REPORT OF SURVEY

ON

PULP AND PAPER INDUSTRY DEVELOPMENT

AND EXPANSION PROJECT

REPUBLIC OF INDONESIA

December 1968

GOVERNMENT OF JAPAN

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FOREWORD

In response to the request of the Government of Republic of Indonesia, the Government of Japan decided upon the execution of a feasibility study on the pulp and paper industry development project of that country with the appropriation of fiscal 1968 budget and entrusted the Overseas Technical Cooperation Agency, a working organization, with the execution of this task. The agency, fully realizing the importance of pulp and paper industry in that country, organized a survey mission and sent it to that country during a period from October 24 to November 20, 1968. The mission, beside making surveys, held discussions with various parties concerned, placing emphasis on the expansion project for Gowa Paper Mill and Pematang Siantar Paper Mill, both of which were constructed by our country as a reparation project, and at the same time provided instructions on technical matters for the people on the field. Thanks to the special support and cooperation rendered by the officials of the Government of Republic of Indonesia, the survey was smoothly carried out as scheduled. After their return to Japan, the member of the mission devoted themselves to the finalization of the report. The report is now ready for presentation.

I sincerely hope that this report will serve for the promotion of pulp and paper industry in the Republic of Indonesia and at the same time contribute to furthering friendship and economical exchange between the two countries.

Finally I express my heartiest appreciation to the officials of the Government of Republic of Indonesia for their generous cooperation during the stay of survey mission.

December, 1968

Shinichi Shibusawa
Director General
Overseas Technical Cooperation Agency

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1 INTRODUCTION

I INTRODUCTION

1. Purpose of the Survey

The Government of Indonesia sought the cooperation of our country (Japan) for the rehabilitation of Gowa Paper Mill and Pematang Siantar Paper Mill under Japan's Project Aid to Indonesia. Both of these mills were constructed by our country for reparation but are now operating at an extremely low operation rate Eligibility of the final work under this project for loans is determined only after its feasibility has been confirmed by both governments and The Overseas Economic Cooperation Funds Japan. For this reason, the Japanese Government had decided to send a survey mission to that country to study the cause of low operation rate in the above mentioned two mills and the works required for their rehabilitation and the effect of such works.

The Survey Mission left Tokyo by air on October 24, 1968 and returned to Japan on November 20, 1968. Though the time allocated for the survey was short, a total of 28 days, the mission tried to find time whenever possible to provide operational instructions in the field and to exchange views with personnel at the mills.

2. Organization of Survey Mission

Leader (Overall activities and power plant facilities)

Iwao Murayama
Manager, Engineering Service Dept.
Honshu Paper MFG. CO., Ltd.

Member (Kraft Pulp facilities)

Yoshio Nagase
Mill Manager, Tsurusaki Mill
Tsurusaki Pulp Co., Ltd.

Member (Soda recovery and ground pulp facilities)

Noboru Fujita
Engineering Service Dept
Honshu Paper MFG CO., Ltd.

Member (Civil engineering and water supply system)

Satoru Kataoka
Civil engineer
1st Class Architectural and Engineering Office,
Honshu Papaer MFG Co., Ltd.

Member (Finance)

Toshiyuki Ozaki
Assistant Chief
4th Section, Loan Dept
The Overseas Economic Cooperation Fund, Japan.

Member (Paper machine)

Eiji Suko
Mechnical engineer, Yodogawa Mill
Honshu Paper MFG Co., Ltd.

Member (Machine design and maintenance)

Shinzo Shinagawa
Mechanical engineer
Engineering Service Dept
Honshu Paper MFG.Co., Ltd.

3. Acknowledgments

The Mission expresses grateful appreciation to the officials of the Indonesian Government agencies for their cooperation. Special recognition is given the officials of the National Development Planning Body, the Ministry of Industry and the management of Gowa mill and Siantar Mill for their heartfelt cooperation during the survey.

The mission is also grateful to the members of the Japanese Embassy in Indonesia, Consulate-general in Medan, and the staff of the DJakarta Office of the Overseas Economic Cooperation Fund, Japan, for their advices and assistance in both official and unofficial activities of the mission.

The Mission also expresses grateful appreciation to the Japanese residents there for the kindness shown to the members during their stay.

It was through the cooperation of all the parties mentioned above that the survey mission was able to carry out its duties successfully. To those, we renew our sincere appreciation.

4. Itinerary of the Survey Mission.

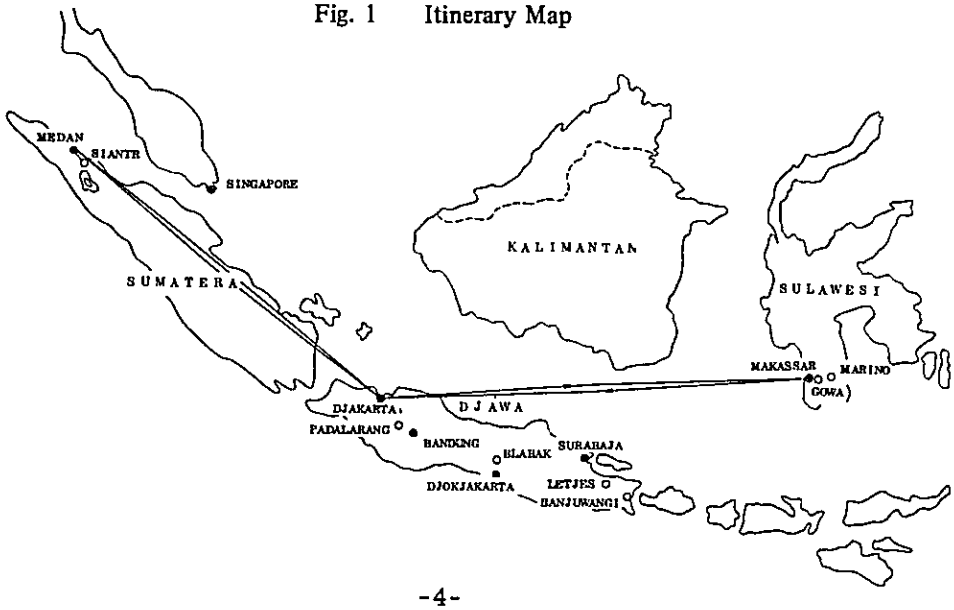
Oct. 24	Left Tokyo by air and arrived at Djakarta
Oct. 25	Courtesy call to the Japanese Embassy and consultations with the embassy staff on Itinerary of the mission. Courtesy calls to the Indonesian National Development Planning Body and the Ministry of Industry.
Oct. 26	Consultations with officials of the ministry of Industry.
Oct. 27	Coordination meeting of the mission and processing of data
Oct. 28	Left DJakarta and arrived at Makassar. Visit to Gowa Paper Mill and touring of plant facilities.
Oct. 29	Briefing by the Manager and management personnel of the Gowa mill on the present condition, followed by questions and answers sessions.
Oct. 30 ~ Nov. 4	Survey of Gowa Paper Mill. " "
Nov. 5	Reporting to the management of Gowa mill on the findings of the survey, followed by discussions. Call to the Governor of Gowa Province and consultations for aquisition of plant water.
Nov. 6	Left Makassar and arrived at Djakarta.
Nov. 7	Call to the Japanese Embassy and reporting on the findings of the survey of Gowa Paper Mill.
Nov. 8	Compilation of data and preparation of an interim report.
Nov. 9	Left Djakarta and arrived at Medan.
Nov. 10	Left Medan and arrived at Siantar. Call to the Siantar Paper Mill and touring of the facilities.
Nov. 11	Briefing by the manager of the Siantar Mill on the present conditions, followed by questions and answers session. Survey of the Siantar Paper Mill facilities.
Nov. 12 ~ Nov. 14	Survey of the Siantar Paper Mill facilities. " "

Nov.	15	Reporting to the management of the Siantar Mill on the findings of the survey, followed by discussions. Survey of the forest in the Parapat District.
Nov.	16	Left Parapat and arrived at Medan. Call to the Consulate-General and reporting on the findings of the survey. Left Medan and arrived at Djakarta.
Nov.	17	Collection and compilation of data.
Nov.	18	Call to the Japanese Embassy and reporting on the findings of the survey. Call to the Ministry of Industry and breifing and discussions on the findings of the survey.
Nov.	19	Reporting to a Joint meeting of the National Development Planning Body and the Ministry of Industry on the result of the survey.
Nov.	20	Left Djakarta and arrived at Tokyo.

A proposal was made by the Ministry of Industry of the Indonesian Government for their participation in the survey. As a result, Ir Satiadi and Ir Koesni of the same ministry accompanied the mission to the Gowa Mill. The mission met with Industrial Minister Jusuf during its survey of the Gowa Mill. The mission also met with Govenor Lsh Masud of Gowa and discussed the matter related to the survey of industrial water for the mill.

Finally, it should be noted that Mr. Suzuki, Secretary of the Embassy, participated in the survey of Gowa Mill and Mr. Sasanuma. Secretary of the Embassy and Mr. Takizawa, Vice-Consul of the Consulate-general at Medan, participated in the survey of Siantar Mill.

Fig. 1 Itinerary Map



5. Summary

5.1 Gowa Mill

(a) Though the current operation of Gowa mill is rated less than 1/3 of the planned production level, production is gradually increasing through the effort of all the employees including the management. However, being the first kraft paper mill in Indonesia, the mill is experiencing frequent misoperation and mechanical failure due to the lack of proper technique and experiences, which in turn is hampering continuous operation of the mill. For this reason, it may be said that the mill has not reached the stage of commercial operation or under management control as a paper manufacturing mill which comes under the category of process and chemical industry.

This stalemate is not due to any rooted cause in the process or in the mechanism of equipment. Here the acquisition of technology becomes prerequisite, and it will be necessary to invite well experienced engineers for the instructions from the beginning. Fund required for this purpose is estimated at US$70,000.

(b) The works necessary to bring this mill to normal operating condition involve some repair and rehabilitation works and some modifications to the facilities in order to make operation easier than at present. Fund required for this purpose is estimated at US$81,600 plus matching Rp currency.

(c) As for the water intake equipment, a gate and simple low dam should be constructed so that the future requirement of the water may be obtained by discharging 0.4 m^3/sec from Kampili Dam. Fund required for the construction work is estimated at US$30,400 plus matching Rp currency.

(d) One of the greatest reasons for almost daily failure of equipment is the shortage of parts for repair work. This prevents a complete repair work and causes frequent mechanical failure, resulting in the shut-down of equipment. And this intermittent operation in turn is causing another failure in its vicious cycle. It is mandatory that all required parts for repair work are provided now for the implementation of preventive maintenance and to normatize the operation of the mill. It is needless to say that such parts for repair work and supplies should be provided as many as required, but for immediate use the parts required is estimated at US$81,000.

(e) With the investment of abovementioned US$343,000 plus matching Rp currency, it is considered possible for this mill to attain a normal operating level.

(f) As to the profitability, the mill has been surffering deficits because of its low production rate. However, when the production reaches the level of 20 +/day or above, it will be possible to show some profit and at the planned production level of 30 t/day, it will be able to stand on its own feet as an enterprise.

(g) However, in view of small demand for paper on the Sulawesi Island and extremely high freight rate for the transportation of the product to Djakarta, it will be necessary for the government to take some measures for the sale and transportation of the products.

5.2 Pematang Siantar mill.

(a) At the time of construction of the Siantar mill there was a misjudgment in the design and the construction of water taking. For this reason, within a few years after its initial operation the mill was unable to maintain its normal operation due to water shortage. This, coupled with other reasons, makes the current production of the mill only about 1/8 of the planned production level. This problem of water shortage, however, will be solved at the end of 1968 with the completion of additional reparations work.

(b) Though two diesel generators 10.00 kW are currently installed, shutdown of one generator for scheduled overhaul will inevitably cause power shortage. To cope with this situation, the mill is designed to prevent the decrease in production with the use of wet pulp manufacturing process. However, the use of river water will cause the mold to grow because of the temperature and quality of the water, thereby making it difficult to store wet pulp.

It is necessary therefore to be prepared for full operation with the procurement of one spare diesel generator at the estimated cost of US$174,500.

(c) This mill has a record of production above the planned production level during its initial operation. Therefore, there can not be any fault in its process as to be specially taken up. However, in order to realize a profit in the production of news print, mass production in nature, in a small mill with a 15 +/day capacity, a careful and closely controlled management will be required.

It is recommended therefore that several minor works be accomplished in order to operate the mill more effectively and to bring down production cost. Fund required for these works is estimated at US$41,700 plus matching Rp currency.

(d) Because of mill's deficit since 1965, most of its spare parts and supplies procured at the time of construction have been consumed, and many equipment are left inoperative due to the lack of spare parts, and some are being operated after given a temporary repair work. Fund required for the procurement of necessary spare parts is estimated at US$60,800.

(e) With the investment of the above sum in the total of US$2777,000 plus maching Rp currency, it will be possible for this mill to resume normal operation. Though the break-even point for this mill is the production of 12 t/day of paper, utmost effort should be made to increase production to the level of the planned production level of 15 t/day or over and to increase the number of operating days in consideration of sales expenses and other factors involved if the mill is to stand on its own feet. In fact, facilities of the mill have sufficient capability to stand such production. The question is how the effort of the management will be made for the realization of the above objectives.

(f) In conclusion, problems common to both mills in their nature, requiring a proper solution will be pointed out in the hope that the Indonesian Government will provide appropriate protection and promotion measures for pulp and paper industry.

II GOWA MILL SECTION

II GOWA MILL SECTION

1. Present Conditions

1.1 Background

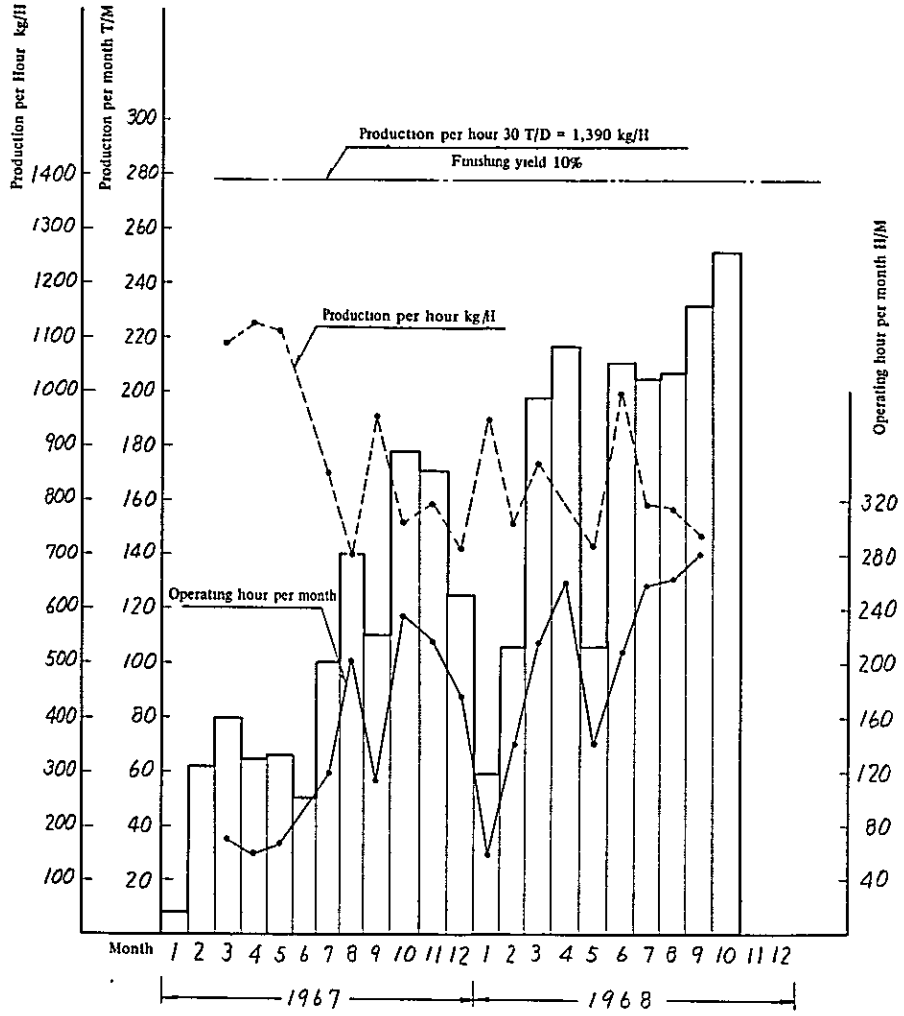
A contract for the construction of this mill as a reparation project at US$6,450,000 came into effect in January 1963 and the construction work was commenced the same year. The mill was completed in May 1965, but due to the lack of required chemicals for operation, only power generators were put into operation and the supply of power to Makassar City was inaugurated in 1966. With the procurement of necessary chemicals with the yen credit in January 1967, the part of the plant were put into trial run and the test operation for acceptance was commenced in June of that year. However, due to the shortage of skilled operators, it was impossible to put the whole plant into a continuous operation. As a result, the data on the trial run was collected from each department for the acceptance of the whole plant.

Meanwhile, the period of assignment for the Japanese supervisiors under contract expired and the extension of their stay was not approved due to the lack of fund. As a result, Japanese supervisors returned to their homeland in late August. The following year, 1967, was the period for trial operation and normal operation was commenced in 1968. It is expected that the plant will make a start as a P. T. (Limited Company) in 1969.

1.2 Present operation

Actual operation following trial operation is shown in Fig. 2. Even with 25 operating days per month, the plant is designed to produce 300 t/month of paper on machine real, therefore the production in the past few months may be said to be around 1/4 of the full capacity and very recently the production finally attained a 1.3 level of the full capacity. This is b cause the actual working hours are very short, ranging from 250 to 280 hours a month. Therefore, the production lot per hour is surprisingly large compared with the production lot per month and its rate is as high as 60-80% of the planned production level.

Fig. 2 Paper Production per Month (Gowa Mill)



However, against the principle of continuous operation for paper manufacturering as a process industry, suspension of operation in these two mills occure almost every day and the failure in one department is causing the suspension of another department at the same time. Fig.3 shows the result of investigations into the cause of such failure in the recent two weeks. Though the operating hours of each department indicated in the Fig. 3 do not correspond with the operating hours for paper machine, the last process, because of difference in the capacity of each department, operating conditions in each department are known from this chart.

As is seen in the chart, suspension of operation in each department due to its own failure and other reasons is only in a few cases and its ratio is 18% in paper machine and less than 10% in other departments. The rest of failures are caused by the failure in the preceding or subsequent processes. Also, because of poor coordination between each department, many equipment have to be shut-down to wait for stock within a short period of time after resumption of the operation. Since this type of suspension is not caused by the failure of equipment, this problem can be solved either by setting up a coordinating organ or establishing procedures for coordination. The cause of suspension in chipping department, where failure due to its own cause is seen most, is the shortage of bamboo supply to the chipper. This shortage is caused by confusion in the pond for slasher due to poor conveying system from bamboo yard, thus failing to transport required amount of bamboo to inclined chain conveyor. The cause of frequent suspension of paper machine is mostly the failure of bearings in pumps and fans, but it is also often caused by poor quality of stock. Inferiority in the quality is largely due to over cooked or immaturely cooked pulp as a result of disparity in chemical feeding and the temperature in the cooking process and is also due to the fact that in the bleaching process, more over-bleached pulp is likely to be produced because brightness is overly emphasized and because of failure of chemical feed meter, thus weakens paper strength with the resultant paper break. This was brought about by the failure of instruments and unfamiliarity with the operation on the part of operators but the greatest cause is the shortage of machine parts for repair work and supplies. Presently, equipment are repaired temporary with the use of substitute for standard parts, but in fact, this temporary measure is causing another failure. Under such conditions, the quality of paper also has to be extremely inferior. (Table 1)

Since the switchover of Kraft process to soda process in June 1968 to replace refractory in recovery boiler, no increase or decrease in the production has been seen before and after the switchover, which is not shown in Fig. 2, and no substantial difference because of recovery boiler has been noted. Therefore, it is not conceivable that the soda recovering section has been the bottleneck in the increased production, but it is true that the operation of recovery boiler has had much difficulties. This was due to the fact that because of low production of pulp and frequent suspension of operation, supply of black liquor became intermittent, making it impossible to operate recovery boiler on continuous base. Since this is the boiler for chemical reaction, operation become difficult at the load less than 60% of full capacity and at the same time starting and shutting down of it will

Fig. 3

Operating Conditions (Gowa Mill) Nov. 21, – Dec. 3, 1968

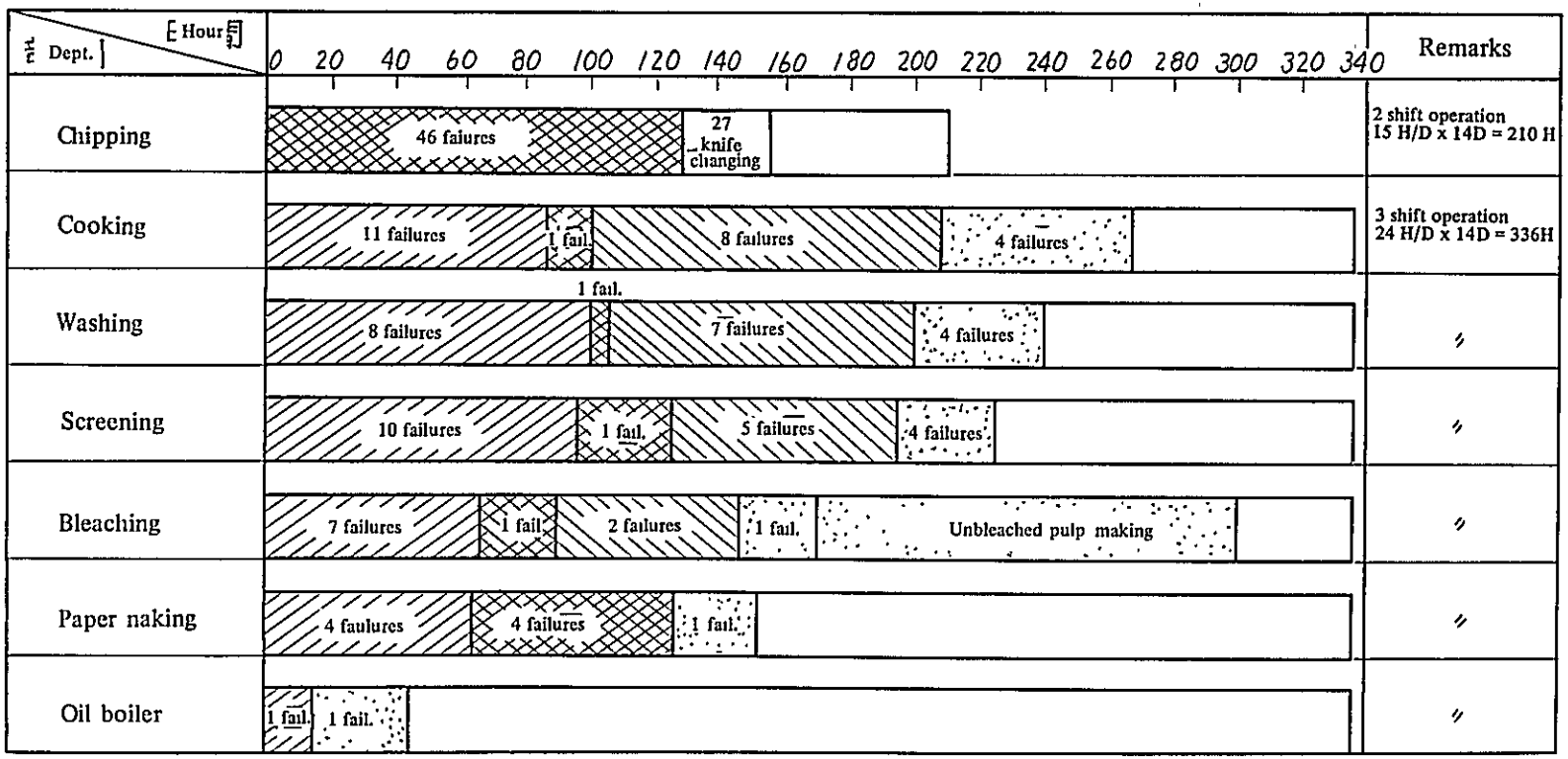


Table I Properties of Products at Gowa Mill

Figures in parentheses under tensile strength indicate breaking strength.

Brand	Printing & writing paper (H.V.S)			Printing & writing paper (H.V.S)		Mimeograph paper (white)		Wrapping paper (yellow)		Wrapping paper			Wrapping paper		Wrapping paper
Nominal weight (g/m^2)	60			38		70		44		50			88		118
	Front side	Middle	Back side	Front side	Back side	Front side	Back side	Front side	Back side	Front side	middle	back side	Front side	middle	
Basis weight (g/m^2)	62.2	57.3	56.3	37.3	38.4	63.7	67.3	43.6	47.1	47.2	48.7	51.3	85.1	88.5	113.0
Thickness (mm/100)	7.3	6.9	7 2	5.0	4.9	12.5	12.9	7.9	8.0	8.6	7.9	7.5	17.3	18.7	26.8
Density (g/m^3)	0.85	0.83	0.78	0.75	0.78	0.51	0.52	0.55	0.59	0 55	0.62	0.69	0.49	0.47	0.46
Tensile strength T (kg)	(3.90) 3.63	(4.49) 3.86	(4.20) 3.55	(3.77) 2.11	(3.33) 1.92	(5.23) 5.00	(4.90) 4.95	(5.30) 3.47	(3.30) 3.32	(5.21) 3.69	(4.66) 3.41	(4.37) 3.36	(3.66) 4.67	(3.06) 4.07	(2.99) 5.07
Elongation T (%)	1.75	1.70	1.55	1.68	1.40	1.65	1.60	1.60	1.40	1.75	2.05	1.75	1.27	1.03	0.87
Tensile strength Y (kg)	(2.44) 2.27	(2.43) 2.09	(2.45) 2.07	(2.50) 1.40	(2.57) 1.48	(2.72) 2.60	(2.41) 2.43	(2.43) 1.58	(2.27) 1.61	(2.69) 1.90	(3.29) 2.40	(2.78) 2.14	(2.19) 2.79	(1.70) 2.26	(1.97) 3.34
Elongation Y (%)	3.90	3.50	4.00	3.43	3.15	3.53	3.70	3.33	3.40	3.65	2.98	4.23	2.83	1.47	2.50
Tearing strength T (g)	26	24	22	14	16	42	44	32	32	36	32	34	92	100	136
Tearing strength Y (g)	28	28	26	16	18	46	46	34	40	38	44	40	96	128	144
Bursting strength (kg/m^2)	1.25	0.83	1.11	0.58	0.66	1.19	0.92	0.70	0.92	0.94	0.96	1.13	1.00	1.24	1.40
Brightness (%)	77.0			74.0		61.0									
Opacity (%)	76.0	76.0	76.5	66.5	67.5	81.5	81.5								
Smoothness, top (sec)	68	166	92	93	110	4.7	3.7								
Smoothness, back (sec)	76	136	64	68	94	4.2	3.5								
Dirt particles (P/m^2)	900	400	200	500	400										
Area of dirt part (mm^2/m^2)	94	26	10	40	20										
Sizing degree (sec)	8.0	7.0	6.0	1.0	1.6	25.7	33.5	3.7	2.3	8.4	7.5	11.4	61.0	69.0	190
Picking, top A			11		11	9									
Picking, back A			10		10	7									
Folding endurance T (freq)								26	18	58	61	64	49	47	19
Folding (MIT) T (freq)								11	10	27	32	30	21	27	11
Water absorption degree (mm/10m)													0	0	0
Oil absorption degree (sec)															
Air permeability (sec)	51	25	22	10	10	10	11						40		

also become difficult. Particularly, in shutting down the boiler, insufficient calorie makes it impossible to completely discharge smelt. As a result, the smelt has to be removed by chipping with a chisel after it cooled down, and the practice is causing damages to the lining in the bottom and walls of the furnace. Also, due to inefficient combusion method, carry over of black liquor occurs frequently, thus damaging refractory in waste heat boiler. The above irregularities, after all, can be eliminated if continuous operation is maintained at the production rate above the minimum requirement. Also, anticipated trouble with sillica because of bamboo pulp has hot yet been encountered, instead, accumulation of calcium scale due to excessive feeding of lime is remarkable.

1.3 Raw Material Condition

The bamboo, key raw material for this mill, is classified into two types, thorny bamboo and thronless bamboo. The forest owned by the mill covers an area of 24,100 ha, of which natural forest covers an area of 70,000 ha and replantation is being carried out in the area covering 10,000 ha. Therefore, there is no need for anxiety about the stockpile of raw materials. However, cutting down of thorny bamboo involves difficult problems, therefore, it will be necessary to make a clear up all thorny bamboo in each small district so that it may be replaced with thornless bamboo of good quality. It will also be necessary to introduce mechanical means for cutting bamboo.

On the other hand, since the original construction project had no plan for road construction, the mill is currently working out a road construction project. It is considered necessary that the development of road is carried out with the assistance of the Ministry of Public Works. As for the truck and tractor for transportation, some are being used in the mill construction work and some have been expropriated by military authorities, leaving only 10 units in service at present. Although an order for additional units has been placed, replenishment of these equipment should be made every year. Though the transportation of bamboo in rainy season is expected to accompany major difficulties, demands for bamboo can be met temporarily with the procurement from private bamboo forest and with other means. Meanwhile, a long range plan should be worked out for the work to solidity road surface.

As for the receiving of bamboo, no standards have been established nor the inspection seems to be sufficient. Same thing can be said with other

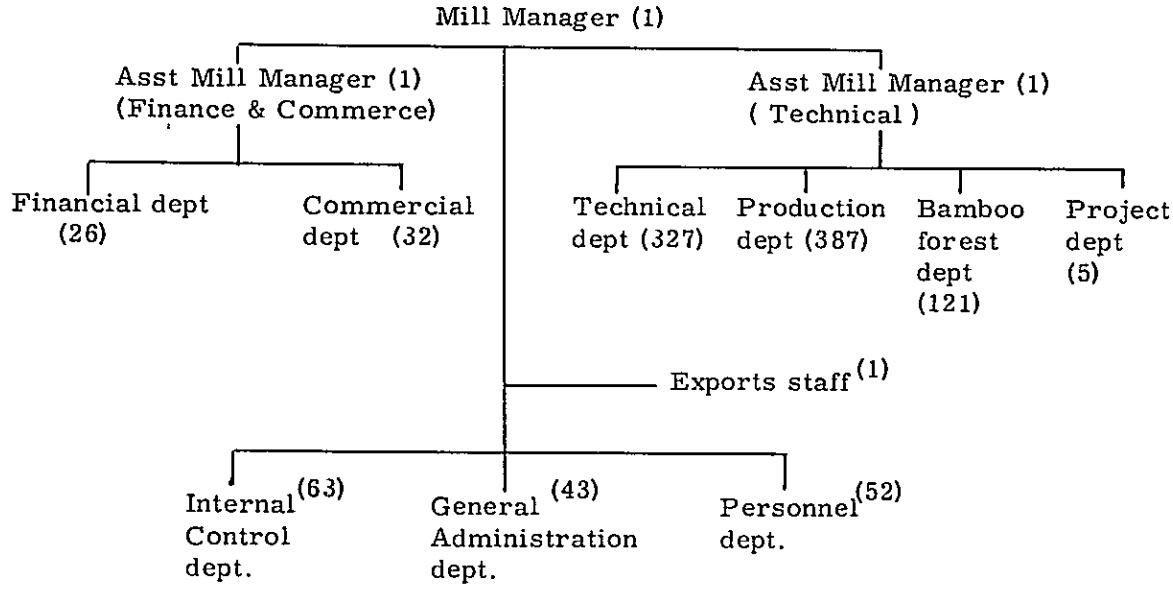
materials.

1.4 Personnel

This mill is being operated with a very small personnel strength (Fig. 4) compared with that of the existing mills in Indonesia. However, the extremity in adhering to fixed personnel strength has brought about difficulties in the operation in many departments. Falling this category are bamboo supply department, slasher room, laboratory and maintenance patrol. Departments in want of personnel should be strengthened by reassignment of personnel from other departments or by additional personnel.

As to the quality of labor forces, attendance rate has been improved recently compared to the initial stage of operation and it is a matter for congratulation that the quality of labor in general has been improved. However, in view of the fact that the paper industry is a process industry which frequently requires more mental work of observation type than the dexterity of hand, senior highschool graduates are most suited for the operation of the mill. However, because of the shortage in the absolute number of school graduate in this district, it is absolutely necessary to recruit employees from all over the Indonesian Islands. For this purpose, it may be necessary in the future to provide employee's dormitories.

Fig. 4 Gowa Mill Organization and Personnel



Total strength 1,060

Figures in parentheses show the number of personnel assigned to each department.

2. Mill Water

Water to the paper mill is such an important factor that it may be called one of the key row materials rather than infrastructure or utility. Since it is one of the most important factors among the geographical requirements for the plant, the problem of water has been given due attention also in this case. Circumstances surrounding this matter is described in detail in The Report of the Joint Survey for Water Supply of Pabrik Kertas Gowa, submitted by Kanematsu Kosho Co. Ltd., in June 1968 but it was decided in the final form as follows.

"In accordance with the decision of the joint conference of the government officials held at the time of deciding the mill site : Makassar, 0.4 m^3/sec. of water should be released from Kampili dam during the dry season from August to October. As mentioned in confirmation of the discussion for the design of the project held on 24th October 1962, building of spur-dikes in the river bed to force the flow of water into the direction of the Intake should be locally furnished".

The Djeneberang River originates in valcanic zone and flows down through volcanic rock district. It flows through Alluvial soil which is seen in the point 10 km upstream of Bili Bili and down, joins many tributaries on its way and flows down to the point of Kampili dam where soft rock-bed is exposed. At this point, a dam for irrigation purpose was constructed 30 years ago. The total legth of the river is 400 km with a catchment area of 779.69 km^2 and the average width of 250 m. The river has been left in its natural shape without any river channel improvement work, therefore severe breaking of embankment is seen on both banks. Rate of discharge is 900 m^3/sec maximum and 5 m^3/sec minimum throughout the year with a great difference between the two. It is also said that the maximum flood discharge recorded in the past was over 2,800 m^3/sec and it is a troublesome river requiring difficult maintenance and control. As the measures for river maintenance, appropriate river structures matching with the river regime such as revetment, groin, groundsel, etc. will be necessary for the prevention of inaundation in case of floods. Also in the dry season, distribution of water creates a big problem because of shortage in the supply. Water from this river is used by farmers for irrigation water and by Gowa Mill for plant water and by Makassar City for city water. According to D.P.U. of South Sulawes ; Province and Gowa Provincial Government, irrigation water is supplied to irrigated area covering 24000 ha by taking the maximum flow of 24 m^3/sec and the minimum flow of 3 - 5 m^3/sec from the above mentioned Kampili dam. Of this area, 3,000 to 5,000 ha is for two crop cultivation. Rice planting in the first crop

season is carried out during the period from January to June and has no problem since this period falls on rainly season. The problem lies in the max. dry-season from August to October when water is needed for the second crop cultivation.

Table 2 Statistic of Rainning 1955 - 1959 (Sulawesi Selatan)

Sunggu Minasa District Rainfall in mm

	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1955	389	561	157	164	230	138	190	51	13	17	732	299
1956	735	420	315	44	353	81	131	73	3	135	149	937
1957	452	727	217	23	33	0	16	31	0	26	154	573
1958	329	330	230	0	64	229	11	7	22	65	181	575
1959	659	184	642	201	59	236	129	0	0	7	125	603
Total	2,564	2,222	1,561	432	739	684	477	164	38	250	1,341	2,987
Average	513	444	312	87	148	137	95	38	8	50	268	597
					Amount of rainning days							
1955	16	16	6	8	9	6	8	6	2	3	23	19
1956	24	13	11	3	11	9	8	11	1	10	15	23
1957	21	20	16	4	4	0	3	5	0	1	8	21
1958	12	13	11	0	6	7	1	2	2	6	6	20
1959	20	23	10	9	7	5	2	0	0	1	10	20
Total	93	85	54	24	37	27	22	24	5	21	62	102
Average	19	17	11	5	7	5	4	5	1	4	12	20
					Max. Amount of Rainfall in mm during 24 hours							
1955	53	120	49	101	157	51	60	15	8	10	121	43
1956	141	89	85	34	129	32	66	27	3	39	23	114
1957	45	101	45	13	21	6	9	10	0	26	73	95
1958	56	28	70	0	26	109	11	4	15	30	73	120
1959	92	34	175	63	21	159	127	0	0	7	30	103
Total	387	372	424	211	354	356	273	56	26	112	320	570
Average	77	74	85	42	71	71	55	11	5	22	64	134

Bontablli 2 district

Rainfall in mm

	Jan.	Feb.	Mar.	Apr	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1955	329	669	149	516	308	219	227	237	52	334	953	425
1956	773	550	151	310	390	275	57	164	67	509	671	1,084
1957	637	950	575	255	257	102	88	126	0	10	351	895
1958	507	435	251	223	398	281	18	49	47	139	279	425
1959	902	302	745	284	383	216	37	-	-	14	341	917
Total	3,148	2,906	1,871	1,588	1,736	1,165	427	576	166	1,006	2,595	3,746
Average	630	581	374	518	347	283	85	115	55	201	519	749

Amount of rainning days

1955	24	25	11	15	14	16	22	17	6	13	26	22
1956	23	20	15	11	20	15	10	9	6	20	18	26
1957	22	22	19	9	14	4	6	7	0	1	14	29
1958	19	23	15	12	4	12	4	11	3	8	11	23
1959	26	22	22	17	21	12	8	-	-	3	16	25
Total	114	112	82	64	73	59	50	44	15	45	85	125
Average	23	22	16	13	15	12	10	9	3	9	17	25

Amount of rainning during 24 hours in mm

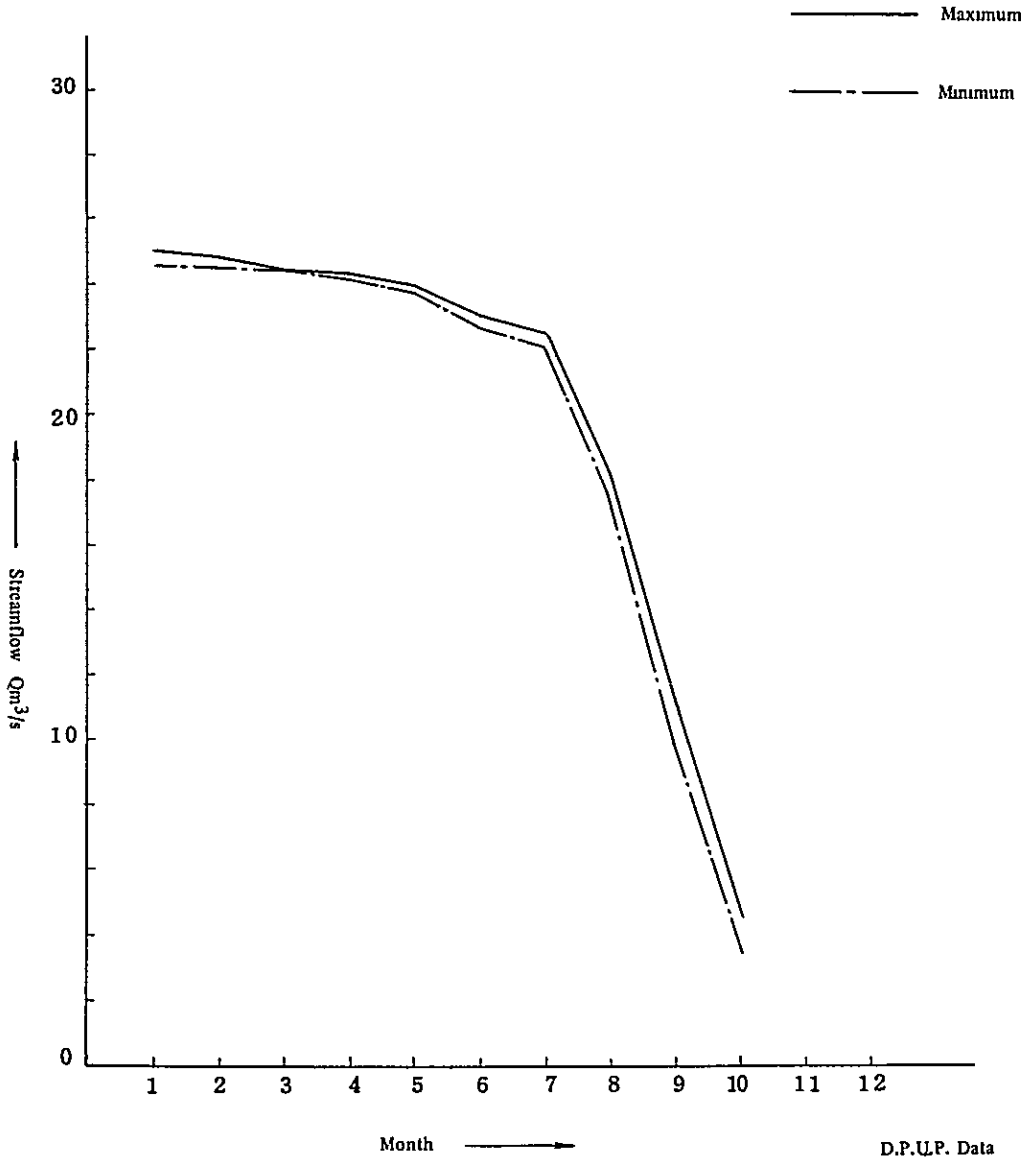
1955	45	139	53	182	96	19	43	55	21	125	150	92
1956	82	120	37	70	90	63	21	46	24	79	110	145
1957	98	142	143	81	75	91	26	61	0	10	112	80
1958	143	90	69	65	110	86	9	12	26	46	92	86
1959	200	58	134	41	75	84	14	-	-	11	67	145
Total	568	549	436	439	446	363	113	174	71	271	531	548
Average	114	109	87	88	89	72	23	35	14	54	10	110

Fig. 5 Kampili Dam Monthly Discharge Capacity 1968

1 9 6 8

Streamflow of the Djeneberang

(Kampili Dam, 1968)



Since it is possible to increase plantation area in proportion to the increase in the irrigation water during this period and also upon strong desire of the farmers, a contract was signed in September of this year for laying pipelines direct to the Kampili dam for the purpose of taking water at a rate of only 0.25m^3/sec. despite the previously mentioned agreement. Based on this contract, a plan for the execution of the above construction work at the cost of US$275,000 plus Rp 105,000,000 was worked out. Request recently made to the Japanese Government for project aid is for this portion of foreign currency. As a result of our investigation into this project, the following may be pointed out.

(1) Under a long-range project for this mill, installation of an additional line is being planned to bring production to a 60 t/day to 80 t/day level. The quantity of water required is estimated at 0.4 m^3/sec. if recovery of white water is to be made. Therefore, unless authorized licence for this quantity of water is secured, the future of this mill would not be very promising.

(2) At the initial stage of the operation there were some disturbances due to misunderstanding between both parties. However, through a negotiation which was carried out amicably, water is now being discharged at a rate of one m^3/sec and no decrease in the production due to water shortage has since been experienced. However, in reality the present production of this mill is only 30% of the planned production and this stems from other reason. This mill is now suffering a large loss and requrires a large amount of fund to tide over this financial difficulty. Therefore, for the rehabilition of this mill, there must be a well balanced investment.

(3) The new construction project proposed by Indonesian side calling for the supply of water at the pressure of 80m Ag in the pipe of 5,800 m long present some problems which require reexamination from technical point of view.

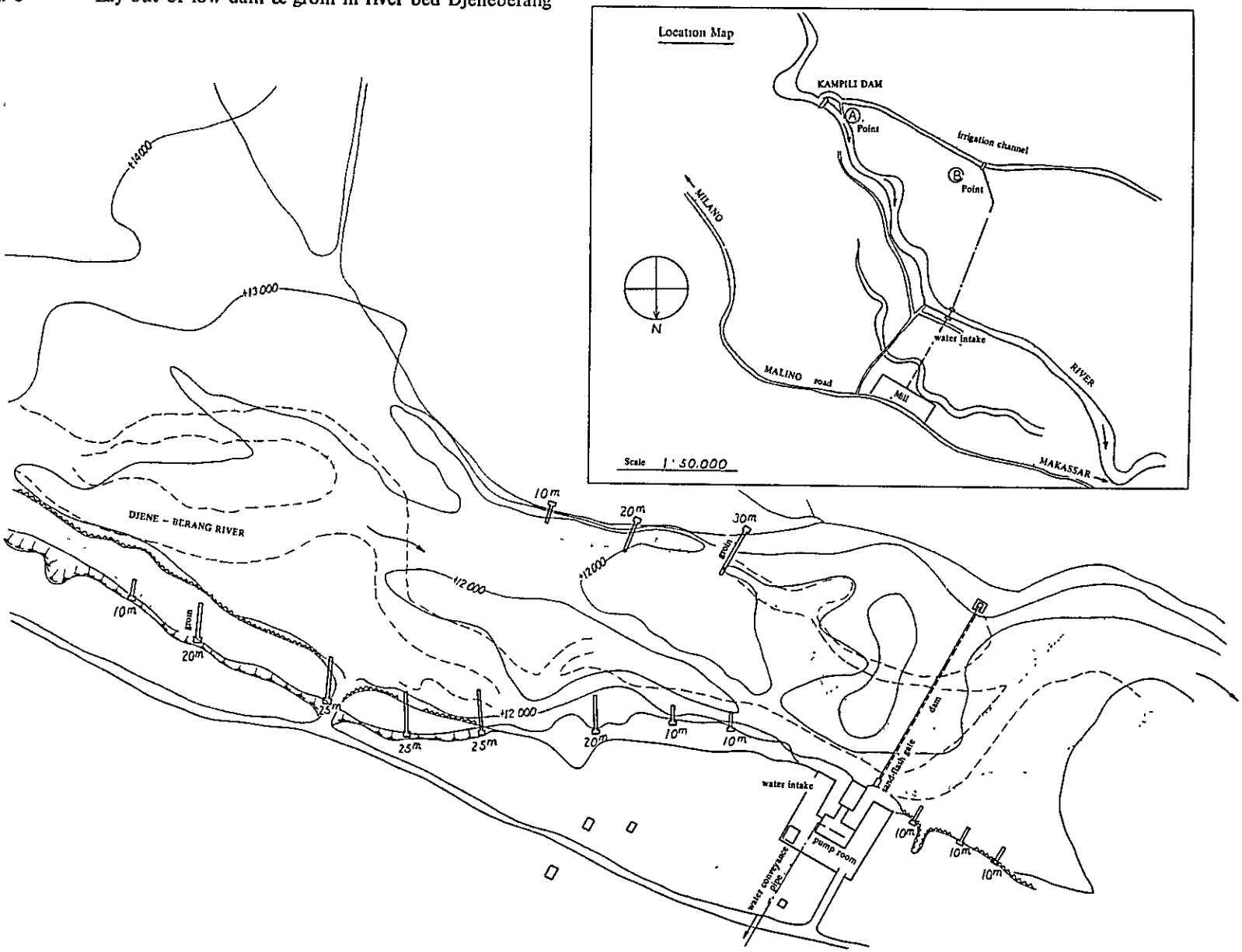
In view of the above fact, the following projects are recommended.

(1) To constantly discharge 0.4 m^3/sec of water from Kampili dam.

(2) To construct a sand-flash gate and simple low dam on the downstream side of water intake and to close the gate in the dry season so that all the water may be taken. The gate is to be opened in the wet season and at time of sand-flash.

But the dam and the gate shall be designed so as not to bring disadvantages to the river during the wet season.

Fig. 6 Lay-out of low dam & groin in river bed Djeneberang



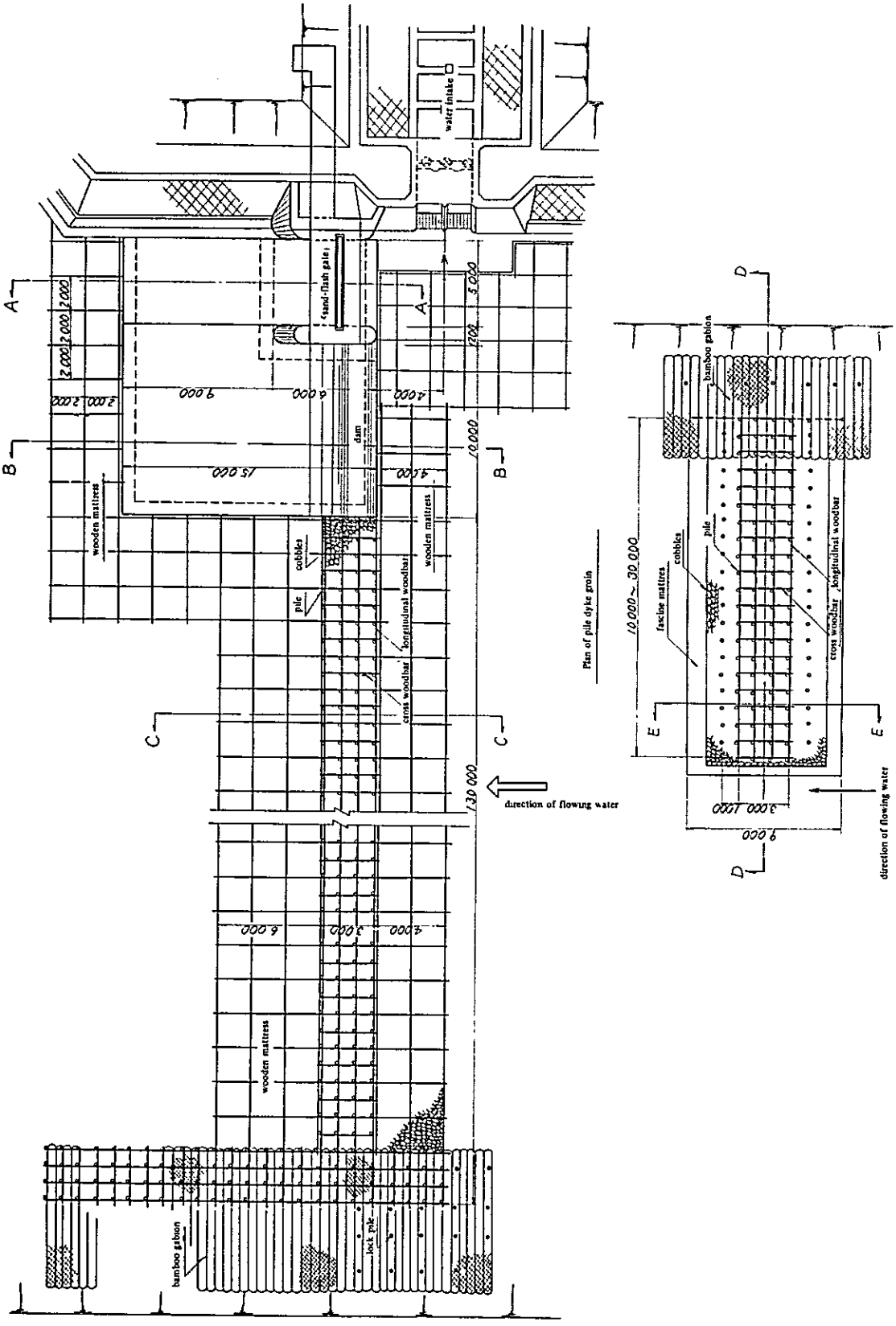
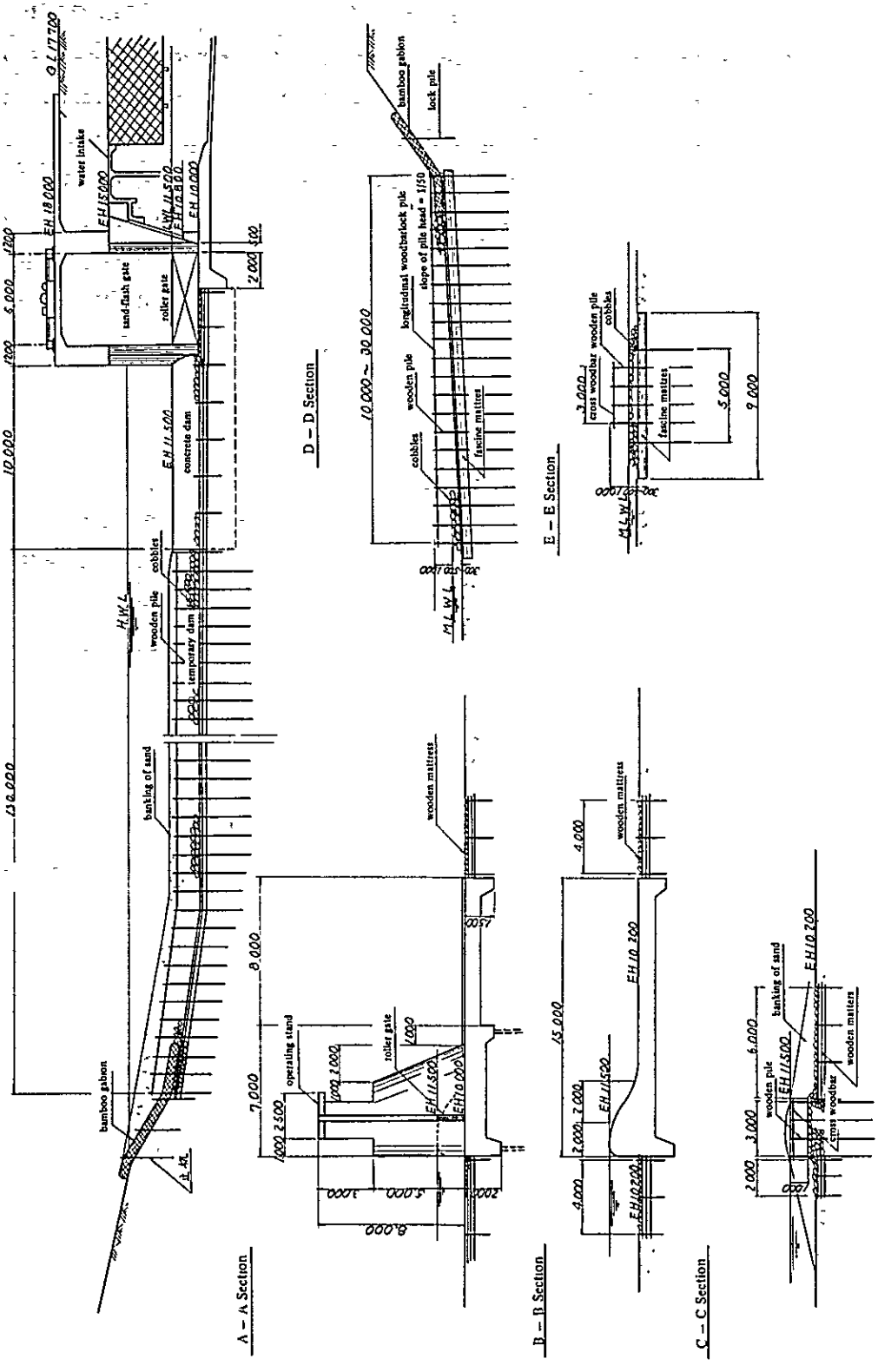


Fig. 7 Plan of sand-flash gate & low dam

Fig. 8 Front View of Sand-Flash Gate & Low Dam



(3) In the future when the mill is expanded, a pipeline is to be laid from site B and water is to be pumped from the opposite bank of water intake to the existing pump house. Presently, over a half amount of total volume is being discharged into the downstream due to the lack of low dam and gate, making it necessary to discharge a large amount of water. However, if the work described in para. 2 above is completed, the level of underground water in the area 1 km down the Kampili Dam will be raised and also with additional flow-in from the brooks and marsh, discharge from the Kampili dam may be completely taken up by the mill. (See the Report of the Joint Survey for Water Supply of Publik Kertas Gowa).

When Govenor Lsh. Masud of Gowa was advised of the above plan, he showed his understanding and gave a ready consent to our proposal saying that the paper mill was built by Japan and is now playing a vital role in the development of Gowa Province and that if measures are taken to prevent valuable water from running into the sea, he would see to it that required amount of water is supplied to the Gowa Mill. Following is a detailed explanation of the plan proposed by the mission.

In view of the changes occurring in the river bed and also in order to make it possible to take in all available water even in the max. dry season. This work should be designed to match river regine by thoroughly investigating the location, height and function of the low dam and gate. Since the bottom height of sandflash gate in its function determines the position of low-water channel, it should be located lower than the height (level) of water intake (EH 10,000 mm). The width of gate was determined to be 5 meters so that it will have sufficient cross-section area to flash out sand accumulated in the water intake. The gate was designed to be of roller gate type to provide easy handling and will be equipped with a winch which can be operated electrically and manually. The height of operating stand (platform) will be made higher than max. flood level and will be matched with GL at pump house side. The dam to be constructed will be divided into a concrete fixed dam and temporary wooden dam. The fixed dam will be of floating type because the foundation soil comprises permeable sand bed. The height will be + EH 11,500 mm and wooden mattress will be provided for both upper and down stream for foot protection. The temporary dam will be of groin process type and wooden mattress will be provided in both upper and down streams. The left turn bank revetment will have foot protection with bamboo gabion to prevent

scouring. Groin to be provided in both upper and down streams of water intake will be that of pile dyke-groin process.

Estimated construction cost of the above work is as follows.

Foreign currency

Roller gate	1 complete	US$18,000
Submerged pump (For civil engineering work)	4 ea	3,400
Sand pump (For sand basin)	1 ea	450
Reinforcing bar and others	1 complete	1,150
Assignment of supervisor	1 complete	7,400
		US$30,400

Local currency (Cost of construction)

Earth work	1 complete	Rp. 600,000
Foundation work (piling work)	"	50,000
Temporary work	"	250,000
"	"	50,000
Concrete work of gate and dam Temporary intake-channel,	410 m^3	2,460,000
Temporary diversion conduit	1 complete	120,000
Temporary dam work	130 m	1,000,000
Revetment of temporary dam root (gabion)	1 complete	240,000
Wooden mattress	1440 m^2	1,584,000
Pile dyke groin work	235 m	2,467,500
Revetment of groin root (gabion)	14 places	147,000
Miscellaneous		31,500
Contingency		1,000,000
		Rp. 10,000,000
		Approx. US$30,000)

This estimate represents about 10% of original proposed construction cost and it is possible to secure all of the water required for the mill at a very low cost.

As to the turbidity of the river water, no significant difference is seen in both plans. For the clearater, no regularly scheduled sludge drain operation or chemical feeding has been performed, thus preventing the formation of flock. Therefore, there is a need to install a jar tester.

3. Equipments to be improved

3.1 Bamboo preparation equipment

One of the greatest obstructions to the operation of the mill at present is the bamboo preparation process. The bamboo preparation equipment is designed to transport bamboo from bamboo yard to slasher pond by light railway. However, because of the failure of diesel locomotives, bamboo material is currently transported and unloaded by dump trucks, thus causing confusion in the pond and preventing effective placement to bamboo on chainconveyor for the transportion to slasher. To improve this situation, it will be necessary to redesign and expand the existing equipments.

1. Repair of diesel locamotive now taken out of service.
2. Addition of one diesel locomotive
3. Additional construction of railroad tracks.
4. Addition of ten manual trucks

Other field works:

1. Improvement of pond
2. The width of Slasher to be reduced from the present 5m to 4m.

Reducing the width of the above slasher is required because the length of many bamboo pieces received are shorter than the required 6m. This problem is the result of improper receiving inspection, and therefore requires due consideration in view of cost control. The chipper now in use is the modification of Norman type chipper for use on bamboo. However, due to the shortage of spare parts (knife, grinding stone, fixed blade, etc.) and also the lack of familiarity with the instructions on the part of operators, its blade angle, clearnace and installation can not properly maintained, thus nct only failing to perform its own function but also causing irregularity in chip size and resulting in a large quantity of sleaver. For the selection of equipment, the type now in use is considered appropriate for the bamboo of large diameter and thickness prevailing in this district. Its performance is also considered satisfactory.

3.2 Cooking

Use of a large quantity of water at a time in heat exchanger to recover heat for the blowing from digester causes fluctuation in the water pressure in other department. As a corrective measure, a water tank and a water pump should be installed.

3.3 Evaporator

As previously stated the failure of soda recovery process for a smooth operation has so far been caused by intermitted operation. Installation of an additional concentrated black liquor tank of $100m^3$ capacity will solve this problem and with the extension of continuous operation hour of recovery boiler, operation of the mill will be improved remarkably. On the other hand, the black liquor from the evaporator itself should always be brought to the required density with the circulation of black liquor.

3.4. Recovery boiler

It is not considered appropriate to operate recovery boiler at the load lower than 60% of specified capacity. This is because that low load operation makes it difficult to maintain required temperature in the furnace, and it becomes more difficult as the size of boiler becomes smaller.

Since banking is not possible with the recovery boiler and also due to the fact that the smelt must be discharged, shutting down of it requires very difficult operation. Improper handling in the past necessitated frequent chipping of smelt in the bottom of furnace when the boiler was shut down, causing damages to the wall and bottom of the furnace. Also, the overdraft has frequently caused carry-over of ash to waste heat boiler and in some cases it caused second combustion. Mishandling in some cases had even caused small explosions. These are the causes of frequent failure of the boiler. For this reason, it is advisable to install an additional concentrated black liquor tank mentioned above and at the same time to install an oil ignition device on the boiler to make starting and shutting down easier and to eliminate mishandling. Also, to provide a means to maintain required temperature in the furnace to stand low load operation which is expected to continue for some time, it is recommended that castable refractory be installed in the water wall to a considerable height.

3.5 Stock Preparation

Though the wet machine is not used at present, it should be utilized when it is difficult to maintain continuous operation such as in this case. Advantages of wet machine are:

1. When the paper machine is shut down, the wet machine can be used for wet pulp making.
2. When the capacity of pulp section is increased with resultant excessive pulp, the wet machine may be used for excess pulp storing.
3. When the pulp section is not functioning properly, stored wet pulp may be used.
4. When a means of transportation with a shortest time possible is available, wet pulp may be delivered to the paper mills at Letje and Blabak for their use. In this case, however, use of preservatives will be necessary.

For the effective utilization of wet pulp as described above, it will be necessary:

1. To install a 3.75m^3 pulper on lower floor.
2. To provide a hoisting equipment.
3. To install a pump for pulper.

The purpose of the pulper is:

1. To break wet pulp.
2. To act as a stand-by for the two existing pulpers in paper making room.
3. To break purchased pulp or waste paper that will be blended when making papers of other grade in the future.

3.6 Paper Machine

Following works will provide an effective means for the improvement of the quality of paper and increase in the yield and for the minimization of paper breaking.

1. Installation of a settling tank.

   It will be possible with this tank to recover about 5% of loss fiber and also to reduce the quantity of water required. It will also be effective for the betterment of paper formation.

2. Improvement of design and relocation of mixing box.

   Distance between the mixing box and head box will be shortened and at the same time the design of mixing box will be altered. By doing this, fluctuation in the basis weight in the paper machine direction will be lessened.

3. Replacement of pump for broke pulper.

   It takes as much as one hour to deliver stock with the existing pump because of insufficient head. Other conceivable means will be to install a larger diameter.

4. Stock of spare dandy roll

   Dandy roll is not fully utilized at present because of no spare roll in stock. It should be used to full extent to improve the quality of products.

5. Increase of winding roll

   Only twenty rolls are available at present. In order to make the cutter operation complete during days shift, 10 more rolls will be required.

3.7 Machine Parts for Repair Work

One of the greatest causes of present low productivity in this mill is the failure of machines, which frequently occures in various sections almost every day. Failure of machine is caused by mishandling of machine due to lack of knowledge in the operation on the part of operators and also by incomplete repair work following the failure of machine. Also, due to lack of spare parts, many machines are put into operation after given only a temporary repair work with the use of available parts, and left in that condition thus causing the repetition of the same failure. This situation not only deteriorates the quality of product but also deforms even the essential quality of process in some cases.

To cope with such frequent failures of machine,

(1) Scheduled shut down of machine

(2) Complete preventive maintenance

may be considered. However, to implement the above, required machine parts for repair work must be available. Though the standard stock level of these spare parts will vary with the conditions in each country, this mill will have to keep in stock a large quantity in view of the difficulty in obtaining even simple spare parts in Indonesia, particularly in the Makassar district. These machine parts for repair work are to be charged to store account and transferred to production cost each time the parts are used and their stock should be replenished on periodical base. However, the present situation is that the spare parts purchased at the time of construction have almost been used up and no recorder for the replenishment has since been made. For this reason, it is necessary to bring the level of stock to the standard level this time and to make sure that these parts are furnished by working capital in the future.

Since clothing material and chemicals are considered as the raw material, requisition for them should be made in each business term same as for bamboo, fuel, but so far, no such requisition has ever been made. It is necessary therefore to give a serious thought to the fact that the shortage in the stock of clothing material is hampering the operation of the mill.

Working ratio of instruments is extremely low and only 40% of the total instruments are currently in use. In addition, more failure is seen in the important and more sophisticated instruments than in any other instruments. A compele repair work on all the instrument is needed at this very moment. However, not a single specialist on instrument is available in the mill and installation

of replacement parts would not be possible even when they (parts) are available.

4. Technical Assistance

As the Gowa Mill is the first Kraft mill ever built in Indonesia and is a medium sized mill with a capacity of 30 T/day in comparison to other existing small mills having a capacity of 10 T/day, employees including the plant officers have no previous experience in the operation of the mill of this type. Moreover, the period for the instructions on technical matters at the time of trial operation covered only a six-month duration due to financial reasons. Under such conditions as this, plant officers have to depend on general reference books and bibliographies for the operation of the mill. Workers at job site also are trying their best, but due to lack of knowledge in the operation, their efforts do not realize the anticipated result in spite of their toil.

It will be necessary therefore to invite experienced foreign engineers for instructions on technical matters and at the same time, to establish operation standards for the mill. Engineers most urgently needed at present are listed below.

Kraft pulp engineer
Paper machine engineer
Instrument engineer
Machine maintenance engineer
Recovery boiler engineer

Though only a few operating manuals on individual equipment are available in the mill, there are not any overall operation manuals, operating technical standards, preventive maintenance manuals of safety cord, all of which are indispensable to the operation of a new mill, are not provided. Since these instruction books must be prepared in a manner so that they may be suitable to the equipment peculiar to this mill, it is advisable to have an engineering consultant well experienced in the paper manufacturing of a large paper manufacturing company prepare such manuals for the mill in parrallel with the invitation of engineers for instructions. This mill also lacks instrument engineers. These engineers are absolutely necessary for the mill, therefore must be trained as soon as possible. However, since such training can not be accomplished without some training aid, it is advisable to send selected employees to the instrument manufacturers in Japan for training.

The way of the cost control is exercised in the paper mills in Indonesia is still in its primitive stage. Since accounting system itself has not yet been established, it is recommended that an appropriate accountant or paper manufacturing company be entrusted with the preparation of fiscal regulations for paper industry and upon completion of them to hold a mass training for all the existing paper mills. After this traing, strict enforcement of fiscal regulations should be encouraged by making each mill submit a financial report in specific form.

5. Profitability Study

5.1 Current Statement of Profit and Loss

As the production is still below the 1/3 level of design capacity, fixed cost is running high by three times and sales revenue after depreciation is showing a large deficit every month. Details of profit and loss before depreciation since 1968 also shows an average monthly deficit of 2,617,000 Rp, which is equivalent to about 29% of 9,128,000, an average monthly sales during the same period.

Table 3. Profit and Loss Statement

Year and Month			1968								
			Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug	Total
A	Production	ton	63	77	165	187	118	152	186	178	1,126
B	Sales	"	76	165	180	165	160	154	165	--	1,065
C	Sales	1,000Rp	2,193	5,633	11,753	11,655	12,254	12,145	13,819	3,572	73,024
D	Production cost	"	13,997	16,926	19,889	20,639	17,090	27,128	23,529	24,884	164,082
E	Depreciation	"	8,773	8,760	8,766	8,766	8,760	8,778	8,762	8,756	70,121
F=C-D+E	Profit and loss before depreciation	"	(-)3,031	(-)2,533	630	218	3,924	(-)6,205	(-)948	(-)12,556	(-)20,940
G=C-D	Profit and loss after depreciation	"	(-)11,804	(-)11,293	(-)8,136	(-)8,984	(-)4,836	(-)14,983	(-)9,710	(-)21,312	(-)91,058

(Note) Average sales amount per month 9,128,000 Rp

Average profit and loss before depreciation per month 2,617,000 Rp

Under present financial situation, fund available is all that can support monthly salary and allowances. Lack of adequate fund often causes shortage of working capital for the purchase of raw material and spare parts required for even such low operation rate as 1/3 of design capacity. This situation is a great obstruction to the operation of the mill.

Until the end of 1967 the shortage of fund had been made up by subsidies from the Treasury Accounts. However, deficit-covering subidy from Treasury Accounts has been suspended since 1968 and the mill was placed on a self-paying basis. Required funds during this period was financed by eating out of working capital appropriated at the time of construction and with the loans from banks. Loans from banks for working capital accompanies an interest rate as high as 36%. Therefore, as long as the mill operate at such a low operation rate, financial situation will become more aggravated.

In procuring imported raw materials (all chemical are presently imported from Japan), it generally takes three to four months before import licence is granted after appropriation is made and it will be six months before materials actually arrive at the mill. Therefore, under present inflationary economy, requirement for working capital will have to be increased. In this context, the shortage of working capital presents a serious problem for the time being.

As has been mentioned above, present economics of the mill is showing a large deficit but this is another problem when looked at from the standpoint of national economy. That is, if paper is not manufactured in the country and is to be imported from foreign countries, foreign exchange must be used as a matter of course and it is needless to say that the use of domestic products has a merit of saving large amount of foreign exchange. In other words, the difference after the subtraction of foreign exchange required for the import of necessary paper making material from the import price of paper will be the amount saved in foreign currency. Saving in foreign exchange for the operation at 15 T/D base will be approx. US$ 1.27 million annually and will amount to approx. US$2.3 million annually at 30 T/D base (US$1 converted to Rp 400).

5.2 Production Cost

Because of the present small production scale, production cost is naturally running extremely high. In case of Soda process, production cost per kg on the basis of a daily production of 10 ton is Rp125.50. Meanwhile, the present market

price is Rp105.12, thus leaving a loss of Rp20.38 per kg. Import price at Djakarta and Surabaya is Rp125.60 per kg.

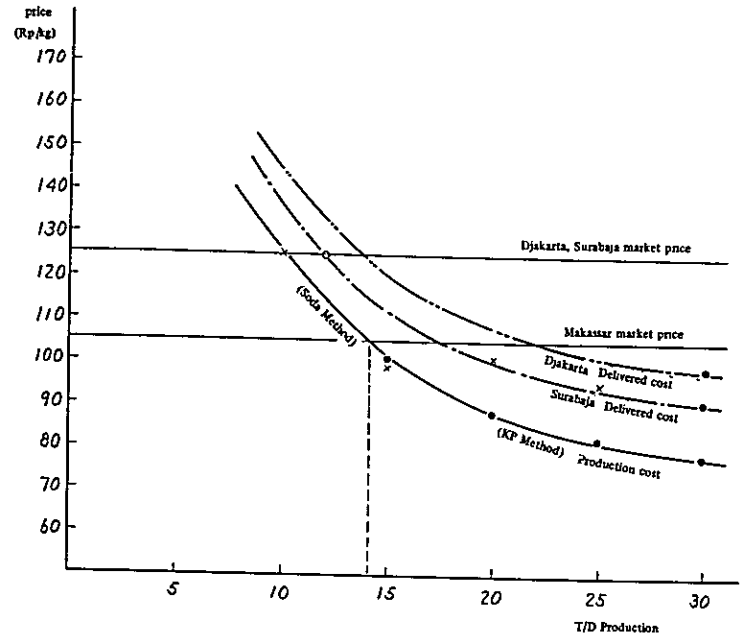
In analyzing the production cost of Gowa Mill, it is evidnt that the price of chemicals, raw material to be imported, is comparatively high but one great advantage, on the other hand, is that the price of bamboo, key raw material, is available at such a low price as Rp. 1 per kg. For this reason, in case of sulfate process the variable cost in the production cost on the basis of a daily production of 15 ton becomes almost close to that in Japan. Therefore, if production increases, a merit of mass production will be evident or the fixed cost will decrease and the operation becomes profitable. In this connection, a trial calculation was made on printing paper by sulfate process and the result indicates that the production cost will decrease in proportion to the increase in production (Table 4 and Fig. 9).

Table 4. Calculation of Production Cost and Profit & Loss (Sulfate Process)

Element of Production Cost		Local Procurement (L) Import (I)	15T/D x 25D = 375 T/M			20T/Dx25D= 500 T/M	25T/Dx25D= 625 T/M	30T/Dx25D= 750 T/M	Remarks
			Unit ratio (Kg/T)	Unit price	Amount (M Rp)	Amount (M Rp)	Amount (M Rp)	Amount (M Rp)	
Raw material	Bamboo	L	4,786 (kg/T)	1.0	1,795.0	2,393.3	2,991.6	3,590	
Chemicals	Hydrochloric Acid	L	2 66 "	99.5	99 5	132.6	165 8	199.0	
	Quick lime	L	327 "	4.0	491.0	654.6	818.3	982	
	Salt	L	183.3 "	4.5	309.3	412.5	515 6	618.7	
	Sodium Sulfate	I	108.6 "	25.2	1,026.9	1,369 1	1,711.4	2,053.8	
	Kaolene (Clay)	I	161.5 "	20.71	1,254.2	1,672.3	2,090 4	2,508 4	
	Rosin (Size)	I	20 "	93 6	702	936	1,170	1,404	
	Alum	I	40 "	22.6	338.7	451.6	564.5	677.4	
	Methylviolet (dye)	I	0.01 "	924.6	3 8	5.0	6.3	7.6	
	Anode carbon	I	0.53 "	42.1	8.4	8.8	11.1	16.8	
	Mercury	I	0.05 "	8,180 0	153.7	204.5	255.6	306.7	
	Sodium carbonate	I	2.66 "	23.6	23.6	31 4	39.3	47.2	
	Sulfuric acid	I	3.33 "	50.24	62.8	83.7	104.6	125.6	
	Barium chloride	I	1 83 "	53 84	37.0	48.1	60.1	74.0	
	Freon gas	I	0.02 "	836.0	6.9	9.2	11.6	13.9	
Fuel	Fuel oil	L	1,060 ℓ/T	14 5	5,764.0	7,685.0	9,606.3	11,527.5	
	Petroleum	L	5.3 ℓ/T	6.0	12.0	15.9	19.9	24.0	
	Firewood	L	0.11M^3/T	100.0	4.1	5.5	6.9	8.3	
Packing material	Packing paper	L	20 $\$$bs/T	75.0	562.5	750	937 5	1,125.0	
	Tape	L	50 kg/T	45.0	84.3	112.5	140.6	168.7	
Variable Cost Total					12,739.7	16,981.6	21,227.4	25,478.6	
Auxiliary material		I			1,583.3	1,583.3	1,583.3	1,583.3	
Repair cost		L			1,000	1,000	1,000	1,000	
Labor cost	Cash payment	L			2,750	2,750	2,750	2,750	
	Payment in kind	L			1,500	1,500	1,500	1,500	
	Medical expense	L			1,772	2,742	4,944	7,088	
Depreciation		L			8,792	8,792	8,792	8,792	
Interest		L			3,790 6	3,790.6	3,790.6	3,790.6	
Insurance		L			265.5	265.5	265.5	265.5	
Administrative expenses		L			500	500	500	500	
Fixed cost Total					21,953.4	22,923.4	25,125.4	27,269.4	
Total production cost					34,693.1	39,905.0	46,352.8	52,748.0	
Net production					337.5T	450T	562.5T	675T	
Production cost per kg				Rp/kg	102.79	88.67	82.40	78.14	

Fig. 9

Gowa Mill Production Cost and Market Price



	Production Cost
15 T/D production	Rp 102.79/kg
20 T/D production	Rp 88.67/kg
25 T/D production	Rp 82.40/kg
30 T/D production	Rp 78.14/kg

Though it will require fund for the rehabilitation of production capacity, the above calculations do not include related depreciation and interest (about 1.5 - 3 Rp/kg). As is evident from the above trial calculation, the operation will show a profit, apart from the question of the quality, if production reaches a 15 T/D level, but when the escalation of prices of raw material and wage is taken into consideration, it can not be said that it possesses a full competitive power. (In case of Gowa Mill, a reduction ranging from Rp1.50/kg to Rp. 5.00/kg is being made in actual selling depending on the amount of sales).

5.3 Selling Price

When it comes to the point of marketing, serious problems must be faced. Demand for paper in the Makassar area is 100 tons per month at the most (150 T/m at the most even when small surrounding islands are included), and the quantity exceeding this demand must be exported to other islands (in fact, major markets

are Surabaja and Djakart). This means that if this mill operates at the full production capacity, indeed, approx 85% of the total production will have to be exported to the market other than Makassar. However, in Indonesia where social indirect capital (harbor facilities, ships, etc.) is yet in its early stage, transportation cost between islands is extremely high. For example, the freight between Makassar and Djakarta, the greatest market, is about twice as high as that between Japan and Djakarta and this corresponds to about 25% of the production cost at the full production (30 T/D). *

Price of wood free paper imported by B. E. at DJakarta and Surabaja, even inclusive of 30% duties and import charge, is Rp 125 per kg. Therefore, if production is possible at the cost per ton same as the foreign products, the paper produced at Makassar, located far from major markets, will find it difficult to compete with other products in these markets. Still more, if the quality is taken into consideration, more disadvantages will be evident in the competition.

Transportation cost to Surabaja may be brought down if small motor and sailing boats are to be used. However, if the increase in the production capacity of state-run paper mills in the east Jawa area (Leties Mill, Banjuwang Mill) which seek Surabaja market from the same reason as the above is taken into consideration, the problem which these state-run paper mills have to face in the market will become more critical.

In view of the above fact, it is important that not only the Gowa Mill make efforts to lower the production cost by promptly increasing its production but also some measures are taken by the government to reduce high interland freight charges. Paper mills in Indonesia are still in their infancy and have many problems in various fields such as production, technology, sales and financing. In addition, there are also many problems which can not be solved by these enterprises through their own efforts. Also, in the sense of helping these enterprises attain self-support, some protective measures will be necessary in respect of financial and monetary system and tax administration from a national standpoint of view.

*	Between Makassar and Surabaja	Rp13,000 per ton (1,000 class vessel) Rp 8,000 per ton (motor and sailing boat)
	Between Makassar and DJakarta	Rp20,000 per ton
	Between Tokyo and DJakarta	US$20.00 per ton

6. Required Funds and Details of Expenditure

Estimated amount of funds required for the rehabilitation of the mill and details of expenditure are shown below.

Expenditure	Required funds (US$)		
	Foreign Currency	Local Currency	Total
A. Improvement and repair works			
A-1. Improvement of water intake equipment (1) Water intake equipment (roller gate, reinforcing bar, binding wire, wire, nail and others, submerged pump, sand pump) (2) Civil engineering works (3) Dispatch of supervisor (4) Others Sub total	30,400	30,000	60,400
A-2. Improvement of bamboo yard equipment (1) Main & repair of existing manual trucks and diesel locomotives (2) 4 ton diesel locomotive 1 unit (3) Manual truck 10 units (4) Additional railraod tracks (rail and accessories, 9kg point, 8 sets construction work) (5) Improvement of pond (6) Others Sub total	20,000	600	20,600
A-3. Improvement of slasher (1) Shortening of distance between both outside chains. (2) Installation of metal fittings for holding bamboo (3) Others Sub total	0	400	400
A-4. Improvement of bamboo sleaver treating equipment (1) Installation of one set of portable convyor (2) Others Sub total	400	0	400
A-5. Installation of cooling water tank for blowing steam of digester (1) Installation of one 80m^3 tank made of steel plate. (material, processing, erection, foundation) (2) Fresh water boosting pump (pump, motor, switch, erection, foundation)			

(3) Piping (material, piping work) (4) Others Sub total	4,400	2,800	7,200
A-6. Installation of concentrated black liquor tank of evaporator. (1) Installation of one 100^3 tank made of steel plate (material, processing, erection, foundation) (2) Installation of agitator (agitator, motor, switch, erection) (3) Piping (material, piping work) (4) Others Sub total	5,000	2,900	7,900
A-7. Improvement of recovery boiler (1) Prevention against overcooling (installation of pump, auxiliary oil burner, extension of castable refractory) (2) Dispatch of supervisor (3) Others Sub total	14,000	1,400	15,400
A-8. Wet pulp breaking equipment (1) Installation of $3.75m^3$ pulper for breaking (pulper, motor, switch, erection, foundation) (2) Pulp pump for pulper (pump, motor, switch, erection, foundation) (3) Piping (material, piping work) (4) Pulp transporting lift (hoist, rail, cage, switch, erection) (5) Pulp storage house ($30m^2$) (6) Others Sub total	9,900	2,800	12,700
A-9. Installation of settling tank (1) Installation of one tank $190m^3$ settling (concrete, reinforcing bar, steel skelton, copper plate, tile, mortar, painting, erection, foundation) (2) Installation of one white water feeding pump (pump, motor, switch, erection, foundation) (3) Installation of one recovered white water pump (pump, motor, switch, erection, foundation)			

(4) Installation of one settling tank tail pump (pump, motor, switch, erection, foundation) (5) Piping (6) Others Sub total	9,200	16,600	25,800
A-10. Reconstruction and relocation of mixing box (1) Stock box (wooden box and stainless steel gate) (2) White water box (wooden box and stainless steel gate) (3) Mixing box (wood) (4) Relocation of pump (5) Piping (material, piping work) (6) Wiring (material, wiring work) (7) Others Sub total	1,400	1,500	2,900
A-11. Replacement of pulper pump at reel part (1) Installation of one pulp pump (pump, motor, switch, erection, foundation) (2) Others Sub total	1,000	300	1,300
A-12. Stock of spare roll of dandy roll (1) One dandy roll Sub total	4,900	0	4,900
A-13. Increase of winding roll of reel (1) 10 winding rolls Sub total	8,500	0	8,500
A-14. Installation of a water quality tester for water treatment (1) One jar tester Sub total	400	0	400
A-15. Repair of instrument (1) Parts for repair work (price included in the price of machine parts for repair work) (2) Dispatch of supervisor Sub total	2,500	0	2,500
A. Total cost of improvement and repair works	112,000	59,300	171,300

B. Machine parts for repair work			
B-1. Bamboo preparation Dept. Wire cloth of chip screen (top, middle, bottom) Side roller of chip elavator. Carrier roller of chip conveyor Others Sub total	640	0	640
B-2. Cooking Dept. Carrier roller of chip conveyor Heating tube Segment of disc refiner Shaft sleave of disc refiner Others Sub total	2,380	0	2,380
B-3. Washing & screening Dept. Valve sheet and seal band of washer Bearing for washer Bearing for shredder Bearing for Cowan screen Wire cloth & bearing for thickner Bearing for agitator for unbleached pulp chest Screen plate of Johnson screen Others Sub total	8,110	0	8,110
B-4. Bleaching Dept. Bearing for agitator for No. 2 Alkali tower Bearing for agitator for No. 2 Hypo tower Wire cloth and seal band of Chlorine washer Bearing for chlorine washer Wire cloth and seal band of alkali washer Bearing for alkali washer Wire cloth and seal band of Hypo washer Bearing for Hypo washer Pump bearing Others Sub total	5,280	0	5,280
B-5. After screening Dept. Wire cloth and seal band for thickner Bearing for thickner Bearing for agitator for chest Pump bearing Others Sub total	1,870	0	1,870
B-6. Paper machine and Finishing Dept. Screen plate of tube separator Spring plate for breast swing arm			

Siphon pipe for dryer Suction roll deckel strip Magnet clutch of driving equipment O-ring of baling press Vari-pitch sheave of driving equipment Baling press hydraulic pump Others Sub total	29,000	0	29,000
B-7. Black liquor evaporating Dept. Heating tube Glass for peep hole Others Sub total	1,090	0	1,090
B-8. Black liquor recovery boiler Water tube Flexible tube Bearing and rubber coupling for FDF Coupling rubber for IDF Special shape brick for rotary furnace Others Sub total	15,370	0	15,370
B-9. Recausticizing Dept. Diaphram for suction pump Gland packing for pump Packing for compressor Others Sub total	770	0	770
B-10. Boiler room Water tube Oil burner Packing for pump Pressure gage Others Sub total	2,460	0	2,460
B-11. Electric equipment & wiring Fluorescent lamp Insulating oil Indicating lamp Others Sub total	690	0	690
B-12. Chemical equipment Runner, shaft, bearing of pump, sleave, labyrinth of blower Others Sub total	3,120	0	3,120
B-13. Water treatment Dept. Impeller, coupling rubber for pump, surface washing device for rapid sand filteration equipment Rotar meter Others Sub total	12,690	0	12,690

B-14. Bleaching agent making dept Silicon rectifier element Bottom plate of electrolysis cell Others Sub total	31,800	0	31,800
B-15. Measuring instrument Electronic instrument Pneumatic instrument Temperature instrument Others Sub total	2,730	0	2,730
B-16. Clothing material and bearing Wire cloth for paper machine Felt for paper machine Canuas for paper machine Bearing V-belt Others Sub-total	43,000	0	43,000
B. Total cost of machine parts for repair work	161,000	0	161,000
C. Technical assistance			
C-1. Guidance in operation (1) Dispatch of operation supervisors (2) Preparation of operating manuals Sub total	60,000	0	60,000
C-2. Guidance in office administration (1) Dispatch of office administration supervisors (2) Preparation of office administration manuals. Sub total	10,000	0	10,000
C. Total cost of technical assistance	70,000	0	70,000
Grand Total	343,000	59,300	402,300

Note: Local funds are estimated on the basis of unit price in Japan and therefore must be changed according to local conditions in Indonesia.

III PEMATANG SIANTAR MILL SECTION

III PEMATANG SIANTAR MILL

1. Present Conditions

1.1 Background

A contract for the construction of this mill under the US$1,450,000 reparation project was signed between a Japanese trading firm and the Repatriation Bureau of the Indonesian Government in February 1959, and the mill was delivered upon completion in August 1962.

Later in September 1965, a contract for the work to double its facilities at the cost of US$2,500,000 was concluded but actual approval was given to US$ 500,000 as a reparation project, and only water supply, boiler, and buildings were shipped to the mill. This work was suspended temporarily at one time but was resumed in March 1968. Water supply system and boiler facilities are scheduled to be completed for the end of 1968. Also, the charge of the mill was transferred from the Ministry of Repatriation to the Ministry of Industry in 1965.

1.2 Present Operation

Actual operation of the mill after initial trial operation is shown in Fig.10.

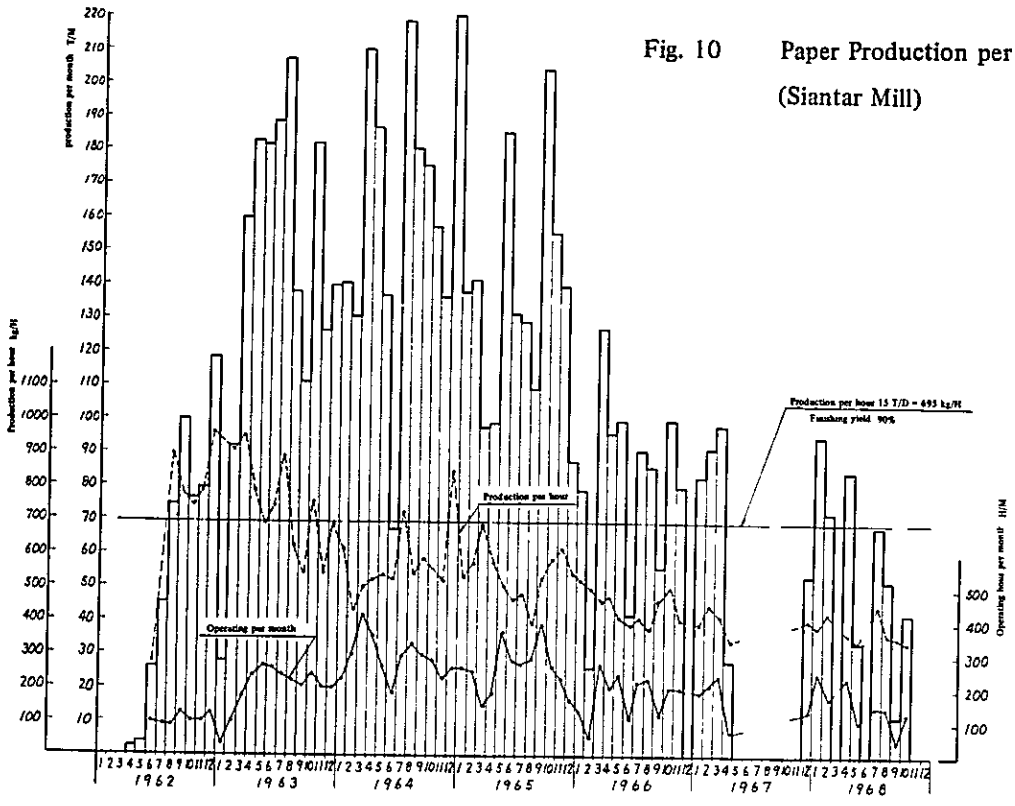


Fig. 10 Paper Production per Month (Siantar Mill)

Against the 400 ton per month production plan (on machine reel), actual production was 221 tons (55%) at the maximum and apparent average production was 160 tons (40%). However, since December 1965, the mill was put on a 16 hour operation base due to a personnel reduction. As a result, the production has considerably decreased.

The first stumbling of the mill was with the mill water. At the time of construction the Japanese engineers insisted on the use of river water but the decision was made to supply water from wells on advice of the Indonesian engineers. It was essentially a big error to have adopted the plan of supplying well water while the long range plan envisaged the production of 30t/day paper. Besides, of the 4 wells actually drilled under the contract for the supply of 210 t/hr, only 3 wells were able to supply water and the quantity available was 150 t/hr. Moreover, because of incompleteness of the work, one well failed to supply water soon after and in 1967 another well ceased operation due to the settlement of ground, thus leaving only one well which is now supplying 50t/hr. water. Since this mill requires 140t/day water for the production of 15t/day paper, water shortage begun soon after the completion of the mill and the production decreased accordingly. As a result, a plan was worked out in September 1965 for the work to take water from a river under additional reparation project and the work is now in progress. Upon completion of the work at the end of the year, the problem of decreased production due to water shortage will be solved. However, under present circumstances, only 1,150 tons of water, including 350 tons out of 470 tons that is kept in the reservoir during the night when the mill is not in operation after 100 to 150 tons are set aside for housing area, is supplied to the mill and production of paper above 6 t/day can not be attained. In fact, only about 1/3 of that amount is presently being turned out.

Investigation into the operation of the mill for the past 7 weeks revealed that out of the total 42 days, paper machine was operated on 16 days and the grinder on 24 days. Operating conditions during this period are shown in Fig. 11.

Fig. 11 Operating Conditions (Siantar Mill)

Oct. 1 – Nov. 11, 1968

Dept. \ Hour	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	Remarks:
Wood preparation	45.9 %	Of the above period for survey, work was performed in 15 days
Quantity of wood used	161.16 M^3	
Grinder	49.6 % Standby for water 33 % Standby for power	Work was performed in 24 days
GP production	51.450 kg (bone dry)	
Paper machine	48.8 % Standby for stock	Work for performed in 16 days
Quantity of SP used	12.000 kg	
Quantity of GP used	48.000 kg	
Paper production	65.840 kg (machine reel)	
Finishing		
End products	66.638 kg	

Operation Suspension

As is seen in the chart, of the total 16 working hours of the day, about 8 hours are used for operation and the remaining 8 hours are spent for standby for water and power.

On the production, the per hour production at the early stage of mill operation had exceeded the planned production goal and even attained a production record of 18 t/day as shown in Fig. 10, therefore it may be said that the skill of operators in the mill operation is fairly high. However, ever since the personnel reduction at the end of 1959 the mill was placed on the 16 hours a day operation against the principle of continuous operation for a paper mill. This, coupled with additional unfavorable conditions such as water and power shortage, lead to the bad habit of shutting down the mill without due reasons. Under such a condition, operation of grinder is limited to about eight hours a day, therefore hot grinding can not be performed as a matter of course. This results in the drop of temperature in grinder pit to 42°C and the decrease of freeness of pulp to 60cc. Stock produced in such a manner can hardly be conceived as newsprint pulp. As a result, the paper produced as the finished product is one of coarse papers, so-called stencil paper, and its selling price also has to be low. Its measured quality is shown in Table 5.

Table 5. Quality of Products at Siantar Mill
(Sampling Taken on Nov. 12, 1968)

Quality Element		
Basis weight	g/m^2	61.6
Thickness	mm/100	12.9
Density	g/cm^3	0.48
Breaking length, longitudinal	Km	1.72
Breaking length, traverse	Km	1.42
Tensile strength, longitudinal	Kg	1.68
Tensile strength, traverse	Kg	1.31
Elongation, longitudinal	%	1.08
Elongation, traverse	%	11.70

Also, the wood material now in use are the old timbers which were cut down last year due to financial reasons. As a result, the color of paper produced is extremely inferior.

The number of operating days at this mill is estremely small. For example, under the production plan for 1969 the number of operating days during the year is set to be 287 days and all employees take leaves on all holidays including Sundays, National Holidays, Islamite Holidays and Christian Holidays. Accordingly, all repair works and changing of clothing material have to be done on normal working days, thus making actual working days even fewer. As previously stated, continuous operation is the most important fundamental principle of a paper mill. Nevertheless, if Siantar Mill is to continue such operating systems under peculiar regional conditions, it must be said that the future of this mill will be very gloomy. However, even under present conditions where water and power shortage persist, continuous operation of the mill may be possible if only reassignment of personnel is properly carried out.

1.3 Raw Material Condition

Main raw materials used in this mill are the wood for ground pulp and imported sulfite pulp.

At present, stock of imported pulp on hand amount to 40 tons. This is equivalent to 10 days use if mill is to be put in full operation, but it will last for 3 to 4 months with the present pace of production.

Wood material is being purchased from Aek Nauli area, 40 to 50km distant from the mill. According to a survey made in 1968, 168,500m^3 of timber was already cut down in this area and the remaining wood resources are estimated at 619,000m^3. Currently 3,000m^3 of timber is cut down per month and most of them are exported and the remainder is used by match manufacturers. This paper mill is purchasing low priced timber which is not fitted for the above mentioned purpose. If the future production at this mill is said to be approximately 10,000 ton/year, more than 30,000 ton/year of pine trees will be needed. This is close to the total volume of timber now being cut down. This is also fairly close to the total volume of annual growth of timber when replantation is normally carried out in this area. Though there are many other pine forests around the Toba Lake, the distance between these forests and the mill is more than 100km, thus making the profitability of the mill extremely unfavorable. It will be necessary therefore to im-

mediately take some measures for overall control on the felling of pine trees.

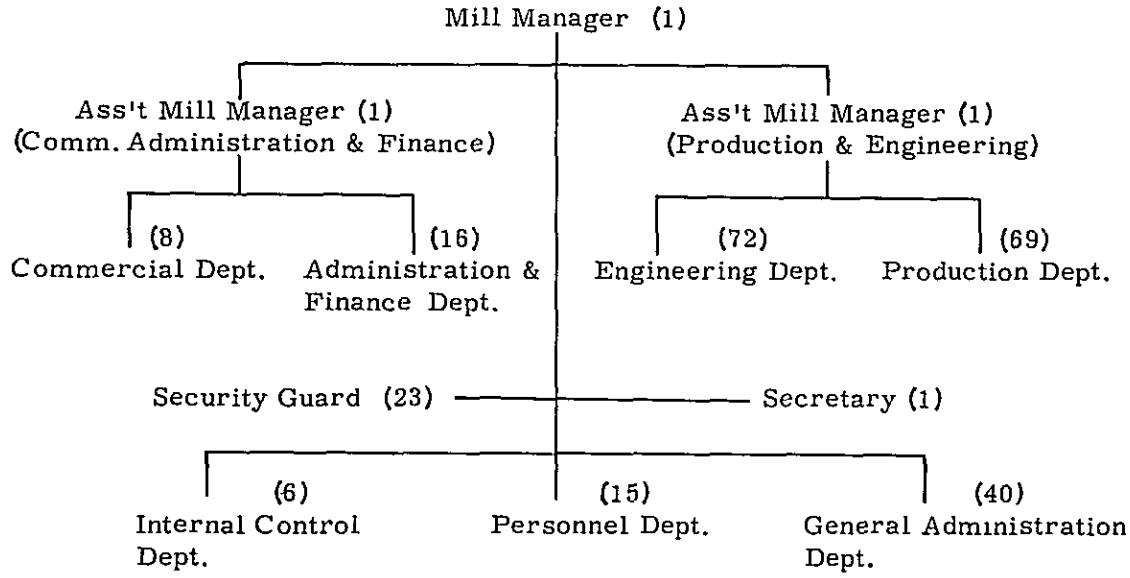
Moreover, in the forest area branches, tops and small trees are left unused. Effective utilization of these materials must also be considered. For this reason, RGP method (Refining Ground Pulp Process) should be taken up for consideration in planning the expansion of Siantar Mill. In fact, even now a tree up to 10cm in diameter can be used as raw material for pulp making.

The wood now being exported to foreign countries are cut to 4 meters in length but the wood this mill is purchasing is 1.8 to 2.2m in length. For this reason, when the wood is cut to a piece 85cm long for pocket grinder, about 15% of the total length is wasted. This fact may present a serious problem when the mill is put in full operation in the future.

1.4 Personnel

Defects in the administration and organization of the mill has been discussed previously and they are most evident in personnel assignment.

Fig. 12 Siantar Mill Organization and Personnel



Total Strength : 253

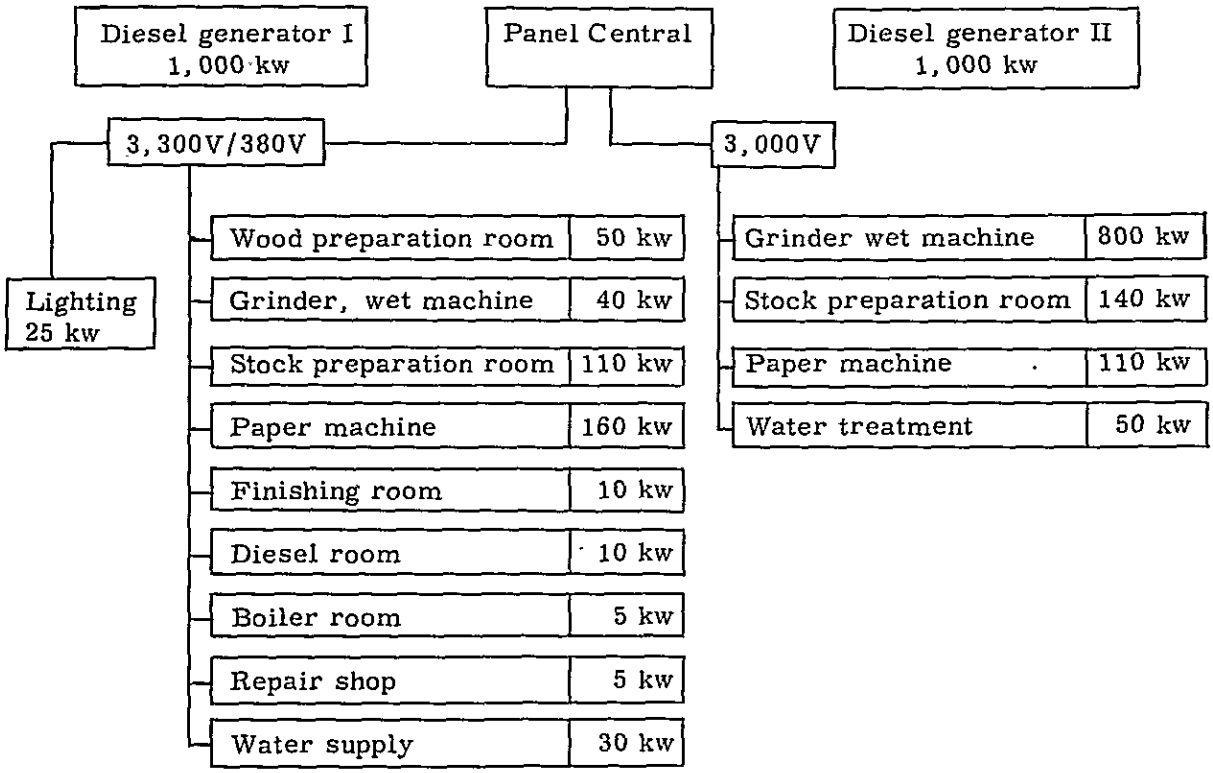
Figures in parentheses indicate the number of personnel assigned

As is seen in Fig. 12, the number of personnel assigned to non-production fields is extremely large as compared with that of those directly engaged in the production and accounts for 45% of the total strength. If these personnel are properly reassigned and retrained, 3 shift work at production department may be possible.

2. Electric Power

Existing two 1,000 kw diesel generators are considered adequate for the mill in view of the present maximum demand of 1,600kw for the entire electrical equipment of 2,600 HP (1,940 kw) with the demand factor of 0.8 and also judging from the record of use in Fig. 13.

Fig. 13 Siantar Mill Power Distribution (Full operation)



Total power requirement: 1,545 kw

However, it is common with most of the diesel power plant that each diesel engine undergo a complete overhaul for every 5,000 hours (in this mill a brief cheek is made every 1,000 hours). Therefore it is often necessary in these plants to have one standby generator for several units. But in this mill the following arrangement is made for the overhaul of diesel engines.

(1) During normal operation

Ground pulp production capacity	Approx. 23 t/day
Ground pulp requirement	Approx. 14.1 t/day
Ground pulp excess	Approx. 8.9 t/day
Capacity of wet machine	6 - 8 t/day

(2) During the overhaul of one diesel engine

Ground pulp production capacity	7.5 t/day
Shortage of ground pulp	6.6 t/day

Under this schedule, the capacity of wet machine with the arrangement(1) is almost equal to the shortage with the arrangement (2), therefore the wet pulp may be produced and stored for the number of days required for the overhaul of one diesel engine.

However, the mill water, scheduled to be converted from present well water to river water at the end of the year, is not considered to be satisfactory from biological point of view, because the river flows through Saintar City and is expected to accelerate the growth of mold in wet pulp. Anti-mold agents (Liquicide, etc.) are available but the use of them will result in the increase of production cost. Besides, in view of low skilled repair work and the difficulties in obtaining spare parts, it is desirable to have one standby diesel generator installed in the mill.

3. Equipments to be Improved

3.1 Grinding Room

As previously stated, the ground pulp in this mill is of very low grade and can hardly be used as raw material for news print with its present quality. This situation was brought about mainly by intermittent operation owing to water and power shortage and also by unskilled operation on the part of operators but is partly due to its equipments. Problems related to the equipments will be discussed below.

(1) Rearrangement of pocket grinder

Of the two grinders presently installed, one is out of service due to defective bearings and only one unit is now in operation. Since bearings and shaft on the unit now in operation are considered to have been worn out considerably Judging from the time in which the unit has been in use

since initial operation, spare parts for these important portions should be made available immediately. Also, the grinder load regulator has been removed from both units after they became inoperative, thus making the operation unstable and resulting in the inferior quality of the products. This equipment allows the use of maximum allowable power supply and contributers to the improvement and stabilization of the quality and also to the increase in the quantity to be treated. Therefore, it should be installed as soon as possible.

(2) Treatment of tail of Cowan screen

The tail of Cowan secreen is presently disposed of into sewage line and it amounts to 15 to 25% of the total pulp production, thus considerably deteriorates unit ratio of wood material to product at the mill. For this reason, a tail refiner should be installed to break the tail and recover it as usable raw material. This will result in a great increase in yield.

(3) Effective utilization of white water of decker for GP.

Presently, a large portion of white water of decker for GP is discarded along with white water of paper machine. It is therefore necessary to recover white water of decker by providing a pit specifically for this purpose and to use it effectively with grinder and screen, etc. By this means it will be possible not only to reduce loss in pulp but also to improve the paper quality with the recovery of fine fibers and the rise of temperature in the grinder pit.

3.2 Paper Machine

In order to improve the quality of paper and to increase the yield of production and also the production, the following works are considered necessary to bring a good result.

(1) Installation of a recovery equipment of white water of paper machine.

As previously stated, a large portion of white water of paper machine is now being used for drum barker or disposed of as waste. This wasted portion of white water should be recovered and used at mixing box in the preparation room on priority basis and the remainder should be sent to drum barker. By doing this, it will be possible to improve the quality of paper and the yield of production and also to save mill water.

(2) Stock of spare rolls for paper machine

Since the repair shop of the mill is not equipped with a roll grinder, a long range grinding plan must be worked out for off plant work. However, the transportation of rolls to Java Island (Padalarang Mill) for grinding may become the bottleneck after the mill is put in full operation. To cope with such a situation, it is recommended to keep in stock some spares of important rolls (approx. US$10,000) rather than to install a roll grinder (US$60,000 to 90,000) in view of relatively small scale of the mill. The rolls on paper machine have never been ground since initial operation, thus resulting in adverse effect on the quality of paper and overall production. (See Table 6)

Table 6. Paper Machine Roll

Description of roll	Material	Dimensions	No. of roll	No. of spare roll		Length of use
				On hand	Additional requirement	
Breast roll	Bronze	355φ x 2,030 ℓ	1		1	6 months
Couch roll		660φ x 1,930 ℓ	1			
Lump breaker roll	Rubber	305φ x 1,980 ℓ	1			
Upper press roll						
No. 1	Stone	560φ x 1,960 ℓ	1	1		2 years
No. 2	"	"	1			
No. 3	"	"	1			
Lower press roll						
No. 1	Rubber	450φ x 1,950 ℓ	1	1		1 year
No. 2	"	"	1			
No. 3	"	"	1			
Upper squeezing roll	Rubber	355φ x 2,000 ℓ	1		1	2 years
Lower squeezing roll	Stonite	355φ x 2,200 ℓ	1		1	2 years
Top calender roll	Chilled steel	355φ x 1,830 ℓ	1		1	5 months
Middle calender roll	"	255φ x 1,830 ℓ	5	1	1	3-4 months
2nd calender roll	"	355φ x 1,830 ℓ	1			"
Bottom calender roll	"	510φ x 1,830 ℓ	1		1	"
			17			

(3) Equalization of winding roll for double cutter with that for reel

Presently, products of this mill are all sheet and most of the news print now being planned will also be the sheet. Therfore, the winder is being used for a sole reason that rewinding is necessary as there is a difference in the winding roll and bearing between reel and cutter. By equalizing the roll of double cutter with reel roll and modifying bearing bracket

of winder and cutter, it will be possible to eliminate a process of winder and obtain a merit of simplification of process.

3.3 Machine Parts for Repair Work

This mill, like Gowa Mill, lacks many machine parts and materials for repair works and this is one of the reasons for low production rate and inferior quality of products. There had not been any machine parts purchased since the inauguration of the mill until this September when an order amounting to US$19,000 for emergency machine parts for use on machines now out of service was placed. However, most of the spare parts which should be kept on inventory for future use in case of equipment failure were not included in this order. In the past, failure of machine was not too frequent because of low operating rate, but in the future when production is brought to full operation, it is expected the frequency of failure of equipment will be increased accordingly. It is necessary therefore to provide adequate spare parts this time. As is the case with Gowa Mill, these spare parts must always be provided with working capital in the future. It must also be considered to use these spare parts effectively be establishing and implementing preventive maintenance procedures. Clothing materials other than canvas are in stock, but they are only for two to three months use and unless an order is placed immediately for additional stock, they may not be available for use when a need arises.

4. Technical Assistance

As stated previously, this mill has been in operation for six years and has had a record of near full operation at one time. During this period each employee's skill has attained a certain level. In addition, their experience through daily operations and suspensions of equipment in recent years have contributed to the promotion of their skill in the work requiring hand work. It will not be difficult therefore to increase the production close to the planned production level if equipment and facilities are put in complete order.

However, in view of the above mentioned work such as additional installation of power generators, which will require a considerable length of time, and such factors as unexpected confusion in obtaining raw materials and in the sales activities as a result of increased daily production, it is considered that full fledged operation will not be realized before the end of 1969. About this time the production will come close to critical point and there will be a possibility of presenting

a problem in connection with the quality of products. It is considered more effective if technical assistance for a short period of time is provided at this stage.

5. Profitability Study

5.1 Current Statement of Profit and Loss

Because of incomplete accounting books left disorderly during pur survey, it was extremely difficult for the mission to grasp true picture of financial situation. However, recent financial situation may be summarized as follows.

Recent profit and loss statement shows that for the income revenue from electricity (sales of electricity) accounts for approximately 32% of the total revenue and the remainder is filled by the sale of paper which is turned out by a scanty operation, using up the fund out of initial working capital. (Table 7)

Table 7. Profit and Loss Statement

(Unit . Rp 1,000)

Year and Month		1968									
		Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Total
A	Sales of paper	1,223	1,484	1,148	1,898	1,261	1,192	2,998	1,647	1,881	14,732
B	Sales of electricity	-	-	-	-	-	-	1,300	1,279	398	2,977
C=A+B	Total Sales	1,223	1,484	1,148	1,898	1,261	1,192	4,298	2,926	2,279	17,709
D	Production cost	3,608	2,713	1,683	3,145	3,333	3,364	5,101	4,216	2,930	30,093
E	Depreciation	700	700	700	700	700	700	700	700	700	6,300
F=C-D +E	Profit and loss before depreciation	(-)1,685	(-)529	165	(-)547	(-)1,372	(-)1,472	(-)103	(-)590	49	(-)6,084
G=C-D	Profit and loss after depreciation	(-)2,385	(-)1,229	(-)535	(-)1,247	(-)2,072	(-)2,172	(-)803	(-)1,290	(-)651	(-)12,384

Note : Average monthly profit and loss before depreciation 675

As a result, expenditure is extremely retrenched and almost no purchase of raw materials has been made in the past one year. Wage is such a low level that it may be said to be the lowest in Indonesia (Incidentially, the salaries of executives are about one fifth of those in Gowa Mill). To be concrete, the business

is in the red since 1968 at an average monthly rate of Rp. 670,000 and this is equivalent to 41% of the average monthly sales. It is evident from the above fact that this mill is under heavy pressure of a shortage of fund. This situation has been continuing ever since 1965 and as a result, the working capital appropriated at the time of inauguration has been almost used up. Therefore, it will be necessary to make reinvestment for the working capital at the end of rehabilitation work which is expected to be completed next year (1969).

5.2 Production Cost

As for the production cost, the price of pine tree, main raw material, is 1,160Rp/m^3 and this price is about one-sixth of that in Japan. However, the production being about 1/4 of installed capacity, fixed expenses run comparatively high and the production cost per kg on the basis of daily production of 4 ton is Rp 67.29. With the present market price at Medan being Rp. 63.04, the loss is Rp. 4.25/kg. But with the present actual production amounting to only 2 to 3 tons per day, actual loss will be much larger.

Our trial calculation shows the production cost on the basis of 12t/day production to be Rp59.94/kg. (See Table 8 and Fig. 14)

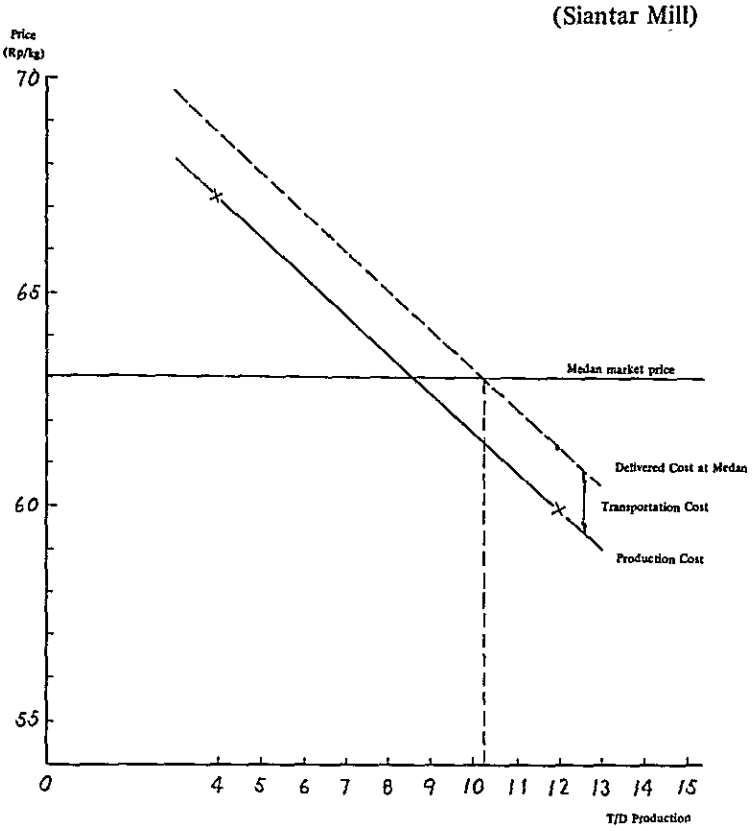
Table 8. Calculation of Production Cost

(12 T/D on 3 shift work)

Cost Element		Unit ratio	Unit price	Cost	Remarks
Raw material	Pine	2.46 t	1,160 Rp.	767,593	GP 75%
	B S P	0.325 t	60	5,382,000	SP 25%
Chemical	Alum	35 kg	90	202,860	
	Size pine	5 kg	21	124,000	
Fuel	Diesel oil	810 ℓ	14.5	3,241,620	
	Heavy oil	270 ℓ	8	596,160	
	Lubricating oil	16.3 ℓ	60	269,928	
Clothing material	Wire cloth	0.0009	160,000	39,744	
	Felt		66,150	164,316	
	Canvas		157,625	87,009	
Variable cost				10,875,230	
Labor cost				2,625,000	
Repair cost				661,788	
Administrative expenses				330,894	
Interest				1,320,808	
Insurance				31,000	
Depreciation				700,000	
Fixed cost				5,669,490	
Total cost				16,544,720	

$$\text{Production cost per kg} = \frac{16,544,720}{12,000 \times 25 \times 0.9} = \text{Rp. } 59.94/\text{kg}$$

Fig. 14 Production Cost and Market Price (Siantar Mill)



In this case, delivered cost at Medan is Rp. 61. 44/kg (transportation cost between mill and Medan is Rp. 1. 5/kg). This should result in some profit as compared with the above Rp. 63. 04/kg, the market import price at Medan, but it is said that a reduction in the price is needed in actual dealing because of inferior quality of products of the Siantar Mill. The price of pine trees and other raw materials was calculated also on the basis of unit price of previous year. Expenses on chemicals are expected to increase with the change of plant water from well to river. Therefore, if the rise in the price of raw materials is taken into consideration, it is highly probable that the business will be in the red. Also, because of present extremely low depreciation rate it will be necessary to make a revaluation of assets. Considering these factors of high production cost, it will be necessary to bring the production close to a full production level as early as possible and at the same time to increase the number of production days if profitable and self-sufficiency operation is to be attained.

5. 3 Marketing

As the demand for paper in and around Siantar is only 15 tons per month,

the majority of the products of this mill are being marketed in Medan. Present demand in the Medan area is estimated at 325 t/month. As previously stated, if production reaches the full production level, the products should be able to compete with imported products in respect of price, but when the quality is taken into consideration, this difference in the price would not be sufficient to survive competition. Marketing of news print, which is exempted from customs duties, in Djakarta will not be practical since the transportation cost between Medan and Djakarta is as high as Rp. 29/kg.

In this sense also, it will be necessary to provide some protective measures from a national point of view, as has been discussed in the section for Gowa Mill.

6. Required Funds and Details of Expenditure

Following is an estimate of fund required for the rehabilitation of this mill and the description of expenses.

Expenditure	Required funds (US$)		
	Foreign Currency	Local Currency	Total
A. Improvement and repair works			
A-1. Increase of diesel generators (1) Installation of one 1,250 KVA diesel engine (main body, accessories, spare parts, foundation, erection) (2) Installation of one 1,250 KVA AC generator (main body, accessories, spare parts, foundation, erection) (3) Relocation of existing 50 KVA diesel generator (building, movement of generator) (4) Dispatch of supervisor (5) Others Sub total	174,500	4,900	179,400
A-2. Adjustment of pocket grinder (1) Installation of load regulator (2) One spare grinder shaft (3) Others Sub total	8,700	0	8,700
A-3. Installation of tail of Cowan screen treating equipment (1) Installation of one 55 kw tail refiner (refiner, motor, switch, foundation, erection) (2) Piping (material, piping work) (3) Others Sub total	7,000	1,000	8,000
A-4. Installation of white water pit and pump for GP decker (1) Installation of white water pump (pump, motor, switch, foundation, erection) (2) Piping (material, piping work) (3) Construction of white water pit (4) Others Sub total	800	400	1,200

A-5. Installation of recovering equipment for white water of paper machine (1) Installation of white water transferring pump to mixing box (pump, motor, switch, foundation, erection) (2) Installation of water transfer pump to drum barker (pump, motor, switch, foundation, erection) (3) Piping (material, piping work) (4) Others Sub total	2,000	1,100	3,100
A-6. Installation of pump for drain pit under dryer (1) Installation of one drain pump (pump, motor, switch, foundation, erection) (2) Piping (material, piping work) (3) Others Sub total	300	300	600
A-7. Spare paper machine roll (1) One brest roll (2) One upper squeeze roll (3) One lower squeeze roll (4) One top calender roll (5) One middle calender roll (6) One bottom calender roll Sub total	10,400	0	10,400
A-8. Equalization of winding roll for double cutter to that for reel (1) 20 winding rolls for reel (2) Alteration of bearing bracket (12 for cutter, 2 for winder, work for alteration) (3) Installation of brake (6 for cutter, erection) (4) Others Sub total	12,300	300	12,600
A-9. Installation of additional scale for products (1) Platform scale (500 kg) Sub total	200	0	200
A. Total cost for improvement and repair work	216,200	8,000	224,200

B.	Machine parts for repair			
B-1.	Grinder and paper machine Load regulator for pocket grinder Grinder piston packing Bronze shower pipe for paper machine Bronze pipe for tube separator Carbon for dryer steam rotary joint Spring for dryer steam rotary joint Gate valve Canvas dryer Wire cloth Felt (No. 1, 2 & 3 press) Others Sub total	38,800	0	38,800
B-2.	Boiler Smoke tube Steam stop valve Reducing valve Safety valve Others Sub total	10,000	0	10,000
B-3.	Electrical equipment Battery Contact tip for magnetic switch box Carbon brush for commutator motor Others Sub total	700	0	700
B-4.	Bearing Spherical roller bearing Ball bearing Taper roller bearing Thrust bearing Ball bearing for motor Others Sub total	11,300	0	11,300
B.	Total cost of machine parts for repair	60,800	0	60,800
	Grand Total	277,000	8,000	285,000

Note: Local currency indicated is estimated on the basis of unit price in Japan, therefore must be adjusted to the conditions in Indonesia.

IV CONCLUSIONS

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The impression we had upon our survey of both mills was that the top management in both mills was lacking the ability in the management of the mill. It may be said that this situation is unavoidable in Indonesia under the present conditions. However, considering a vast investment that has been spent for these mills, it will be necessary to take some measures to effectively utilize such investment. In this sense, it may be said that the initiative the Indonesian Government has taken in requesting the aid is appropriate and well-timed. However, even with the realization of such aid, it is still expected to confront many problems. Followings are the problems expected to be encountered.

(a) Being deficit-laden mills, both mills are naturally hard pressed by a shortage of working capital. Since it will be difficult for the mills to raise required working capital by their own effort, this matter should be given a due consideration by the central government.

(b) Machine parts for repair work must be supplied regularly on the same basis as for the raw material. The should be considered equally important as the cost even when the mill operates in deficits. Since the majority of required parts are to be imported, there should be a careful consideration about the fund and procedures to be followed. That is, in placing an emergency order for machine parts for repair work, it will be necessary to find some means to shorten the time of delivery so that the quantity of stock on hand may be minimized. It will also be beneficial if the parts common to all the mills are stored in one specified place for mutual use.

(c) On the organization and personnel, the ratio of personnel assigned to the non-production fields is extremely high in both mills. In spite of a vast organization for clerical work, there has been little accomplishment. Since no standard or system has been established for accounting either, it will be necessary to provide guidance by setting up a basic standard procedures.

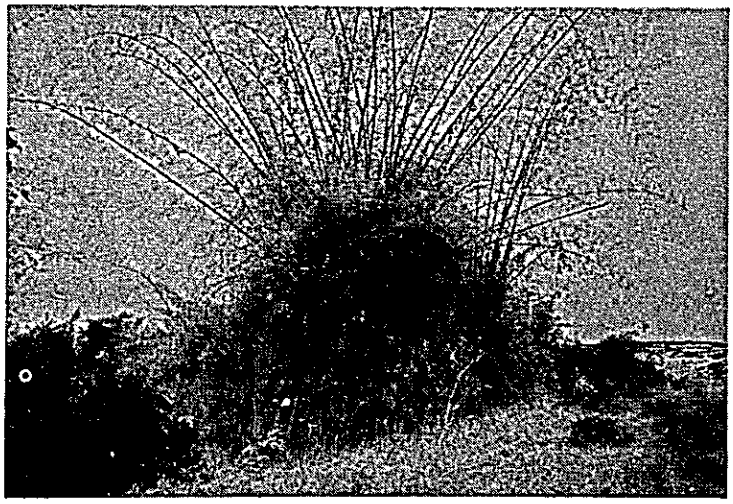
(d) The purpose of a manufactory is to produce articles for sale. In spite of this principle, the present marketing system must be said to be very weak. This problem should not be left to one individual mill for solutation but should be handled by the central government. A new marketing system should be developed through the study of foundamental questions such as the improvement of distribution channel, rationalization of transportation and the standerdization of products. If necessary, some measures will have to be taken to give priority to

the use of domestic product in addition to the handling of imported goods. Also on the quality of the paper, it will be questionable to unilaterally pursue the brightness. In view of the present situation of domestic products, it will also be necessary to provide guidance for the people in respect of paper consumption, placing emphasis on the practical use of paper.

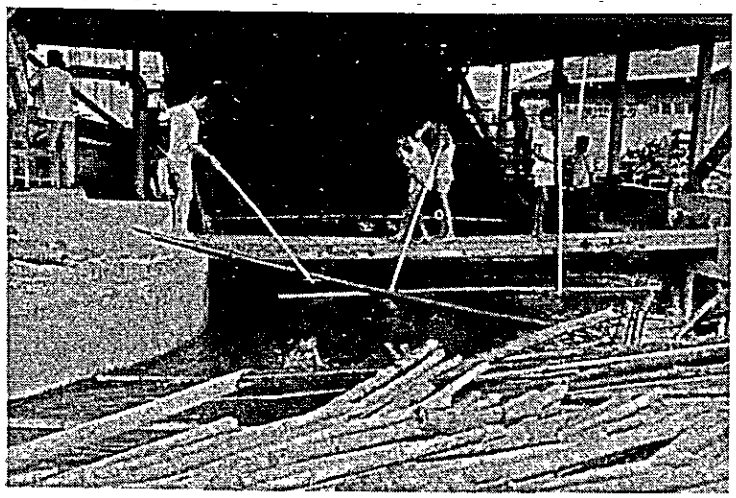
(e) In the end, however, the paper industry, which is a new and basic industry, will require some protective and promoting measures.

Paper, particularly the cultural paper, is indispensable to the nation and the Indonesian Government has been appropriating a large amount of foreign exchange every year for the purchase of paper from foreign countries. Fortunately, if the six mills are to be put in full operation, over a half of the total demand will be met by domestic products. In addition, considering the characteristics of the paper industry with the rate (portion of Rp in production cost portion) of domestic production of as high as 60 to 80% compared with other industries, the saving of foreign currency will will amount to a considerable figure. It is recommended therefore that measures are taken for the protection and promotion of this industry by recognizing the fact that the population which this industry and related industries will employ (in the future) will be enormous.

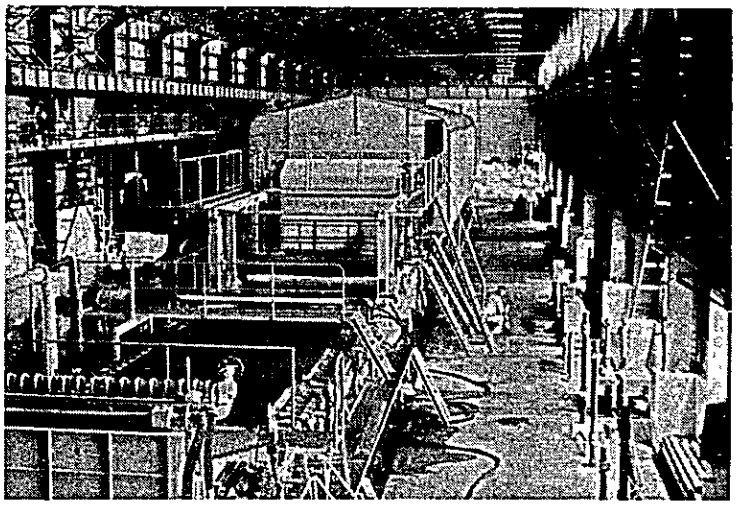
Parring Bamboo (thornless) Plantation in Gowa Province



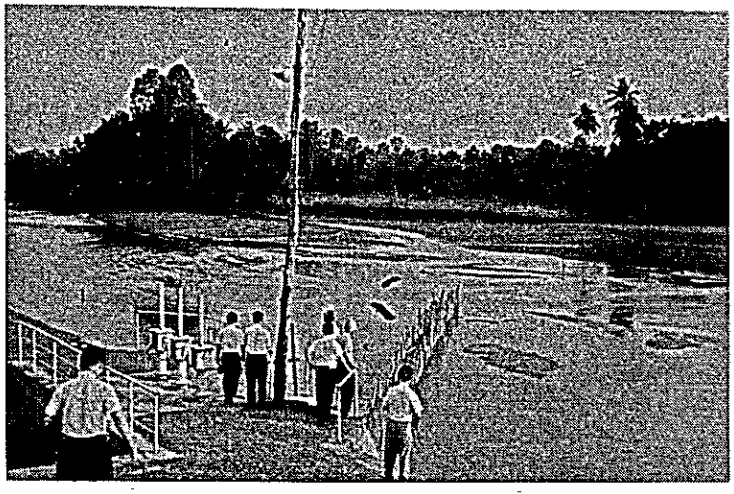
Wild Thorny Bamboo in Gowa Province



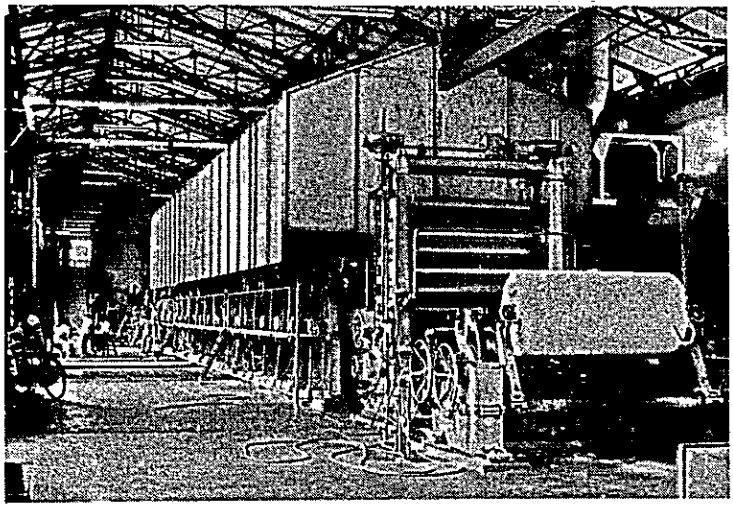
Slasher Pond in Gowa Mill



Paper Machine in Gowa Mill



Slasher Pond in Gowa Mill



Paper Machine in Gowa Mill