

10-11 Paper Quality

The desirable quality of paper (HVS and HVO) is shown in Table 10-9-1:

These quality standards are set in reference to qualities of competitors' products and they will be acceptable in the market.

10-12 Forecast of Paper Selling Prices

As a result of less amount of second quality paper owing to renewal of the finishing equipment (cutter machine and rewinder) and overall quality improvement owing to the improvement of various equipment including installation of a supercalender, we expect that BRPP can raise the selling prices up to the level of competitors' prices. These forecasted prices are shown in Table 10-10-1.

Table 10-3-1 Comparison of Productivity in Existing Plant, BRPP

	Production			Quality			Efficiency		
	50	75	100%	50	75	100%	50	75	100%
Wood preparation	50	75	100%	50	75	100%	50	75	100%
	<ol style="list-style-type: none"> 1. Non-control chip mixed ratio 2. Used wood with bark 3. Non-control moisture content in wood 								
Digester	50	75	100%	50	75	100%	50	75	100%
	<ol style="list-style-type: none"> 1. Roe-No. is not even. 2. Actual Product: 29 tpc/d as 306 days operation 3. Act. Steam Consumption: 2.39 t/33t.BK/Nominal 4.0t (steam consumption) 								
Washer	50	75	100%	50	75	100%	50	75	100%
	<ol style="list-style-type: none"> 1. Dilution factor: Approx. =2 2. Chemical loss: 463 kg/33t. Pulp as <p>Approx. 20 = 30 kg as reasonable</p>								
Bleaching	50	75	100%	50	75	100%	50	75	100%
	<ol style="list-style-type: none"> 1. Roe-No. is not even 2. Freshness is not even 								
Evaporator	50	75	100%	50	75	100%	50	75	100%
	<ol style="list-style-type: none"> 1. Strong BL solid is low (Av. 46 = 47% as solid) 2. Evaporating ratio is low. 3. BL solid content is not even. 								
Stock preparation	50	75	100%	50	75	100%	50	75	100%
	<ol style="list-style-type: none"> 1. Pulp consistency and Freshness are not even 2. Fiber strength after Refining is low. 								
Paper machine	50	75	100%	50	75	100%	50	75	100%
	<ol style="list-style-type: none"> 1. Productivity is low = Total efficiency is low 2. Steam consumption is high (Approx. 3.6t/ADC) 								
Recovery boiler	50	75	100%	50	75	100%	50	75	100%
	Good operation								
Main boiler	50	75	100%	50	75	100%	50	75	100%
	Good operation								
Electric generator	50	75	100%	50	75	100%	50	75	100%
	Good operation								
Operating technique	50	75	100%	50	75	100%	50	75	100%
Maintenance technique	50	75	100%	50	75	100%	50	75	100%
	Breakdown maintenance								

Table 10-5-1 Comparison of Paper Production

Description	Existing	Renovation	Diff.
1. Production			
HVS/HVO ADt/y	11,787	11,770	-17
*1 H.V. Paper ADt/y	-	2,475	+2,475
Total	11,787	14,245	+2,458
2. Av. daily production			
HVS/HVO ADt/d	34.10	44.75	+10.65
H.V. Paper ADt/d	-	31.33	+31.33
3. Total efficiency			
HVS/HVO %	76.31	85.0	+8.69
H.V. Paper %	-	80.0	
4. Av. speed			
HVS/HVO m/min	230 - 240	280 - 285	-
H.V. Paper	-	min. 140	-
5. Available operation			
HVS/HVO d/y	345.6	263.0	-82.6
∠ H.V. Paper	-	79.0	+79.0
Total	345.6	342.0	-3.6

*1. H.V. Paper = High Value Paper

Table 10-5-2 Estimate Daily Production in 1983

Paper	Act. basis weight		Machine speed m/min	Trimming at Reel m m	Theoretical production on Reel ADt/24Hr	Av. total eff. %	Daily production ADt/d	1 9 8 3 Est. Operation		Sales Price 1983		AV.
	g/m ²	g/m ²						D/Y	ADt/Y	Rp/Kg	Rp/Kg	
HVS 45 g/m ²	45.37	234.90	2,390	(34.23)	36.38	76.31	27.76	41.0	1,138.16	561.74	489.13	554.4
HVS 50 g/m ²	50.94	236.07	2,390	(38.21)	40.62	76.31	31.00	66.0	2,046.00	634.90	539.11	536.1
HVS 60 g/m ²	59.80	232.52	2,390	(45.19)	48.01	76.31	36.64	144.0	5,276.16	578.22	505.35	
HVO 60 g/m ²	61.20	231.89	2,390	(45.06)	47.88	76.31	36.54	45.0	1,644.30	535.41	527.70	
HVS/O 80 g/m ²	81.10	160.54	2,400	(41.76)	44.39	76.31	33.87	12.0	406.44	598.36	-	-
CS 70 g/m ²	70.6	183.87	2,445	(42.65)	45.32	76.31	34.58	37.0	1,279.66	574.72	-	-
AV. production ADt/d	345.64 D/Y as actual available operation					76.31	34.18	345.0	11,790.52	-	-	-
	309.004 D/Y as effective operation											

Table 10-5-3 Production Plan after Renovation

Paper	Machine speed m/min	Trimming at reel mm	Theoretical production ADt/24 Hr	Total eff. %	Case I			Case II		1983 Sales price Rp/kg	Est. cost Rp/kg
					Production ADt/d	Operation Day/y	Amount ADt/y	Operation Day/y	Amount ADt/y		
WV 45 g/m ²	280	2,385	42.18	83.0	35.0	29.0	1,015	37.0	1,295.0	489.13	
WV 50 g/m ²	280	2,390	48.18	83.0	41.0	103.0	4,305	84.0	3,355.0	539.11	
WV 60 g/m ²	285	2,390	58.85	85.0	50.0	61.0	3,050	130.0	6,500.0	505.35	
WV 60 g/m ²	285	2,390	58.85	85.0	50.0	34.0	1,700	45.0	2,250.0		
WV 80 g/m ²	213	2,400	58.89	85.0	50.0	8.0	400	10.0	500.0		
CS 70 g/m ²	240	2,465	59.15	84.0	50.0	26.0	1,300	36.0	1,800.0		
Av. basic weight 57.682 g/m ²											
Sub Total	273.883	2,373.578	53.81	85.257	45.877	263.0	11,770	342	15,700.0	-	
O11 proof paper 42 g/m ²	140	2,400	20.32	80.0	16.0	23.0	400				
Base paper for laminare 45 g/m ²	200	2,400	31.10	80.0	23.0	23.0	625				
Form paper 60 g/m ²	284	2,400	58.82	85.0	50.0	29.0	1,450				
Sub total						79.0	2,475				
Total						342.0	14,245				

Table 10-5-4 Furnish Combination in 1983

Description	HVS 45	HVS 50	HVS 60	HVS 60	HVS/O 80	CS 70	Total	
1) Production ADt/y	1,140.6	2,058.7	5,284.7	1,637.8	400.2	1,264.9	11,786.9	7% of av. moisture
2) Finished paper								
Pulp	841.2	834.0	831.6	822.0	810.0	822.0	-	
Clay	88.8	96.0	98.4	108.0	120.0	108.0	-	As retained 60% clay
Total	930.0	930.0	930.0	930.0	930.0	930.0	-	
AD, Kg	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	-	
3) Req. pulp								As 95% of fiber yield
Own pulp	706.53	(698.95)	775.37	(765.26)	(752.63)	738.95	-	
Purchasing								
N D K P	178.94	(178.94)	42.11	(42.11)	(42.11)	-	-	@ 405.19 Rp/30.Kg
L B K P	-	-	57.89	(57.89)	(57.89)	-	-	@ 355.49 Rp/30.Kg
C T M P	-	-	-	-	-	126.31	-	@ 363.97 Rp/30.Kg
C P	-	-	-	-	-	-	-	
Total	885.47	(877.89)	875.37	(865.26)	(852.63)	865.26	-	
4) Req. Chemical								
(Data on Mar. 1984)								
Size as solid	10.0	(10.0)	13.0	(13.0)	7.0	(5.0)	-	@ 448.57 Rp/Kg x 100/70 = 640.8 Rp/Kg
Alum as 17% Al2O3	36.0	(36.0)	45.0	(45.0)	35.0	(35.0)	-	@ 162.81 Rp/Kg
Clay as solid	148.0	(160.0)	164.0	(180.0)	200.0	(180.0)	-	@ 72.03 Rp/Kg
Starch								
Other chemicals								
5) Utility as P.M.								
Stream	3.62	3.62	3.62	3.62	3.62	3.62	3.62	
Electric	820.06	820.06	820.06	820.06	820.06	820.06	820.06	529.2-290.86=820.06 kWh/ADt
Water	416	416	416	416	416	416	416	416 m ³ /ADt as total mill water

Table 10-5-5 Furnish Combination after Renovation

Description		HVS 45	HVS 50	HVS 60	HVO 60	HVS/O 80	CS 70	Oil proof paper 42 g	Base paper for laminate 45 g	Form paper 60
1) Production	ADt/y	1,000.0	2,600.0	5,050.0	1,700.0	400.0	1,300.0	400	500	1,450.0
2) Finished paper										
Pulp	NO. kg/ADt paper	846.0	834.0	834.0	834.0	822.0	846.0	930	822	834.0
Clay	"	84.0	96.0	96.0	96.0	108.0	84.0	0	108	96.0
Total	NO. kg/ADt paper AD. kg	930.0 1,000.0	930.0 1,000.0	930.0 1,000.0	930.0 1,000.0	930.0 1,000.0	930.0 1,000.0	930.0 1,000.0	930.0 1,000	930.0 1,000.0
3) Req. Pulp										
Own pulp	NO. kg/ADt paper	771.43	675.0	540.0	540.0	540.0	540.0	978.95	865.26	540.0
Purchasing pulp										
NDMP	NO. kg/ADt paper	119.10	-	-	-	-	-	-	-	-
LBMP	"	-	202.89	337.89	337.89	325.26	224.1	-	-	337.89
CTMP	"	-	-	-	-	-	126.42	-	-	-
Total	NO. kg/ADt paper	890.53	877.89	877.89	877.89	865.26	890.52	978.95	865.26	877.89
4) Req. chemical										
Size as solid	kg/ADt paper	12.0	12.0	12.0	12.0	15.0	8.0	Nonoxide 1000 13.0	5.0	20.0
Alum as 17% Al ₂ O ₃	"	30.0	30.0	30.0	30.0	30.0	30.0	-	10.0	30.0
Clay as solid	"	140.0	160.0	160.0	160.0	180.0	140.0	-	180.0	160.0
Asahi-Guard	"	-	-	-	-	-	-	* 8.0	-	-
Carta-Retin-F	"	-	-	-	-	-	-	* 22.0	-	-
Fluorescence dye	"	0.006	0.006	0.006	0.006	0.006	-	-	0.006	-
Starch										
Other chemicals										
Pitch control								0.8	1.0	
5) Utility										
Steam	t/ADt paper	2.5	2.5	2.5	2.5	2.5	2.5	3.0	3.0	3.0
Electric	t/ADt paper	890.3	890.3	890.3	890.3	890.3	840.3	2,000	2,000	1,800
Water	t/ADt paper	300	300	300	300	300	300	300	300	300
(as total water)										

Table 10-5-6 Comparison of Self-made Pulp Production and Purchased Pulp

Description	Existing	Renovation	Diff.
1. Purchased pulp			
NBKP ADt	540.6	134.4	-406.2
LBKP ADt	911.1	3,198.6	+2,287.5
CTMP ADt	103.5	182.6	+79.1
Total ADt	1,555.2	3,515.6	+1,960.4
2. Self-made pulp (BDt - BKP/y)	8,862.6	8,426.0	-436.6
3. av. daily production (BDt - BKP/d)	28.9	25.8	-3.1
4. * Operating days (days/y)	320.0	327.0	+7.0
5. Total yield as BKP (Z)	37.41	40.41	+3.0

*: Operating Days = 342 - (20-5) = 327 d/y

Est. Plan of Boiler Inspection

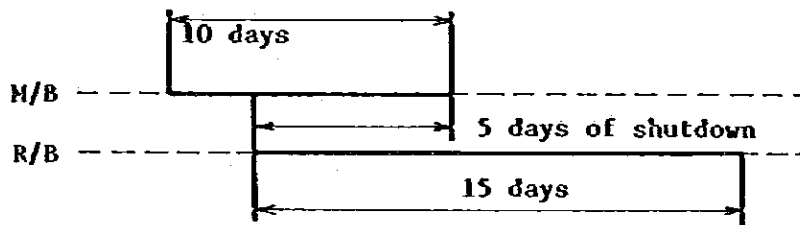


Table 10-5-7 Pulp Requiring Plan per Day after Renovation

Paper	Production		Pulp in paper		Pulp requiring				Own pulp				Purchased pulp				Remarks
	ADt/d	BDE/d	BDE/d	BDE/d	N BDE/d	L BDE/d	CTMP BDE/d	Total BDE/d	N BDE/d	L BDE/d	Total BDE/d	N BDE/d	L BDE/d	Total BDE/d	CTMP BDE/d		
																ADt/d	
HVS 45	35	32.55	29.61	43% 14.03	43% 17.14	-	31.17	9.86	17.14	27.0	4.17						
HVS 50	40	37.20	33.36	43% 13.802	55% 19.314	-	35.116	15.802	11.198	27.0		8.116					
HVS 60	50	46.50	41.70	30% 13.169	70% 30.726	-	43.895	13.169	13.831	27.0		16.895					
HVO 60	50	46.50	41.70	30% 13.169	70% 30.726	-	43.895	13.169	13.831	27.0		16.895					
HVS/O 80	50	46.50	41.10	25% 10.816	75% 32.447	-	43.263	10.816	16.184	27.0		16.263					
CS 70	50	46.50	42.30	20% 8.905	65.8% 29.300	14.22 6.321	44.526	8.905	18.095	27.0		11.205	6.321				
Oil proof paper 42	16	14.88	14.88	56% 8.771	44% 6.892	-	15.663	8.771	6.892	15.663							
Base for	25	23.25	20.55	30% 6.490	70% 15.142	-	21.632	6.490	15.142	21.142							
Form 60	50	46.50	41.70	40% 17.358	60% 26.337	-	43.895	17.358	9.442	27.0		16.895					

Table 10-5-8 Comparison of Cooking Condition

Description	Actual (Dec. '83 - Feb. 84)		After modification	
	Kraft method Mixed chip cooking	Kraft method Separate cooking N-chip including bamboo	Kraft method Separate cooking L-chip except mangrove	
2) Roe No.	act. 4.0±0.3	5.5±0.5	2.1±0.4	
3) Active alkali as Na ₂ O	act. 17% as DD chip	17% as B.D chip	16% as DD chip	
4) Sulphidity	act. 23.7%	20 - 23%	20 - 23%	
5) Liquid ratio	act. 3:2	3:5	3:5	
6) Cooking yield	est. 42.7% (N-only 43.5% L-only 42.0%)	est. 45.0%	est. 43.0%	
7) Washing yield	act. 98.0%	92.0%	92.0%	
8) Bleaching yield	act. 89.34%			
9) Total yield	est. 97.41% (act. 95.9% in 1982)	est. 41.4%	39.6%	

Description	Existing		After modification	
	(Mixed chip including bark)	(N-chip excluding bark)	(N-chip excluding bark)	(N-chip including bark)
10) Cooking condition Brown pulp	Recently datas (Av. in 1983)	32.77 BDE/d 28.93 BDE/d	4% as Bleached pulp 30 ADT/D x 0.9 x 0.45/0.92 = 13.21 BDE/d	5% as Bleached pulp 30 x 0.9 x 0.55/0.92 = 16.14
Chip volume into Dig.	10.4 BDT-chip/Batch		10.2 BDE-chip/Batch	10.6
Production/Batch	10.4 x 0.438 = 4.615 BDE pulp		10.2 x 0.45 = 4.59 BDE/Batch	10.6 x 0.43 = 4.56
No. of cooking	Av. 7.1 cooking/D		13.21/4.59 = 2.9 cooking/D	16.14/4.56 = 3.50
Req. cooking liq	3.2 of cooking ratio 10.4 x 3.2 = 33.28 c/Batch		3.5 of cooking liq. ratio 10.2 x 3.5 = 35.70 c/Batch	Ditto 10.6 x 3.5 = 37.10
Req. W.L	10.4 x 0.171 x 1000/91.44 = 19.47 m ³ /Batch		10.2 c x 0.17 x 1000/91.44 = 18.96 m ³ /Batch	10.6 x 0.16 x 1000/91.44 = 18.55
	WL 19.47 x 1.1 = 21.419 c Water in chip = 5.600 c BL = 6.261 c Total = 33.28 c		WL 18.96 x 1.1 = 20.86 c Water in chip as 35% molec = 5.49 c BL (9.81 m ³) = 9.35 c Total = 35.70 c/Batch	WL 18.55 x 1.1 = 20.40 Water = 5.71 BL (11.52 m ³) = 10.99 Total = 37.100 c
11) BL solid as 100%	From chip 10.4 = 4.615 = 6.185 c From chemical 0.27/0.17 x 91.44 x 19.472 = 2.828 c Total = 8.613 c		From chip 10.2 = 4.59 = 5.610 c From chemical 0.27/0.17 x 91.44 x 18.96 = 2.754 c Total = 8.364 c/Batch	From chip 10.6 = 4.56 = 6.04 From chemical = 2.694 Total = 8.734 c/Batch
12) Blow out volume from Dig.	Chip 10.4 Water in chip 5.600 WL 21.418 BL 6.26 Evaporation Δ 5.0 Total = 38.678 c		Chip 10.2 Water in chip 5.49 WL 20.86 BL 9.35 Evaporation Δ 5.0 Total = 40.90 c	Chip 10.6 Water in chip 5.71 WL 20.40 BL 10.99 Evaporation Δ 5.0 Total = 42.70

Table 10-5-9 Comparison of Chemical Consumption

Description	Existing	Renovation	Diff.
1. Chemical recovery Ratio in pulp plant (%)	65.16	90.0	+25.0
2. Cooking			
Na ₂ SO ₄ (kg/BDt-BKP)	77.77	76.10	-1.67
Na ₂ S (kg/BDt-BKP)	60.50	0	-60.50
NaOH (kg/BDt-BKP)	111.65	18.50	-93.15
3. Bleaching			
Liq. Cl ₂ (kg/BDt-BKP)	59.05	55.0	-4.05
Ca-Hypo (kg/BDt-BKP)	38.08	40.0	+1.92
NaOH (kg/BDt-BKP)	25.56	25.0	-0.56
4. Paper machine case of HVS/HVO			
Size kg/ADt. paper	10 - 13	12	-
Alum kg/ADt. paper	36 - 45	30	-
Clay kg/ADt. paper	av. 160	160	-

Table 10-6-1 Comparison of Utility Consumption

1. Steam

Description	Existing	Renovation	Diff.
1. Pulp plant			
Cooking t/BDt-BKP	2.74	2.50	-0.24
Others t/BDt-BKP	4.48	4.48	0
Total	7.22	6.98	-0.24
2. Paper machine			
HVS. HVO	3.62	2.5	-1.12
Oil proof paper	-	3.0	+3.0
Base paper for laminate	-	3.0	+3.0
Form paper	-	3.0	+3.0

2. Fuel Oil Consumption in 1983

	Existing	After renovation
Main boiler:	12.57 t·steam/kl	12.57 t·steam/kl
Recovery boiler:	82.42 t·steam/kl	102.70 t·steam/kl
Total:	94.99 t·steam/kl	115.27 t·steam/kl

Note: BL. heat calories are not measured for steam generation.

3. Electric

Description	Existing	Renovation	Diff.
1. Pulp plant (kWh/BDt -BKP)	944.14	944.14	0
2. Paper machine (kWh/ADt. paper)			
HVS. HVO	820.06	890.30	+70.24
Oil proof paper	-	2,000.0	+2,000
Base paper for laminate	-	2,000.0	+2,000
Form paper	-	1,800.0	+1,800

Table 10-6-2 Comparison of Utility Consumption

Description	HVS	HVO	C.S.	Oil proof paper	Base paper for laminate	Form paper	Remarks
Steam	Typical figure base in JAPAN	2.5 - 3.0	2.5 - 3.0	2.8	2.8	2.8	
	Existing	Est 3.62	Est 3.62				
	Renovation	2.5	2.5	2.5	3.0	3.0	Dryer inlet moisture: 57%
Electric Paper machine + Stock prepar.	Typical figure base in JAPAN	775	775	775	1,580	1,400	BRPP = M/C 529.20 + 290.86 = 820.06 kWh
	Existing	820.06	820.06	820.06			(BRPP Reports revised)
	Renovation	890.30	890.30	840.30	2,000	1,800	Super calendar 50 kWh/ADt
Water as total	Typical figure base in JAPAN	200	200	200	250	250	
	Existing	416	416	416			
	Renovation	300	300	300	300	300	

Pulp Plant Steam Consumption

Description	Pulp Product. BDt-BKP/y	Pulp plant		t/BDt BKP
		Cooling	Others	
1983	8862.64	2.74 t/t	4.48 t/t	Total 7.22 t/t
Renovation	8426.0	24,284 t/y	39,708 t/y	63,992 t/y
		2.50 t/t	4.48 t/t	6.98 t/t
		21,065 t/y		59,804 t/y

* Reference: Paper machine steam consumption

1981: 123,482/12,702.28 x 0.4 = 3.89 t/ADt

1982: 127,096/12,595.44 x 0.4 = 4.04 t/ADt

1983: 106,661/11,786.94 x 0.4 = 3.62 t/ADt

1983 Sep. - 1984 Jan. = 3.1 t/ADt on reel

3.1/0.8385 = 3.7 t/ADt as Finished paper

* E - Mill: HVS 2.04 - 2.4 t/t steam,
420 + 370 = 790 kWh/ADt

F - Mill: HVS 2.7 t/t steam, 520 kWh/ADt + ?

N - Mill: G.P. 2.4 - 2.8 t/t steam,
420 + 600 = 1,020 kWh/ADt

Table 10-6-3 Utility Consumption in Dec. 1983

	Steam			Electric			Remark
	Op. day	t/Month	Unit in 1983 Dec	kWh/month	kWh/12 Month	Revised kWh/Y	
1. Pulping	-	-		9,825	(540.6 BDE-BDE/Y)	(8862.64 BDE-BDE/Y)	12.68 kWh/BDE - BDE
Wood preparation				40,993	153,490		51.46 kWh/BDE - BDE
Cooking	23	1,520	22.2	81,986	623,130		102.95 kWh/BDE - BDE
Washing				68,321	1,246,710		85.76 kWh/BDE - BDE
Bleaching					1,038,550		
Others							
Evaporator	21	807	11.8	19,186	298,736		24.67 kWh/BDE - BDE
Recirculating	22	516	7.5	24,255	438,900		36.24 kWh/BDE - BDE
Chemical (CAP)	28	31	0.5	587,360	7,633,755		630.38 kWh/BDE - BDE
Sub total		2,874	42.0	831,926	11,433,271	8,567,573	944.14 kWh/BDE - BDE
2. Paper machine							
Stock preparation	-	-	-	375,550	4,684,390		290.86 kWh/ADT
Paper machine	27	2,982	3.62	643,600	8,323,050		529.20 kWh/ADT
Sub total		2,982	43.6	1,019,150	13,207,440	9,665,998	820.06 kWh/ADT
3. Boiler							
Recovery boiler	21	712	10.4	53,721	836,461		-
Main boiler	26	278	4.0	23,023	358,483		-
		990	14.4	76,744	1,194,944	874,537.5	874.537.54 kWh/Y
4. Water		-	-	34,750	443,510	324,589.4	324,589.39 kWh/Y
5. Others		-	-	48,495	368,695	430,943.1	430,943.12 kWh/Y
Total		6,846	100	2,011,065	26,867,860	19,663,643	Actual elect. consumption

Table 10-7-1 Details of Improvement of Major Equipment

Item No.	Details of major equipment			Investment (1000 Rp)	Purpose	Improvement details	
	Plant	Equipment name	Quant'y Major specs.				
A	Wood preparation	1. Additional chip screen	1	1830 W x 3060 L	295,662	Quality improvement	<ol style="list-style-type: none"> One line of wood preparation should be added for separate transportation and storage of N-wood, L-wood and L-chips. As a result, N-wood and L-wood can be cooked separately, contributing to improving the pulp quality. The existing silo (300 m³) is used for N-chips only. Two new silos (180 m³ each) should be installed for self-made L-chips and purchased L-chips. Chips are delivered from each of these new silos by a motor with variable speed reducer and the quantity of chips from each silo is controlled to the optimum compounding ratio. The hole diameter of bottom screen plate of existing chip screen should be changed from plate of 5 to 6 mm dia. hole to remove more dust.
		2. Additional chip silo	2	180 m ³ x 2			
		3. Additional chip conveyor	3	Machine length: 100 m			
		4. Others	1				
B	Cooking	1. Improvement around WL line	1	1.5 m ³ /m x 25 m x 11 kW TICQ, EICA, TIC	171,304	Quality improvement	<ol style="list-style-type: none"> Installation of new WL pump and add. flow meter Replacement of a larger BL circulation pump and attachment of FI and TIC to the steam pipeline volume to stabilize cooking condition, the BL heater circulation pump is replaced and the BL temperature is controlled. Installation of one blow tank One blow tank should be additionally installed (one tank is existing). N-pulp and L-pulp that are individually cooked should be stored separately. The existing blow tank should be used for N-pulp and the new tank should be used for L-pulp.
		2. Improvement around BL heater	2	5.0 m ³ x 75 m x 30 kW, FI + TIC			
		3. Additional blow tank	1	150 m ³			

Item No.	Details of major equipment			Investment (1000 Rp)	Purpose	Improvement details
	Plant	Equipment name	Quantity			
C	Washer	1. Improvement of blow tank outlet line	1	1.1 m ³ x 20 m TICQ, CRC	Quality stabilization Higher chemical recovery rate (cost reduction) Stabilized operation (washer and evaporator)	<p>1. New increments of CRC and TICQ to the pipeline for both N and L-pulp for washer from the blow tanks should be separately attached to each pipeline. The pulp volume should be measured by TICQ and supplied to the washer as mixed pulp in a correct furnish combination.</p> <p>2. Washer replacement (3 units) The existing washers have a structural problem for pulp washing, as a result amount of chemical loss is large. Therefore, all three washers should be replaced to raise the chemical washing efficiency as well as reduce the chemical loss. The chemical recovery rate can be increased to 90% from existing 65 % ± 6%.</p> <p>3. Additional BL storage tank The existing digester operates on a batch system and BL for cooking is intermittently supplied to the digester. As a result, the filtrated BL tank level of washer is different each time, fully affecting the washing performance. A BL storage tank should be added to stabilize the washer operation. The black liquor for the evaporator and digester should be taken from the newly installed tank.</p>
		2. Washer replacement	3	2 m ³ x 2 m ³		
		3. Additional BL storage tank	1	70 m ³ LICA		
		4. Others				
D	Bleaching	1. Additional shower pipe to each filter	5	50A shower pipe	Quality stabilization Quality stabilization	<p>1. One more additional shower pipe to each filter.</p> <p>2. In the existing system, the Ca-hypo liquor is stored in a storage pit and taken out from this storage pit by pump. Therefore, fine impurities are always floating in the liquor. So, this pit</p>
		2. Modification of Ca-hypo storage pit	1	Modification of existing 50 m ³ concrete pit		

Item No.	Details of major equipment			Investment (1000 Rp)	Purpose	Improvement details	
	Plant	Equipment name	Quan'y Major specs.				
E	Stock preparation	3. Improvement around white liquor tank	1			<p>should be divided into two by concrete, to settle these impurities and to raise the clarity of liquor.</p> <p>1. The existing primary refiner (super-refiner) is an old type and it cuts fibre (lowering the paper property like tensile strength). Recently, this type of refiner is used at the after process for adjusting of the freeness.</p> <p>2. Therefore, two-DDRs should be installed as new type of refiners. The existing primary refiner should be used as the secondary stage refiner. (This improves the paper property and causes easy freeness control.)</p> <p>3. Refiner use method.</p> <p>2 DDR plus 2 Super-refiner for production of printing/writing paper</p> <p>2 DDR plus 2 Deluxe refiner for production of high add. value paper</p> <p>4. The feed pump for each chest should be replaced since the quantity of production has increased.</p> <p>1. The existing paper machine was installed 18 years ago to produce printing/writing paper only and the machine was not given any major modification during the period. The machine is obsolete, inefficient and lacks in the proper performance.</p>	
		1. Installation of DDR	2	20" type x 220 KW	173,913		Quality improvement
		2. Replacement of feed pumps for each chest	4				Production increase
		3. Installation of freeness tester	1				
7	Paper machine	1. Improvement of approach flow system		1. Fan pump (SUS) x 150 KW DC motor	1,501,304	Quality improvement	

Item No.	Details of major equipment			Investment (0,000 Rp)	Purpose	Improvement details
	Plant	Equipment name	Qty Major space			
	2.	Flow box replacement	2. High class air cushion type		Production increase	2. Therefore, all degraded parts in the paper machine should be replaced to increase the efficiency, and the paper machine improved to be capable of producing high add. value paper in addition to the existing products.
	3.	Wire part improvement	3. Wire roll drive and others		Efficiency improvement	3. Also the paper machine speed should be increased to gain income.
	4.	Press part replacement	4. High nip pressure type with suction pick up roll			4. The improvement details of major equipment are as follows.
	5.	Improvement of dryer drainage system	5. Change drainage siphon in dryer			4-1 Approach flow system The fan pump should be changed to a DC-motor drive system and the speck removal equipment reinforced.
	6.	Reel improvement	6. Modification of primary arm			4-2 Flow box replacement The flow box should be replaced by a high class type for operation of both existing grade and high add. value paper.
	7.	Sectional drive improvement	7. Modification of drive controller, chrysiator control instead of existing mechanical control type			4-3 Wire part modification The initial rewetring effect at the wire part should be improved. On the driving system, the wire roll should be set to main drive (new installation) and the couch roll set for helper driven, so that the wire part will endure the higher speed of operation.
						4-4 Press part replacement (all equipments) The press part should be replaced with a new type press including a pick-up roll (new part) to produce high add. value paper at a speed of 300 m ² /min.

Item No.	Details of major equipment		Investment (1000 Rp)	Purpose	Improvement details
	Equipment name	Quan'y Major specs.			
					<p>The moisture content of wet sheet at the dryer inlet should be improved to realize energy-saving (steam) effect. The existing moisture content at the dryer inlet is 64%, and this should be decreased to 57-58% to save steam. The unit consumption of steam can be reduced to 2.5 t/c from existing 3.62 t/c in the case of HVS. HVO.</p> <p>4-5 Dryer drainage system improvement</p> <p>The dryer drainage system should be improved to adapt itself to the higher speed. A central steam control panel should be newly installed.</p> <p>4-6 Pope reel improvement</p> <p>The existing gravity type pope reel should be changed to an air pressure type to uniform the roll winding tightness.</p> <p>4-7 Improvement of sectional drive system</p> <p>The existing control system is mechanical and has much deterioration. The system should be changed to an electrical (thyristor) system to be capable of controlling the higher speed. The existing speed of 230-240 m/min should be increased to 300 m/min.</p> <p>4-8 As a result of the quality improvement and equipment improvement, the total efficiency can be increased to 85% (HVS and HVO) from the existing 76.31%. The daily production can be increased to 44.75 ADe/d (HVS and HVO) from the existing 34.10 ADe/d.</p>

Item No.	Details of major equipment		Quantity	Major specs.	Investment (1000 Rp)	Purpose	Improvement details
	Plant	Equipment name					
C	Finishing equipment	Cutter machine replacement	1	Double rotary-cutter, 100 m/min of speed	317,891	Higher performance	1. The existing cutter machine has greatly dilapidated, causing frequent defective cutting misses and size errors, and these increase second quality goods. The cutter machine, therefore, should be replaced with a new one.
K	Finishing equipment	Rewinder replacement	1	1200 m/min. Shiftless type, Rewinder.	234,783	Higher performance	2. The existing rewinder has greatly dilapidated and the performance is poor, causing frequent improper winding. The rewinder, therefore, should be replaced with a new one.
				Total	552,174		
I	Finishing plant	Installation of super-calender	1	12-stage roll, max 700 m/min. of speed	1,782,609	Quality improvement	1. Since the quality is poorer than that of competitors' products, BPP cannot help selling their own printing/writing paper with lower prices. 2. Therefore, a supercalender should be newly installed to improve qualities such as glossiness and smoothness, thereby restoring the selling prices to the normal level. 3. A part of high add. value paper should be produced by the supercalender to get a higher selling price. 4. The grades to be produced through the supercalender: HVS and HVO Whole quantity Base paper 50% Form paper 50%

Item No.	Details of major equipment		Investment (1000 Rp)	Purpose	Improvement details
	Plant	Equipment name			
J	Recovery boiler	Electric precipitator dust discharge device	86,957	<ol style="list-style-type: none"> Higher chemical recovery rate Pollution control 	<ol style="list-style-type: none"> The existing recovery boiler has dilapidated much and since it is structured inadequately, troubles occur frequently. This dust discharge device operate at a rate of about 64% of the Correll operation (average of three months). Stoppage hours of this dust discharge device is about 129.5 hours a month. On the other hand, pulp production is 692 MT-RP/month. The estimated amount of dust (Na_2SO_4) that scatters into the atmosphere during this stopping time is about 9,200 kg/m ($9,000 - 9,500$ kg/m). Therefore, the existing bagga type conveyor should be removed and a spade type conveyor installed. As a result, about 8,300 kg/m of dust (Na_2SO_4) can be recovered and used again, reducing the cost of cooking chemicals. The amount of dust that scatters into the atmosphere can be reduced by about 70% or from 11,700 kg/m to 3,400 kg/m.

Table 10-9-1 Desirable Quality Control

Description	HVS 45 g/m ²	HVS 60 g/m ²	HVS 80 %	CS 70 g/m ²	HVO 60 g/m ²	HVO 80 g/m ²	HVS 50 g/m ²
Basis weight	45±1 g/m ²	60±1	80±1	70±1	60±1	80±1	50±1
Thickness	60±5 μ	75±5	110±10	140±10	75±5	110±10	65±5
Density	0.75±0.05 g/m ³	0.8±0.05	0.75±0.05	0.8±0.05	0.8±0.05	0.75±0.05	0.75±0.05
Brightness P	82±1 %	82±1	80±1	80±1	82±1	80±1	82±1
W	82±1 %	82±1	80±1	80±1	82±1	80±1	82±1
Opacity	75±1 %	85±1	90±1	90±1	85±1	90±1	80±1
Smoothness P	-	-	-	-	-	-	-
W	70±10 Sec	70±10	50±10	10	100±10	70±10	70±10
Ash content	7±1 %	10±1	10±1	9±1	12±1	12±1	7±1
Sizing degree	15±5 Sec	15±5	30±5	10±1	15±5	15±5	15±5
Picking	7±1 Δ	7±1	7±1	nove 2	7±1	7±1	7±1
Tensile MD	3.5 kg	4.0	5.5	4.5	3.8	5.0	3.5
CD	1.5 kg	1.8	3.0	1.8	1.5	2.5	1.5
Breaking MD	4.8 km	5.0	5.5	4.0	5.0	5.5	4.8
CD	1.8 km	2.0	2.5	2.0	1.8	2.0	1.8
Stiffness MD	30 cm ³ /100	40	80	-	35	70	30
CD	15 cm ³ /100	20	50	-	18	40	15
Moisture cont. %	7±0.5	7±0.5	7±0.5	7±0.5	7±0.5	7±0.5	7±0.5

Note: Brightness by Photovolt
 Smoothness by Bekk (after Super calendering)
 Stiffness by Clark

Table 10-10-1 Estimate Sales Price after Renovation

Paper	Actual production and sales price in 1983 (May - Dec.)				Estimate sales price after modification					Diff. as 10% up Rp/kg
					For finishing off. up					
	Q1	Q2	Q1 + Q2		Q1	Q2	Q1 + Q2	7% Up	10% Up	
RVS 45	ADt/y	889.72	90.32	980.05	950.38	29.67	980.05			
	Rp/kg	561.74	489.13	555.04			559.54	598.71	615.49	a
RVS 50	ADt/y	761.54	71.96	833.50	813.46	20.04	833.50			
	Rp/kg	634.90	539.11	626.63			632.60	676.88	695.86	
RVS 60	ADt/y	2,271.81	229.76	2,501.57	2,426.71	74.86	2,501.57			
	Rp/kg	578.41	505.33	571.70			576.22	616.56	633.84	
RVO 60	ADt/y	499.48	22.21	521.69	506.69	15.0	521.69			
	Rp/kg	535.41	527.70	535.08			535.19	572.65	588.71	
RVO/S 80	ADt/y	159.43	-	159.43						
	Rp/kg	598.36					598.36	640.25	658.20	
CS 70	ADt/y	616.23	-	616.23						
	Rp/kg	574.72					574.72	574.72	574.72	
Oil proof 42 paper	Rp/kg							1,060.0		
Base paper for laminate 40 - 50 g	Rp/kg							1,300.0		
Form paper 60 g	Rp/kg							1,400.0		

CHAPTER 11 TRAINING



1. 2. 3. 4. 5. 6. 7. 8. 9. 10.

11. 12. 13. 14. 15. 16. 17. 18. 19. 20.

CHAPTER 11 TRAINING

11-1 Purpose and Outline

11-1-1 BRPP has managed the plant operation excellently for many years and the operation technique of each department is at a fairly high level. Therefore, in this renovation project, we plan training of employees in departments (or control duties) which will most effectively contribute to increasing the BRPP income and departments which need new operation techniques such as supercalender and paper machine.

11-1-2 In the paper-pulp manufacturing industry, the most desirable situation is the use of equipment to the full extent of capacity, and to realize this, various control techniques must be exercised. Furthermore, these techniques must be adopted by the BRPP employees as a habit. For these reasons, we would like to have the training given in foreign countries, to ensure that the results of training both on the software and hardware are directly connected with increase of the BRPP income.

11-2 Overseas Training

11-2-1 Paper Making and General Control

(1) Objective departments and period

The number of persons to dispatch for overseas training is seven, with the period scheduled for 17 man-months. The seven persons consist of the following members.

- | | |
|---|--|
| 1) General plant management | 1 person \times 0.75 months = 0.75 man-months |
| 2) Production control | 1 person \times 3.0 months = 3.0 man-months
(including 6 weeks at AOTS) |
| 3) Quality control | 1 person \times 2.5 months = 2.5 man-months
(including 6 weeks at AOTS) |
| 4) Sales and market research
studying | 1 person \times 0.75 months = 0.75 man-months |
| 5) Maintenance control | 1 person \times 3.5 months = 3.5 man-months
(including 6 weeks at AOTS) |
| 6) Operation control and training
of papermaking | 1 person \times 3.5 months = 3.5 man-months
(including 6 weeks at AOTS) |

- 7) Training of supercalender operation 1 person × 3.0 months = 3.0 man-months

Total 17 man-months

(2) Training contents

- 1) General plant management
Methods of grasping the general situation of plant and practice of problem solving
- 2) Production control
Planning, checking and adjusting methods of production control
- 3) Quality control
Acquisition of quality control method
- 4) Sales and market research
Acquisition and application of control methods
- 5) Maintenance control
Practice and application of PM (Preventive Maintenance)
- 6) Operation control and training of papermaking
Operation control and high add. value paper production technique
- 7) Training of supercalender operation
Practice of supercalender operation control

(3) Training method

- 1) It is important that all trainees complete the Japanese language course before coming to Japan.
- 2) The trainees who are scheduled to receive the 6-week training course at ATOS are to be trained in a Japanese papermaking mill to further accumulate the knowledge and technique.

11-3 Training in Indonesia (Supercalender)

Operators of the supercalender should be training for operation for at least two months in a paper-making plant in Indonesia (for example, Gowa Mill).

11-4 Guidance on Operation and Operation Control

- 11-4-1 It is recommendable that BRPP receives aid from foreign engineers in order to execute this renovation project. The period of aid should be about three and half months from the stage of immediately before the trial operation up to checking of the production, quality and various consumption units.

11-4-2 Contents of Aid

- (1) Operation guidance and production capacity check
- (2) Setting and adjustment of quality
- (3) Discovery of problems on operation and equipment and countermeasures
- (4) Advice to market research and sales expansion

11-4-3 Engineers to Receive for Guidance

(1) Pulp plant	1 engineer × 3.0 months = 3.0 man-months
(2) Paper machine	1 engineer × 4.0 months = 4.0 man-months 1 engineer × 2.0 months = 2.0 man-months
(3) Supercalender	1 engineer × 2.0 months = 2.0 man-months
(4) Electricity and instrument	1 engineer × 1.0 month = 1.0 man-month
(5) Market research and sales expansion	1 person × 1.0 month = 1.0 man-month
(6) General management	1 person × 4.0 months = 4.0 man-months
Total	17.0 man-months

CHAPTER 12 IMPLEMENTATION OF RENOVATION PROJECT

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CHAPTER 12 IMPLEMENTATION OF RENOVATION PROJECT

12-1 General

We recommend that the overall plan for BRPP becoming constantly profit-making and contributing to the regional development is implemented divided into three stages of short-term, medium-term and long-term.

(1) Short-term plan

Items that were pointed out by the survey team during their stay in BRPP, and some of the items which are short for delivery of equipment described in this report can be implemented by a short-term plan. For example, modification around the digester, bleaching equipment and dust discharge device of precipitator fall in this category.

(2) Medium-term plan

This renovation project is implemented as one of the main projects of the fourth 5-year plan (1984 – 1988). The renovation work will start in 1985, and the whole work is to be completed in two years and two months.

(3) Long-term plan

Since BRPP has only one paper machine now, if any serious mechanical trouble occurs to it, BRPP cannot supply the products for a long time, which may result in alienation of large users and other serious cases. Accordingly, installation of an additional paper machine should be reviewed. If installation of the second paper machine is determined, the project is to be implemented during the fifth 5-year plan (1989 – 1993) in consideration of the fund procurement state, trend of the domestic market and state of the accumulated technical and selling abilities.

12-1-1 Since this renovation project is essentially a renovation of an existing plant, the management system that the plant already has should be utilized, and at the same time, a renovation plan execution team should be organized to pursue the project.

We think that this renovation plan execution team should consist of the following members:

- 1. Production departments (including production control)**
- 2. Engineering department**
- 3. Sales, purchase and warehouse departments**
- 4. Financial and personnel departments**

12-1-2 Another method for efficiently executing this renovation project is better cooperation with technical assistance of a foreign consultant or foreign papermaking companies.

12-2 Details of Control

1. Control and adjustment of production plan and working schedule of project
2. Designing and engineering works
3. Preparation of tender specification, tender evaluation, delivery period, inspection and witness, etc.
4. Control and adjustment of erection
5. Plans of trial operation and commercial operation
6. Control of training programs
7. Fund management
8. Control of machineries and materials in warehouse and handling
9. Labor control
10. Control on the safety and disaster prevention

12-3 Implementing Schedule

Table 12-3-1 shows the renovation project implementing schedule. The commercial operation of pulp plant and paper machine starts 24 months after beginning the project, the supercalender starts 26 months after the beginning.

The estimated stoppage time of pulp plant and paper machine for this renovation is about 60 days.

12-4 Fund

The total fund necessary for this project is as follows.

Total investment:	Rp11,030,434,000
Breakdown	
Foreign currency:	Rp7,552,174,000
Local currency:	Rp3,478,260,000

The details are shown in Tables 12-4-1 and 12-4-2.

12-5 Annual Investment Plan

(Unit: 1000Rp)

Year	Foreign currency	Rupiah	Total
-2 (1985)	2,395,651	552,695	2,948,346
-1 (1986)	5,095,653	2,690,695	7,786,348
1 (1987)	60,870	234,870	295,740
Total	7,552,174	3,478,260	11,030,434

Details are shown in Table 13-8-2.

12-6 Machinery and Equipment List

The machinery and equipment prepared by this renovation project are shown in Appendix 6.

12-7 Other Advice for Construction

12-7-1 Design of Machinery Foundation

- (1) Since the supercalender and winder operate at high speeds, vibration should not occur to them. Therefore, the design of these foundations should be better to be entrusted with consultant having the experience of designing such foundations.
- (2) The existing sole plate at paper machine should be utilized for the foundation plate of paper machine as much as possible.

12-7-2 Steel Construction Works

The major equipment in the pulp plant are belt conveyors, chip silos and tanks and there will be many steel structures to be manufactured and be installed at the site. In order to reduce the construction period at the site and to construct these structures accurately, it is recommended that the structural members are brought into the site with as much completed or half-manufactured goods as possible. Also, in order to avoid overlapping with the paper machine renovation works, manufacturing and erection of these structures should be started in advance.

Particular attention should be paid to the construction schedule of BL storage tank. It should be completed and ready before the shutdown for the renovation work so that BL can be stored in this tank and this BL used for smooth start-up after the renovation works.

12-7-3 Machineries

It is recommended that all machineries are brought into the site completed as much as possible.

12-7-4 Selection of Contractors

(1) Pulp plant

Many of the equipment at the pulp plant are made of mild steel and are tall facilities. Therefore, a contractor who has ample experience in working at high places, carrying heavy materials and mild steel welding must be selected.

(2) Paper machine

The winder and superealender must be installed very precisely. Therefore, a contractor who possesses necessary measuring tools and experience of precision measuring and installation technique must be selected.

Many stainless steel pipes are used for the piping. A contractor who has good experience in welding stainless steel pipes is preferable.

12-7-5 Transportation

A port that is as close to BRPP as possible, preferably Banyu Wangi West port in Indonesia, is desirable as the port to land machineries imported from abroad.

12-8 Training for Operation Start-up

(1) Pulp plant

BRPP has experience on all equipment that are newly installed or renovated in this project. Therefore, no special training is necessary for the operation start-up, so, the training should be given on the operation procedures and countermeasures to be taken in case of emergency.

(2) Paper machine

There is no special equipment on the paper machine except the press part. The press part is the modern equipment including a suction pick-up roll and the operation is conducted with a high nip pressure. Therefore, the operator must be trained with the actual machine prior to starting the operation.

(3) Supercalender

Operation of a supercalender is the first experience for BRPP. A fair amount of experience is needed to operate the supercalender since many cotton rolls and chilled rolls rotate at a high speed. Therefore, operators must be selected as early as possible and sent to an Indonesian paper mill which has a supercalender and a foreign company for training.

12-9 Personnel Plan



The supercalender is the only new equipment for BRPP. To operate it, 13 persons are necessary as shown below.

Foreman:	1 person
Operator:	$3 \text{ persons/shift} \times 4 \text{ shifts} = 12 \text{ persons}$
Total:	13 persons

On the other hand, on the wood preparation, the existing two shift system (40 persons) can be changed to daytime work only because of the improvement given to the wood preparation equipment.

Accordingly, the number of employees in the whole plant will remain the same.

Table 12-3-1 Renovation Project Schedule Plan

 Paper Machine & Pulp Plant
 Supercalendar

Description	Date																																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	
1. Consulting works																																			
a) Field survey for construction																																			
b) Preparation to tender spec.																																			
c) Call for tender																																			
d) Evaluation for quotation																																			
e) Signing suppliers																																			
f) Check & approval of drawing																																			
g) Inspection and witness																																			
h) Specification for erection																																			
i) Technical guidance of operation																																			
2. Construction works																																			
a) Design for machinery																																			
b) Manufacturing the above																																			
c) Shipping the above & material																																			
d) Erection & installation																																			
Pulp plant																																			
Paper machine																																			
Super calendar																																			
e) Design for civils & building																																			
f) Construction for civils & bid. works																																			
3. Operation works																																			
a) Training operators																																			
b) No load running																																			
c) Test running																																			
d) Operation for paper machine																																			
Operation for supercalendar																																			

Table 12-4-1. Budgetary Price & Break down for BRPP Renovation Project

No.	Description	Ratio Z	Budgetary price (1000 RP)			Break down price (1000 RP)							
			FOB Japan	Local supply	Total amount	Equipment	Aux'y	Erect. piping	Civil works	Instrument	Electric		
	(Pulp plant)												
A	Wood preparation		250,000	45,652	295,652	240,000	0	21,304	16,087 + 3,043	0	15,218		
B	Cooking		121,739	49,565	171,304	71,739	0	17,391	26,522	37,826	17,826		
C	Washing		288,043	49,783	337,826	246,304	0	29,783	14,783	30,435	16,521		
D	Bleaching		24,348	4,348	28,696	8,261	0	870	2,174	17,391	0		
	Sub total		684,130	149,348	833,478	566,304	0	69,348	59,566 + 3,043	85,652	49,565		
	(Paper machine)												
E	Stock preparation		157,391	16,522	173,913	88,696	4,348	10,870	1,739	0	68,260		
F	Paper machine		1,410,870	90,435	1,501,305	1,100,435	0	59,565	9,130	67,826	264,348		
G	Cutter machine		313,043	4,348	317,391	305,218	0	3,043	435	0	8,696		
H	Revider		223,113	10,869	234,782	197,826	0	4,348	4,348	0	28,261		
I	Supercalender		1,600,000	182,609	1,782,609	1,308,696	0	73,913	47,826 + 43,478	0	308,696		
	Sub total		3,705,217	304,783	4,010,000	3,000,870	4,348	151,739	63,418 + 43,478	67,826	678,261		
	(Recovery boiler)												
J	Dust precipitator		82,609	4,348	86,957	82,608	0	1,305	3,044	0	0		
K	Spare parts for new equi.		230,435	0	230,435	230,435	0	0	0	0	0		
L	Spare parts for existing		773,913	0	773,913	504,348	0	0	0	191,304	78,261		
M	Start up expense (wire cloth, felt etc.)		86,937	0	86,937	86,937	0	0	0	0	0		
	Total		5,563,261	458,479	6,021,740	4,471,522	4,348	223,392	216,087 + 46,521	344,782 (incl. FOB 333,913)	806,087 (incl. FOB 753,478)		

Table 12-4-2 Total Funds Required (Excluding Interest Rate during Construction)

No.	Item	Condition	Amount (Rp)	Duty (Rp)		1st year		2nd year		3rd year	
				Foreign	Local	Foreign	Local	Foreign	Local	Foreign	Local
A	Equipment cost										
	-1 FOB price		5,593,261								
	-2 CIF charge	6% of FOB price	333,796	278,165	55,631						
	-3 CIF price		5,897,057	5,841,426	1,765,652	3,479	4,075,774	52,152	737,130		
	-4 Import tax duties	12.5% of CIF price	737,130	-	737,130		0	0	206,391		
B	-4 Inland transportation	3-5% incl. insurance	206,391	-	206,391						
	-5 Spare parts										
	Import price		6,840,578	5,841,426	1,765,652	3,479	4,075,774	995,674			
	Engineering fee										
	-1 Field sketch	Engineering cost 5 M.M	44,783	44,783	44,783	-	-	-	-	-	-
C	-2 Design & drawing work*	Daily allowance & air fare	15,217	15,217	15,217	-	-	-	-	-	-
	-3 Tender evaluation	25 M.M	217,392	217,392	217,392	-	-	-	-	-	-
	-4 Inspection & report	8 M.M	69,565	69,565	69,565	-	-	-	-	-	-
	-5 Documentation	2 M.M	17,391	17,391	17,391	-	-	-	-	-	-
	engineering fee	Manual, report etc.	39,130	39,130	39,130	-	-	-	-	-	-
D	Construction works		403,478	403,478	403,478	-	-	-	-	-	-
	-1 Local works	Incl. local construction & erection, piping	222,391	222,391	222,391	0	88,956	0	133,435		
	-2 Civil & bldg. works	Incl. foundation	172,609	172,609	172,609	0	57,535	0	115,074		
	-3 Instrument works	Incl. piping/wiring	10,870	10,870	10,870	0	0	0	10,870		
	-5 Field supervision	Incl. wiring works	52,609	52,609	52,609	0	0	0	52,609		
E	Operation supervision	For pulp plant 19.0 M.M	226,087	226,087	226,087	-	-	-	-	-	-
		For paper machine 7.5 M.M									
		For super calender 2.5 M.M									
		Engineering cost 16 M.M	684,566	226,087	458,479	0	146,491	226,087	311,987		
		Daily allowance & air fare	143,409	143,409	-	-	-	-	-	-	-
F	Training fee		37,161	37,161	37,161	-	-	-	-	-	-
	Total A-E		180,570	180,570	180,570	-	-	-	-	-	-
	Over head	Expense for trainee	260,669	221,739	39,130	-	-	-	-	-	-
		Table (A-E) x 4%	8,370,061	6,873,300	1,496,761	2,169,130	149,970	4,643,300	1,346,791	60,870	
	Contingency	Table (A-E) x 8%	340,409	226,287	114,122	75,504	38,413	150,783	75,709		
G	Grand total		9,391,304	7,552,174	1,839,130	2,375,651	265,217	5,095,653	1,573,913	60,870	

CHAPTER 13 FINANCIAL EVALUATION

1. *Phragmites australis* (Common Reed)
2. *Scirpus americanus* (Sedges)
3. *Cyperus tenuiflorus* (Sedges)
4. *Eleocharis acicularis* (Sedges)
5. *Eleocharis obtusa* (Sedges)
6. *Eleocharis palustris* (Sedges)
7. *Eleocharis acicularis* (Sedges)
8. *Eleocharis obtusa* (Sedges)
9. *Eleocharis palustris* (Sedges)
10. *Eleocharis acicularis* (Sedges)
11. *Eleocharis obtusa* (Sedges)
12. *Eleocharis palustris* (Sedges)
13. *Eleocharis acicularis* (Sedges)
14. *Eleocharis obtusa* (Sedges)
15. *Eleocharis palustris* (Sedges)
16. *Eleocharis acicularis* (Sedges)
17. *Eleocharis obtusa* (Sedges)
18. *Eleocharis palustris* (Sedges)
19. *Eleocharis acicularis* (Sedges)
20. *Eleocharis obtusa* (Sedges)
21. *Eleocharis palustris* (Sedges)
22. *Eleocharis acicularis* (Sedges)
23. *Eleocharis obtusa* (Sedges)
24. *Eleocharis palustris* (Sedges)
25. *Eleocharis acicularis* (Sedges)
26. *Eleocharis obtusa* (Sedges)
27. *Eleocharis palustris* (Sedges)
28. *Eleocharis acicularis* (Sedges)
29. *Eleocharis obtusa* (Sedges)
30. *Eleocharis palustris* (Sedges)
31. *Eleocharis acicularis* (Sedges)
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34. *Eleocharis acicularis* (Sedges)
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38. *Eleocharis obtusa* (Sedges)
39. *Eleocharis palustris* (Sedges)
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41. *Eleocharis obtusa* (Sedges)
42. *Eleocharis palustris* (Sedges)
43. *Eleocharis acicularis* (Sedges)
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77. *Eleocharis obtusa* (Sedges)
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81. *Eleocharis palustris* (Sedges)
82. *Eleocharis acicularis* (Sedges)
83. *Eleocharis obtusa* (Sedges)
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86. *Eleocharis obtusa* (Sedges)
87. *Eleocharis palustris* (Sedges)
88. *Eleocharis acicularis* (Sedges)
89. *Eleocharis obtusa* (Sedges)
90. *Eleocharis palustris* (Sedges)
91. *Eleocharis acicularis* (Sedges)
92. *Eleocharis obtusa* (Sedges)
93. *Eleocharis palustris* (Sedges)
94. *Eleocharis acicularis* (Sedges)
95. *Eleocharis obtusa* (Sedges)
96. *Eleocharis palustris* (Sedges)
97. *Eleocharis acicularis* (Sedges)
98. *Eleocharis obtusa* (Sedges)
99. *Eleocharis palustris* (Sedges)
100. *Eleocharis acicularis* (Sedges)

CHAPTER 13 FINANCIAL EVALUATION

13-1 Basic Policy

It is difficult to determine the effectiveness of new investments themselves at the time of carrying out renovations on the existing mill as the effectiveness of the past investments on the existing facilities and the new investments intertwine.

Therefore, the following evaluation was carried out as it concerns the renovation plan.

- (1) In the case of the renovation plan not being carried out on the existing mill; a study was carried out on the profit and loss prospects for the existing mill.
- (2) The profit and loss prospects (annual) were sought in the case of the renovation plan being carried out on the existing plant and a comparison made with the profit and loss prospects in the case of not carrying out the renovation plan.
- (3) In order to determine the effectiveness of the renovation plan, the internal ratio of return on investment (the I.R.R.O.I.) and the payout period required for (recovering) the invested capital has been sought by considering the difference in the profit and loss in the case the renovation plan is carried out and when not carried out, as the profit of the renovation plan.
- (4) In order to determine the financial situation for the mill as a whole in the case of carrying out the renovation plan, a study was made on the profit and loss for the existing as a whole.
- (5) For this financial analysis, data submitted by the mill, the actual figures for 1983 were used as the basic figures.

The starting year of the evaluation has been set at 1985 while the fiscal year shall be the fiscal accounting year of the mill (January – December).

- (6) All the prices used for the evaluation have been fixed at the 1983 actual prices.

That is, rises in selling revenues, as well as rises in all costs, have not been taken into account.

- (7) There is the tendency to regard the renovation plan as being only an improvement of the equipments.

However, we wish to stress that the renovation plan has another phase just as important as an improvement of the equipments, namely, strengthening of the management and employee educational training.

(8) Exchange rate of this report is as follow:

US\$1 = Rp1,000, US\$1 = ¥230

13-2 Production and Sales Plan

13-2-1 Conditions

- (1) The production volume and sales volume have been taken as equal with no increase or decrease in the inventory volume.
- (2) The annual operation days are set unchanged in principle existing condition.
- (3) The number of days of operation was calculated by production items and the total of these was taken as the total number of days of operation for the year.
- (4) For the daily production volume by grades in the case the renovation plan is carried out, the anticipated increase in the daily production through speedup and the anticipated increase in daily production through various efficiency improvements have been added to the daily production by grades in the case the renovation plan is not carried out.
- (5) The annual production and sales volume by grades, as concerns the existing grades, shall in principle be the same in the case of carrying out the renovation plan as in the case of not carrying out the renovation plan.
- (6) In the case of carrying out the renovation plan, number of days for production has been increased and the surplus operation days will be to produce the new saleable and profitable grade papers.
- (7) As concerns those items having extremely low profitability, the number of days required for production has been reduced and the time saved is planned for production of items which can be sold with a good profit, as well as new items with sales possibilities.

13-2-2 Production and Sales Plan

The production and sales plan in the case renovation is carried out and when not carried out is shown in Table 13-2-1.

13-3 Daily Production by Grades

13-3-1 Method for Deciding the Daily Production by Item

The daily production of a certain grade is decided by the theoretical daily production and the total efficiency.

Further to say, the total efficiency is decided by the operation efficiency, the sheet-making efficiency, and the finishing yield. This relationship will be shown by the following formula:

Theoretical daily production = Basis weight x machine speed x paper making width
x 1,440

Daily production = theoretical daily production x total efficiency.

Total efficiency = Operating efficiency x Reeling efficiency x finishing yield

Operating efficiency = $\frac{\text{Available operation days} - \text{stoppage by cause of maintenance}}{\text{Available operation days}}$

Finishing yield = Volume of finished production ÷ Volume production on reel

13-3-2 The Total Efficiency, Operating Efficiency, Reeling Efficiency, and Finishing Yield in the Case of not Carrying out the Renovation Plan:

The total efficiency and the other efficiency factors in the case of not carrying out the renovation plan have been set up with consideration paid to the figures for 1983, as well as the actual data obtained during our stay at the mill to conduct a survey on the mill.

Table 13-2-1 Sales Plan

Kinds	Present			Improved			Increase/ Decrease	Remarks
	Days	Daily production	Sales	Days	Daily production	Sales		
(Existing kinds)	day	t/day	t	day	t/day	t	t	
HVS 45g	41	27.76	1,138.16	29	35.00	1,015	- 123.16	
HVS 50g	66	31.00	2,046.00	105	41.00	4,305	2,259	
HVS 60g	144	36.64	5,276.16	61	50.00	3,050	- 2,226.16	
HVO 60g	45	36.54	1,644.30	34	50.00	1,700	55.70	
HVS/O 80g	12	33.87	406.44	8	50.00	400	- 6.44	
CS 70g	37	34.58	1,279.46	26	50.00	1,300	20.54	
Sub. Total	345	34.18	11,790.52	263	44.75	11,770	- 20.52	
(New Kinds)								
Oil Proof Paper 42g	-	-	-	25	16.00	400	400	
Base Paper Laminato 45g	-	-	-	25	25.00	625	625	
Form Paper 60g	-	-	-	29	50.00	1,450	1,450	
Sub. Total	-	-	-	79	31.33	2,475	2,475	
Total	345	34.18	11,790.52	342	41.65	14,245	2,454.48	

13-3-3 The Total Efficiency, Operating Efficiency, Reeling Efficiency, and Finishing Yield in the Case of Carrying out the Renovation Plan:

For determining the said various factors, the average figures prevailing in Japan have been taken into consideration.

It is of course only natural but this cannot be automatically attained simply by improving the equipment but can be attained finally through the strengthening of operational and managerial controls.

13-3-4 Daily Production, Total Efficiency, Operating Efficiency, Reeling Efficiency, and Finishing Yield:

The daily production, total efficiency, operating efficiency, reeling efficiency, and finishing yield in the case the renovation plan is carried out and in the case the renovation plan is not carried out are shown in Table 13-3-1.

13-4 Annual Operating Profits by Grades Produced

13-4-1 Outline of the Operating Profits

(1) We have introduced the concept of operating profit for determining advantageous products and disadvantageous products, as well as for calculating increases in profit in the case of increased production, and for calculating increases in profit in the case the production cost is lowered through improvements in the various yields and efficiencies, and for calculating increases in profit in the case of producing new items.

(2) By per kg operating profit is meant the figure after the total variable cost required for producing 1 kg is deducted from the sales price per kg.

Operating profit per kg = Product sales price per kg - variable cost per kg

Product cost per kg = Variable cost per kg + fixed cost per kg

Table 13-3-1 List of Daily Production and Efficiencies

Kode	Basa Weight	Trim width	Operation speed (m/min)		Operation efficiency (%)		Kecuaan efficiency (%)		Finish yield (%)		Total efficiency (%)	
			Present	Improved	Present	Improved	Present	Improved	Present	Improved	Present	Improved
	m/m ²	mm										
MVS	45	2,300	244.10	243	91.71	96.24	97.69	98.00	85.17	88.00	76.31	83.00
MVS	50	2,300	236.07	240	91.71	96.88	97.69	99.00	85.17	88.00	76.31	85.00
MVS	60	2,300	232.42	245	91.71	96.88	97.69	99.00	85.17	88.00	76.31	85.00
MVO	60	2,300	231.49	245	91.71	96.88	97.69	99.00	85.17	88.00	76.31	85.00
MVNO	80	2,400	160.54	213	91.71	96.88	97.69	99.00	85.17	88.00	76.31	85.00
CS	70	2,445	183.87	240	91.71	95.74	97.69	94.00	85.17	88.00	76.31	84.00
Oil Proof Paper	42	2,400	-	140	-	92.76	-	98.00	-	88.00	-	80.00
Base Paper Laminate	45	2,400	-	200	-	92.76	-	98.00	-	88.00	-	80.00
Form Paper	60	2,400	-	214	-	96.88	-	99.00	-	88.00	-	85.00

Theoretical production	Production on reel		Production finished		Yield		Yield of pump (%)	Yield of day (%)	(Note)
	Present	Improved	Present	Improved	Present	Improved			
t/day	t/day	t/day	t/day	t/day	%	%			Yield: value of complete drying base Moisture in paper %
36.38	42.18	39.77	27.76	35	95	60			
40.92	48.18	46.26	31.00	41	95	60			
44.01	54.85	56.42	36.64	50	95	60			
47.88	58.85	58.42	36.56	50	95	60			
44.39	54.89	56.42	33.87	50	95	60			
43.32	59.15	56.42	34.58	50	95	60			
-	20.32	-	-	16	95	60			
-	31.10	-	-	25	95	60			
-	58.89	-	-	50	95	60			

That is, the operating profit per kg for a certain product is the gross profit at the time 1 kg of a certain product is produced and sold in the case that the fixed costs are not considered.

- (3) Operating profit per daily operation is meant by the operating profit in the case of sales for one day.

Operating profit per day = Operating profit per kg \times daily production

Operating profit per day = (Selling price per kg - variable cost per kg) \times daily production

- (4) Therefore, by comparing the daily operating profit of a certain product and the fixed costs per day (in principle, this is fixed with no relationship to the kind of product) it will be possible to determine whether a certain product has profitability when viewed from the total cost.

Operating profit per day $>$ Fixed costs per day = There is a profit

Operating profit per day $<$ Fixed costs per day = There is no profit

13-4-2 Factors that Influence the Variable Cost per kg of Paper

As the factors that influence the variable cost per kg we have considered the following for producing and selling 1 kg of the paper.

Pulp cost (Unit price \times quantity)

Filler clay and chemicals (Unit price \times quantity)

Steam, electricity (Unit price \times quantity)

Sales expenses (Unit price \times quantity)

Total yield

13-4-3 Production Cost of Self-made Pulp

The per kg production cost of self-made pulp was calculated on the basis of variable cost. The following factors have been considered as concerning the factors influencing the variable cost.

The pulpwood cost, the daily production, the pulp yield, the bleaching yield, the chemicals cost, the fixed costs of the pulp section, and the variable cost for self-made pulp production in the case of carrying out the renovation plan and in the case of not carrying out the renovation plan are shown in Table 13-4-1.

Table 13-4-1 Production Cost of Self-made Bleached Pulp

Items	Present	Improved	Contents of Improvement	Remarks
Production	1,000 BD kg	1,000 BD kg	-	
Yield	37.41%	40.41%	RP/t	Improvement of yield
Wood cost	2,873 t/pulp BDt x @ 39,956 RP/t = 106,402 RP/t	2,475 t/pulp BDt x @ 39,956 RP/t = 98,491 RP/t	0.194 t/pulp	Improvement of unit consumption of pulp wood
Chemical costs				
Na ₂ SO ₄	77.77 kg/pulp BDt x @ 337.43 RP/kg = 26,273	76.10 kg/pulp BDt x @ 337.43 RP/kg = 25,709	1.67 kg/pulp	
Na ₂ S	60.50 kg/pulp BDt x @ 320.64 RP/kg = 19,399	0 kg/pulp BDt x @ 320.64 RP/kg = -	60.50 kg/pulp	
NaOH	111.65 kg/pulp BDt x @ 136.03 RP/kg = 15,184	14.50 kg/pulp BDt x @ 136.03 RP/kg = 2,516	93.15 kg/pulp	
	Sub total of cooking chemical cost 60,460	28,225	32,235 RP/BDt pulp	
Liq Cl ₂	59.05 kg/pulp BDt x @ 369.65 RP/kg = 21,824	55.0 kg/pulp BDt x @ 369.65 RP/kg = 20,331	4.05 kg/pulp	
Ca-Hypo	34.05 kg/pulp BDt x @ 362.94 RP/kg = 12,403	40.0 kg/pulp BDt x @ 362.94 RP/kg = 14,514	- 1.97 kg/pulp	
NaOH	25.56 kg/pulp BDt x @ 136.03 RP/kg = 3,477	25.0 kg/pulp BDt x @ 136.03 RP/kg = 3,400	0.56 kg/pulp	
Dimesol	1.24 kg/pulp BDt x @ 103.57 RP/kg = 124	1.24 kg/pulp BDt x @ 103.57 RP/kg = 124	-	
	Sub total of bleaching chemical cost 39,236	38,577	659 RP/BDt pulp	
	Total of chemical cost 100,096	66,692	33,404 RP/BDt pulp	
Steam cost	Cooking 2.74 t/pulp BDt x @ 6,400.24 RP/t = 46,643 Others 4.44 t/pulp BDt	Cooking 2.50 t/pulp BDt x @ 6,040.33 RP/t = 42,104 Others 4.44 t/pulp BDt	0.24 t/pulp t @ 419.61 RP/steam	Saving of heavy oil for recovery boiler
Power cost	1.124 kWh/pulp BDt x @ 46,14 RP/kWh = 52,046	1,154.07 kWh/pulp BDt x @ 46.14 RP/kWh = 53,249	- 26.07 kWh/pulp	Increase of power
Total	305,547	260,906	44,641 RP/BDt pulp	
Pulp cost/kg	305.55 RP/BDt kg	260.91 RP/BDt kg	44.64 RP/kg	

The effectiveness of the cost reductions in the production of self-made pulp has been reflected in the unit price of pulp used in the case the operating profit is calculated.

13-4-4 Steam Cost after Renovation of the Boiler

At present BRPP has two boilers, one is a power boiler and other one is a recovery boiler. Required steam generation needed for after renovation is about 313.51/day (max. 338.51/day). On other hand, steam generation capacity of both boilers is 3841/d. So, capacity of existing boiler is enough. Steam cost used 6,460.24Rp/t. steam as base on actual figures of 1983.

13-4-5 Operating Profit by Grades Produced

The per kg operating profit by grades produced, in the case the renovation plan is carried out and in the case the renovation plan is not carried out, are shown in Table 13-4-2.

13-4-6 Annual Operating Profit

The annual operating profit in the case the renovation plan is carried out and in the case the renovation plan is not carried out has been calculated by combining the production and sales plan of Table 13-2-1 with the daily operating profit by grades produced in Table 13-4-2.

This is shown in Table 13-4-2.

The difference in the case the renovation is carried out and in the case renovation is not carried out is:

In the case of BRPP.....Rp2,620,947,000

These figures represent the increase in the profit arising through the improvements made to each factor mentioned in 13-3-2 through the carrying out of the renovation plan considering that there will be no change in the fixed costs.

These figures include the portion of an increased operating profit owing to a certain recovery in the sales prices. The effect of the price recovery is stated in the next paragraph.

Table 13-4-2 Operation Profit for Every Grade of Paper

Kinds	Present								
	Daily production	Days	Sales (Production)	Sales		Variable cost		Operation profit	
				each kg	Amount	each kg	Amount	each kg	Amount
	1/day	day	1	RP/kg	1000 RP	RP/kg	1000 RP	RP/kg	1000 RP
HVS	45g	41	1,138.16	555.04	631,724	372.97	424,434	182.87	207,290
HVS	52g	66	2,045.00	626.83	1,292,055	311.51	769,123	255.11	521,932
HVS	67g	144	5,276.16	571.20	3,016,381	363.80	1,915,472	207.90	1,098,909
HVO	65g	45	1,644.30	535.08	879,832	361.86	595,819	173.22	284,012
HVS/O	85g	12	426.44	528.36	243,197	353.73	143,769	244.63	99,428
CS	70g	37	1,278.65	574.72	735,331	355.08	454,314	219.64	281,017
Total	34.18	345	11,290.52	525.76	6,788,550	364.66	4,292,182	211.30	2,491,368
Oil Proof Paper 42g									
Base Paper Laminated 45g									
Form Paper 67g									
Total									
Grand total	34.18	345	11,290.52	525.76	6,788,550	364.66	4,292,182	211.30	2,491,368

Expected								
Daily production	Days	Sales (Production)	Sales		Variable cost		Operation profit	
			each kg	Amount	each kg	Amount	each kg	Amount
1/day	day	1	RP/kg	1000 RP	RP/kg	1000 RP	RP/kg	1000 RP
15.00	29	1,015	598.71	607,691	328.90	335,833	269.81	271,858
41.00	155	4,395	626.83	2,743,338	329.85	1,416,545	347.83	1,497,423
54.00	61	3,856	616.56	2,380,568	341.81	1,322,530	274.75	831,978
50.00	34	1,700	572.65	973,505	341.81	581,650	230.84	392,425
50.00	8	430	649.25	280,120	343.83	156,330	299.45	119,780
50.00	26	1,350	574.72	775,838	349.12	472,155	234.60	304,581
44.75	263	11,778	626.93	7,376,908	355.81	4,192,463	291.12	3,026,445
16.00	15	430	9,060	426,000	703.04	281,216	356.96	142,784
25.00	25	625	1,300	872,500	651.64	376,825	698.36	436,475
50.00	29	1,450	1,820	2,639,000	626.82	923,389	743.88	1,126,411
31.33	79	2,435	1,319.80	3,266,500	638.64	1,543,630	611.16	1,655,870
43.65	392	14,245	747.31	10,645,424	364.42	5,193,693	354.89	5,112,315

13-5 Other Items Contributing to Increased or Decreased Profits

13-5-1 Profit Accruing from Price Recovery

As mentioned in Chapter 3, due to the fact that the product quality is not uniform in the present situation and is inferior when compared to that of other companies, the sales price is lower by 10–20% than the other companies in terms of equivalent grades.

In the case the renovation plan is carried out, as described in detail in Chapter 6 the product quality will not only become stabilized but the product will also be improved to the point where there is little difference from that of similar products of other companies and thus the sales price can be restored. It is assessed that the price restoration will at least be about 3% (in the case of PPM) and 7% (in the case of BRPP).

13-5-2 Loss Due to Reduced Production During the Period of Renovation Work

- (1) In the case the renovation plan is carried out, the production will be stopped temporarily for the improvement project and the production will be temporarily suspended, or slowed down. Therefore, the production quantity will decrease and there will be a loss in income. This is referred to as loss due to reduced production.

In this plan, such a loss will be held down as far as possible with consideration paid to the following conditions.

- a. The stoppage will be carried out during the season of stagnant demand.
- b. Production of grades with poor profitability will be reduced.
- c. Profitable grades and regular items (products that are supplied on a regular basis to certain customers) will be produced in volume prior to the stoppage taking into consideration the volume that cannot be produced due to the temporary stoppage, and these will be stored.
- d. The assistance of engineers with ripe experience in such improvement projects as this will be sought from foreign paper companies and the stoppage period should be shortened as much as possible.

- (2) Number of days for shutdown required for renovation work

BRPP: 60 days

13-6 Other Matters to be Taken into Consideration in the Process of Calculating Year-to-Year Operating Profit

13-6-1 The Loss Due to Reduced Production

On the basis of the number of days for shutdown stated in paragraph 13-5-2, the loss due to reduced production is calculated as follows:

	BRPP
-1st year	Rp415,228

13-6-2 Rate of Achieving Operating

	BRPP
1st year	50%
2nd year	80%
3rd year	100%

13-6-3 Total Amount of Increased Operating Profit

Unit: Rp 1000

	BRPP
At present	Rp2,491,368
After renovation (100% operation ratio)	Rp5,112,315
Increment	Rp2,620,947

13-7 Fixed Costs

13-7-1 Basic Conditions

- (1) The fixed costs in the case of not carrying out the renovation plan, i.e. the present fixed costs, are all based on the actual data for 1983.

- (2) In order to lower the production cost for certain products and to strengthen the market competitive power, the improvement of labor productivity is important. In particular, this is indispensable in the case of BRPP which has a low labor productivity. However, in this plan, in order to attain the mission of BRPP to stabilize employment and to contribute to the development of the local area, the total personnel cost has been fixed, rather than to introduce an idea to rationalize the labor force.

On the other hand, in the case the renovation plan is carried out, a certain amount of new equipment will be added. A certain amount of increased production, and a certain degree of intensified control of operations will call for an increased number of operators in some of the sections. Then, personal rotation from section to section should be carried out without increasing the total number of employees. In this way, the total personnel costs for the mill as a whole has been fixed.

- (3) An increase in the fixed cost in the case of carrying out the renovation plan is expected due to the total capital required for the renovation plan.

13-8 Total Funds Required

The total funds required shall comprise the funds required for carrying out the project within the scope stated in Chapter 11 "Renovation Plan Execution" and expenses for the consulting services and training, the initial working capital and the costs (interests) required for capital procurement during the period of the execution of the plan, and has been calculated based on the execution processes of Chapter 11. The details are shown in Table 13-8-1.

Also, the investment schedule by year for the renovation plan is shown in Table 13-8-2.

**Table 13-8-1 Total Funds Required
(Exclude Interest during Construction)**

Unit: Rp1000

		BRPP
(A)	Equipment cost	6,840,578
(B)	Engineering fee	463,478
(C)	Construction work	684,566
(D)	Operation supervision	180,570
(E)	Training fee	260,869
(F)	Overhead	340,409
(G)	Contingency	680,834
	Total	9,391,304
(H)	Interest payable during renovation	1,186,434
(I)	Repayment	217,826
(J)	Initial working capital	234,870
	Grand total	Rp 11,030,434

13-8-1 Plant Cost

(1) Equipment & machinery

This cost covers all the equipment and machinery purchased from abroad for the renovation plan.

Equipment and machinery that can be purchased within Indonesia will wherever possible be purchased in Indonesia. The imported equipment and machinery shall be on a FOB price basis.

(2) Ocean freight and marine insurance

This cost includes the ocean freight and marine insurance for the imported equipment and machinery, as well as materials provided by suppliers.

(3) Custom duties and import charges

This cost is for custom duties (10%) and import charges (2.5%) for the imported items. It is strongly desired that in view of the purpose of this renovation the custom duties (10%) be exempted.

(4) Inland transportation cost

This cost covers the transportation of the equipment and machinery, as well as the materials, within Indonesia.

13-8-2 Construction Work Cost

(1) Locally procured equipments

This cost covers the arrival price of the equipments and materials procured within the country at the mill.

(2) Civil and building works

This cost covers the costs required for the civil works, the foundation works, and other concrete works and building works, as well as the equipments and materials costs required for the above works.

(3) Installation cost

This cost covers the local costs such as the transportation, storage, and installation and assembly, etc. of the equipments arriving at the mill, as well as the equipments, machinery and materials costs required for the local work.

13-8-3 Pre-operation Cost

This cost covers the following cost required during the execution of the renovation plan.

(1) Operators training

(2) Field survey, such as sketching, and designing work for carrying out this plan.

(3) Bidding procedures and tender evaluation.

(4) Management and supervision on the execution of the project.

Table 13-8-2 Plan of Total Funds Required

(Unit: 1000 Pp)

No.	Item	- 2 (1985)		- 1 (1986)		1 (1987)		Total		Grand total	Remarks
		Foreign	Local	Foreign	Local	Foreign	Local	Foreign	Local		
A	Equipment Cost										
1.2	CIF Price	1,765,652	3,479	4,075,774	52,152	0	0	5,841,426	55,631	5,897,057	
3	Import Taxes and Dutys	0	0	0	737,130	0	0	0	737,130	737,130	
4	Inland Transportation (Spares parts)	0	0	0	206,391	0	0	0	206,391	206,391	
	Sub total	1,765,652	3,479	4,075,774	985,674	0	0	(1,004,348) 5,841,426	999,152	(1,004,348) 6,840,578	
B	Engineering Fee	403,478	0	0	0	0	0	403,478	0	403,478	
C	Construction Works										
1	Local Works	0	88,956	0	113,435	0	0	0	222,391	222,391	
2	Civil & Bldg. Works	0	57,535	0	115,074	0	0	0	172,609	172,609	
3	Instrument Works	0	0	0	10,870	0	0	0	10,870	10,870	
4	Electric Works	0	0	0	52,609	0	0	0	52,609	52,609	
5	Field Supervision	0	0	226,087	0	0	0	226,087	0	226,087	
	Sub total	0	146,491	226,087	311,987	0	0	226,087	458,479	684,566	
D	Operation Supervision										
1	Engineering Cost	0	0	95,583	0	47,826	0	143,409	0	143,409	
2	Daily Allowance & Air Fare	0	0	24,117	0	13,044	0	37,161	0	37,161	
	Sub total	0	0	119,700	0	60,870	0	180,570	0	180,570	
E	Training Fee	0	0	221,739	39,130	0	0	221,739	39,130	260,869	
F	Over Head	75,504	38,413	150,783	75,709	0	0	226,297	114,122	340,409	
G	Contingency	151,017	76,834	301,570	151,413	0	0	452,987	228,247	680,834	
	Total	2,395,651	265,217	5,095,653	1,573,913	60,870	0	7,552,174	1,839,130	9,391,304	
	Interest		287,478		898,956			0	1,186,434	1,186,434	
	Payment				217,821			0	217,821	217,821	
	Working Capital						234,870	0	234,870	234,870	
	Grand total	2,395,651	552,695	5,095,653	2,690,690	60,870	234,870	7,552,174	3,478,255	11,030,429	

(5) Supervision of the operation

The costs have been estimated based on the condition that assistance will be received from a foreign consulting company or a foreign paper company.

13-8-4 Initial Operating Funds

(1) The following costs are listed

- a. Spare parts cost
Spare parts necessary for operating one year.
- b. Cash
Cash reserve to manage current assets and current liabilities as well as operation and technical assistance costs during the initial year of operation, as well as operating reserve cost.

However, for the renovation plan, the situation will differ as the renovation will be carried out while the plant is in actual operation.

(2) Spare parts cost

There is no need for a reserve for spare parts and consumable materials.

The renewal equipment, or the so-called spare parts, have been included in the equipment and machinery cost.

(3) Cash

In the case the renovation plan has been carried out, 60% of the increase in sales revenue per month during the average year shall be listed as an increase in the working capital.

13-8-5 The Costs (Interest) Required for Capital Procurement during the Renovation Plan Period

This is the interest payable during the period of the plan for the long-term loans, as concerns the total required funds for the project.

13-9 Funds Procurement

30% of the total required funds will be procured by equity while 70% will be on long-term loans.

Unit: Rp 1000

	BRPP	
	Foreign	Local
Equity	—	3,309,130
Long term loan	7,552,174	169,130

13-10 Interest for Long-term Loan

13-10-1 Interest Rate for Long-term Loan

The rate will be:

a. Foreign	12%
b. Local	16%

13-10-2 Interest for Long-Term Loan in Each Year

The interest for long-term loan is shown in Table 13-10-1.

13-11 Repayment Method for Long-term Borrowings

13-11-1 Equal Annual Repayment for a Period of 10 Years after 2 Years Grace Period

13-11-2 Repayment Plan

The payment plan is as shown in Table 13-10-1.

Table 13-10-1 Repayment Schedule of Foreign Loan and Interest

Year	(1965)		(1966)		(1967)		Total		Interest paid	Remarks
	Balance at the beginning of the period	Amount of repayment	Balance at the beginning of the period	Amount of repayment	Balance at the beginning of the period	Amount of repayment	Balance at the beginning of the period	Amount of repayment		
-2	2,395,651	-					2,395,651		237,478	Precondition 1. Loan shall be executed at the beginning of the period (Dec. 1st). 2. Repayment of principal and interest shall be executed at the term end (Dec. 31st). 3. Payment of interest shall be paid. 4. Interest rate shall be 12% yearly. 5. Equal annual repayment a period of 10 years after 2 years grace.
-1		2,177,821	5,095,653	-			2,177,821	2,177,821	898,956	
1		2,177,820	4,632,399	60,870	-		681,040	6,653,307	880,122	
2		2,177,820	4,169,151	55,300	5,570		6,653,307	5,966,715	794,396	
3		2,177,820	3,705,912	49,770	5,530		6,653,307	5,280,163	716,004	
4		2,177,820	3,242,673	44,240	5,530		6,653,307	4,593,611	633,622	
5		2,177,820	2,779,434	38,710	5,530		6,653,307	3,907,059	551,235	
6		2,177,820	2,316,195	33,180	5,530		6,653,307	3,220,507	468,844	
7		2,177,820	1,852,956	27,650	5,530		6,653,307	2,533,955	386,461	
8		2,177,820	1,389,717	22,120	5,530		6,653,307	1,847,403	304,074	
9		2,177,820	926,478	16,590	5,530		6,653,307	1,160,851	221,687	
10		2,177,820	463,239	11,060	5,530		6,653,307	474,299	135,304	
11			0	5,530	5,530	0	5,530	0	56,917	
12				5,530	5,530	0	5,530	0	665	
Total	2,395,651	2,395,651	5,095,653	5,095,653	60,870	60,870	7,352,174	0	6,343,769	

13-12 Depreciation Method

13-12-1 Number of Years for Depreciation

a. Machinery and equipment	10 years
b. Civil and building construction	30 years
c. Vehicles	5 years

13-12-2 After the depreciation on the fixed installment method is completed, the book value will become zero.

13-12-3 Amount of Depreciation

The amount of depreciation per year is as shown in Table 13-12-1.

13-13 Corporation Taxes

The corporate taxes shall be only on the profits and shall be as follows:

Profit \leq Rp 10 million:	15% of profit
Rp 10 million $<$ Profit \leq Rp 40 million:	25% of profit
Rp 40 million $<$ Profit:	35% of profit

13-14 Annual Profit and Loss Statement

All factors as stated above are taken into account to make "Annual profit and loss statement", which is shown in Table 13-14-1.

13-15 Break-even Point by Grades and by Machines

Under the slow growth of economy, how to balance cash flow is an important matter, even under the lowered operating rate. Such a turning point by grades and machines is calculated in Table 13-15-1.

13-16 Calculation of I.R.R.O.I.

This is a calculation to check the profitability against the investment for the project. The calculation is made on an assumption that the total investment is met by own equity. Consequently, the loan conditions and the rate of equity used against the total investment, which is the usual

case for any project, are not reflected in this calculation.

The profit figures are calculated in two ways, namely, the profit before tax and the net profit after tax payment.

The I.R.R.O.I. is indicated in Table 13-16-1 and Table 13-16-2.

13-17 Sensitive Analysis in Varied Conditions

13-17-1 Sales Prices

In the calculation of I.R.R.(O.I.), two cases, where the sales price is increased by 5% or decreased by 5%, are taken for calculation as shown in Table 13-17-1 to Table 13-17-4 and Fig. 13-17-1.

13-17-2 Total Amount of Investment

In the calculation of I.R.R.O.I., two cases, where the total amount of investment is increased or decreased by 5%, are taken for calculation as shown in Table 13-17-5 to Table 13-17-8 and Fig. 13-17-2.

13-18 Financial Indicators

Financial Indexes worked out by this financial evaluation are indicated in Table 13-18-1 as a whole.

(1) Profit after tax payment to sales revenue (percentage)

Rate of net profit against sales revenue (%)

$$\frac{\text{Net profit after tax payment}}{\text{Sales revenue}} \times 100$$

(2) Profit before Tax payment against total Investment (percentage)

$$\frac{\text{Profit before tax payment}}{\text{Total investment}} \times 100$$

(3) Debt service ratio

Ability of Repayment of loans

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

Table 13-12-1 Depreciation Expenses

- (1) Depreciation shall be made by the fixed installment method.
- (2) No residual book value shall be left (Total amount shall be depreciated.)
- (3) Working capital and spare parts shall not be depreciated.
- (4) Installation expense and fundation of the equipment shall be depreciated the machineries and the equipments.
- (5) Annual depreciation amount

Items	Amount to be depreciated	Depreciation years	Annual depreciation amount
Equipment	1000 Rp 6,814,683	year 10	100 Rp/year 681,468
Civil and building	46,522	30	1,551
Others	2,930,011	10	293,001
Total	9,791,216	10.03	976,020

$$\text{Depreciation period} = \frac{9,791,216}{976,020} = 10.03 \text{ years}$$

$$\text{Annual depreciation amount} = \frac{9,791,216 \times 1,000 \text{ Rp}}{10 \text{ years}} = 979,122,000 \text{ Rp}$$

The depreciation amount for building and civil works usually spread out over a period of 30 years.

On this basis the actual depreciation of the mill should be 976,020,000 Rp.

For practical reason, however, in our instance, calculation of depreciation is made on the assumed basis of 10 years.

Thus assumed, the depreciation changes are 9,791,216,000 Rp as indicated above.

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

Items	Present	(1985) -2	(1984) -1	(1987) 1	(1988) 2	(1989) 3	(1990) 4	(1991) 5	(1992) 6	(1993) 7	(1994) 8	(1995) 9	(1996) 10	Remarks
Sales	6,794,550 (11,791 t)	6,794,550 (11,791 t)	5,657,125 (9,826 t)	9,012,158 (13,008 t)	10,645,408 (14,245 t)	10,645,408 (14,245 t)	10,645,408 (14,245 t)	10,645,408 (14,245 t)	10,645,408 (14,245 t)	10,645,408 (14,245 t)	10,645,408 (14,245 t)	10,645,408 (14,245 t)	10,645,408 (14,245 t)	
Production cost	4,297,182	4,297,182	3,580,945	4,742,278	5,533,093	5,533,093	5,533,093	5,533,093	5,533,093	5,533,093	5,533,093	5,533,093	5,533,093	
Variable cost	1,018,954	1,018,954	1,018,954	1,018,954	1,018,954	1,018,954	1,018,954	1,018,954	1,018,954	1,018,954	1,018,954	1,018,954	1,018,954	
Permitted expense	548,430	548,430	548,430	548,430	548,430	548,430	548,430	548,430	548,430	548,430	548,430	548,430	548,430	
Depreciation (current)	0	0	0	979,122	979,122	979,122	979,122	979,122	979,122	979,122	979,122	979,122	979,122	
Depreciation (new)	0	0	0	0	0	0	0	0	0	0	0	0	0	
Other fixed cost	918,572	918,572	918,572	918,572	918,572	918,572	918,572	918,572	918,572	918,572	918,572	918,572	918,572	
Total	6,794,550	6,794,550	6,066,941	8,207,456	8,994,171	8,994,171	8,994,171	8,994,171	8,994,171	8,994,171	8,994,171	8,994,171	8,994,171	
Operating income	5,412	5,412	-409,816	804,302	1,310,063	1,647,237	1,901,476	2,195,667	2,195,667	2,195,667	2,195,667	2,195,667	2,195,667	
Selling expense	248,419	248,419	248,419	248,419	248,419	248,419	248,419	248,419	248,419	248,419	248,419	248,419	248,419	
Administrative expense	777,931	777,931	777,931	777,931	777,931	777,931	777,931	777,931	777,931	777,931	777,931	777,931	777,931	
Total	1,026,370	1,026,370	1,026,370	1,026,370	1,026,370	1,026,370	1,026,370	1,026,370	1,026,370	1,026,370	1,026,370	1,026,370	1,026,370	
Tool cost	7,409,108	7,409,108	7,093,311	9,234,286	9,708,415	10,024,541	9,776,302	9,476,111	9,476,111	9,476,111	9,476,111	9,476,111	9,476,111	
Interest payable	110,693	110,693	110,693	110,693	110,693	110,693	110,693	110,693	110,693	110,693	110,693	110,693	110,693	
Current (Longterm loan)	202,410	202,410	202,410	202,410	202,410	202,410	202,410	202,410	202,410	202,410	202,410	202,410	202,410	
(Shortterm loan)	0	0	0	794,394	794,394	716,004	633,622	551,233	468,444	366,441	304,074	221,687	139,104	
New (Longterm loan)	0	0	0	0	0	0	0	0	0	0	0	0	0	
(Shortterm loan)	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total	313,103	313,103	313,103	1,111,501	1,029,109	946,727	864,340	741,933	690,866	617,170	534,792	452,409	371,688	
Profit before tax	-1,234,093	-1,234,093	-1,749,291	-1,421,539	-827,808	-408,242	-71,621	304,957	387,344	469,731	552,118	634,503	716,888	
Corporation tax	0	0	0	0	0	0	0	101,733	130,370	159,406	188,241	217,077	243,911	
Profit after tax	-1,234,093	-1,234,093	-1,749,291	-1,421,539	-827,808	-408,242	-71,621	203,222	256,974	310,325	363,877	417,426	470,977	
A * K	-785,633	-785,633	-1,200,861	106,013	699,744	1,119,310	1,201,692	1,182,344	1,233,846	1,289,447	1,342,999	1,398,530	1,450,099	
Loan repayment	24,000	24,000	641,046	641,046	641,046	641,046	641,046	641,046	641,046	641,046	641,046	641,046	641,046	

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

Kinds	Amount					
	Daily production	Operation profit	Fixed cost	Break-even point	Ratio of operation	
	¢/day	RP/kg	Thousand RP/day	¢/day	%	
BVS	45g	27.76	192.97	11,068	69.90	119
HVS	55g	31.00	255.31	11,068	43.45	143
HVS	65g	36.64	207.90	11,068	53.33	145
HVO	60g	36.54	173.22	11,068	64.01	175
HVSO	80g	33.87	244.63	11,068	45.33	134
CS	70g	34.58	219.54	11,068	50.41	146
Sub total		34.18	211.30	11,068	52.41	154
Oil Proof Paper	92g					
Box Paper Laminated	45g					
Form Paper	65g					
Sub total						
Total		34.18	211.30	11,068	52.45	154

Imposed					Remarks	
Daily production	Operation profit	Fixed cost	Break-even point	Ratio of operation		
¢/day	RP/kg	Thousand RP/day	¢/day	%		
35	26.81	14,565	53.76	154	(1) Actual fixed cost (Prest) 1900 Rp Payroll expenses 1,018,954 Depreciation 548,439 Other fixed cost 916,572 Selling expenses 248,419 Administrative expenses 222,351 Interest payable 313,285 Total 3,025,431 (1900 Rp) (1900 Rp) $3,025,431 \div 345 (Rp) = 11,068$	
41	307.83	14,565	41.70	192		
50	274.75	14,565	52.79	176		
50	230.84	14,565	62.84	136		
50	299.45	14,565	41.44	97		
50	234.60	14,565	61.83	134		
44.35	295.12	14,565	49.82	111		(2) Actual fixed cost after imposed (Average for 10 years) 1900 Rp Payroll expenses 1,018,954 Depreciation 1,113,970 Other fixed cost 916,572 Selling expenses 248,419 Administrative expenses 222,351 Interest payable 822,285 Total 4,368,671 (1,000 Rp) (1,000 Rp) $4,368,671 \div 342 (Rp) = 14,565$
16	354.96	14,565	43.43	254		
25	638.36	14,565	20.77	83		
50	763.18	14,565	19.01	38		
31.33	831.16	14,565	21.20	68		
41.65	354.19	14,565	43.42	97		

Table 13-16-1 Internal Earning Rate Statement of Profit & Loss
 Profit & Loss Statement for Internal Rate of Return on Investment (I.R.R.O.I.)

Unit: 1,000 Rp

	Present	(1985) -2	(1986) -1	(1987) 1	(1988) 2	(1989) 3	(1990) 4	(1991 ~ 1996) 5 ~ 10	Remarks
Sales	6,788,550			9,012,158	9,992,108	10,645,408	10,645,408	10,645,408	
Variable cost	4,297,182			4,742,778	5,216,967	5,533,093	5,533,093	5,533,093	
Fixed cost	2,963,896			2,963,896	2,963,896	2,963,896	2,963,896	2,963,896	
Depreciation (current)	548,430			548,430	548,430	548,430	548,430	0	
Depreciation (new)	0			838,696	838,696	838,696	838,696	838,696	
Total	7,809,508			9,093,800	9,567,989	9,884,115	9,629,876	9,335,685	
Operating income	- 1,020,958			- 81,642	424,119	761,298	1,015,532	1,309,723	
Interest payable (current)	313,105			313,105	313,105	313,105	313,105	313,105	
Profit before tax	- 1,334,063			- 394,747	111,014	448,188	702,427	996,618	
Corporation tax	0			0	33,855	151,866	240,849	343,816	
Profit after tax	- 1,334,063			- 394,747	77,159	296,322	461,578	652,802	
Investment amount	0	- 2,660,868	- 6,669,366	- 295,740					
Production cutback loss due to construction	0	0	- 415,228	0					
Depreciation (current)				548,430	548,430	548,430	548,430	0	
Depreciation (new)				838,696	838,696	838,696	838,696	838,696	
Profit				- 394,747	77,159	296,322	461,578	652,802	
Current profit				1,334,063	1,334,063	1,334,063	1,334,063	1,334,063	
New flow		- 2,660,868	- 7,084,794	2,030,702	2,798,348	3,017,511	2,928,528	2,825,561	

Table 13-16-2 Internal Rate of Return on Investment (I.R.R.O.I.)

Unit: 1000 Rp

Year	Net flow	22%		24%	
		Discount coefficient	Current value	Discount coefficient	Current value
- 2	- 2,660,868	0.820	- 2,181,912	0.806	- 2,144,660
- 1	- 7,084,794	0.672	- 4,760,982	0.650	- 4,605,116
1	2,030,702	0.551	1,118,917	0.524	1,064,088
2	2,798,348	0.451	1,262,055	0.423	1,183,701
3	3,017,511	0.370	1,116,479	0.341	1,028,971
4	2,928,528	0.303	887,344	0.275	805,345
5 ~ 10	2,825,561	0.955	2,698,411	0.831	2,348,041
Total			140,312		- 319,630

$$\text{I.R.R.O.I.} = 22\% + 2\% \times \frac{140,312}{140,312 + 319,630} = 22.61\%$$

$$\text{Payout period} = \frac{10,041,402}{2,825,561} = 3.55 \text{ years}$$

Table 13-17-1 Sensitivity Analysis (Variation of +5% base selling price)
Profit and Loss Statement for I.R.R.O.I.

Unit: 1,000 Rp

	Present	(1985) -2	(1986) -1	(1987) 1	(1988) 2	(1989) 3	(1990) 4	(1991 ~ 1996) 5 ~ 10	Remarks
Sales	6,788,550			9,462,766	10,491,713	11,177,678	11,177,678	11,177,678	
Variable cost	4,297,182			4,742,778	5,216,967	5,533,093	5,533,093	5,533,093	
Fixed cost	2,963,896			2,963,896	2,963,896	2,963,896	2,963,896	2,963,896	
Depreciation (current)	548,430			548,430	548,430	548,430	294,191	0	
Depreciation (new)	0			838,696	838,696	838,696	838,696	838,696	
Total	7,809,508			9,093,800	9,567,989	9,884,115	9,629,876	9,335,685	
Operating income	-1,020,958			368,966	928,724	1,293,563	1,547,802	1,841,993	
Interest payable (current)	313,105			313,105	313,105	313,105	313,105	313,105	
Profit before tax	-1,334,063			55,861	610,619	980,458	1,234,697	1,528,888	
Corporation tax	0			14,551	208,717	338,160	427,144	530,111	
Profit after tax	-1,334,063			41,310	401,902	642,298	807,553	998,777	
Investment amount	0	-2,660,868	-6,669,566	-295,740					
Production cutback low due to construction	0	0	-415,228	0					
Depreciation (current)				548,430	548,430	548,430	294,191	0	
Depreciation (now)				838,696	838,696	838,696	838,696	838,696	
Profit				41,310	401,902	642,298	807,553	998,777	
Current profit				1,334,063	1,334,063	1,334,063	1,334,063	1,334,063	
Net Flow		-2,660,868	-7,084,794	2,466,759	3,123,091	3,363,487	3,274,503	3,171,536	

Table 13-17-2 Sensitivity Analysis (Variation of +5% base selling price)
I.R.R.O.I.

Unit: 1000 Rp

Year	Net flow	25%		27%	
		Discount coefficient	Current value	Discount coefficient	Current value
- 2	- 2,660,868	0.800	- 2,128,694	0.787	- 2,094,103
- 1	- 7,084,794	0.640	- 4,534,268	0.620	- 4,392,572
1	2,466,759	0.512	1,262,981	0.488	1,203,778
2	3,123,091	0.410	1,280,467	0.384	1,199,267
3	3,363,487	0.328	1,103,224	0.302	1,015,773
4	3,274,503	0.262	857,920	0.238	779,332
5 ~ 10	3,171,536	0.774	2,454,769	0.670	2,124,929
Total			296,399		- 163,596

$$\text{I.R.R.O.I.} = 25\% + 2\% \times \frac{296,399}{296,399 + 163,596} = 26.29\%$$

$$\text{Payout period} = \frac{10,041,402}{3,171,536} = 3.17 \text{ years}$$

Table 13-17-3 Sensitivity Analysis (Variation of -5% base selling price)
Profit and Loss Statement for I.R.R.O.J.

Unit: 1,000 Rp

	Present	(1985) -2	(1986) -1	(1987) 1	(1988) 2	(1989) 3	(1990) 4	(1991~1996) 5~10	Remarks
Sales	6,788,550			8,561,550	9,492,503	10,113,138	10,113,138	10,113,138	
Variable cost	4,297,182			4,742,778	5,216,967	5,533,093	5,533,093	5,533,093	
Fixed cost	2,963,896			2,963,896	2,963,896	2,963,896	2,963,896	2,963,896	
Depreciation (current)	548,430			548,430	548,430	548,430	548,430	548,430	
Depreciation (new)	0			838,696	838,696	838,696	838,696	838,696	
Total	7,809,508			9,093,800	9,567,989	9,884,115	9,629,876	9,335,685	
Operating income	-1,020,958			-532,250	-75,486	229,023	483,262	777,453	
Interest payable (current)	313,105			313,105	313,105	313,105	313,105	313,105	
Profit before tax	-1,334,063			-845,355	-388,591	-84,082	170,157	464,348	
Corporation tax	0			0	0	0	54,555	157,521	
Profit after tax	-1,334,063			-845,355	-388,591	-84,082	115,602	306,827	
Investment amount	0	-2,660,868		-295,740					
Production outback low due to construction	0	0	-415,228						
Depreciation (current)				548,430	548,430	548,430	548,430	548,430	
Depreciation (new)				838,696	838,696	838,696	838,696	838,696	
Profit				-845,355	-388,591	-84,082	115,602	306,827	
Current profit				1,334,063	1,334,063	1,334,063	1,334,063	1,334,063	
New flow		-2,660,868	-7,084,794	1,580,094	2,332,498	2,637,107	2,582,552	2,479,586	

Table 13-17-4 Sensitivity Analysis (Variation of -5% base selling price)
I.R.R.O.I.

Unit: 1000 Rp

Year	Net flow	18%		20%	
		Discount coefficient	Current value	Discount coefficient	Current value
- 2	- 2,660,868	0.847	- 2,253,755	0.833	- 2,216,503
- 1	- 7,084,794	0.718	- 5,086,882	0.694	- 4,916,847
1	1,580,094	0.609	962,277	0.579	914,874
2	2,332,598	0.516	1,203,621	0.482	1,124,312
3	2,637,107	0.437	1,152,416	0.402	1,060,117
4	2,582,552	0.370	955,544	0.335	865,155
5 ~ 10	2,479,586	1.296	3,213,543	1.133	2,809,371
Total			146,764		- 359,521

$$\text{I.R.R.O.I.} = 18\% + 2\% \times \frac{146,764}{146,764 + 359,521} = 18.58\%$$

$$\text{Payout period} = \frac{10,041,402}{2,479,586} = 4.05 \text{ years}$$

Table 13-17-5 Sensitivity Analysis (Variation of +5% base investment cost)
 Profit and Loss Statement for I.R.R.O.I.

	Unit: 1,000 Rp										Remarks
	Present	(1985) -2	(1986) -1	(1987) 1	(1988) 2	(1989) 3	(1990) 4	(1991 ~ 1996) 5 ~ 10			
Sales	6,788,550			9,012,158	9,992,108	10,645,408	10,645,408	10,645,408	10,645,408		
Variable cost	4,297,182			4,742,778	5,216,967	5,533,093	5,533,093	5,533,093	5,533,093		
Fixed cost	2,963,896			2,963,896	2,963,896	2,963,896	2,963,896	2,963,896	2,963,896		
Depreciation (current)	548,430			548,430	548,430	548,430	548,430	548,430	548,430		
Depreciation (new)	0			880,631	880,631	880,631	880,631	880,631	880,631		
Total	7,809,506			9,135,735	9,609,924	9,926,050	9,671,811	9,671,811	9,377,620		
Operating income	-1,020,958			-123,577	382,184	719,358	973,597	973,597	1,267,788		
Interest payable (current)	313,105			313,105	313,105	313,105	313,105	313,105	313,105		
Profit before tax	-1,334,063			-436,682	69,079	406,253	660,492	660,492	954,683		
Corporation tax	0			0	19,178	137,189	226,172	226,172	329,139		
Profit after tax	-1,334,063			-436,682	49,901	269,064	434,320	434,320	625,544		
Investment amount		-2,793,911		-310,527							
Production cutback low due to construction		0		0							
Depreciation (current)				548,430	548,430	548,430	548,430	548,430	548,430		
Depreciation (new)				880,631	880,631	880,631	880,631	880,631	880,631		
Profit				-436,682	49,901	269,064	434,320	434,320	625,544		
Current profit				1,334,063	1,334,063	1,334,063	1,334,063	1,334,063	1,334,063		
New flow		-2,793,911		-310,527							
			-7,418,272	2,015,915	2,813,025	3,032,188	2,943,205	2,943,205	2,840,238		

Table 13-17-6 Sensitivity Analysis (Variation of +5% base investment cost)
I.R.R.O.I.

Unit: 1,000 Rp

Year	Net flow	20%		22%	
		Discount coefficient	Current value	Discount coefficient	Current value
-2	- 2,793,911	0.833	- 2,327,328	0.820	- 2,291,007
-1	- 7,418,272	0.694	- 5,148,281	0.672	- 4,985,079
1	2,015,915	0.579	1,167,215	0.551	1,110,769
2	2,813,025	0.482	1,355,878	0.451	1,268,674
3	3,032,188	0.402	1,218,940	0.370	1,121,910
4	2,943,205	0.335	985,974	0.303	891,791
5~10	2,840,238	1.133	3,217,990	0.955	2,712,427
Total			470,388		- 170,515

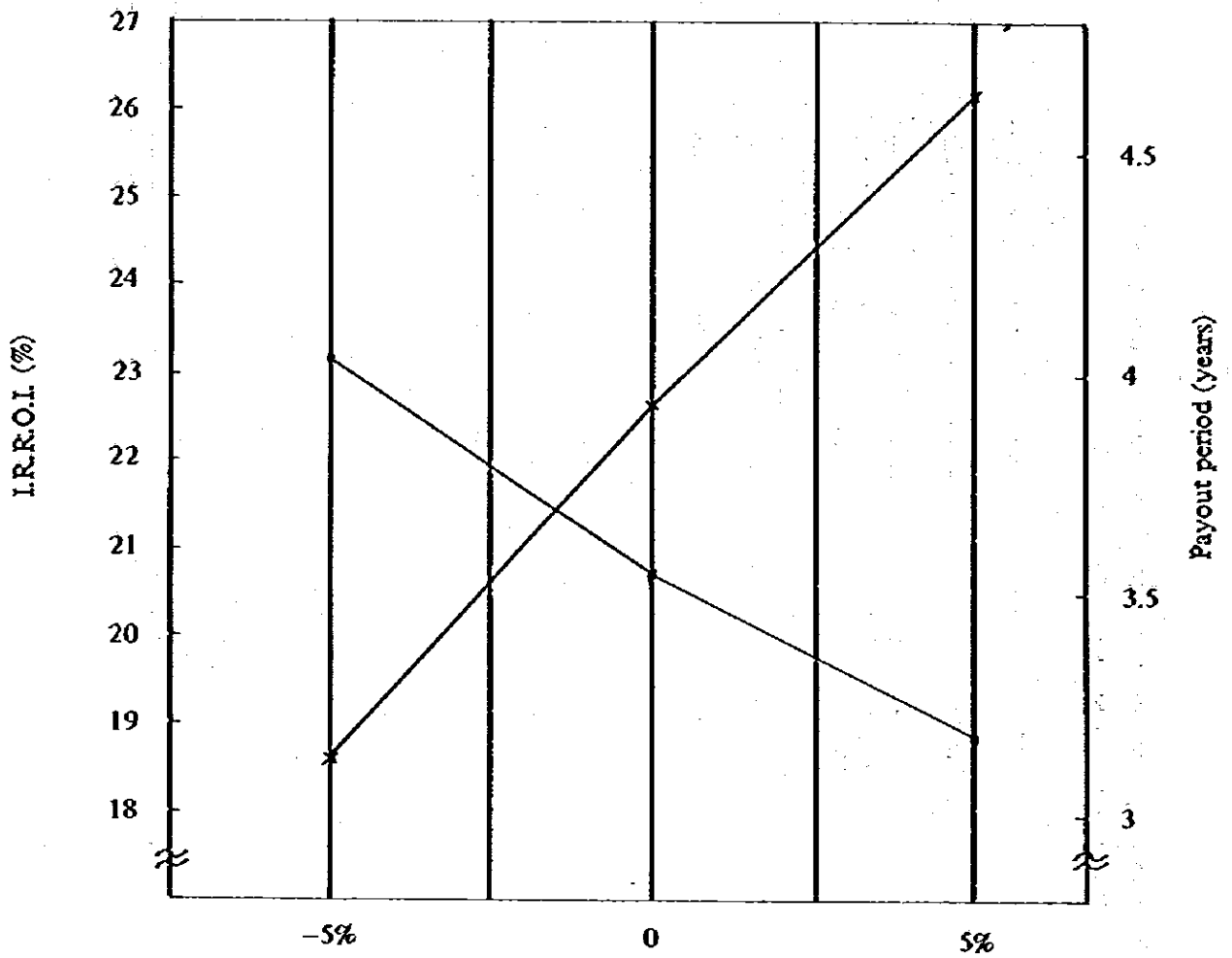
$$\text{I.R.R.O.I.} = 20\% + 2\% \times \frac{470,388}{470,388 + 170,515} = 21.47\%$$

$$\text{Payout period} = \frac{10,522,710}{2,840,238} = 3.70 \text{ years}$$

Table 13-17-7 Sensitivity Analysis (Variation of -5% base investment cost)
Profit and Loss Statement for I.R.R.O.I.

Unit: 1.000 Rp

	Present	(1985) -2	(1986) -1	(1987) 1	(1988) 2	(1989) 3	(1990) 4	(1991 ~ 1996) 5-10	Remarks
Sales	6,788,550			9,012,158	9,992,108	10,645,408	10,645,408	10,645,408	
Variable cost	4,297,182			4,742,778	5,216,967	5,533,093	5,533,093	5,533,093	
Fixed cost	2,963,896			2,963,896	2,963,896	2,963,896	2,963,896	2,963,896	
Depreciation (current)	548,430			548,430	548,430	548,430	294,191	0	
Depreciation (new)	0			796,761	796,761	796,761	796,761	796,761	
Total	7,809,508			9,051,865	9,526,054	9,842,180	9,587,941	9,293,750	
Operating income	-1,020,958			-39,707	466,054	808,228	1,057,467	1,351,658	
Interest payable (current)	313,105			313,105	313,105	313,105	313,105	313,105	
Profit before tax	-1,334,063			-352,812	152,949	495,123	744,362	1,038,553	
Corporation tax	0			0	48,532	166,543	255,527	358,494	
Profit after tax	-1,334,063			-352,812	104,417	328,580	488,835	680,059	
Investment amount		-2,527,825	-6,336,088	-280,953					
Production outback low due to construction		0	-415,228	0					
Depreciation (current)				548,430	548,430	548,430	294,191	0	
Depreciation (new)				796,761	796,761	796,761	796,761	796,761	
Profit				-352,812	104,417	323,580	488,835	680,059	
Current profit				1,334,063	1,334,063	1,334,063	1,334,063	1,334,063	
New flow		-2,527,825	-6,751,316	2,045,489	2,783,671	3,002,834	2,913,850	2,810,883	



	-5%	0	5%
I.R.R.O.I.	18.58	22.61	26.29
Payout period	4.05	3.55	3.17

Fig. 13-17-1 I.R.R.O.I. & Payout Period vs. Variation of Selling Price

Table 13-17-8 Sensitivity Analysis (Variation of -5% base investment cost)
I.R.R.O.I.

Unit: 1,000 Rp

Year	Net flow	22%		24%	
		Discount coefficient	Current value	Discount coefficient	Current value
-2	- 2,527,825	0.820	- 2,072,817	0.806	- 2,037,427
-1	- 6,751,316	0.672	- 4,536,884	0.650	- 4,388,355
1	2,045,489	0.551	1,127,064	0.524	1,071,836
2	2,783,671	0.451	1,255,436	0.423	1,177,493
3	3,002,834	0.370	1,111,049	0.341	1,023,966
4	2,913,850	0.303	882,897	0.275	801,309
5~10	2,810,883	0.955	2,684,393	0.831	2,335,844
Total			451,138		- 15,334

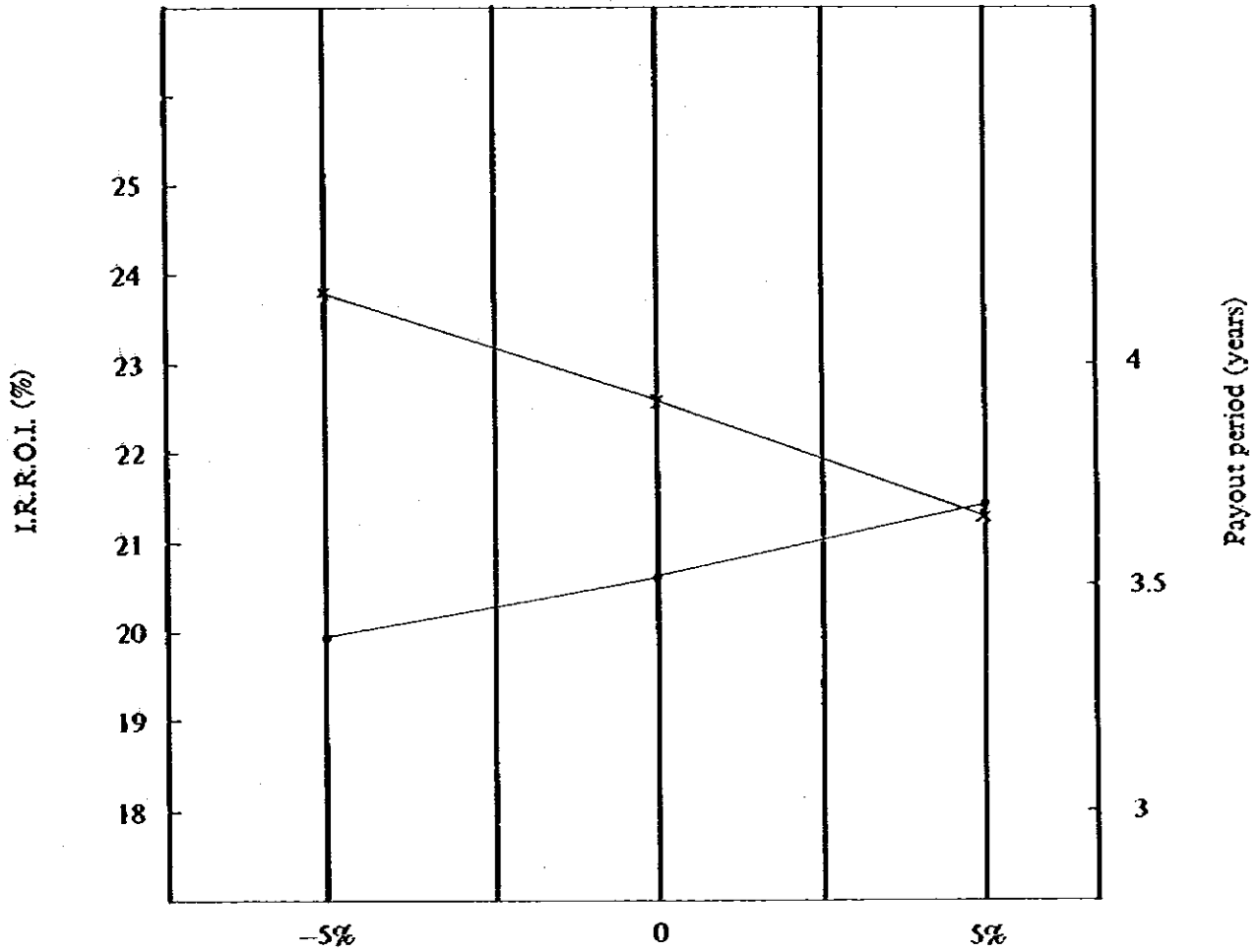
$$\text{I.R.R.O.I.} = 22\% + 2\% \times \frac{451,138}{451,138 + 15,334} = 23.93\%$$

$$\text{Payout period} = \frac{9,560,094}{2,810,883} = 3.40 \text{ year}$$

Table 13-18-1 Financial Indicators

Year	Ratio of after tax to sales	Ratio of profit before tax	Debt service ratio
	%	%	%
1. (1987)	15.8	12.9	65.6
2. (1988)	8.3	7.5	100.8
3. (1989)	3.8	3.7	128.6
4. (1990)	0.7	0.6	136.0
5. (1991)	1.9	2.8	136.8
6. (1992)	2.4	3.5	143.4
7. (1993)	2.9	4.3	150.9
8. (1994)	3.4	5.0	159.6
9. (1995)	3.9	5.8	169.7
10. (1996)	4.4	6.5	181.5

If debt service ratio will be over 100%, loan payment could be expected to be paid.



	-5%	0	5%
I.R.R.O.I.	23.93	22.61	21.47
Payout period	3.40	3.55	3.70

Fig. 13-17-2 I.R.R.O.I. & Payout Period vs. Investment Cost

**CHAPTER 14 ECONOMIC EVALUATION
APPENDIX**

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CHAPTER 14 ECONOMIC EVALUATION

- (1) The BRPP operation is in deficit at present and the amount of deficit is increasing. If BRPP continues the production and sale of printing/writing paper only as done at present, it will not be able to come out of this difficult position and to create a profit. However, if this renovation project is implemented, in the years starting from 1991 BRPP will be able to make profit, contribute to the regional development and secure employment.**
- (2) Through this renovation project, sales of new items will increase and since these items are the replacement for the ones imported at present, the BRPP operation after the renovation project will contribute to saving foreign currencies.**
- (3) Expansion of sales that is planned by this renovation project are on items which are not produced in Indonesia at present, and production and sales of such items will help in raising the technical abilities of this company.**

APPENDIX

Appendix 1 Itinerary

February 1984

26 (Sun.)	9-persons	Lv. NKT - Av. JKT	9-persons (Messrs. Kano, Mauda, K. Suzuki, Y. Suzuki, Omachi, Fujii, Nakayama, Shibata, Sakai)
27 (Mon.)	9-persons		Visit to Embassy of Japan, JICA and JETRO
28 (Tue.)	9-persons		Visit to DCBCT, Victory Offset Prima, Gama Cipta Offset Daisei and Toppan Printing Indonesia
29 (Wed.)	2-persons 7-persons	Lv. JKT - Av. BRPP	2-persons (Messrs. Omachi, Fujii) Visit to DCBCT, IPPA, RUMAYASA, JP

March 1984

1 (Thu.)	5-persons 1-person 2-persons 1-person Team A Team B Team C Team D Teams A and C Team B Team D Teams A and C Team B Team D Teams A, C and D Team B Team A Team B Team C Team D Teams A and B Team C Team D Teams A and B Team C Team D	Lv. JKT - Av. PPM Lv. JKT - Av. BRPP	5-persons (Messrs. Kano, K. Suzuki, Nakayama, Shibata, Sakai) 1-person (Mr. Y. Suzuki) 2-persons (Messrs. Omachi, Fujii) Study in BRPP 1-person (Mr. Mauda) Visit to NAC A Team (Messrs. Kano, K. Suzuki) Study in PPM B Team (Messrs. Y. Suzuki, Omachi, Fujii) Study in BRPP C Team (Messrs. Nakayama, Shibata) Study in PPM D Team (Mr. Mauda) Visit to Dainippon Ginkakarya Printing and Toppan, Indonesia Study in PPM Study in BRPP Market Study in JKT Study of Documents Study of Documents Study in PPM Study in BRPP Study in BRPP Study in BRPP Study in PPM Visit to Saetra Daya and Karya Nusantara, Study in PPM Study in BRPP Study in PPM Visit to Perun Persekitakan Uang, Perdagangan & Percetakan and Margano Study in BRPP Study in PPM Visit to Daisei
2 (Fri.)			
3 (Sat.)			
4 (Sun.)			
5 (Mon.)		Lv. JKT - Av. PPM	
6 (Tue.)		Lv. PPM - Av. BRPP	
7 (Wed.)		Lv. PPM - Av. JKT	
8 (Thu.)			

9 (Fri.)	Teams A and B Team C Team D 1-person		Study in DRPP Study in PPM Visit to Central Scientific Bureau 1-person (Mr. Yamagawa)
10 (Sat.)	Teams A and B Team C Team D and Mr. Yamagawa	Lv. NRT - Av. JKT	Study in BRPP Study in PPM
11 (Sun.)	Teams A and B Team C	Lv. JKT - Av. DPS	Study in BRPP Study in PPM Study in BRPP
12 (Mon.)	Team D and Mr. Yamagawa Teams New A, B and D	Lv. DPS - Av. BRPP	Team New A (Messrs. Kano, K. Suzuki, Yamagawa) Study in BRPP
13 (Tue.)	Team C Teams New A, B and D		Study in PPM Study in BRPP
14 (Wed.)	Team C Teams New A and B		Study in PPM Final Meeting with BRPP
15 (Thu.)	Team C Team D Teams New A and B	Lv. BRPP - Av. Surabaya Lv. BRPP - Av. DPS	Study in PPM Final Meeting with BRPP Final Meeting with BRPP Study in PPM
16 (Fri.)	Team New A Team B Team C Team D	Lv. DPS - Av. PPM Lv. DPS - Via JKT - For NRT	Visit to Sentral Gandilank, Panda Puji Banjar, Areka Keretas, Cey Nusanegara Bima Trading, Heaan Ryongas, Ubunasi, NAC
17 (Sat.)	Team New A Team B Team C Team D	At. NRT	Study in PPM Visit Bantoei, Gedong Batu Study in PPM
18 (Sun.)	Team New A Team C Team D		Team B (Messrs. Y. Suzuki, Omachi, Fujii) Study in PPM Study of Documents Study in PPM Study in PPM
19 (Tue.)	Team D Teams New A and C	Lv. Surabaya - Av. Semarang	Study in PPM Visit to Djarum, Jambubi, Noyorono
20 (Tue.)	Team D Teams New A and C		Study in PPM
21 (Wed.)	Team D Teams New A and C	Lv. Semarang - Av. JKT	Final Meeting with PPM Visit to JETRO

22 (Thu.)	3-persons 3-persons Team D 4-persons	Lv. PPM - Av. JKT	3-persons (Messrs. Kano, Nakayama, K. Suzuki) Final Meeting with PPM 3-persons (Messrs. Shibata, Sakai, Yamagishi) Final Meeting with PPM Study of Documents 4-persons (Messrs. Kano, Nakayama, K. Suzuki, Masuda) Final Meeting with DCDCI, DRPP and PPM
23 (Fri.)	3-persons 4-persons 3-persons 7-persons	Lv. PPM - Av. JKT	Study in PPM Final Meeting with DCDCI, DRPP and PPM Study in PPM
24 (Sat.)	3-persons 7-persons	Lv. JKT - For NRI Av. NRI	7-persons (Messrs. Kano, Nakayama, K. Suzuki, Masuda, Shibata, Sakai, Yamagishi) Off Visit to DCDCI, Embassy of Japan, JICA and JETRO
25 (Sun.)			
26 (Mon.)			
27 (Tue.)			

Appendix 2 Members of JICA Study Team

Mr. Tadao Kano : Team Leader
Mr. Yasuharu Masuda : Marketing
Mr. Kazuma Suzuki : Finance
Mr. Tadahiko Yamagiwa : Electric and Instrument

In Charge of Basuki Rachmat

Mr. Yasuhiko Suzuki : Chief and Machinery Equipment
Mr. Hideo Omachi : Pulping
Mr. Tsunetoyo Fujii : Paper Manufacturing

In Charge of Padalarang

Mr. Heihachiro Nakayama : Chief and Machinery Equipment
Mr. Yoshihito Shibata : Pulping
Mr. Kazuo Sakai : Paper Manufacturing

**Appendix 3 Members of the Counter Team in
the Directorate General of Basic
Chemical Industries Ministry of
Industry**

DGBCI

Mr. Bintaldjemur	Director of Programming DGBCI
Mr. H. Mansur	Sub Director Pulp, Paper and Rubber
Mr. F. Muñaf	Sub Director Pulp, Paper and Rubber
Mr. Soekirto	Sub Director Pulp, Paper and Rubber
Mr. Soepranyoto	Dir. Gen's staff
Mr. Sagaf	
Mr. Syafii	

IPPA

Mr. Kahar

**Appendix 4 Members of the Cooperation Team in
the Basuki Rachmat Pulp and Paper Mill**

Mr. Murtedjo Kadarisman	:	Team Leader Production/Technical Director
Mrs. Dawanhuri	:	Secretary Production Division III
Mr. Muslich	:	Production Department
Mr. Eddy Sunyoto	:	Maintenance Department
Mr. Siswandi	:	Logistic Department
Mr. Priyadi	:	Accounting Department
Mr. Kadariaman	:	Maintenance Division I
Mr. Dawanhuri	:	Production Division I
Mr. Mulyadi	:	Instrument Section
Mr. Heru Budiyanto	:	Electrical Section

**Appendix 5 Members of the Cooperation Team in
the Padalarang Pulp and Paper Mill**

Mr. Soetamat	: Plant Manager
Mr. Suparmat	: Assistant Plant Manager
Mr. Wahyu Harun	: Administration Manager
Mr. Affandi	: Accounting Manager
Mr. Asikin. A.H.	: Engineering Manager
Mr. Suparman AL.	: Production Manager
Mr. A. Syamsudin	: Maintenance Manager
Mr. U. Gunawan	: Electric & Instrument Manager
Mr. Martoyo. S.	: Plant Technical Staff
Mr. Yayan. S.	: Pulp Plant Section Chief
Mr. A. Sukendar	: Paper M/C Unit I Section Chief
Mr. Suwarno	: Finishing Unit I Section Chief
Mr. Hadras. H.	: Paper M/C Unit II Section Chief
Mr. Iyus. Y.	: Laboratory Section Chief
Mr. H. Yusuf WK.	: Domestic Purchasing Section Chief

Appendix 6 List of Machinerles and Equipments

6-1 Renovation for Plant Equipments

Equipment	Specification	Q'ty
A. Wood preparation		
A-1 Chip screen	1830W x 3660L x 3.7kW	1
A-2 Chip conveyor	450W belt x 100m machine length with 11kW geared motor	1
A-3 Chip conveyor	500W belt x 15m machine length with 1.5kW geared motor	2
A-4 Chip silo	Mild steel	
1) Chip silos	4mW x 6mL x 7.5mH, 180m ³	2
2) Screw conveyors	400 dia. x 8mL x 1pc x 3.7kW	1
	400 dia. x 4mL x 2 pcs x 2.2kW	2
3) Oil units	For rake drive x 7.5kW	2
B. Cooking		
B-1 Around WL tank	BL pump (1.5m ³ x 25m x 11kW) with LICA, FIQ, FICQ	1
B-2 Around BL heater	BL pump (5.0m ³ x 25m x 30kW) with TIC, FI	2
B-3 Blow tank with Agi.	5250 dia. x 150m ³ , mild steel	1
C. Washing		
C-1 Blow tank pump	Pump 1.1m ³ x 20m x 11kW with CRC and FICQ as 2 sets	1
C-2 Washers	2500mm dia. x 2000L x 5.5kW mild steel/stainless	3
C-3 BL storage tank with LICA	6m dia. x 7.2mH, 200m ³ mild steel	1
C-4 Washer shower pump	0.6m ³ x 40m x 15kW	1

Equipment	Specification	Q'ty
D. Bleaching		
D-1 Shower pipe for filter	50A SUS pipe with shower nozzle	5
D-2 Modification of Ca-Hypo storage pit	To be separated by concrete	1
D-3 Around W.W. tank	Piping for new mill water pipe line with LC and settling tank accept pipeline with LC	2
E. Stock preparation		
E-1 Double disc refiner	20 type x 220kW	2
E-2 Replacement of pumps	Item 701: 0.715m ³ → 1.2m ³ x 30m Item 706: 0.715m ³ → 1.5m ³ x 15m Item 709-1, 709-2: → 1.5m ³ x 15m	4
E-3 Installed freeness tester	New one	1
F. Paper machine		
F-1 Approach flow system	New fan pump with DC motor and basic weight valve	1
F-2 Replacement of flow box	High class air cushion type	1
F-3 Wire part improvement	Wire roll drive, hydro foils	1
F-4 Replacement of press part	High nip press. type with suc. pick up roll	1
F-5 Improvement of dryer drainage system	Change drainage siphons. Installed central control panel	1
F-6 Reel improvement	Modification of primary arm device	1
F-7 Sectional drive improvement	Modification of drive control, thyristor control instead of existing mechanical control type	1
G. Finishing equipment		
G-1 Cutter machine replacement	Double rotary cutter as max. 100a/min of speed	1

Equipment	Specification	Q'ty
H. Finishing equipment		
H-1 Rewinder replacement	Shaftless type as 1200m/min of speed	1
I. Finishing plant		
I-1 Installed super-calender	12 stage rolls, max. 700m/min of speed	1
J. Recovery boiler		
J-1 Dust discharge device replacement	Spade type conveyor instead of existing bagga type conveyor	1

6-2 Spare Parts List for Existing Plant

6-2-1 For machineries and equipments

Name of Parts	Specification	Q'ty	Equipment
1. Steam trap	50A, 10kg/cm ²	2	BL heater
2. Tubes	SUS304	300	BL heater
3. Blow pipes	STB	1	Digester
4. Impeller	Pulp & BL pumps	5	Digester sect.
5. Screen plate	SUS304	1	Vib. screen
6. Wire cloth	2300W x 6600L	3	Washer
7. Screen plate	Bypte, SUS304	1	Cowan screen
8. Wire cloth	1300W x 8200L	5	Bleaching
9. Single mixer	Complete (SUS316L)	1	Hypo tower
10. Single mixer	Complete (SUS304)	1	Alkali tower
11. Centri-cleaner	Complete without nozzle	30	Bleaching
12. Pumps	Complete without motor (SUS304)	3	Centri-cleaner feed pump
13. Dozing pumps	Complete	4	Chemical plant
14. Dandy roll	Complete	2	Wire part
15. Wire roll	Complete	2	Wire part
16. Canvas roll	Complete	5	Dry part
17. Doctor blade	Stainless & others	20	Press. calender
18. Basket	2mm dia. hole (SUS)	3	Select. screen
19. High press. shower pump	80kg/cm ² x 180l/min complete	1	For cleaning at paper machine
20. Boiler tubes	STB	1	M/B and R/B
21. Spare parts	Diesel engine	1	Niigata Model L-8
22. Universal milling machine	Complete	1	Workshop

6-2-2 For instrument section

Name of Parts	Tag No.	Q'ty	Equipment
1. Transmitter	2LI-1, 2	2	LI of BL & CL tank
	2LC-12	1	LC of drain tank
2. Complete	2LI-3	2	LI of blow tank
3. Indicator	2LIC-4	1	LIC of hot water tank
4. Transmitter and recorder	2PR-7, 8	2	PR of digester
5. Orifice plate and transmitter	2FR-9	1	Steam flow at digester
6. Thermocouple	2TR-10	5	Cooking
7. Instrument panel	-	1	For cooking
8. Indicator and annunciator	309LICA-1, 2, 3	3	LICA of BL tanks
9. Recorder	309FR-2	1	FR of hot water line
	309TR-1	1	TR of No. 1 BL tank
10. LIA complete	309-LIA	1	LIA of UKP stock chest
11. TR complete	309-TR	1	TR of BL pipe for Eva.
12. CRC complete	501-CRC	1	UKP stock chest outlet
13. FRC complete without valve	520FRC-1	1	FRC of bleaching
14. LIA complete	520-LIA-1	4	No. 1 - No. 4 tower
15. Indicator	520-FI-1, 3, 8, 9		
	621-FI-1, 2	2	Chemical line
16. LIA complete	621-LIA	1	
17. Indicator	520FI-7	1	Hot water tank
18. Thermocouple	520TRC1 - 4	4	Single mixer
19. FR and CRC complete	714FR, CRC	1	Bleaching refiner chest outlet
20. CRC complete	702CRC	1	Bleached stock chest outlet
21. LIA complete	LIA	2	Bleached stock chest

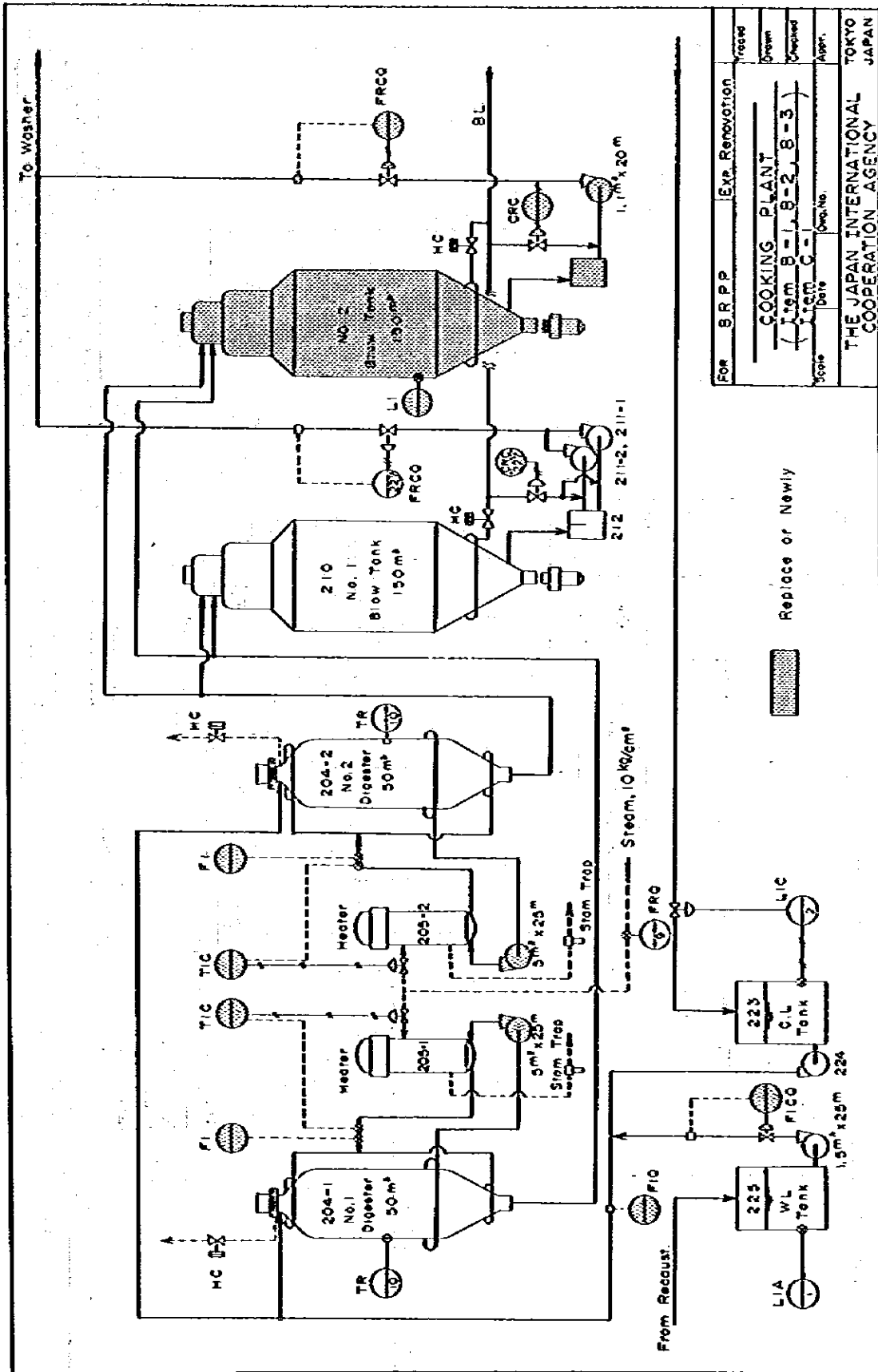
Name of Parts	Tag No.	Q'ty	Equipment
22. LC complete	702LC	1	White water tank LC
23. PI and TI complete	PI, TI	1	Steam to heat Exch. bleach
24. FRC complete	FRC	1	Bleached stock chest
25. Instrument panel	-	1	For cooking
26. Solenoid valve and air regulator sets		3	Control desk for stone refiner
27. Transmitter and controller	850LIC-6	1	White water tank
28. Transmitter	850AFG-3	1	Wire guider
29. Microswitch	-	5	Canvas guider
30. Diaphragm	-	6	Canvas guider
31. FIQ complete	FIQ	1	Steam for paper machine
32. Transmitter and C valve	916LIC-1	1	B.L effect No. 1
33. Transmitter and controller	916LIC-3, -4	2	B.L effect No. 3 and No. 4
34. Recorder of temp. with 6 pen and thermocouples	-TR	1	For evaporator
35. Sarino meter complete	916SIA	1	For evaporator
36. Transmitter and C valve	10FRC-4	1	Hot water recaust.
37. Controller with recorder	10TRC-5	1	Hot water
38. Thermocouple	10IR-8	6	For Temp. recorder recaust.
39. Purge sets	10LR-6, -7	3	G.L tank and W.L tank
40. Thermocouple	976-TI	4	For recovery boiler
41. Recorder	1124-TRC	1	Dearator tank
42. Piping and wiring sets	-	1	General

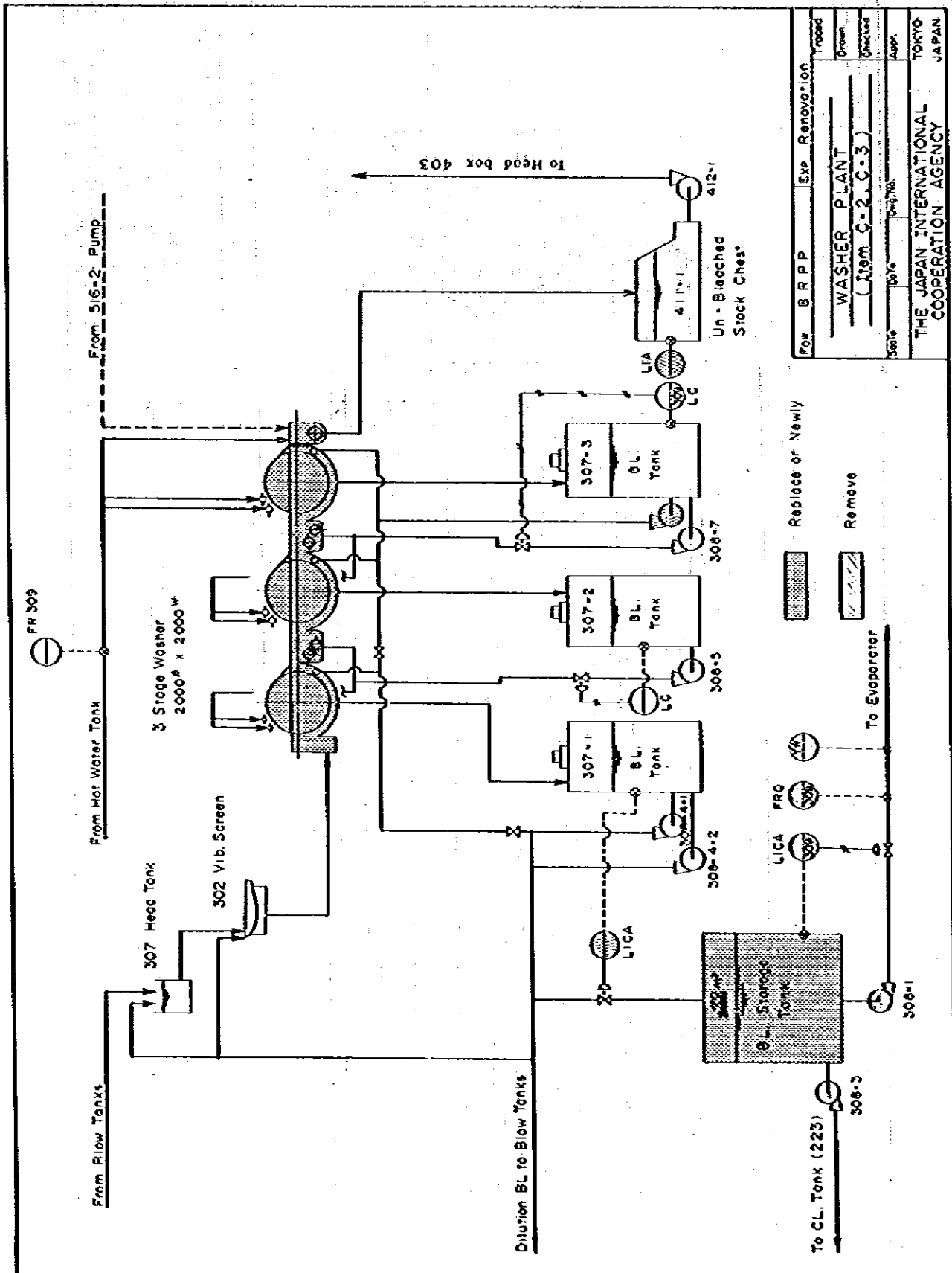
Name of Parts	Tag No.	Q'ty	Equipment
43. Portable recorder	-	1	
44. Transducer	-	1	
45. Pressure gauge	-	2	
46. Test chain	-	1	For belt scale
47. Multimeter	-	2	
48. Portable manometer	-	1	
49. Tools	-	1	For instrument

6-2-3 For electric section

Name of Parts	Specification	Q'ty	Equipment
1. Electrical hoist (3 ton)	Complete	1	For P. machine
2. Oil circuit breaker	Complete 7.2kV 600A, 150MVA	1	For sectional
3. High tension conductor	Complete 6.9kV 200A	1	For chipper and fun pump
4. Low tension switch	Complete 90, 55, 37kW	3	Vacuum pump Hydra pulper, others
5. Invertor	Complete unit	1	For pulp pump to head box, P. machine
6. Induction motor	75kW 8P to 15kW 2P	8	General
7. D.C. motor	75kW to 2.2kW	5	For sectional drive
8. Motor control box	Complete	1	Behind wire part/P. machine
9. Air conditioner	Complete	2	For section
10. Power cable and terminal	Complete	1	General
11. Portable recorder	2 pen, with ac- cessory	1	General
12. Oil tester	0 - 50kV	1	For isolation test
13. Vibration meter	-	1	Bearing check
14. Synroscope	50MHz 2 ways	1	For D.C. motor drive
15. Strobo scope	0 - 20000 r.p.m.	1	General
16. Digital counter	5 windows preset	1	General

Appendix 7

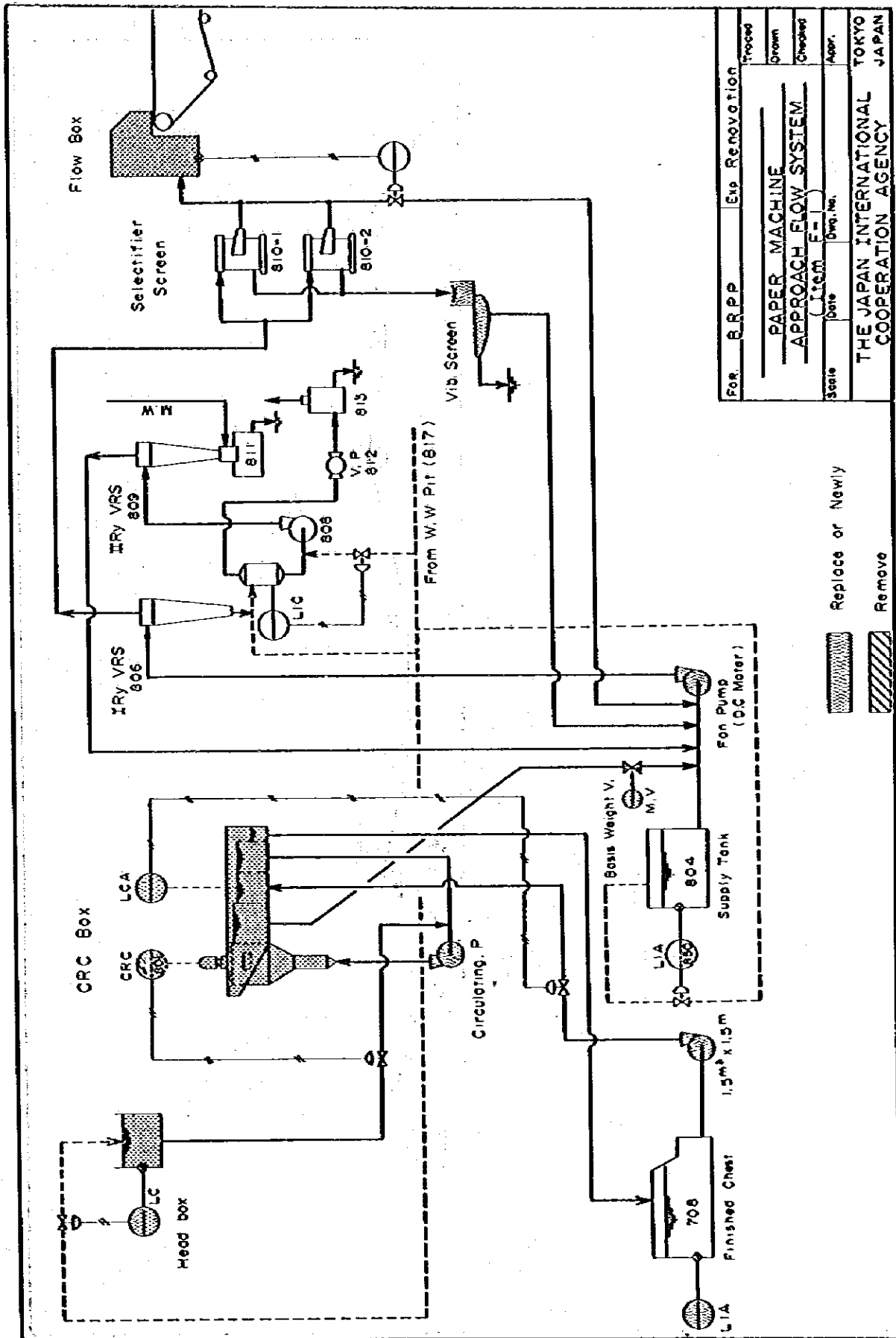






FOR	B R P P	Exp. Renovation
	WASHER PLANT	
	(Item C-2, C-3)	
Date	1947/10	
Drawn		
Checked		
Appr.		
THE JAPAN INTERNATIONAL COOPERATION AGENCY		
TOKYO JAPAN		

Replace or Newly

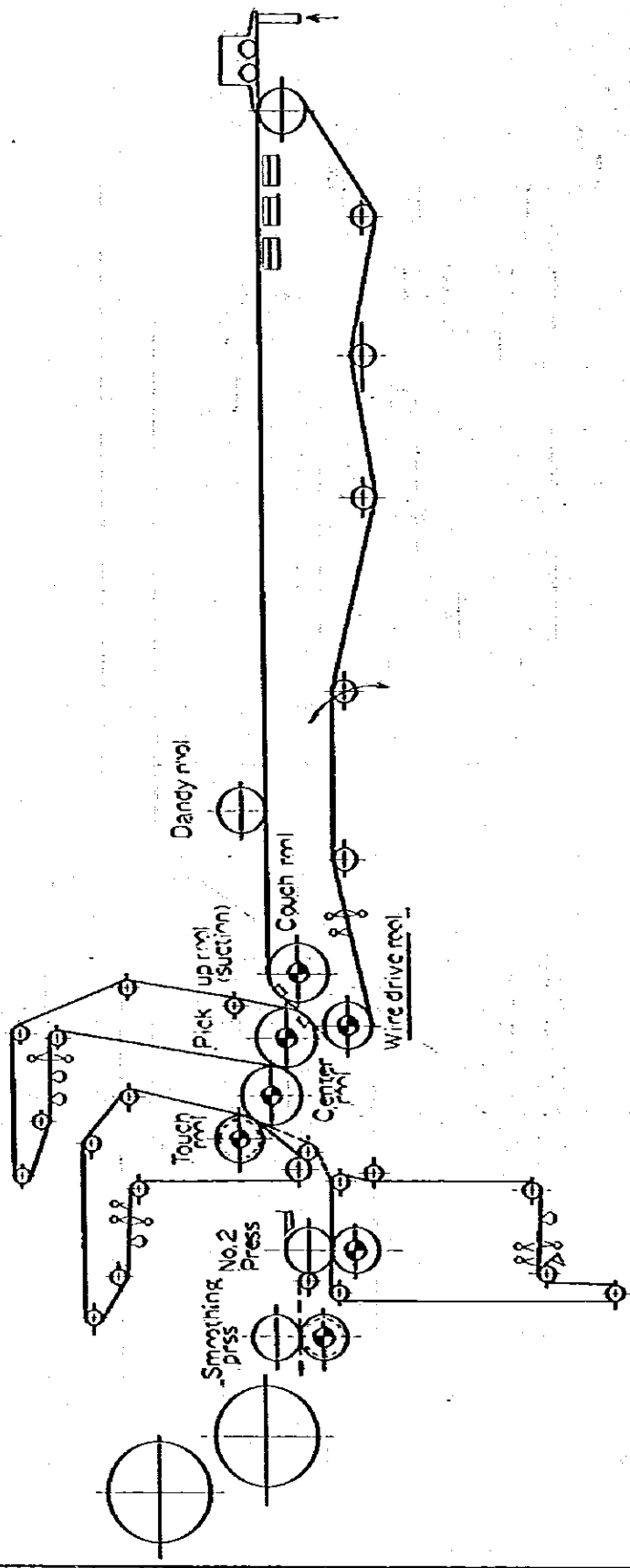
Remove

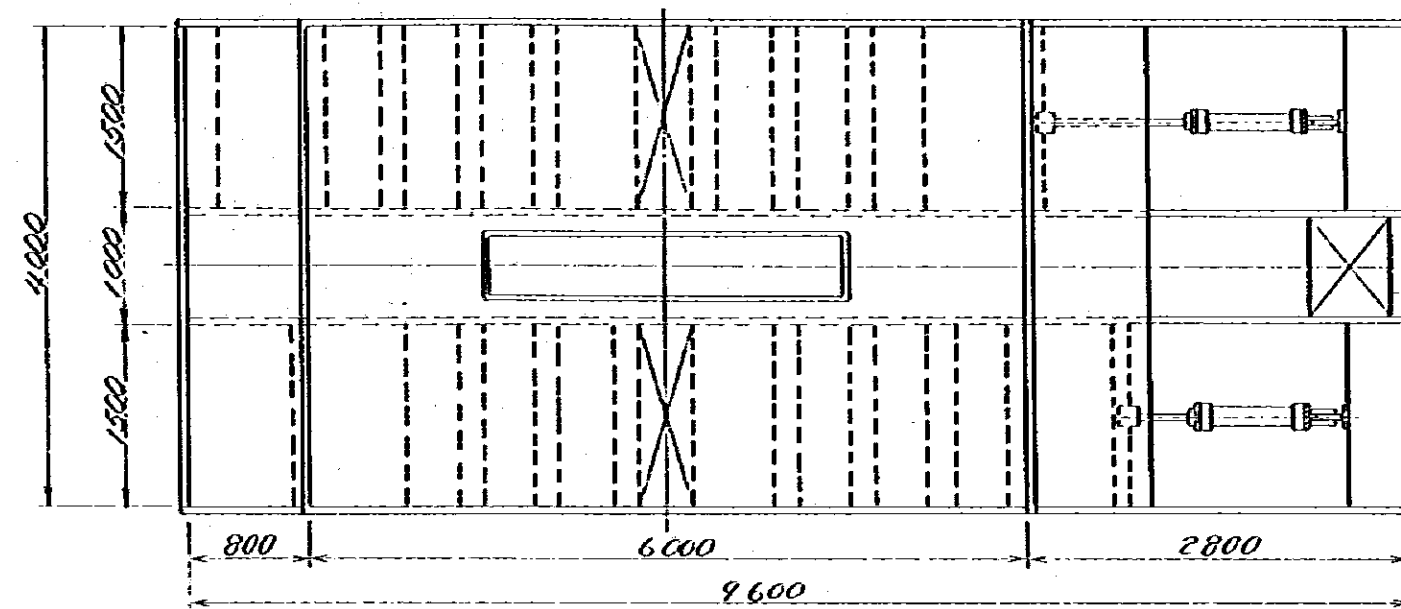


For	BRPP	Exp	Renovation	Traced
				Drawn
				Checked
Scale	(1:1000 E=1)	Date	Dep. No.	Appr.
THE JAPAN INTERNATIONAL COOPERATION AGENCY				TOKYO JAPAN

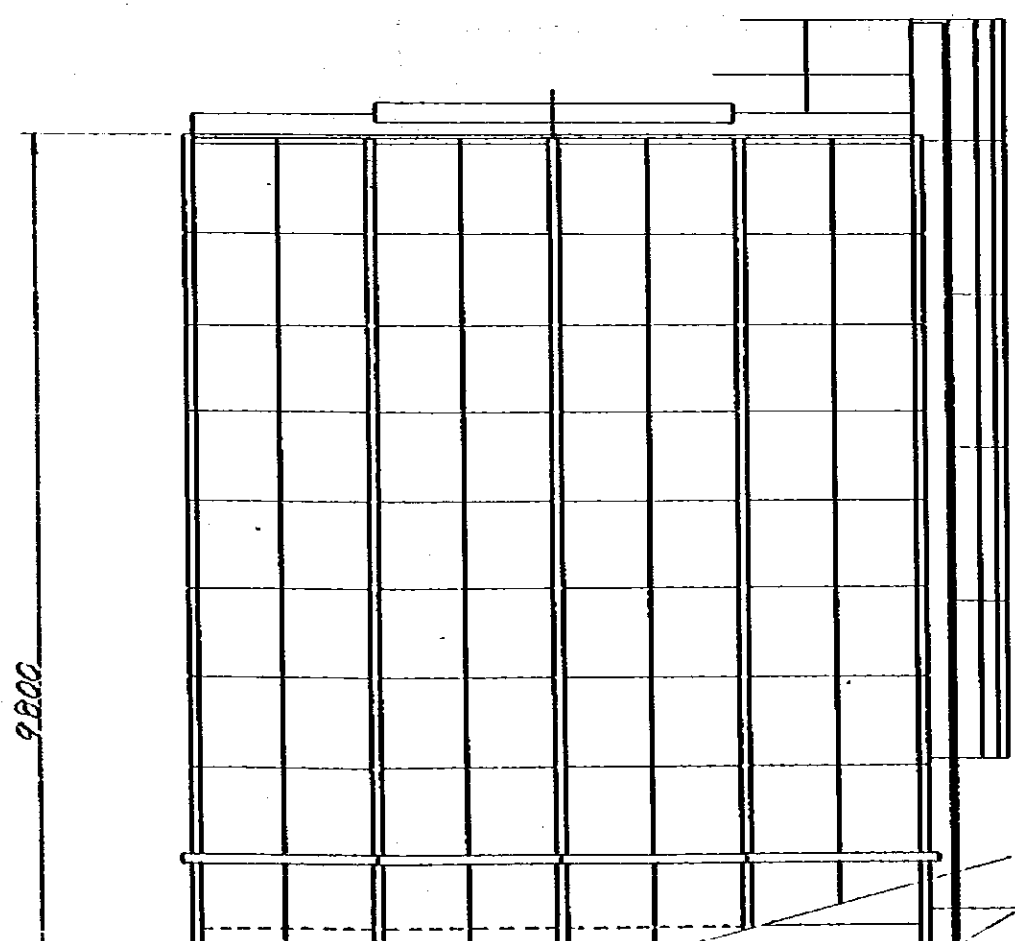
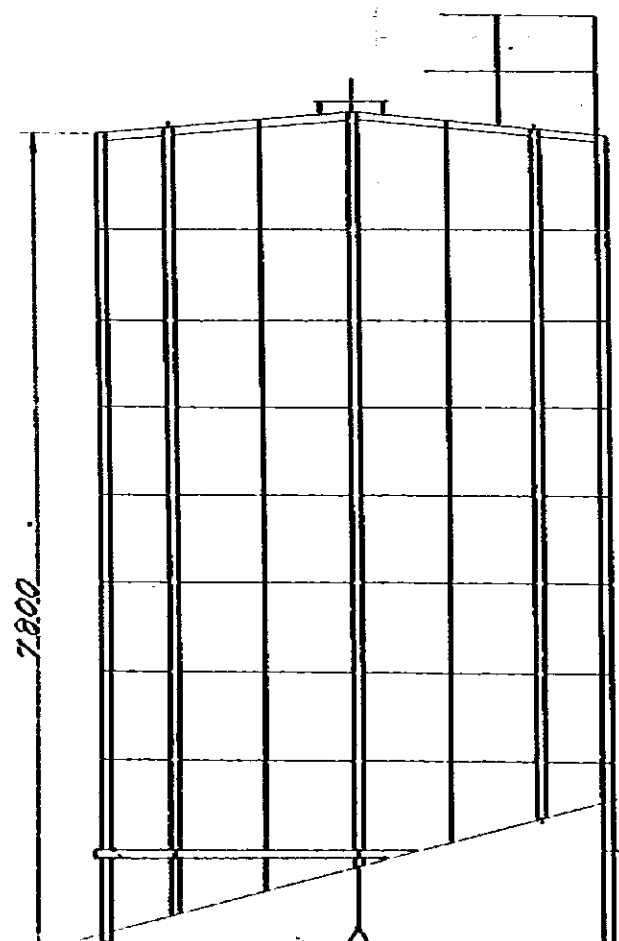
 Replace or Newly
 Remove

Renovation Plan. Reference Side View





Hydraulic Power Un

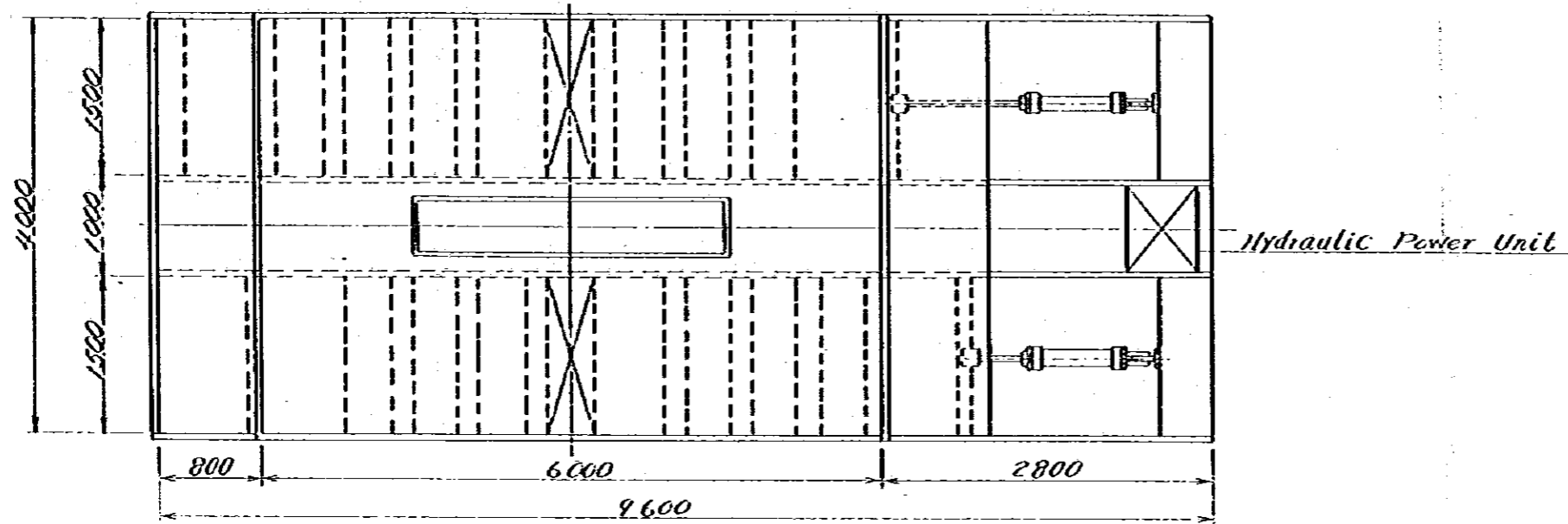


Sturge Capacity
Discharge System
Screw Feeder

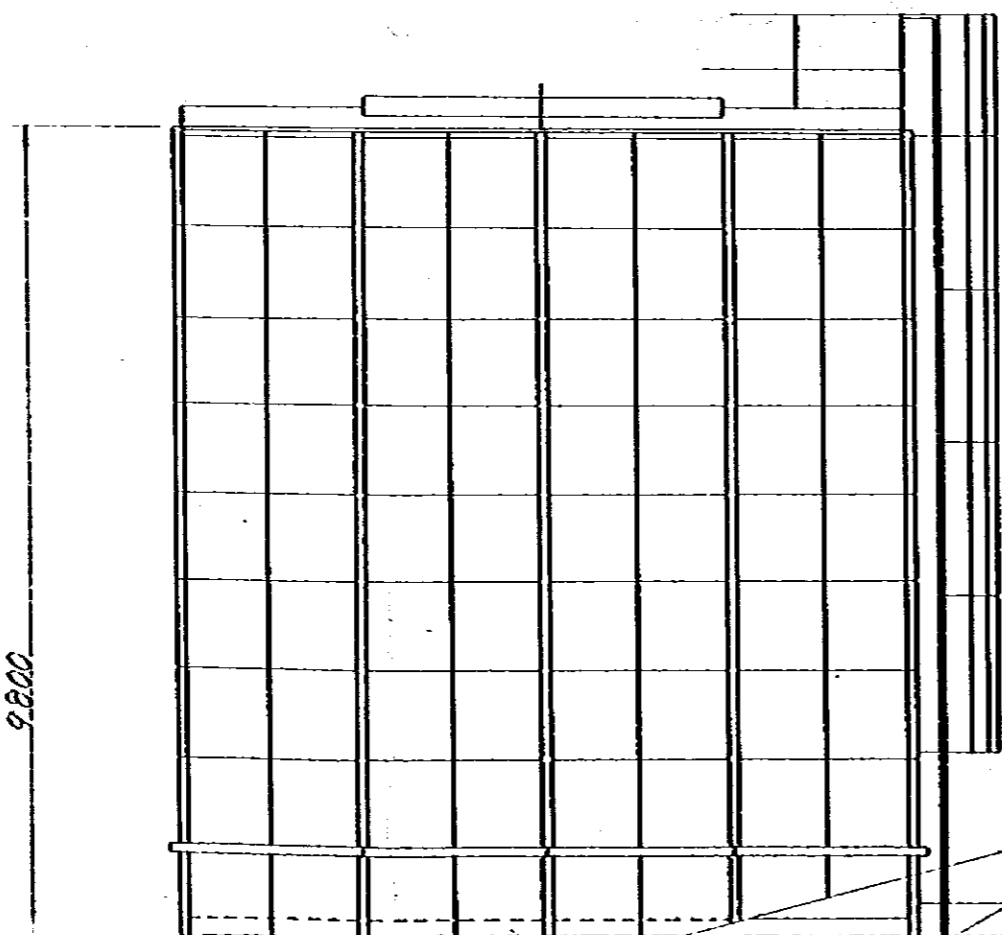
Reciprocating Rake Feeder

7.5kW Hydraulic

MARK	PARTICULARS	MATERIAL	REQUIRED	REMARKS
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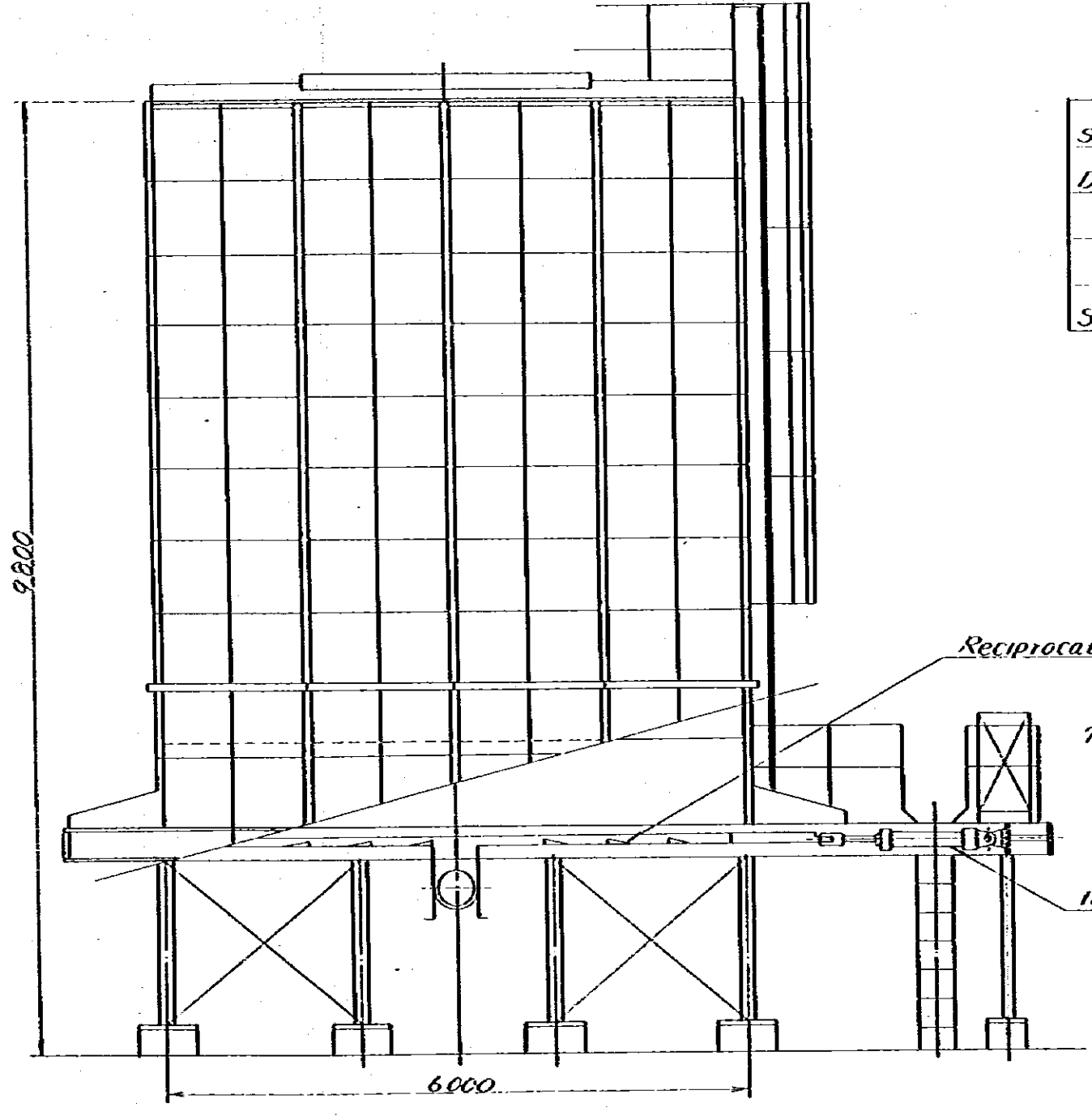
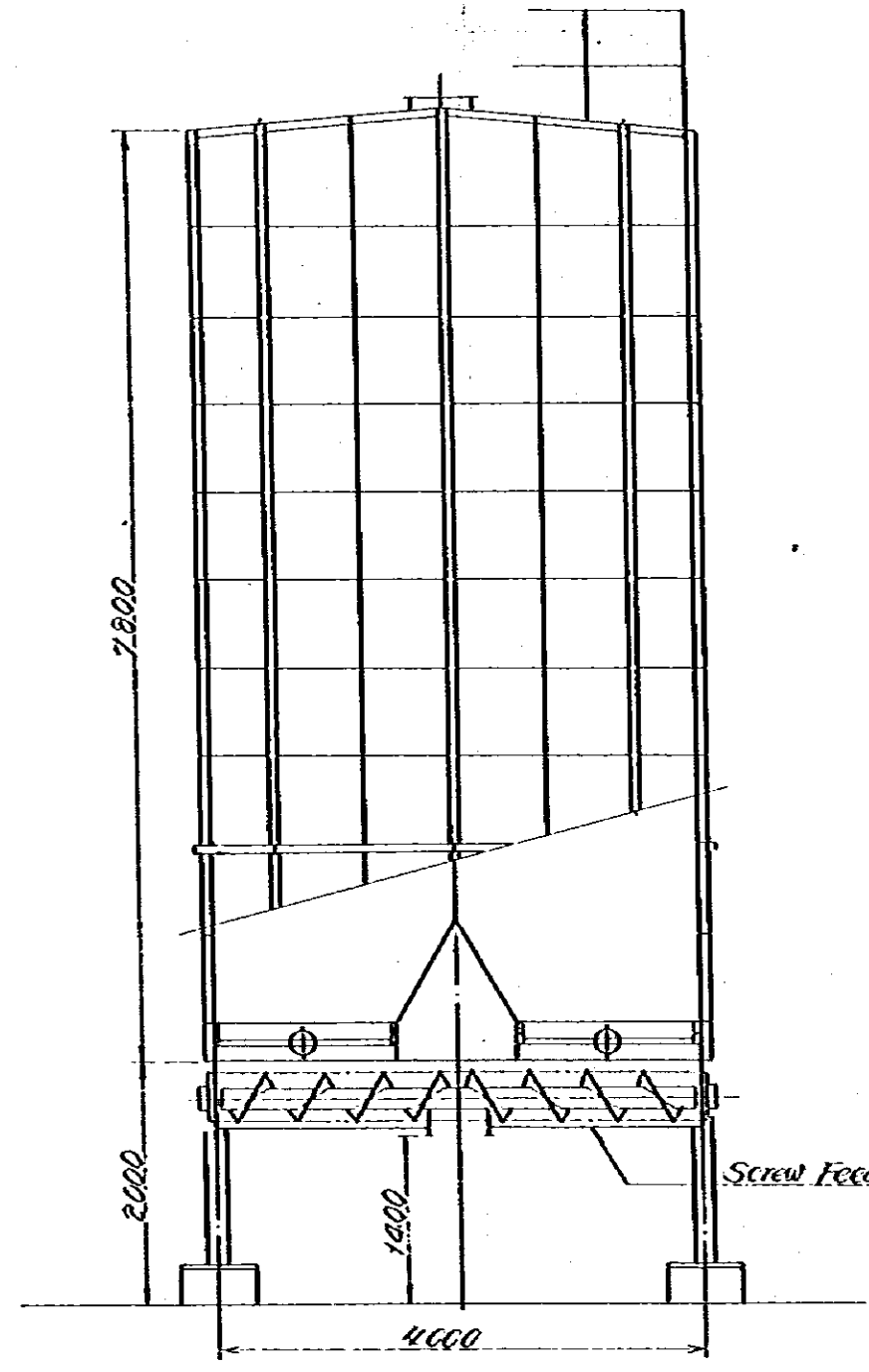
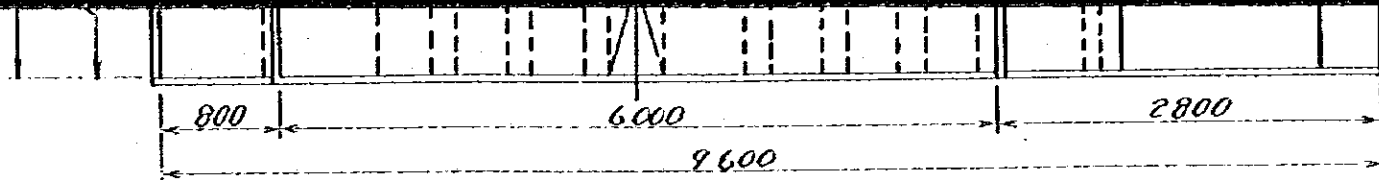
Hydraulic Power Unit



Slurge Capacity	150 ^{M³}
Discharge System	Hydraulic Power Drive
	Reciprocating Rake Feeder
	Motor : 7.5KW
Screw Feeder	Capacity : 100 ^{M³} /hr Motor : 2.2KW

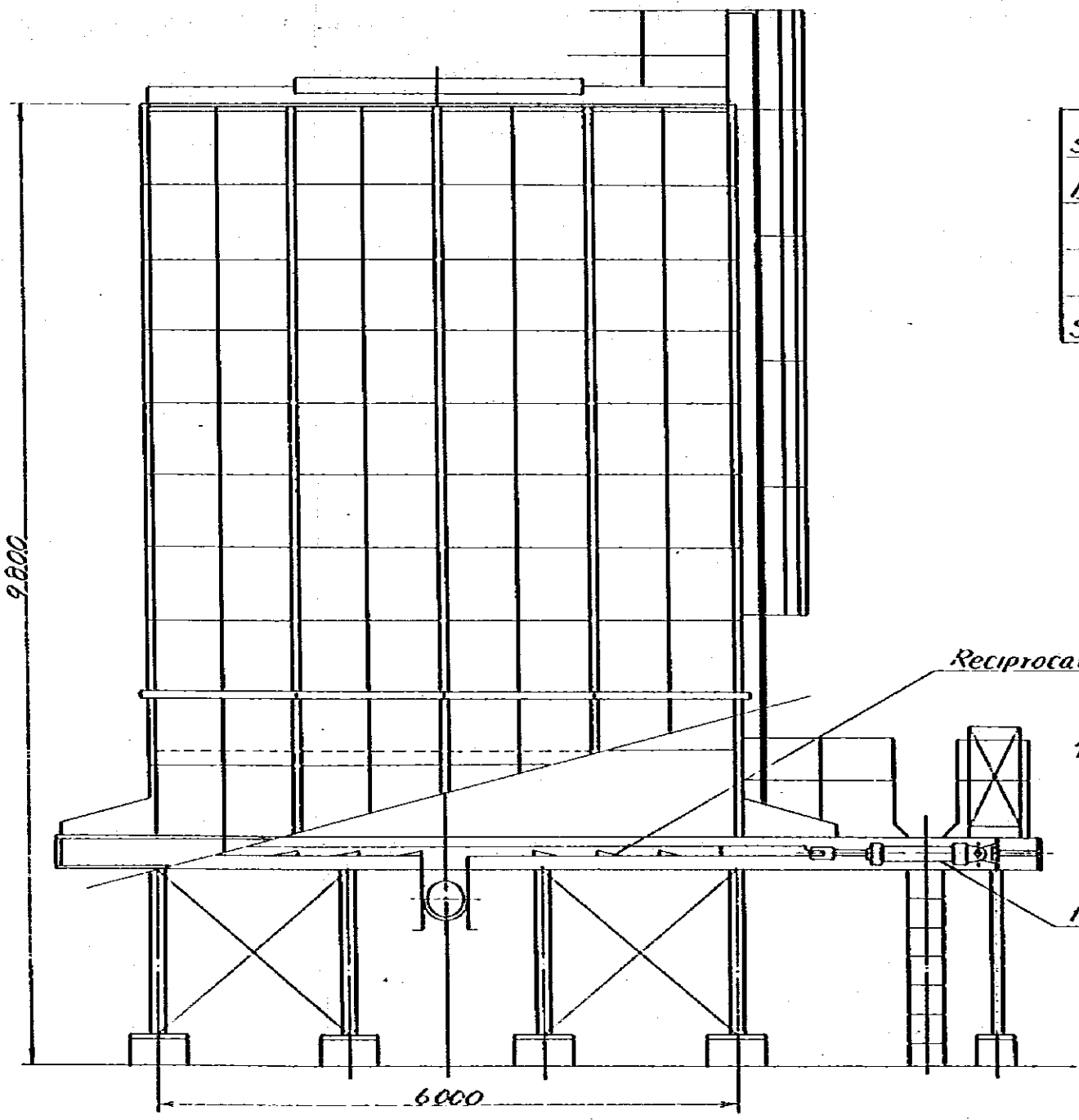
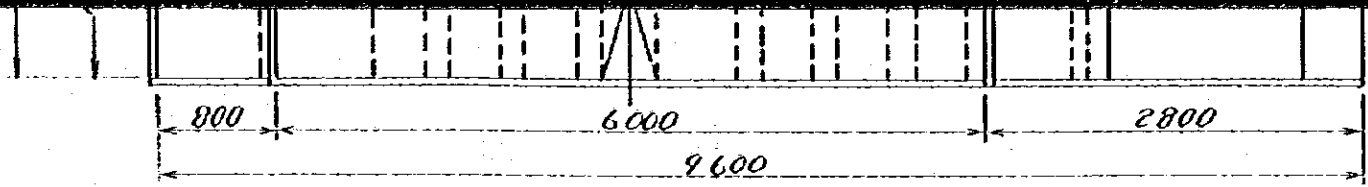
Reciprocating Rake Feeder

7.5KW Hydraulic



Storage Capacity
Discharge System
Screw Feeder

APPROV
CHIEF
CHECK
DRAWN
H



Storage Capacity	150 ^{M³}
Discharge System	Hydraulic Power Drive
	Reciprocating Rake Feeder
	Motor : 7.5KW
Screw Feeder	Capacity : 100 ^{M³} /Hr Motor : 2.2KW

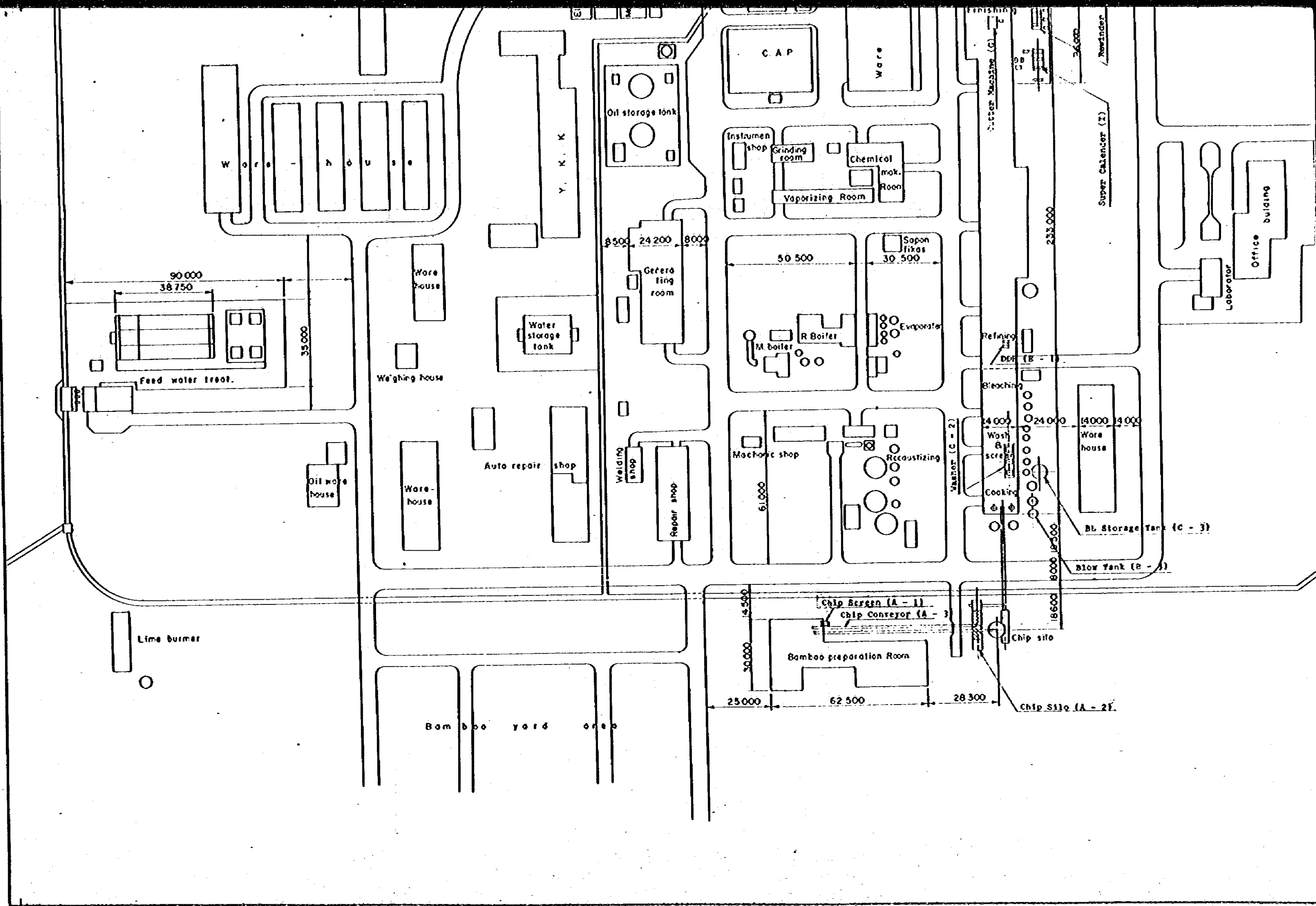
Reciprocating Rake Feeder

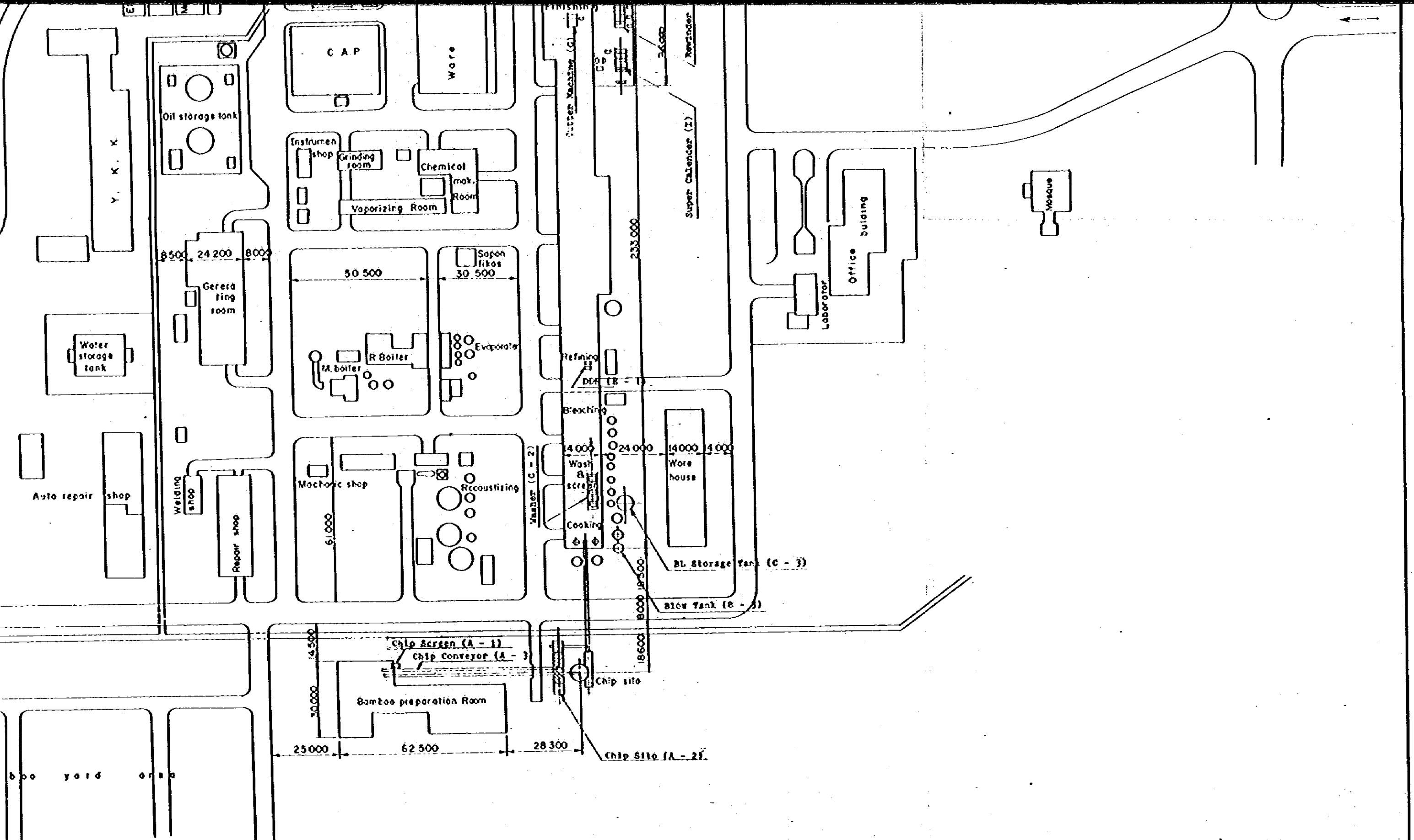
7.5KW Hydraulic power Unit

125^φ Hydraulic Cylinder 2set

Screw Feeder 100^{M³}/Hr 2.2KW

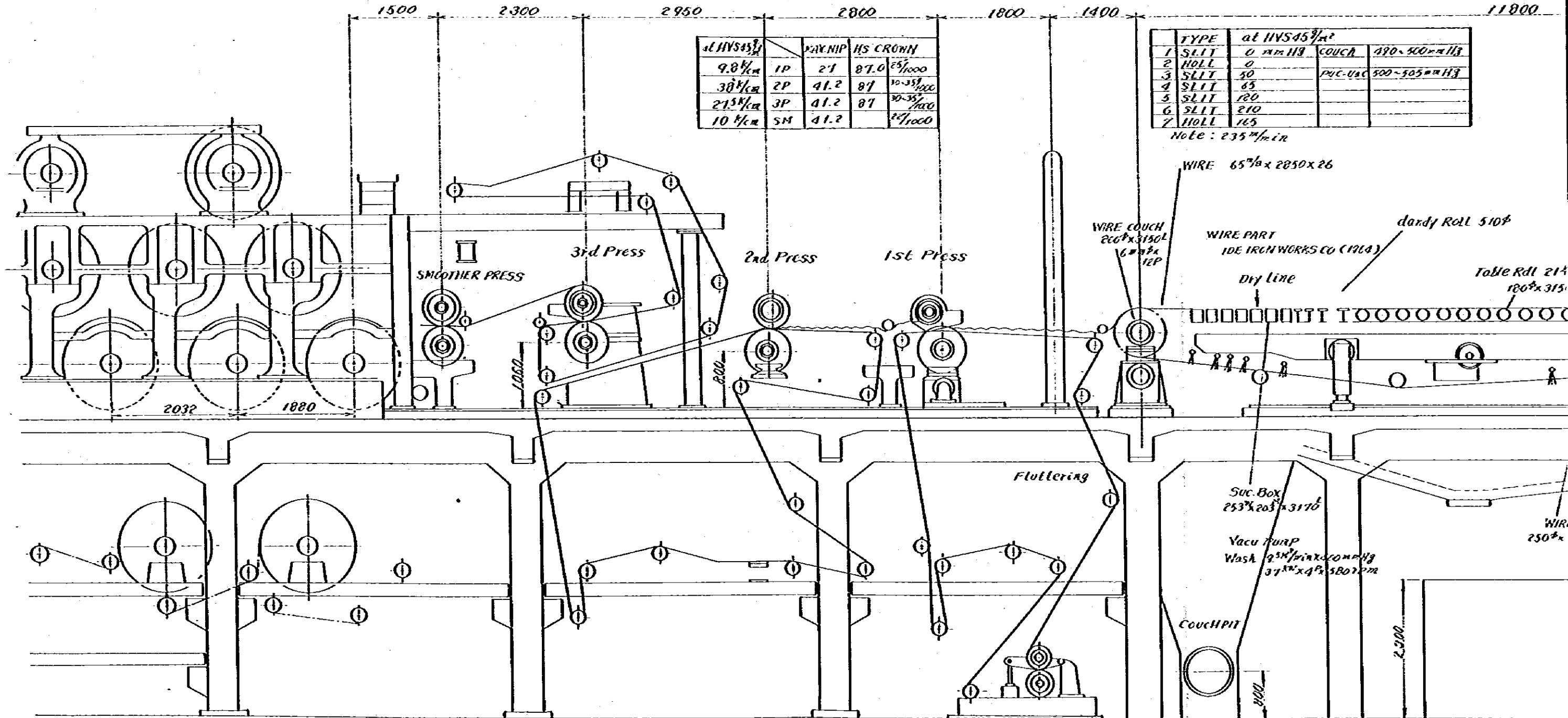
APPROVED		QUANT	SCALE
CHIEF			
CHECKED		Wood Chip Storage and Discharge System	
DRAWN		DRAWING NO.	
HONSHU PAPER CO. LTD		DATE	





FOR RENOVATION EXP				Traced
LAYOUT OF				Drawn
BASUKI RACHMAT				Checked
PULP & PAPER MILL				Asst.
Scale	Date	Draw No.		
	Aug '64			
JAPAN INTERNATIONAL COOPERATION AGENCY				TOKYO JAPAN

Existing Side View



at HV545 ³ / _m		MAX NIP	HS CROWN	
9.8 ¹ / _m	1P	21	87.0	25 ¹ / ₁₀₀₀
38 ¹ / _m	2P	41.2	87	30-35 ¹ / ₁₀₀₀
215 ¹ / _m	3P	41.2	87	30-35 ¹ / ₁₀₀₀
10 ¹ / _m	SM	41.2		24 ¹ / ₁₀₀₀

TYPE	at HV545 ³ / _m	
1 SLIT	0 mm HB	COUCH 490-500 mm HB
2 HOLL	0	
3 SLIT	50	PVC-UAC 500-505 mm HB
4 SLIT	65	
5 SLIT	120	
6 SLIT	210	
7 HOLL	165	

Note: 235¹/_m in

WIRE 65¹/₂ x 2850 x 26

WIRE COUCH
260¹/₂ x 3150 L
6¹/₂ x 12P

WIRE PART
IDE IRON WORKS CO (1964)

dandy ROLL 510¹/₂

Dry Line

Table Rdl 214
120¹/₂ x 315

Fluttering

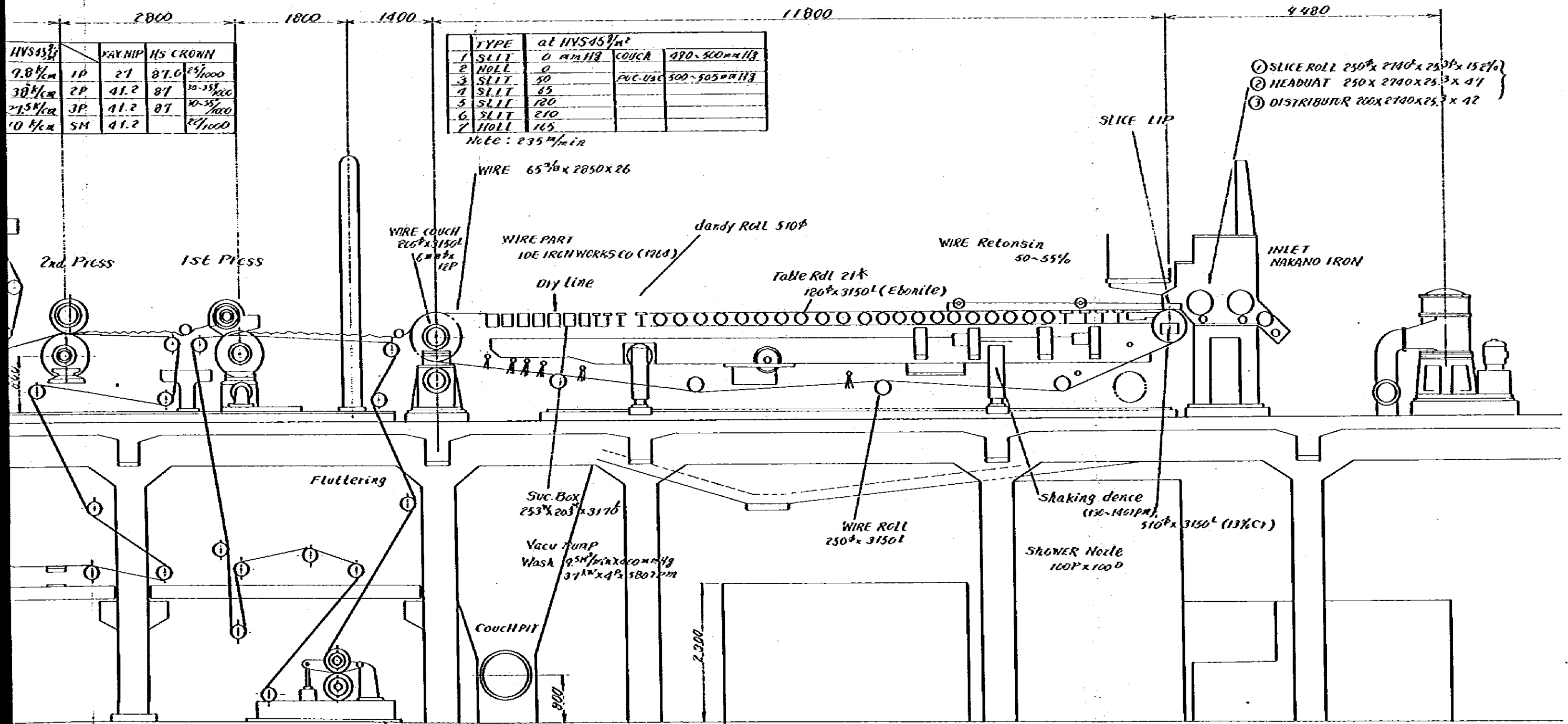
Suc. Box
253¹/₂ x 203¹/₂ x 317¹/₂

Vacu Pump
Wash 9¹/₂ x 11 x 10 mm HB
37¹/₂ x 4¹/₂ x 580¹/₂ mm

COUCH PIT

WIR.
250¹/₂ x

Existing Side View



HVS 45%	PAY NIP	HS CROWN
9.8% / cm	1P	21 87.0 ²⁵ / ₁₀₀₀
38% / cm	2P	41.2 87 ³⁰⁻³⁵ / ₁₀₀₀
21.5% / cm	3P	41.2 87 ³⁰⁻³⁵ / ₁₀₀₀
10% / cm	SM	41.2 ²⁵ / ₁₀₀₀

TYPE	at HVS 45% / m ²	
1 SLIT	0 mm / 118	COUCH 490-500 mm / 118
2 HOLL	0	
3 SLIT	50	PUC-UNC 500-505 mm / 118
4 SLIT	65	
5 SLIT	120	
6 SLIT	210	
7 HOLL	165	

Note: 235 m/min

- ① SLICE ROLL 250^φ x 2140^L x 25^φ x 15% (C)
- ② HEADUAT 250 x 2740 x 25^φ x 47
- ③ DISTRIBUTOR 200 x 2740 x 25^φ x 42

WIRE 65% x 2850 x 26

WIRE COUCH
200^φ x 3150^L
6 mm x 12P

WIRE PART
IDE IRON WORKS CO (1768)

dandy Roll 510^φ

WIRE Retension
50-55%

INLET
NAKANO IRON

Table Rdl 21^φ
120^φ x 3150^L (Ebonite)

Fluttering

Suc. Box
253^φ x 203^φ x 3170^L

Vacu pump
Wash 9.5^φ / min x 40 mm x 49
37^φ x 4^φ x 5802^L mm

Couch PIT

WIRE ROLL
250^φ x 3150^L

Shaking dence
(12-1401P)
510^φ x 3150^L (13% C)

SHOWER Nozle
100^φ x 100^φ

2300

800

