

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

FEBRUARY, 1985

JAPAN INTERNATIONAL COOPERATION AGENCY

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| 受入 月日 '85. 8. 22 | 108 |
| 登録No. 11855 | 69.5 |
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CHAPTER 1 INTRODUCTION

CHAPTER 2 SUMMARY

1. INTRODUCTION

- 1-1 As described in Chapter 2, Summary, this report is presented as an Appendix to the Feasibility study Report (hereinafter called F/S Main Report) submitted to the Directorate General of Basic Chemical Industries, Department of Industry of the Republic of Indonesia (hereinafter called DGBCI) by the Japan International Cooperation Agency (hereinafter called JICA) with regard to the renovation plan for Basuki Rachmat Pulp and Paper Mill (hereinafter called BRPP).
- 1-2 This report describes the results of the investigation on the installation of No. 2 Paper Machine of BRPP.
- 1-3 The paper produced by No. 2 Paper Machine shall be for use in Insonesia as well as for export to other countries. Therefore, the selected equipment must be capable of maintaining high quality standards and must also be equipped with an effluent treatment system for environmental protection.
- 1-4 This report shall be presented to DGBCI by JICA.

2. SUMMARY

2-1 History and Objectives of the Investigation

- 2-1-1 The Government of the Republic of Indonesia made a request to the Government of Japan for technical cooperation, relative to the renovation plan for pulp and paper plants in Indonesia.

The preliminary survey team sent by the JICA to Indonesia during period, December 21 to 28, 1983 investigated the preconditions for a full-scale feasibility study and clarified the scope of technical cooperation.

DGBCI and JICA agreed with the following Scope of the Study (hereinafter called S/S) with regard to the feasibility study, on December 26, 1983 to 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 thire Renovation from technical, financial and economic points of view and to formulate the renovation programs in order to contribute to increasing production efficiency and improving products quality.

2) Scope of the study

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

- (1) Present situation of and national policy on Pulp and Paper Industry in Indonesia.
- (2) Examination of management of the Mill.
 - (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 examination of machinery and equipment of the existing Mill.

- (3)-1 pulp
- (3)-2 stock preparation
- (3)-3 paper machine
- (3)-4 finishing
- (3)-5 chemical recovery
- (3)-6 utility

(4) Survey of raw material

(5) Survey of domestic market requirement

(6) Formulation of Renovation program

The Renovation program for the existing Mill and its management will be formulated, taking into account the improvement of environmental effects.

- (6)-1 renovation plan
- (6)-2 requirement for education and training and capital investment
- (6)-3 implementing schedule

(7) Financial analysis

(8) Economic evaluation

(9) Conclusion and recommendations

2-1-3 In its report, the JICA Preliminary Survey Team primarily focused on the installation of No. 2 Paper Machine (hereinafter called PM2) in BRPP as an objective of renovation plan, for further investigation, in a full-scale feasibility study. The investigation team covered the following points with regard to PM2:

- 1) Availability of raw materials
- 2) Selection of types of paper, production capacity and marketability.
- 3) The economic feasibility of the PM2 plan
- 4) Effectiveness in an existing plant
- 5) Effects on the profitability of the entire mill operation

2-1-4 This study group investigated the situation (as outlined in the S/S) during the period, from February 26 to March 27, 1984, and upon returning to Japan reviewed the results, and prepared an F/S. The F/S Main Report was officially submitted to DBGCI by JICA in October, 1984. This investigation team also prepared an F/S Appendix on PM2 (Expansion Plant) submitted herewith the F/S Main Report.

2-2 Outline of Basuki Rachmat Pulp and Paper Mill

2-2-1 History

Basuki Rachmat Mill (BRPP) started operation in 1969 to produce printing/writing paper out of bamboo pulp. BRPP is a vertically organized plant for pulp and paper, equipped with facilities for bamboo preparation and cooking and chemical recovery. The initially designed capacity was 30 tons/day.

The availability of bamboo, the primary raw material, has since become limited, forcing the mill to change from bamboo to pine and other hard woods, the current percentage of bamboo used is only about 10%, with the possibility of discontinuing its use completely in the near future.

In 1976, the paper machine was renovated for faster operation from 200 to 300 m/min, resulting in an increase in daily production (designed capacity) from 30 tons to 45 tons. However, due to the unstable pulp quality and aging equipment, the average daily production in 1983 was only about 34 tons.

This plant was built from the reparations paid by Japan after the war. Hence, from its inception, it has been closely related with Japan and receives aid both from the Japanese government and from private sources.

2-2-2 Location Banyuwangi City, Eastern Java

2-2-3 Major Equipment

- 1) Pulp plant
 - Daily production capacity : 30 ADt/d
 - Chipper : 4 units
 - Digester : 2 units of 50 m³ vertical type
 - Washing and Screen : 1 line of 3(4)-stage drums
 - Bleaching plant : 1 line of 5-stage (C-E-H-E-H) bleaching facilities.

- 2) Papermaking and Finishing
 - Daily production capacity : 45 ADt/d of a printing/writing paper as design (34 ADt/d as actual in 1983)

 - Paper machine : 2850 mm of Wire cloth width, 45~200 g/m² of Basis weight, 60~250 m/min of Speed

 - Finishing equipment : 1 double cutter, 1 winder

- 3) Chemical Recovery Plant
 - Evaporator : 1 line of 5 body-5 effects
 - Recovery boiler : 1 set
 - Causticizing equipment : 1 set

- 4) Auxiliary Facilities

- Electrolysis equipment : 1 set (1,200 KW)
 Power boiler : 1 unit (10 t/h)
 Diesel generator : 5 units (1,500KW x 3, 2,710KW x 2)
- 2-2-4 Mill Site Area : 50 ha
- 2-2-5 Number of Employees : 735 (as of 1984)
- 2-2-6 Status of Mill

1) Major investment made in past

1962 Toyo Menka Kaisha Ltd. concluded the plant construction contract with the Government of the Republic of Indonesia based on the Japanese reparation. (Construction cost: US\$8,500,000)

1962 Honshu Paper Co., Ltd. concluded a consulting contract with Toyo Menka Kaisha Ltd.

1976 Renovation of the paper machine for faster operation (833,000,000 Rp)

New installation of electrolysis equipment and diesel generators

Total cost: 2,302,000,000 Rp (US\$1.00=425 Rp)

2) Production Trends

KRp=1,000Rp

| Item | Year | 1980 | 1981 | 1982 | 1983 |
|-------------|------------|---------|--------|----------|------------|
| | Production | t/y | 12,873 | 12,702 | 12,595 |
| Profit/loss | KRp/y | 721,160 | 53,105 | -502,642 | -1,573,936 |

The production rate has remained relatively constant in the past four years. Unless the equipment is updated, there will be no significant change in the production level in the future.

The mill operation showed large deficits in 1982, and 1983. The following are the reasons:

- (1) Severe competition from the larger and more modern private mills.
 - Delay in modernizing existing equipment and in implementing the necessary energy conservation measures.
- (2) Reduction of the sales price forced by a decline in product quality
- (3) Increase in costs resulting from the mills unfavorable location
- (4) High raw material cost resulting from the use of higher-cost wood chips in stead of low-cost bamboo
- (5) Decrease in general efficiency and increase in the maintenance cost of aging equipment

In the impact of these factors on BRPP was further aggravated by the overall economic depression and oil price increases.

It is evident that unless steps are taken in the near future to improve this situation, the BRPP will be irreversibly damaged within several years.

The F/S Main Report submitted by JICA in October, 1984 analyzed these problems and proposed measures to improve BRPP's profitability.

2-3 Raw Material Availability

2-3-1 Raw Material Procurement

1) BRPP has a pulp production plant. However, as described in the F/S Main Report on the existing plant, increase in pulp production over the current level (as of 1983) is difficult. The following are the major reasons:

- (1) The collection areas for wood are moving out farther each year. -thereby-increasing transportation cost.
- (2) The control exercised by the Forestry Agency of the Indonesian government on the quantity and areas for logging wood limits BRPP's production plans.
- (3) As of 1983, the quantity of wood that may be cut has reached the limit, and there are no foreseeable increases in wood supply.
- (4) To increase pulp production, the pulp plant, itself, including the chemical recovery system, must be improved.

This requires a substantial investment which cannot be immediately offset by adequate production.

2-3-2 We therefore recommend in the report that the average daily production be set at about 29 ADI and that any shortages in material be supplemented by purchase.

2-3-3 Under the circumstances, our plan proposes purchasing all the pulp needed by the PM2 plant (expansion).

The prices of pulp to be purchased is as follows:

NBKP : US\$450/BDI

LBKP : US\$410/BDI

In the pulp prices indicated in the F/S Main Report are based on actual purchase prices:

Purchasing NBKP : US\$405.5/BDI

Purchasing LBKP : US\$355.5/BDI

2-4 Rate of Domestic Paper Supply in Indonesia and BRPP's Selection

2-4-1 The paper supply and demand profile in Indonesia for 1983 is shown below:

Unit: 1,000 t

| Paper Item | News print | Printing writings | Other types | Total |
|------------------|------------|-------------------|-------------|-------|
| Consumption | 120 | 193 | 351 | 664 |
| Production | - | 190 | 201 | 391 |
| Export | - | 7 | 3 | 10 |
| Import | 120 | 10 | 153 | 283 |
| Self sufficiency | 0% | 98% | 57% | 59% |

Source: Trade magazine "Paper", November 1984

2-4-2 The rate of domestic paper supply of printing/writing paper in Indonesia as of 1983 is high at 98%.

Currently, the 120,000 t/y of newsprint paper is all imported, however the newspaper machines, with a total capacity of 156,000 t/y (90,000 t/y by PT KERTAS LECES and 66,000 t/y by PT ASPEX), will start production in 1985.

The domestic supply meets 50 to 60% of the demand for industrial paper such as liner board paper, corrugated medium and sack paper. Once the planned project is implemented, the domestic supply of industrial paper will be able to meet a substantially larger percentage of the demand in the very near future.

2-4-3 The Republic of Indonesia's primary focus should be on increasing the rate of domestic paper supply of thin paper.

2-4-4 Printing/writing paper, liner board paper and corrugated paper, all of which are mass-production items, are not suitable new products for BRPP for the following reasons:

- (1) The availability of the raw material, wood is very limited.
- (2) Since BRPP is located far from the main market, the transportation cost is high, making BRPP costs less competitive.
- (3) The large amount of water necessary for the operation is not available.
- (4) Since the enterprises in the surrounding area are relatively undeveloped, everything necessary for BRPP's operation must be self-generated and supported.

2-4-5 Thin paper is, therefore, the most suitable product for BRPP, since it can be produced on a smaller scale with higher yield on investment.

2-4-6 The demand for thin paper in 1983 and the forecast for 1989 are shown below. The details are given in Table 3-3-1, F/S (Main Report).

| | 1983 | 1989 |
|-------------------------------|-----------|-----------|
| (1) Manifold | 7,500t/y | 10,500t/y |
| (2) N.C.R | 2,400t/y | 3,400t/y |
| (3) Base paper for Lamination | 2,000t/y | 3,800t/y |
| (4) Carbon base paper | 2,000t/y | 2,300t/y |
| (5) Glassine paper | 1,700t/y | 1,700t/y |
| (6) Soap wrapper | 1,500t/y | 2,100t/y |
| (7) Grease proof paper | 1,200t/y | 1,300t/y |
| Total | 18,300t/y | 25,100t/y |

2-5 Production Scale of No. 2 Paper Machine Plant

2-5-1 In 2-3 and 2-4, It was emphasized that due to the difficulty in procuring the raw material, wood, BRPP should use purchased pulp for the entire production, Furthermore the production of a variety of thin paper, each in small lots, would be more suitable for BRPP, instead of a mass production item.

2-5-2 Indonesia has already started production of three types of thin paper: manifold, N.C.R. and

carbon base paper. The demand in 1983 for thin paper, excluding these three was 6,400 t/y, the projected demand in 1989 is only 8,900 t/y.

2-5-3 BRPP already has a license to produce 6,000 t/y of thin paper from the Indonesian Government. BRPP is also planning for the PM2 plant expansion in 1989.

2-5-4 Since the consumption of thin paper in Indonesia is low and a large growth in consumption rate is not anticipated, the PM2 production rate was set at 6,020 ADt/y. BRPP has already obtained approval to construct a plant with a capacity of 6,000 ADt/y from the government.

2-5-5 The total BRPP production is 21,740 ADt/y, (6,020 ADt/y for PM2, Item 2-6-2 and 15,720 ADt/y for PM1-see Item 2-6-4).

2-6 Selection of Products for No. 2 Paper Machine

2-6-1 The PM2 plant should produce types of paper that are not being produced in Indonesia or imported, (e.g. base paper for lamination, glassine paper, soap wrapper and grease-proof paper).

2-6-2 Therefore, we planned the items for PM2 production as follows:

| | |
|-------------------------------|-------------------|
| (1) Base paper for Lamination | 1,700ADt/y |
| (2) Soap wrapper | 1,800ADt/y |
| (3) Glassine | 1,440ADt/y |
| (4) Grease proof paper | 1,080ADt/y |
| Total | 6,020ADt/y |

2-6-3 Among the types shown in the above table, the production of base paper for lamination and greaseproof paper, totaling 2,780 ADt/y, is converted from PM1 to PM2.

2-6-4 The consumption of from paper (computer paper) in 1989 is expected to be 12,900 ADt/y. After implementing the renovation plan, the existing PM1 can increase its production to 14,245 ADt/y.

If the PM1 is then used only for the production of printing/writing paper and form paper, it can increase its production to 15,720 ADt/y.

Changes PM1 production

| Grade | After renovation | | 1989 | |
|---------------------------|------------------|---------------|----------------|---------------|
| | d/y x ADt/d | ADt/y | d/y x ADt/d | ADt/y |
| Printing/writing | 263 | 11,770 | 263 | 11,770 |
| Oil proof | 25 x 16 | 400 | - | - |
| Base paper for lamination | 25 x 25 | 625 | - | - |
| Form paper | 29 x 50 | 1,450 | 79 x 50 | 3,950 |
| Total | 342 d/y | 14,245 | 342 d/y | 15,720 |

The profits on form paper (see table 13-4-2, F/S Main Report) is greater than that for other thin paper. Therefore, by constructing the PM2 plant and by changing the PM1 production line, the profits on the PM1 plant can be increased.

2-7 Marketability Study

2-7-1 Since there is no official data on current demand or projected demand for thin paper in Indonesia.

The JICA team based its estimates on discussions with importers/exporters and local paper dealers in Indonesia. The results are shown in Table 3-3-1, F/S (Main Report).

2-7-2 The production plan for PM2 plant is shown in Table 3-3-1.

This production level satisfies more than 85% of the demand in Indonesia.

The production is scheduled to reach 100% of capacity three years from the start of operation.

However, it must be noted that the sale of thin paper is not easy and BRPP will have to take a more aggressive posture in the domestic market as well as promoting exports to other ASEAN countries. Presently, the other ASEAN countries do not have a paper mill that can produce this type of paper. Therefore, if BRPP can successfully produce thin paper that is competitive in quality with the imported thin paper, BRPP should be able to find a significant market in the ASEAN countries.

2-7-3 Since, there are no construction plans for any other thin paper mill in the area, the construction of No. 2 Paper Machine is a valid program.

2-8 Setting the Sales Price

PM2 is designed exclusively for the production of thin paper and the sales prices are set as follows:

| | | |
|---------------------------|-----------|-------------|
| Base paper for Lamination | | 1,500 RP/kg |
| Soap Wrapper | (White) | 1,600 RP/kg |
| | (Colored) | 1,680 RP/kg |
| Glassine | (White) | 1,700 RP/kg |
| | (Colored) | 1,780 RP/kg |
| Grease Proof paper | | 1,500 RP/kg |

These sales prices were based on an evaluation of 1983 domestic prices in Indonesia.

2-9 Total Annual Sales of No. 2 Paper Machine

2-9-1 The annual sales calculation for PM2 is based on the plan described in 2-6-2 and 2-8.

The production of soap wrapper and glassine, white and colored, is set at 50% for each.

PM2 is to produce thin paper at a rate of 6,020 ADt/y. The total sales amount is 9,627.6 million Rp, which makes the average sales price 1,600 Rp/kg.

The details of sales amount are as follows:

| | | |
|-------------------------------|---------|---------------------------------------|
| (1) Base paper for Lamination | | 1,700 AD/y x 1,500 RP/kg=2,550 M.RP |
| (2) Soap wrapper | | |
| | White | : 900 AD/y x 1,600 RP/kg=1,440 M.RP |
| | Colored | : 900 AD/y x 1,680 RP/kg=1,512 M.RP |
| (3) Glassine | | |
| | White | : 720 AD/y x 1,700 RP/kg=1,224 M.RP |
| | Colored | : 720 AD/y x 1,780 RP/kg=1,281.6M. RP |
| (4) Grease proof | | : 1,080 AD/y x 1,500 RP/kg=1,620 M.RP |
| Total | | 6,020 AD/y 9,627.6M.RP |

2-10 Total Investment

- (1) Table 4-9-1 shows the total capital investment required.
- (2) The total investment is US\$26,802.873.

2-11 Turnover Ratio of Invested Funds

The turnover raio of invested fund is once in about 2.8 years.

CHAPTER 3 NO.2 PAPER MACHINE EXPANSION PLAN

3. No. 2 PAPER MACHINE EXPANSION PLAN

3-1 Policy and Summary

- 1) The purpose of an enterprise is continuity and growth, while, it pursues the dual objectives of making a profit and fulfilling its social responsibilities.
Particularly with BRPP, however, the emphasis is on its social responsibilities since it was originally constructed by the Indonesian Government in Banyuwangi City which was not an ideal location for the plant.
The expansion plan of PM2 has been formulated in order to be consistent with this principle.
- 2) In view of BRPP's unfavorable location, the PM2 expansion plan is designed to produce thin paper which is a small scale operation but a potentially profitable one.
PM2 is to focus on the production of four types of base paper for lamination, soap wrapper, glassine and grease-proof paper. Any PM1 products that overlap with the production of PM2 are to be shifted to PM2. In its stead PM1 will increase the production days for form paper. The production of form paper by PM2 at the start of the operation is to be increased to 3,950 t/y from 1,450 t/y, (the forecast for demand in 1990 is 12,900 t/y which suggests that this quantity can be sold).
- 3) All the pulp necessary for the paper production is to be purchased since the availability of the raw material, wood, is tenuous.
The production of thin paper is set at 6,020 ADt/y, and the number of operating days at 315 days per year.
- 4) By installing PM2, BRPP will have two paper machines.
This will allow BRPP more flexibility in the management of its operation in the unstable Indonesian paper market. Simultaneously, it can provide for the stabilization of employment and the stand and of living in the surrounding area of Banyuwangi City.
It must also be noted that Indonesia is now importing the entire quantity of thin it needs. By producing it domestically, PM2 can save the foreign currency, as well as pursue Indonesia's national policy of becoming self-sufficient in the production of most types of paper.

3-2 Basic Conditions for the Plant

- 1) All of pulp needed by the plant is to be purchased. The plant is to be equipped with stock preparation, paper machine and finishing equipment. Superior optimum equipment shall be selected for the production of thin paper to assure high quality and high efficiency in the plant operation.
- 2) For environmental protection the plant is to be equipped with an overall effluent treatment system (including the effluent from PM1).

3-3 Paper Types and Production

- 1) Paper types and daily production schedule.
 - Base paper for Lamination : 20 AD/D
 - Soap wrapper : 20 AD/D
 - Glassine : 18 AD/D
 - Grease proof paper : 18 AD/D
- 2) Annual production : 6,020 ADI
- 3) Number of operating days a year : 315 days

* Details are shown in Table 3-3-1.

3-4 Operation Conditions

- 1) Furnish combination

| | | | |
|---------------------------|------|---|------|
| | NBKP | : | LBKP |
| Base paper for Lamination | 30 | : | 70 |
| Soap wrapper | 35 | : | 65 |
| Glassine | 70 | : | 30 |
| Grease proof paper | 70 | : | 30 |
- 2) Freeness at Head box (0.3 gr mothed) : 500~600 cc
- 3) Consistency at Head box : 0.3~0.5 %
- 4) Chemical consumption : —

* Details are shown in Tables 3-3-2 and 3-3-3.

3-5 Efficiencies

- 1) Yield

| | |
|--------|---------|
| Fiber | : 90.0% |
| Filler | : 60.0% |
- 2) Total efficiency : 83, 85%
 - a) Operation efficiency : 98.0%
 - b) Sheet making efficiency : 96.5%
 - c) Finishing yield : 80, 90%

* Details are shown in Tables 3-3-1 and 3-3-3.

3-6 Paper Machine Specifications

- 1) Type of machine : Fourdrinier type paper machine
- 2) Machine speed
 - Design speed : 120~300 m/min
 - Operation speed : 166~239 m/min
- 3) Basis weight : 25~80 g/m²
- 4) Moisture at finished paper : 5~7 %
- 5) Trimmed width
 - Wire cloth width : 2,880 mm
 - Width after super-calender : 2,330 mm
 - Width after cutter : 2,250 mm
- 6) Drive for Paper machine : Sectional drive by thyristor system

* Details are shown in Tables 3-3-1 and 3-3-4.

3-7 Utilities

The utility consumption is set as follows:

Table 3-3-5 Utility Consumption

| Paper | Steam t/t paper | Electric kWh/t paper | Water m ³ /t paper |
|------------------------------|--------------------|-------------------------|----------------------------------|
| Base paper for Lamination | 3.5 | 1,800 | 280 |
| Soap wrapper | 3.5 | 2,000 | 280 |
| Glassine | 5.0 | 2,000 | 280 |
| Grease proof | 4.0 | 1,800 | 280 |

Table 3-3-1 Production Plan for No. 2 Paper Machine

| Grade | Basis weight | Production | | Operation | Machine speed | Trimming after S/C | Theoretical production | Efficiency | | | | Size press | Super calend. |
|---------------------------|------------------|------------|--------------|-----------|----------------|--------------------|------------------------|------------|---------------|----------|-------|------------|---------------|
| | | Amount | Daily | | | | | Op. eff. | Sheet. making | F. yield | Total | | |
| | g/m ² | ADt/y | ADt/d | Days | m/min | mm | ADt/24 hr | % | % | % | % | | |
| Base paper for lamination | 36.1 | 1,700 | 20.0 | 85 | 199.0 | 2,330.0 | 24.1 | 98.0 | 96.5 | 88.0 | 83.0 | | o |
| Soap wrapper (colored) | 30.0 | 1,800 | 20.0 | 45 45 | 239.4 | 2,330.0 | 24.1 | 98.0 | 96.5 | 88.0 | 83.0 | | o |
| Glassin (colored) | 28.5 | 1,440 | 18.0 18.0 | 40 40 | 226.8 226.8 | 2,330.0 2,330.0 | 21.69 | 98.0 | 96.5 | 88.0 | 83.0 | | o |
| Grease proof | 38.0 | 1,080 | 18.0 | 60 | 166.0 | 2,330.0 | 21.17 | 98.0 | 96.5 | 90.0 | 85.0 | | o |
| Total | - | 6,020 | Av. 19.11 | 315 | - | - | - | - | - | - | - | | - |

Note: Operating eff. = (1440 min - T₁ min)/1440 T₁ : Stoppage due to unexpected maintenance breakdown

Sheet making eff = (1440 min - T₂ min)/1440 T₂ : Stoppage due to unexpected product section breakdown

Finishing yield = Finished production for sold/actual net production on reel

Table 3-3-2 Furnish Combination and Chemical

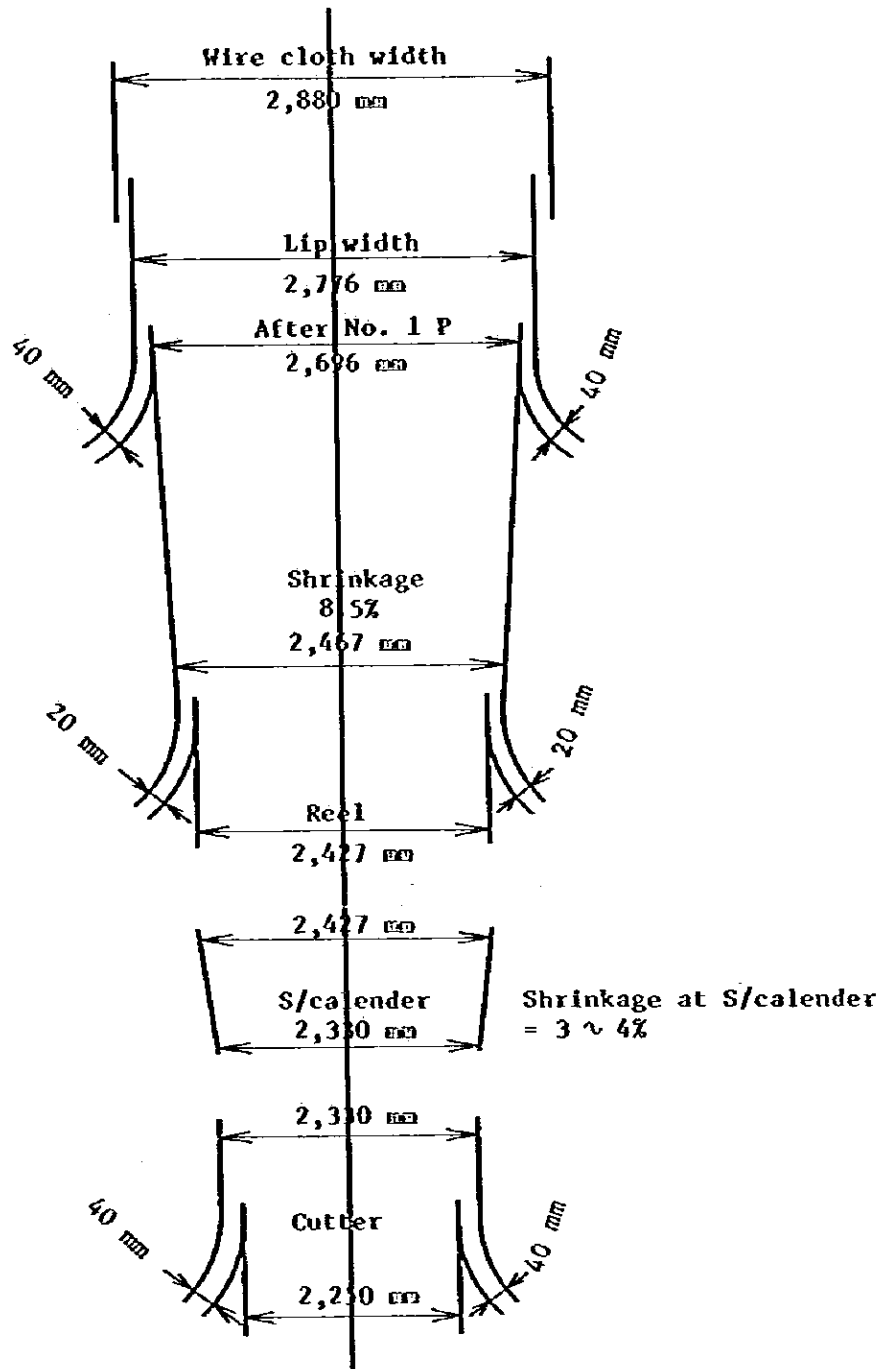
| Grade | Furnish combination | | Filler | | | Chemical | | | | | Dye stuff | Final freeness | |
|---------------------------|---------------------|------|-------------|-------------|-------------|---------------|-------------|----------------------|-----------------------------------|-----------------------|-------------------------------|----------------|-----------|
| | NBKP | LBKP | Kaolin A | Kaolin B | Talc | Pitch control | Size pine | Sheet strength agent | Alum | Drainage accelerative | | Freeness | Cons. |
| | % | % | kg/t. paper | kg/t. paper | kg/t. paper | kg/t. paper | kg/t. paper | kg/t. paper | kg/t. paper | kg/t. paper | kg/t. paper | csf | % |
| | | | | | | 100% solid | 30% solid | 10% solid | 8% Al ₂ O ₃ | | (powder) | | |
| Base paper for lamination | 30 | 70 | - | - | 180 | 0.6 | 10.0 | 3.0 | 17.0 | - | | 530/0.3 g | 0.3 ~ 0.5 |
| Soap wrapper | 35 | 65 | - | - | 50 | 0.6 | 12.0 | 3.0 | 17.0 | - | 4.0 kg/ADt paper as dye stuff | 600/0.3 g | 0.3 ~ 0.5 |
| Glassin | 70 | 30 | - | - | - | 1.5 | - | - | 7.5 | - | | 500/0.3 g | 0.3 ~ 0.5 |
| Colored glassine | | | | | | | | | | | | | |
| White milk | 70 | 30 | 6.0 | 17.0 | - | 0.5 | 7.5 | - | 7.5 | 7.5 | | | |
| Red | 70 | 30 | - | - | - | 0.8 | 40.0 | - | 7.5 | 10.0 | Scarlet 14.4 kg | | |
| Yellow | 70 | 30 | - | - | - | 0.8 | 40.0 | - | 7.5 | 10.0 | Yellow 11.7 kg | | |
| Orange | 70 | 30 | - | - | - | 0.8 | 40.0 | - | 7.5 | 10.0 | Blue 10 k, violet 6.7 kg | | |
| Chocolate | 70 | 30 | - | - | - | 0.8 | 40.0 | - | 7.5 | 10.0 | Scarlet 2.8 k, yellow 3.3 kg | | |
| | | | | | | | | | | | Brown 22.2 k, violet 4.5 kg | | |
| | | | | | | | | | | | Black 14.5 k | | |
| Grease proof | 70 | 30 | - | - | 10 | 1.5 | - | - | 7.5 | - | Oil resisting 20 kg | 500/0.3 g | 0.3 ~ 0.5 |

Table 3-3-3 Required Pulp and Chemical per 1 ADt Paper Products

| Description | | Base paper for laminate | Soap wrapper | Glassine | | | | Grease proof |
|-----------------------------|--------------------------------------|----------------------------|-----------------|------------|------------|------------|------------|-----------------|
| | | | | Regular | Red | Yellow | White milk | |
| 1. Production | | | | | | | | |
| Amount | ADt/y | 1,700.0 | 1,800 | 720 | | 720 | | 1,080 |
| Daily | ADt/y | 20.0 | 20 | 18.0 | | 18.0 | | 18.0 |
| Operation | d/y | 85 | 45 + 45 | 40.0 | | 40.0 | | 60.0 |
| Moisture of paper | % | 6 ~ 7.0 | 6 ~ 7.0 | 5 ~ 6.0 | | 5 ~ 6.0 | | 5 ~ 6.0 |
| 2. Finished paper | | per ADt. paper | | | | | | |
| NBKP | BDkg/ADt. paper | 247 / 30 | 320.0/ 35 | 665.0/ 70 | 665.0/ 70 | 665.0/ 70 | 655.0/ 70 | 660.0/ 70 |
| LBKP | BDkg/ADt. paper | 585 / 70 | 590.0/ 65 | 285.0/ 30 | 285.0/ 30 | 285.0/ 30 | 281.0/ 30 | 284.0/ 30 |
| Filler | BDkg/ADt. paper | 108 | 30.0 | 0 | 0 | 0 | 14.0 | 6.0 |
| Total | | 940.0/100% | 940.0/100% | 950.0/100% | 950.0/100% | 950.0/100% | 950.0/100% | 950.0/100% |
| 3. Yield | | | | | | | | |
| Fiber | % | 90.0 | 90.0 | 90.0 | 90.0 | 90.0 | 90.0 | 90.0 |
| Filler | % | 60.0 | 60.0 | - | - | - | 60.0 | 60.0 |
| 4. Required pulp | | | | | | | | |
| NBKP | BDkg/ADt. paper | 274.4 | 355.6 | 738.9 | 738.9 | 738.9 | 727.8 | 733.3 |
| LBKP | BDkg/ADt. paper | 650.0 | 655.6 | 316.7 | 316.7 | 316.7 | 312.2 | 315.6 |
| Total | | 924.4 | 1,011.2 | 1,055.6 | 1,055.6 | 1,055.6 | 1,040.0 | 1,048.9 |
| 5. Required filler | | | | | | | | |
| Kaolin | kg/ADt. paper | 0 | 0 | 0 | 0 | 0 | 23.0 | 0 |
| Talc | kg/ADt. paper | 180.0 | 50.0 | 0 | 0 | 0 | 0 | 10.0 |
| Total | | 180.0 | 50.0 | 0 | 0 | 0 | 23.0 | 10.0 |
| 6. Required chemical | | kg-Liq/ADt. paper | | | | | | |
| Pitch control agent | as 100% solid | 0.6 | 0.6 | 1.5 | 0.8 | 0.8 | 0.5 | 1.5 |
| Size pine | as: 30% solid | 10.0 | 12.0 | 0 | 40.0 | 40.0 | 7.5 | 0 |
| Sheet strength agent | as 10% solid | 3.0 | 3.0 | 0 | 0 | 0 | 0 | 0 |
| Alum | as 8% Al ₂ O ₃ | 17.0 | 17.0 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 |
| Drainage accelerative | as 30% solid | 0 | 0 | 0 | 10.0 | 10.0 | 7.5 | 0 |
| Dye stuff | powder | None | Yes | None | Yes | Yes | Yes | None |
| Oil resisting agent | as 15% solid | 0 | 0 | 0 | 0 | 0 | 0 | 20.0 |

Table 3-3-4 Arrangement of Trimmed Width

1. Sheet dimension : 750 mm × 1,000 mm
2. Sheet length after cutter: 750 mm × 3 = 2,250 mm
3. Trimmed width



CHAPTER 4 MAJOR EQUIPMENT COMPONENTS

4. MAJOR EQUIPMENT COMPONENTS

4-1 Stock Preparation

- 1) The stock preparation section shall have the necessary equipment for processing, including a pulper, cleaners, refiners and chemical plant.
Also, this section must have with a set of dry broke pulp line equipment as a separate line.
- 2) The pulper shall be of a batch type capable of defibering a pulp mixture, consisting of NBKP and LBKP.
- 3) Since greasy pulp of 500-600 CC (0.3 gr method) is required for the freeness final quality, in the combination of Double Disc Refiners and Deluxe Finer shall be used.
The pulp shall be circulated in the refiners for 'batch type' refining.
- 4) The 5-stage mixer shall be capable of producing colored tissue of various types.
- 5) The dry broke pulp shall be prepared through a separate line and mixed with virgin pulp in the last stage of stock preparation.
- 6) All necessary instruments and testers for production and quality control shall be installed.
- 7) Fig. 4-1-1 shows the flow chart.

4-2 Machine Approach System

- 1) The screening equipment and white water recovery equipment necessary for the final screening process shall be installed.
- 2) The fan pump shall be a DC motor drive type, with the lowest pulsation to stabilize the flow rate.
- 3) In order to stabilize the pulp consistency, the pulp and dilution water situated before the fan pump shall each have an independent head box, with a gauge to control and maintain constancy in the water level in the head box.

4-3 No. 2 Paper Machine (PM2)

- 1) Although PM2 is designed for the exclusive production of thin paper, it is also capable of producing extremely thin printing paper. It is also to be equipped with a size press to reduce chemical cost.
The paper machine model used shall be the multi cylinder type Fourdrinier.
- 2) In order to obtain uniformity in the products and stabilize paper quality, a B/M control system is to be installed.

3) The major specifications are shown in 3-6. Other specifications are as shown below.

- a) Head box at wire part : Enclosed air cushion type
- b) Press part : Combination press type with suction pick up roll
- c) Dryer part : Multi cylinders type
- d) Size press : Inclined type
- e) Reel : Horizontal double arm surface type
- f) Dryer Hood : Open hood type

4-4 Finishing Plant

- 1) Two sheet cutters and one super calender shall be prepared. Renovation of the winder is included in the renovation project for PM1. Since this rewinder operates at a low rate of 15 to 20%, far below its capacity, a winder, exclusively for PM2 shall not be necessary.

4-5 Steam Source

- 1) The volume of steam needed for this project is approximately 4.0 t/h for the normal production of glassine, and approximately 5.0 t/h at the very maximum. Since the existing boiler has no space for supplying PM2 with steam, one new boiler shall be installed. The capacity of this new boiler is to be 10 t/h x 16 kg/cm²G to be available during an emergency for use in cooking in the digesters:

- 2) Installing a new boiler will bring the total steam generation capacity to 624 t/24 hr.

Existing boiler:

$$(6 \text{ t/h R/B} + 10 \text{ t/h O/B}) \times 24 = 384 \text{ t/24 hr}$$

New boiler:

$$10 \text{ t/h O/B} \times 24 = 240 \text{ t/24 hr}$$

$$\text{Total} \qquad \qquad \qquad 624 \text{ t/24 hr}$$

The maximum volume of steam needed by No. 1 Paper Machine including the pulp plant is 338.5 t/h and the steam volume needed by No. 2 Paper Machine is 90 t/h, for making a total of 428.5 t/d. Assuming the need is 25% more at peak time, the total necessary volume is 535.6 t/d.

There is an allowance of about 17% in the steam generation capacity.

In the event of a break down in one of the three boilers, the generated steam volume is min. 16 t/h x 24 hr = 384 t/d. However, No. 1 and No. 2 paper machines can continue to secure enough volume of steam for their respective operations, printing paper and base paper.

| | |
|--------------------|----------|
| NO.1 Paper machine | 313.5 tD |
|--------------------|----------|

| | |
|---------------------|--------------------------|
| No. 2 Paper machine | 3.2 t/h x 20 t = 64.0 tD |
|---------------------|--------------------------|

| | |
|-------|----------|
| Total | 377.5 tD |
|-------|----------|

$$384 \text{ tD} > 377.5 \text{ tD}$$

4-6 Electric Power

1) The production of soap wrapper requires the most electricities $20 \text{ ADt/d} \times 2,000 \text{ kWh/t} = 40,000 \text{ kWh/d}$. Even if the electricity necessary for the boiler, feed-water and drainage system and illumination is added, the total consumption is about $44,000 \text{ kWh/d}$ ($1,834 \text{ kWh/hr}$).

2) BRPP has five diesel generators, with a total generation capacity of $238,080 \text{ kWh/d}$.

NIIGATA : $1500 \text{ kw} \times 24 \text{ Hr} \times 3 = 108,000 \text{ kWh/D}$

M.B.L : $2710 \text{ kw} \times 24 \text{ Hr} \times 2 = 130,080 \text{ kWh/D}$

Total : $238,080 \text{ kWh/D}$

3) The F/S (Main Report) indicates that three generators can generate of the necessary power even after the renovation.

4) According to the project estimates, four generators are sufficient to provide both No. 1 and No. 2 paper machines with the necessary electric power. This leaves one generator on standby, which is an ideal operation form.

4-7 Water Source

1) The maximum clear water consumption is calculated as follows: $20 \text{ ADt/d} \times 280 \text{ m}^3/\text{ADt} = 5,600 \text{ m}^3/\text{d}$.

The maximum water consumption of the existing No.1 Paper Machine is $15,000 \text{ m}^3/\text{d}$, making the maximum total water consumption $20,600 \text{ m}^3/\text{d}$.

2) The availability of water was the lowest during the dry season (November of 1983) at $21,500 \text{ m}^3/\text{d}$, even under such conditions operation is possible.

The water consumption of No. 1 Paper Machine is $300 \text{ m}^3/\text{ADt}$. However, since this machine will be used for the production of printing paper and form paper only, about $2,500 \text{ m}^3/\text{d}$ ($50 \text{ m}^3/\text{ADt} \times 50 \text{ t/d}$) of clear water can be saved.

4-8 Plant Layout

Fig. 4-8-1 and Fig. 4-8-2 show the layout of No. 2 Paper Machine.

4-9 Plant Construction Cost

The total investment necessary to construct the plant is US\$26,802,873 (US\$185,180,000 foreign currency and US\$8,284,873 local currency).

Table 4-9-1 shows the details of the construction fund.

The details of the machinery and equipment cost and the operating funds are shown in Tables 4-9-2 and 4-9-3.

4-10 Construction schedule and Duration

Fig. 4-10-1 shows the construction schedule. The total construction period is 29 months from the planning and engineering to the start of operation. The operation of existing No. 1 Paper Machine will not disturbed during the construction of the No. 2 plant.

4-11 Technical Cooperation

- 1) The those planned for this project will be produced in Indonesia for the first time. Therefore, it is assumed that none of the BRPP personnel possesses the necessary technical knowledge for operation and production control.
- 2) Equipment suitable for those production shall be selected to eliminate potential problems with the equipment. Since the market is already familiar with imported thin , the same quality will be expected from BRPP. If BRPP can produce thin paper equivalent in quality to the imports, the product will find a ready market, thus making this project a success.
- 3) The key to making this project successful is how well and how quickly the production control and operation techniques can be mastered. Therefore, it would be an advantage for BRPP to solicit the cooperation of a paper manufacturer who already has the experience and knowledge to assist in the engineering and in the training of personnel in operation techniques.
- 4) Therefore, expenses for BRPP to train its employees at a paper manufacturing plants (abroad) in for approximately 25 man-months and engineering fees for plant construction are included in the construction budget of this project.

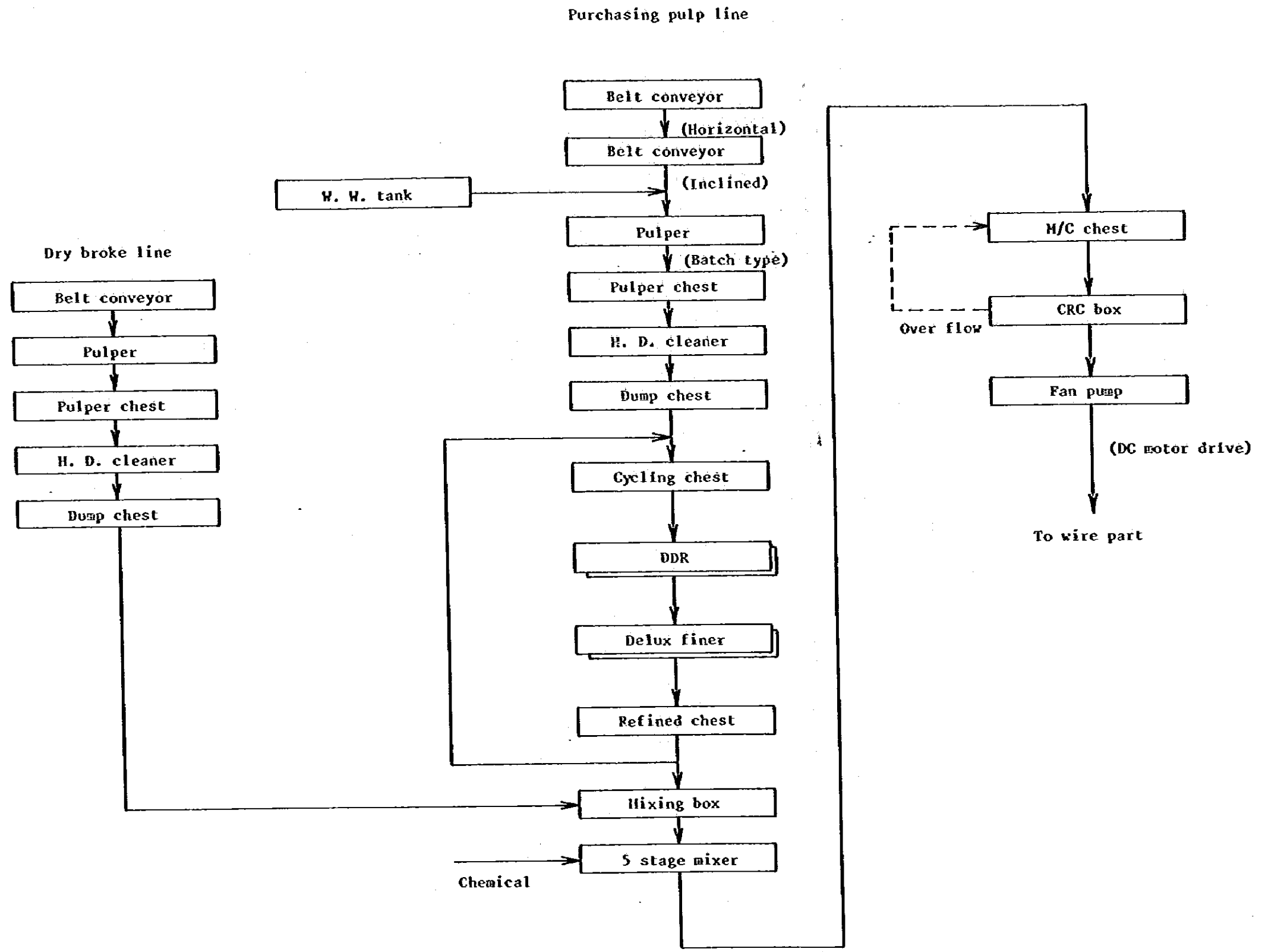


Fig. 4-1-1 Flow Chart of Stock Preparation for No. 2 Paper Machine

Table 4-9-1 Total Funds Required for No. 2 Paper Machine Expansion

Unit: US\$

| No. | Description | Condition | 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 | 12,878,000 | 12,878,000 | - | 3,863,000 | - | 9,015,000 | - | - | - |
| 2 | Civil & building works | 18.0% of FOB | 2,318,000 | 1,391,000 | 927,000 | 1,391,000 | 278,000 | - | 464,000 | - | 185,000 |
| 3 | Foundation works | 2.0% of FOB | 258,000 | - | 258,000 | - | - | - | 258,000 | - | - |
| 4 | Installation works | 10.0% of FOB | 1,288,000 | 193,000 | 1,095,000 | - | - | 193,000 | 1,095,000 | - | - |
| | Total (A) | | 16,742,000 | 14,462,000 | 2,280,000 | 5,254,000 | 278,000 | 9,208,000 | 1,817,000 | - | 185,000 |
| B | Total plant capital cost | | | | | | | | | | |
| 1 | Direct plant cost (A) | | 16,742,000 | 14,462,000 | 2,280,000 | 5,254,000 | 278,000 | 9,208,000 | 1,817,000 | - | 185,000 |
| 2 | Price escalation | (A) x 4% | 670,000 | 579,000 | 91,000 | 203,000 | 12,000 | 376,000 | 79,000 | - | - |
| 3 | Import tax & duty | As exemption | - | - | - | - | - | - | - | - | - |
| 4 | Freight & insurance | FOB x (6 + 4)% | 1,288,000 | 773,000 | 515,000 | 281,000 | 63,000 | 492,000 | 452,000 | - | - |
| 5 | Start up expenses | Wire cloth etc. | 200,000 | 170,000 | 30,000 | - | - | - | - | 170,000 | 30,000 |
| 6 | Construction overhead | (A) x 1% | 167,000 | 144,000 | 23,000 | 53,000 | 3,000 | 91,000 | 20,000 | - | - |
| 7 | Training cost | | 200,000 | 160,000 | 40,000 | - | - | 160,000 | 40,000 | - | - |
| 8 | Eng. & supervision | (A) x 5% | 837,000 | 837,000 | - | 460,000 | - | 377,000 | - | - | - |
| 9 | Overhead | (A) x 4% | 670,000 | 670,000 | - | 369,000 | - | 301,000 | - | - | - |
| 10 | Contingency | (A) x 5% | 837,000 | 723,000 | 114,000 | 434,000 | 23,000 | 217,000 | 68,000 | 72,000 | 23,000 |
| | Total (B) | | 21,611,000 | 18,518,000 | 3,093,000 | 7,054,000 | 379,000 | 11,222,000 | 2,476,000 | 242,000 | 238,000 |
| C | Total capital investment | | | | | | | | | | |
| 1 | Total plant capital cost | (B) | 21,611,000 | 18,518,000 | 3,093,000 | 7,054,000 | 379,000 | 11,222,000 | 2,476,000 | 242,000 | 238,000 |
| 2 | Interest during const. | | 3,039,600 | - | 3,039,600 | - | 846,480 | - | 2,193,120 | - | - |
| | Total (C) | | 24,650,600 | 18,518,000 | 6,132,600 | 7,054,000 | 1,225,480 | 11,222,000 | 4,669,120 | 242,000 | 238,000 |
| D | Working capital (D) | | 1,511,000 | - | 1,511,000 | - | - | - | - | - | 1,511,000 |
| | Payment | | 641,273 | - | 641,273 | - | - | - | 641,273 | - | - |
| | Grand total | | 26,802,873 | 18,518,000 | 8,284,873 | 7,054,000 | 1,225,480 | 11,222,000 | 5,310,393 | 242,000 | 1,749,000 |

Percent of foreign portion : $18,518,000 \times 100/26,802,873 = 69.1\%$ Percent of local portion : $8,284,873 \times 100/26,802,873 = 30.9\%$

Table 4-9-2 Break Down Price List of No. 2 Paper Machine of BRPP

1 US\$ = 230 Yen

| Item No. | Description | Q'ty | Price ¥1,000 | Price US\$ | Remarks |
|--------------------|--------------------------------|--------|--------------|---------------------|-----------------------------------------------------------------|
| 1 | Stock preparation | | | | |
| | 1) Stock preparation | 1 set | 300,000 | 1,304,000 | DDR. delux finer, pulper etc. |
| | 2) Chemical preparation | 1 set | 70,000 | 304,000 | Clay, alum, size, dye include fluorescent, starch etc. |
| | 3) Spare parts | | 20,000 | 87,000 | Disc plate for DDR and others |
| | Total | | 390,000 | 1,695,000 | |
| 2 | Paper machine & finishing equ. | | | | |
| | 2-1 Paper machine | | | | |
| | 1) Head box | 1 set | 50,000 | 217,000 | Air cushion pressurized, enclosed box type with multi-tube flow |
| | 2) Wire part | 1 set | 250,000 | 1,087,000 | Cantilever type, shaking device, 7-suc. box, 1-dandy roll |
| | 3) Press part | 1 set | 180,000 | 783,000 | Combination press type, suc-pickup roll, grooved roll, etc. |
| | 4) Dryer part | 1 set | 230,000 | 1,000,000 | 5-group dryer x 20pcs of dryer, 1,524 mmφ x 2850 mmL |
| | 5) Size press | 1 set | 60,000 | 261,000 | Inclined type |
| | 6) M/C calender | 1 set | 80,000 | 348,000 | |
| | 7) Slitter | 1 set | 8,000 | 35,000 | Shear cutting type |
| | 8) Reel | 1 set | 45,000 | 196,000 | Horizontal double arm surface type, 1500 mmφ of reeling roll |
| | 9) Drive system | 1 set | 120,000 | 522,000 | Sectional drive by thyristor system |
| | 10) BM control system | 1 set | 60,000 | 261,000 | |
| | Sub total | | 1,083,000 | 4,710,000 | |
| | 2-2 Finishing equipment | | | | |
| | 1) Sheet cutter | 2 sets | 150,000 | 652,000 | Double rotary cutter, 70 m/min of speed |
| | 2) Super-calender | 1 set | 300,000 | 1,304,000 | Directed loading system, 400 m/min of speed |
| | 3) Roll grinding machine | 1 set | 50,000 | 217,000 | |
| | Sub total | | 500,000 | 2,173,000 | |
| | 2-3 Auxiliary equipment | | | | |
| | 1) Vacuum system | 1 set | 50,000 | 217,000 | Wire part and press part |
| | 2) Dryer hood | 1 set | 50,000 | 217,000 | Open hood type pocket ventilation system |
| 3) Drainage system | 1 set | 35,000 | 152,000 | Blow through system | |

| Item No. | Description | Q'ty | Price ¥1,000 | Price US\$ | Remarks |
|----------|------------------------------------------------------|--------|---------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------------------------------------|
| | 4) Lubrication system | 1 set | 20,000 | 87,000 | Forced circulating system |
| | 5) Operation panel | 1 set | 20,000 | 87,000 | |
| | 6) Screen, white water re-recovery & broke treatment | 1 set | 65,000 | 283,000 | 3 stage centri-cleaner with vacuum pumps, vertical pressure screen, agitator of dry broke and couch pit |
| | 7) Pumps | 1 set | 20,000 | 87,000 | 17 pumps |
| | 8) Instrumentation | 1 set | 50,000 | 217,000 | |
| | 9) Electric equipment | 1 set | 80,000 | 348,000 | |
| | 10) Crane, paper roll handling | 1 set | 100,000 | 435,000 | Overhead crane (10t+5t+5t), reel crane (2t+2t), for super calender |
| | 11) Piping materials | 1 set | 40,000 | 174,000 | |
| | 12) Compresser | 1 set | 15,000 | 65,000 | 1 set of 6 m ³ /min for mill air, 1 set of 2.2 m ³ /m for inst. air |
| | 13) Testing equ. for mill site | 1 set | 5,000 | 22,000 | |
| | Sub total | | 550,000 | 2,391,000 | |
| | 2-4 Spare parts | | 207,000 | 900,000 | |
| | Total | | 2,340,000 | 10,174,000 | |
| 3 | Fork lift | 3 sets | 12,000 | 52,000 | |
| 4 | Package boiler | 1 set | 60,000 | 261,000 | 10 ton/hr x 16 kg/cm ² pressure with soft water treatment |
| 5 | Sub station | 1 set | 30,000 | 131,000 | |
| 6 | Water & effluent treatment | 1 set | 90,000 | 391,000 | |
| 7 | Communication equipment | 1 set | 6,000 | 26,000 | Telephone, hand-set at mill site |
| 8 | Fire fighting equipment | 1 set | 34,000 | 148,000 | |
| | Grand total | | 2,962,000 include spare parts of 227,000 | 12,878,000 include spare parts of 987,000 | |

Table 4-9-3 Working Capital

| Description | Raw material | | Calculation |
|---------------------------------------|--------------|------------|-------------------------------------------------------------|
| | Price Rp/kg | Amount t/y | |
| 1. Raw material inventory | | | |
| 1-1. Import material (3 month) | | | |
| NBKP | 450 | 2,959.74 | $450 \times 2,959.74 \times 1/4 \times 1,000 = 332,971,000$ |
| LBKP | 410 | 3,080.84 | $410 \times 3,080.84 \times 1/4 \times 1,000 = 315,786,000$ |
| Sheet strength agent | 720 | 10.50 | $720 \times 10.50 \times 1/4 \times 1,000 = 1,890,000$ |
| Pitch control agent | 3,000 | 5.30 | $3,000 \times 5.30 \times 1/4 \times 1,000 = 3,975,000$ |
| Drainage accelerative | 2,300 | 6.57 | $2,300 \times 6.57 \times 1/4 \times 1,000 = 26,615,000$ |
| Oil resisting agent | 3,000 | 21.60 | $3,000 \times 21.60 \times 1/4 \times 1,000 = 16,200,000$ |
| Sub total | | | 701,215,000 |
| 1-2. Local material (1 month) | | | |
| Clay | 120 | 412.60 | $120 \times 421.60 \times 1/4 \times 1,000 = 4,126,000$ |
| Size | 500 | 59.21 | $500 \times 59.21 \times 1/4 \times 1,000 = 2,467,000$ |
| Alum | 90 | 78.40 | $90 \times 78.40 \times 1/4 \times 1,000 = 588,000$ |
| Sub total | | | 7,181,000 |
| Total | | | 708,396,000 |
| 2. Product inventory (1 month) | | | Sales amount $9,627,600,000 \times 1/12$ = 802,300,000 |
| Grand total | | | 1,510,696,000 → 1,511,000,000 Rp |

Fig. 4-10-1 No. 2 Paper Machine Expansion Schedule Plan

| Description | 1st year | | | | | | | | | | | | 2nd year | | | | | | | | | | | | 3rd year | | | | | | | | | | | |
|----------------------------------------|---------------------|---|---|---|---|---|---|---|---|----|----|----|-------------------|---|---|---|---|---|---|---|---|----|----|----|-------------------------|---|---|---|---|---|---|---|---|----|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1. Engineering works | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| a) Field survey for construction | [Bar from 1 to 2] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| b) Preparation of tender specification | [Bar from 2 to 3] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| c) Call for tender | [Bar from 4 to 6] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| d) Evaluation of proposal | [Bar from 6 to 8] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| e) Decision of suppliers | [Bar from 9 to 10] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| f) Check & approval of drawing | [Bar from 10 to 12] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| g) Inspection and witness | [Bar from 5 to 6] | | | | | | | | | | | | [Bar from 8 to 9] | | | | | | | | | | | | | | | | | | | | | | | |
| h) Documentation | [Bar from 10 to 12] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2. Construction works | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| a) Design for machineries | [Bar from 10 to 12] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| b) Manufacturing the machineries | [Bar from 10 to 12] | | | | | | | | | | | | [Bar from 1 to 3] | | | | | | | | | | | | [Bar from 7 to 9] (S/C) | | | | | | | | | | | |
| c) Shipping | [Bar from 10 to 12] | | | | | | | | | | | | [Bar from 1 to 3] | | | | | | | | | | | | [Bar from 7 to 9] (S/C) | | | | | | | | | | | |
| d) Erection and installation | [Bar from 10 to 12] | | | | | | | | | | | | [Bar from 1 to 3] | | | | | | | | | | | | [Bar from 7 to 9] | | | | | | | | | | | |
| Paper machine, stock preparation | [Bar from 10 to 12] | | | | | | | | | | | | [Bar from 1 to 3] | | | | | | | | | | | | [Bar from 7 to 9] | | | | | | | | | | | |
| Super calender | [Bar from 10 to 12] | | | | | | | | | | | | [Bar from 1 to 3] | | | | | | | | | | | | [Bar from 7 to 9] | | | | | | | | | | | |
| Boiler and others | [Bar from 10 to 12] | | | | | | | | | | | | [Bar from 1 to 3] | | | | | | | | | | | | [Bar from 7 to 9] | | | | | | | | | | | |
| e) Civil and building works | [Bar from 10 to 12] | | | | | | | | | | | | [Bar from 1 to 3] | | | | | | | | | | | | [Bar from 7 to 9] | | | | | | | | | | | |
| 3. Operation works | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| a) No load operation | [Bar from 10 to 12] | | | | | | | | | | | | [Bar from 1 to 3] | | | | | | | | | | | | [Bar from 7 to 9] | | | | | | | | | | | |
| b) Test running (Day run) | [Bar from 10 to 12] | | | | | | | | | | | | [Bar from 1 to 3] | | | | | | | | | | | | [Bar from 7 to 9] | | | | | | | | | | | |
| c) Test running (Full run) | [Bar from 10 to 12] | | | | | | | | | | | | [Bar from 1 to 3] | | | | | | | | | | | | [Bar from 7 to 9] | | | | | | | | | | | |
| d) Performance Guarantee test | [Bar from 10 to 12] | | | | | | | | | | | | [Bar from 1 to 3] | | | | | | | | | | | | [Bar from 7 to 9] | | | | | | | | | | | |
| 4. Training at foreign country | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| [Blank] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5. Operation supervision | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| [Blank] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

CHAPTER 5 OPERATION OF THE EXPANDED PLANT

5. OPERATION OF THE EXPANDED PLANT

5-1 Number of Operating Days

The number of operating days is set at 315 days a year.

This is a reduction from the current number of operating days on the existing plant of 342 days. This is to allow for the increased time necessary for the frequency of paper change for the production of multiple types of paper, each in small lots, and for cleaning of the chests, rolls and wire cloth for colored paper production.

5-2 Number of Personnel

The total number of personnel necessary to operate this plant is 158 (details are shown in Table 5-2-1).

5-3 Production and Production Plan

1) Production of No. 2 Paper Machine

The nominal capacity of PM2 is set at 20 ADI/d (6,020 ADI/y). The overall efficiency of this plant is set at 83% (85% on some grades). Raising the overall efficiency to 89% or 90% can be expected in the future when the level of expertise in operation techniques is improved. The estimated annual production is then approximately 6,800 ADI.

2) Operation rate

For the following reasons, the thin paper production rate is set at 50% in the first year, 80% in the second year and 100% in the third year.

1. Since thin paper is produced for the first time and the quality of the production must be the same as that of imported thin, the production may not proceed smoothly in the early stages.
2. The Indonesian market for BRPP thin must be cultivated anew and the full scale production must wait until the market responds favorably to the product.

Table 5-2-1 Man Power Schedule

| Section | Members (person) | | |
|---------------------------------------|------------------|--------|--------|
| | Day work | Shift | Total |
| a. Stock preparation (3-shift) | | | |
| 1) Chief of shift | - | 4 | 4 |
| 2) Operators | - | 12 | 12 |
| 3) Pulper & chemical | - | - | - |
| Sub total | - | 16 | 16 |
| b. Paper machine (3-shift) | | | |
| 1) Chief of section | 1 | - | 1 |
| 2) Staff | 1 | - | 1 |
| 3) Laboratory in field | - | 4 | 4 |
| 4) Chief of shift | - | 4 | 4 |
| 5) Operators | - | 12 | 12 |
| Sub total | 2 | 20 | 22 |
| c. Finishing section (3-shift) | | | |
| 1) Chief of shift | - | - | - |
| 2) Super calender operators | - | 16 | 16 |
| 3) Sheet cutter and winder operators | - | 24 | 24 |
| Sub total | - | 40 | 40 |
| d. Finishing section (2-shift) | | | |
| 1) Chief of shift | - | - | - |
| 2) Soaters and counters | - | 40 (F) | 40 (F) |
| 3) Packing operators | - | 20 (F) | 20 (F) |
| 4) Stagger | - | 14 (F) | 14 (F) |
| Sub total | - | 74 (F) | 74 (F) |
| e. Boiler section | - | ±0 | 0 |
| f. Engineering section | - | ±0 | 0 |

| Section | Members (person) | | |
|------------------|------------------|------------|------------|
| | Day work | Shift | Total |
| g. Laboratory | 2 | - | 2 |
| h. Sales section | 4 | - | 4 |
| Total | 8 | 150 | 158 |

Male : 84 persons

Female : 74 persons

Total : 158

CHAPTER 6 FINANCIAL EVALUATION

6. FINANCIAL EVALUATION

6-1 Basic Policy of Financial Evaluation

When the project plans are executed and the effects are determined, the effects from investment on the existing mill and that from the new plant overlap making it difficult to isolate the effects of the new investment. Therefore, we evaluated the effects as follows.

- 1) The profits and losses on the installation of a new paper machine is calculated. This means that the impact on the existing plant is excluded from the calculation.
- 2) The equipment, administrative and personnel expenses that are shared by the new plant and the existing plant are divided according to the sales ratio for each paper machine. The results are added as a fixed cost.
- 3) The evaluation is to start in 1989, (the fiscal year adopted for BRPP is January-December).
- 4) All prices used for the evaluation are derived from BRPP's actual records for 1983, with some adjustments.

As a rule, no increase in the commodity prices and personnel expenses is calculated.

- 5) The currency used in this chapter is the Rupiah (Rp). The conversion rates are as follows:

US\$1.00 = Rp 1,000

US\$1.00 = Y 230

6-2 Production and Sales Plan

6-2-1 Conditions on Planning

- 1) The production and sales quantities are set at the same value, (estimating no stock increases or decreases).
- 2) The number of operating days is 315 days a year.
- 3) The number of operating days is calculated on each production item and the total should equal the number of annual operating days indicated above.
- 4) The current production of thin paper in the existing plant is to be stopped and the thin (two types of base paper for lamination and grease-proof paper) is to be produced by the new equipment.
- 5) The existing plant is to produce printing/writing paper and form paper only.

6-2-2 Production and sales plan

Table 6-2-1 shows the production and sales plan for each product including efficiency factors in this project. The production plan includes the daily production and sales proceeds, variable cost, fixed cost and profits and losses.

As shown in Table 6-2-1, the annual profit from the project is 493,096,000 Rp.

6-2-3 Break-Even Point

Table 6-2-1 shows the break-even point for each product.

6-3 Production Cost

1) Production cost

The production cost is the total of the variable cost, the fixed cost and depreciation. (Table 6-3-1 shows the production cost for each product).

The average production cost is 1,309 Rp/AD kg, and the average sales price is 1,599.27 Rp/AD kg.

2) The unit prices that are used for the production cost calculation, such as the price of raw materials, personnel expenses, etc. are all based on BRPP records for 1983. The details are shown in Table 6-3-2.

The currency conversion rates are as follows:

US\$1.00 = Rp 1,000

US\$1.00 = Y 230

3) The consumption unit of pulp and other materials is shown in Table 3-3-2, 3-3-3 and 3-3-5.

6-4 Variable Cost

1) The average variable cost and variable cost of each product are shown in Tables 6-4-1 through 6-4-8.

2) Since the power necessary to operate the plant can be supplied by the existing diesel generators, the electricity expense is calculated from the expense records for 1983 (60 Rp/kWH).

The recorded values of BRPP power generation in 1983 is 19,663,643 kWH and the diesel consumption is 5,575,300 liter.

$$19,663,643 \text{ kWH} \div 5,575,300 \text{ liter} = 3.5 \text{ kWH/L}$$

$$210 \text{ Rp/L} \div 3.5 \text{ kWH/L} = 60 \text{ Rp/kWH}$$

3) The necessary steam is to be supplied by the new boiler. If 13 UKL oil of steam is generated, the steam expense is 16,154 Rp/t.

$$210 \text{ Rp/L} \times 1,000 \text{ L} \div 13 \text{ t} = 16,154 \text{ Rp/t}$$

6-5 Fixed Cost

- 1) The fixed cost is calculated as a 'total fixed cost' by including the partial cost of the parts used in common by the existing and new plants. It is not the direct fixed cost only.

The breakdown of the total fixed cost is shown in Table 6-5-1 and the breakdown of the 'direct fixed cost' is shown in Table 6-5-2.

- 2) The fixed cost and depreciation costs for each product is shown in Table 6-5-3.
- 3) The expenses for production materials for paper making and packing materials are estimated from the records of similar plants in Japan and are set at 20 Rp/kg paper (Item 4, Table 6-5-2).
- 4) The maintenance expense is set at 1.8845% of the sales price (Item 3, Table 6-5-2).
- 5) Personnel expenses

As shown in Table 5-2-1, the total number of personnel necessary to operate this plant is 158, consisting of 84 men and 74 women. The wages for women employees are to be 65% of the wages for men. The details are shown in Table 6-5-2.

6-6 Depreciation

The depreciation rates are as follows:

- | | |
|----------------------------|------------|
| a) Machinery and equipment | : 10 years |
| b) Building and fixtures | : 30 years |

The fixed instalment method is used for the calculation and the remained book value will become zero. (The details are shown in Table 6-6-1).

6-7 Total Fund Requirement

- 1) The total fund required is US\$26,802,873, (the details are shown in Table 4-9-1).

The total fund requirement is summarized in the following.

| No. | Description | US \$ |
|-----|--------------------------------------|-------------------|
| (A) | Equipment | 14,166,600 |
| (B) | Construction | 3,864,000 |
| (C) | Price escalation | 670,000 |
| (D) | Start up expenses | 200,000 |
| (E) | Training cost | 200,000 |
| (F) | Eng. supervision fee | 837,000 |
| (G) | Overhead | 837,000 |
| (H) | Contingency | 837,000 |
| | Total | 21,611,600 |
| (I) | Interest payable during construction | 3,039,000 |
| (J) | Repayment | 641,273 |
| (K) | Working capital | 1,511,000 |
| | Grand total | 26,802,873 |

2) The working capital is calculated as follows: three months for imported goods, one month for local goods and one month for BRPP products, (the details are shown in Table 4-9-3).

3) The investment schedule by years is shown in Table 4-9-1.

6-8 Funds Procurement

30% of the total funds required shall be procured from equity while 70% shall be from long-term loans.

| | (Unit: US\$) | |
|-----------------|--------------|-----------|
| | Foreign | Local |
| Equity | — | 8,039,862 |
| Long-term loans | 18,518,000 | 245,011 |

6-9 Interest and Repayment Method of Long-Term Loans

1) The following interest rates are set for the long-term loans:

- | | |
|--------------------------|-----|
| a) Foreign currency loan | 12% |
| b) Local currency loan | 16% |

2) Repayment of foreign currency loan

Two years of grace period will be followed by equal yearly payments for ten years. (The repayment schedule is shown in Table 6-9-1.)

6-10 Corporation Tax

The only corporate taxes to be paid is on the profit, which is calculated as follows:

Expressing the profit as A (=A1+A2+A3):

| | |
|----------------------------------------|---------------|
| (1) A1 ≤ 10 million Rp | : A1 x 15/100 |
| (2) 10 million Rp < A2 < 40 million Rp | : A2 x 25/100 |
| (3) 40 million Rp < A3 | : A3 x 35/100 |

$$\text{Total corporate tax} = 0.15 A1 + 0.25 A2 + 0.35 A3$$

6-11 Profit and Loss Statement by Years (New Plant Only)

- 1) Table 6-11-1 shows the profit and loss statement for each year based on the conditions described below.

The upper column in the annual profit and loss statement shows the figures based on calculating total fixed cost; the lower column shows the figures based on the case calculating only the direct fixed cost.

Total fixed cost = Direct fixed cost + Fixed cost as expenses applied to new plant for the parts used in common by the existing and new plants at a ratio corresponding to the sales ratio (43% of the fixed cost of existing plant)

- 2) When the calculation is based on the total fixed cost, the new plant generates a profit after taxes starting with the fourth year of operation. When the calculation is based on the direct fixed cost, the new plant generates a profit after taxes starting with the third year of operation.
- 3) The production rate is set at 50% of capacity in the first year, 80% in the second year and 100% from the third year.

6-12 Annual Profit and Loss Statement for BRPP

The annual statement for profits and losses on both the existing and new plants combined is shown in Table 6-12-1. The profit and loss figures for the existing plant is taken from Table 13-14-1 of the F/S (Main Report).

Table 6-2-1 Production and Sales Plan

| Grade | Production (sales) plan | | | Efficiencies | | | | | | | Unit price/kg | | | Profit & Loss | | | | Break-even point | Operation rate |
|-------------------------|-------------------------|------------------|------------|------------------|-------|--------------------|----------------------|-------------------------|-----------------|------------------|---------------|---------------|------------------|---------------|---------------|------------|-------------|------------------|----------------|
| | No. of days | Daily production | Production | Basis weight | Trim | Paper making speed | Operating efficiency | Paper making efficiency | Finishing yield | Total efficiency | Sales price | Variable cost | Operation profit | Sales amount | Variable cost | Fixed cost | Profit/loss | | |
| | d | t/d | t | g/m ² | mm | m/min | % | % | % | % | Rp/kg | Rp/kg | Rp/kg | 1,000Rp | 1,000Rp | 1,000Rp | | t/d | % |
| Base paper for laminate | 85 | 20 | 1,700 | 36.1 | 2,330 | 199.0 | 98.0 | 96.5 | 88.0 | 83.0 | 1,500 | 581.76 | 918.24 | 2,550,000 | 988,996 | 1,397,424 | 163,580 | 17.9 | 89.5 |
| Soap wrapper | 90 | 20 | 1,800 | 30.0 | 2,330 | 239.4 | 98.0 | 96.5 | 88.0 | 83.0 | 1,640 | 654.85 | 985.15 | 2,952,000 | 1,178,721 | 1,479,625 | 293,654 | 16.7 | 83.5 |
| Glassine (Regular) | 40 | 20 | 720 | 28.5 | 2,330 | 226.8 | 98.0 | 96.5 | 88.0 | 83.0 | 1,700 | 668.30 | 1,031.70 | 1,224,000 | 481,174 | 657,611 | 85,215 | 15.9 | 88.3 |
| (Red) | 13 | 18 | 234 | 28.5 | 2,330 | 226.8 | 98.0 | 96.5 | 88.0 | 83.0 | 1,780 | 824.40 | 955.60 | 416,520 | 192,909 | 213,724 | 9,887 | 17.2 | 95.6 |
| (Yellow) | 13 | 18 | 234 | 28.5 | 2,330 | 226.8 | 98.0 | 96.5 | 88.0 | 83.0 | 1,780 | 802.80 | 977.20 | 416,520 | 187,854 | 213,724 | 14,942 | 16.8 | 93.3 |
| (White) | 14 | 18 | 252 | 28.5 | 2,330 | 226.8 | 98.0 | 96.5 | 88.0 | 83.0 | 1,780 | 682.22 | 1,097.78 | 448,560 | 171,919 | 230,164 | 46,477 | 15.0 | 83.3 |
| Subtotal | 80 | 18 | 1,440 | 28.5 | 2,330 | 226.8 | 98.0 | 96.5 | 88.0 | 83.0 | 1,740 | 717.96 | 1,022.04 | 2,505,600 | 1,033,856 | 1,315,223 | 156,521 | 16.1 | 89.4 |
| Grease proof | 60 | 18 | 1,080 | 38.0 | 2,330 | 166.0 | 98.0 | 96.5 | 90.0 | 85.0 | 1,500 | 698.37 | 801.63 | 1,620,000 | 754,242 | 986,417 | 120,659 | 20.5 | 113.9 |
| Total | 315 | 194 | 6,020 | - | - | - | - | - | - | - | 1,599.27 | 657.11 | 942.16 | 9,627,600 | 3,955,815 | 5,178,689 | 493,096 | 17.4 | 91.1 |

o Fixed cost breakdown (annual)

| | |
|-------------------------|------------------------------------------------------------------------|
| *1 Occurring fixed cost | 2,753,104,000 Rp |
| Distributed fixed cost | 1,288,051,000 (application of common's fixed cost from existing mill.) |
| Interest payable | 1,137,534,000 (average of 11 years) |
| Total | 5,178,689,000 Rp |

* Detail of *1 (Direct cost and Depreciation)

| | |
|-----------------------|------------------|
| 1) Personnel expenses | 243,064 |
| 2) Water cost | 16,856 |
| 3) Maintenance cost | 181,432 |
| 4) Others cost | 120,400 |
| Sub total | 561,752 |
| 5) Depreciation | 2,191,352 |
| Total | 2,753,104 |

Table 6-3-1 Calculation for Production Cost

| Paper Cost Rp/ADkg. paper | | Average | Base paper for lamination | Soap wrapper | Glassine | | | | Grease proof |
|------------------------------|------------------------------|------------|---------------------------------|-----------------|------------|------------|------------|------------|-----------------|
| | | | | | Regular | Red | Yellow | White milk | |
| Variable cost | | 657.11 | 581.76 | 654.85 | 668.30 | 824.40 | 802.80 | 682.22 | 698.37 |
| Fixed cost | Case of total fixed cost | 287.88 | 275.09 | 275.09 | 305.65 | 305.65 | 305.65 | 305.65 | 305.65 |
| | Case of direct fixed cost | (93.31) | (89.17) | (89.17) | (99.07) | (99.07) | (99.07) | (99.07) | (99.07) |
| Depreciation | | 364.01 | 347.83 | 347.83 | 386.48 | 386.48 | 386.48 | 386.48 | 386.48 |
| Total | Case of total fixed cost | 1,309 | 1,204.68 | 1,277.77 | 1,360.43 | 1,516.53 | 1,494.93 | 1,374.35 | 1,390.50 |
| | Case of direct fixed cost | (1,114.43) | (1,018.75) | (1,091.85) | (1,153.85) | (1,309.95) | (1,288.35) | (1,167.77) | (1,183.92) |
| Sales price | | 1,599.27 | 1,500 | 1,640 | 1,700 | 1,780 | 1,780 | 1,780 | 1,500 |
| Difference | Total fixed cost | 290.27 | 295.32 | 362.23 | 339.57 | 263.47 | 285.07 | 405.65 | 109.50 |
| | Direct fixed cost | (484.84) | (481.25) | (548.15) | (546.15) | (470.05) | (491.65) | (612.23) | (316.08) |

Note: 1) Total fixed cost = Direct fixed cost + Application of common's fixed cost from existing mill

2) Direct fixed cost

Table 6-3-2 List of Raw Materials Price

| Raw materials | Act. price in 1983, BRPP | Setting price |
|-----------------------------|----------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| 1. Pulp and filler | | |
| NBKP Rp/BDkg | 405.5 | 450 |
| LBKP Rp/BDkg | 355.5 | 410 |
| Clay Rp/kg | 72.67 | 120 |
| 2. Chemical | | |
| Size pine Rp/kg | 443.67 | 500 |
| Alum Rp/kg | 169.90 (as 18% Al ₂ O ₃) | 90 (as 8% Al ₂ O ₃) 202.5 (as 18% Al ₂ O ₃) |
| Pitch control agent Rp/kg | - | 3,000 |
| Sheet strength agent Rp/kg | - | 720 |
| Drainage accelerative Rp/kg | - | 2,300 |
| Oil resisting agent Rp/kg | - | 3,000 |
| Dye stuff Rp/kg | - | 8,000 |
| 3. Fuel | | |
| Diesel oil Rp/kg | 126.45 | 210 |
| Fuel oil Rp/kg | 126.45 | 210 |

Table 6-4-1 Average Variable Cost

| Description | Unit consumption | Quantity kg | Unit price | Amount Rp | Remarks |
|---------------------------|------------------|-------------|-------------|----------------------|----------------------------------|
| 1. Pulp cost | | | | | |
| NEKP | - BKg/ADt | 2,959,742.8 | 450 Rp/BKkg | 1,331,884,260 | } Pulp total } 6,040,584.8 kg |
| LBKP | - BKg/ADt | 3,080,842.8 | 410 Rp/BKkg | 1,263,145,220 | |
| Clay | - BKg/ADt | 412,596 | Rp/kg | 49,511,520 | |
| Sub total | - | 6,453,180.8 | | 2,644,541,000 | |
| 2. Chemical cost | | | | | |
| Pitch control agent | - kg/ADt | 5,300.4 | 3,000 Rp/kg | 15,901,200 | |
| Sheet strength agent | - kg/ADt | 10,500 | 720 Rp/kg | 7,560,000 | |
| Drainage accelerative | - kg/ADt | 6,570 | 2,300 Rp/kg | 15,111,000 | |
| Oil resisting agent | - kg/ADt | 21,600 | 3,000 Rp/kg | 64,800,000 | |
| Size pine | - kg/ADt | 59,210 | 500 Rp/kg | 29,605,000 | |
| Alum | - kg/ADt | 78,400 | 90 Rp/kg | 7,056,000 | |
| Dye stuff | - kg/ADt | 13,307.4 | 8,000 Rp/kg | 106,459,200 | |
| Sub cost | - | 194,887.8 | - | 246,492,400 | |
| 3. Raw material cost | | 6,648,068.6 | | 2,891,033,400 | |
| 4. Steam cost | - t/ADt | 23,260 | 16,154 Rp/t | 375,742,040 | |
| 5. Electric cost | - kWh/ADt | 11,484,000 | 60 Rp/kWh | 689,040,000 | |
| 6. Grand total | | - | | 3,955,815,440 | |
| 7. Variable cost/kg paper | | | | 657.11 Rp/ADkg paper | |
| 8. Daily production | 19.11 ADt/D | | | | |
| 9. Number of operation | 315 d/y | | | | |
| 10. Production | 6,020 ADt/y | | | | |

Table 6-4-2. Variable Cost of Base Paper for Lamination.

| Description | Unit consumption | Quantity kg | Unit price | Amount Rp | Remarks |
|---------------------------|------------------|-------------|-------------|----------------------|--------------------------|
| 1. Pulp cost | | | | | |
| NBKP | 274.4 BKkg/ADt | 466,480 | 450 Rp/BKkg | 209,916,000 | } Pulp } 1,571,480 kg |
| LBKP | 650.0 BKkg/ADt | 1,105,000 | 410 Rp/BKkg | 453,050,000 | |
| Clay | 180.0 BKkg/ADt | 306,000 | 120 Rp/kg | 36,720,000 | |
| Sub total | | 1,877,480 | | 699,686,000 | |
| 2. Chemical cost | | | | | |
| Pitch control agent | 0.6 kg/ADt | 1,020 | 3,000 Rp/kg | 3,060,000 | |
| Sheet strength agent | 3.0 kg/ADt | 5,100 | 720 Rp/kg | 3,672,000 | |
| Drainage accelerative | - kg/ADt | - | - Rp/kg | - | |
| Oil resisting agent | - kg/ADt | - | - Rp/kg | - | |
| Size pine | 10.0 kg/ADt | 17,000 | 500 Rp/kg | 8,500,000 | |
| Alum | 17.0 kg/ADt | 28,900 | 90 Rp/kg | 2,601,000 | |
| Dye stuff | - kg/ADt | - | - Rp/kg | - | |
| Sub cost | | 52,020 | | 17,833,000 | |
| 3. Raw material cost | | 1,929,500 | | 717,519,000 | |
| 4. Steam cost | 3.2 t/ADt | 5,440 | 16,154 Rp/t | 87,877,760 | |
| 5. Electric cost | 1,800 kWh/ADt | 3,060,000 | 60 Rp/kWh | 183,600,000 | |
| 6. Grand total | | | | 988,996,760 | |
| 7. Variable cost/kg paper | | | | 561.76 Rp/ADkg paper | |
| 8. Daily production | 20 ADt/d | | | | |
| 9. Number of operation | 85 d/y | | | | |
| 10. Production | 1,700 ADt/y | | | | |

Table 6-4-3 Variable Cost of Soap Wrapper

| Description | Unit consumption | Quantity kg | Unit price | Amount Rp | Remarks |
|---------------------------|------------------|-------------|-------------|----------------------|--------------|
| 1. Pulp cost | | | | | |
| NBKP | 355.6 BKkg/ADt | 640,080 | 450 Rp/BKkg | 288,036,000 | Pulp |
| LBKP | 655.6 BKkg/ADt | 1,180,080 | 410 Rp/BKkg | 483,832,800 | 1,820,160 kg |
| Clay | 50.0 BKkg/ADt | 90,000 | 120 Rp/kg | 10,800,000 | |
| Sub total | | 1,910,160 | | 782,668,800 | |
| 2. Chemical cost | | | | | |
| Pitch control agent | 0.6 kg/ADt | 1,080 | 3,000 Rp/kg | 3,240,000 | |
| Sheet strength agent | 3.0 kg/ADt | 5,400 | 720 Rp/kg | 3,888,000 | |
| Drainage accelerative | - kg/ADt | - | - Rp/kg | - | |
| Oil resisting agent | - kg/ADt | - | - Rp/kg | - | |
| Size pine | 12.0 kg/ADt | 21,600 | 500 Rp/kg | 10,800,000 | |
| Alum | 17.0 kg/ADt | 30,600 | 90 Rp/kg | 2,754,000 | |
| Dye stuff | - kg/ADt | - | - Rp/kg | - | |
| Sub cost | | 65,880 | | 78,282,000 | |
| 3. Raw material cost | | 1,976,040 | | 860,950,800 | |
| 4. Steam cost | 3.5 t/ADt | 6,300 | 16,154 Rp/t | 101,770,200 | |
| 5. Electric cost | 2,000 kWh/ADt | 3,600,000 | 60 Rp/kWh | 216,000,000 | |
| 6. Grand total | | | | 1,178,721,000 | |
| 7. Variable cost/kg paper | | | | 654.85 Rp/ADKS paper | |
| 8. Daily production | 20 ADt/d | | | | |
| 9. Number of operation | 90 d/y | | | | |
| 10. Production | 1,800 ADt/y | | | | |

Table 6-4-4 Variable Cost of Glassine (Regular)

| Description | Unit consumption | Quantity kg | Unit price | Amount Rp | Remarks |
|---------------------------|------------------|-------------|-------------|----------------|---------|
| 1. Pulp cost | | | | | |
| NBKP | 738.9 BDKg/ADt | 532,008 | 450 Rp/BDkg | 239,403,600 | |
| LBKP | 316.7 BDKg/ADt | 228,024 | 410 Rp/BDkg | 93,489,840 | |
| Clay | - BDKg/ADt | - | - Rp/kg | - | |
| Sub-total | | 760,032 | | 332,893,440 | |
| 2. Chemical cost | | | | | |
| Pitch control agent | 1.5 kg/ADt | 1,080 | 3,000 Rp/kg | 3,240,000 | |
| Sheet strength agent | - kg/ADt | - | - Rp/kg | - | |
| Drainage accelerative | - kg/ADt | - | - Rp/kg | - | |
| Oil resisting agent | - kg/ADt | - | - Rp/kg | - | |
| Size pine | - kg/ADt | - | - Rp/kg | - | |
| Alum | 7.5 kg/ADt | 5,400 | 90 Rp/kg | 486,000 | |
| Dye stuff | - kg/ADt | - | - Rp/kg | - | |
| Sub cost | - | 6,480 | - | 3,726,000 | |
| 3. Raw material cost | | | | | |
| | | 766,512 | | 336,619,440 | |
| 4. Steam cost | 5.0 t/ADt | 3,600 | 16,154 Rp/t | 58,154,400 | |
| 5. Electric cost | 2,000 kWh/ADt | 1,440,000 | 60 Rp/kWh | 86,400,000 | |
| 6. Grand total | | | | 481,273,840 | |
| 7. Variable cost/kg paper | | | | 668.30 Rp/ADkg | paper |
| 8. Daily production | 18 ADt/d | | | | |
| 9. Number of operation | 40 d/y | | | | |
| 10. Production | 720 ADt/y | | | | |

Table 6-4-5 Variable Cost of Glassine (Red)

| Description | Unit consumption | Quantity kg | Unit price | Amount Rp | Remarks |
|---------------------------|------------------|-------------|-------------|----------------|---------|
| 1. Pulp cost | | | | | |
| NEKP | 738.9 BKkg/ADt | 172,902.6 | 450 Rp/BKkg | 77,806,170 | |
| LEKP | 316.7 BKkg/ADt | 74,107.8 | 410 Rp/BKkg | 30,384,198 | |
| Clay | - BKkg/ADt | - | - Rp/kg | - | |
| Sub total | | 247,010.4 | | 108,190,368 | |
| 2. Chemical cost | | | | | |
| Pitch control agent | 0.8 kg/ADt | 187.2 | 3,000 Rp/kg | 561,600 | |
| Sheet strength agent | - kg/ADt | - | - Rp/kg | - | |
| Drainage accelerative | 10.0 kg/ADt | 2,340 | 2,300 Rp/kg | 5,382,000 | |
| Oil resisting agent | - kg/ADt | - | - Rp/kg | - | |
| Size pine | 40.0 kg/ADt | 9,360 | 500 Rp/kg | 4,680,000 | |
| Alum | 7.5 kg/ADt | 1,755 | 90 Rp/kg | 157,950 | |
| Dye stuff | 14.4 kg/ADt | 3,369.6 | 8,000 Rp/kg | 26,956,800 | |
| Sub cost | - | 17,011.8 | - | 37,738,350 | |
| 3. Raw material cost | | 264,022.2 | | 145,928,718 | |
| 4. Steam cost | 5.0 t/ADt | 1,170 | 16,154 Rp/t | 18,900,180 | |
| 5. Electric cost | 2,000 kWh/ADt | 468,000 | 60 Rp/kWh | 28,080,000 | |
| 6. Grand total | | | | 192,908,898 | |
| 7. Variable cost/kg paper | | | | 824.40 Rp/ADkg | paper |
| 8. Daily production | 18 ADt/d | | | | |
| 9. Number of operation | 13 d/y | | | | |
| 10. Production | 234 ADt/y | | | | |

Table 6-4-6 Variable Cost of Glassine (Yellow)

| Description | Unit consumption | Quantity kg | Unit price | Amount Rp | Remarks |
|---------------------------|------------------|-------------|-------------|----------------|---------|
| 1. Pulp cost | | | | | |
| NBKP | 738.9 BKkg/ADt | 172,902.6 | 450 Rp/BKkg | 77,806,170 | |
| LBKP | 316.7 BKkg/ADt | 74,107.8 | 410 Rp/BKkg | 30,384,198 | |
| Clay | - BKkg/ADt | - | - Rp/kg | - | |
| Sub total | | 247,010.4 | | 108,190,368 | |
| 2. Chemical cost | | | | | |
| Pitch control agent | 0.8 kg/ADt | 187.2 | 3,000 Rp/kg | 561,600 | |
| Sheet strength agent | - kg/ADt | - | - Rp/kg | - | |
| Drainage accelerative | 10.0 kg/ADt | 2,340 | 2,300 Rp/kg | 5,382,000 | |
| Oil resisting agent | - kg/ADt | - | - Rp/kg | - | |
| Size pine | 40.0 kg/ADt | 9,360 | 500 Rp/kg | 4,680,000 | |
| Alum | 7.5 kg/ADt | 1,755 | 90 Rp/kg | 157,950 | |
| Dye stuff | 11.7 kg/ADt | 2,737.8 | 8,000 Rp/kg | 21,902,400 | |
| Sub cost | - | 16,380 | - | 32,683,950 | |
| 3. Raw material cost | | | | | |
| 4. Steam cost | 5.0 t/ADt | 1,170 | 16,154 Rp/t | 18,900,180 | |
| 5. Electric cost | 2,000 kWh/ADt | 468,000 | 60 Rp/kWh | 28,080,000 | |
| 6. Grand total | | | | 140,874,318 | |
| 7. Variable cost/kg paper | | | | 802.80 Rp/ADkg | paper |
| 8. Daily production | 18 ADt/d | | | | |
| 9. Number of operation | 13 d/y | | | | |
| 10. Production | 234 ADt/y | | | | |

Table 6-4-7 Variable Cost of Glassine (White milk)

| Description | Unit consumption | Quantity kg | Unit price | Amount Rp | Remarks |
|---------------------------|------------------|-------------|-------------|----------------------|---------|
| 1. Pulp cost | | | | | |
| NBKP | 727.8 BDKg/ADE | 183,405.6 | 450 Rp/BDKs | 82,532,520 | |
| LBKP | 312.2 BDKg/ADE | 78,674.4 | 410 Rp/BDKs | 32,256,504 | |
| Clay | 23.0 BDKg/ADE | 5,796 | 120 Rp/kg | 695,520 | |
| Sub total | | 267,876 | | 115,484,544 | |
| 2. Chemical cost | | | | | |
| Pitch control agent | 0.5 kg/ADE | 126 | 3,000 Rp/kg | 378,000 | |
| Sheet strength agent | - kg/ADE | - | - Rp/kg | - | |
| Drainage accelerative | 7.5 kg/ADE | 1,890 | 2,300 Rp/kg | 4,347,000 | |
| Oil resisting agent | - kg/ADE | - | - Rp/kg | - | |
| Size pine | 7.5 kg/ADE | 1,890 | 500 Rp/kg | 945,000 | |
| Alum | 7.5 kg/ADE | 1,890 | 90 Rp/kg | 170,100 | |
| Dye stuff | - kg/ADE | - | - Rp/kg | - | |
| Sub cost | | 5,796 | | 5,840,100 | |
| 3. Raw material cost | | 273,672 | | 121,324,644 | |
| 4. Steam cost | 5.0 t/ADE | 1,260 | 16,154 Rp/t | 20,354,040 | |
| 5. Electric cost | 2,000 kWh/ADE | 504,000 | 60 Rp/kWh | 30,240,000 | |
| 6. Grand total | | | | 171,918,684 | |
| 7. Variable cost/kg paper | | | | 682.22 Rp/ADkg paper | |
| 8. Daily production | 18 ADt/d | | | | |
| 9. Number of operation | 14 d/y | | | | |
| 10. Production | 252 ADt/y | | | | |

Table 6-4-8 Variable Cost of Grease Proof

| Description | Unit consumption | Quantity kg | Unit price | Amount Rp | Remarks |
|---------------------------|------------------|-------------|-------------|----------------------|---------|
| 1. Pulp cost | | | | | |
| NBKP | 733.3 BDKg/ADE | 791,964 | 450 Rp/BDkg | 356,383,800 | |
| LEKP | 315.6 BDKg/ADE | 340,848 | 410 Rp/BDkg | 139,747,680 | |
| Clay | 10.0 BDKg/ADE | 10,800 | 120 Rp/kg | 1,296,000 | |
| Sub total | | 1,143,612 | | 497,427,480 | |
| 2. Chemical cost | | | | | |
| Patch control agent | 1.5 kg/ADE | 1,620 | 3,000 Rp/kg | 4,860,000 | |
| Sheet strength agent | - kg/ADE | - | - Rp/kg | - | |
| Drainage accelerative | - kg/ADE | - | - Rp/kg | - | |
| Oil resisting agent | 20.0 kg/ADE | 21,600 | 3,000 Rp/kg | 64,800,000 | |
| Size pine | - kg/ADE | - | - Rp/kg | - | |
| Alum | 7.5 kg/ADE | 8,100 | 90 Rp/kg | 729,000 | |
| Dye stuff | - kg/ADE | - | - Rp/kg | - | |
| Sub cost | | 31,320 | | 70,389,000 | |
| 3. Raw material cost | | 1,174,932 | | 567,816,480 | |
| 4. Steam cost | 4.0 t/ADE | 4,320 | 16,154 Rp/t | 69,785,280 | |
| 5. Electric cost | 1,800 kWh/ADE | 1,944,000 | 60 Rp/kWh | 116,640,000 | |
| 6. Grand total | | | | 754,241,760 | |
| 7. Variable cost/kg paper | | | | 698.37 Rp/ADkg paper | |
| 8. Daily production | 18 ADt/d | | | | |
| 9. Number of operation | 60 d/y | | | | |
| 10. Production | 1,080 ADt/y | | | | |

Table 6-5-1 Detail of Total Fixed Cost

| Description | 1 (1991) | 2 (1992) | 3 (1993) |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------------|-------------------|
| 1. Application expenses to new plant apart from fixed cost in existence (exclude selling expenses) | 772,556 | 1,046,688 | 1,171,294 |
| 2. Direct fixed cost (Table 6-5-2) | 561,752 | 561,752 | 561,752 |
| Total fixed cost | 1,334,308 | 1,608,440 | 1,733,046 |
| Detail for application expenses Distributing ratio for application expenses by sales amount existing plant | 10,645,408 (69%) | 10,645,408 (58%) | 10,645,408 (53%) |
| New plant | 4,813,800 (31%) | 7,702,080 (42%) | 9,627,600 (47%) |
| 1. Personnel expenses 795,592 a) Total personnel expenses in existence = 1,018,954 b) Personnel expenses for operators of existing paper machine and pulping plant = 223,362 c) ∴ 1,018,954 - 223,362 = 795,592 | | | |
| 2. Depreciation of existing 0 | | | |
| 3. Others fixed cost 918,572 | | | |
| 4. Administrative expenses 777,951 | | | |
| Fixed cost for existing (A) 2,492,115 | 772,556 (Ax31%) | 1,046,688 (Ax42%) | 1,171,294 (Ax47%) |
| 5. Selling expenses (B) 248,419 | 77,010 (Bx31%) | 104,336 (Bx42%) | 116,757 (Bx47%) |

Note: Base figures of detail for application be collected from Table 13-14-1 in F/S main report.

Table 6-5-2 Detail of Direct Fixed Cost

| Description | Annual amount (1000 Rp) | Calculation |
|-------------------------|----------------------------|-------------------------------------------------------------|
| 1. Personnel expenses | 243,064 | |
| 2. Water treatment cost | 16,856 | 2.8 Rp/kg. paper x 6,020 ADT/y = 16,856 |
| 3. Maintenance cost | 181,432 | As 1.8845% of sales amount 9,627,600 x 0.01884 = 181,432 |
| 4. Others | 120,400 | 20 Rp/kg. paper x 6,020 ADT/y = 120,400 |
| Total | 561,752 | Average 93.31 Rp/kg. paper |

Note: Calculation of personnel expenses for No. 2 Paper Machine

| | | |
|---------|------------------------------------|--------------------|
| Male : | 84 persons x 1,840,000 Rp/y | = 154,560,000 Rp/y |
| Female: | 74 persons x 1,840,000 Rp/y x 0.65 | = 88,504,000 Rp/y |
| Total | 158 persons | 243,064,000 Rp/y |

**CHAPTER 7 PROFITABILITY AND ECONOMIC
EFFECTS THE OF EXPANSION**

Table 6-5-3 Detail of Fixed Cost and Depreciation for Each Paper

| Paper | Number of operation (days) | Production (ADT/y) | Total fixed cost | | Direct fixed cost | | Depreciation | |
|--------------|----------------------------|--------------------|--------------------|-------------------|-------------------|------------------|--------------------|-------------------|
| | | | Amount (1,000Rp) | Unit Rp/kg paper | Amount (1,000Rp) | Unit Rp/kg paper | Amount (1,000Rp) | Unit Rp/kg paper |
| Base paper | 85 | 1,700 | 467,647.1 | 275.09 | 151,583.9 | 89.17 | 591,317.1 | 347.83 |
| Soap wrapper | 90 | 1,800 | 495,156.0 | 275.09 | 160,500.6 | 89.17 | 626,100.6 | 347.83 |
| Glassine | Regular | 40 | 220,069.3 | 305.65 | 71,333.6 | 99.07 | 278,266.9 | 386.48 |
| | Red | 13 | 71,522.5 | 305.65 | 23,183.4 | 99.07 | 90,436.8 | 386.48 |
| | Yellow | 13 | 71,522.5 | 305.65 | 23,183.4 | 99.07 | 90,436.8 | 386.48 |
| | White milk | 14 | 77,024.3 | 305.65 | 24,966.7 | 99.07 | 97,393.4 | 386.48 |
| | Sub total | 80 | 1,440 | 440,138.6 | 305.65 | 142,667.1 | 99.07 | 556,533.9 |
| Grease proof | 60 | 1,080 | 330,104.0 | 305.65 | 107,000.4 | 99.07 | 417,400.4 | 386.48 |
| Total | 315 | 6,020 | 1,733,046.0 | Av. 287.88 | 561,752.0 | Av. 93.31 | 2,191,352.0 | Av. 364.01 |

Note: 1) Total fixed cost = Direct fixed cost + Application expenses to new plant apart from fixed cost in existing mill

2) Direct fixed cost

Table 6-6-1 Calculation of Depreciation

(Unit: 1,000 Rp)

| No. | Description | Detail | Amount to be depreciated | Depreciation years | Annual depreciation amount | Remarks |
|-----|--------------------------|--------------------|--------------------------|--------------------|----------------------------|---------|
| A | Equipment | | | | | |
| -1 | Equipment cost | A-1, B-4, B-6, B-9 | 15,003,000 | | | |
| -2 | Spare parts cost | | (-) 987,000 | | | |
| -3 | Installation cost | A-4 | 1,288,000 | | | |
| -4 | Foundation cost | A-3 | 258,000 | | | |
| -5 | Price escalation | B-2 | 670,000 | | | |
| | Sub total | | 16,232,000 | 10 years | 1,623,200 | |
| B | Civil and building cost | A-2 | 2,318,000 | 30 years | 77,267 | |
| C | Other expenses | | | | | |
| -1 | Training and engineering | B-7, B-8 | 1,037,000 | | | |
| -2 | Contingency | B-10 | 837,000 | | | |
| -3 | Interest during const. | C-2 | 3,039,600 | | | |
| -4 | Payment | | 641,273 | | | |
| | Sub total | | 5,554,873 | 10 years | 555,487 | |
| | Total | | 24,104,873 | | 2,255,954 | |

$$\text{Depreciation period} = \frac{24,104,873}{2,255,954} = 10.7 \text{ years} \quad \bullet 11 \text{ years}$$

$$\text{Annual depreciation amount} = \frac{24,104,873,000}{11} = 2,191,352,000 \text{ Rp/y}$$

Table 6-9-1 Repayment Schedule of Foreign Currency Loans and Interest

(1,000 Rp)

| | Loan on -2nd year | | | Loan on -1st year | | | Loan on 1st year | | | Total | | | Interest i paid | Remarks |
|-------|----------------------------------------|---------------------|---------------------|----------------------------------------|---------------------|---------------------|----------------------------------------|---------------------|---------------------|----------------------------------------|---------------------|---------------------|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | Balance at the beginning of the period | Amount of repayment | Balance at term-end | Balance at the beginning of the period | Amount of repayment | Balance at term-end | Balance at the beginning of the period | Amount of repayment | Balance at term-end | Balance at the beginning of the period | Amount of repayment | Balance at term-end | | |
| -2 | 7,054,000 | - | 7,054,000 | | | | | | | 7,054,000 | | 7,054,000 | 846,480 | Preconditions 1. All loans are made at the beginning of each term (January 1). 2. The repayment of loans and interest payment are at the end of each term (December 31). 3. The interest shall be paid for the past period. 4. The interest rate shall be 12% yearly. 5. Equal annual repayment a period of 10 years after 2 years grace. |
| -1 | 7,054,000 | 641,273 | 6,412,727 | 11,222,000 | - | 11,222,000 | | | | 18,276,000 | 641,273 | 17,634,727 | 2,193,120 | |
| 1 | 6,412,727 | 641,273 | 5,771,454 | 11,222,000 | 1,020,182 | 10,201,818 | 242,000 | - | 242,000 | 17,876,727 | 1,661,455 | 16,215,272 | 2,145,207 | |
| 2 | 5,771,454 | 641,273 | 5,130,181 | 10,201,818 | 1,020,182 | 9,181,636 | 242,000 | 22,000 | 220,000 | 16,215,272 | 1,683,455 | 14,531,817 | 1,945,833 | |
| 3 | 5,130,181 | 641,273 | 4,488,908 | 9,181,636 | 1,020,182 | 8,161,454 | 220,000 | 22,000 | 198,000 | 14,531,817 | 1,683,455 | 12,848,362 | 1,743,818 | |
| 4 | 4,488,908 | 641,273 | 3,847,635 | 8,161,454 | 1,020,182 | 7,141,272 | 198,000 | 22,000 | 176,000 | 12,848,362 | 1,683,455 | 11,164,907 | 1,541,803 | |
| 5 | 3,847,635 | 641,273 | 3,206,362 | 7,141,272 | 1,020,182 | 6,121,090 | 176,000 | 22,000 | 154,000 | 11,164,907 | 1,683,455 | 9,481,452 | 1,339,789 | |
| 6 | 3,206,362 | 641,273 | 2,565,089 | 6,121,090 | 1,020,182 | 5,100,908 | 154,000 | 22,000 | 132,000 | 9,481,452 | 1,683,455 | 7,797,997 | 1,137,774 | |
| 7 | 2,565,089 | 641,273 | 1,923,816 | 5,100,908 | 1,020,182 | 4,080,726 | 132,000 | 22,000 | 110,000 | 7,797,997 | 1,683,455 | 6,114,542 | 935,760 | |
| 8 | 1,923,816 | 641,273 | 1,282,543 | 4,080,726 | 1,020,182 | 3,060,544 | 110,000 | 22,000 | 88,000 | 6,114,542 | 1,683,455 | 4,431,087 | 733,745 | |
| 9 | 1,282,543 | 641,273 | 641,270 | 3,060,544 | 1,020,182 | 2,040,362 | 88,000 | 22,000 | 66,000 | 4,431,087 | 1,683,455 | 2,747,632 | 531,730 | |
| 10 | 641,270 | 641,270 | 0 | 2,040,362 | 1,020,182 | 1,020,180 | 66,000 | 22,000 | 44,000 | 2,747,632 | 1,683,452 | 1,064,180 | 329,716 | |
| 11 | | | | 1,020,180 | 1,020,180 | 0 | 44,000 | 22,000 | 22,000 | 1,064,180 | 1,042,180 | 22,000 | 127,702 | |
| 12 | | | | | | | 22,000 | 22,000 | 0 | 22,000 | 22,000 | 0 | 2,640 | |
| Total | | 7,054,000 | 0 | (11,222,000) | 11,222,000 | 0 | | 242,000 | 0 | | 18,518,000 | 0 | 15,555,117 | |

Table 6-11-1 Annual Statement of Profit and Loss of New Plant

(Unit: 1,000 Rp)

| | (1989) -2 | (1990) -1 | (1991) 1 | (1992) 2 | (1993) 3 | (1994) 4 | (1995) 5 | (1996) 6 | (1997) 7 | (1998) 8 | (1999) 9 | (2000) 10 | (2001) 11 |
|-----------------------|--------------|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|--------------|
| (Sales quantity) | - | - | (3,010t) | (4,816t) | (6,020t) | (6,020t) | (6,020t) | (6,020t) | (6,020t) | (6,020t) | (6,020t) | (6,020t) | (6,020t) |
| Sales amounts | - | - | 4,813,800 | 7,702,080 | 9,627,600 | 9,627,600 | 9,627,600 | 9,627,600 | 9,627,600 | 9,627,600 | 9,627,600 | 9,627,600 | 9,627,600 |
| Variable cost | - | - | 1,977,908 | 3,164,652 | 3,955,815 | 3,955,815 | 3,955,815 | 3,955,815 | 3,955,815 | 3,955,815 | 3,955,815 | 3,955,815 | 3,955,815 |
| Fixed cost | - | - | 1,334,308 | 1,608,440 | 1,733,046 | 1,733,046 | 1,733,046 | 1,733,046 | 1,733,046 | 1,733,046 | 1,733,046 | 1,733,046 | 1,733,046 |
| Depreciation | - | - | 2,191,352 | 2,191,352 | 2,191,352 | 2,191,352 | 2,191,352 | 2,191,352 | 2,191,352 | 2,191,352 | 2,191,352 | 2,191,352 | 2,191,352 |
| Production cost total | - | - | 5,503,568 | 6,964,444 | 7,880,213 | 7,880,213 | 7,880,213 | 7,880,213 | 7,880,213 | 7,880,213 | 7,880,213 | 7,880,213 | 7,880,213 |
| Sales expenses | - | - | 77,010 | 104,336 | 116,757 | 116,757 | 116,757 | 116,757 | 116,757 | 116,757 | 116,757 | 116,757 | 116,757 |
| Interest payable | - | - | 2,145,207 | 1,945,833 | 1,743,818 | 1,541,803 | 1,339,789 | 1,137,774 | 935,760 | 733,745 | 531,730 | 329,716 | 127,702 |
| Profit before tax | - | - | -2,911,985 | -1,312,533 | -113,188 | 88,827 | 290,841 | 492,856 | 694,870 | 896,885 | 1,098,900 | 1,300,914 | 1,502,928 |
| Corporation tax | - | - | - | - | - | 26,089 | 96,794 | 167,500 | 238,205 | 308,910 | 379,615 | 450,320 | 521,025 |
| Profit after tax | - | - | -2,911,985 | -1,312,533 | -113,188 | 62,738 | 194,047 | 325,356 | 456,665 | 587,975 | 719,285 | 850,594 | 981,903 |

(Case of excluding distributed cost)

| | | | | | | | | | | | | | |
|-----------------------|---|---|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Sales amounts | - | - | 4,813,800 | 7,702,080 | 9,627,600 | 9,627,600 | 9,627,600 | 9,627,600 | 9,627,600 | 9,627,600 | 9,627,600 | 9,627,600 | 9,627,600 |
| Variable cost | - | - | 1,977,908 | 3,164,652 | 3,955,815 | 3,955,815 | 3,955,815 | 3,955,815 | 3,955,815 | 3,955,815 | 3,955,815 | 3,955,815 | 3,955,815 |
| Fixed cost | - | - | 561,752 | 561,752 | 561,752 | 561,752 | 561,752 | 561,752 | 561,752 | 561,752 | 561,752 | 561,752 | 561,752 |
| Depreciation | - | - | 2,191,352 | 2,191,352 | 2,191,352 | 2,191,352 | 2,191,352 | 2,191,352 | 2,191,352 | 2,191,352 | 2,191,352 | 2,191,352 | 2,191,352 |
| Production cost total | - | - | 4,731,012 | 5,917,756 | 6,708,919 | 6,708,919 | 6,708,919 | 6,708,919 | 6,708,919 | 6,708,919 | 6,708,919 | 6,708,919 | 6,708,919 |
| Sales expenses | - | - | 77,010 | 104,336 | 116,757 | 116,757 | 116,757 | 116,757 | 116,757 | 116,757 | 116,757 | 116,757 | 116,757 |
| Interest payable | - | - | 2,145,207 | 1,945,833 | 1,743,818 | 1,541,803 | 1,339,789 | 1,137,774 | 935,760 | 733,745 | 531,730 | 329,716 | 127,702 |
| Profit before tax | - | - | -2,139,429 | -265,845 | 1,058,106 | 1,260,121 | 1,462,135 | 1,664,150 | 1,866,164 | 2,068,179 | 2,270,194 | 2,472,208 | 2,674,222 |
| Corporation tax | - | - | - | - | 365,337 | 436,042 | 506,747 | 577,453 | 648,157 | 718,863 | 789,568 | 860,273 | 930,978 |
| Profit after tax | - | - | -2,139,429 | -265,845 | 692,769 | 824,079 | 955,388 | 1,086,697 | 1,218,007 | 1,349,316 | 1,480,626 | 1,611,935 | 1,743,244 |

Table 6-12-1 Annual Statement of Profit and Loss for All Existing and New Plants

| | | (1989) -2 | (1990) -1 | (1991) 1 | (1992) 2 | (1993) 3 | (1994) 4 | (1995) 5 | (1996) 6 | (1997) 7 | (1998) 8 | (1999) 9 | (2000) 10 | (2001) 11 |
|-------------------------------------------------------------------|------------------|--------------|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|--------------|
| Profit from existing machines (before tax) | | -408,242 | -71,621 | 304,957 | 387,344 | 469,731 | 552,118 | 634,505 | 716,888 | 1,778,397 | 1,834,649 | 1,835,314 | 1,835,314 | 1,835,314 |
| Profit from new machines excluding distributed costs (before tax) | | - | - | -2,139,429 | -265,845 | 692,769 | 824,079 | 955,388 | 1,086,697 | 1,218,007 | 1,349,316 | 1,480,626 | 1,611,935 | 1,743,244 |
| Total profit before tax | | -408,242 | -71,621 | -1,834,472 | 121,499 | 739,740 | 1,376,197 | 1,589,893 | 1,803,585 | 2,996,404 | 3,183,965 | 3,315,940 | 3,447,249 | 3,579,558 |
| Corporation tax | | 0 | 0 | 0 | 37,525 | 253,909 | 476,669 | 551,463 | 626,255 | 1,043,741 | 1,109,388 | 1,155,579 | 1,201,537 | 1,247,495 |
| Profit after tax (A) | | -408,242 | -71,621 | -1,834,472 | 83,974 | 485,831 | 899,528 | 1,038,430 | 1,177,330 | 1,952,663 | 2,074,577 | 2,160,361 | 2,245,712 | 2,331,063 |
| Depreciation | existing machine | 1,527,552 | 1,273,313 | 979,122 | 979,122 | 979,122 | 979,122 | 979,122 | 979,122 | - | - | - | - | - |
| | new machine | - | - | 2,191,352 | 2,191,352 | 2,191,352 | 2,191,352 | 2,191,352 | 2,191,352 | 2,191,352 | 2,191,352 | 2,191,352 | 2,191,352 | 2,191,352 |
| Total (B) | | 1,527,552 | 1,273,313 | 3,170,474 | 3,170,474 | 3,170,474 | 3,170,474 | 3,170,474 | 3,170,474 | 2,191,352 | 2,191,352 | 2,191,352 | 2,191,352 | 2,191,352 |
| (A) + (B) profit before depreciation | | 1,119,310 | 1,201,692 | 1,336,002 | 3,254,448 | 3,656,305 | 4,070,002 | 4,208,904 | 4,347,804 | 4,144,015 | 4,265,929 | 4,351,713 | 4,437,064 | 4,522,415 |
| Loan repayment | existing machine | 686,552 | 686,552 | 686,552 | 686,552 | 686,552 | 686,552 | 686,552 | 686,552 | 468,769 | 5,530 | - | - | - |
| | new machine | - | - | 1,661,455 | 1,683,455 | 1,683,455 | 1,663,455 | 1,683,455 | 1,683,455 | 1,683,455 | 1,683,455 | 1,683,455 | 1,683,455 | 1,683,455 |
| Total | | 686,552 | 686,552 | 3,348,007 | 2,370,007 | 2,370,007 | 2,370,007 | 2,370,007 | 2,370,007 | 2,152,224 | 1,688,985 | 1,683,455 | 1,683,455 | 1,683,455 |

7. PROFITABILITY AND ECONOMIC EFFECTS OF THE EXPANSION

7-1 Break-Even Point by Grades

The figures for the break-even point are shown in Table 6-2-1. The average break-even point is 17.4 AD/d (average daily production of 19.1 ADt), which is not a too favorable figure.

7-2 Calculation of Incoming and Outgoing Funds

- 1) The annual statement of profits and losses for the new plant is shown in Table 6-11-1. The new plant can show a profit beginning with the fourth year of operation.

The statement of the total profit and loss for both the existing and the new plants is shown in Table 6-12-1. With the two combined, the operation shows a profit even during the new plant construction period.

- 2) The estimated cumulative profits after taxes in the six years from 1991 to 1999 is as follows:

Table 7-2-1 Estimated Cumulative Profit after Taxes over a Six-year Operation Period

| | 1991 ~ 1999 |
|------------------------|------------------|
| A) New plant only | 2,346,066,000 Rp |
| B) Existing plant only | 4,808,716,000 Rp |
| Total | 7,154,782,000 Rp |
| C) Profit from (A + B) | 9,302,889,000 Rp |
| D) Balance | 2,148,107,000 Rp |

This table indicates that the average annual profit after taxes is 391,011,000 Rp for the new plant and 801,425,667 Rp for the existing plants if the operation results are calculated separately, for a total average annual profit of 1,192,436,667 Rp. However, if the results of the operation these two plants are combined, the average annual profit is 1,550,481,500 Rp, about a 30% increase in profit.

7-3 Profit Ratio and Loan Repayment Ability

- 1) The annual profit ratio and the loan repayment ability are shown in Table 7-3-1.
- 2) This project can begin loan repayments from the third year; the average ability over eleven years is about 135%.

7-4 Calculation of Internal Rate of Return (IRR)

- 1) The internal rate of return for this project is shown in Table 7-4-1. The estimated IRR is a rather low, 5.3%.
- 2) The changes in IRR when the sales price only is changed can be shown by the following expression:

$$Y(\text{IRR}) = 34/100 \times X + 5.3$$

X%: Increase ratio of sales price

3) The changes in IRR when the sales price and the total investment are both changed are shown in Table 7-4-2.

If the sales price is increased by 10% and the investment is reduced by 20%, the IRR is 10.7%.

7-5 Financial Indices

The financial indices used in these calculations are shown in Table 7-5-1.

| Year | Rate of net profit on sales (%) | Before-tax profit rate on investment (%) | Loan repayment ability (%) |
|-----------|---------------------------------|------------------------------------------|----------------------------|
| 1 (1991) | -60.5 | -12.6 | 37.4 |
| 2 (1992) | -17.0 | -5.7 | 77.8 |
| 3 (1993) | -1.2 | -0.5 | 111.5 |
| 4 (1994) | 0.7 | 0.4 | 117.7 |
| 5 (1995) | 2.0 | 1.3 | 123.2 |
| 6 (1996) | 3.4 | 2.1 | 129.5 |
| 7 (1997) | 4.7 | 3.0 | 136.8 |
| 8 (1998) | 6.1 | 3.9 | 145.3 |
| 9 (1999) | 7.5 | 4.8 | 155.4 |
| 10 (2000) | 8.8 | 5.6 | 167.5 |
| 11 (2001) | 10.2 | 6.5 | 282.2 |

Table 7-3-1 Profit Ratio and Loan Repayment Ability Calculation by Year (Foreign currency portion)

| Year | Production ADt/y | Operation rate (%) | Sales amount (1,000 Rp/y) | Profit (1,000 Rp/y) | | Profit ratio on sales (%) | | Turnover ratio of investment (%) | Before-tax profit ratio on investment | Loan repayment ability (%) |
|-----------|------------------|--------------------|---------------------------|---------------------|------------|---------------------------|-----------|----------------------------------|---------------------------------------|----------------------------|
| | | | | Before tax | After tax | Before tax | After tax | | | |
| 1 (1991) | 3,010 | 50.0 | 4,813,800 | -2,911,985 | -2,911,985 | -60.5 | -60.5 | 17.96 | -12.6 | 34.72 |
| 2 (1992) | 4,816 | 80.0 | 7,702,080 | -1,312,533 | -1,312,533 | -17.0 | -17.0 | 28.74 | - 5.7 | 77.83 |
| 3 (1993) | 6,020 | 100.0 | 9,627,600 | -113,188 | -113,188 | -1.2 | -1.2 | 35.92 | - 0.5 | 111.52 |
| 4 (1994) | 6,020 | 100.0 | 9,627,600 | 88,827 | 62,738 | 0.9 | 0.7 | 35.92 | 0.4 | 117.69 |
| 5 (1995) | 6,020 | 100.0 | 9,627,600 | 290,841 | 194,047 | 3.0 | 2.0 | 35.92 | 1.3 | 123.22 |
| 6 (1996) | 6,020 | 100.0 | 9,627,600 | 492,856 | 325,356 | 5.1 | 3.4 | 35.92 | 2.1 | 129.54 |
| 7 (1997) | 6,020 | 100.0 | 9,627,600 | 694,870 | 456,665 | 7.2 | 4.7 | 35.92 | 3.0 | 136.83 |
| 8 (1998) | 6,020 | 100.0 | 9,627,600 | 896,885 | 587,975 | 9.3 | 6.1 | 35.92 | 3.9 | 145.34 |
| 9 (1999) | 6,020 | 100.0 | 9,627,600 | 1,098,900 | 719,285 | 11.4 | 7.5 | 35.92 | 4.8 | 155.40 |
| 10 (2000) | 6,020 | 100.0 | 9,627,600 | 1,300,914 | 850,594 | 13.5 | 8.8 | 35.92 | 5.6 | 167.48 |
| 11 (2001) | 6,020 | 100.0 | 9,627,600 | 1,502,928 | 981,903 | 15.6 | 10.2 | 35.92 | 6.5 | 282.16 |

Total fund invested : 26,802,873,000 Rp

$$\text{Annual loan repayment ability} = \frac{\text{Depreciation} + \text{Profit after tax} + \text{Interest paid}}{\text{Loan repayment} + \text{Interest paid}}$$

Table 7-4-0 Annual Statement of Profit and Loss Expansion Plant, Basuki Rachmat Mill (for IRR calculation)

(Unit: 1,000 Rp)

| Year | 1 (1991) | 2 (1992) | 3 (1993) | 4 (1994) | 5 (1995) | 6 (1996) | 7 (1997) | 8 (1998) | 9 (1999) | 10 (2000) | 11 (2001) |
|-------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|--------------|
| Production (t/y) | 3010 | 4816 | 6020 | 6020 | 6020 | 6020 | 6020 | 6020 | 6020 | 6020 | 6020 |
| Sales amount | 4813800 | 7702080 | 9627600 | 9627600 | 9627600 | 9627600 | 9627600 | 9627600 | 9627600 | 9627600 | 9627600 |
| Production cost | | | | | | | | | | | |
| Variable cost | 1977908 | 3164652 | 3955815 | 3955815 | 3955815 | 3955815 | 3955815 | 3955815 | 3955815 | 3955815 | 3955815 |
| Fixed cost | 1334308 | 1608440 | 1733046 | 1733046 | 1733046 | 1733046 | 1733046 | 1733046 | 1733046 | 1733046 | 1733046 |
| Depreciation | 2191352 | 2191352 | 2191352 | 2191352 | 2191352 | 2191352 | 2191352 | 2191352 | 2191352 | 2191352 | 2191352 |
| Total | 5503568 | 6964444 | 7880213 | 7880213 | 7880213 | 7880213 | 7880213 | 7880213 | 7880213 | 7880213 | 7880213 |
| Sales expenses | 77010 | 104336 | 116757 | 116757 | 116757 | 116757 | 116757 | 116757 | 116757 | 116757 | 116757 |
| Interest payable | 2145207 | 1945833 | 1743818 | 1541803 | 1339789 | 1137774 | 935760 | 733745 | 531730 | 329716 | 127702 |
| Profit before tax | -2911985 | -1312533 | -113188 | 88827 | 290841 | 492856 | 694870 | 896885 | 1098900 | 1300914 | 1502928 |
| Corporation tax | 0 | 0 | 0 | 26089 | 96794 | 167500 | 238205 | 308910 | 379615 | 450320 | 521025 |
| Profit after tax | -2911985 | -1312533 | -113188 | 62738 | 194047 | 325356 | 456665 | 587975 | 719285 | 850594 | 981903 |

Table 7-4-1 IRR of Expansion Plant, Basuki Rachmat Mill

| Year | Net flow 1000RP | 5 . 3 % | | 5 . 4 % | |
|------------|--------------------|---------|-----------|---------|-----------|
| | | | 1000RP | | 1000RP |
| - 2 (1989) | -7433000 | 0.950 | -7058879 | 0.949 | -7052182 |
| - 1 (1990) | -13698000 | 0.902 | -12353796 | 0.900 | -12330365 |
| 1 (1991) | -566426 | 0.856 | -485130 | 0.854 | -483750 |
| 2 (1992) | 2490878 | 0.813 | 2025998 | 0.810 | 2018320 |
| 3 (1993) | 3139143 | 0.772 | 2424763 | 0.769 | 2413282 |
| 4 (1994) | 3139143 | 0.734 | 2302719 | 0.729 | 2289641 |
| 5 (1995) | 3139143 | 0.697 | 2186817 | 0.692 | 2172335 |
| 6 (1996) | 3139143 | 0.662 | 2076750 | 0.657 | 2061039 |
| 7 (1997) | 3139143 | 0.628 | 1972222 | 0.623 | 1955445 |
| 8 (1998) | 3139143 | 0.597 | 1872955 | 0.591 | 1855261 |
| 9 (1999) | 3139143 | 0.567 | 1778685 | 0.561 | 1760210 |
| 1 0 (2000) | 3139143 | 0.538 | 1689159 | 0.532 | 1670028 |
| 1 1 (2001) | 3139143 | 0.511 | 1604140 | 0.505 | 1584467 |
| | | | 36402 | | -86270 |

IRR determined from the above ----- 5 . 3 %

Table 7-4-2 Sensitivity Analysis of Expansion Plant, Basuki Rachmat Mill

The internal rate of return from the expansion based on changes in sales prices and investment is calculated as shown below.

| | | Internal Rate of Return (I.R.R.) | | | | | | | | (Unit: %) | |
|--------------------------|-------------|----------------------------------|-------|-----|-------|-----|-------|-----|-------|-----------|------------------------------------|
| Investment \ Sales price | Sales price | -10% | -7.5% | -5% | -2.5% | 0% | +2.5% | +5% | +7.5% | +10% | |
| | | | | | | | | | | | |
| -20% | | 2.3 | 3.5 | 4.6 | 5.7 | 6.8 | 7.8 | 8.8 | 9.8 | 10.7 | |
| -15% | | 2.1 | 3.2 | 4.3 | 5.4 | 6.4 | 7.4 | 8.3 | 9.3 | 10.1 | |
| -10% | | 1.9 | 3.0 | 4.0 | 5.0 | 6.0 | 6.9 | 7.9 | 8.8 | 9.6 | |
| -5% | | 1.7 | 2.7 | 3.7 | 4.7 | 5.6 | 6.6 | 7.4 | 8.3 | 9.1 | |
| 0% | | 1.5 | 2.5 | 3.5 | 4.4 | 5.3 | 6.2 | 7.1 | 7.9 | 8.7 | |
| +5% | | 1.4 | 2.3 | 3.3 | 4.2 | 5.0 | 5.9 | 6.7 | 7.5 | 8.3 | |
| +10% | | 1.3 | 2.2 | 3.1 | 3.9 | 4.8 | 5.6 | 6.4 | 7.2 | 7.9 | |
| +15% | | 1.1 | 2.0 | 2.9 | 3.7 | 4.5 | 5.3 | 6.1 | 6.8 | 7.6 | |
| +20% | | 1.0 | 1.9 | 2.7 | 3.5 | 4.3 | 5.1 | 5.8 | 6.5 | 7.2 | |
| | Investment | | | | | | | | | | + Increase - Decrease |

CHAPTER 8 CONCLUSIONS AND RECOMMENDATIONS

8. CONCLUSIONS AND RECOMMENDATIONS

8-1 The results of our investigation of the renovation plan (F/S Main Report) has already been reported.

The report was prepared to assist BRPP in curing its deficits, strengthen its management foundation and contribute to developing the district as a viable industrial area. The following is the basic proposal.

- a) In product Quality
- b) Increase efficiency while reducing cost
- c) Gradual conversion from the production of printing/writing paper to products of higher yield and value, to increase profit

This report describes our proposal for the installation of a new paper machine for specialized thin production, which is a product of a higher added value, after the implementation of the renovation plan and the stabilization of the BRPP management.

8-2 The plan for the a installation new paper machine (PM2) is outlined below.

- 1) The existing No. 1 Paper Machine is to be used for the production of printing/writing paper and form paper only.
- 2) The installation of an additional paper machine (PM2)
A special paper machine with daily production a capacity of 20 ADT shall be installed to produce and sell 6,020 ADT of special thin paper. The machine will produce the four grades of base paper for lamination, soap wrapper, glassine and greaseproof paper.
- 3) The existing pulp plant is not be renovated, nor shall a new pulp plant be constructed. All of pulp the needed is to be purchased.
- 4) An effluent treatment system for each, including effluent treatment for the existing plant and auxiliary equipment such as the boiler shall be installed.
- 5) Employee training and technical cooperation.
Some employees shall be sent abroad for training. For proper construction of the facilities, BRPP shall also receive technical assistance from experienced engineers from foreign paper companies.
- 6) Total funds required : US\$26,802,873 (including the foreign currency portion of US\$18,518,000)
- 7) Annual proceeds for sales amount : US\$9,627,600
- 8) Construction period : 29 months
- 9) Number of additional Employees : 158

8-3 Market

The scheduled production will satisfy 85% or more of the total thin consumption in Indonesia. For the project to be cost effective, it requires 85% or more of the market share. Since this cannot be accomplished easily, BRPP must plan on exporting a portion of its production to the other ASEAN countries.

8-4 Expected Profit after Implementing Expansion plan

1) IRR after Taxes: 5.3%

The projected IRR when the fixed cost of the existing plant is distributed according to the sales ratio (194.57 Rp per kg of product) is 5.3%.

2) IRR after Taxes (Sensitivity analysis)

a) When the sales price only is increased by 10% : 8.7%

b) When the investment only is decreased by 20% : 6.8%

c) When both a) and b) are applied : 10.7%

3) Profits after taxes

This project generates a profit starting with the fourth year of the operation. However, if the calculation is based on the total proceeds from both the existing and the new plants, BRPP can generate profit through the entire period.

4) Financial status

This project shows a deficit up to the second year after the start of operation. The loan repayment ability is low, at 110 to 167% which is not indicative of sound financial status.

8-5 Conclusions and Recommendations

1) Based on the results of the investigation described above, this expansion plan can not be considered economically feasible. The major reasons are as follows:

a) The cost of new plant is extremely high since it must share the fixed cost of the existing plant. The fixed cost of the new plant averages 287.88 Rp/kg paper, of which 67% (194.57 Rp/kg paper) is for the existing plant.

b) The depreciation is extremely high (average 364.01 Rp/kg paper).

These two factors increase the cost, thus reducing the profit and the IRR.

2) However, if the following measures are taken and governmental support is obtained, the IRR can be raised to approximately 10.3, which would make the expansion plan feasible.

a) Relative to Item

Only the direct fixed cost (93.31 Rp/kg paper) should be applied to the fixed cost. In other words, the fixed cost on the existing plant has already been calculated as the fixed cost of the plant. Therefore this project should share the cost needed to install a new plant within BRPP.

b) Relative to Item

The waste water treatment facilities should be installed with the funds from the existing plant. The installation of a BM control system and a size press should be postponed.

c) If these three items are excluded from the project, approximately US\$2,000,000 can be saved in the total investment.

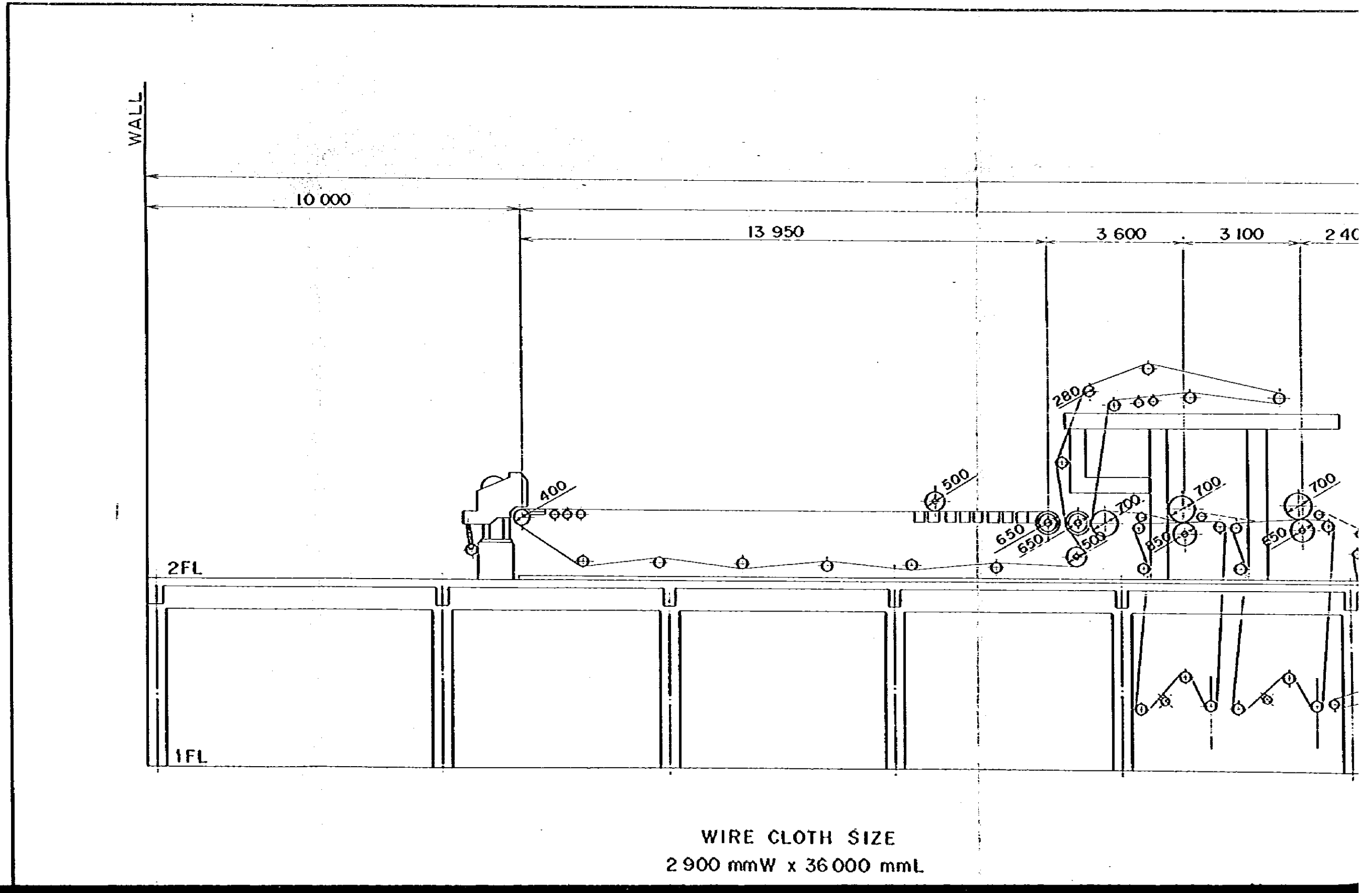
If the measures a), b), and c) are implemented and the interest rate on foreign currency loans is guaranteed by the government, at 8% to 10% this expansion plan can be feasible.

3) Indonesia should pursue this expansion program as a matter of national policy, for the following reasons:

a) BRPP is a national plant and plays a significant role in the promotion and stabilization industry and employment in the district.

b) There are no national plants in Indonesia that have paper machines other than BRPP. The BRPP's burden of fixed costs must be reduced. BRPP also must acquire flexibility and diversity in its operation by installing an additional paper machine. We firmly believe that this additional installation is necessary for achieving the basic objectives, of maintaining healthy management and continuing growth.

4) The renovation program contained in the F/S (Main Report) should be implemented. We recommend that this expansion plan be executed at an opportune time to minimize the risk, under the strong guidance and support of the Indonesian government.



120 000

94 000

3 600

3 100

2 400

27 750

4 000

6 300

2 100

3 150

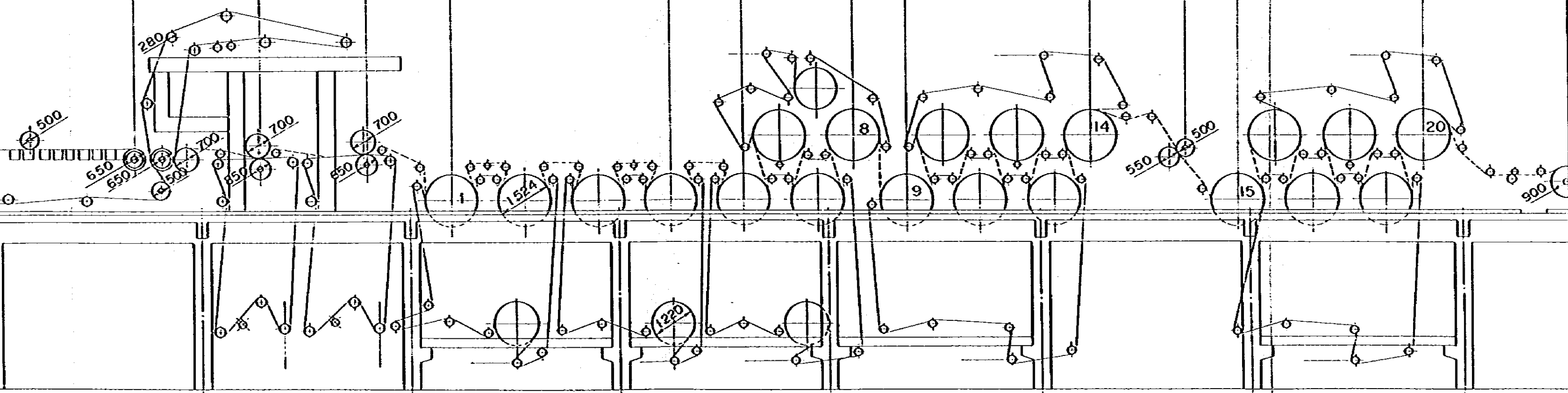
1 500

5 250

2 700

1 500

5 250



SIZE
0 mmL

120 000

94 000

4 000

24 000

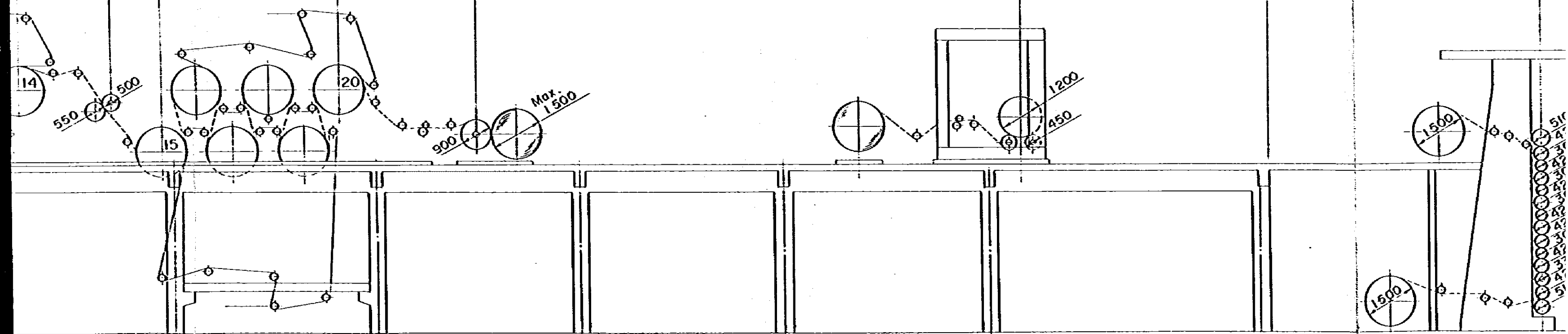
7 200

8 000

2 700

1 500

5 250



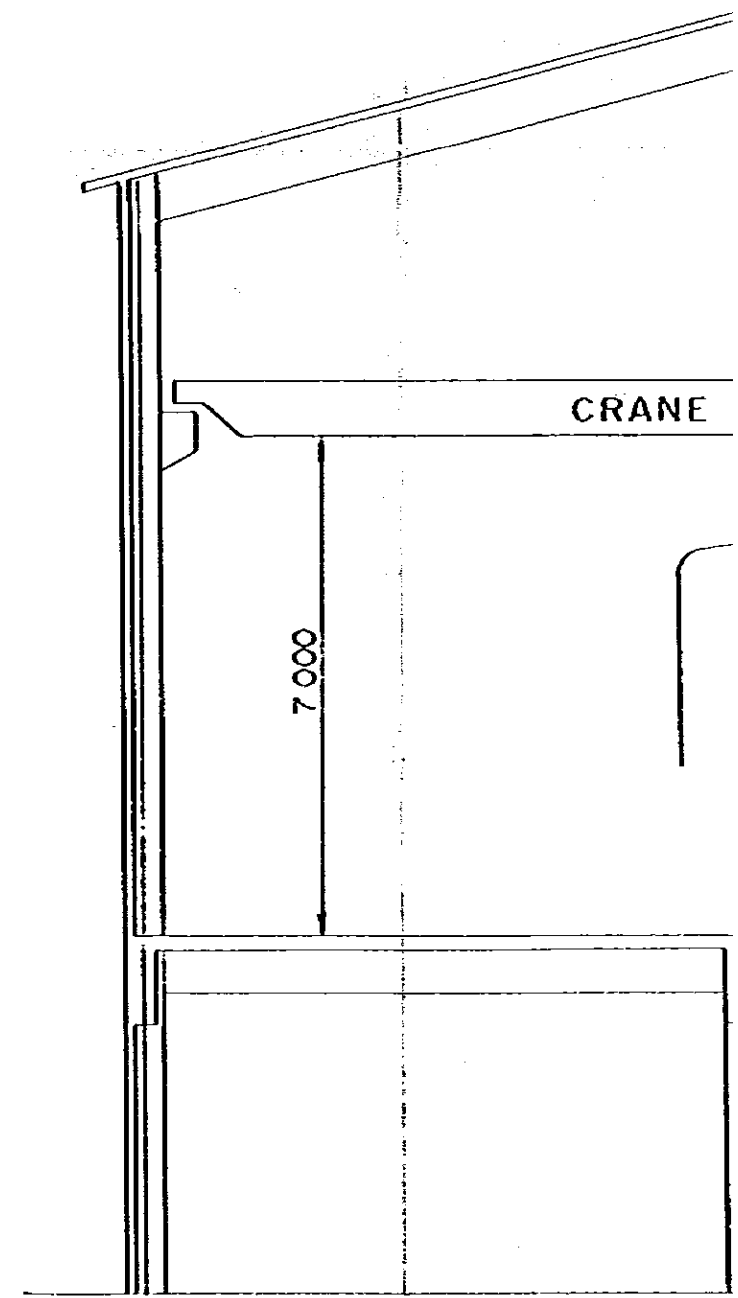
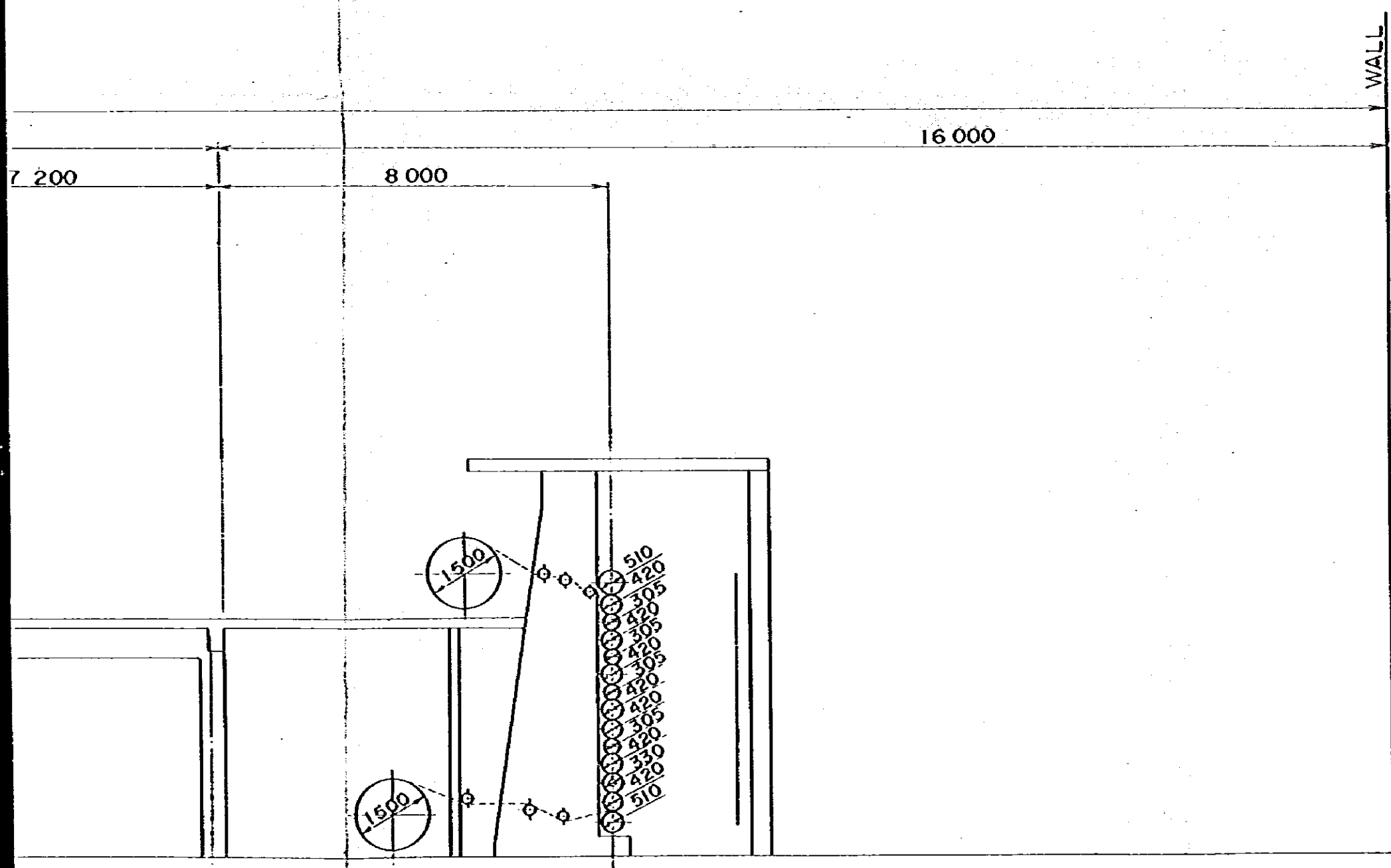
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1500

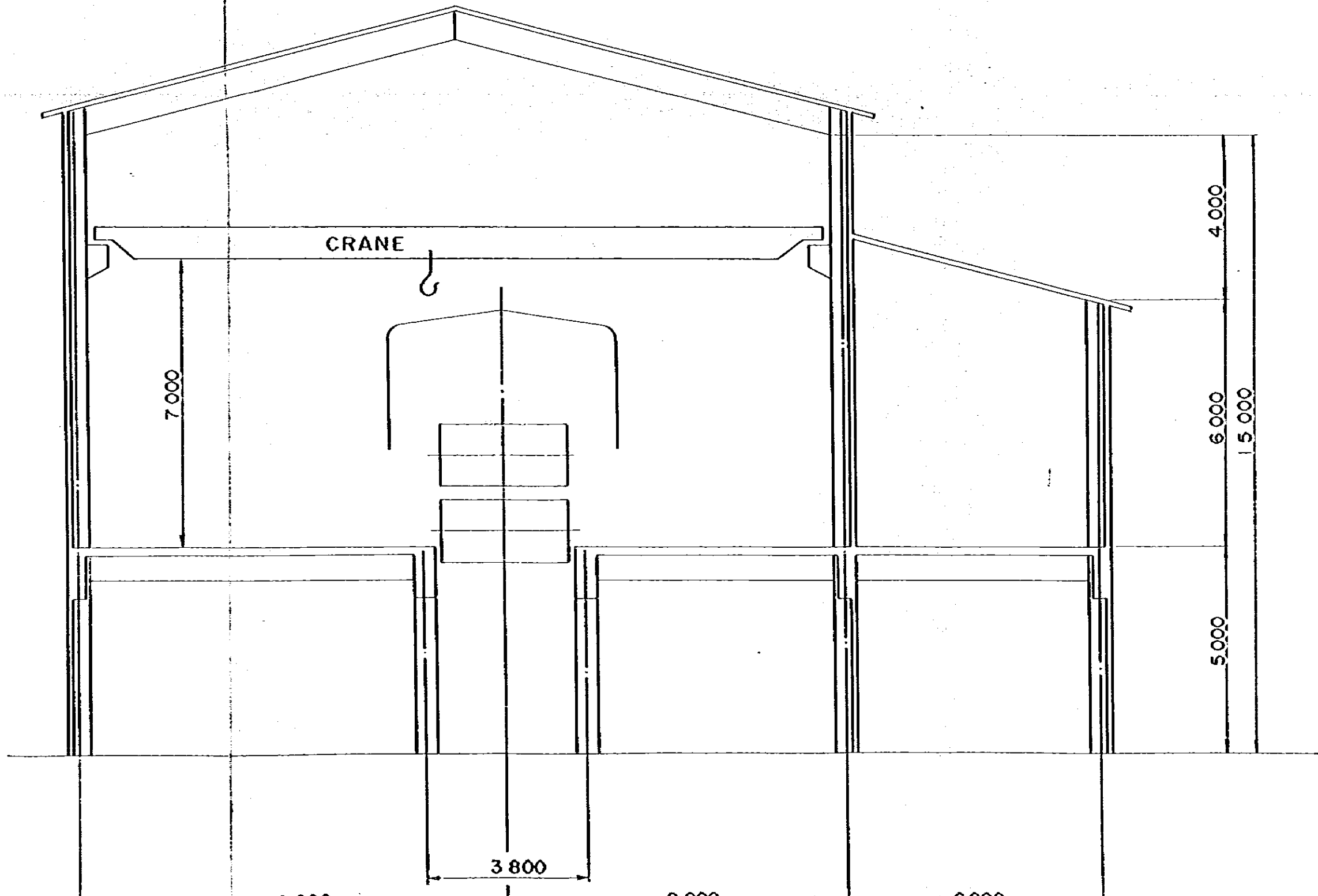
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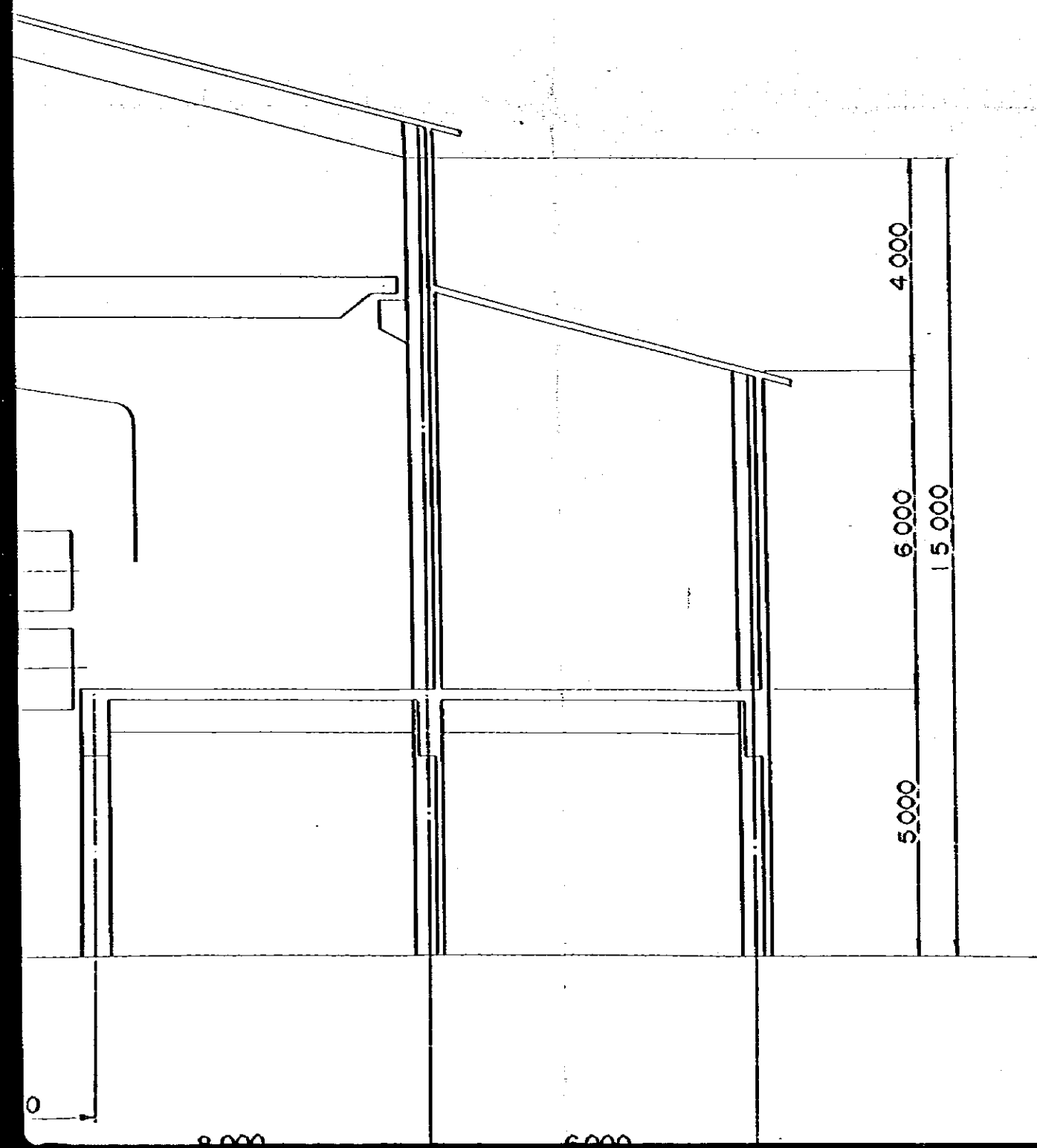
1500





DESIGN BA

- 1 GRADE OF PAPER
- 2 BASIS WEIGHT
- 3 WIRE WIDTH
- 4 PAPER WIDTH
- 5 OPERATING SPE
- 6 PRODUCTION

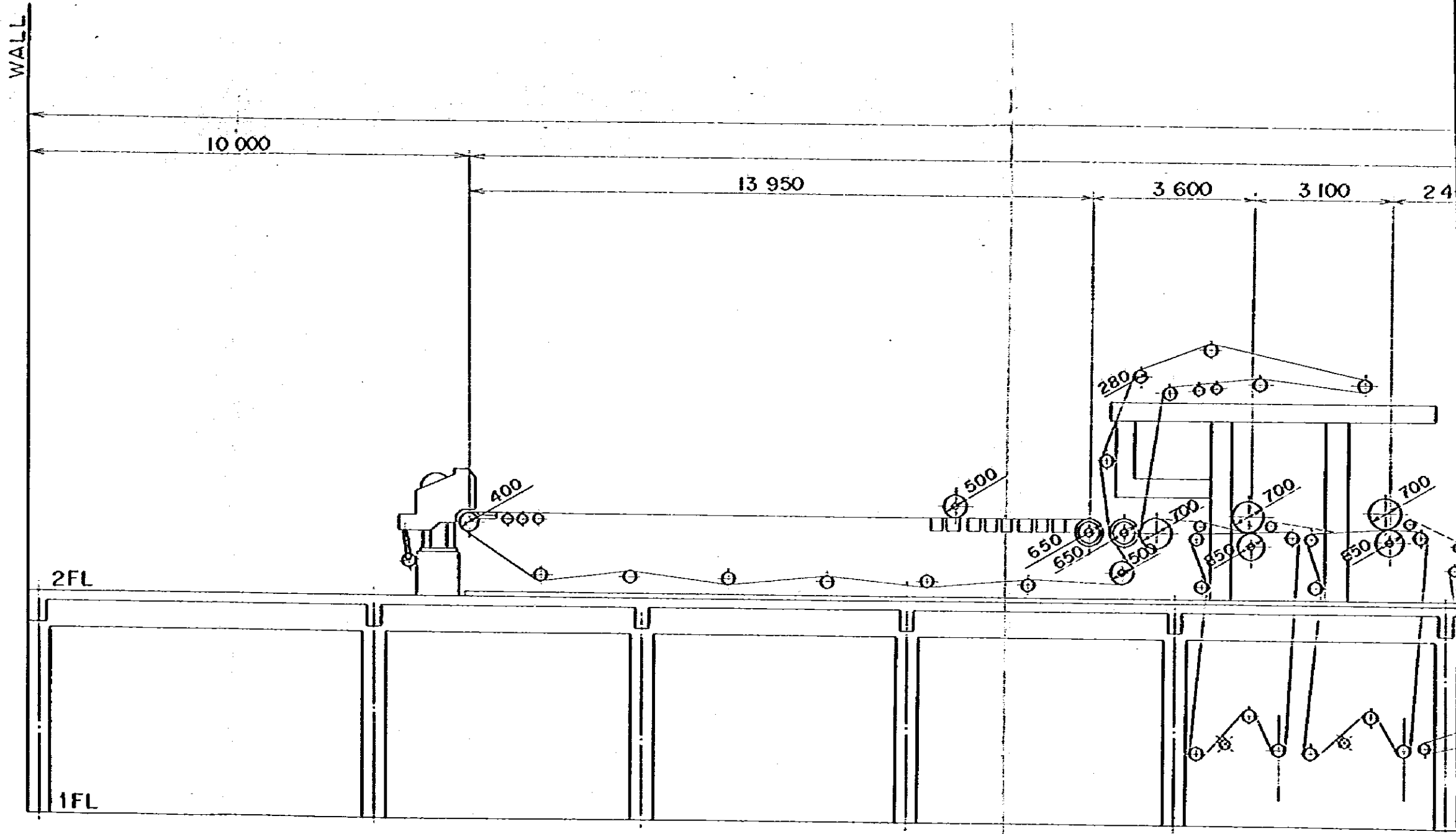


DESIGN BASIS

| | | |
|---|-----------------|---------------------------------------------------------------------------|
| 1 | GRADE OF PAPER | GREASED PROOF SOAP WRAPPER BASE PAPER OF LAMINATE GLASSINE PAPER |
| 2 | BASIS WEIGHT | 20 - 80 g/m ² |
| 3 | WIRE WIDTH | 2900 mm |
| 4 | PAPER WIDTH | 2370 mm on reel |
| 5 | OPERATING SPEED | Max. 300 m/min |
| 6 | PRODUCTION | 20 T/D |

Fig. 4-8-1

| | | | |
|-------------|------------------------------------------------------|---------|-------|
| Title | NO.2 PAPER MACHINE EXPANSION FOR BRPP CORPORATION | | |
| | 20 T/D THIN PAPER MACHINE | | |
| Drawing No. | | SC S110 | L/100 |

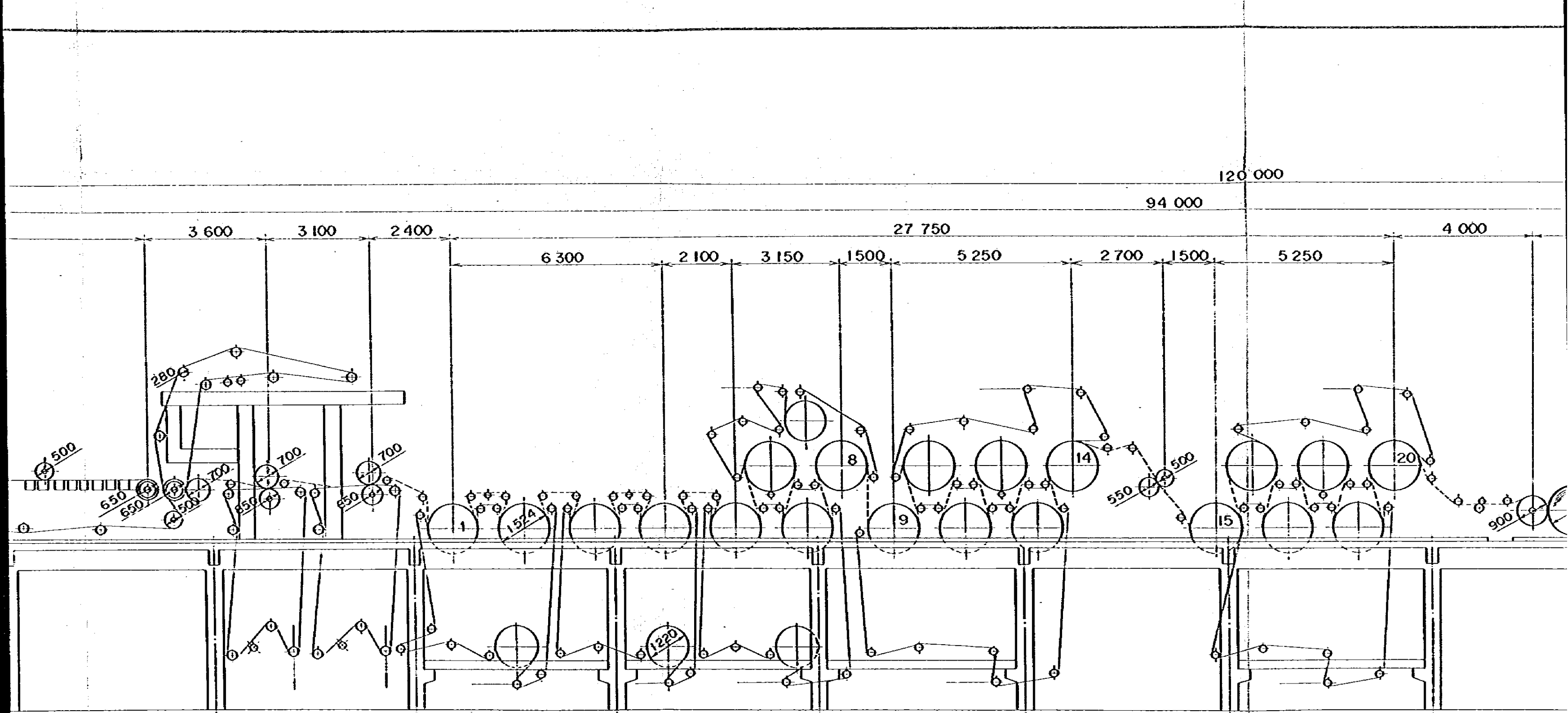


WIRE CLOTH SIZE
2 900 mmW x 36 000 mmL

HEAD BOX

WIRE PART

PRESS PART



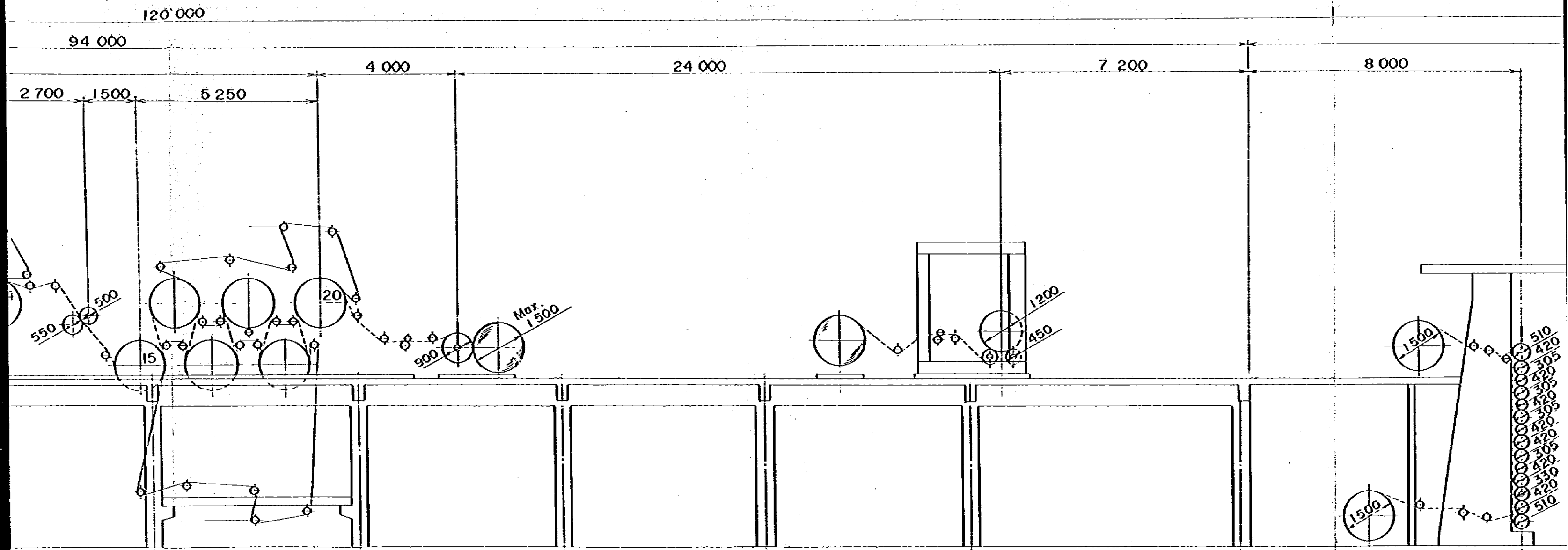
PRESS PART

DRYER PART

SIZE PRESS

REEL

mL

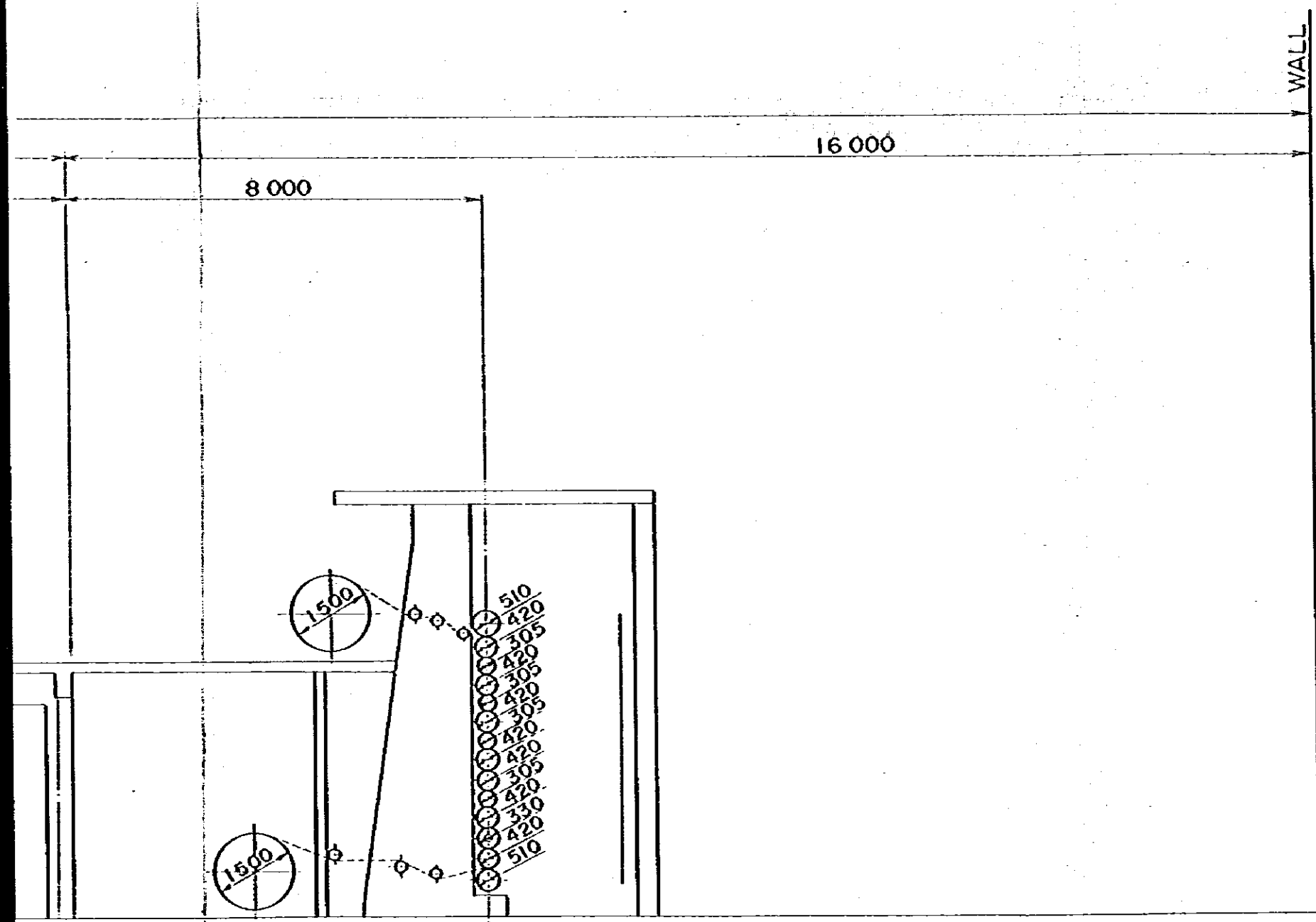


IZE PRESS

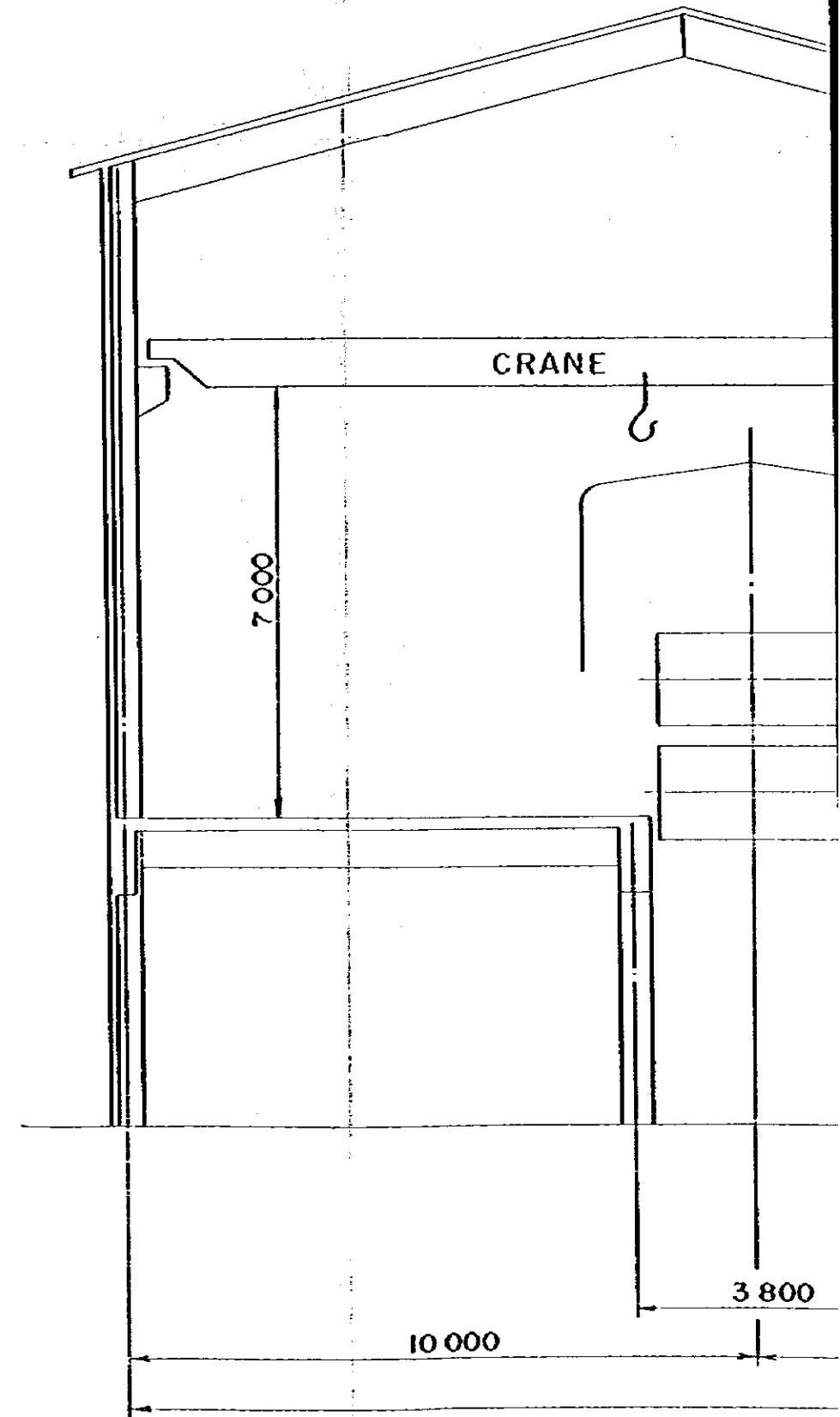
REEL

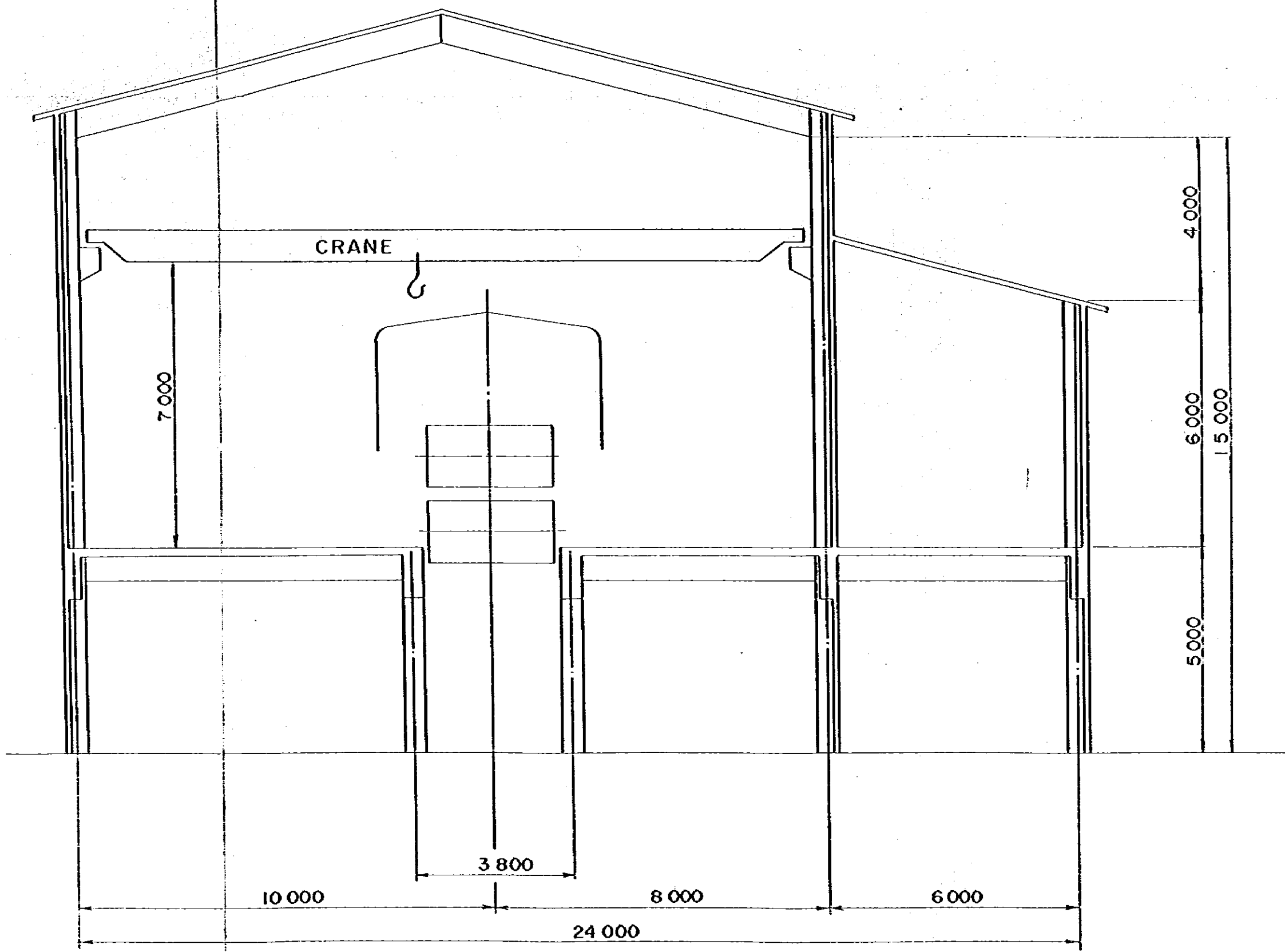
WINDER

SUPER CALEM



SUPER CALENDER



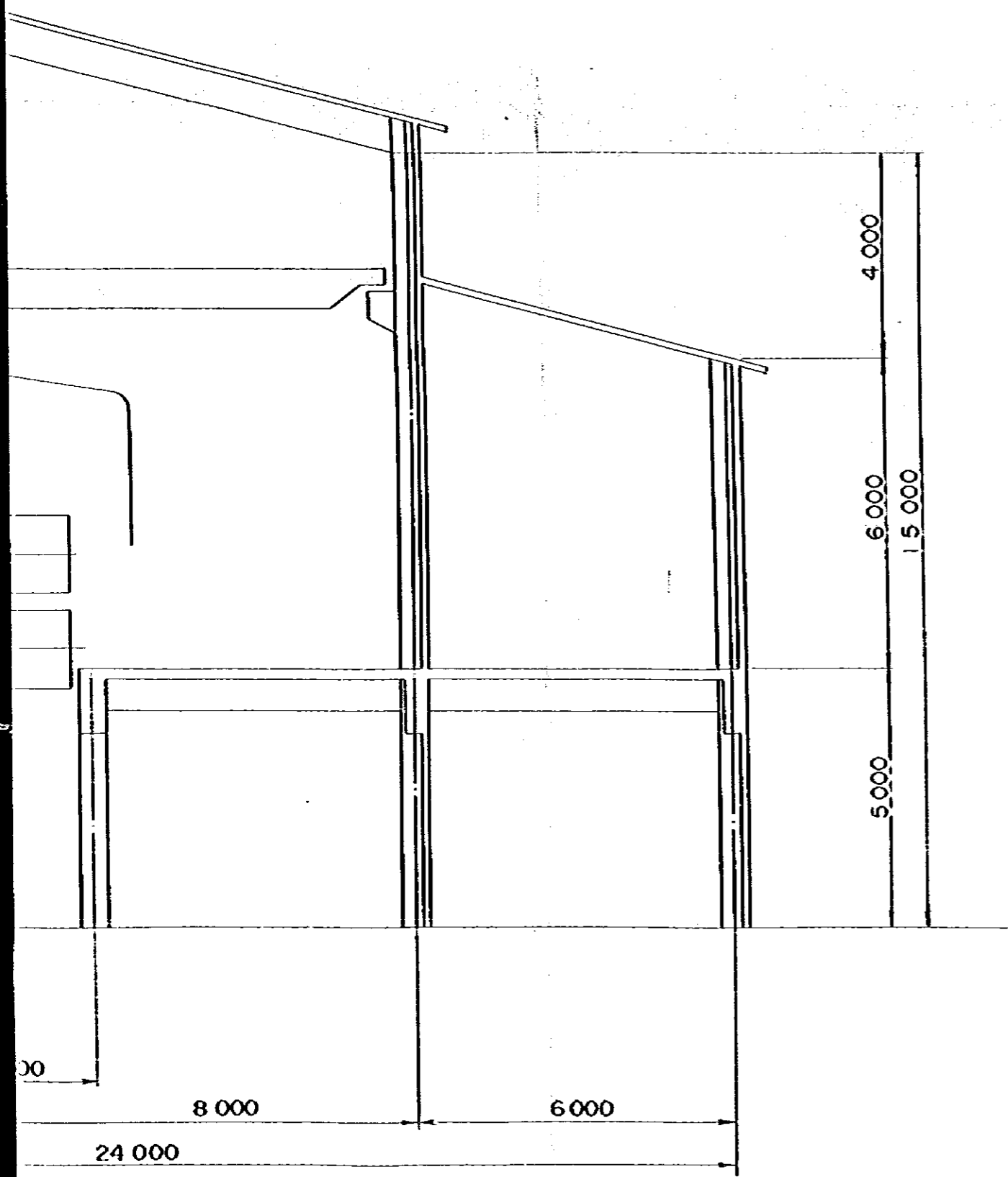


DESIGN BASIS

| | | |
|---|-----------------|-----|
| 1 | GRADE OF PAPER | GRE |
| | | SOA |
| | | BAS |
| | | GLA |
| 2 | BASIS WEIGHT | 20 |
| 3 | WIRE WIDTH | 290 |
| 4 | PAPER WIDTH | 237 |
| 5 | OPERATING SPEED | Max |
| 6 | PRODUCTION | 20 |

Fig.

| |
|----------|
| Title |
| Drawing |
| Spec N |
| THE C |

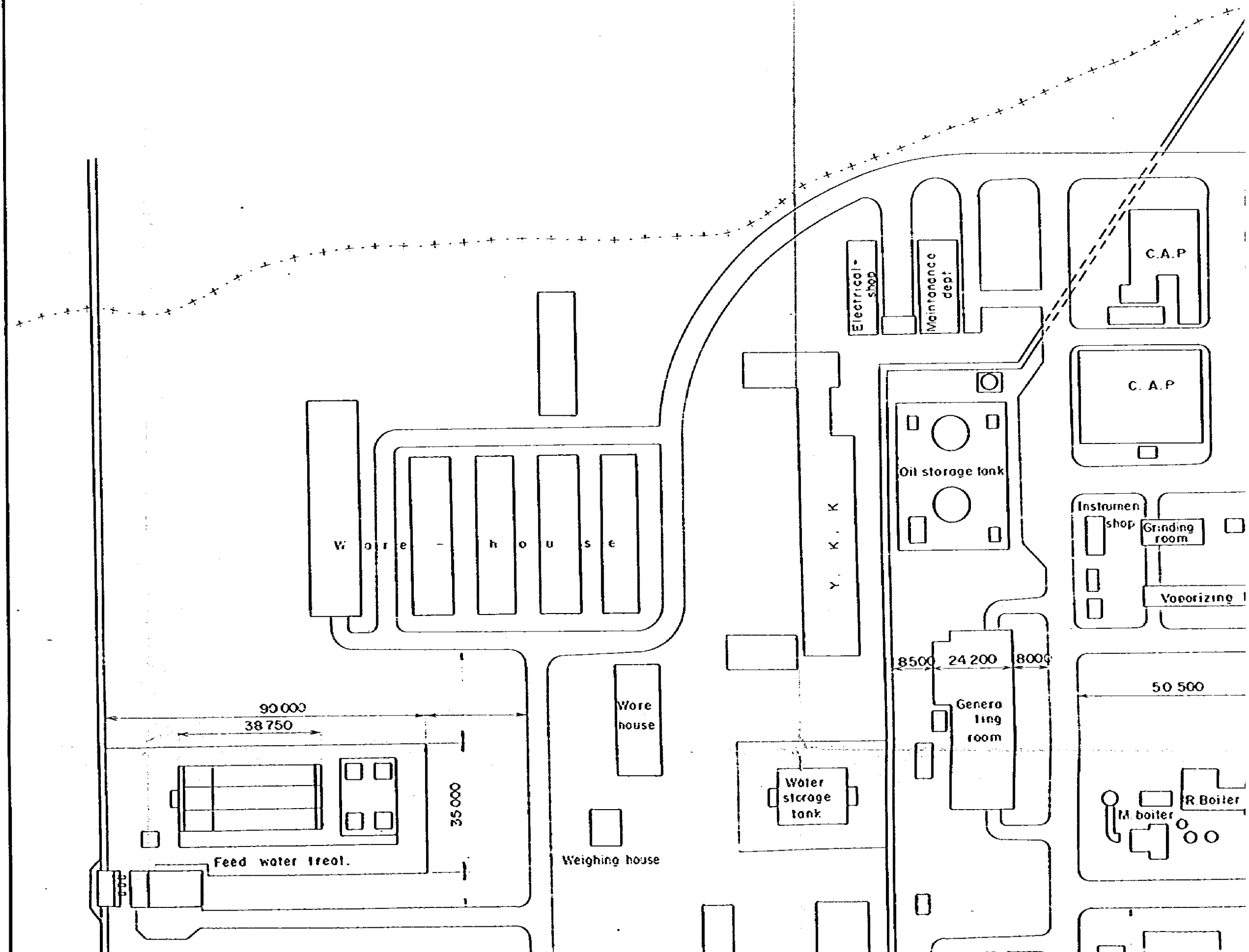


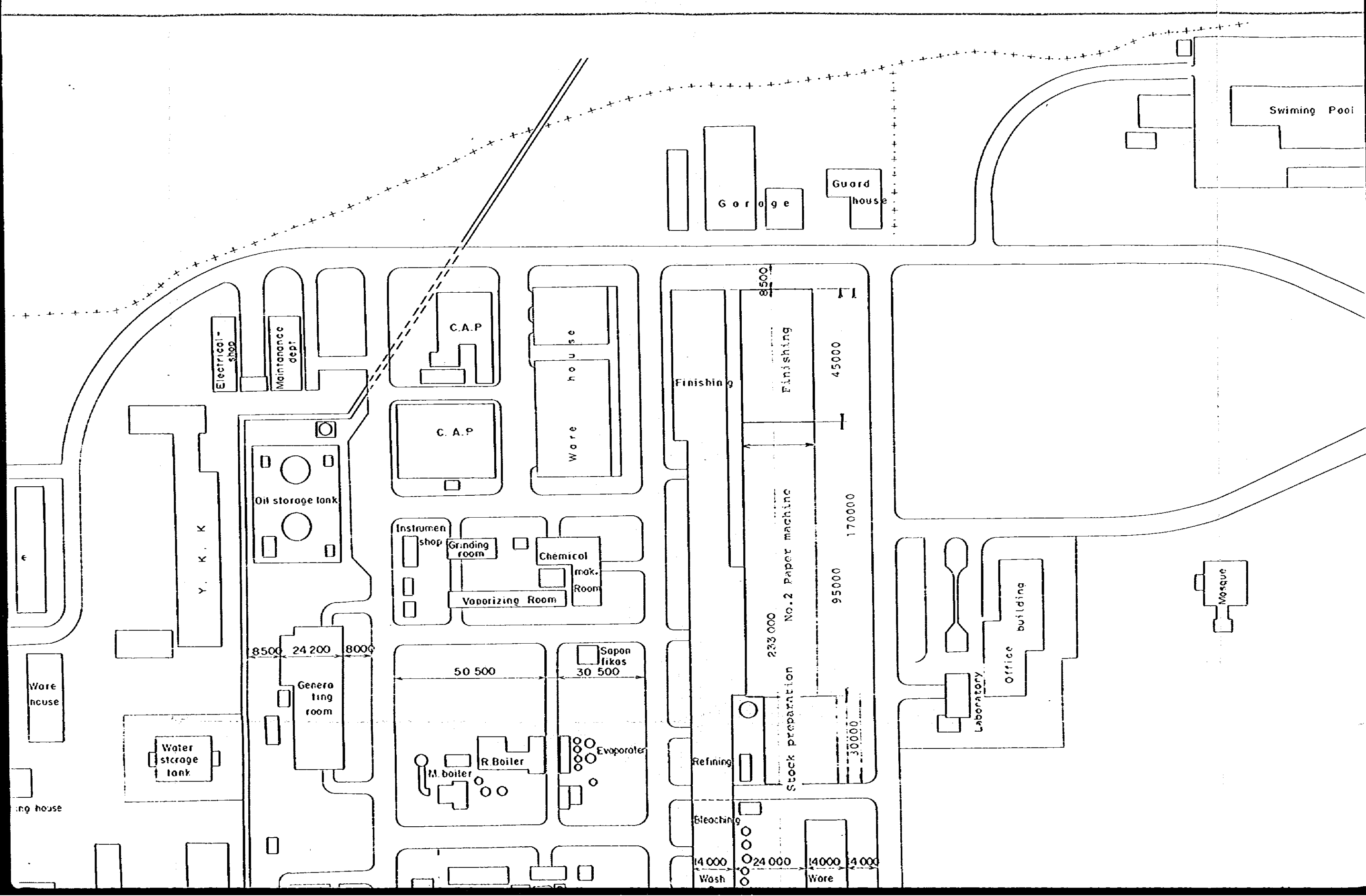
DESIGN BASIS

| | | |
|---|-----------------|---------------------------------------------------------------------------|
| 1 | GRADE OF PAPER | GREASED PROOF SOAP WRAPPER BASE PAPER OF LAMINATE GLASSINE PAPER |
| 2 | BASIS WEIGHT | 20 - 80 g/m ² |
| 3 | WIRE WIDTH | 2900 mm |
| 4 | PAPER WIDTH | 2370 mm on reel |
| 5 | OPERATING SPEED | Max. 300 m/min |
| 6 | PRODUCTION | 20 T/D |

Fig. 4-8-1

| | | | |
|------------------------------------------------------|--|--------------|----------------|
| NO.2 PAPER MACHINE EXPANSION FOR BRPP CORPORATION | | | |
| Title 20 ^{T/D} THIN PAPER MACHINE | | | |
| Drawing No. | | SC Size | 1 / 100 |
| Spec No. | | Drawing Date | |
| THE JAPAN INTERNATIONAL COOPERATION AGENCY | | | TOKYO JAPAN |





Swimming Pool

Guard house

Garage

Ware house

C.A.P.

C.A.P.

Oil storage tank

Y. K. K.

Electrical shop

Maintenance dept

Instrument shop

Grinding room

Chemical mak. Room

Vaporizing Room

Saponifikas 30 500

50 500

Generating room

8500 24 200 8000

Water storage tank

Ware house

ing house

M. boiler

R Boiler

Evaporator

Refining

233 000 Stock preparation

No. 2 Paper machine

95 000

170 000

Finishing

Finishing

45 000

8500

Bleaching

14 000

Wash

24 000

Wore

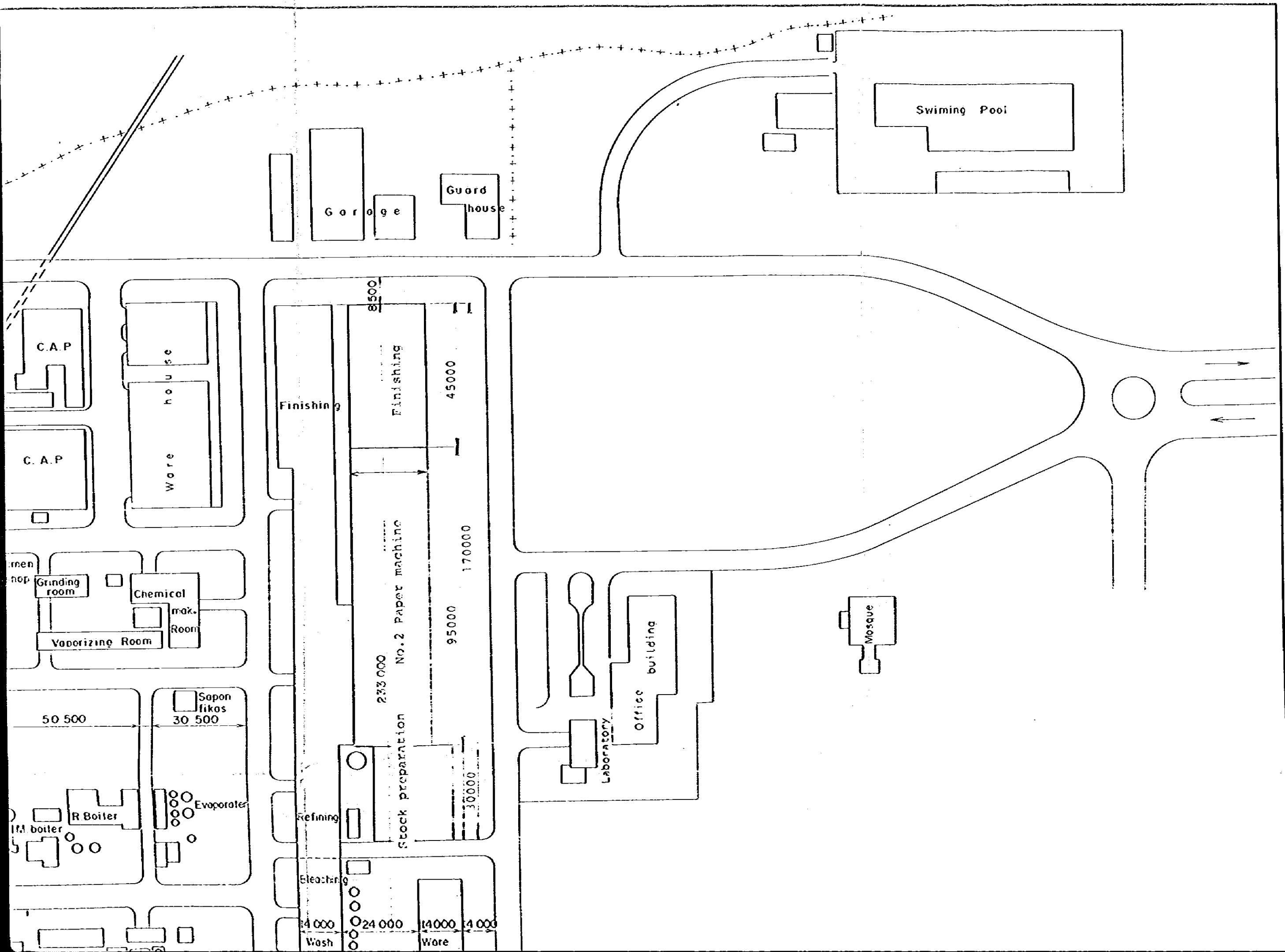
14 000

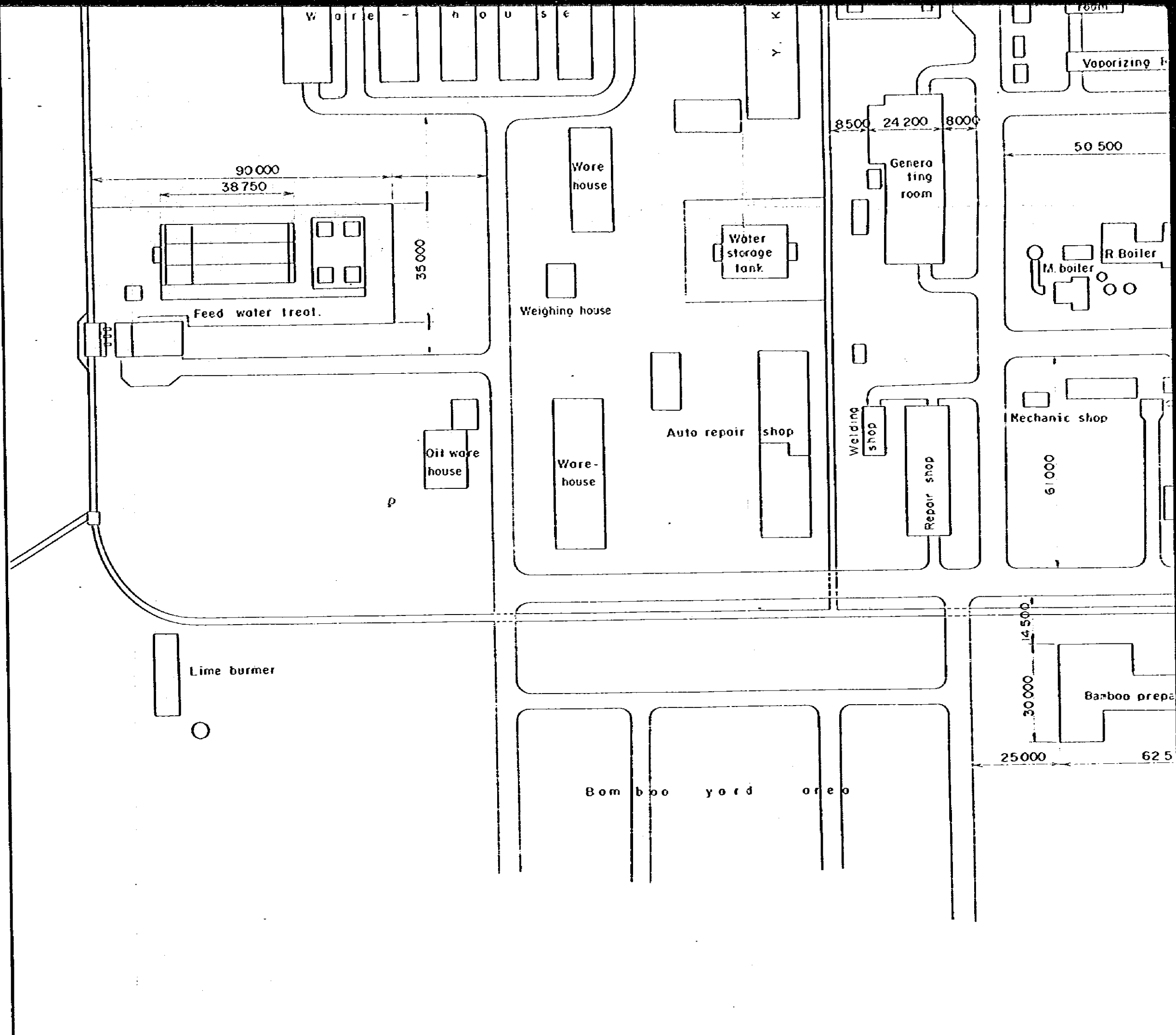
14 000

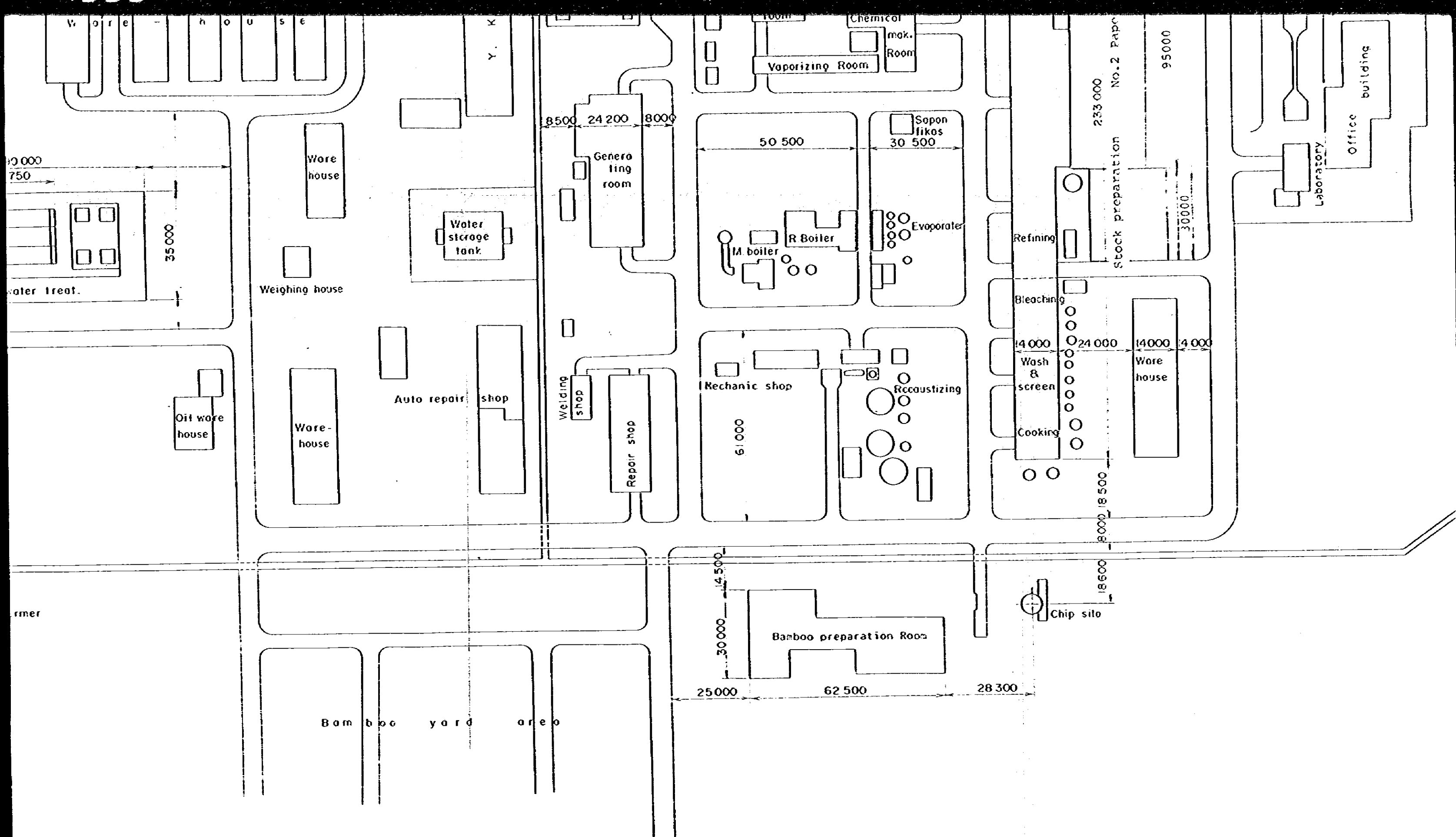
Laboratory

Office building

Mosque







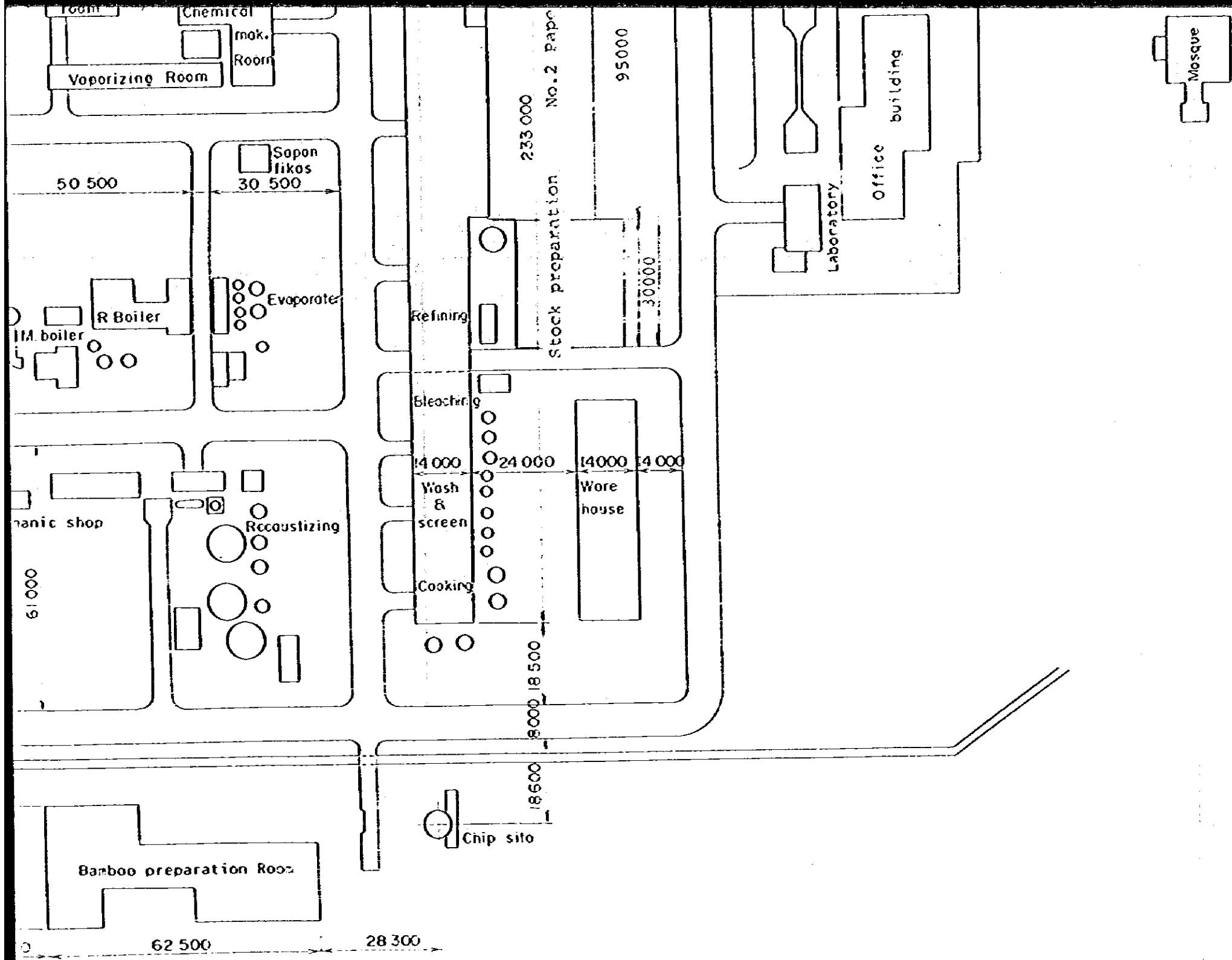



Fig. 4-8-2

| | | | |
|--------------------------------------------------------------------------------------------------------------|----------|---------|-------------|
| FOR RENOVATION EXP | | | |
| LAYOUT OF | | | Traced |
| BASUKI RACHMAT | | | Drawn |
| PULP & PAPER MILL | | | Checked |
| Scale | Date | Draw No | Appr |
| | Aug. '84 | | |
|  HONSHU PAPER CO., LTD. | | | TOKYO JAPAN |

JICA

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