaking. There had been no private paper mill until Noree Indonesia Co. constructed a mill in 1974.

During the period of 1975/6 to 1980, more than 30 private paper mills were constructed in the suburbs of large cities on Java Island, and the production rapidly increased from the level of 50,000/60,000 tons a year to 374,000 tons a year in 1983. The production capacity in 1984 is estimated to reach 676,000 tons a year, making Indonesia the largest paper producing country of the five ASEAN countries.

On the other hand, while there are abundant fiber resources in Indonesia, 14 pulp mills are currently producing only 140,000 tons of pulp, and the insufficient domestic supply of pulp is one of the major problems for the paper industry in Indonesia.

The paper consumption per capita is extremely low, since the population is so large, the figure being only about 4kg per capita, which is less than 3% of per capita consumption in Japan (146kg in 1982).

The largest production item in Indonesia is printing/writing paper, which is followed by packaging paper such as liner, corrugating medium and white-lined board.

The largest import item is newsprint paper for which Indonesia has no production facilities, followed by wrapping paper and packaging paper. The importation of printing/writing paper is below 10,000 tons a year. Apparently, the production facilities increased and the domestic production is increasing on the printing/writing paper, limiting the importation of this type paper to a relatively small quantity.

In recent years, the actual production of paper is not increasing proportionally to the increase of production capacity. The main reasons for this are that the domestically produced paper is not competitive with imported paper both in quality and price and that many of these domestic mills are in the process of expansions and renovations.

2-2 Position of Paper and Pulp Industries in Indonesia

According to DGBCI, the paper and pulp industries are designated as the most important industries in the country after the petroleum industries, positioning above the fertilizer and cement industries.

The fourth 5-year plan (1984-1988) schedules expansion of the Leces Mill up to 90,000 tons a year of newsprint paper and expansion of the Ciracap Mill to have a capacity of 90,000 tons a year of kraft paper with a total investment of US\$3,238,000 (out of which US\$1,527,000 is borne by the government) during the period.

The annual growth rate planned during the fourth 5-year plan is 18.53%. When this is compared with the national average growth rate of 5% projected with the breakdown of 17% for heavy chemical industries, 6.5% for light industries, and 3% for small industries, it is apparent that the Indonesian government is placing priority on the paper and pulp industries.

Being an equipment industry, the scale of employees in the paper and pulp industries is small, but during the period of the fourth 5-year plan, employment of additional 5,200 persons over the present 12,000 persons is scheduled, bringing the total number of employees up to 17,200 persons.

Thus, the paper and pulp industries are one of the priority industries of Indonesia. The Indonesian government is encouraging optimization and rational expansion of the existing mills. Thus, the government is aiming at their growth to be competitive internationally so that the industries will be positioned as export-oriented type of industries.

At present, however, the Indonesian paper and pulp industries lack in international competitive ability both in quality and price to a considerable extent, and for sometime to come, the industries must be protected by means of holding a higher tariff barrier and so on.

2-3 General Policies on BRPP and PPM

Both the Basuki Rachmat Paper and Pulp Mill (BRPP) and Padalarang Paper and Pulp Mill (PPM) are pioneer national paper mills. Their facilities are old when compared with other private mills and the two are handicapped on geographical conditions and the availability of raw materials. Accordingly, we have confirmed that consideration should be given to the following points as measures to overcome these handicaps.

- a. Optimization of production scale
- b. Selection of production grades that are competitive in the market
- c. Effective utilization of domestic raw materials and restriction on importation
- d. Activation as regional industries and stabilization of employment
- e. Conversion to export-oriented type of industry
- f. Improvement to highly efficient facilities with an investment as small as possible
- g. Conversion to production of energy-saving type
- h. Upkeeping of old facilities with complete maintenance
- i. Importance of education and training of all employees

PPM has a license for producing 6,000 tons of cigarette paper a year and BRPP has a license for producing 6,000 tons of specialty paper a year. Therefore, the market research and equipment studies must be conducted in detail for efficient production of these items.

CHAPTER 3 MARKET

Page 1 of 1

Page 1 of 1

CHAPTER 3 MARKET

3-1 Policy of Market Research

We have used data obtained from public organizations such as the Ministry of Industry, Republic of Indonesia, Statistic Bureau and IPPA (Indonesian Pulp & Paper Association) as well as non-public organizations like paper dealers and users.

When there was a discrepancy on data of the same subject, we have revised it taking the actual situation into consideration. Such revision was particularly necessary when handling the data of current demand for making demand forecast on specialty paper.

Our market research was conducted with a view to plan renovation of both mills, Basuki Rachmat Pulp & Paper mill (hereinafter referred to as BRPP) and Padalarang Pulp & Paper Mill (hereinafter referred to as PPM), placing the importance on the following points:

- (1) Collection of data to forecast the future demand based on the past and present situation of paper production, import/export and sales in the Republic of Indonesia.
- (2) Particular emphasis was placed on investigation of supply and demand structure and market size of specialty paper, cigarette paper and printing/writing paper, all of which were very closely related with the products of the two mills.
- (3) We have conducted the following investigation by conferring with the executive members of the two mills and by visiting users of their products accompanied by the mill management people:
 - a. Investigation of sales activities
 - b. Learning of sales policies
 - c. Investigation of quality evaluation in the market
 - d. Investigation of actual prices
 - e. Effort to transfer the software related to sales
- (4) Collection of materials to determine the promising grades for future production of the two mills.
- (5) Investigation of conditions on competition between national and private enterprises and comparison of the management status from sales viewpoint.

3-2 Demand and Supply of Paper in Indonesia

The records of production and sales in 1982 and 1983 and forecast for 1984 as obtained from the INDONESIA BUSINESS NEWS (1983 edition) are described in this section.

3-2-1 Actual Production in 1982 and 1983

The actual production in 1983 was 374,379 tons, which is an increase of 13.55% over the 1982 production (329,688 tons). The production capacity is 505,000 tons, so that the rate of operation was only 74%. The reasons for the lower rate of operation are (1) several mills were under remodeling or expansion work, (2) the market was soft and, (3) some grades were not competitive with imported ones quality-wise.

The main reasons for the soft market are increased fuel price in January 1983 (Rp125/lit to Rp135/lit on heavy oil) and devaluation of the Rupiah in March 1983.

3-2-2 Export and Import in 1982 and 1983

Import	1982:	306,995 t	US\$210,455,000 (@\$685/t)
	1983:	267,105 t	US\$183,206,000 (@\$686/t)
Export	1982:	5,200 t	US\$ 2,443,000 (@\$470/t)
	1983:	10,706 t	US\$ 5,790,000 (@\$541/t)

The government determined to pay 15% of the check price as export subsidy starting from 1983.

3-2-3 Consumption in 1982 and 1983

1982:	631,483t (4.20 kg per capita a year)
1983:	630,778t (4.10 kg per capita a year)

Decrease of purchasing power, lower GDP (2-3%) and increase of the population are cited as the reasons for the decrease of consumption per capita.

3-2-4 Government Plans for 1984

Production capacity

The capacity is aimed at 676,000t, or 133.86% of the current capacity of 505,000t in 1983. The projected increase is 171,000t, out of which 110,000t is on newsprint paper.

Consumption

106.22% of 630,778t consumed in 1983, or 670,000t.

Supply

As was in 1983, paper will be oversupplied in 1984. To overcome this problem, the government set the export target at 70,000t. In order to achieve this goal, the government is taking measures of export subsidy, as well as guiding the paper mills to reduce various costs.

Import

Saving of foreign currency by about \$30,000,000 by decreasing the import from 267,105t in 1983 (@183,206,000, @\$686/t) to 228,850t (\$153,000,000, @\$669/t) in 1984.

The government plans to raise the rate of operation to 76% by saving on import.

3-2-5 Related Governmental Reference Materials

Table 3-2-1 shows the actual production, import, export and consumption in 1976 through 1983 by grades.

The forecast of supply-demand by grades for 1983 through 1990 is shown in Table 3-2-2.

The new installation and expansion plans are shown in Table 3-2-3.

The actual import records of pulp and waste paper in 1975 through 1983 are shown in Table 3-2-4.

Table 3-2-1 Production, Import, Export and Consumption by Grades

		1976	1977	1978	1979	1980	1981	1982	1983	
Production	Cultural paper	Newsprint	-	-	-	-	-	-	-	
		W/P	51,809	63,158	94,378	119,793	120,826	135,250	161,278	172,934
		Subtotal	51,809	63,158	94,378	119,793	120,826	135,250	161,278	172,934
	Industrial paper	Wrapping & packaging	4,101	21,500	39,279	60,457	63,699	73,222	101,734	111,049
		Boards	5,000	9,600	18,910	30,870	43,593	47,365	62,589	85,821
		Cigarette	1,115	1,900	2,006	2,385	2,640	2,410	3,209	3,095
		Subtotal	10,216	35,000	60,225	93,722	109,932	122,997	167,532	199,965
	Others	435	500	600	640	968	1,304	878	1,460	
	Total	62,460	98,658	155,203	214,155	231,726	259,551	329,688	374,379	
	Import	Cultural paper	Newsprint	67,454	55,959	90,274	72,659	99,609	100,410	119,934
W/P & business			54,675	32,122	28,670	23,686	15,262	14,550	12,062	9,939
Others			1,870	2,353	2,023	2,208	3,969	5,182	5,440	5,766
Subtotal		123,999	90,434	120,967	98,553	119,040	120,142	137,436	115,877	
Industrial paper		Wrapping & packaging	43,181	71,205	66,842	102,293	108,307	106,468	119,763	97,918
		Boards	62,480	43,582	27,390	27,524	32,904	25,169	25,456	28,406
		Cigarette	6,010	8,564	8,116	7,132	8,762	6,460	7,178	7,139
		Others	4,584	3,908	4,529	6,748	10,598	14,591	10,451	11,350
Subtotal		116,255	127,259	106,877	143,697	160,571	152,708	162,848	144,613	
Others		2,987	11,162	9,200	10,375	7,848	7,024	6,721	6,615	
Total	243,241	228,855	237,044	252,625	287,459	279,874	307,005	267,105		
Export	W/P	-	-	-	6,507	6,891	4	1,387	7,070	
	Wrapping & packaging	-	-	-	-	55	1,144	3,813	3,636	
Consumption	Newsprint	69,454	55,959	90,274	72,659	99,609	100,410	119,934	100,172	
	W/P & business	106,484	95,280	123,049	136,972	129,197	149,796	171,953	175,803	
	Other cultural paper	1,870	2,353	2,023	2,208	3,969	5,182	5,440	5,766	
	Wrapping & packaging	47,282	94,705	106,121	162,760	171,951	178,545	217,684	205,761	
	Boards	67,480	53,182	46,330	58,394	76,497	72,534	68,045	113,797	
	Cigarette	7,125	10,464	10,122	9,517	11,402	8,890	10,387	10,235	
	Industrial board	4,584	3,908	4,529	6,748	10,598	14,591	10,451	11,150	
	Others	3,422	11,662	9,800	11,015	8,816	8,328	7,599	8,095	
Total	305,701	327,513	392,247	516,273	512,239	538,277	631,493	630,778		

Table 3-2-2 Supply-Demand Forecast (1983 - 1990)

Supply Forecast

(Unit: 1,000 t)

		1983	1984	1985	1986	1987	1988	1989	1990
Cultural paper	Newsprint	-	-	76.5	76.5	76.5	81	85.5	90
	W/P	179	246	257	311	378	395	406	406
	Subtotal	179	246	333.5	387.5	454.5	476	491.5	496
Industrial paper	Sack kraft	-	-	76	150	246	258	270	283
	Kraft liner	56	77	123	132	275	284	293	293
	Fluting medium	89	90	104	113	114	116	119	119
	Boards	102	128	131	151	156	157	161	233
	Subtotal	247	295	434	546	791	815	843	928
Others	Cigarette	2.9	5	10.6	10.6	10.6	10.6	10.6	10.6
	Tissue	1.8	14	14	14	14	14.5	15	16
	Others								
	Subtotal	4.7	19	24.6	24.6	24.6	25.1	25.6	26.6
Total		430.7	560	792	958	1,270	1,316	1,360	1,480.6

Demand Forecast

		1983	1984	1985	1986	1987	1988	1989	1990
Cultural paper	Newsprint	100	107	115	123	131	140	149	160
	W/P	183	200	220	236	255	276	299	325
	Subtotal	283	307	355	359	386	416	448	485
Industrial paper	Sack kraft	52	59	66	74	82	91	102	115
	Kraft liner	82	93	105	116	130	145	162	182
	Fluting medium	68	77	85	95	109	122	141	159
	Boards	94	105	127	134	146	163	176	199
	Subtotal	296	334	377	419	467	521	581	655
Others	Cigarette	} 60	} 68	} 78	} 86	} 96	} 107	} 120	} 130
	Tissue								
	Others								
	Subtotal								
Total		639	709	790	864	949	1,044	1,140	1,270

Table 3-2-3 Development of Pulp and Paper Industry in Indonesia

Name of mills	Start of production	Production capa. (TPY)	Kind of product
I			
Expansion Program			
1. Under construction			
PT. INPAMA	1984	3,000	Tissue paper
PT. PAKERIN	In stages-1986-1986	51,600	Coated paper, N.C.R., wrappings, kraft liner, duplexboard coated
PT. KERTAS LUCKS	Stage III-1983	76,000	Writing & writing, wrapping and tissue paper
PT. PELITA CENGARENG	Stage IV -1986	90,000	Newsprint paper
PT. PINDO DELI	1985	10,500	Kraft liner
PT. CIWI KIMIA	1984	6,000	Board
PT. NORZI INDONESIA PAPER	In Stages-1984-1987	147,000	Coated, N.C.R., computer, fine paper for laminated, kraft liner, lining paper, duplex board, paperboard-coated with asphalt
2. Planned			
PT. ASIA PASTIC AGUNG CORPORATION		15,000	Kraft liner, corrugating medium and board
PT. KERTAS BASUKI RACHMAT		6,000	Specialty thin paper
PT. KERTAS PADALABANG		6,000	Cigarette paper
PT. INDA KIJAT		18,000	Writing and printing paper
PT. NORZI INDONESIA PAPER		2,500	Duplex board
II			
New products			
1. Under construction			
PT. BERKAT AGUNG INDAH (Market pulp)	1984	100,000	Bleached pulp (LUMP)
2. Planned			
PT. KERTAS KUATI AGER (Integrated)		175,000	Sack kraft and kraft liner
PT. KERTAS KRATI CILAGAT (Integrated)		90,000	Sack kraft paper
PT. PAKAR ANSANA UTAMA		60,000	Kraft liner and sack kraft paper
PT. KAWAPAN TUNGGAL JAYA (Integrated)		150,000	Paper and 100,000 pulp
PT. INDUSTRI DEHO		15,000	Kraft liner and corrugating medium
PT. INCON CEMAYA SERESTA		15,000	Sack kraft paper
PT. ISARIN MANTONGAL		51,000	Abrasive, white board
PT. KERTAS BARITO (Integrated)		51,000	Paper and 100,000 market pulp
PT. KERTAS JATIULUR		150,000	Cigarette paper
PT. KERTAS KALBAR KESOMA		3,500	Paper board
PT. KERTAS MERPATI		15,500	Writing and printing paper
PT. KERTAS MUSI RAYA INDUSTRY		15,000	Paper board
PT. KING PAPER MILL		30,000	Writing & printing, kraft liner and corrugating medium
PT. SURYA ARJUNA JAYA		12,432	Sack kraft paper
PT. UNIQVE PANCA MURATI		24,000	Corrugating medium and kraft liner
PT. ASPER		9,800	Newsprint paper
PT. SAPIIDA PERMASA		66,000	Cigarette paper, dipping paper

Table 3-2-4 Statistics of Imported Pulp and Waste Paper

1985 - 1983 (Jan. - Sep.) (Unit: kg)

	1975	1976	1977	1978	1979	1980
1. Mechanical wood pulp	3,302,439	13,534,355	17,822,726	30,282,726	17,045,551	39,186,201
2. Soda wood pulp unbleached	174,331	448,512	5,375,858	12,204,980	8,869,771	7,856,823
3. Sulphite wood pulp	650,442	295,962	911,321	313,950	1,683,648	1,099,088
4. Chemical wood pulp dissolving grades	1,117,923	773,540	2,028,406	29,701,100	48,451,598	50,939,21
5. Soda wood pulp bleached	100,000	1,499,288	11,168,080	26,206,467	15,663,197	19,200,92
6. Sulphite wood pulp bleached	3,355,739	2,211,928	3,032,014	3,310,247	2,381,781	1,843,545
7. Semi-chemical wood pulp	10,250,454	499,373	100,000	196,947	300,000	-
8. Other pulp	310,555	634,527	2,976,734	8,602,129	34,112,091	17,509,318
Total, imported pulp	19,261,393	19,898,085	45,435,129	110,810,526	108,507,637	137,035,079
9. Waste paper etc. for remanufacturing	120,023	-	350,000	6,534,418	5,954,276	10,826,834
10. Other waste paper	13,315,147	12,156,685	13,215,904	13,077,622	7,413,147	830,945
Total, imported waste paper	13,435,172	12,156,685	13,565,904	19,612,040	12,467,423	11,665

1981 - 1983

(Unit: kg)

	1981	1982	1983
1. Mechanical wood pulp	24,006,000	35,909,731	38,306,457
2. Chemical wood pulp dissolving grades in grades	18,485,162	19,202,425	8,758,326
3. Chemical wood pulp soda or sulphate unbleached	8,037,857	13,242,295	23,770,458
4. Chemical wood pulp soda or sulphate bleached/semi-bleached	60,122,808	62,485,084	144,470,363
5. Chemical wood pulp sulphite unbleached	494,915	1,103,292	526,742
6. Chemical wood pulp sulphite bleached or semi-bleached	22,721,006	33,683,818	60,414,209
7. Semi-chemical wood pulp	2,303,802	1,633,278	5,190,296
8. Other pulp from any fibrous veg. mat.	18,980,268	33,236,926	58,511,673
Total, imported pulp	153,171,884	199,798,849	339,948,526
9. Other waste paper and paperboard for remanufacturing	8,459,481	10,337,203	17,459,530
10. Other waste paper and paperboard	-	-	270,840
Total, imported waste paper	8,459,481	10,337,203	17,730,370

3-3 Estimation of Demand by Grades

A macroscopic view on the supply-demand situation is described in 3-2 based on data obtained from governmental organizations. However, the data used in 3-2 does not show the actual picture in reviewing the grades that are closely related with BRPP and PPM on the following points.

- (1) The classification of paper is not clear and even secondary processed goods are included in the paper category.
- (2) As the habit of tax payers in Indonesia, all of the manufacturers, agents and dealers of paper are apt to report the sales at a lower level.
- (3) A considerable part of paper on which the import duty is low, for example, about 30% of newsprint paper, is being used for other purposes like wrapping paper, cigarette paper and book paper. Special type of thin paper is being imported as lightweight grade of woodfree paper. Therefore, the classification of specialty paper is not clear.
- (4) We have checked the statistics of paper exported from Japan to Indonesia, and we found large discrepancies on the export clearance figures in Japan and import clearance figures in Indonesia. This is another reason for us to say that the classification of specialty paper is not clear.

In consideration of these points, in this clause we estimate the demand of specialty paper based on the investigation result conducted mainly on specialty paper.

In other words, on the demand for 1983 through 1984, we prepared Table 3-3-1 based on the hearing from paper trading firms and dealers in Jakarta and Surabaya.

3-3-1 Basis for Demand Estimation

(1) Fourth 5-year plan

Since we were unable to find out the demand growth rate by paper grades concretely in the 5-year plan, we set the JETRO Survey figures of 5% stated as the GDP growth rate in Indonesia and 9% as the growth rate of manufacturing industries as the basic growth rates.

(2) Configuration and change of paper demand

- a. The growth rate for general industrial paper is set at the same rate as that of manufacturing industries.
As for cultural papers, it seems that light and soft wrapping papers, such as, glassine papers, cellophane, manifold and greaseproof paper are rapidly being replaced by plastic film and their share will decrease.

- b. Since it is said that the number of people who smoke increases by about 7% a year (hearing from management people of a large tobacco manufacturer), we estimate that the cigarette paper demand would increase by about 7%. The configuration rate between bobbin (mechanical rolling) paper and sheet (manual rolling) paper would be changing more toward the mechanical rolling.
- c. Newsprint and writing/printing paper seem to grow at the same rate as the GDP growth rate. If the compulsory education system is completely realized from September 1984, the number of school children will increase year by year, and it can be expected that the growth rate would be greater towards the latter part of the 5-year plan than the current forecast.
- d. Automation of office work is proceeding on a world scale and Indonesia is no exception. The propagation of computer use will expand more than it looks on the surface, and for this reason, we estimated an annual growth rate of about 20% for form paper and computer paper.
- e. It looks that carbon base paper will be gradually replaced by non-carbon paper (NCR) and stencil paper by ordinary paper (PPC). The share of specialty paper in this field will decrease, but we estimate that the absolute quantity will remain unchanged.
- f. Thus, this clause describes the demand estimate mainly on specialty paper. On industrial paper like containerboard and white board, we estimate a 9.5% growth, taking the average growth rate of manufacturing industries.

Reference: GDP growth rate

First 5-year plan (1969 ~ 1974)	7.7% (Actual)
Second 5-year plan (1975 ~ 1979)	6.9% (Actual)
Third 5-year plan, 1980	9.9% (Actual)
1981	7.9% (Actual)
1982	2.25% (Actual)
1983	2.25% (Actual)
Fourth 5-year plan (1984 ~ 1989)	5% (Forecast) of which 9.5% is for manufacturing industries

Table 3-3-1 Forecast of Demand for Paper (1984-1990)

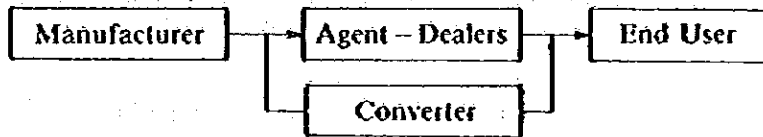
Kind	1983	Growth rate %	1984	1985	1986	1987	1988	1989	1990
Classine paper	1,700	0	1,700	1,700	1,700	1,700	1,700	1,700	1,700
Crossed-proof paper	1,200	1	1,212	1,224	1,236	1,248	1,260	1,273	1,286
Carbon base paper	2,000	2	2,040	2,080	2,120	2,160	2,203	2,247	2,292
N.C.R.	2,400	5	2,520	2,646	2,778	2,917	3,063	3,216	3,377
Base paper for lamination	2,000	9.5	2,190	2,398	2,626	2,875	3,148	3,448	3,776
Manifold	7,500	5	7,875	8,269	8,682	9,116	9,572	10,051	10,554
Ribbed kraft paper	7,500	9.5	8,213	8,991	9,846	10,782	11,807	12,928	14,156
Onion skin	150	2	153	156	160	162	165	169	172
Soap wrapper	1,500	5	1,575	1,654	1,736	1,823	1,914	2,010	2,111
Tracing paper	100	9.5	110	120	131	144	157	172	188
Cigarette paper	15,000	7	16,050	17,174	18,376	19,662	21,036	22,511	24,086
Computer paper	3,600	20	4,320	5,184	6,221	7,465	8,958	10,750	12,900
Transfer paper	240	2	245	250	255	260	265	270	275
W/P pap. (incl. couced paper)	160,000	5	168,000	176,400	185,220	194,481	204,205	214,415	225,136
Newsprint	120,000	5	126,000	132,300	138,915	145,860	153,154	160,811	168,852
Kraft liner	250,000	9.5	273,750	299,976	328,233	359,415	393,560	430,945	471,885
Corrugated medium	105,000	9.5	114,975	125,898	137,858	150,954	165,295	180,998	198,193
White board	45,000	5	47,250	49,613	52,093	54,698	57,433	60,304	63,319
Total	724,890		778,178	836,035	898,185	965,722	1,038,897	1,118,218	1,204,258
Population (estimation): mil.	158.1		161.6	165.2	168.7	172.2	175.6	179.1	182.7
Consumption per capita	4.6		4.8	5.1	5.3	5.6	5.9	6.2	6.6
IPPA'S ANNOUNCEMENT	630,778		709,000	790,000	864,000	949,000	1,140,000	1,270,000	-
Consumption per capita	4.0		4.4	4.8	5.1	5.5	6.5	7.1	-

Unit: ton

3-4 Sales Activities

3-4-1 Distribution

- (1) The distribution system of paper in Indonesia is as shown in the chart below, and it is not much different from that of Japan.



The actual power of distribution is in the hands of Chinese merchants. The information network of Chinese merchants is so developed that it is said even large foreign trading firms cannot compete. The Chinese merchants are said to have an information network that enables them to control the prices constantly while watching the balance of production and inventory covering the domestic product and imported paper.

If the governmental enterprises are to enter the general market on a real scale, sales policies must be established based on thorough recognition of this situation. Through the market research conducted this time, we really felt that the governmental enterprises are very weak in sales activities. Training and recruitment of competent salesmen are extremely important.

- (2) In reflection of the soft market, manufacturers have been placed in an inadvantageous position recently on the payment. A 30-day promissory note was a conventional payment form, but recently, the term is becoming longer to 60 days, 70 days or even as long as 90 days. Manufacturers are handicapped on the money flow.
- (3) Paper dealers are operating mainly in Jakarta and Surabaya, and Semarang. Table 3-4-1 shows major paper dealers in Indonesia. The scale of these dealers is rather small. Most of them handle 200 to 400t of paper a month, having 10 to 30 employees. Some paper dealers have bases in Singapore and Malaysia, and they constantly travel these areas for information gathering and sales activities.
- (4) Generally, needless to speak of salesmen in the agencies of Chinese paper manufacturers, salesmen of the manufacturers are making sincere efforts and conducting energetic sales activities. National enterprises must learn much from these private enterprises.

3-4-2 Supply-demand and Mill Location

It is assumed that 80 to 90% of the paper consumption is on Java island, and especially, the ratio of processing and consumption is high in Jakarta, Surabaya, Semarang, Malang, Kudus and Jogjakarta.

Thin papers can only be processed by qualified converters located in large cities, and essentially, processing and consumption of thin papers are conducted in the said large cities almost entirely.

In most cases, private paper enterprises have mills in places that are close to large consumption areas when compared with government-owned paper mills, and they are in an advantageous position in all aspects of production cost, sales expenses, information collection and exchange.

Map 1 shows the paper and pulp mills on Java island.

3-4-3 Major Consumption Areas and Consumption Per Capita

The estimated paper consumption per capita in 1984 is 4.3 to 4.4kg and perhaps 6.6 to 7.5kg in 1990.

The estimated population is 161 to 162 million at present, out of which the population in urban districts is about 24%. The population of ten large cities accounts for 10.4% of the whole population.

The estimated paper consumption in urban districts is about 90% of the whole consumption and in ten large cities is estimated to be about 60%.

Accordingly, the estimated annual paper consumption per capita in ten large cities is about 28kg, which is still below the consumption of Malaysia in 1981 (32kg) or Singapore (67kg).

The population statistics are given in Table 3-4-2.

**Table 3-4-1 List of Indonesian Dealers in Paper
(Mill Representatives Included)**

Surya CV	Jl. Perniagaan 5	JAKARTA
Mas Djawa (Java) PT	Jl. Perniagaan 13	JAKARTA
Surya Kertas Jkt	Jl. Perniagaan 16	JAKARTA
Pantja Warna PD	Jl. Perniagaan 28	JAKARTA
Nasional PD	Jl. Perniagaan 44	JAKARTA
Raksa PT Lte.	Jl. Perniagaan Timur 11A	JAKARTA
Khiøe Chiang Hø Firma	Jl. Perniagaan Timur 56	JAKARTA
Sutio Jaya	Jl. Perniagaan Timur 50	JAKARTA
Kresna Nurani	Jl. Toko Tiga 12	JAKARTA
Masa Semil	Jl. Toko Tiga 57B	JAKARTA
Sion Trading Co. CV	Jl. Toko Tiga 74	JAKARTA
Sam Looking & Co. NV	Jl. Toko Tiga 80	JAKARTA
Sinar Abadi PD	Jl. Pintu Besar Selatan I/8	JAKARTA
CV Pelita	Jl. Pintu Besar Selatan 85 atas	JAKARTA
Pelita Cengkareng	Jl. Pintu Besar Selatan 89/91	JAKARTA
Wara Djaya Trading Co.	Jl. Pinangsia 73	JAKARTA
Nuree Indonesia Paper	Jl. Pinangsia 83	JAKARTA
Surya CV	Jl. Pinangsia Timur 48	JAKARTA
Impama	Jl. Tiang Bendera 73 ii	JAKARTA
Cinjoe Jaya PD	Jl. Pejagalan Raya 83 A	JAKARTA
PT Tjiwi Kimia	Jl. Kalibesar Barat 8	JAKARTA
Karya Nusantara	Jl. Veteran III/9	JAKARTA
Papyrus Djaya PT	Jl. Ceylon 36	JAKARTA
Tri Tunggal Utawa PT	Jl. Biak 8	JAKARTA

Table 3-4-1 List of Distributor/Agents

Name	Address
EAST JAVA	
1. UD. Nasional	—Jln. Panggung No. 26, Surabaya
2. UD. Bima	—Jln. Karet No. 79, Surabaya
3. PT. Tjipta Niaga	—Jln. Rajawali No. 54, Surabaya
4. UD. Aneka Baru Kertas	—Jln. Perak Barat No. 91, Surabaya
5. PT. Sali Sugih	—Jln. Rungkut Industri III/33A, Surabaya
6. UD. Nusantara	—Jln. Kenjean No. 434, Surabaya
7. UD. Aneka Kertas	—Jln. Karet No. 100, Surabaya
8. Toko Interjaya	—Jln. Kartini No. 2, Denpasar, Bali
CENTRAL JAVA	
1. PT. Sumber Jabaru Sakti	—Jln. Mt. Haryono No. 104, Semarang
2. PT. Sarana Mas	—Jln. Sorogenen No. 55, Solo
3. PT. Margono Dian Graha	—Jln. Petudungan No. 27, Semarang
4. Toko Jaya Baru	
WEST JAVA/JAKARTA	
1. PT. Pelita Satwika Sakti	—Jln. P. Jayakarta No. 44, Jakarta
2. PD. Nasional	—Jln. Perniagaan No. 46, Jakarta

Table 3-4-2 Regional Distribution of Population

1980 - 1980: Population census

1983 - 1988: National Development Planning Agency, 1984

Unit: million

District	1980	1983	1984	1985	1986	1987	1988
Java	93.6	96.9	98.8 (61.1%)	100.7	102.5	104.4	106.0
Sumatra	25.8	31.0	31.9 (19.8%)	33.0	34.0	35.0	36.0
Kalimantan	6.3	7.4	7.6 (4.2%)	7.8	8.0	8.2	8.4
Sulawesi	10.5	11.1	11.3 (7.0%)	11.6	11.8	12.0	12.3
Bali & Nusatenggara		8.9	9.1 (5.6%)	9.2	9.4	9.6	9.8
Irianjaya		2.8	2.9 (1.8%)	2.9	3.0	3.0	3.1
Total	146.8	158.1	161.6 (100%)	165.2	168.7	172.2	175.6

162.2 (UN: Population of the World)

Growth of Population

Java : 1.8%, Sumatra : 3.0%, Kalimantan : 2.5%
 Sulawesi : 1.7%, Bali & Nusatenggara : 1.9%, Irianjaya : 2.0%
 Average : 2.0%, Of which 1983 - 1988 ; Urban 5.0%, Rural: 1.1%

Urban ... 1983 37.9 mil. (24%), 1988 48.4 mil. (28%)
 Rural ... 1983 120.2 mil. (76%), 1988 127.2 mil. (72%)

10 Big City's Population

Jakarta	6,481	1980 : Population census
Surabaya	2,018	Unit : 1,000
Bandung	1,461	
Medang	1,374	
Semalang	1,025	
Palenban	787	
Ujung Pandang	708	
Malang	511	
Solo	470	
Jogyakarta	398	
	15,233	

3-4-4 Sales Organization and Training of Salesmen

- (1) We cannot help but say that government-owned paper mills are less active than private paper mills in sales, and government-owned paper mills must rearrange the sales organization and train their salesmen so as to strengthen the sales force. If the sales force cannot be strengthened, government-owned paper mills will not be able to increase the sales quantity and earn more profit, even if they could produce higher quality paper.
- (2) The top management must review the existing sales system, strengthen the system and train the current salesmen. The sales activities of management level as done at present are limited since they are extremely busy.
- (3) We recommend that competent salesmen be stationed in major consuming areas and they call on major customers and paper dealers periodically, at least once a week, or preferably twice a week, to gather information, try to expand the sales, and handle all complaints. Both mills have a liaison office in Jakarta and Surabaya, but BRPP Surabaya office only is engaging in activities that might be called sales activities.
- (4) Emphasis is placed on the following points in order to stimulate the sales activities.
 - a. Establishment of appropriate sales system, clarification of responsibility, and transfer of competence.
 - b. Pursuance of the concept of "being in the market" by the production people as well, which is a basic point of total quality control activities.
 - c. Stabilization of the product quality, enabling the salesmen to engage in positive sales activities for expanded sales without being occupied in office work only.
- (5) The quality and training of salesmen are most important. Salesmen must have the abilities of at least mastering the following knowledge, and must organically combine the knowledge and efficiently use it as needed.
 - a. Merits and demerits of own and competitors' products.
 - b. Cost of own products and estimated cost of competitors' products
 - c. Method of price setting (estimation)
 - d. Prompt response to complaints
 - e. Correct understanding of customers' requirements and preference
 - f. Understanding of business and procurement policies of customers
 - g. Advertising of own mill
- (6) Recruitment of competent salesmen is extremely important. It takes five to seven years to train professional salesmen. Therefore, employment of experienced salesmen, picking them up from private enterprises, should be an idea.

- (7) Under this renovation project, we plan giving training to selected qualified persons at the management level for three months by foreign instructors during the first stage of training and education.**

Table 3-4-3 Each Firm's Paper Production & Productivity

Name of company	Start of production	Type of product	Production capacity/1980	1979	1980	1983	Man Power 1980	Efficiency 1980 c/man/year
Baski Kachnac	1969	Writing & printing	13,800	12,311	12,837	11,808	770	16.7
Coma	1967	Writing & printing, coated paper	20,000	20,843	20,791	9,691	930	22.4
Pedalrang	1923	Writing & printing, cigarette paper carton & manifold	3,900	6,131	6,733	6,431	743	9.1
Diabak	1962	HVO, HVS, stencil, brief card, manila carton wrapping	7,200	6,923	7,938	7,236	548	14.3
Leces	1940	HVO (60-70g), HVS (50-60g), Cyclostyle/duplicator, drawing pap.	30,000	30,279	27,353	24,298	649	42.5
Deificus Dolta	1978	HVO, HVS & cigarette paper	1,200	1,000	-	-	126	7.9
Indama	1976	Issue, collat paper & nupkin	1,500	664	938	889	101	9.3
Noree Indonesia	1973	Duplex board & straw board	10,000	7,270	7,769	7,125	404	19.2
Bekasi Teguh	1976	Kraft liner, corrugated medium, sack kraft, wrapping paper	33,000	29,923	30,330	74,743	614	49.4
Sarawaci Bhakti	1977	HVO, HVS, BPS, coated paper	14,000	-	12,000	14,080	388	30.9
Surya Agung Kertas	1976	Writing & printing, duplex card board	23,000	15,600	16,000	9,693	310	51.6
Pindo Deli	1974	HVO, HVS, BPS, manifold, coated paper	7,800	3,010	3,305	11,804	176	18.8
Lenter Papyrus	1977	HVO, HVS, BPS, manifold	7,500	4,443	4,330	1,124	135	32.1
Asia Pacific Agung	1974	Corrugating/flute, medium, wrapping paper	3,000	2,140	1,241	-	108	11.5
Polica Ceng Kertas	1977	Coated & uncoated board	19,500	1,600	7,500	-	-	-
Pura Kertas	1978	Coated & uncoated board, kraft liner	5,000	3,500	3,950	134	-	-
Eureka Aba	1978	Corrugating/flute, medium, wrapping paper	9,000	3,548	2,253	6,015	172	13.1
Papyrus Sakti	1978	Brief card, manila carton, wrapping paper, kraft liner	3,400	900	3,000	3,975	-	-
Sinar Kudus	-	Wrapping/flute, corrugating	1,500	1,520	1,520	-	71	21.4
Uninga	1978	Wrapping paper, kraft liner	3,040	1,282	-	-	75	-
Ciwi Kimia	1978	HVS, HVO	12,000	3,000	10,000	9,295	579	17.3
Pakerin	1977	Straw & white board, wrapping paper	24,000	12,000	12,445	13,653	71	175.3
Indah Klat	1979	HVS, HVO, BPS	33,000	16,428	27,509	45,683	234	117.6
Suparna	1978	Manifold, kraft liner, kraft paper, ribbed kraft	9,000	7,200	7,560	-	161	47.0
Karyu Tulada	1977	Wrapping, kraft paper	3,500	1,026	1,279	2,900	85	15.0
Unipa Daya	1978	HVS, HVO, BPS	16,740	-	2,800	5,060	-	-
Seoar Sakti	1980	Duplex board	9,000	-	-	-	-	-
Golden Matadure	1980	Kraft liner, writing/printing	3,500	-	4,500	-	-	-
Sundaraya		Boards						
Jaya Kertas		W/P						
Maka Box		W/P						
Fajar Agung		Sack kraft						
Surya Arjuna		Sack kraft						

3-5 Quality

- (1) On almost all types of products, the quality is not up to the standard that is recognized internationally. Furthermore, the quality of paper that is produced by government-owned mills is much lower than the paper produced by private enterprises.
- (2) The test results of samples from the two mills and samples from competitors' products, conducted in Japan, are shown in Tables 3-5-1 and 3-5-2 and Fig. 3-5-1. It must be noted that there are many users who wish to purchase a larger quantity should the quality of paper produced by the two mills be improved.
- (3) The table below shows the evaluation results of users in Indonesia.

	No. 1 group	No. 2 group	No. 3 group
Writing/printing paper	CK, IK, PD	GW, BR	LC
Coated paper	PD	SK	GW
Boards	SK	SP	

CK: Ciwi Kima BR: Basuki Rachmat
 IK: Indah Kiat GW: Gowa
 PD: Pindo Deli SP: Suparma
 SK: Surya Agung Kertas LC: Leces

- (4) Users prefer paper having a higher brightness. Brightness of white paper that is liked is obtained by processing with a fluorescent dye rather than brightness obtained as a result of using white pulp. Although the worldwide trend is toward restricting the use of fluorescent dyes for health reasons, but no restriction is enforced in Indonesia.
- (5) It must be noted that important elements of the quality are processability, printability, control of static electricity and finished state (packing material, packing form, state of cut sections, existence of paper dust on the sheet, etc.).

Table 3-5-1 Printing Paper Quality Test Results

Item	Sample	BRPP Writing paper 80 g/m ²	BRPP P/W paper	Surya Kertas P/W paper	Inpah Kiat P/W paper 60 g/m ²	Leces P/W paper 60 g/m ²	Leces P/W paper	Cibi Kinta P/W paper 60 g/m ²	Cibi Kinta P/W paper 80 g/m ²
		Made on Mar. 3, '84	Made on Dec. 3, '83		Made on Jan. 2, '84		Made on Dec. 24, '83		
Basis weight	g/m ²	80.7	69.6	44.1	60.7	60.0	50.7	52.0	83.4
Thickness	mm	0.110	0.098	0.061	0.077	0.080	0.067	0.065	0.106
Density	g/cm ³	0.73	0.71	0.72	0.79	0.75	0.16	0.80	0.79
Brightness, front (Photo volt)	%	80.0	78.0	81.0	81.5	83.2	78.0	84.1	85.0
back	%	80.6	78.9	81.0	82.0	84.0	78.9	84.5	86.0
Opacity	%	72.0	84.7	74.5	87.0	82.7	76.5	79.2	87.1
Smoothness, front (Beck)	sec	37	22	44	57	40	40	95	45
back	sec	31	22	43	45	23	35	83	22
Shives and specks	mm ² /100g	102	24.6	29.6	16.6	9.09	8.93	26.9	12.8
Tensile strength, M.D.	kg	5.03	4.98	3.44	4.10	3.92	3.82	3.75	6.60
C.D.	kg	2.24	2.03	1.24	1.37	1.93	1.85	2.65	3.95
Elongation,	M.D./C.D.	1.6/3.1	1.5/3.6	1.3/3.0	1.8/4.4	1.7/6.0	1.9/3.9	1.8/3.8	2.4/5.5
Breaking length, M.D.	km	4.16	4.77	5.20	4.50	4.36	5.02	4.81	5.28
C.D.	km	1.85	1.94	1.87	1.53	2.14	2.43	3.40	3.16
Stiffness M.D.	cm ³ /100g	98.0	59.3	28.6	38.7	42.5	35.1	35.1	84.9
C.D.	cm ³ /100g	35.1	33.8	10.9	17.3	19.5	16.4	21.0	59.3
Air permeability	sec	52	64	63	65	12.5	13.0	6.2	22.3
Sizing	sec	32	23	8	4	15	6	11	31
Picking, front/back A	up to 2/ up to 2	2/2	2/2	2/2	2/2	2/2	3/2	3/3	3/2
Ash content	%	10.1	7.6	6.3	15.3	10.1	7.6	9.1	8.1
Moisture content	%	7.0	7.3	7.4	6.8	7.6	7.5	7.5	7.6

Table 3-5-2 Litho Paper Quality Test Results

Iten	Sample	BRPP	Indah	Léces 1	Léces 2	Saraswati
		Litho paper 70 g/m ²	Kiat Litho paper 70 g/m ²	Litho paper 70 g/m ²	Litho paper 70 g/m ²	Litho paper 70 g/m ²
Basis weight	g/m ²	69.5	75.2	81.8	71.4	70.6
Thickness	mm	0.147	0.200	0.131	0.118	0.144
Density	g/m ³	0.47	0.38	0.61	0.61	0.49
Brightness, front	%	77.0	81.7	80.3	79.8	74.7
back	%	75.2	82.4	80.4	78.2	73.9
Opacity	%	90.7	91.2	88.8	94.5	92.8
Smoothness, front	sec	6.0	8.5	8.5	11.0	5.5
back	sec	3.1	5.1	6.1	5.8	5.1
Shives and specks	mm ² /kg	103	6.38	32.7	27.9	98.8
Tensile strength						
M.D.	kg	3.71	4.35	5.38	4.38	2.60
C.D.	kg	-	-	-	-	-
Elongation,						
M.D./C.D.	%	1.4/-	1.2/-	2.21/-	1.6/-	1.2/-
Breaking length,						
M.D.	km	3.56	3.86	4.38	4.09	2.46
C.D.	km	-	-	-	-	-
Air permeability	sec	9.8	11.0	6.4	4.5	6.0
Sizing	sec	1	14	3.6	0	7.1
Picking, front/back	A	up to 2/ up to 2	2/2	2/up to 2	up to 2/ up to 2	up to 2/ up to 2
Ash content	%	9.2	15.3	5.7	14.9	7.6
Moisture content	%	7.1	6.5	7.9	7.8	7.3

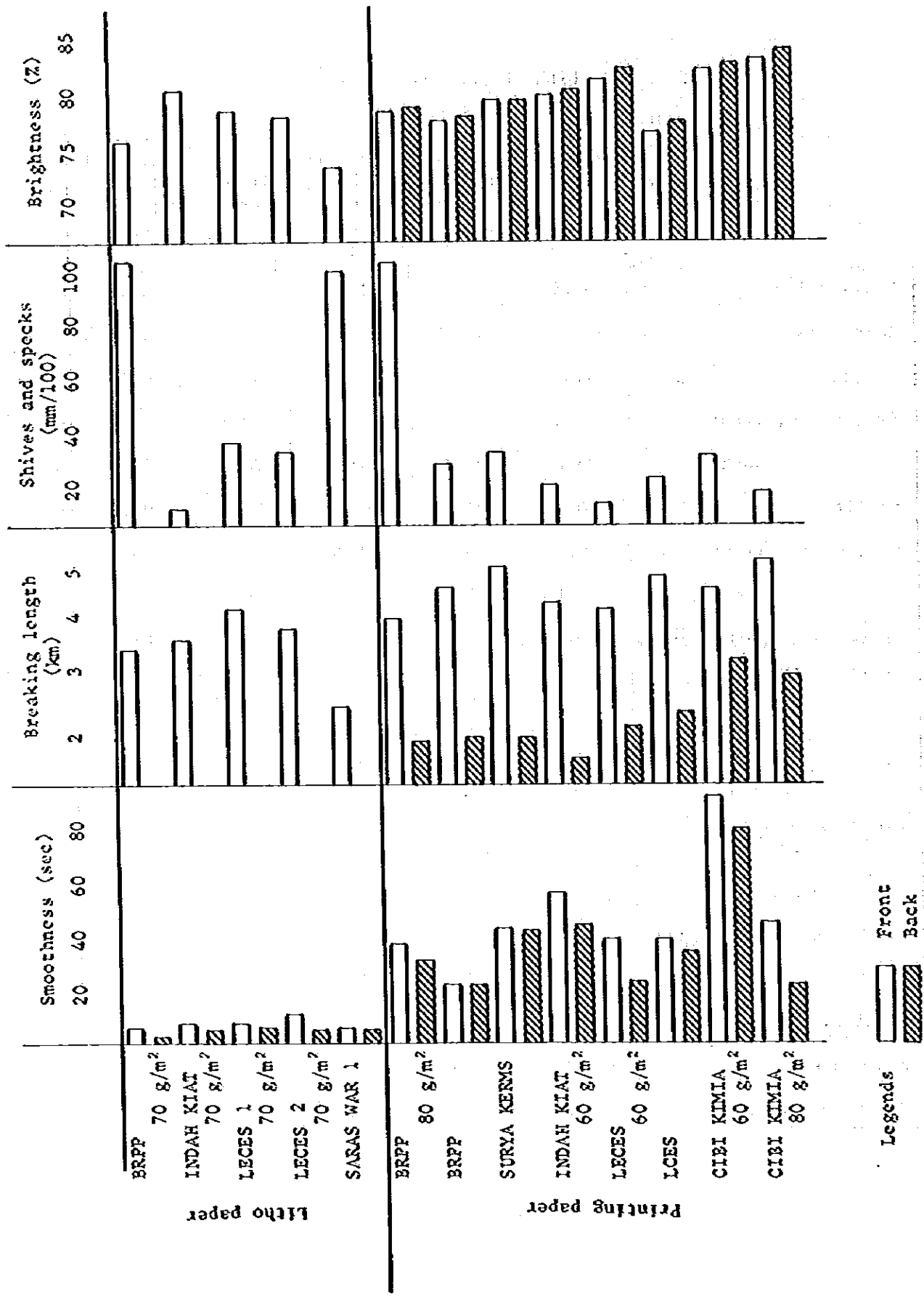


Fig. 3-5-1 Comparison of Test Results of Various Manufacturers' Products

3-6 Prices

- (1) In Indonesia, paper prices are quoted based on the imported paper prices. This is because imported paper occupies about 60% of the whole consumption and the quality of imported paper is good.
- (2) Particular attention must be paid to the fact that the unit of sales is by ream (500 sheets) rather than kg.

Example: Cigarette paper

Import

24g/m² 508mm × 762mm = 0.387m²/sheet, 4.645kg/ream

Domestic products

26g/m² 510mm × 765mm = 0.390m²/sheet, 5.072kg/ream

Domestically produced paper has the following losses:

Weight loss (basis weight loss)

$$(26 - 24) \div 24 \times 100 = 8.33\%$$

Size loss

$$(0.390 - 0.387) \div 0.387 \times 100 = 0.78\%$$

When domestically produced paper is sold at the same price per ream, slightly over 11% difference is created in the final yield, and this is a difference which cannot be disregarded from the manufacturing cost viewpoint.

- (3) The trend of prices of major types is shown in Tables 3-6-1, 3-6-2 and 3-6-3. Paper made by government-owned mills is sold at about 10% lower prices than those of private mills since the quality is inferior and the sales ability is behind those of private mills.
- (4) Price premium is applied for lighter substance (g/m²) and for sheets as against rolls as a general rule.
- (5) An extra price is set separately for delivery to remote areas.

Table 3-6-1 Trend of Prices of Major Paper Products

Paper Type	Basis weight g/m ²	Size (cm)	April 1982		August 1982		August 1983		March 1984		Yen/kg	
			Rp/R	Rp/kg	Rp/R	Rp/kg	Rp/R	Rp/kg	Rp/R	Rp/kg		
Coated paper import	85	65 x 100	29,000	1,050	28,000	1,014	39,500	1,430	39,500	1,430	357.5	<27.6>
	85	79 x 109	36,000	984	35,000	956	47,500	1,298	48,500	1,325	331.0	<36.597>
	100	65 x 100	34,000	1,049	33,500	1,031	43,000	1,323	43,500	1,338	335.0	<32.5>
	100	79 x 109	46,000	1,068	45,500	1,057	58,500	1,358	66,000	1,533	383.0	<43.055>
	120	65 x 100	41,000	1,051	41,000	1,051	59,000	1,513	60,000	1,538	385.0	<39>
	120	79 x 109	57,500	1,173	57,000	1,103	77,000	1,490	77,500	1,500	375.0	<51.666>
Local	85	65 x 100	22,500	814	21,500	778	30,000	1,086	31,000	1,122	281.0	<27.625>
	85	79 x 109	30,500	833	29,500	806	39,000	1,066	41,000	1,120	280.0	<36.597>
	100	65 x 100	25,500	785	25,500	785	34,500	1,062	36,500	1,123	281.0	<32.5>
	100	79 x 109	35,000	813	34,500	801	45,000	1,045	47,500	1,103	276.0	<43.055>
	120	65 x 106	31,500	808	31,000	795	40,000	1,026	42,500	1,070	273.0	<39>
	120	79 x 109	43,500	842	43,000	832	55,000	1,065	57,500	1,113	278.0	<51.666>
Duplex board	270	79 x 109	52,000	490	54,500	469	70,000	602	71,500	615	154.0	<116.249>
	310	79 x 109	62,000	464	59,000	442	73,000	547	74,500	558	140.0	<133.471>
	350	79 x 109	69,500	461	66,500	441	81,000	538	82,000	544	136.0	<150.623>
	400	79 x 109	77,000	447	74,000	430	70,000	523	72,000	534	134.0	<172.22>
Woodfree paper	50	65 x 100	11,500	708	11,000	677	11,000	677	12,250	754	189.0	<16.25>
	60	65 x 100	13,000	667	12,000	615	12,000	615	13,500	692	173.0	<19.5>
	80	65 x 100	17,500	673	16,500	635	16,500	635	18,000	692	173.0	<26>
	100	65 x 100	21,500	662	20,500	631	21,500	662	23,000	707	177.0	<32.5>

Table 3-6-2 Woodfree paper prices

Basis weight g/m ²	Size cm	Indah Kiat Dec. '83 Rp price per riem	Indah Kiat Dec. '83 Rp price per kg	Indah Kiat Mar. '84 Rp price per kg	BRPP Mar. '84 Rp price per kg
45	65 x 100	10,500	717.9	761 - 768	600
	63 x 97.5	10,100	730.8	775 - 782	
50	65 x 100	11,800	726.15	770 - 777	
	63 x 97.5	11,300	735.85	780 - 787	
	65 x 87	10,500	742.70	787 - 795	
58	61 x 86	9,800	747.23	792 - 800	
	65 x 100	12,600	668.45	708 - 715	
	63 x 97.5	12,000	673.65	714 - 720	
	65 x 87	11,100	676.85	717 - 724	
60	61 x 86	10,400	683.60	724 - 731	
	65 x 100	13,000	666.67	707 - 713	
	63 x 97.5	12,500	678.33	719 - 726	
	65 x 87	11,500	677.87	718 - 725	
	62 x 86	11,000	687.67	729 - 736	
70	79 x 109	17,600	681.30	722 - 729	
	65 x 100	15,200	668.13	708 - 715	
80	65 x 100	17,300	665.38	705 - 712	
	65 x 90	16,100	688.03	729 - 736	
	61 x 86	14,300	681.47	722 - 729	
	79 x 109	23,700	688.03	729 - 736	
	65 x 100	21,800	670.77	711 - 718	
100	67 x 107	39,000	659.40	699 - 706	
	65 x 100	35,500	662.00	702 - 708	
	61 x 86	28,500	658.57	678 - 765	

Generally, the price for 1 riem of HVS 60 g 65 x 100 is 14,500 (Indah Kiat and Civi Kima), 14,250 (Superma) and 13,000 (BRPP and Leccs).

Table 3-6-3 Specialty Paper Prices

Grade	Basis weight (g/m ²)	Size (cm)	Mar. '84 Price/ream (Rp)	Mar. '84 Price/kg (Rp)	Remarks
Manifold (white)	28	44 x 69	3,650	859	
(color)	28	44 x 69	3,850	706	
Glassine (white)	28.5	75 x 100	16,500	1,705	Mainly produced by Jujo
(color)	28.5	75 x 100	13,250	1,783	
Greased-proof	38.0	75 x 100	18,000	1,263	Not clear
Cigarette paper					
France			15,000 ~ 18,000	2,257 ~ 2,709	
Japan			10,000	1,505	
Domestic:					
Silver bird			6,300	1,242	
Golden bird			6,500	1,282	
Eagle			8,500	1,676	
Imitation France			11,000 ~ 12,000	2,169 ~ 2,366	
Poster Paper	40	79 x 109	17,500	1,017	
One time Carbon base		Roll	\$930/MT		Roll
Ribbed kraft	38	70 x 120	17,000	828	Made in China
Onion skin	30	68 x 88	24,000	2,674	Made in West Germany
Woodfree form paper	60	Roll		900	Roll
Oriented polypropylene				2,300 ~ 3,000	Resin price 1,300 Rp/kg (Tariff)
NCR					Pusakaraya
NCR					Production & sale started in 1983 at 3 t a day.

3-7 Trading and Tariff

3-7-1 Export

Export of paper started in 1979 with a quantity of 6,507tons, followed by 6,949tons in 1980, 1,148tons in 1981, 5,200tons in 1982 and 10,706tons in 1983. In 1979 and 1980, almost all quantity exported was printing/writing paper. The export duplex board started to grow in 1981, and 1983 marked export of 3,636tons of boards.

Printing/writing paper and boards are the two major paper products of export, and both of them are products that are produced in excess. The Indonesian government started the incentive policy for export by paying 15% of the check price to the exporter. The export target as set by the government for 1984 is 70,000tons. Whether or not this goal can be achieved depends on how all enterprises can build the international competitive power by fully utilizing this subsidy system.

The Indonesian government is planning expansion of production by 830,000tons in 1985 and 1,430,000tons in 1990, and these exceed the estimated domestic consumption by 40,000 and 150,000tons respectively.

Since it is estimated that the quantity of imported paper will stay at a level of 200,000tons, the overproduction problem cannot be solved unless 200,000 to 400,000tons are exported. The most important matter is that the Indonesian paper manufacturers become competitive in the international market both in quality and cost.

3-7-2 Import

Since about 1975, Indonesian import of paper has been at a level of 200,000tons a year. Many paper manufacturing companies were established and started production in succession since 1975, but the quantity of import has not declined. The most important matter in relation with the paper import is that Indonesian paper manufacturers become internationally competitive in the grade of paper where they have enough production capacity.

3-7-3 Tariff

Table 7-3-1 shows Indonesian tariff rates of major paper products.

Generally, the tariff rate is low on paper that is politically important (newsprint paper) and those used by government-owned enterprises (kraft paper for cement and fertilizer). However, the level of duty is generally high (import duty 60% and sales tax of imported goods 10%).

No duty is charged to imported waste paper and pulp at present, but there is a sign of applying protective tariff in the near future. If protective tariff is applied to pulp, government-owned mills that produce pulp become very advantageous. The tariff policy of the government plays a very important role in the rise and fall of the pulp & paper industry and it is assumed that the high tariff policy will last until the Indonesian manufacturers develop themselves to be internationally competitive.

Table 3-7-1 Main Paper Import Tariff Table

Description of goods	Tariff rate	
	Imp. duty	Sales tax
News print	20%	10%
Printing/Writing	60	10
For news-printing	30	5
Kraft liner	60	10
Sack kraft paper	60	10
For cement/fertiliser sacks	0	0
Kraft paper board	60	10
For formica industry	20	10
Semi-chemical fluting industry	60	10
Sulphite wrapping paper	60	10
Paper board	60	10
Cigarette paper		
In sheets	60	10
In rolls/bobbins	30	5
Blue match-box paper	15	5
Basic paper for duplicating and carbon paper	10	5
Glazed transparent paper	60	10
For industry	30	5
Kraft paper	30	5
Tissue paper	30	5
Carbon and similar copying paper, stencil	60	10
Duplicator	40	10
Metallic paper for paper condensor	20	5
Pattern paper for formica industry	30	5
Punch cards	0 - 5	0 - 5
Cigarette paper		
In the form of ribbon or rolls	30	5
In the form of booklets or tubes	60	10
N.C.R. paper	60	10
Heat transfer paper	10	5
Confectionary wrappers	30	5

3-8 BRPP Evaluated from Viewpoint of Sales

3-8-1 Product Grades

BRPP produces fine paper of HVS and HVO, litho paper and drawing paper, but none of these have characteristics that are unique to the mill.

The mainstream of basis weight from now on is 45 to 80g. The average selling price in 1982 was Rp591.14, the average price in May through December 1983 was Rp603.82. When this is compared with the HVS selling price of Rp665 to 740 in the general market toward the end of 1983, BRPP products are sold 10 to 23% cheaper.

The percentage of second grade paper among the whole production is about 15%, which is abnormally high. The second grade paper is sold to a subsidiary notebook company (located on the same premises) at a discount of 20%.

3-8-2 Locational Conditions

Being located at a place about 300km from Surabaya and about 1,100km from Jakarta, BRPP is quite far from the main market, and when compared with competitors like Civi Kimia, Surya Kertas and others, BRPP is handicapped in the location. The breakdown by selling districts is 70% in Surabaya, 20% in Semarang and 10% in Jakarta.

The transportation cost is Rp11/kg to Surabaya, Rp20/kg to Semarang, Rp31/kg to Jakarta. The comparatively large share of Surabaya district in the total sales is appreciative, but the sales in this district must be expanded since BRPP is still behind the others.

3-8-3 User Configuration

Since BRPP manufactures and sells ordinary products of printing/writing paper, it has no special user, with an exception of HVS for notebooks, which BRPP sells to notebook companies of their own and others.

BRPP has two selling channels, one directly to end users and the other through agents and dealers. In spite of the fact that BRPP is a mill operated by the government, it has no customers among enterprises that are operated by the government. We seriously question about this and believe that BRPP should take more positive actions to sell to enterprises operated by the government.

We also think that, as long as BRPP has its own notebook plant, the plant should be expanded to increase the ratio of processing its own products, as well as adding more value to the products, thereby increasing the profit.

3-8-4 Equipment and Cost

General type paper like printing/writing paper is overproduced in Indonesia even now, and as is clear from the governmental plan for the future, the degree of overproduction will become even greater.

Accordingly, we recommend that the equipment be renovated to be able to produce paper of higher added value (low basis weight high quality paper, specialty paper, etc.).

With regard to the finishing process we can say that the finishing work, product warehouse space, transportation equipment within the plant, and packaging are all in good state.

The administrative practice is excellent.

3-8-5 Quality Evaluation in the Market

Within the limited research done by ourselves, visiting users in Jakarta, not a few of them, even dealers, were aware of what kind of paper BRPP was producing. Therefore, we cannot report about the evaluation of BRPP products in the market.

In Surabaya, which is the main market of BRPP, BRPP products are ranked at the lowest position as described in 3-5. BRPP products are evaluated very low and this is attributable to the unstabilized quality. Even sample books, which are very important for sales activities, contain dust, or the color shade is different even on the same type paper. The stabilization and improvement of the quality is the key to getting better selling prices.

3-8-6 Recommendable New Production Items

The details are described in 3-10, but we recommend that BRPP produces form paper, oil-proof paper (similar grease-proof paper) and paper for lamination in consideration of the market scale, degree of necessary renovation to be given to existing equipment, and accumulation of production knowhow.

Glassine paper is being imported and it is a promising product, but the paper machine must be completely renovated to produce glassine paper. Glassine paper cannot be produced if the current facilities are renovated partially.

Production of carbon paper or onion skin paper is even more difficult.

3-9 PPM Evaluated from Viewpoint of Sales

3-9-1 Product Types

(1) Unit I (Old Plant)

Most of the No. 1 and No. 2 machine products are delivered to organs related to the government, and the production and sales of PPM are at more favorable position when compared with other paper mills.

However, as a result of active sales campaign of other mills to organs related to the government, the growth of the demand is now limited, and there is a trend of the demand for Unit I group products not growing any longer. PPM also produces ordinary paper and is trying to enter the market, but PPM is not competitive price-wise.

Accordingly, Unit I must make efforts to increase the share on the traditional products that it has been selling by fully utilizing the unique production facilities, and whatever excess in the capacity (estimated to be about 400t/y) after implementation of this renovation project, of which expansion is given later, should be used for production of middle grade cigarette paper.

(2) Unit II (New Plant)

No. 3 machine has now been operated for about 10 years as the only exclusive cigarette paper machine in Indonesia. The initially designed production capacity of five tons a days has been increased to ten tons a day, and on the production capacity, No. 3 machine is by no means inferior to other machines on a world scale.

However, the product quality is behind others on a world scale and this is due to improper stock furnish combination, inadequate details of the equipment, and improper operation control, and the production is limited to manual rolling middle class cigarette paper only.

According to official statistics, about 9,000 tons of cigarette paper is imported every year, and early expansion of No. 4 machine is greatly expected.

A piece of information we heard is that cigarette manufacturers, Gudang Gagum, Delitua Delta and Jatelhul are planning the production of cigarette paper.