FEASIBILITY STUDY FOR THE PLANT RENOVATION OF PADARALANG PULP AND PAPER MILL IN THE REPUBLIC OF INDONESIA

(APPENDIX)

FEBRUARY, 1985

JAPAN INTERNATIONAL COOPERATION AGENCY

CONTENTS

CHAPTER 1 INTRODUCTION

1. INTRODUCTION

1-1 Padalarang Pulp and Paper Mill (hereinafter called PPM) is the first paper mill in the Republic of Indonesia. It was originally planned and constructed by the Dutch Government.
The mill is located about 18 km northwest of Bandung, close to the road connecting Jakarta and Bandung.
No. 1 Paper Machine started production in 1924 when the pulping of paddy straw (collected in the surrounding area) started. No. 2 Paper Machine was installed in 1931.
The management organ of PPM at that time was a Dutch Private firm called NV Papier Fabrik "Padalarang". It had a daily production of 9 tons, mainly of printing & writing paper for governmental use.

1-2 Based on the success of PPM, NV Papier Fabrik "Padalarang" constructed the second mill in Leces. This is the predecessor of the current Leces Paper Mill. In 1961, PPM and Leces Paper Mill were separated, and the two became independent.
The administrative organ of the Indonesian Government is the Directorate General Basic Chemical Industries, Department of Industries.

1-3 The relationship between PPM and Japan started in 1969, when the Department of Industry of Indonesia planned the rehabilitation and animprovement efficiency for the existing facilities. In addition, it planned to expand them for future increases in cigarette paper production, and requested a feasibility study from the Japan Consulting Institute (hereinafter called JCI).
Upon completing the feasibility study, JCI submitted a report on each of the subjects, rehabilitation and expansion.
Based on these reports, loan agreements (LA) were concluded between The Overseas Economic Cooperation Fund (Japan) (hereinafter called OECF) and the Indonesian Government: in 1971 for the rehabilitation project; and in 1972 and 1973 for the expansion project. These projects were then smoothly implemented.

1-4 The No. 3 Paper Machine line (hereinafter called PM3), which was installed (based on the OECF loan as an expansion plant of PPM) with a designed capacity of 5 T/D, is an epoch-making plant in Indonesia, even beyond being very successful.

1) No. 3 Paper Machine is a machine for producing cigarette paper only. The demand for this has steadily grown in Indonesia, and PPM made a success of domestically producing cigarette paper with this machine.
In 1969, the demand for bobbin cigrarette paper was 480 to 600 tons per year, and that for sheet cigarette paper was 1,430 to 1,900 tons per year. Imported cigarette paper amounted to as much as US$ 1,700,000 to 2,200,000 per year.

2) Unlike the ordinary printing and writing paper, the cigarette paper is subjected to several very strict quality standards, such as low basis weight of 25 g/m², no fluctuation in paper thickness, and uniformity of burning speed and ash. Transfer and mastery of high operation technology have been used to conform to these standards.

3) There are more than 31 paper mills in Indonesia, yielding a domestic production of over 370,000 tons.
Nevertheless, PPM has no competitor in cigarette paper manufacturing in Indonesia.

4) Although the nominal capacity of this plant is 5 tons per day, it has producing an average of 9 tons per day since February, 1984. This is due to advances in skill level and minor modifications of the facilities, both of which contribute greatly to increasing the profitability of PPM.

1–5 Ten years have passed since 1975, when the rehabilitation and expansion projects were completed and PM3 first started operation.
During this period, PPM has solidified its foundation as a paper mill producing only thin paper (mainly cigarette paper). However, it now faces many problems typical of these times, such as difficulty in securing enough raw materials, changes in market situation, deterioration of the facilities, and higher costs. One example is the necessity of installing a bobbin slitter in the finishing section of the PM3 line. This is because the demand for machine rolling cigarette paper is rapidly increasing, in addition to the cigarette paper for hand rolling.

1–6 Many plants have been constructed in ASEAN countries with the economic cooperation of Japan and other nations. However, many of them are now facing the problems of lower operation rate or higher costs, due to the deterioration of the facilities and the difficulty of obtaining spare parts.
Under such circumstances, the requests for Japanese cooperation in the renovation and reactivation of these plants are becoming stronger. Prime Minister Nakasone made a statement of his intention to cope with these requests, on the occasion of his visit to the ASEAN countries in April 1983.
It is very opportune that the Government of the Republic of Indonesia made a request to the Japanese government with regard to the implementation of technical cooperation on the renovation plans of Basuki Rachmat Pulp and Paper Mill (hereinafter called BRPP) and PPM with the Terms of Reference at this time.
Upon receiving this request, The Japan International Cooperation Agency (hereinafter called JICA) sent a Project finding mission for the period between December 21 and 28, 1983 and a full-scale feasibility study team to Indonesia for the period between February 26 and March 27, 1984.
Upon returning home the feasibility study team reviewed the results of the study and prepared a feasibility survey report.

1–7 JICA investigated the following points on the renovation of PPM.

1) Existing facilities
JICA examined the two aspects, of renovating or renewing the facilities and providing technical guidance and training. They also calculated the funding requirements.
(1) Prospect of and measures to be taken to assure availability of raw materials for pulp, including the paddy straw.
(2) Measures to be taken to stabilize product quality
(3) Measures to be taken to increase production

(4) Measures to be taken to increas the unit ratio of steam, electricity and water
(5) Measures to be taken to improve yield and paper making efficiency
(6) Appreciate selection of profitable paper and a production plan
(7) Measures to be taken to cope with producting various types of cigarette paper

Then JICA reviewed the feasibility of plant renovation in view of the necessary investment and evaluated the financial effects of renovation.

2) Concurrenty, JICA also conducted a feasibility study for the installation of No. 4 Paper Machine (hereinafter called PM4) as an alternative plan.

1-8 The PM4 installation plan as an alternative is outlined below.
The project of cigarette paper production is 10 tons per day. By operating 330 days per year, this totals 3,300 tons per year. The average sales price of PM4 products (the ex-mill price, not including the sales tax) is set at 3,140 Rp/kg, after deducting the distribution expenses from the average price of 10,000 to 18,000 Rp/ream, which is the market price of imported French and Japanese paper indicated under Special Paper in Table 3-6-3 in the Feasibility Study Report.
The average price of 3,140 Rp/kg is calculated as follows:
Sheet paper: 2,900 Rp/kg, operating 106 days per year
Bobbin paper: 3,250 Rp/kg, operating 224 days per year
Since the top quality French paper is sold at 3,875 Rp/kg, this price of 3,140 Rp/kg can be competitive if the quality control system is established and the market is efficiently managed.
The production and facility plans are established with the objective of producing and selling cigarette paper of the same quality as the French paper by adopting combination of 30% pulp produced from domestic linum and better quatily calcium carbonate ($CaCO_3$).

1-9 The total investment for the PM4 plant consists of expenditures for the Flax pulp Plant and Cigarette Paper Making Plant; the figures are shown below:
Total capital requirement:
Rp 36,705,000 (US$ 36,705,000)(Yen 8,442,150,000)
Foreign currency portion:
Rp 25,058,000,000 (US$ 25,068,000)(Yen 5,765,640,000)
Local currency portion:
Rp 11,637,000,000 (US$ 11,637,000)(Yen 2,676,510,000)
(Conversion rates: US$ 1 = 1,000 Rp, US$ 1 = Yen 230)
This includes capital investments for hardware for on effluent water trentment system and improvement in the indirect facilities and for the software such as technical assistance and fees for training abroad.
In addition, the profitability of PM4 plant alone is reviewed without including the estimated profit increases resulting from the shutdown of PM2 and up grading of PM3 products.
In conclusion, considering the 11.9% internal rate of return (IRR) of this PM4 installation plan, and the multipled effects of this installation on the existing lines, this project may be deemed feasible. However, this IRR is not so high when compared with internal rates of return of other general projects in Indonesia.

1-10 Cigarette paper, (the main product of this project) containing 30% of flax pulp (raw material: linum) can be competitive in quality with the French cigrette paper now being imported.

The Flax Pulp Plant, also has the capacity to take care of the increased need of the PM3 line. If it is to supply only the PM4 line, PM4 can produce cigarette paper of 100% flax pulp. In other words, the Flax Pulp Plant has a sufficient equipment capacity to satisfy the market demand for quality. Of course, the expansion of the market for cigarette paper is not necessarily limited to Indoresia. One may anticipate a broader maket in the exports to the ASEAN countries for the cigarette paper and flax pulp.

Ten years ago, all of the cigarette paper was imported. In the last ten years, PPM has been contributing greatly to saving foreign currency by constructing and operating the PM3 line. Now PPM can anticipate gererating an inflow of foreign currency.

Thus, with this project, Indonesia's long term desire may be realized, however, recognition of the need for and enforcement of strict quality control and productivity standards are essential.

1-11 On August 16, 1984, the day before the 39th Independence day of Indonesia, President Suharto made the following.

"For a developing country to expand its exports, it must make the utmost effort to be competitive in quality, price and market cultivation activities, in addition to fighting with protectionism-oriented advanced countries in international negotiations. Efforts must also be made to improve quality and productivity to compete with imported goods, rather than protecting domestic production. We will never win in this severe international competition with a tariff wall, only such efforts must be made.

This PM4 project can contribute substantially to for PPM's efforts towards the development of Indonesia along the principles espoused by President Suharto in his speech.

1-12 As previously mentioned, the paper making techniques must be improved in order to export the products to neighboring countries including ASEAN.

We would like very much for the Governments of Indonesia and Japan to extend their support to PM4 project, so that PPM can install the PM4 line, purchase the necessary machinery and equipment, introduce new techniques and provide for training of the employees.

CHAPTER 2 SUMMARY

2. SUMMARY

2–1 History and the objectives of the Investigation

2–1–1 The Government of the Republic of Indonesia made a request to the Japanese Government for technical cooperation with regard to the renovation of pulp and paper plants in Indonesia.

JICA dispatched a project-finding team to Indonesia, which, between December 21 and December 28, 1983, investigated the basic pre-conditions for a full scale feasibility study and clarified the applicable range of technical cooperation.

The Directorate General Basic Chemical Industries, Department of Industry of the Republic of Indonesia (hereinafter called DGBCI, DOI) and JICA concluded the Scope of the Study related to the full scale feasibility survey on December 26, 1983 in Jakarta.

2–1–2 Scope of Study

1) Objective of the study

The objective of the study is to diagnose BRPP and PPM and to investigate the possibility of renovation from the technical, financial and economic viewpoints, and to formulate a renovation program in order to contribute to improved production efficiency and product quality.

2) Scope of the study

In order to achieve the above-mentioned objective, the study will cover the following items:

(1) Present status of, and national policy on the pulp and paper industry in Indonesia

(2) Examination of mill management
- (2)–1 Operation and quality control
- (2)–2 Maintenance of machinery and equipment
- (2)–3 Cost control
- (2)–4 Administration
- (2)–5 Education and training

(3) Technical inspection of machinery and equipment in the existing mill
- (3)–1 Pulp plant
- (3)–2 Stock preparation
- (3)–3 Paper machine
- (3)–4 Finishing
- (3)–5 Chemical recovery
- (3)–6 Utilities

(4) Survery of raw material

(5) Survey of domestic market requirements

(6) Formulation of a renovation program

A renovation program for the exisiting mill and its management will be formulated, taking into consideration the improvement of environmental effects.
- (6)–1 Renovation plan
- (6)–2 Requirements for education and training and capital investment
- (6)–3 Implementation schedule

(7) Financial analysis
(8) Economic evaluation
(9) Conclusions and recommendations

2-1-3 The HCA Project-Finding Team submitted a preliminary survey report in which the installation of an additional unit, PM4, as an objective of the renovation plan (to increase PPMs production). We cited as one of the items to consider during the full-scale investigation.
This investigation team fully investigated the following items with regard to PM4:
1) Possibility of procuring raw material
2) Product marketability
The team then studied the following points:
3) The economic feasibility of the project.
4) Desirable influence on the activity of the existing plant
5) Impact on the profitability of the PPM system.

2-1-4 This study group team conducted the investigation according to the aforementioned' Scope of the Study from February 26 to March 27, 1984.
Then, after reviewing the results in detail, they prepared a feasibility study report.
In addition, investigation team prepared a feasibility study report (here in submitted) of PM4 as an alternative, separate from the above mentioned feasibility study report.

2-2 Outline of Padalarang Mill

2-2-1 History

Padalarang Mill is the first paper mill in Indonesia.
No. 1 Paper Machine (hereinafter called PM1) started operation in 1924 when the production of straw pulp, first began and No. 2 Paper Machine (hereinafter called PM2) was installed in 1931. Installation of these two machines was planned by the Netherlands for the purpose of producing various kind of paper, such as printing & writing paper, watermark security paper and index board which were needed by the Dutch Government. About 80% of the raw material was domestic semi-bleached straw pulp and the balance was imported pulp.
There was a small scale renovation in 1969, and another in 1973. In 1975 No. 3 Paper Machine was installed with Japanese cooperation, and the machine started cigarette paper production and continues operation up to now.

2-2-2 Location

About 18 km west of Bandung, western Java.

2-2-3 Equipment

Straw pulp plant

Paddy straw treatment equipment		1 set
Digester	30m³ vertical type	5 units
	24 m³ globe type	1 unit
Screening/cleaning process		1 set
Bleaching process		1 set

Paper making plant

No. 1 Paper Machine, 2,400 mm wire width

No. 2 Paper Machine, 2,250 mm wire width

Type of paper: Printing & writing paper and specialty paper

Production capacitly: 15 tons/ day

No. 3 Paper Machine, 2,440 mm wire width

Type of paper: Cigarette paper

Production capacity: 10 tons/day

2–2–4 Total area of Mill site 10 ha

2–2–5 Number of Employees About 800

2–2–6 Situation of Mill

1) Major investments made in the past.

1968 The first renovation project Rp 70,000,000

1971 Japan Consulting Institute
(the implementation by: Honshu Paper Co., Ltd.) concluded a consulting contract for rehabilitation with the Department of Industry. Y 14,000,000

1971 Toyo Menka Kaisha Ltd. concluded a supply contract with the Department of Industry. Y 95,000,000

1972 Japan Consulting Institute
Other implementation: Honshu Paper Co., Ltd. concluded a consulting contract for an expansion project with the Department of Industry. Y 107,000,000

1973 Ishikawajima Harima Heavy Industries Co., Ltd. concluded a supply contract with the Department of Industry. Y 1,030,000,000

2) Production trends

Unit: ton

Unit: ton

Dept. \ Year	1978	1979	1980	1981	1982	1983
Pulp	1,806	1,587	1,050	1,241	1,345	1.108
Unit I (PM 1, 2)	4,056	4,408	4,748	4,361	4,172	4,067
Unit II (PM 3)	2,623	2,687	3,163	3,193	3,533	3,007

There's been a decline in straw pulp production in the last five years. There are several possible reasons for this, such as difficulty in obtaining the raw material, paddy straw, decrease in the yield resulting from lower quality paddy straw, and purchasing the amount necessary to produce pulp because of price reduction on LBKP. The decrease of yield caused by the in-process loss of fiber content, however, seems to be the most a serious factor.

Unit-I shows a declining trend after the peak of 1980. The major reason for this is the severe competition in the market with the products from private enterprises which were started as a result of the third 5-year plan. A reverse in this trend is anticipated once the effects of the scheduled renovation are demonstrated and the paper quality control system is established.

In the ten years since the start of Unit-II (PM3), due to the PPM's own efforts, the sales have steadily increased up to 1982. Current daily production has reached about twice the capacity of the equipment constructed. In the five years up to 1982, the production increased by about 35%; In 1983 production decreased by 15%, compared to that of 1982. However, this decrease reflects only the quantity, due to the increased production of high grade cigarette paper for which there was more market demand. The profit ratio on the sales increased normally.

For reference, the following items related to Unit-II are excerpted from the production and sales plan of PPM for February 1984.

Brand	Basis weight GSM	Ream kg/RM	Daily production TPD	Production cost Rp/kg	Net sales price Rp/kg	Net profit after taxes Rp/kg
1) Ordinary grade GB	26	5.07	10.56	1,540	1,562	22
2) Ordinary grade SB	26	5.07	10.34	1,449	1,503	54
3) Semi-high grade Eagle	26	5.07	9.60	1,852	2,022	170
4) Semi-high grade Coklat	26	5.07	9.60	2,240	2,268	28

12. Note) The Ordinary grade GB and SB in the table are products of 100% wood pulp.
The semi-high grade EAGLE is a product of 15% flax pulp.
The semi-high grade CAKLAT is a product of 15% flax pulp dyed a chocolate color.

2-2-7 Outline of PPM's OECF Loan Projects

The contents of past OECF loan agreaments (i.e. the rehabilitation of UNIT-I in 1972 F. year and installation of Unit-II, PM3 in 1974 F. year,) are summarized below. (Excerpted from the 1979 OECF report; PPM Future Plan and Its Propriety)

Item \ Project		(1) Rehabilitation project	(2) Expansion project
1.	Exchange notice E/N	June, 1970	June, 1970
2.	General agreement G/A	June, 1970	June, 1970
3.	Loan agreement L/A	March, 1971	IP-62 : Feb., 1972 IP-79 : Feb., 1973
4.	Approved loan amount	104.4 million yen	IP-62 : 518 million yen IP-79 : 618 "
5.	Advanced amount	104.4 million yen	IP-62 : 518 " IP-79 : 618 " Total 1,136 million yen
6.	Interest	3.5%	3.5%
7.	Period (grace period included)	20 years (7 years)	20 years (7 years)
8.	Procurement	tied	tied
9.	Implementing organ	Department of Industry	Department of Industry
10.	Consultant	Japan Consulting Institute	Japan Consulting Institute
11.	Related Japanese party	Toyo Menka Kaisha Ltd.	Ishikawajima Harima Heavy Industries Co., Ltd.
12.	Project purpose	Renovation of old machinery and increase equipment to production from 3,600 ton/year to 4,000 ton/year and to increase profits by improving the quality	Reduce the amount of imported cigarette paper by installing a machine exclusively for cigarette paper production and use an existing machine exclusively for paper production

Item \ Project		(1) Rehabilitation project	(2) Expansion project
13.	Project activities	. Improvement of pulp equipment (digester) . Improvement of pulp washing and sorting equipment . Installation of a new kraft pulp refiner . Conversion of No. 1 machine operation to production of thick paper (e.g Manila carton of 60 - 150 g/m^2) . Conversion of No. 2 machine operation to production of thin paper of up to 40 g/m^2	. Installation of a new cigarette paper machine (wire width 2,440 mm, basis weight 18 - 40 g/m^2, and paper making speed 40 - 120 m/min) with a capacity of 5 ton/day . Installation of finishing equipment (2,180 mm width double cutter and 1,220 mm bobbin cutter)
14.	Funds required (plan)	1) Foreign currency portion (Unit: US$) (1) Equipment (FOB) Pulp equipment 81,600 Stock preparation equipment 38,800 Paper machine 91,100 (2) Ocean freight charges 18,500 (3) Contingency 33,000 (4) Consultant fees 27,000 Subtotal 290,000 2) Local currency portion (Unit: US$ 135,000 3) Total 425,000 (All foreign currency portion from the OECF loan)	1) Foreign currency portion (Unit: Yen) (1) Equipment (FOB) Stock preparation equipment 43,040,160 Paper machine (one) 457,073,280 Finishing equipment 26,516,160 Electric power substation and distribution equipment 30,792,960 Instruments 15,785,280 Oil boiler 7,348,320 Water feeding equipment 38,413,450 Spare parts 65,189,160 Auxiliary equipment 93,195,360 (2) Ocean freight and marine insurance 66,390,540

Item \ Project		(1) Rehabilitation project	(2) Expansion project
14.	Funds required (plan)		(3) Construction materials 52,530,840 (4) Chemicals 68,061,600 (5) Technical assistance fees 28,800,000 (6) Consultant fees 106,920,000 (7) Contingency 36,000,000 Subtotal 1,136,057,400 2) Local currency portion (Rp) 340,642,638 3) Total (Rp) 1,535,502,908
15.	Scheduled construction period	24 months	33 months
16.	Actual construction period	Mar. '71 - Apr. '73 (26 months)	Mar. '73 - Dec. '75 (34 months)

2-3 Availability of Raw Materials

2-3-1 Linum for Flax Pulp

Linum (Linum Usistatismam), presently being cultivated, by the Lembang Agriculture Laboratory, grows to a height of about 60 cm in 85 days, after seeding, and to about 120 cm in 120 days, at which time it can be harvested. Thus it can be harvested three times a year.

The cultivation and harvesting of linum are possible in the Lembang, Sumedang and Subang districts.

The bleached pulp yield is set at 30% of the raw material, linum, which was calculated based on a cooking yield of 35% and bleaching yield of 85%. There yields representing expected values for direct cooking of virgin linum are based on the composition analysis of the raw material. If the cultivation technique and plant breeding are improved and to increase the ratio of Cross-Bevan cellulose and non-fibrous cell these yields can be improved, thereby reducing manufacturing costs.

In this project, the purchase standards are set for 6-month old linum, a breed of 50%

Cross-Bevan cellulose contents (bone dry), moisture content 15% and sheaves 300 mm. The set purchase price is 150 Rp/kg AD, that is 194 Rp/kg BD, for the linum of the domestic pulp.

2–3–2 Linum Necessary for Flax Production

The pulp made of linum by cooking and bleaching, is called flax pulp. The quality obtained is equivalent to the flax pulp that is currently imported from France. It has long fibers and is considered ideal for use in the stock preparation for cigarette paper.

In this project, the PM4 line produces high-grade cigarette paper at the rate of 3,300 tons (BD) per year. The existing PM3 line also produces semi-high grade paper. In other words, the proposal is for exclusive production of high grade cigarette paper by the PM4 line and semi-high grade and ordinary grade cigarette paper by PM3, bringing the total annual production and sales to about 6,500 tons. (the profitability of PM4 only will be examined).

The flax pulp production equipment to produce cigarette paper is set at 2,970 tons (BD) per year, or 9 tons (BD) per day. 1,320 tons are intended for PPM's internal use and the balance of 1,650 tons for sale to other paper manufacturers in Indonesia and abroad.

Clause 3–2 later describes the breakdown of 1,320 tons for PPM's internal use.

The quantity of linum necessary to produce 2,970 BD ton per year is 12,370 tons/year when green (with moisture content of 15% loss of 5% in storage). This means that about 12,500 tons of green linum must be purchased each year.

We are told by PPM that 6,000 tons of linum for use in flax pulp production have already been acquired with the cooperation of the Perhutani (governmental organ). The total amount of money spent to purchase the necesesry linum for by this project is approximately 2,040 million Rupiah.

This project needs about 12,500 tons of green linum per year, and since this is an extremely important raw material one must always be assured of its. In addition, ways to improve material quality and reduce costs must be studied continously.

2–3–3 Paddy Straw

Paddy straw is a suitable material for cigarette paper and security paper because of the characteristics of its pulp: high opacity, high stiffnese and ease in sheet formation.

In this PM4 project, to make good sheet formation and improve as well as to reduce the manufacturing cost, we planned for a 10% combination of straw-pulp. This means that 297 tons of SBKP (bleached straw pulp) are needed each year for PM4 to produce 3,300 tons of cigarette paper per year.

In the renovation plan, we point out the need for reducing the cost of straw pulp and increasing production in order to increase the earnings from the existing plant and outline the measures to be taken.

Since rice is the staple food and Indonesia has a vast amount of land and favorable climatic conditions (dry and rainy seasons), paddy straw can be collected when the rice is harvested. Advances in the techniques of paddy rice production makes possible three harvests per year. The, however, quick growth of the rice plant, makes the paddy straw weak, making a low yield material for pulp production.

The height of the stalk is only about one third of that grown previously and due to its low fiber content, it absorbs moisture quickly. Consequently, there are problems of moisture

absorption and rotting in storage. It is very important to avoid collecting paddy straw during the rainy season. It should be collected instead,during the dry season and stored in a place with low humidity. Since this means that the raw material necessary for one year consumption must be collected in half a year, the paddy straw must be purchased from a wider area and transported to the mill.

Therefore, baling for moisture prevention in storage at the collection yard, as well as using a sheet cover during track transport is essential.

Although Indonesia is an oil producing country, the price of gasoline is extremely high when compared with prices of other commodities. Therefore, there are cost restrictions on transportation from remote areas. To desolve or resolve this problem, measures must be taken to improve the efficiency in transportation such as baling transport.

Fig. 2–3–1 showing the linum and paddy straw collecting areas is given on the next page.

The major areas for collecting linum are Lembang, Sumedang and Subang and for paddy straw, Bogor, Cianjur, Sukabumi, Sumedang, Garut, Tasikmaraya and Majalengka.

The price of paddy straw delivered to the mill has been 33 Rp/kg since February 1984. In this project, we set the price at 40 Rp/kg to allow for the additional expense of baling the paddy straw collected from remote areas.

Assuming that the bleached pulp yield is 30% and the moisture content of paddy straw is 20%, the neccessary increase of raw paddy straw for the PM4 project is about 1,300 tonAD.

Fig. 2–3–1 Guide map for raw material around PPM

Fig. 2-3-1 Guide map for raw material around PPM

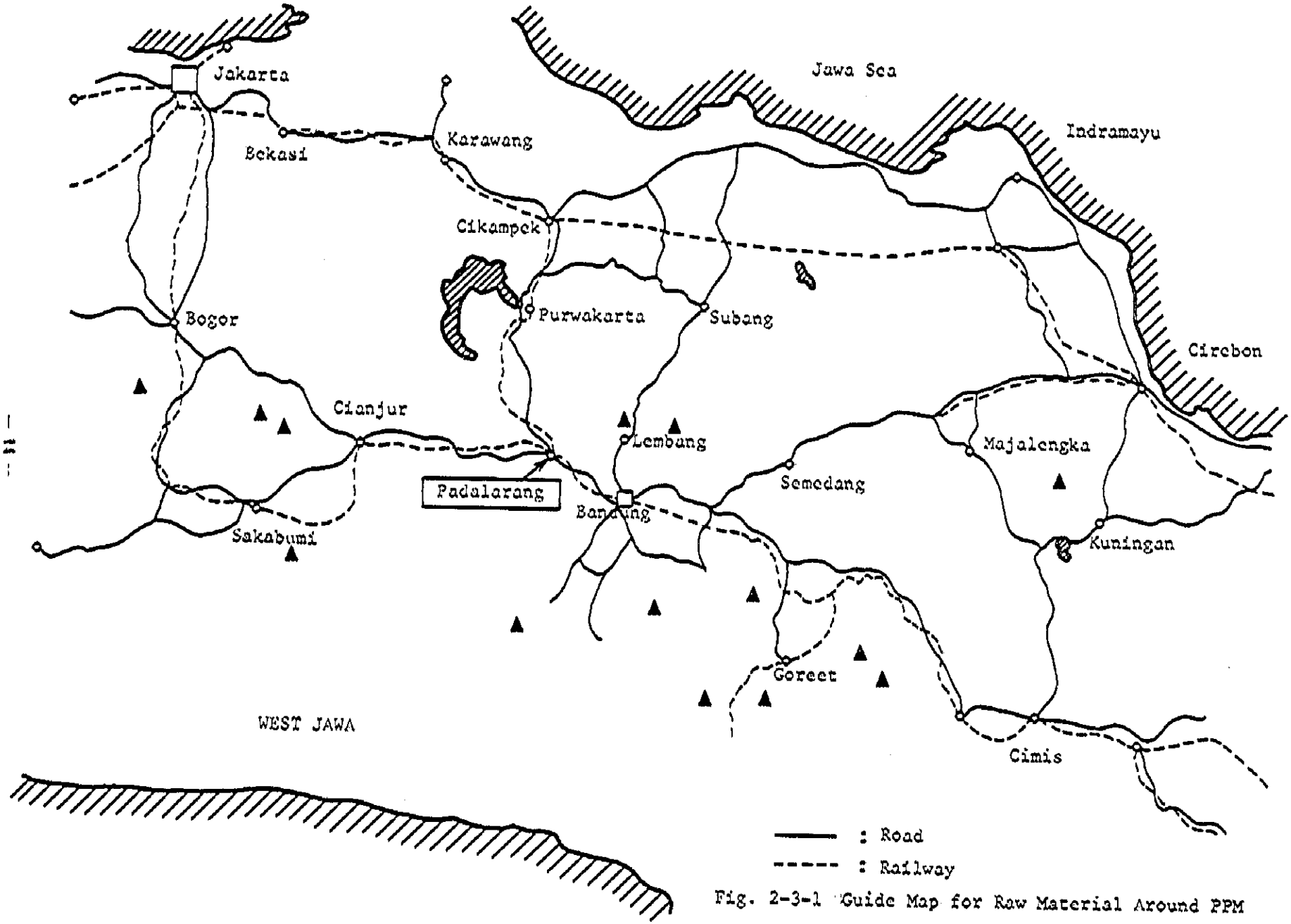


Fig. 2-3-1 Guide Map for Raw Material Around PPM

2-4 Marketability Study

2-4-1 Cigarette Paper Demand Forecast

As mentioned in the Feasibility Study Report for the renovation project, the demand for cigarette paper in 1983 was 12,000 tons, out of which 3,000 tons were supplied by PM3 of PPM and the balance of 9,000 tons was imported from France and Japan.

According to the statistics from Indonesian Customs, the quantity of cigarette paper imported in 1983 was 8,263 tons. The imports of cigarette paper is measured in reams (500 sheets/package), which is a system unique in Indonesia, However since the number of sheets in the actual package is often more than the specified number, the actual quantity of imported cigarette paper is probably about 50% more than the statistics indicate, or about 12,000 tons.

Also, it is said that the imported packages, actually contain 1,000 sheets therefore the actual figure is two times the 500 sheets per package indicated. If this is true, the actual demand is 15,000 tons.

The population of Indonesia is currently about 160,000,000 and this number is growing at a rate of 2% per year. The cosumption of cigarette has increased 7% per year due to the growth in population and increase in the number of younger smokers.

Based on this growth rate, the cigarette paper demand in 1989 is calculated as $15,000 \times (1 + 0.07)^5 \fallingdotseq 21,000$ tons, or $12,000 \times (1 + 0.07)^5 \fallingdotseq 17,000$ tons.

In other words, an increase in demand of 5,000 to 9,000 tons of cigarette paper can be expected by 1989.

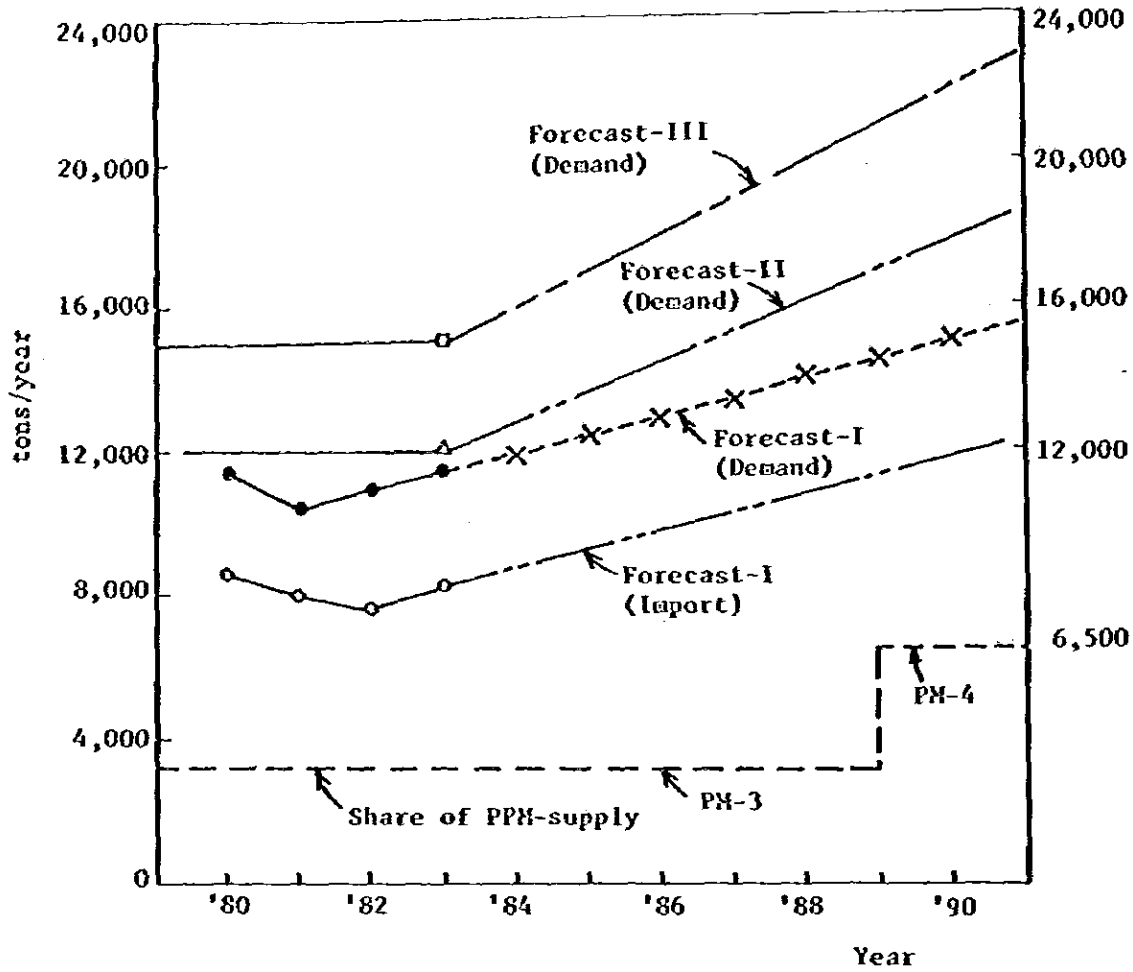


Fig. 2-4-1 Forecast of Supply/Demand

(1) Data Sources for Demand in Jakarta

Forecast-I: Central Bureau of Statistic, Jakarta

Forecast-II: Hearing Data; 12,000 t/y in 1983

Forecast-III: Hearing Data; 15,000 t/y in 1983

(2) Data for Import in Jakarta

Forecast-I: Central Bureau of Statistic, Jakarta

(3) Data, Share of PPM-supply; expansion plan by JICA

2-4-2 Cigarette Paper Demand Structure

1) All cigarette factories in Indonesia are private enterprises, and the Indonesian Government has a policy of not nationalizing the cigarette factories.

2) The following are the six types of cigarettes currently produced in Indonesia:

(1) Booklets cigarette

(2) Klobot cigarette

(3) Klewbak kemenyan cigarette

(4) Hand rolling kretek or Glove cigarette

(5) Machinal kretek cigarette

(6) White cigarette

3) The following four cities are representative of the cities where cigarette factories are located.

(1) North Surmatera, Medang

(2) West Jawa, Jakarta and Cirebon

(3) Central Jawa, Gombong, Semarang, Solo and kudus

(4) East Jawa, kediri, Surabaya and Malang

4) The following are representative cigarette manufacturing firms and their locations:

(1) East Jawa	: Gudang Garam	:kediri
	Bentoel	: Malang
	Sampoerna	: Surabaya
(2) West Jawa	: B.A.T.	: Jakarta & Cirebon
(3) Central Jawa	: Djaroem	: Kudus
	Djamboe Bol	: kudus
	Soekoen	: kudus
	Noyorono	: kudus

5) Cigarette producton (based on February 1984 data submitted by PPM)

Cigarette production figures between 1970 and 1982, *excluding* Booklets, Klembak Kemenyan and Klobot cigarette, are as follows:

(*) Kretek cigarette

Cigarette that is unique to Indonesia. It is made of 60% ordinary tobacco leaves and 40% "clover" or "cinke" leaves. (The "White cigarette" is the same as that consumed in Japan.)

From the above table, the average annual cigarette production is calculated as follows:

Unit: mil pcs.

	Kretek cigarette (*)				White cigarette		Total production	
	Hand rolling		Machinal					
	pcs	%	pcs	%	pcs	%	pcs	%
1970	19,000	63	-	-	11,000	37	30,000	100
1971	20,500	60	-	-	13,700	40	34,200	100
1972	21,400	59	-	-	14,700	41	36,100	100
1973	23,700	59	-	-	16,800	41	40,500	100
1974	30,200	60	-	-	20,400	40	50,600	100
1975	30,600	58	-	-	21,900	42	52,500	100
1976	33,300	59	-	-	23,500	41	56,800	100
1977	37,900	63	-	-	22,600	37	60,500	100
1978	40,900	64	-	-	23,100	36	64,000	100
1979	34,540	52	3,870	6	28,107	42	66,517	100
1980	35,600	43	13,550	16	33,370	41	82,520	100
1981	40,068	43	22,775	25	29,735	32	92,578	100
1982	40,467	46	20,674	23	27,125	31	88,266	100
Total	408,175		60,869		286,037		755,081	

6) Cigarette paper consumption

The consumption rates of paper necessary for cigarette production are shown below.

Source: Date submitted by Directorat Aninkra, Jkt.

From the above table, the average annual cigarette production is calculated as follows :

Hand Rolling Kretek

=408,175,000,000÷13=31,398,076,923PCS(46%)

Machinal Kretek

= 60,869,000,000÷4 =15,217,250,000PCS(22%)

White Cigarette

=286,037,000,000÷13=22,002,816,154PCS(32%)

Total =68,618,173,077PCS(100%)

No.	Cigarette factory	Sheets	Bobbines	Total
1	Booklets and small Kreteck Factories	27%	-	27%
2	Klobot Cigarette	-	-	-
3	Klembak Kemenyan	3%	-	3%
4	Hand Rolling Kretek = 46% × (100-30)	32%	-	32%
5	Machinal Kretek = 22% × (100-30)	-	15%	15%
6	White Cigarette = 32% × (100-30)	-	23%	23%
	Total	62%	38%	100%

Source : Data submitted by Directorat Aninkrat, Jkt.

2-4-3 Quality of Cigarette Paper in the Market

The quality and forms of shipment of cigarette paper distributed in Indonesia are shown below (February 1984 date from PPM)

No.	Quality	Kinds of Cig., factories	Kinds of Cig., paper
1	High	White cigarette	in bobbines
2	High	Big Kretek	in sheets & bobbines
3	Medium	Small Kretek	in sheets
4	Medium	Booklets	in sheets

2-4-4 Price of Cigarette Paper in the Market

1) Except for the 3,200 ton/year of the sheets of medium quality paper that are produced and sold by PPM, all of the cigarette paper presently distributed in Indonesia is imported from France and Japan, the demand in 1983 was 12,000 ton/year.

2) As mentioned in Table 3-7-1 of the Market Study of the Renovation Report, 60% import duty and 10% domestic sales tax are applied to imported cigarette paper.

3) As of February 1984, the market prices of imported cigarette paper (in sheets) are as follows.

Cigarette paper imported from France:

2,900 Rp/kg (30% flax)

Cigarette paper imported from Japan:

2,200 Rp/kd (0% flax)

Cigarette paper produced by PPM:

2,200 Rp/kg (15% flax)

4) The price of imported cigarette paper in bobbin is about 10% higher than that (in sheets) is:

Import from France: 3,250 Rp/kg (30% flax)

Import from Japan: 2,420 Rp/kg (0% flax)

Produced by PPM – – (–)

The PPM paper price cannot be listed since it had no bobbin slitter in February 1984. If a bobbin slitter is installed prior to starting the PM4 expansion project scheduled for 1989, the cigarette paper in bobbin produced by PPM can be sold at the same price as the Japanese import by increasing the flax pulp ratio or even at the same price as the French import, 3,250 Rp/kg.

2-4-5 Prices of Cigarette Paper and Flax Pulp set for PM4

1) The PM4 project is being planned considering the possibility of porducing cigarette paper with 100% flax pulp. The sales price of cigarette paper is dependent on the flax pulp ratio, the paper can be sold at an even higher price by increasing the flax pulp ratio. (For reference, the highest grade French paper is sold at 4,500 Rp/kg.)

2) However, in the PM4 project, the plan is to set the average flax pulp ratio of PM4 at 30% thus allowing an increase of the flax pulp supply to the existing PM3 line. Remainder can then be sold to other private cigarette paper producers, thereby enhancing the profitability of the project.

3) Since February 1984, the selling price of cigarette paper has been 2,900 Rp/kg for the sheet type and 3,250 Rp/kg for the bobbin slit type. The plan is to sell cigarette paper with 70% of it in the bobbin slit type, making an average selling price of 3,140 Rp/kg · (3,240 Rp/kg · BD).

4) If the increase rate of prices for the year of expansion (the year of installing PM4) is set to 110% (10% increase) of 1984, the above average selling price is 3,561 Rp/kg · BD (3,240x1.1).

The profit and loss are calculated on the bases of a 10% increase over the rates in Feb. 1984.

Table 6-1-1 and Table 6-1-2 show the cost calculation of flax pulp and cigarette paper, respectively; the selling price and sales amount shown on these tables are shown below.

Flax pulp

PPM consumption: 1,978 Rp/kg BD; 1,320 BDt/year

Sales to outside firms: 2,453 Rp/kg BD; 1,650 BDt/year

Cigarette paper

Average of sheet and bobbin slit types: 3,560 Rp/kg BD; 3,300 BDt/year

2-5 Expected Effects of Investment

The objective of this project is "saving foreign currency as well as earning foreign currency by taking positive approach forwords exporting" by domestically producing high grade cigarette paper which at present is being imported and for which the demand will certainly grow.

The existing PM2 line is to be shut down in order to settle the fundmental condition and allow PPM to obtain the plant mill water and the necessary employees for the PM4 line.

Furthermore, PM4 can be applied to the production of flax pulp, which is an essential material for high-grade cigarette paper. This flax pulp can be utilized for various internal purposes, including the conversion of the existing PM3 to the production of high-grade cigarette paper, thereby enhancing the profitability of PPM.

Nevertheless, the effects of this investment are calculated for the PM4 project only on the following items, without considering the compound effects resulting from the closing of PM2 and production of high-grade cigarette paper by PM3.

(1) Profit resulting from use of low cost flax pulp

(2) Earnings from selling excess flax pulp to other paper manufacturers

(3) Earnings from producing and selling high-grade cigarette paper

2-5-1 Total Investment

The total investment is Rp 36,705,000,000 as shown in Table 4-5-1 under Total capital requirement.

2-5-2 Annual Sales

1) The objective of the PM4 project is to produce and sell 2,970 BDt of flax pulp per year and 3,300 BDt of cigarette paper per year.

2) Of the 2,970 BDt/year production of flax pulp, 1,650 BDt/year is to be sold to other paper manufacturers and the remaining 1,320 BDt/year is to be used by PPM.

3) Based on the planned rate of production of items 1) and 2) above, and the sales prices indicated Clause 2-4-5, the following annual sales can be expected in the "Fourth year (1994) of the operation" in which 100% production of the designed equipment capacity is expected, based on Table 7-1-1.

Annual total sales: Rp 18,408,436,000

2-5-3 Rate of profit against sales

Based on Table 7-1-1, the rate of profit against sales is 9.3% before taxes and 6.1% after taxes in the fourth year (1994) of operation.

2-5-4 Turnover Ratio of Invested Capital

Based on the information contained in 2-5-1 and 2-5-2, the expected turnover ratio of the invested capital is once in two years.

2–5–5 Internal Rate of Return (IRR)

As shown in Table 7–2–1, the IRR when the total investment and sales prices after the 5th year are fixed is 11.9%.

If the sales prices raised by 2.5%, the IRR is 13.1%. (The compound effects of PM2 and PM3 are not included in the calculation of both internal rate of return.)

CHAPTER 3 BASIC PLAN OF PM4 INSTALLATION

3. BASIC PLAN OF PM4 INSTALLATION

3-1 Policy and Summary

1) The objective of the PM4 project is to increase the national income by the efficiend use of domestic resources in producing and selling cigarette paper that is competitive with imported paper in quality.
   Towards this purpose the project plans to establish an integrated pulp and paper plant equipped with the facilities for both flax pulp and high-grade cigarette paper production.
   Also, as the population increases in the neighboring educational city of Bandung, the area surrounding PPM will become rapidly urbanized. To reduce the additional environmental impact a resulting from this expansion project the installation of a effluent water treatment system is being considered.

2) The following measures are concurrently taken to solidify the relationship with the existing plant and to increase the profitability of the entire PPM system.
   (1) PM2 is to be shut down as soon as PM4 starts operation.
   (2) PM3 is to be converted to the production of high-grade cigarette paper comparable in quality to that produced by PM4 for 156 days per year, which is equivalent to 50% of 316 days of current annual operation.
   (3) The water from the existing well is to be used for cooking the Unit-I straw pulp and the flax pulp in the new line.
   (4) The mill water obtained from the mountain spring is to be divided for use by Unit-I PM1 line and Unit-II PM3 and PM4 lines. Tighter measures will be taken for use of recirculated water.

3) The Flax pulp plant is to have a production capacity of 9 BD tons (10 ADt) per day, (2,970 BD tons per year by operating 330 days per year.)
   From this total 1,320 BD tons are to be used within PPM by PM3 and PM4, and the remaining 1,650 tons are to be sold to private making companies in Indonesia.

4) The PM4 cigarette paper plant is to have a production capacity of 10 BD tons (10.3 ADt) per day, (3,300 BD tons per year by operating 330 days per year.)

5) Both the flax pulp plant and PM4 cigarette paper plant, is to be designed with a production capacity that is 110% of the daily capacity.

3-2 Flax Pulp Plant

3-2-1 Purpose

The purpose of constructing the flax pulp plant is to produce and sell high quality cigarette paper by cooking the linum supplied from the scheduled plantation of the Perhutani of the Indonesian Government and to generate profit by selling excess flax pulp to other paper manufactures.

3-2-2 Flax Pulp Quantity Necessary for the Project

1) In order to enhance the over all profitability of PPM the flax pulp supply to the exisiting PM3 will be increased.
   PM4: 30% mixing to BD on 10.3 ADt/d x 330 d/y
   PM3: 20% mixing to BD on 8 ADt/d x 156 d/y
   15% mixing to BD on 9 ADt/d x 160 d/y

2) Flax pulp for use within PPM

Flax pulp	30%
NBKP	60%
SBKP	10%
$CaCO_3$	30%

$$\text{PM4:} \frac{10.3 \times 330}{0.85} \times \frac{30}{130} \times 0.97 \fallingdotseq 920 \text{ BDt/y}$$

$$\text{PM3:} \frac{8 \times 156}{0.85} \times \frac{20}{130} \times 0.97 \fallingdotseq 220 \text{ BDt/y}$$

$$\text{PM3:} \frac{9 \times 160}{0.85} \times \frac{15}{130} \times 0.94 \fallingdotseq 180 \text{ BDt/y}$$

1,320 BDt/y

3) Sales of excess flax pulp to other paper manufacturers
   10 ADt/d × 330 d/y × 0.9 BD/AD − 1,320 = 1,650 BDt/y

3-2-3 Flax Pulp Equipment and Capacity

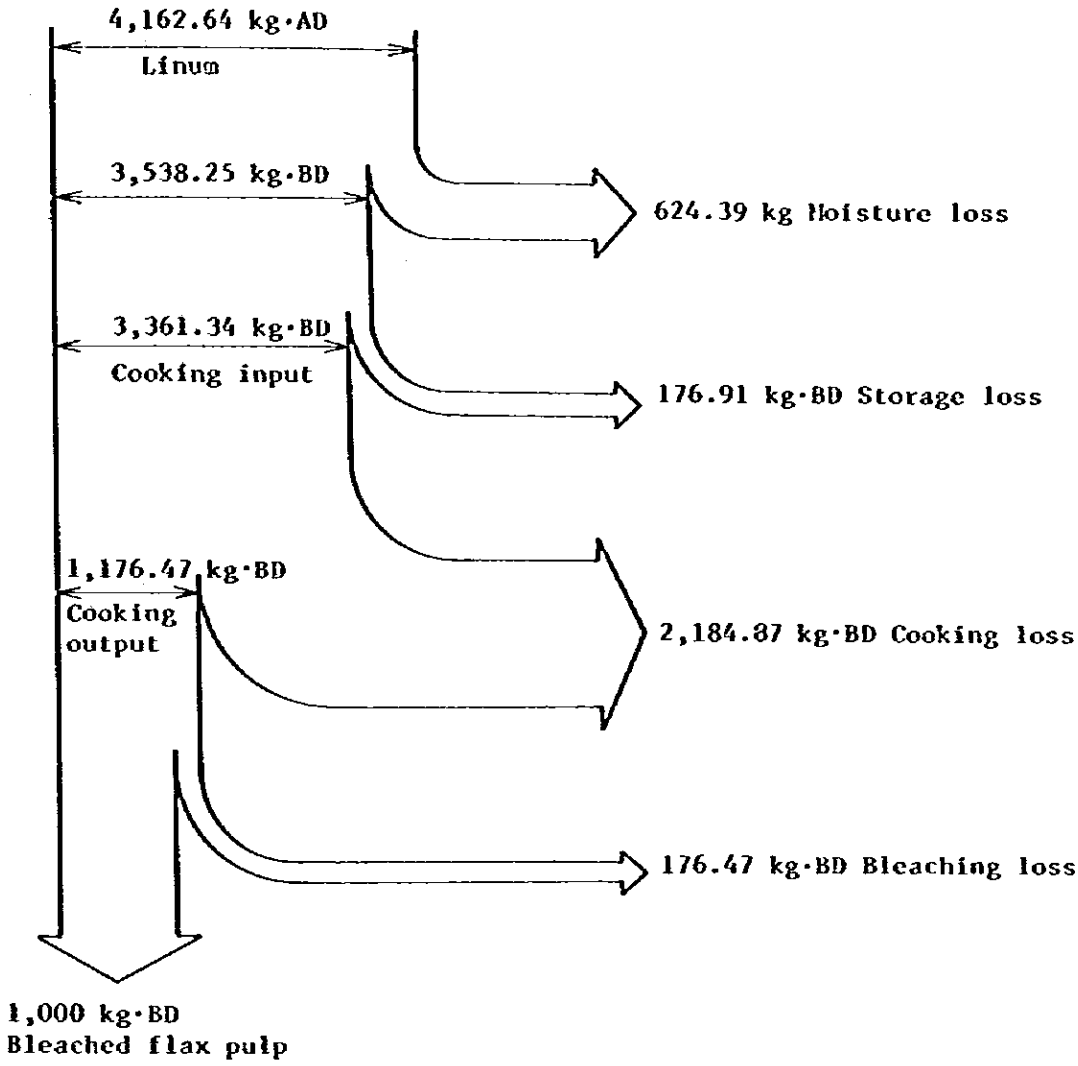
1) The average annual production is set at 2,970 BD tons, based on a daily production of 9 BD tons in 330 days of operation per year; the equipment capacity is set at 3,267 BD tons (3,630 AD tons) per year.

2) The equipment to be installed are a 4.9 m globe digester, Bellmer and hypo bleaching equipment, and a wet pulp sheet machine for outside pulp sales.

3-2-4 Raw Material Flax Pulp Production

1)	Raw material	Linum
2)	Linum quality	Growth period of 4 months (harvested in 6th month)
3)	Linum moisture content	15% ± 5%
4)	Crose Bevan cellulose content	At least 50% (bone dry)
5)	Form of linum package	Baled linum of about 300 mm
6)	Price delivered to mill	150 Rp/kg-AD (as of February 1984)
7)	Supplier	Perhutani, Government of the Republic of Indonesia
8)	Dealer	Not yet determined

3-2-5 Material Balance



(Basis of setting)

(1)	Linum moisture content:	15%
(2)	Weathering loss in storage:	5%
(3)	Unbleached pulp yield:	35% (to bone dry)
(4)	Bleached pulp yield:	85% (to unbleached)

3-2-6 Calculation of Flax Pulp Manufacturing Cost (Fourth year of Operation)

1) Table 6-1-1 shows the results of cost calculation based on prices 10% higher than those in February 1984.

2) Depreciation cost and interest are distributed by the ratio of investment for equipment against the total capital requirement, 20% is applied to the flax pulp plant.

3) The selling price is set at 110% (=2,453 Rp/kgBD) of 2,007 Rp/kgAD, which is the price of flax pulp imported from Spain as of February 1984.

4) The delivered price of flax pulp used within PPM, excluding sales expenses and interest, is set at 1,978 Rp/kgBD.

5) The profit from sales of 1,650 BDt/year flax pulp to outside paper manufacturers is 294,317,000 Rp, or 178.4 Rp per BDkg.

3-3 PM4 Cigarette Paper Plant

3-3-1 Purpose

The purpose of constructing the PM4 cigarette paper plant is to produce cigarette paper in a quality that is competitive with the cigarette paper currently imported in order to save the currency spent for the imports as well as to develop the domestic industry by effectively utilizing domestic resources.

3-3-2 Basic Conditions of Plant

1) The stock preparation, paper making and finishing equipment shall be able to produce cigarette paper in a quality that is equivalent to or better than the quality of cigarette paper imported from France by mixing an average of 30%, (or up to 100%) of flax pulp and using high grade calcium carbonate.

2) The specifications main equipment to be installed in the PM4 line shall be, as much as possible the same as those of existing PM3 to assure compatibility of spare parts, in order to reduce operation costs.

3) The sales in Reams shall be one of the transaction conditions. In order to reduce the bases weight loss, the necessary measuring devices shall be installed.

4) Equipment for reduction of fiber loss and for white water circulation shall be improved, both to reduce the effluent water load and to improve the total yied.

3-3-3 Plant Specifications

1)	Efficiency (average)		
	(Design)	(in sheets)	(in bobbins)
	Total yield (%)	85	85
	Total efficiency (%)	85	84
	Operation efficiency(%)	96.0	96.0
	Paper making efficiency (%)	94.0	93.0
	Finishing yield (%)	94.5	94.0
2)	Basis weight (g/m²)	25.0	24.0
3)	Machine speed (m/min)		
	Designed speed machine	250	250
	Operation, maximum	225	225
	Operation, normal	175	165
4)	trim (mm)	2,040	2,106
		(510 x 4)	(27 x 78)
5)	Moisture content of the paper (%)	3.0	3.0
6)	Average combination ratio (%)	30%FBP, 10%SBKP, 60%NBKP	
		30%$CaCO_3$, against pulp	

3-3-4 Scheduled Production (BD ton/day)

1) Theoretical amount of produced paper

product in sheets : $0.025 \times 0.97 \times 175 \times 2.04 \times 1.44 = 12.47$

product in bobbin : $0.024 \times 0.97 \times 165 \times 2.106 \times 1.44 = 11.65$

2) Scheduled amount of produced paper

product in sheet : $12.47 \times 0.96 \times 0.94 = 11.25$

product in bobbin : $11.65 \times 0.96 \times 0.93 = 10.40$

3) Scheduled amount of finished paper

product in sheet : $12.47 \times 0.85 = 10.60$

product in bobbin : $11.65 \times 0.84 = 9.79$

4) Average daily production

$$\frac{10.6 + 9.79}{2} = 10.2 \sim 10.0 \text{ Nominal}$$

In other words, the daily finished production is to average 10 BDt/d (10.3 ADt/d).

5) Annual production (average)

When the number of operating days per year is 330 days:

10 x 330 = 3,300 BDt/y

10 x 330 1/0.97 ≒ 3,400 ADt/y

This calculation is based on a 50/50 ratio of bobbin/ sheet. This ratio will probably as the share of bobbin production increases in the future.

3-3-5 Calculation of Cigarette Paper Manufacturing Cost (Fourth year of the production)

1) Table 6-1-2 shows the results the calculation of manufacturing costs based on 110% of the values for flax pulp production calculated in 3-2-6 and the prices of genaral commodities in the 1984 PPM budget.

2) With regard to the depreciation cost and interest, 80% of the total capital requirement is applied to the cigarette paper plant since the cigarette paper plant equipment accounts for 80% of the total investment.

3) The average selling price is set at 3,560.83 Rp/kg · BD, by calculating 110% of the price (as of February 1984) of cigarette paper imported from France and converting the result to the price for bone dry weight.

4) The projected annual profit from production and selling 3,300 BDt/y is 1,419,311,000,Rp, or 430.1 Rp per BDkg of cigarette paper.

CHAPTER 4 MANUFACTURING PROCESSES

4. MANUFACTURING PROCESSES

4-1 Basic machinery and Equipment

4-1-1 Flax Pulp Plant

1) The flax pulp plant produces bleached flax pulp by using equipment with a daily production capacity of 9 BD tons (10 AD tons) from the main raw material linum. From the annual production of 2,970 BD tons, 1,320 BD tons is the portion used within PPM for the PM4 stock preparation process. (The feeding line to existing PM3 is to be arranged by PPM and the flax pulp for PM3 is to be distributed from of the 1,320 BD tons.)
The remaining flax pulp of 1,650 BD tons is separately produced by a wet lap machine and used for sales to other paper manufacturers.

2) Since the produced pulp is to be distributed between use and sales to outside manufacturers, production control instruments must be provided.

3) The basic equipment shall be batch processing equipment that consists of a 4.9 m globe digester, beaters, hypo bleaching and dust removal and washing equipment. However, the production line after the dump chest of the bleacher shall operate continuously.

4) The bleached pulp shall be one of a quality necessary which can make cigarette paper that is competitive with imported cigarette paper.

4-1-2 Stock Preparation

1) The subsequent of the stock pump of lapping machine chest after bleaching/cleaning shall be defined as the area for stock preparation.

2) This section shall have the equipment suitable for processing flax pulp, straw pulp and NBKP and $CaCO_3$,; the equipment shall be arranged with particular attention to the following points:

(1) The quantity of stock preparation necessary to produce the theoretical capacity of the paper machine should be normally treated in this section; the prepared stock must be continously supplied.

(2) The paper production capacity of the equipment is calculated with virgin stock only, does not include the circulating waste paper.

(3) 30 ± 5cc/1.5g CSF must be obtained on the freeness of the finished pulp at the machine chest with average new stock combination ratio (Note).

(Note)	Bleached flax pulp	30%
	Bleached straw pulp	10%
	Purchased NBKP	60%
	Imported calcium carbonate (against pulp)	30%

3) The main equipment for this section shall be a consist of combination of cone and disk type refiners, for continuous refining,mixing of circulating waste paper and filler at the mixing chest, and feeding to the machine chest.

4) This section shall be equipped with the necessary control instruments.

4-1-3 Machine Approach System

1) Main equipment
The machine approach system must be equipped with screening/cleaning equipment necessary for the final fine screening and must also be equipped with circulating wast paper treating equipment and white water circulation and recovery equipment. This equipment must be one that allows in as little air as possible. It should also be equipped with a beater and jordan for final adjustment of freeness, these will be for adjusting freeness depending on the quality of the final product.

2) The flow meter and consistency gage are instruments necessary for continuous control, but the freeness tester will be jointly used with the stock preparation as a sampling control measurement tester.

4-1-4 Paper Machine (PM4)

1) PM4 can make various types of thin paper. It is not necessarily limited to cigarette paper.

2) A closed type head box and wire part with full hydrofoil type shall be installed in order to obtain porous paper with pin holes as little as possible.

3) In order to facilitate operation of the bobbin slitter, we adoped a surface reel which wind the two paper rolls separately for the pope reel.

4) In order to facilitate control of the paper making process, for uniformity in the product we are installing a basis weight and moisture indication controller system (B/M meter)

5) The main specifications of PM4 are as follows:

Type	Fourdrinier with multi cylinder dryer. closed type head box
Wire width	2,440 mm
Finished width	2,040 mm/sheet, 2,106 mm/bobbin
Basis weight	18-40 g/m²
Designed paper making speed	100-225 m/min (Max. 250 m/min)
crawling speed	25 m/min
Driving method	D.C sectional drive system
Auxiliary equipment	A set of cigarette paper and thin paper making equipment

Operation side	Left side (The driving part is on the left when looking at the head box from the reel)
Average finishing quantity	10 BDt/d based on 24.5 g/m²

4-1-5 Finishing Plant

1) Since the use of bobbin slit paper is increasing, (although the pope reel cuts the paper into two pieces) one unit each of slitting rewinder and bobbin slitter shall be installed for joint use by PM3 and PM4.

2) Since the use of sheet products is decreasing, the double cutter in the existing PM3 is also to be used by PM4.

4-1-6 Water/Fiber Recovery

1) Since there is a shortage of mill fresh water, the PM2 line is to be shut down as soon as the PM4 line starts.

2) In order to improve the recovery of white water, a saveall or settler is installed, and the mill water and recovered white water (clear water and cloudy water) are sorted and used by both PM3 and PM4.

4) By taking the above measures for mill water distribution, the total demand for mill water by PM3 and PM4 is 200 m³/T for pulp and 150 m³/T for paper in unit ratio of mill water and concurs with the current total existing water consumption.

Flax pulp plant: 10 x 200	=	2,000 m³/day
Paper machine: 20 x 150	=	3,000 〃
Subtotal		5,000 m³/day
Existing PM1		1,800 m³/day
Existing straw pulp plant		3,000 〃
Portion of PM2 shut down		−1,200 〃
Total		8,600 m³/day

5) Total of mill water

currently available	8,640 m³/day
Balance (surplus)	40 m³/day

4-1-7 Electric Power

1) PPM is favorably located, and the increase in power consumption can be managed by renewing the purchase contract and improving the power receiving equipment.
At present, PPM has a (contract with the State Electric Company for the contracting) purchase of power up to 3,120 kVA, PPM also has three power generators.
The total power consumption for all existing equipment is an average of 35,000 kwh/d.
Although the PM2 line will be shut down as the PM4 line starts, and since there are no significant advantages to power generation, the purchase contract with PLN must be revised from the current 3,120 kVA to 4,000 kVA.

2) When concluding a new power purchase contract, new substation must be installed to receive power from the 70 kV transmission system.
Under the current contract, the power is received from a 6 kV line. However, since the current 6 kV supply has almost reached its limit because of the rapid urbanization in the surroudning area, additional power must be received directly from the 70 kV transmisson system.

3) Since there are problems, such as voltage fluctiation in the PLN power supply, the power receiving equipment must be selected carefully.

4-1-8 Steam Source

1) The average volume of steam required by this project is about 4 t/h for both the flax pulp plant and the cigarette paper plant.

2) Installation of a 14 t/h power boiler for steam, is planned by the renovation project for the existing plants (PM1, PM2, PM3 and Straw Pulp Plant).

3) One 14 t/h power boiler for the renovation project is sufficient if the peak load is not taken into consideration.

4) On the other hand, the batch cooking in the Unit-1, Straw Pulp Plant and Batch cooking in the PM4 Flax Pulp Plant have a large peak load even when operating at different times which causes the pressure fluctuation.

5) In addition, since only one 14 t/h boiler is planned by the renovation project, there is no boiler on standby use for during periodic inspections or breakdowns.
In view of these considerations, the plan is to install 10 t/h x 14 kg/cm² G power boiler (with the same pressure as the boiler planned by the renovation project), to allow parallel operation and load follow-up control, as well as pursuing economical scheduled operation by combining it with the 2.5 t/h boiler.

4-2 Manufacturing Processes

4-2-1 Flax Pulp Plant and Stock Preparation

1) Drawing No. PPM-PM4-1 shows flow diagram.

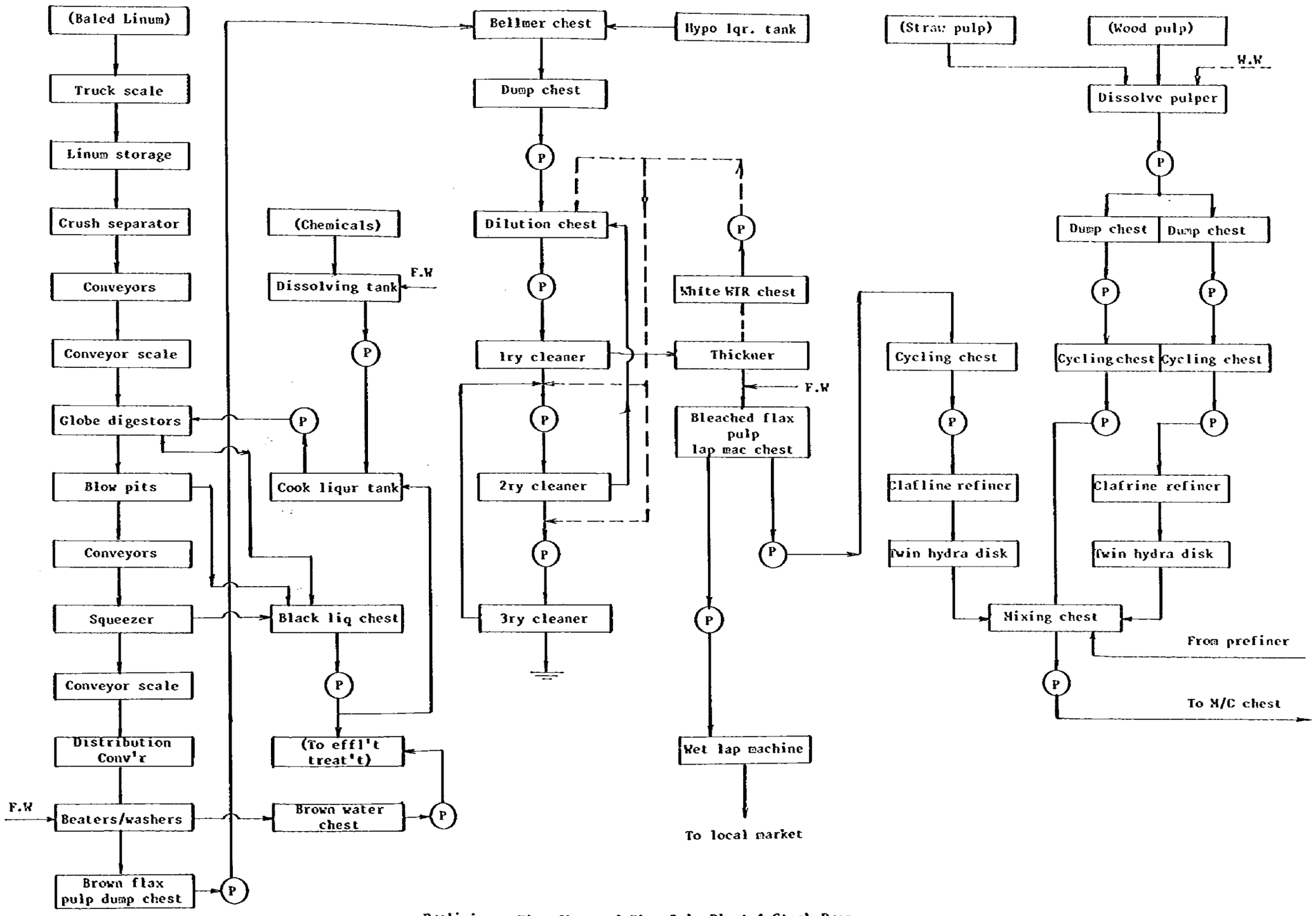
2) The baled linum is brought or conveyed from the storage yard to the crushing separator; the crushed dust is separated and weighed, and the linum is supplied to the globe digester.
The cooked brown stock is dehydrated and weighed, treated by the beater for washing and beating, sent to the bleacher through the dump chest, and is made in bleached flax pulp.
The flax pulp is then diluted in the dilution chest to a proper consistency for the cleaner, cleaned and sent to the lapping machine chest via the thickener, and stored at 4% consistency.

3) The flax pulp sold to other paper manufacturers is sent from the lapping machine chest to the wet lap machine, where the lapped flax pulp is produced in the necessary consistency, then packed and stored.
The flax pulp used within PPM is sent to the stock preparation section, refined to a pre-established freeness by the conical and disk type refiners, sent to the mixing chest, mixed with the refined wood pulp (NBKP) and the straw pulp from the Unit-I Pulp Plant, and then sent to the machine chest.

4-2-2 Cigarette Paper and Finishing Plant

1) Drawing No. PPM-PM4-2 shows a flow diagram.

2) The new stock refined and the dust free broke pulp from the broke chest and the calcium carbonate are stored and mixed in the mixing chest and sent to the machine chest via the beater istalled on the upper floor.
The operation area of the machine tender starts from this stage, including the beater operation. The finished stock is adjusted for the final consistency, and sent to the pressurized head box through the vertical pressure screen after controlling the stock pressure and flow rate by signals from B/M system, and jetted onto the wire to the paper formation.
The wire part has full hydro foils to facilitate sheet formation, as well as to improve the filler yield and reduce the number of pin holes.
The press part is structured with unipress and grooved nip press, assuring production of porous paper quality. The dry part has a chemical coater and mark press, improving the combustibility of cigarette paper and providing a clear cigarette mark.
A B/M system is installed between the dryer and pope reel for continuous measurement and control of the basis weight and moisture content.
The pope reel is a horizontal drum type, and a splitter and spool roll are installed to take up the product paper in two rolls.



Preliminary Flow Sheet of Flax Pulp Plant & Stock Prep

3) Whether the product paper is to be taken up in one roll or to be split into two rolls by the pope reel is pre-determined by the form of the finished product. The product paper for bobbin finishing is taken in two split rolls and then sent to the bobbin slitter. The product paper for sheet finishing is taken in one roll and sent to the sheet cutter in PM3.

Since bobbin processing for the existing PM3 is necessary, one unit for slitting rewinder for finishings shall be installed.

Also, a broke baler shall be installed for the control of dry broke quantity and tighten paper making efficiency and finish yield.

4-3 Plant Layout

Drawing No. PPM-PM4-3 shows the layout of the newly installed equipment.

A space for installation of a globe digester is reserved in the Flax Pulp Plant for a production increase of 50%, in the future. All equipment from the stock preparation section to the finishing plant are installed close to the existing PM; the operation position is the reverse of PM3 (the driving section is to the left when looking at the head box from the reel).

The operation side wall of PM3 building shall be removed, making common the operation and the changing of the clothing materials.

Because of the Flax Pulp Plant layout, the existing power receiving equipment shall be removed and a new set of power substation equipment (70/6 kV) shall be installed on the PLN side.

Sufficient space is also reserved for future construction of PM5.

4-4 Plant Construction Cost

The total fund necessary to construct this plant is US$36,705,000 out of which the foreign currency portion is US$25,068,000 and the local currency portion is US$11,637,000. Table 4-5-1 shows the breakdown of constuction funds.

The breakdown by the machinery and equipment prices and working capital of Table 4-5-1 is shown in Table 4-5-2 and Table 4-5-3, respectively.

The list of major equipment and civil and building engineering work is given in the Appendix.

4-5 Construction Processes and Timetable

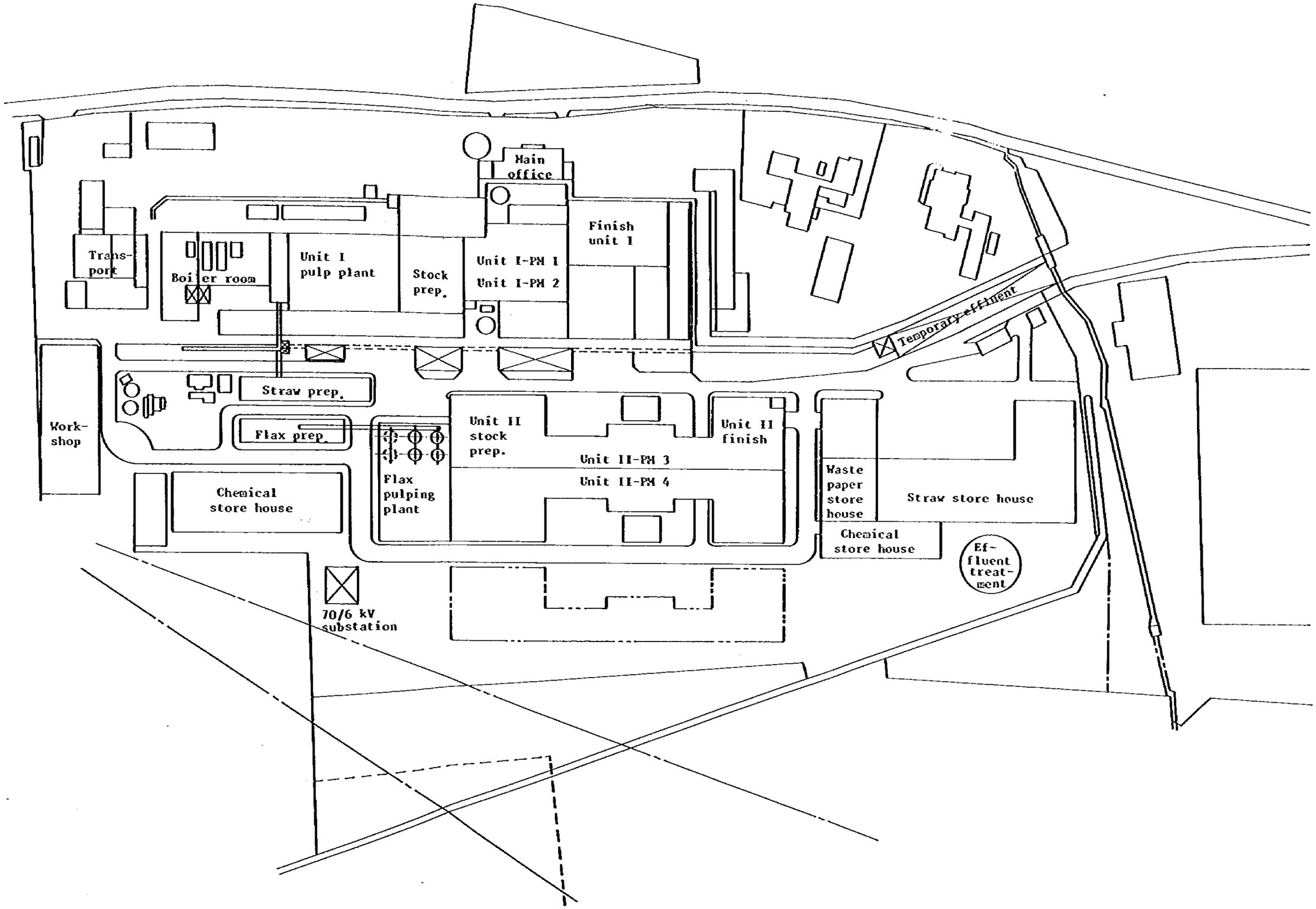
Fig. 4-5-4 shows the construction schedule. As the figure shows, the total construction period is 23 months from the beginning of construction to the start of commercial operation, including trial operation.

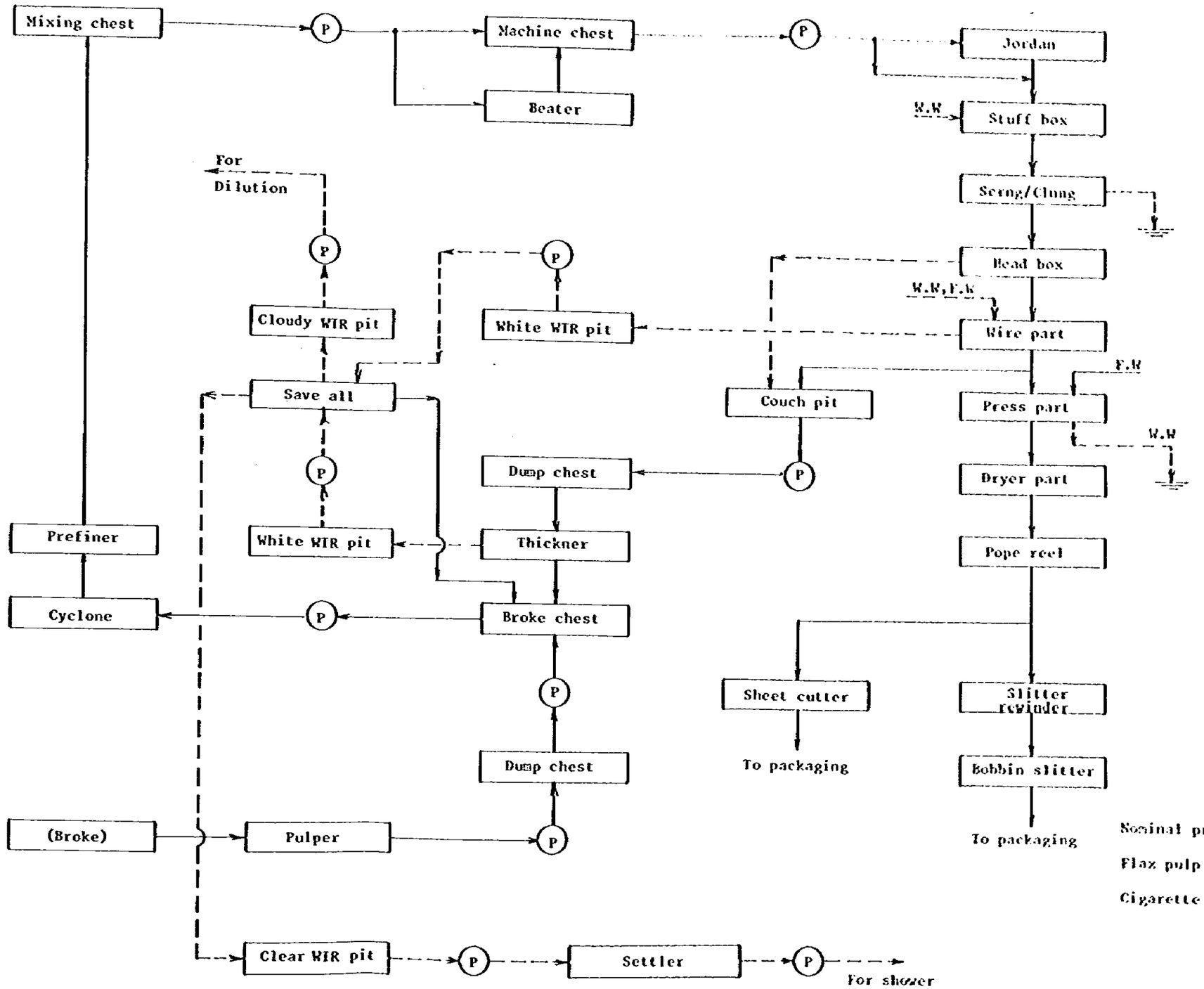
4-6 Technical Cooperation

This project intends to enhance the profitablity of PPM by domestically producing high grade cigarette paper, the imports of which are increasing year by year, in order to contribute to the foreign currency defence policy of the Indonesian Government.

In executing this plan, the cigarette paper making technique of the existing PM3 is the foundation. However the new techniques are necessary for making flax pulp and for making porous paper without pin holes.

The equipment for, the project is planned with an emphasis on compatibility with the existing PM3 to reduce expenditures on the number and types of spare parts. Additional measuring devices necessary for tighter qulity control are also included in the plan.


Main office
Trans-port
Boiler room
Unit I pulp plant
Stock prep.
Unit I-PM 1
Unit I-PM 2
Finish unit I
Temporary effluent
Straw prep.
Work-shop
Flax prep.
Unit II stock prep.
Unit II finish
Unit II-PM 3
Unit II-PM 4
Flax pulping plant
Waste paper store house
Straw store house
Chemical store house
Chemical store house
Ef-fluent treat-ment
70/6 kV substation



Nominal production capacity

Flax pulp bleached: 2,970 Mt/y

Cigarette paper: 3,300 Mt/y

Preliminary Flow Sheet of Paper Machine & Water Recovery

Accordingly, when implementing this project, competent engineers and technical supervisors from paper manufacturing company who have the knowledge and experience in making cigarette paper will be available for the research, design, installation and trial operation of the plant.

It is believed that the demand for a more advanced quality control system in the Indonesian cigarette paper market will intensify in the futune.

This plans for this project allows six months for technical guidance and training of PPM employees abroad. A technical assistance contract with a paper manufacturer is desirable for continued technical assistance after the termination of this project.

Table 4-5-1 Total Capital Requirement for PM4 Expansion

Unit: US$

No.	Descriptions	Conditions	Total amount	Assignment		1st year		2nd year		3rd year	
				Foreign	Local	Foreign	Local	Foreign	Local	Foreign	Local
A	Direct plant cost										
1	Equipment cost	FOB price	17,576,000	17,576,000	-	5,273,000	-	12,303,000	-	-	-
2	Civil & bldg work cost	Incl., effluent water treatment	2,109,000	1,109,000	1,000,000	1,109,000	500,000	-	500,000	-	-
3	Foundation work cost		1,406,000	706,000	700,000	706,000	-	-	700,000	-	-
4	Installation work cost	Incl., piping, elec & inst	1,757,000	257,000	1,500,000	-	-	257,000	1,500,000	-	-
	Total (A)		22,848,000	19,648,000	3,200,000	7,088,000	500,000	12,560,000	2,700,000	-	-
B	Total plant capital cost										
1	Direct plant cost (A)		22,848,000	19,648,000	3,200,000	7,088,000	500,000	12,560,000	2,700,000	-	-
2	Price escallation	(A) x 4%	930,000	800,000	130,000	240,000	40,000	560,000	90,000	-	-
3	Import tax & duty	To be exemption	-	-	-	-	-	-	-	-	-
4	Freight & insurance	(AF) x 6%: F, (AF) x 4%:L	1,970,000	1,180,000	790,000	354,000	237,000	826,000	553,000	-	-
5	Start up expenses	Admi & labor etc.	200,000	200,000	-	-	-	-	-	200,000	-
6	Construction overhead	(A) x 1%	230,000	200,000	30,000	50,000	10,000	150,000	20,000	-	-
7	Training cost		200,000	200,000	-	-	-	200,000	-	-	-
8	Engineering cost	(A) x 4%	930,000	930,000	-	500,000	-	300,000	-	130,000	-
9	Overhead	(A) x 4%	930,000	930,000	-	500,000	-	300,000	-	130,000	-
10	Contingency	(A) x 5%	1,140,000	980,000	160,000	600,000	50,000	280,000	100,000	100,000	10,000
	Total (B)		29,378,000	25,068,000	4,310,000	9,332,000	837,000	15,176,000	3,463,000	560,000	10,000
C	Total capital investment										
1	Total plant capital cost (B)		29,378,000	25,068,000	4,310,000	9,332,000	837,000	15,176,000	3,463,000	560,000	10,000
2	Interest during construction	(BF) x 12% x 16/12	4,012,000	-	4,012,000	-	1,204,000	-	2,808,000	-	-
	Total (C)		33,390,000	25,068,000	8,322,000	9,332,000	2,041,000	15,176,000	6,271,000	560,000	10,000
D	Working capital (D)		3,315,000	-	3,315,000	-	-	-	-	-	3,315,000
	Grand total		36,705,000	25,068,000	11,637,000	9,332,000	2,041,000	15,176,000	6,271,000	560,000	3,325,000

Percent of foreign portion : 25,068,000 x 100/36,705,000 = 68.30%

Percent of local portion : 11,637,000 x 100/36,705,000 = 31.70%

Excess portion of equity : 11,637,000 - 36,705,000 x 0.3 = 625,500

Table 4-5-2 Budgetary Price List of PM4 Expansion Project

No.	Name of equipment	FOB price ¥ x 1000	FOB price US$	Remarks
A	Flax pulp plant			
1	Handling equipment	31,500	136,957	Unload/loading equipment
2	Cooking & beating equipment	318,500	1,384,783	4-16 ft globe digester, 3-20 m^3 beater
3	Bleaching equipment	280,000	1,217,390	5-30 m^3 bleacher by Ca hypo
4	Wet lap machine	80,000	347,826	5 T/D double wire
5	Electrical equipment	93,500	406,522	Incl., wiring material
6	Instrumentation	39,000	169,565	Incl., piping material
7	Spare parts	42,500	184,783	For 1 year
	Total of item A	885,000	3,847,826	For pulp plant
B	Cigarette paper plant			
1	Stock preparation	243,000	1,056,522	Claflin, twin hydradisk
2	Paper machine	1,227,500	5,336,957	2,440 W x 250 MPM, hydro foil
3	Finishing equipment	254,000	1,104,348	S/RW, D/C, B/S
4	Chemical preparation	50,500	219,565	
5	Electrical equipment	223,000	969,565	Incl. wiring material

No.	Name of equipment	FOB price ¥ x 1,000	FOB price US$	Remarks
6	Instrumentation	162,000	704,348	Inc., B/H gage
7	Substation	134,000	582,609	For 70 kV receiving
8	Boiler	61,000	265,217	For cooking & paper making
9	Water treatment	71,000	308,696	For deep well water
10	Effluent water treatment	157,500	684,783	Total effluent treatment
11	Maintenance shop	40,500	176,087	Lathe, shaper etc.
12	Laboratory apparatus	20,000	86,957	For field arrangement
13	Telephone exchange	15,000	65,217	Inter communication
14	Fire fighting	32,500	141,304	Extinguisher only
15	Spare parts	142,000	617,390	For 1 year
	Total of item B	2,833,500	12,319,565	
C	Supplier's supervision	270,000	1,173,913	For 6 months
D	Commissioning	54,000	234,783	For 2 months
	Grand total	4,042,500	17,576,087	Pulp = $\frac{885 \times 100}{4042.5}$ = 22%
			∿17,576,000	PM4 = $\frac{2833.5 \times 100}{4042.5}$ = 78%

Table 4-5-3 Working Capital Calculation Sheet

(F: Foreign currency portion
L: Local currency portion)

Unit: Rp x 1,000

No.	Item	Classification	Unit price Rp/	Unit ratio kg/ka	Quantity/day kg/day	No. of days needed	Required capital Rp x 1,000	Remarks
A	Related to bleached pulp				10,000 (AD)	20		For PM4: 10,000 x 0.9 x 20/3,000
- 1	Linum (raw flax)	L	Rp/ADkg 200	/AD pulp 3.96	39,600	20	158,400	= 60-day portion
- 2	Sodium sulfate	F	390	0.25	2,500	20	19,500	
- 3	Caustic soda	L	440	0.03	300	20	2,640	
- 4	Calcium hypochlorite	L	2,000	0.06	600	20	24,000	
	Subtotal						204,540	F: 19,500 L: 185,040
B	Related to cigarette paper				10,000 (BD)	150		
- 1	NBKP	F	Rp/BDkg 800	/BD paper 0.543	5,430	150	651,600	
- 2	Flax pulp	L	1,650	0.271	2,710	0	0	
- 3	Straw pulp	L	400	0.090	900	0	0	
- 4	Calcium carbonate	F	900	0.271	2,710	150	365,850	
- 5	Potassium nitrate	F	1,700	0.050	500	150	127,500	
- 6	Electricity	L	75 Rp/kWh	2.20 kWh/	22,000	0	0	
- 7	Heavy oil	L	200 Rp/ℓ	0.33 ℓ/	3,300	0	0	
- 8	Mill water	L	20 Rp/m³	0.30 m³/	3,000	0	0	
- 9	Packing materials	L	40 Rp/kg	1.0	10,000	60	24,000	
-10	Consumable material	F	70 "	-	10,000	90	63,000	
-11	Product	L	3,000 "	-	10,000	60	1,800,000	Manufacturing cost
	Subtotal						3,031,950	F: 1,207,950 L: 1,824,000
	Subtotal						3,236,490	F: Rp 1,227,450 L: Rp 2,009,040
	Interest during construction period						78,124	F: 1,227,450 x 12% x 2 months/12 = 24,550 L: 2,009,040 x 16% x 2 months/12 = 53,574
	Total						3,314,614	F: Rp 1,252,000 = US$1,252,000 L: Rp 2,062,614 = US$2,062,614

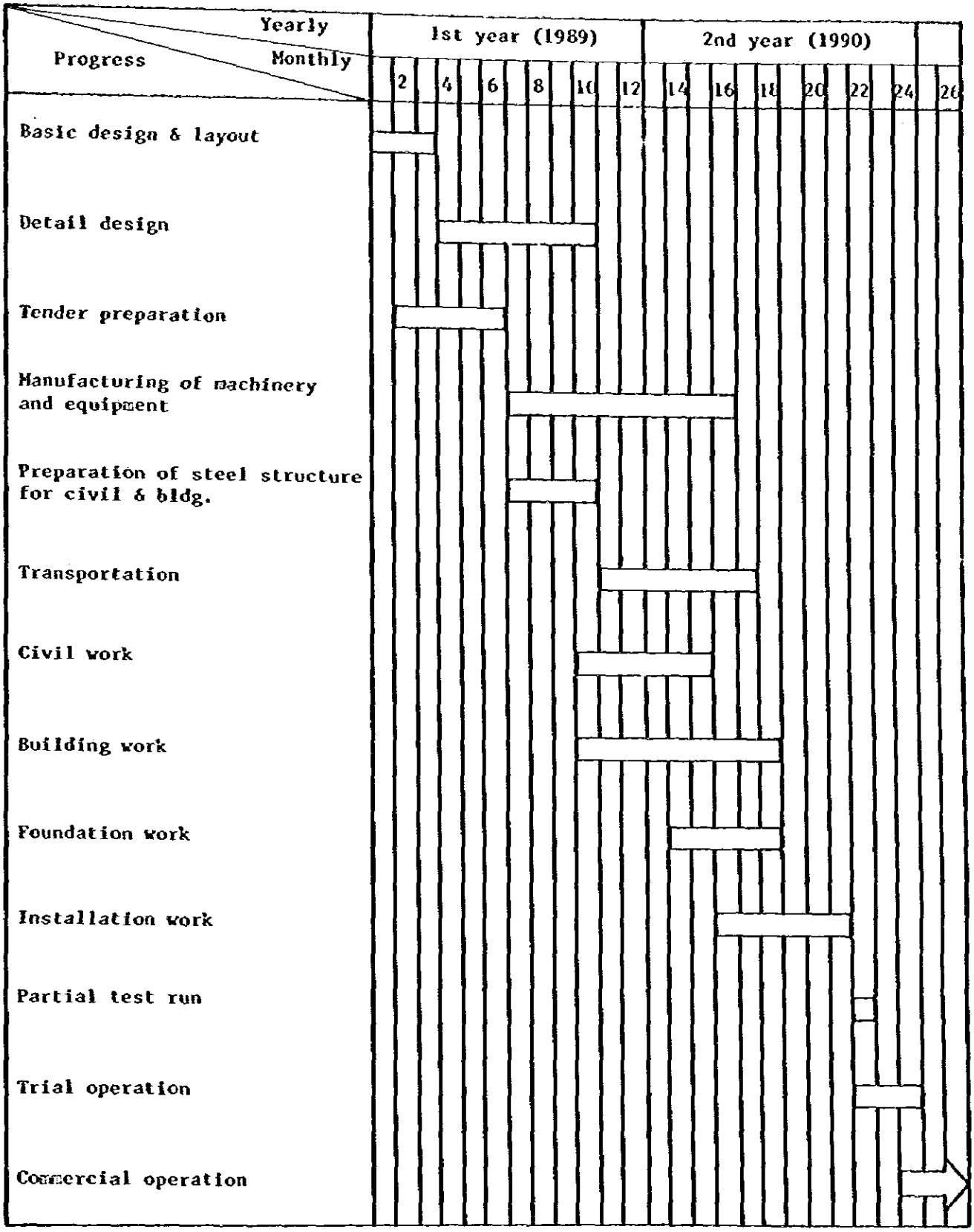


Fig. 4-5-4 Construction Schedule for PM4 Expansion

CHAPTER 5 OPERATION OF EXPANDED PLANTS

5. OPERATION OF EXPANDED PLANTS

5-1 Number of Operating Days

The number of operating days is set at 330 days per year.

Although the existing plant operates for 320 days per year, ten more days are added to the new plants to obtain a greater return on investment.

5-2 Number of Operators

Table 5-1-1 shows the number of employees necessary to operate the new plants (Flax Pulp Plant and PM4).

Existing PM2 shall be scrapped and built and the PM2 employees shall be transferred to the new plants.

Additional employees shall be recruited as needed and assigned to the new plants after training.

5-3 Plant and Quantity of Production (Refer to Table 5-1-2.)

1) Flax Pulp Plant

The Flax Pulp Plant shall have a nominal capacity of 10 t/d (9 BDt/d) or a designed capacity of 11 t/d.

This produces 3,300 tons (2,970 BD tons) of flax pulp based on 330 days of operation per year. Increasing the production to the designed capacity will be considered as the operators gain experience and the quality of the purchased linum (fiber and moisture content) improves.

Of the 2,970 BD tons produced annually, 1,320 BD tons shall be used within PPM (PM3 and PM4) and the balance of 1,650 BD tons shall be sold to other paper manufacturers in Indonesia.

2) PM4 cigarette paper machine

The PM4 cigarette paper machine is planned for a nominal capacity of 10 BDt/d (10.3 ADt/d), or designed capacity of 11 BDt/d. With this capacity, the machine can produce 3,300 BDt/d nominally, when operating for 330 days per year.

3) Rate of operation

The production rate can not be stabilized in the first year since the Flax Pulp Plant requires new operation techniques, and is also, dependent on the quality of the linum purchased. Therefore, the projected operation rate is 40% for the first year, 80% for the second year, and 100% in the third year of operation. It is possible to reach 110% operation from the fifth year as the techniques and conditions improve.

Although PPM has acquired sufficient skill by operating PM3, which has the same specifications as PM4, the operators must become familiar with the improvements in technology, increases in the flax pulp mixing rate and in the paper making speed. Accordingly, the plan is to reach an operation rate of 80% in the first year and 100% from the second year. According to the plan, 110% operation rate can be achieved, beginning with the fifth year.

Table 5-1-1 Labour Assignment Plan by Sections

Section	Employment form		Working form		Level of skill			
	Temporary	Regular	Shift	Daily work	A	B	C	Total
Managing section								
Supervision of flax material collection	-	2	-	2	-	1	1	2
Flax material receiving	-	1	-	1	-	1	-	1
Pulp & paper sales	-	2	-	2	-	2	-	2
Manager	-	2	-	2	2	-	-	2
Flax pulp plant								
Feed material processing	12	4	16	-	-	-	16	16
Charging to digester & cooking	-	12	12	-	-	4	8	12
Dust removal, washing & bleaching	8	8	16	-	-	4	12	16
Lapped pulp making, transportation & storage	8	4	12	-	-	-	12	12
Stock preparation								
Defibering purchased pulp	4	4	8	-	-	-	8	8
Stock preparation	-	8	8	-	-	4	4	8
White water & waste paper	-	4	4	-	-	-	4	4
Staff & stagger	-	2	-	2	-	1	1	2
Paper machine								
Machine operator	-	4	4	-	-	4	-	4
Wet section operator	-	4	4	-	-	-	4	4
Dry section operator	-	4	4	-	-	-	4	4
Finishing plant								
Bobbin operator	-	4	-	4	-	1	3	4
Winder operator	-	4	-	4	-	1	3	4
Sorter (female)	-	20	-	20	-	4	16	20
Packing	4	4	-	8	-	-	8	8
Total	36	97	88	45	2	27	104	133

Note) The personnel for electricity, boiler and maintenance are transferred from PM2, to PM3 and PM4 group.

Table 5-1-2 Production Plan by Years

(Unit: BDt)

Year	Daily production of flax pulp				PM4 daily production of cigarette paper	Annual production	
	Total	For sales	For PM3 use	For PM4 use		Flax pulp	Cigarette paper
1st year	3.6	0	1.4	2.2	8.0	1,188	2,640
2nd year	7.2	2.75	1.65	2.8	10.0	2,376	3,300
3rd year	9.0	4.55	1.65	2.8	10.0	2,970	3,300
4th year	9.0	4.55	1.65	2.8	10.0	2,970	3,300
5th year	9.9	5.0	1.8	3.1	11.0	3,267	3,630
From the 6th year	9.9	5.0	1.8	3.1	11.0	3,267	3,630

Note 1) Moisture content of flax pulp: 10% (nominal)
However, the moisture content of flax pulp for sales is 50 ±5%.

Note 2) Moisture content of cigrarette paper: 3 ±0.5% (actual rate)

Note 3) The first year shall mean the first year after the completion of construction and the start of operation.

CHAPTER 6 MANUFACTURING COST AND PROFIT CALCULATION OF EXPANSION PLAN

6. MANUFACTURING COST AND PROFIT CALCULATION OF EXPANSION PLAN

Table 6-1-1 and Table 6-1-2 are calculations of manufacturing costs in the fourth year after the start of operation for the Flax Pulp Plant and Cigarette Paper Plant, respectively.

6-1 Unit ratio and Variable Cost

The calculation for the variable cost based on the unit ratio according to the actual operation records of Japaneses cigarette paper mills and PPM-PM3. (PPM's raw material unit prices are as of February 1984, including a 10% price increase.)

6-2 Fixed Cost

1) Clothing and auxiliary materials

This cost estimate is based on PPM's actual records for 1983 and those of a similar mill in Japan.

2) Maintenance cost

3% of the variable cost of the Flax Pulp Plant is the estimate for maintenance cost, and 2% of the sales price for the cigarette paper plant.

Since PM4 is designed for compatibility with PM3, the need for spare parts can be substantially reduced.

3) Man power cost

As shown in Table 5-1-1, the total number of workers necessary to operate this plan is 133. The estimated personnel cost is about 30% higher than that in PPM's 1983 records. (The man power cost that can be saved by shutting down PM2 is not included in this cost calculation.)

4) Other expenses

Office expenses, welfare expense and other miscellaneous expenses are included in this item.

6-3 Depreciation Cost

The fixed installment method is applied to calculate the depreciation costs, based on the durable periods of ten years for the machinery and equipment, five years for transportation vehicles, thirty years for buildings and structures and ten years for other expenses.

Table 6-1-3 shows the calculation of depreciation costs.

6-4 Repayment of Loans and Interest Payable

The interest rate is 12% per annum on loans from foreign countries and 16% per annum on domestic loans. However, since the loans are paid back every year, the interest changes with the declining principal balance. This calculation is show in Table 6-1-4. It shows, US$2,208,000 as the total interests payable for all loans in both the foreign and local currency portions in the sixth year after starting construction, which is the fourth year after starting the operation (the manufacturing cost is calculated on this basis).

Table 6-1-1 Flax Pulp Plant: Production Cost at the 4th Year

No.	Cost element	Unit price	Combin'n ratio	Unit ratio of consumption	Consumption rate		Cost requirement	Unit cost	Remarks
					Daily	Yearly			
		Rp/	%	/BDkg	/day	/year	Rp x 1,000/year	Rp/BDkg	
A	Variable cost (UBFP)								10 ADt/d = 9 BDt/d
1	Linum (Raw flax)	194 /BDkg		3.539 BDkg	31,851 BDkg	10,510,830 BDkg	2,039,101	686.57	330 d/y
2	Sodium sulfate (Na_2SO_3)	430		3.361 x 0.25	7,562	2,495,460	1,073,048	361.30	against raw flax 3,361.34 kg/BDkg pulp
3	Caustic soda (NaOH)	485		3.361 x 0.03	907	299,310	145,165	48.88	
4	Electric power	85 /kWh		3.361 x 0.2 kWh	6,050 kWh	1,996,500 kWh	169,703	57.14	
5	Steam	18 /kg		3.361 x 0.9 kg	27,224 kg	8,983,920 kg	161,711	54.45	
B	Variable cost (BFP)								
6	Unbleached flax pulp			1,176.47 BDkg					
7	Bleaching chemical (Ca Hypo)	2,420 /BDkg		1.176 x 0.06	635 BDkg	209,550 BDkg	507,111	170.74	
8	Electric power	85 /kWh		1.176 x 1.7 kWh	17,993 kWh	5,937,690 kWh	504,704	169.93	
9	Mill water	20 /m^3		1.176 x 0.5 m^3	5,292 m^3	1,746,360 m^3	34,927	11.76	
10	Packing material	800 /kg		1.0 x 0.1 kg	900 kg	297,000 kg	237,600	80.00	
	Variable cost total						4,873,070	1,640.77	
C	Fixed cost								
1	Clothing material						60,000	20.20	
2	Maintenance cost						146,183	49.22	
3	Man power cost						97,446	32.81	
4	Other expenses						146,183	49.22	
5	Depreciation cost						550,160	185.24	
	Fixed cost total						999,972	336.69	
D	Pulp price for PPM use						5,873,042	1,977.46	Mill price
E	Selling expenses						48,738	16.41	
F	Selling tax ($2\frac{1}{2}$ ppn)						-	-	
G	Interest						441,600	148.69	
H	Total cost						6,363,380	2,142.55	
I 1	Selling price	2,453.00/BDkg				1,650,000	4,047,450	2,453.00	2,007 x 1.1/0.9
2	PPM use	1,977.46				1,320,000	2,610,247	1,977.46	
J	Sales amount					2,970,000	6,657,697	2,241.65	
K	Profit & loss						294,317	178.37	1,650 BDt/y sales

Table 6-1-2 PM4 Cigarette Paper: Production Cost at the 4th Year

No.	Cost element	Unit price	Combin'n ratio	Unit ratio of consumption	Consumption rate		Cost requirement	Unit cost	Remarks
					Daily	Yearly			
		Rp/	%	/BDkg	/day	/year	Rp x 1,000/year	Rp/BDkg	10 BDt/y
A	Variable cost								330 d/y
1	Flax pulp own made	1,978 /BDkg	30	0.271 BDkg	2,710 BDkg	894,300 BDkg	1,768,925	536.04	
2	NBKP purchased	630	60	0.543	5,430	1,791,900	1,128,897	342.09	
3	SBKP own made	400	10	0.090	900	297,000	118,800	36.00	
4	$CaCO_3$ French quality	600	30	0.271	2,710	894,300	536,580	162.60	
5	Potasium Citrat	1,870	5.5	0.055	550	181,500	339,405	102.85	
6	TiO_2	1,600	2.5	0.030	300	99,000	158,400	48.00	
7	Ultra marine	1,760	0.02	0.0002	2	660	1,162	0.35	
	Raw material total						4,052,169	1,227.93	
8	Electric power	85 /kWh		2.2 kWh	22,000 kWh	7,260,000 kWh	617,100	187.00	
9	Steam	18 /kg		4.2 kg	42,000 kg	13,860,000 kg	249,480	75.60	
10	Mill water	20 /m^3		0.3 m^3	3,000 m^3	990,000 m^3	19,800	6.00	
11	Packing materials	400 /kg		0.1 kg	1,000 kg	330,000 kg	132,000	40.00	
	Variable cost total						5,070,549	1,536.53	
B	Fixed cost								
1	Clothing material						191,000	57.88	
2	Maintenance cost						384,000	116.36	
3	Man power cost						271,986	82.42	
4	Other expenses						310,860	94.20	
5	Depreciation cost						2,200,640	666.86	
	Fixed cost total						3,358,486	1,017.72	
C	Selling expenses						135,993	41.21	
D	Selling tax						-	-	
E	Production cost						8,565,028	2,595.46	
F	Interest						1,766,400	535.27	
G	Total cost						10,331,428	3,130.74	
H	Selling price						11,750,739	3,560.83	Rp/ADkg 3,140 x 1.1/0.97
I	Profit & loss						1,419,311	430.09	

Table 6-1-3 Calculation Sheet of PPM-PM4 Depreciation Cost

(Unit: US$)

No.	Item	Basis	Amount	Depreciation period	Depreciation cost/year	Remarks
A	Machinery and equipment					
-1	Imported machinery (excluding transportation vehicles)	17,576,000 + 1,935,000 -50,000	19,461,000			FOB + CIF charge + inland transportation charge - transportation vehicle cost
-2	Foundation for machinery and equipment		1,406,000			
-3	Machinery installation		1,757,000			
-4	Reserve: for possible price increases		1,142,000			
		Subtotal	23,766,000	10 years	2,376,600	
B	Transportation vehicles	3 forklifts	50,000	5 years	10,000	
C	Civil and building works		2,109,000	30 years	70,300	
D	Other expenses					
-1	Engineering cost and supervising cost		1,142,000			
-2	Training fees		200,000			
-3	Contingency		1,142,000			
-4	Overhead		455,000			
		Subtotal	2,939,000	10 years	293,900	
		Total	28,864,000		2,750,800	

Table 6-1-4 Plans on Loans and Repayment for New Machines Installed in Padaralang Mill

(Unit: Rp 1,000)

	Foreign currency loan				Local currency loan				Payment on principal	Interest payable	Paid amount
	Loan	Balance at the beginning of the period	Repay-ment	Interest payable	Loan	Balance at the beginning of the period	Repay-ment	Interest payable	Total	Total	Total
	A	B	C	D=B*12%	E	F	G	H=F 16%	I=C+G	J=D+H	K=I+J
-2	9332000	9332000	0	1119840	0	0	0	0	0	1119840	1119840
-1	15176000	24508000	0	2940960	625500	625500	0	0	0	2940960	2940960
1	560000	25068000	2068000	3008160	0	625500	125500	100080	2193500	3108240	5301740
2	0	23000000	2300000	2760000	0	500000	200000	80000	2500000	2840000	5340000
3	0	20700000	2300000	2484000	0	300000	300000	48000	2600000	2532000	5132000
4	0	18400000	2300000	2208000	0	0	0	0	2300000	2208000	4508000
5	0	16100000	2300000	1932000	0	0	0	0	2300000	1932000	4232000
6	0	13800000	2300000	1656000	0	0	0	0	2300000	1656000	3956000
7	0	11500000	2300000	1380000	0	0	0	0	2300000	1380000	3680000
8	0	9200000	2300000	1104000	0	0	0	0	2300000	1104000	3404000
9	0	6900000	2300000	828000	0	0	0	0	2300000	828000	3128000
10	0	4600000	2300000	552000	0	0	0	0	2300000	552000	2852000
11	0	2300000	2300000	276000	0	0	0	0	2300000	276000	2576000
	25068000	—	25068000	22248960	625500	—	625500	228080	25693500	22477040	48170540

6-5 Sales Expenses

The estimate for sales expenses is approximately 1.5% of the sales price before tax. It is expected that PPM will take a more aggressive posture in sales strategy and market control.

6-6 Sales Tax

A sales tax is generally, charged on domestic sales as PPn (Pajak Penjualan); the tax rate on paper products is 2.5%.

PPM first selles the product and pays the sales tax (PPn) to the Government the following month.

6-7 Sales Prices

As of February 1984, the prices of imported flax pulp and cigarette paper that are equivalent to those produced by this project are 2,700 Rp/kg · AD and 3,140 Rp/kg · AD, respectively.

In case of these prices are used as the bone dry (BD) base, and with an estimated 10% increase in prices when sales begin, the sales prices of flax pulp and cigarette paper should be 2,453 Rp/kg · BD and 3,560 Rp/kg · BD, respectively.

These price estimates are relatively conservative considering the current upward trend of paper products.

6-8 Profit and Loss Calculation

Table 6-1-5 Annual Cost Accounting Sheet of PM4 shows the profit and loss for each of the years, reflecting the changes in production plan and interest payable.

The tax that is charged on profit before tax is only a corporate tax. This tax is calculated according to the guidelines shows below.

When the profit is expressed as "A" (= A1 + A2 + A3):

1) A1 ≦ 10 million Rp	: 15 A1/100
2) 10 million Rp ≦ A2 ≦ 40 millon Rp	: 25 A2/100
3) 40 millon Rp < A3	: 35 A3/100

Total: 0.15 A1 + 0.25 A2 + 0.35 A3

Table 6-1-6 shows the profit and loss statement for each year based on the above guidelines indicated above.

Table 6-1-5 PM4 Cost Accounting Sheet by Years

	Cost factor \ Year	(1989) -2	(1990) -1	(1991) 1	(1992) 2	(1993) 3	(1994) 4	(1995) 5	(1996) 6	(1997) 7	(1998) 8	(1999) 9	(2000) 10
A	Production (BDt/y)												
1	Flax pulp (internal use)	0	0	1,188	1,320	1,320	1,320	1,485	1,485	1,485	1,485	1,485	1,485
2	Flax pulp (for sales)	0	0	0	1,055	1,650	1,650	1,782	1,782	1,782	1,782	1,782	1,782
3	Cigarette paper	0	0	2,640	3,300	3,300	3,300	3,630	3,630	3,630	3,630	3,630	3,630
B	Manufacturing cost (1,000 Rp)												
1	Variable cost	0	0	6,005,667	8,967,364	9,943,619	9,943,619	10,937,981	10,937,981	19,937,981	10,937,981	10,937,981	10,937,981
2	Fixed cost (including general administrative expenses)	0	0	1,607,658	1,607,658	1,607,658	1,607,658	1,607,658	1,607,658	1,607,658	1,607,658	1,607,658	1,607,658
3	Depreciation cost	0	0	2,750,800	2,750,800	2,750,800	2,750,800	2,750,800	2,750,800	2,750,800	2,750,800	2,750,800	2,750,800
	Subtotal	0	0	10,364,125	13,325,822	14,302,077	14,302,077	15,296,439	15,296,439	15,296,439	15,296,439	15,296,439	15,296,439
4	Sales expenses (1,000 Rp)	0	0	147,785	184,731	184,731	184,731	203,204	203,204	203,204	203,204	203,204	203,204
	Manufacturing cost	0	0	10,511,910	13,510,553	14,486,808	14,486,808	15,499,643	15,499,643	15,499,643	15,499,643	15,499,643	15,499,643
C	Interest payable (1,000 Rp)	1,119,840	2,940,960	3,108,160	2,840,000	2,532,000	2,208,000	1,932,000	1,656,000	1,380,000	1,104,000	828,000	552,000 276,000
	Total cost	1,119,840	2,940,960	13,620,070	16,350,553	17,018,808	16,694,808	17,431,643	17,155,643	16,879,643	16,603,643	16,327,643	16,327,643
D	Sales amount (1,000 Rp)												
1	Flax pulp (internal use)	0	0	2,349,864	2,610,247	2,610,247	2,610,247	2,936,528	2,936,528	2,936,528	2,936,528	2,936,528	2,936,528
2	Flax pulp (for sales)	0	0	0	2,587,915	4,047,450	4,047,450	4,371,246	4,371,246	4,371,246	4,371,246	4,371,246	4,371,246
3	Cigarette paper	0	0	9,400,591	11,750,739	11,750,739	11,750,739	12,925,813	12,925,813	12,925,813	12,925,813	12,925,813	12,925,813
		0	0	11,750,455	16,948,901	18,408,436	18,408,436	20,233,587	20,233,587	20,233,587	20,233,587	20,233,587	20,233,587
E	Profit/loss (1,000 Rp)	-1,119,840	-2,940,960	-1,869,695	598,348	1,389,628	1,713,628	2,801,944	3,077,944	3,353,944	3,629,944	3,905,944	3,905,944

Table 6-1-6 Prospective Profit and Loss Statement by Year

(Unit: 1,000 Rp)

	1	2	3	4	5	6	7	8	9	10
Year	(1991)	(1992)	(1993)	(1994)	(1995)	(1996)	(1997)	(1998)	(1999)	(2000)
Production (t/y)										
Flax pulp (internal use)	1188	1320	1320	1320	1485	1485	1485	1485	1485	1485
Flax pulp (for sales)	0	1055	1650	1650	1782	1782	1782	1782	1782	1782
Cigarette paper	2640	3300	3300	3300	3630	3630	3630	3630	3630	3630
Total	3828	5675	6270	6270	6897	6897	6897	6897	6897	6897
Sales										
Flax pulp (internal use)	2349864	2610247	2610247	2610247	2936528	2936528	2936528	2936528	2936528	2936528
Flax pulp (for sales)	0	2587915	4047450	4047450	4371246	4371246	4371246	4371246	4371246	4371246
Cigarette paper	9400591	11750739	11750739	11750739	12925813	12925813	12925813	12925813	12925813	12925813
Total	11750455	16948901	18408436	18408436	20233587	20233587	20233587	20233587	20233587	20233587
Manufacturing cost										
Variable cost	6005667	8967364	9943619	9943619	10937981	10937981	10937981	10937981	10937981	10937981
Fixed cost	1607658	1607658	1607658	1607658	1607658	1607658	1607658	1607658	1607658	1607658
Depreciation cost	2750800	2750800	2750800	2750800	2750800	2750800	2750800	2750800	2750800	2750800
Total	10364125	13325822	14302077	14302077	15296439	15296439	15296439	15296439	15296439	15296439
Sales expenses	147785	184731	184731	184731	203204	203204	203204	203204	203204	203204
Interest payable	3108240	2840000	2532000	2208000	1932000	1656000	1380000	1104000	828000	828000
Profit before taxes	-1869695	598348	1389628	1713628	2801944	3077944	3353944	3629944	3905944	3905944
Corporation tax	0	204421	481369	594769	975680	1072280	1168880	1265480	1362080	1362080
Profit after taxes	-1869695	393927	908259	1118859	1826264	2005664	2185064	2364464	2543864	2543864

CHAPTER 7 PROFITABILITY AND ECONOMIC EFFECT OF THE EXPANSION PLAN

7. PROFITABILITY AND ECONOMIC EFFECT OF THE EXPANSION PLAN

7–1 Break-Even Point(BEP)

The break-even point of the Flax Pulp Plant and Cigarette Paper Plant in the fourth year (1994) is show in Fig. 7–1–1 and Fig. 7–1–2, respectively.

1) The break-even point for the Flax Pulp Plant is approximately 7.6 BDtons per day, when calculated on the basis of average prices (both on the costs and sales prices) including the flax pulp used for the production of cigarette paper by PM4 and flax pulp sold to consumers in Indonesia.
   Therefore, the production volume of this Flax Pulp Plant should be as close as possible to 7.2 BDtons/day, the quantity scheduled for the second year. The production rate of 9 BDtons/day planned for this project is appropriate.

2) The break-even point for the PM4 Cigarette Paper Plant is approximately 7.8 BDtons per day based on the use of flax pulp supplied by the Flax Pulp Plant.
   On this project, the production should come close to 8 BDtons per day, the rate as planned for the first year (1991) of operation as quickly as possible.
   For this reason, the production scale of 10 BDtons per day of this project is appropriate.

7–2 Calculation of Income and Expenses Funds

1) Table 6–1–6 shows the calculation of profits and losses by years.
   Except for the first year of operation (1991) in which a deficit (–1,869,695,000 Rp) is expected, this project is profitable in all years after the second year (1992).

2) Table 7–1–3 shows the calculation of income and expenses including repayment of loans.
   As the table show, the loans and interests can be paid back out of its own fund every year except for the first year of operation (1991). Up to the fifth year (1995) of operation, all local currency loans can be paid back and still leave a surplus of approximately 150,000,000 Rp.
   The surplus, up to the 10th year (2000) of operation will be a substantial amount, which will enable additional expansion of the paper making line if PPM can obtain a foreign loan. Once the PM5 line can be constructed, then PPM will have three cigarette paper machines with a total annual production of about 10,000 tons.
   If the flax pulp mixing rate is set at 30%, the plant will need 3,300 tons of flax pulp per year which indicates that planned capacity for the flax pulp plant is sufficient. (The mill water shortage problem must still be resolved)

3) The local currency portion of the total investment of US$36,705,000 is 31.7%. Therefore, the project needs US$11,011,500 which is 30% of the equity and an additional US$625,500 which is 1.7% local currency loan, and a long term loan of US$25,068,000 in foreigh currency.
   The fund recovery, which is the year accumulated surplus funds becomes equal to the total fund invested, is about 7.1 years after starting construction or about 5.1 years after starting operation.

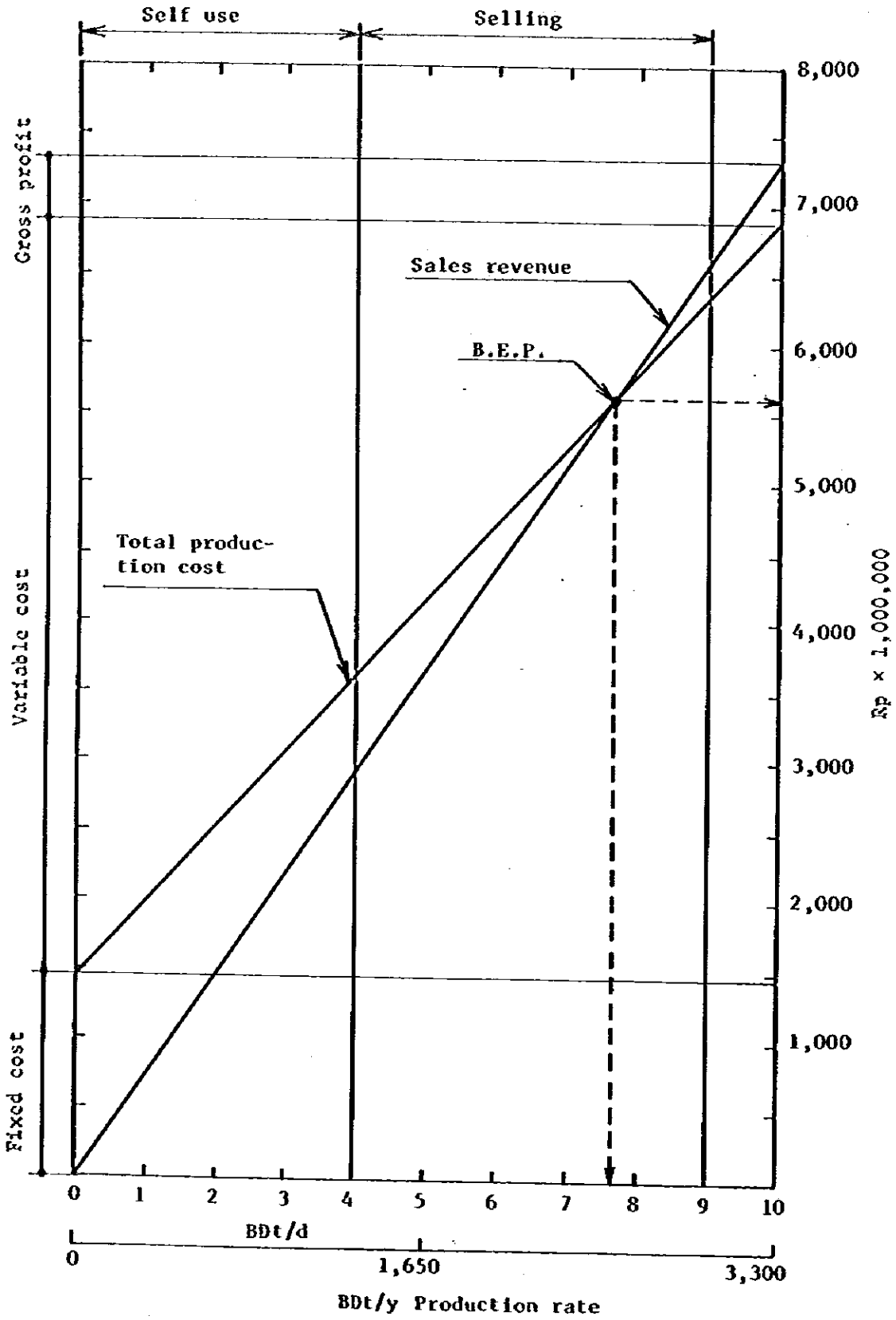


Fig. 7-1-1 Break Even Point of Flax Pulp Plant
(1,320 + 1,650) = 2,970 BDt/y (3rd year)

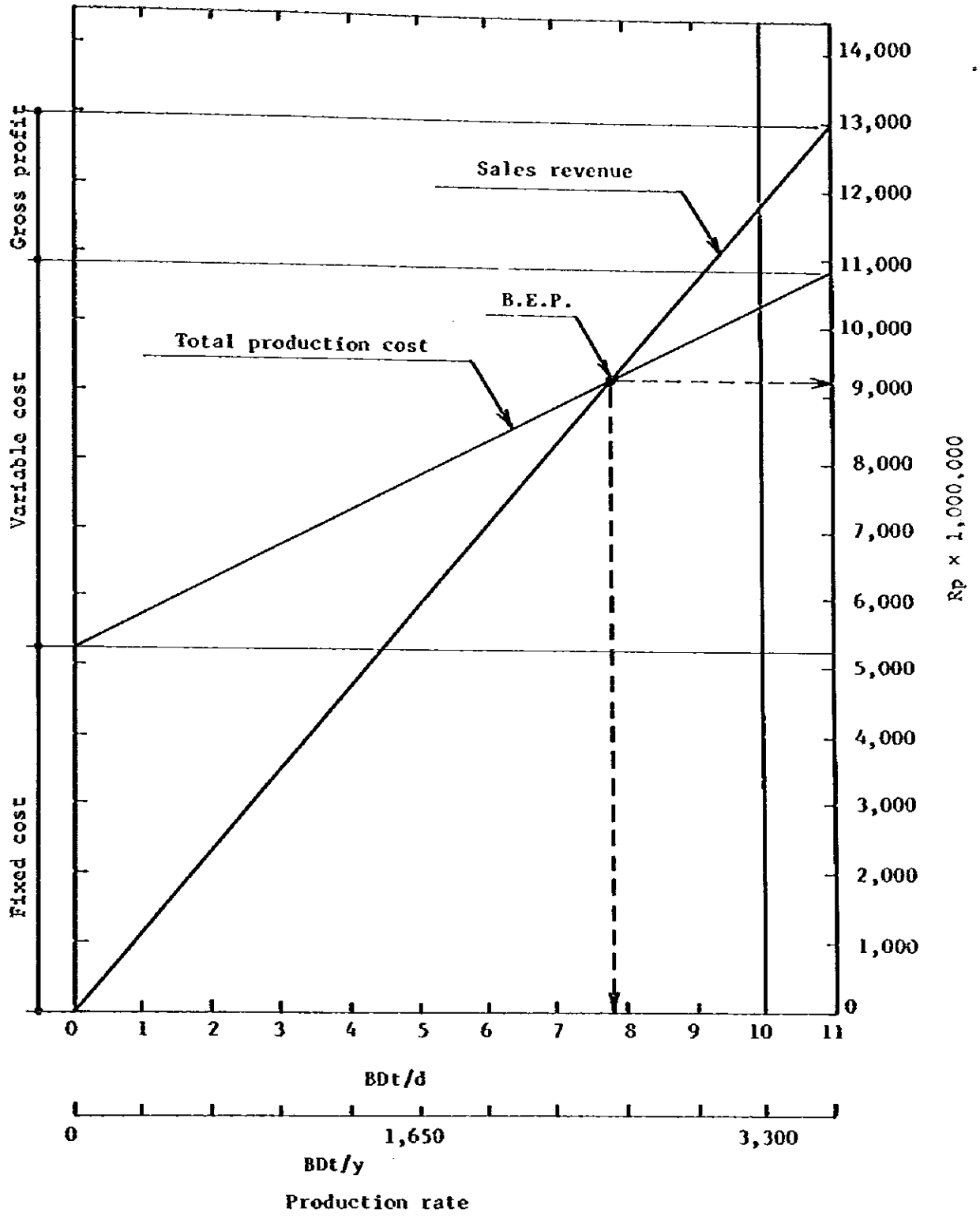


Fig. 7-1-2 Break Even Point of PM4 Plant
Cigarette paper 3,300 BDt/y
(3rd year of operation)

Table 7-1-3 Calculation of Income and Expenses for Each Year

(Unit: 1,000 Rp)

	Year	(1989) -2	(1990) -1	(1991) 1	(1992) 2	(1993) 3	(1994) 4	(1995) 5	(1996) 6	(1997) 7	(1998) 8	(1999) 9	(2000) 10
1	Profit after taxes	-1,119,840	-2,940,960	-1,869,695	393,927	908,259	1,118,859	1,826,264	2,005,664	2,185,064	2,364,464	2,543,864	2,543,864
2	Depreciation cost	0	0	2,750,800	2,750,800	2,750,800	2,750,800	2,750,800	2,750,800	2,750,800	2,750,800	2,750,800	2,750,800
3	Total of reserved funds	-1,119,840	-2,940,960	881,105	3,114,727	3,659,059	3,869,659	4,577,064	4,756,464	4,935,864	5,115,264	5,294,664	5,294,664
4	Loan repayment												
4.1	Foreign currency	0	0	2,068,000	2,300,000	2,300,000	2,300,000	2,300,000	2,300,000	2,300,000	2,300,000	2,300,000	2,300,000
4.2	Local currency	0	0	125,500	200,000	300,000	0	0	0	0	0	0	0
4.3	Total repayment	0	0	2,193,500	2,500,000	2,600,000	2,300,000	2,300,000	2,300,000	2,300,000	2,300,000	2,300,000	2,300,000
5	Surplus funds	-1,119,840	-2,940,960	-1,312,395	614,727	1,059,059	1,569,659	2,277,064	2,456,464	2,635,864	2,815,264	2,994,664	2,994,664
6	Accumulated surplus fund	-1,119,840	-4,060,800	-5,373,195	-4,758,468	-3,699,409	-2,129,750	147,314	2,603,778	5,239,642	8,054,906	11,049,570	14,044,234

Table 7-1-4 Profit Ratio and Debt Service Ratio against Loan by Years

Operation year	Production (BDt/y)				Operation rate (%)		Sales amount (1,000 Rp/y)	Profit (1,000 Rp/y)		Profit ratio on sales (%)		Turn over ratio of invested fund (%)	Profit ratio on invested fund (%)		Debt service ratio against the loan (%)
	BFP·I	BFP·II	C·P	Total	BFP	C·P		Before tax	After tax	Before tax	After tax		Before tax	After tax	
1 (1991)	1,188	0	2,640	3,828	40	80	11,750,455	-1,869,695	-1,869,695	-15.9	-15.9	0.320	-5.09	-5.09	76.6
2 (1992)	1,320	1,055	3,300	5,675	80	100	16,948,901	598,348	393,927	3.5	2.3	0.462	1.62	1.06	116.7
3 (1993)	1,320	1,650	3,300	6,270	100	100	18,408,436	1,389,628	908,259	7.5	4.9	0.502	3.77	2.46	128.4
4 (1994)	1,320	1,650	3,300	6,270	100	100	18,408,436	1,713,628	1,118,859	9.3	6.1	0.502	4.67	3.06	134.8
5 (1995)	1,485	1,782	3,630	6,897	110	110	20,233,587	2,801,944	1,826,264	13.8	9.0	0.551	7.60	4.96	153.8
6 (1996)	1,485	1,782	3,630	6,897	110	110	20,233,587	3,077,944	2,005,664	15.2	9.9	0.551	8.38	5.45	162.1
7 (1997)	1,485	1,782	3,630	6,897	110	110	20,233,587	3,353,944	2,185,064	16.6	10.8	0.551	9.15	5.95	172.6
8 (1998)	1,485	1,782	3,630	6,897	110	110	20,233,587	3,629,944	2,364,464	17.9	11.7	0.551	9.86	6.45	182.7
9 (1999)	1,485	1,782	3,630	6,897	110	110	20,233,587	3,905,944	2,543,864	19.3	12.6	0.551	10.63	6.94	195.7
10 (2000)	1,485	1,782	3,630	6,897	110	110	20,233,587	3,905,944	2,543,864	19.3	12.6	0.551	10.63	6.94	195.7
Total Average	14,058	15,047	34,320	63,425	98.0	105.0	186,917,750	22,507,573	14,020,534	12.0	7.50	0.509	6.11	3.82	151.9

BFP·I : Bleached Flax Pulp for internal use within PPM

BFP·II : Bleached Flax Pulp for sales to outside manufacturers

C.P : PM4 Cigarette Paper

Total investment cost : 36,705,000,000 Rp

Debt service ratio against the loan by year (%)

$$= \frac{\text{Depreciation + Interest payable + Profit after tax}}{\text{Principal repayment + Interest payable}}$$

7–3 Profit Ratio and Loan Repayment Ability (Debt Service)

Table 7–1–4 shows the calculation of profit ratio and debt service ratio for each year.

The profit ratio on sales is 9.0% and the profit ratio on the investment is approximately 5%, both after tax, in the fifth year of operation.

1) Average profit ratio over ten years

Profit ratio on sales after taxes	7.50%
Profit ratio on invested funds after taxes	3.82%

2) Average debt service for ten years

As shows in Table 7–1–4, this project cannot begin payments on the loan in the first year of operation only, but from the second year. The average debt service ratio against the loan for the ten years of operation is approximately 152%.

7–4 Loan Repayment Plan

Table 6–1–4 shows the repayment plan for foreign and local currency loans. The total necessary fund of US$36,705,000 is divided into US$25,068,000 to be borrowed in foreign currency and US$625,500 to be borrowed in local currency.

A grace period of two years is allowed on both of these loans, so that repayment begin in the first year of operation.

The loan on the foreign currency is to be repaid in eleven years. The loan on the local currency is to be repaid in three years starting with the first year of operation.

7–5 Saving of Foreign Currency

The estimated cigarette demand in the first year (1989) of construction is 17,000 to 21,000 t/y.

Assuming that the supply of domestic cigarette paper in Indonesia, including the current PPM production, is 7,000 t/yr, a minimum of 10,000 tons must be imported every year. If half of this volume or 5,000 t/yr, is high-grade cigarette paper and if the import duty is 60%, the Indonesia's foreign currency expenditure is:

10,000 (t/yr) x 1,000 (kg/t) x 0.5 x (3,560 x 0.97) (Rp/kg) x 0.4 x 0.001 (US$/Rp) = US$6,906,400/yr

In other words, about seven million US dollars must be paid out each year.

Therefore, if PPM can supply 3,630 t/yr, which is about 70% of the 5,000 t/yr, of cigarette paper imported Indonesia can save about four million US dollars each year (deducting the foreign currency element in manufacturing costs, that is, the payment for raw materials to be imported). Furthermore, since the flax pulp produced by PPM can be sold to other paper manufacturers in Indonesia, the imports by these manufacturers, can be reduced by approximately four million US dollar (1,650 t/yr x 2,453 Rp/kg). This brings, the total amount of foreign currency saved to eight million US dollars a year.

The total savings is equivalent to 3.1-year of payments on the US$25,068,000 borrowed in the foreign currency.

7-6 Internal Rate of Return (IRR)

Table 7-2-1 shows the IRR over a ten year period based on a stabilization of the figures for total investments and sales after the 5th year.

The IRR is 11.9%, exclusive of any increases in sales proceeds resulting from the increased supply of flax pulp to PM3, discontinuance of the unprofitable PM2 operation and any favorable effects gained from implementing the PM4 project.

1) Table 7-2-2 shows the estimated IRR based on an increase of 2.5% on the sales pirce against the scheduled sales for this project. The IRR would then be 13.1%.

Since the average annual sales total over the ten years of operation is 18,700 million Rp, an increase of 2,5% on the sales price is equivalent to 467 million Rp.

If PM3 can sell 33% of its annual cigarette paper production of 3,000 tons, or 1,000 tons per year, at a price equivalent to 80% of 3,560 Rp/kg at which PM4 cigarette paper is sold, and if the EAGLE (the brand produced by PM3 and currently sold at 2,200 Rp/kg) can be sold at 2,350 Rp/kg assuming 10% up of commodity price, the simple increase on the PM3 sales is calculated as follows:

$$1{,}000 \times (3{,}560 \times 0.8 - 2{,}350) \times 1{,}000 = 498{,}000{,}000 \text{ Rp/yr}$$

In other words, an increase in sales, of about 500 million Rp on the PM3 product can be expected.

It is clear that this figure is large enough for a favorable revision of the IRR on this project,.

2) Due to the mill water shortage, PM2 is to be shut down. However, since PM2 is not a profitable operation there can be advantages in shutting down this operation.

After the renovation, to be conducted in 1985, all equipment from PM2 can be transferred to PM3 and PM4, which will reduce the number of spare parts.

Also, the current plan for PM4 involves recruiting new employees. The changes in man power costs by transferring the skilled employees from PM2 may also be reviewed.

Table 7-2-0 Profit and Loss Statement of Expanded New-Paper Machine in Padalarang Mill (for IRR calculation)

Unit: 1,000 Rp

	-2	-1	1	2	3	4	5	6	7 → 10
Year	(1989)	(1990)	(1991)	(1992)	(1993)	(1994)	(1995)	(1996)	(1997→2000)
Production (t/y)									
Flax pulp (internal use)	–	–	1188	1320	1320	1320	1485	1485	1485
Flax pulp (for sales)	–	–	0	1055	1650	1650	1782	1782	1782
Cigarette paper	–	–	2640	3300	3300	3300	3630	3630	3630
Total	–	–	3828	5675	6270	6270	6897	6897	6897
Sales									
Flax pulp (internal use)	–	–	2349864	2610247	2610247	2610247	2936528	2936528	2936528
Flax pulp (for sales)	–	–	0	2587915	4047450	4047450	4371246	4371246	4371246
Cigarette paper	–	–	9400591	11750739	11750739	11750739	12925813	12925813	12925813
Total	–	–	11750455	16948901	18408436	18408436	20233587	20233587	20233587
Manufacturing cost									
Variable cost	–	–	6005667	8967364	9943619	9943619	10937981	10937981	10937981
Fixed cost	–	–	1607658	1607658	1607658	1607658	1607658	1607658	1607658
Depreciation cost	–	–	2750800	2750800	2750800	2750800	2750800	2750800	2750800
Total	–	–	10364125	13325822	14302077	14302077	15296439	15296439	15296439
Sales expenses	–	–	147785	184731	184731	184731	203204	203204	203204
Profit before taxes	–	–	1238545	3438348	3921628	3921628	4733944	4733944	4733944
Corporation tax	–	–	428490	1198421	1367569	1367569	1651880	1651880	1651880
Profit after taxes	–	–	810055	2239927	2554059	2554059	3082064	3082064	3082064
(Net cash flow)									
Investment	-9332000	-15801500	-3875000	0	0	0	0	0	0
Profit after taxes	0	0	810055	2239927	2554059	2554059	3082064	3082064	3082064
Depreciation cost	0	0	2750800	2750800	2750800	2750800	2750800	2750800	2750800
Total	-9332000	-15801500	-314145	4990727	5304859	5304859	5832864	5832864	5832864

Table 7-2-1 IRR of Expanded New-Paper Machine in Padalarang Mill
(Basic calculation)

Unit: 1,000 Rp

Year		Net flow	11.9 %		11.8 %	
-2	(1989)	-9332000	0.894	-8339589	0.894	-8347048
-1	(1990)	-15801500	0.799	-12619384	0.800	-12641969
1	(1991)	-314145	0.714	-224202	0.716	-224804
2	(1992)	4990727	0.638	3183050	0.640	3194454
3	(1993)	5304859	0.570	3023594	0.573	3037140
4	(1994)	5304859	0.509	2702050	0.512	2716583
5	(1995)	5832864	0.455	2655041	0.458	2671709
6	(1996)	5832864	0.407	2372691	0.410	2389722
7	(1997)	5832864	0.364	2120367	0.366	2137498
8	(1998)	5832864	0.325	1894877	0.328	1911894
9	(1999)	5832864	0.290	1693366	0.293	1710102
10	(2000)	5832864	0.259	1513285	0.262	1529608
				-24854		84889

IRR from the above: 11.9%

Table 7-2-2 IRR of Expanded New-Paper Machine in Padalarang Mill
(Case of 2.5% increase on the sales price)

Unit: 1,000 Rp

Year		Net flow	13.0%		13.1%	
-2	(1989)	-9332000	0.885	-8258407	0.884	-8251105
-1	(1990)	-15801500	0.783	-12374892	0.782	-12353019
1	(1991)	-123200	0.693	-85384	0.691	-85157
2	(1992)	5266147	0.613	3229827	0.611	3218419
3	(1993)	5603996	0.543	3041625	0.540	3028202
4	(1994)	5603996	0.480	2691703	0.478	2677455
5	(1995)	6161660	0.425	2619079	0.422	2602912
6	(1996)	6161660	0.376	2317769	0.374	2301425
7	(1997)	6161660	0.333	2051123	0.330	2034859
8	(1998)	6161660	0.295	1815153	0.292	1799168
9	(1999)	6161660	0.261	1606330	0.258	1590776
10	(2000)	6161660	0.231	1421531	0.228	1406522
				75457		-29544

IRR from the above: 13.1%

CHAPTER 8 CONCLUSIONS AND RECOMMENDATIONS

8. CONCLUSIONS AND RECOMMENDATIONS

8-1 Summary

We have described the renovation program for PPM, covering the following subjects: improving existing equipment, improving the quality, and technology transfer, that is planned for the long term profitability of PPM's operation. The goal is to contribute to its development as the only pulp and paper industry in the district.

This report contains the measures to be taken for the further development of PPM, at the time the PPM's management foundation has become stronger as a result of implementing the aforementioned renovation program.

As mentioned in the earlier report, PPM is a very promising mill for future development as an exclusively cigarette paper, and other special paper producing mill.

We believe that the mill has a good potential for future development and for the expansion of cigarette paper sales for the following reasons.

1) Indonesia at present depends on imports for a major portion of its cigarette paper, one of the main products of PPM. Although several private enterprises intend to begin cigarette paper production in the future which suggests severe competition in the future, PPM can save Indonesia the foreign currency spent for the imports if it can produce cigarette paper in a quality that is competitive with the imports. Furthermore, foreign currency can be generated by actively exporting the product to the ASEAN Countries, which will greatly support the national economic policy.

2) PPM has the technical knowledge and the expesience and is respected as the only cigarette paper making mill, not only in Indonesia but also among the ASEAN countries. PPM has the potential to produce cigarette paper in a quality that is competitive with the cigarette paper presently being imported.

3) Impvovement of Flax pulp, one of the main raw materials for cigarette paper is being pursued by the Indonesian Government as a matter of national policy. The Government is continuously conducting experiments in cultivation, Selective plant breeding, and pulping of linum in the Bandung district. It is believed that an improved supply system will be completed by 1991.

4) Mill water in sufficient quantities can be supplied to the expanded operation by shutting down one of the existing paper machines.

8-2 Outline of PM4 Paper Machine

1) On PM1: efforts should be made to demonstrate the effects of implementing the renovation program, thereby contributing to continuously increasing the profitability of the mill.

2) PM2 is shut down: By shutting down PM2, the mill water needed by PM4 can be secured and the unprofitable production of printing and writing paper can be stopped. Also, the skilled empolyees currently working on PM2 can be transferred to PM4 thus reducing the number of new employees for the expanded operation.

3) On PM3: 156 days out of the total annual operation of 316 days is converted to production of high-grade cigarette paper from the current semi-high-grade cigarette paper, thereby increasing the profitability.

4) PM4 is newly installed for production of high-grade paper at a rate of 10 BDt per day or 3,300 BDt per year.

5) A pulp plant is installed for production of flax pulp at a rate of 9 BDt per day, or 2,970 BDt per year.

6) Employee training and technical assistance.
Some employees are sent abroad for training.
Also, technical assistance will be provided by foreign engineers through the construction period.

7) Total required investment US$36,705,000 (including local currency portion of US$25,068,000)

8) Annual sales US$18,691,750 (not including the multiplied effect of PM3)

9) Construction period 23 months (1989-1990)

10) Number of new employees 133 (not includind the number of employees transferrable from PM2)

8-3 Market

The domestic market is adequate if the PM4 product can be made competitive in quality with the imported goods.
Also, the product can be exported to the ASEAN countries.

8-4 Raw Material for Flax Pulp

As a national policy, the Indonesian Government is promoting the development of linum. If this is successful, enough linum can be collected in the area surrounding PPM

8-5 Profit Forecast after Renovation Program Implementation

1) IRR after tax 11.9%

The IRR of this project by fixing the scheduled investment and annual sales after the 5th year is 11.9%, if the estimated increase in the product sales price is 2.5%, the IRR is 13.1%. The repayment for the investment is 5.1year after the start of operation.

2) Forecast for profit after tax

This project will have a deficit of 1,869,695,000 Rp after taxes in the first year of operation, but it will generate a profit from the second year of operation, earning an annual profit of 2,543,864,000 Rp after 1999.

3) Financial state

In 1991, the first year of operation, the fund is short by 1,312,395,000 Rp. After 1992, there will be no shortage of funds.

8-6 Conclusions and Recommendations

Based on the survey results herein described, this expansion project is feasible. Accordingly, we suggest that the following recommendation be implemented as quickly as possible and that the implementation of the expansion program be started when the appropriate environmental conditions have been set.

We recommend that the following items be reviewed or executed as quickly as possible in order to improve the infrastructure and realize this expansion program.

Such actions are very important, not only for the success of the expansion program but also for PPM's profits through more efficieny use of the existing equipment.

1) The renovation program must be implemented as soon as possible and PPM must solidify the management foundation and accumlate its own capital.

2) In the renovation program, the production and sales plan are limited to semi-high grade cigarette paper. However, trial production and sales of high-grade cigarette paper are possible and PPM must meet the challenge of establishing the techniques for production of high-grade cigarette paper.

3) PPM must aggresively pursue a sales promotion system and cultivate sales channels, these were also pointed out as important items in the renovation program.

4) The cultivation, selective plant breeding and pulping of linum, one of the main raw materials, must be aggressively promote in close cooperation with the related governmental bodies.

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