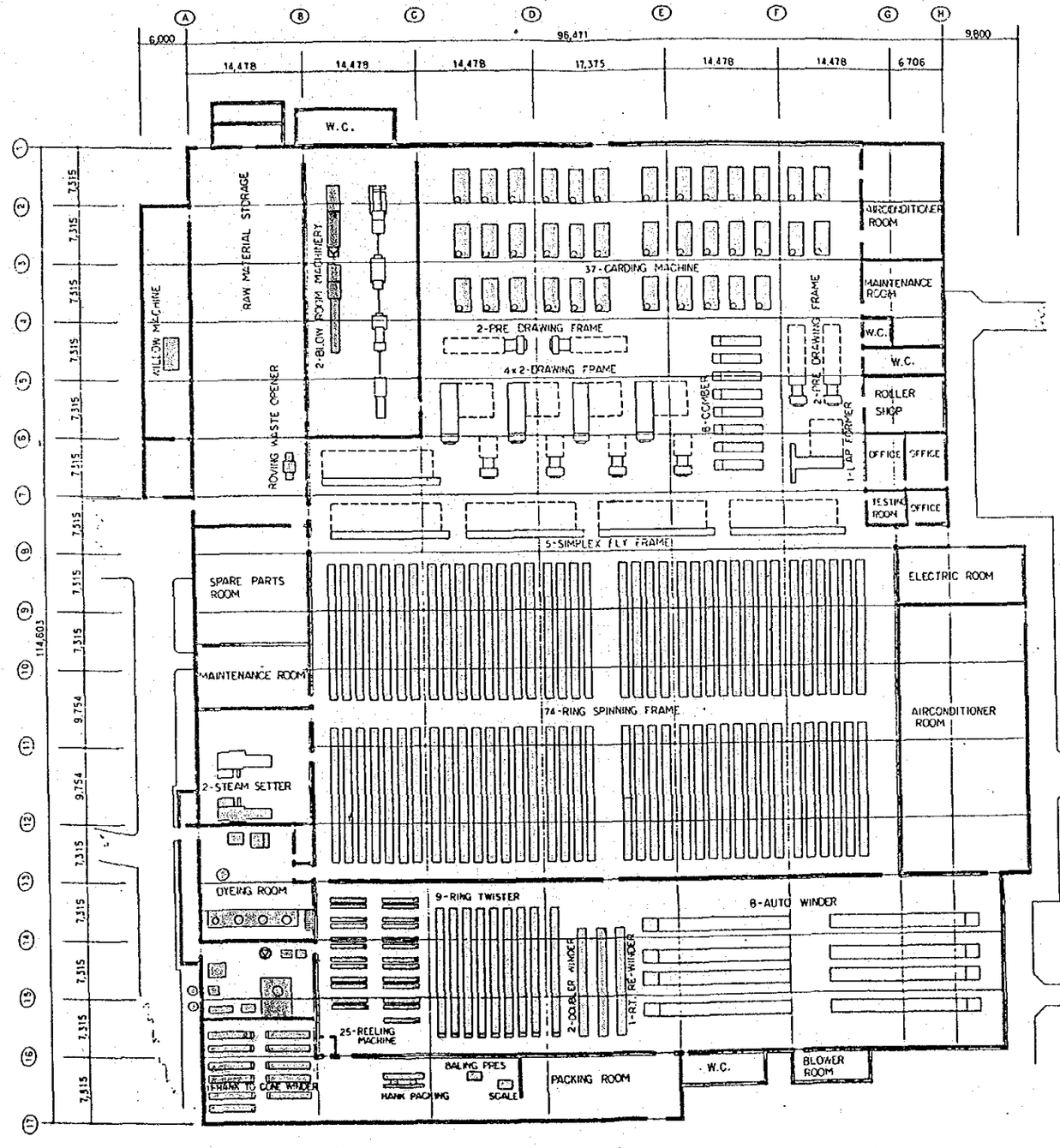
Figure 10 Layout for Machinery of CP-2



N

Remarks:

White colour shows the machines to be newly installed.

Green colour shows the machines to be utilized after improvement through the renovation project plan.

Orange colour shows the machines to be utilized as existing after movement through the renovation project plan.

Pink colour shows the machines to be out of the scope of the renovation project plan and to be moved.

Blue colour shows the machines to be out of the scope of the renovation project plan and to be kept as existing.

MARK	DESCRIPTION	DATE	CHECKED

REVISIONS

TITLE: LAYOUT
CILACAP SPINNING MILL CP-2

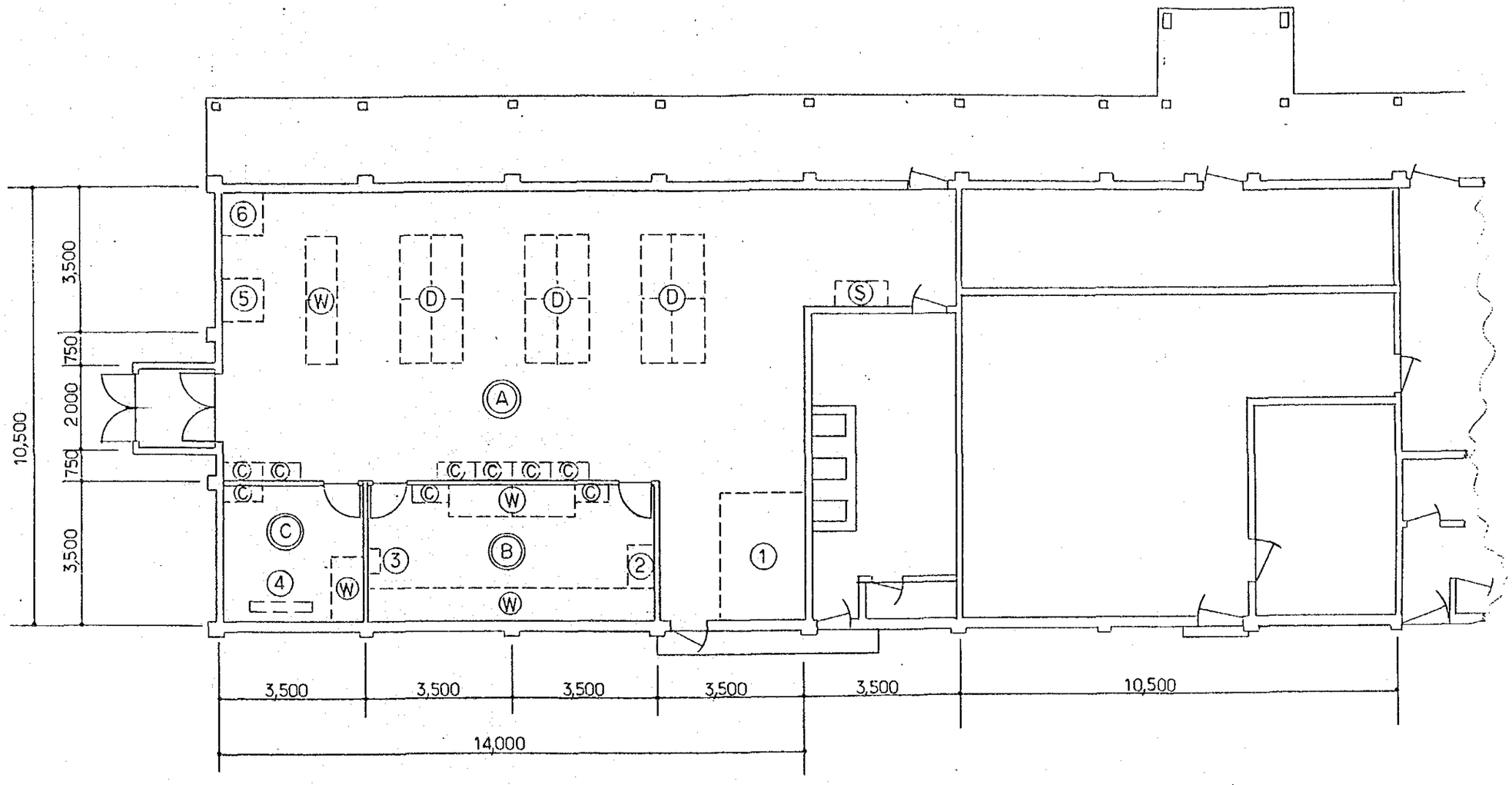
DRAWN | DATE 3 SEPT. 1984 | SCALE 1/ | mm
CHECKED | DWG. No. EX-146-20
APPROVED

5-2-5 Production and Quality Control Center:

Currently, the production control center is located in the office, and the quality control work is carried out at 3 positions of within C-1 and C-2 Mills and the laboratory in the office. For the work process (quality) control, it is important that the result of tests should be fed back to the operations and productions department immediately and appropriate actions are taken. When the production department and the quality control department are centralized in the same place, it should be very effective to produce better results.

The chapel located at intermediate point between C-1 Mill and C-2 Mill is to be remodelled as indicated in Figure 11, where the production and quality control center is to be established. The existing chapel is to be planned separately by Cilacap Mill to be removed to a suitable site. Among items for the quality control, controls of spinning grain and tenacity and elongation test which are items for the daily control, are measured frequently and therefore directly connected daily to the production places, therefore, those facilities are to be established separately in CP-1 Mill and CP-2 Mill in smaller scales. The other items for the check such as tests for raw cotton quality, unevenness and yarn quality are to be centralized at the center to effect measurements and analysis works.

Figure 11
Layout for Machinery of Production and Quality Control Center



REMARKS

Ⓒ: CABINET
Ⓓ: DESK
Ⓦ: WORKING TABLE
Ⓢ: BASIN

Ⓐ : PRODUCTION & QUALITY CONTROL ROOM
Ⓑ : THERMOSTATIC HUMIDSTAT CHAMBRE
Ⓒ : DARK ROOM

①: R.T. WINDER FOR CLASSIMAT
②: SINGLE YARN TENSION STRENGTH TESTER
③: LEA TESTER
④: BLACK BOARD STAND
⑤: SHIRLEY ANALYSER
⑥: CONDITIONING OVEN

TITLE: LAYOUT OF PRODUCTION & QUALITY CONTROL ROOM (FOR REFERENCE)		
DRAWN BY H. Asai	DATE 14 NOV., 1984	SCALE 1/100 mm
CHECKED BY	DWG. NO. EX-146-30	△
APPROVED BY		
TOYOBO TOYOBO ENGINEERING CO.,LTD.		

5-3 Electricity and Utility Equipment

5-3-1 Outline of Electrical Facility:

1) Outline of Power Receiving and Transforming Facilities:

(a) Although particulars of PLN's 20KV voltage flucturation are not available, on the assumption that its range does not cause hindrance in the practical use, planning is made up with a load tap regulating device dispensed.

The system is as per the single line connection diagram (Figure 12). High tension main cable wiring is indicated in Figure 13 and lay-out of sub-station and generating room is shown in Figure 14. In respect of structure, the switch board is of outdoor closed type, however, a waterproof covering is equipped thereto in consideration of relaxation of the severe condition and life of the equipment. By protective outer fense and earth floor, as well as concrete structure, protection from birds and beasts. Both charging parts for 20KV and 6.6KV are not exposed at any part with adoption of the busduct system.

(b) Power Receiving and Distributing System (Refer to Single Line Connection Diagram on Figure 12):

Power receiving line is drawn from the end pole at PLN by 20KV VCT cable 100 mm^2 (drawn into concrete tube route) into compound of the Mill, then after being set at the responsible dividing point by an isolator, is protected by a receiving power circuit breaker through a measuring device (MOF).

In order to detect troubles within the compound, an over-current relay and zero-phase over-current relay are installed. The main transformer is for 5,000KVA, however, it may be made for 6,000KVA by detecting more detailed load power.

The secondary voltage is set at 6,600V in conformity with the existing one, and the main circuit breaker (CB) at the secondary side is not installed. In the receiving power station for high tension voltage, a 6KV feeder panel is installed for power distribution to each distributing substation. For protection of 6KV bus bar, an over-voltage relay, under-voltage relay and over-voltage grand relay are installed. The feeder for each distributing sub-station protects the total system from troubles beyond the feeder by means of the over-current relay as well as the grand relay detecting zero-phase current.

At each sub-station, there are a CB for transformer, transformer for power distribution, switch board for low voltage power and switch board for the main electric light line are installed.

In the sub-station in CP-2, a CB operating board for receiving power, monitoring board and MOF meter board are installed.

(c) Generator for Emergency Use and Important Load Line:

In the newly built generating room, a new diesel engine generator is installed for the emergency use. The generator's voltage is for 6.6KV, and a switching connection is provided with the power receiving side in the sub-station in CP-2. Switching between buying power and generating power is effected in such a way that the CB at power receiving side is tripped after detecting no-voltage at the 6KV bus bar, and

starting of the generator is carried out manually. After the prescribed voltage is reached, the power is distributed to the important load line by the CB at the generator.

The CBs at power receiving side and at the generator are interlocked to avoid reverse flow.

(d) Selection of Low Voltage Power:

Generally, the following are used for power distribution method of low voltage:

Table 20 Power Distribution Method of Low Voltage Power

	Power Distribution Method	Voltage	Comparison of electric wire volume	Power Loss (at the same elec. wire volume)
1	3-phases 3-lines	220V or 200V	1	1
2	3-phases 4-lines	200V and (single-phase 115V)	about 1	about 1
3	3-phases 3-lines	440V	½	¼
4	3-phases 4-lines	400V and (single-phase 230V)	about ½	about 1/3.3

The above 1 and 3 are widely used in Japan, where in spinning mills, they are used for almost all of the major production machines.

By improvement in quality of insulating materials, 440V are recently used widely for low voltage power circuits in general.

Therefore, currently almost all of the motors used in the spinning mills are for 440V or for 400V, which are re-connected to 220V or to 200V depending on for what they are used.

In the electric facilities as in Indonesia where they are belonging to the old European system, many are adopting the above 4, namely 3-phases 4-lines with 440V or 410V and 400V or 380V for motor voltage. Generally, voltage and cross section area of an electric wire are in inverse proportion and about half of 200V will do for 400V. Provided that the electric wire remains same, the power loss at a low voltage power distribution wire makes the current ½ by doubling the voltage through a formula, power loss P = Current^2 x Lead Wire Resistance, and when the lead wire remains same, the power loss will be ¼. However, when the electric wire gets thin, then the power loss will become the same.

From the above, the voltage of the low voltage power for the new production machines and equipments for air conditioning are set as follows:

Transformer at the Secondary Side: 3-phases 4-lines 400V
Motor Voltage: 380V

For the some re-used production machines and existing pumps for well, as well as pumps for sprinklers, the motor voltage is provided with 220V unchanged. Also for electric lights and taps for various uses, the voltage is provided with 220V unchanged.

2) Secondary Sub-station in CP-1 Mill (Refer to Figure 14):

All the equipments are to be installed indoor.

For production machines, new transformers, 1 set for 1,500KVA and another 1 set for 1,200KVA, are to be newly installed.

Data for calculating transformer capacity is indicated in Table 21. Existing transformer for auxiliary equipments to the refrigerator, as well as transformer for electric lights are to be used as they are, unchanged.

The switch board for low voltage power, except that for the auxiliary equipments to the refrigerator, is to be newly equipped as a no-fuse breaker board. The structure of the switch board will be of closed and independent type in order to prevent intrusion by rats and snakes etc. For the low voltage transformer for the auxiliary equipments to the refrigerator, an existing one of 400V, 500KVA at the primary side is to be used.

3) Secondary Sub-station in CP-Mill (Refer to Figure 14):

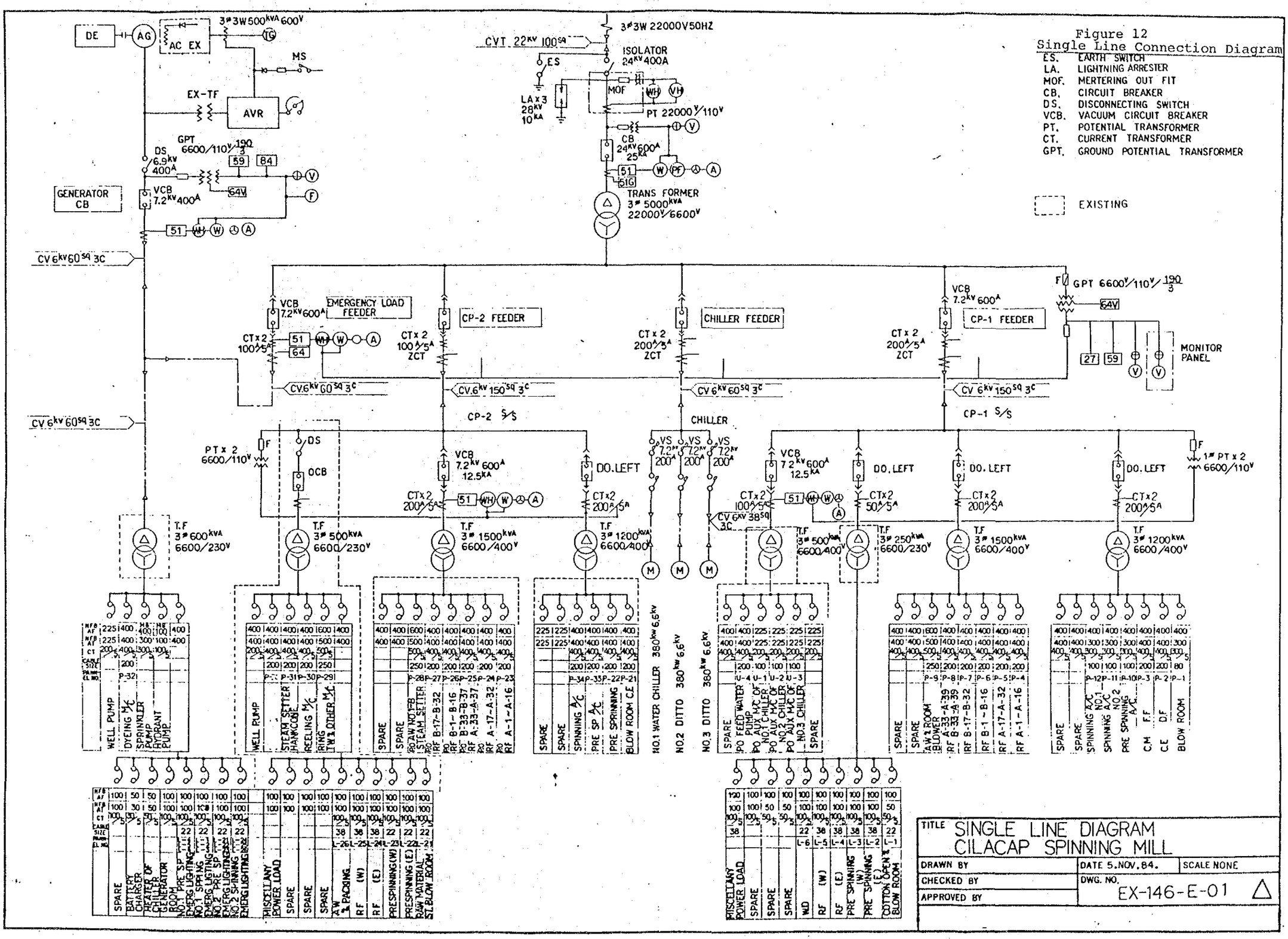
The transformer for power distribution is to be installed in same outdoor place for the transformer, and panels for high and low voltages are to be installed in the sub-station in CP-2. One each of transformers with the secondary voltage 400V 1,500KVA and 1,200 KVA for the production machines are to be newly installed. An existing transformer of secondary voltage 230V, 500KVA is to be used for power supply to the existing production machines including yarn dyeing facilities, miscellaenous equipments, as well as for electric lights, and another existing one of the secondary voltage 230V, 600KVA is to be used for the power in an emergency and for electric lights. For CB at the primary side of the other transformers, the existing OCB and panel are to be used.

Batteries and battery chargers for operation of receiving and transforming equipments are to be provided.

Figure 12
Single Line Connection Diagram

ES. EARTH SWITCH
LA. LIGHTNING ARRESTER
MOF. MERTERING OUT FIT
CB. CIRCUIT BREAKER
DS. DISCONNECTING SWITCH
VCB. VACUUM CIRCUIT BREAKER
PT. POTENTIAL TRANSFORMER
CT. CURRENT TRANSFORMER
GPT. GROUND POTENTIAL TRANSFORMER

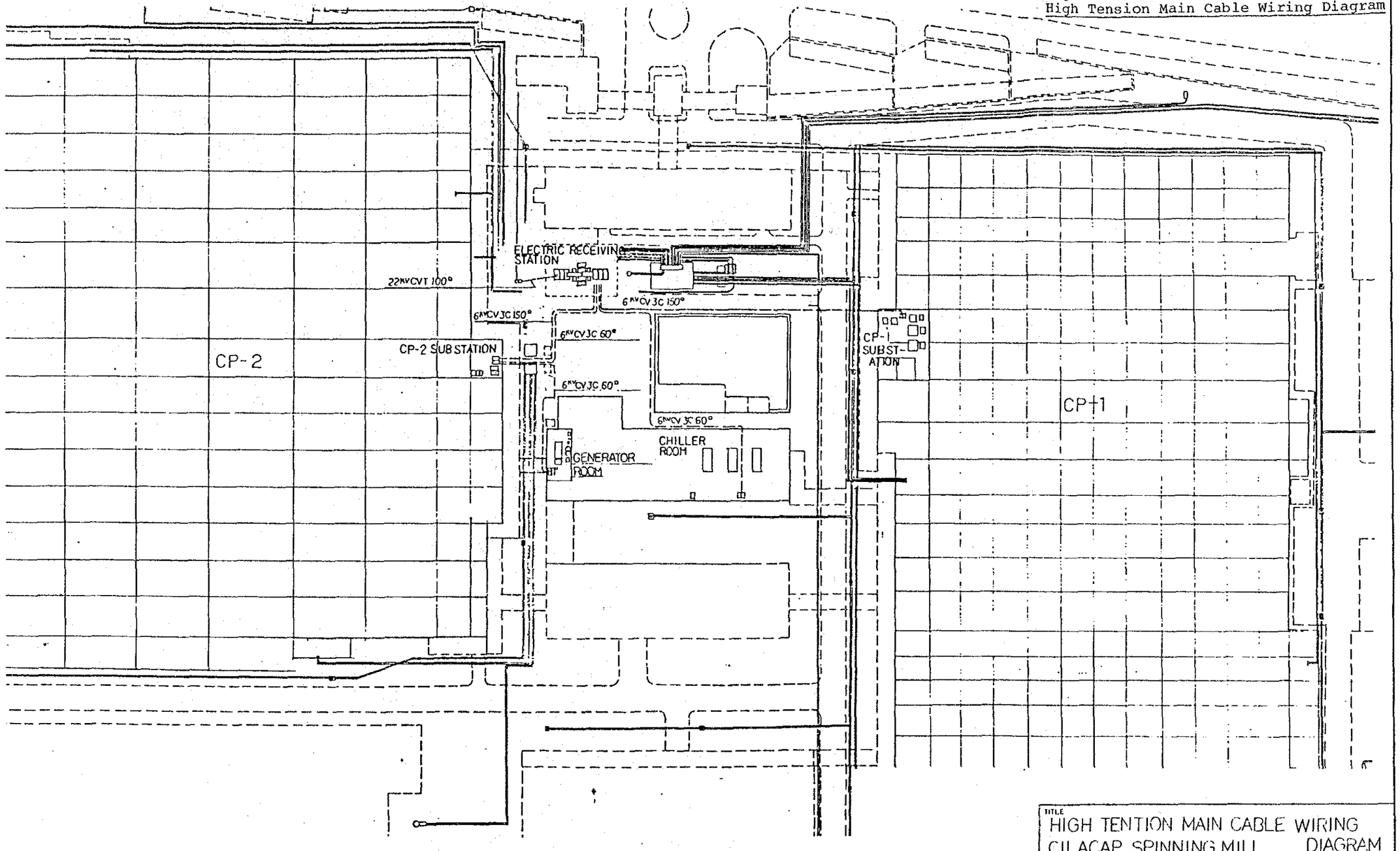
EXISTING



TITLE SINGLE LINE DIAGRAM
CILACAP SPINNING MILL

DRAWN BY	DATE 5.NOV.84.	SCALE NONE
CHECKED BY	DWG. NO.	
APPROVED BY	EX-146-E-01	△

Fig 13
High Tension Main Cable Wiring Diagram

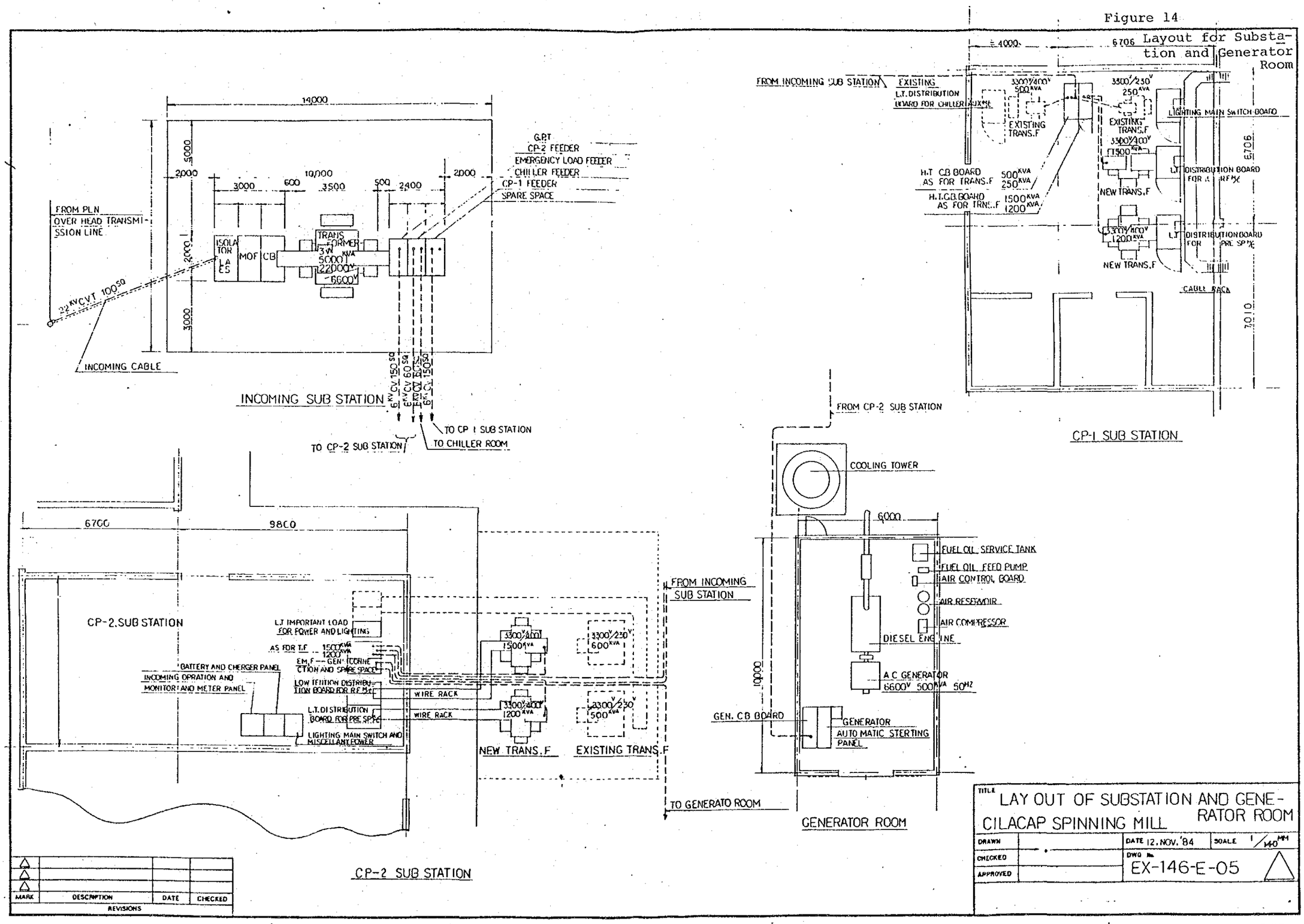


MARK	DESCRIPTION	DATE	CHECKED
	REVISIONS		

TITLE
HIGH TENTION MAIN CABLE WIRING DIAGRAM
CILACAP SPINNING MILL

DRAWN		DATE 5.NOV.'84	SCALE 1/730 min
CHECKED		DWG No.	EX-146-E-02
APPROVED			

Figure 14 Layout for Substation and Generator Room



MARK	DESCRIPTION	DATE	CHECKED
	REVISIONS		

TITLE: LAY OUT OF SUBSTATION AND GENERATOR ROOM
CILACAP SPINNING MILL

DRAWN		DATE 12. NOV. '84	SCALE 1/140 MM
CHECKED		DWG No. EX-146-E-05	
APPROVED			

Table 21 CALCULATION BASE for CAPACITY OF DISTRIBUTION TRANSFORMER

Machine/Equipment		Installed Power	Calculation Base
SPINNING MACHINERY FOR CP-1	Blow Room Carding Engine Pre-Drawing Frame Lap Former Comber Drawing Frame Roving Frame Air-conditioner for first-half spinning	63.5Kw 40.6 ") 103KW 2.3 × 54 = 124.2 4.85 × 5 = 24.3 5.2 × 3 = 15.6 5.2 × 22 = 114.4 4.85 × 10 = 48.5 12 × 9 = 108 14KW ∿ 22KW 126	Voltage 400V Total Installed Eff. 644kw Motor Eff. 90% Power Factor 80% Demand Ratio 90% $664 \times \frac{1}{0.9} \times \frac{1}{0.8} \times 0.9 = 830KVA$ In case Max. Load set at 75%, Capacity will be 1,107KVA. Therefore, a New Transformer with 1,200KVA shall be required.
	Ring Frame Winder RT Winder Compressor & Blower Air-conditioner for later-half Spinning	11.75 × 78 = 916.5 25.88 × 8 = 207 5.5 × 2 = 11 45 45 ∿ 22kw 252	Voltage 400V Total Installed Power 1,431.5KW $1,431.5 \times \frac{1}{0.9} \times \frac{1}{0.9} \times 0.9 = 1,590kw$ Although Power may be excess at the peak time, the Power will be within the Rated Capacity in usual use. Therefore, a New Transformer with 1,500KVA shall be required.
SPINNING MACHINERY FOR CP-2	Blow Room Carding Engine Pre-Drawing Frame Lap Former Comber Drawing Frame Roving Frame Air-conditionar for first-half Spinning Air-conditioner for later half Spinning	63.5 40.6 103 2.3 × 37 = 85.1 4.85 × 2 = 9.7 5.2 × 1 = 5.2 5.2 × 8 = 41.6 4.85 × 8 = 98.8 12 × 5 = 60 126 252	Voltage 400V Total Installed Power 721.4KW $721.4 \times \frac{1}{0.9} \times \frac{1}{0.8} \times 0.9 = 901.8KVA$ In case Max. Load 75%, Capacity will be 1,202KVA A New Transformer with 1,200KVA shall be required.
	Ring Frame Winder	11.75 × 74 = 869.5 25.55 × 8 = 207	Voltage 400V Total Installed Power 1,076.5KW $1,076.5 \times \frac{1}{0.9} \times \frac{1}{0.9} \times 0.9 = 1,196.1KVA$ A New Transformer with 1,500KVA shall be required.
	RT Winder, Re-winder Twisting Frame Reeling Winder Hank Cone Winder Well Pump Lighting & Miscellany	5.5 × 3 = 16.5 15 × 9 = 135 5.5 × 25 = 138 2.2 × 11 = 24.2 5.5 × 5 = 27.5 100	Voltage 230V Total Installed Power 441.2KW $441.2 \times \frac{1}{0.9} \times \frac{1}{0.8} \times 0.9 = 551.5KVA$ A Existing Transformer with 600KVA shall be required.
IMPORTANT LOAD	Feed Well Pump Auxiliary Equipment of Chiller No.1 Auxiliary Equipment of Chiller No.2 Auxiliary Equipment of Chiller No.3	37.0 × 3 = 111 22 ∿ 37 × 3 = 89 89 89	Voltage 400V Total Installed Power 378KW $378 \times \frac{1}{0.9} \times \frac{1}{0.9} \times 0.9 = 420KVA$ A Existing Transformer with 500KVA shall be required.
	Well Pump Yarn Dyeing Sprinkler Hydrant Lighting for Emergency Others	5.5 × 5 = 27.5 50KW 80" 15" 41" 10"	Voltage 230V Total Installed Power 223.5KW $223.5 \times \frac{1}{0.9} \times \frac{1}{0.8} \times 0.9 = 279.4KVA$ A Existing Transformer with 500KVA shall be required.
OTHERS	Lighting Miscellany	65.4 30	Voltage 230V Total Installed Power 95.4KW Power Factor 0.5 $95.4 \times \frac{1}{0.5} = 190.8KVA$ A Existing Transformer 250KVA shall be required.

4) Refrigerating Facility:

From the 6KV chiller feeder board, power to 3 sets of refrigerators is to be supplied through a cable, which is separated into each for 3 sets at the 6KV switch board and connected to the starting board of each refrigerator. The low voltage power source for auxiliary equipments receives its power supply from the power board for auxiliary equipments of the refrigerator installed in the sub-station in CP-1, then is connected to the 400V low voltage power control board in the refrigerator room.

5) Generating Facility for Emergency Use:

Load and Capacity:

Table 22 Load and Rough Estimate of Capacity

Item	Installed Capacity (KW)	Load (KVA)	Kind of Load
About 1/3 of electric lights	about 50	about 100	all the time
Major processes in yarn dyeing facility	about 150	about 180	all the time
Pumps for well, 5.5KW x 5 sets	27.5	34	all the time
Fire extinguishing pump	15	19	
Sprinkler pump	80	100	
Battery charger	2	2	all the time
Refrigerator heater	3	3	all the time
Auxiliary equipments for generator	about 10	12	while generator in operation
Total	337.5	450	Total for all the time load: 331KVA

Installed Place:

Outside of the sub-station housing in CP-2, a housing is newly built, or the iron works shop is partitioned by a sound proof wall, where it is to be installed.

Source of Cooling Water:

Water in the reservoir is to be used.

Starting Method:

To be started manually after power stoppage is confirmed.

Required time for starting (at loadable condition): 3 – 5 minutes.

6) Switching of Important Load:

The load for the aforesaid uses are applied to the dedicated transformer, where at the primary side (6KV), supply is always received from the feeder board at the buying power side, and when the power is stopped, is automatically cut by a low voltage relay.

After the generator has started and the voltage reached to the prescribed level, provided that the emergency load feeder CB at the buying power side is switched off, the

generator CB is manually set into motion. After the receiving power is stopped, about 10 minutes are required for supply of power to the important loads. After the receiving power is restored, the generator CB is switched off after confirming the receiving power voltage having reached to the required level, then the emergency load feeder CB at the receiving power side is switched in. The required switching time from the generation to the power receiving will be about 10 seconds.

7) Low Voltage Power Wiring within the mill (Refer to Figure 15 and 16):

(a) Main Cable:

For distributing wiring from the low voltage power switch boards in sub-stations in CP-1 and CP-2 to the each power switch board in each Mill, cables of 600V CV3C are used, which are laid in cable racks set on the Mill's structure beams.

For nearer distance which is partially involved, the wiring will be by insulated wiring by polyvinyl buried under ground. By work process and capacity, the section for one circuit is to be set as follows:

Maximum 230KW (380V circuit) 450A 3C 250 sq
Standard 200KW (380V circuit) 340A 3C 200 sq

(b) Power Switch Board:

Closed independent type no-fuse breakers are to be equipped at appropriate places for each work process. For the switch board, 500V no-fuse breaker is used, while for the starter board for air-conditioning motor, a motor breaker is used.

Generally, when switch boards are located near to each other and not many feeders are equipped, it is the usual practice that those switch boards are concentrated into the single-type panel.

(c) Power Wiring:

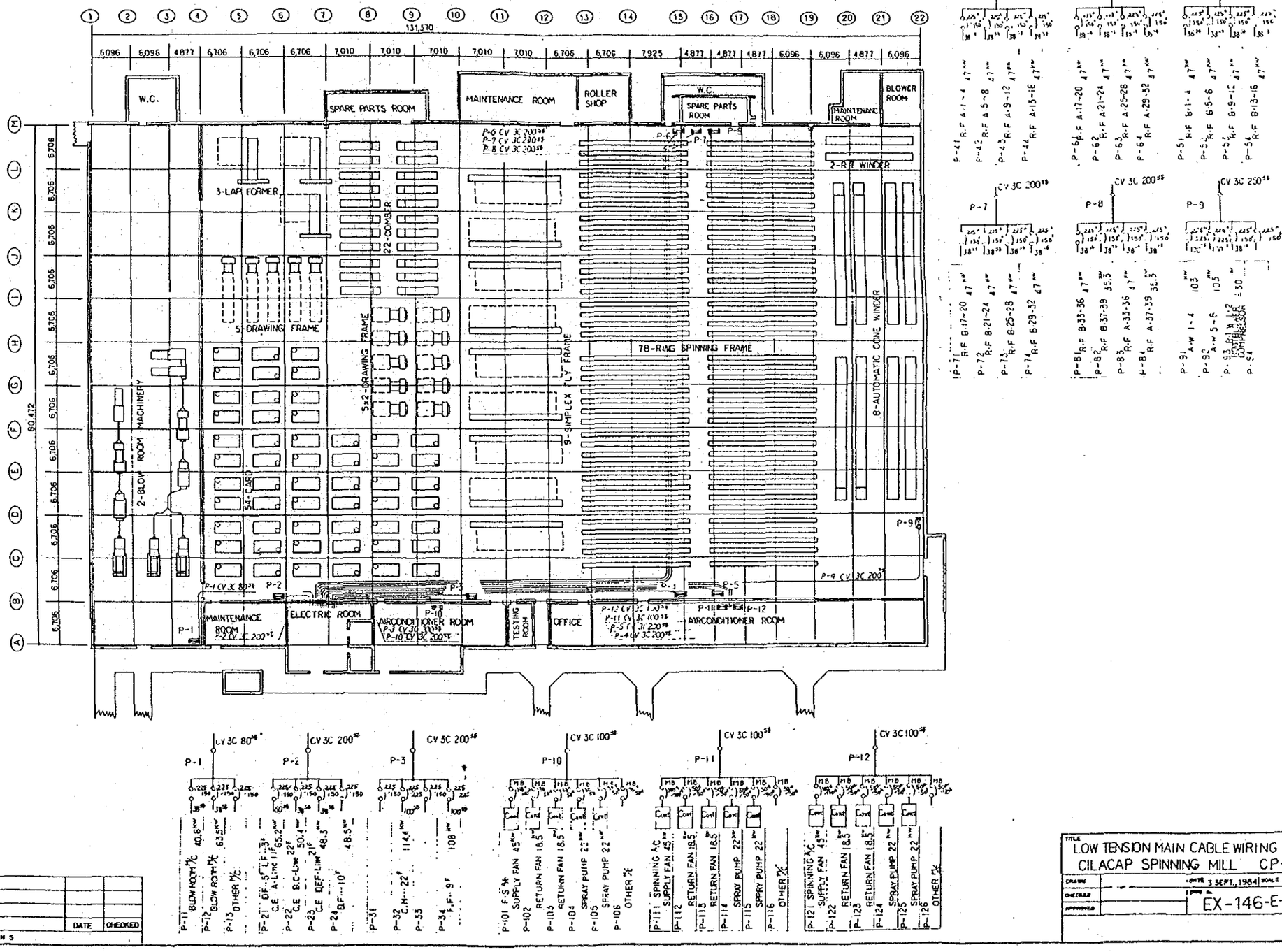
For power wiring from the switch boards, 600V electric cables insulated by polyvinyl are used by leading through conduit tubes. Electric cables to be used for the branch circuit is selected in accordance with the Electric Facilities Technical Standard. Namely, when the length of an electric cable in a branch circuit from the trunk cable is more than 8 m, the using cable shall be with the allowable current value of more than 35% (when less than 8 m, more than 55%) of the breaker trip current value.

(d) Earth Line:

From each sub-station for distribution, parallel with trunk cables for the low voltage power, earthing trunk cables of insulated wires with polyvinyl are to be installed.

The earthing cable is set in the conduit tube from each power switch board to be connected to contactor and motor of each machine.

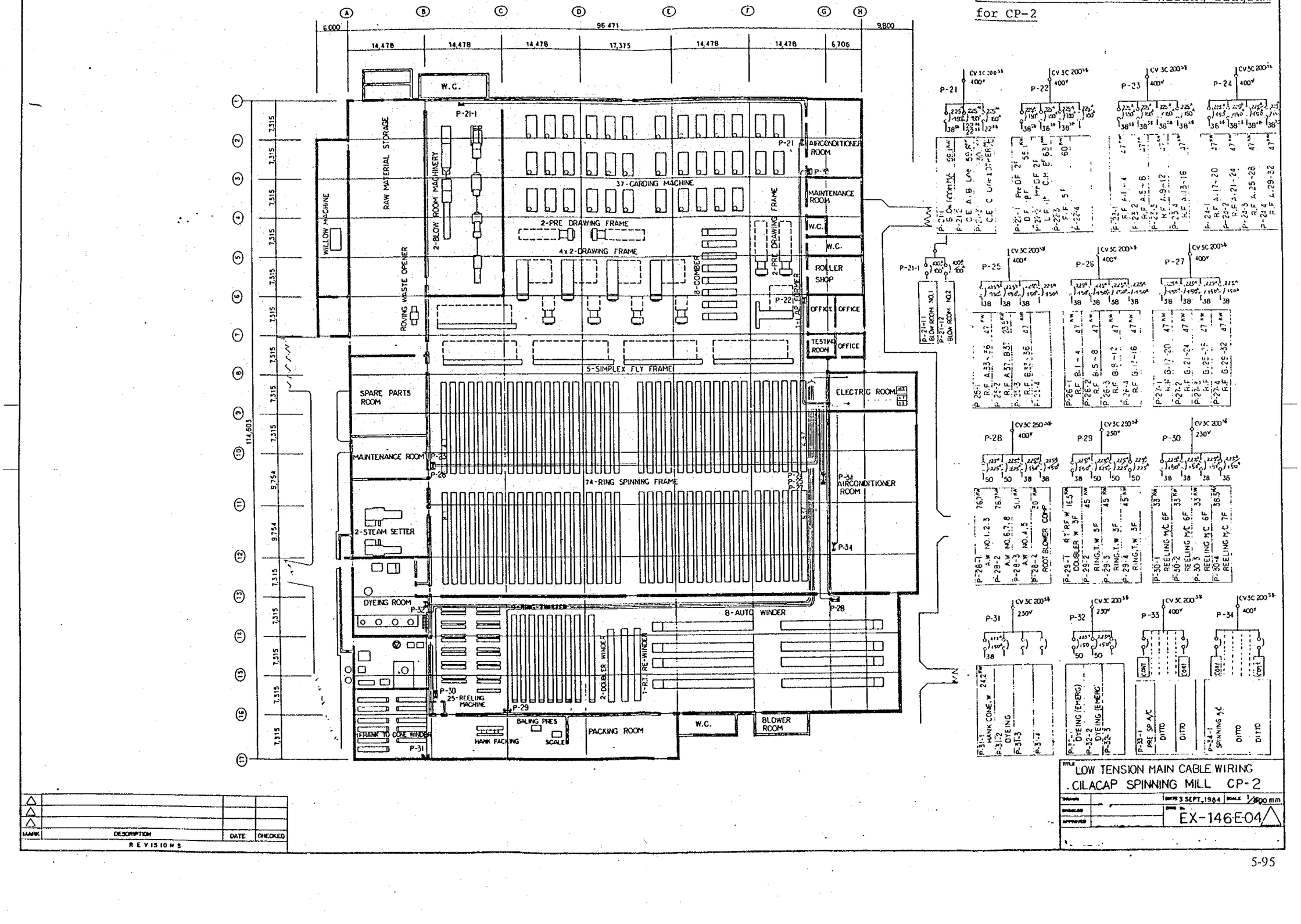
Figure 15
Low Tension Main Cable Wiring Diagram
for CP-1



MARK	DESCRIPTION	DATE	CHECKED
	REVISIONS		

TITLE	LOW TENSION MAIN CABLE WIRING CILACAP SPINNING MILL CP-1
DRAWN	DATE 3 SEPT, 1984 SCALE 1/600 (M)
CHECKED	DWG No. EX-146-E-03
APPROVED	

Figure 16
Low Tension Main Cable Wiring Diagram for CP-2



MARK	DESCRIPTION	DATE	CHECKED
	REVISIONS		

8) Electrical Lighting Facility:

(a) For illumination of production facilities in the Mill, 2-bulbs incandescent electric lamp, 40W with a reflective shade, is used, and where there is no ceiling, the illumination is provided by means of the race way. As for fixture at the ceiling the lights are attached to the ceiling direct.

(b) Target Luminous Intensity by Work Process and Outlined Numbers of Electric Lights equipped:

Table 23 Target Luminous Intensity by Work Process

Work Process	Initial luminous intensity (LX)	Luminous intensity after about 1 year (LX)
Mixing and Blowing	180	100
Carding	220	120
Drawing/Combing	320	180
Roving	350	200
Ring Spinning	350	200
Winding	350	200
Yarn Dyeing	350	200

Table 24 NO. OF ELECTRIC LIGHTS PER PROCESS

Process/Room	Room Space	Standard Luminous Intensity	Required No. of Lights ($FL40^{W}$x2/set)	Installed No. of Electric Lights	Break Down	
					Emergency Use	Regular Use
	m^2	Lux	set	set	set	set
CP-1 Mill						
Bale Opening Room	578	50	10.8	15	–	15
Blow Room	799	100	40	52	15	37
Carding Engine	3,026	120	227	227	30	150
Drawing Frame/Comber		180				
Roving Frame	1,292	200	129	130	30	100
Ring Spinning Frame	2,952	200	295	308	44	264
Winder	1,107	200	95	102	18	84
Testing Room	23.5	200	2.8	3	3	0
Roller Shop	56	120	4.0	6	–	6
Other Rooms	1,110	80 ~ 100	–	69	31	38
Total	–	–	–	912 sets	171	741
CP-2 Mill						
Waste Opener/ Raw Material Storage	905	100 50	21.6	24	–	24
Blow Room	529	100	26.5	36	12	24
Carding Engine	1,254	120	75.2	76	17	59
Drawing Frame/Comber	1,254	180	113	115	20	95
Roving Frame	619	200	61.9	62	30	32
Ring Spinning Frame	3,113	200	311	320	44	276
Winder	1,936	200	145	150	50	100
Packing Room	330	100	16.5	24	–	24
Hank Cone Winder	322	200	30.9	35	5	30
Yarn Dyeing	203	200	18.2	20	20	0
Steam Setter	203	100	10.2	10	10	0
Other Rooms	1,456	80 ~ 100	–	69	35	34
Total	–	–	–	941 sets	243	698

(c) Fluorescent Lamps:

Use of rapid-start type lamps is desirable, however, as the fluorescent lamps available in Indonesia are limited to those of glow-starter type, unavoidably we use the fluorescent lamps of glow-starter type. The lamp to be used is with reflective shade and exposed, and in units of 40W x 2 lamps and 40W x 1 lamp.

(d) Power Distribution Panel for Electric Lamps:

The panel is the closed type no-fuse breaker panel attached to the wall. The trunk cable leading from the main power panel is of 3-phases 3 line system, which is set in the distribution panel to be balanced.

5-3-2 Electricity Facilities List and Specification:

Table 25 indicates the electrical facilities and their specifications based on the particulars described in the outline of the electrical facilities in the preceding item. They are shown for each of CP-1 and CP-2, as well as for both of them.

Table 25 SPECIFICATION FOR ELECTRIC EQUIPMENT

Item No.	Machine/Specification		Quantity
(for CP-1 & CP-2)			
RE-1/2-1	Incoming Substation		1 lot
	1) Incoming Copper Wire Cable	1 lot	
	Voltage	20 KV	
	Type	C.V.T.	
	Size	100 mm²	
	2) Incoming Isolator Board	1 unit	
	Outdoor, cubic type		
	3 pole Disconnecting Switch		
	Voltage	24 KV	
	Current	400A	
	Lighting Arrester		
	Voltage	24A	
	Earth Switch		
	3) Metering Outfit Board	1 unit	
	Metering Outfit	22KV/110V	
		200A/5A	
	Watthour Meter	3φ, 110V, 5A	
	Varhour Meter	3φ, 110V, 5A	
	4) Incoming Circuit Breaker Board	1 unit	
	Type: Vacuum Circuit Breaker		
	Voltage	24KV	
	Rating Current	600A	
	Short-circuit Breaker Current	25KA	
	Operation	DC100V Solenoid	
	5) H.T. Cable Duct for 20KV C.V.T. Cable	1 unit	
	6) Main Transformer	1 unit	
	Type: Oil-immersed, Self Cooling		
	Capacity	5,000KVA	

Item No.	Machine/Specification	Quantity
	Frequency 50Hz	
	Primary Voltage 22,000V (1,000V Step 5 Tap)	
	Secondary Voltage 6,600V	
	Connection Delta-star	
	7) 6.6KV Distribution System	1 unit
	Type: Enclosed Vermin Proof with lock-door	
	Circuit Breaker for 6.6KV	4 sets
	Truck type Switch Gear	
	Voltage 7.2 KV	
	Current 600A	
	Short-circuit Break Current 12.5A	
	Operation D.C. 100V	
	Current Transformer 6.9KV, 400A/5A	
	Zero Phase Current Transformer	
	8) 6.6KV Bus Duct (3 Phase 3 Wire Copper)	1 unit
	Voltage 6.9KV	
	Current 700A	
	9) Grand Voltage Transformer	1 unit
	Phase 3ϕ	
	Voltage 6,600V, 110V, 119V/3	
	10) D.C. Electric Power Source Equipment	1 unit
	Metal enclosed, cubicle	
	Battery (Lead Acid) 100V, 50AHr	1 set
	Floating Battery Charger	
	Installed in Substation for CP-2	
	Input Voltage 3ϕ, 200V	
	Output Voltage DC 125V	
	11) Supervisory Control Panel	1 unit
	Indoor, Metal Closed, Cubicle	
	Remote Supervision of Incoming Circuit Breaker and 6.6KV Feeder Circuit Breaker	
	12) Earthing Device	1 lot
	22KV Lighting Arrester Use	below 5 ohm
	22KV and 6.6KV Incoming Substation	below 10 ohm
(for CP-1)		
RE-1-1	Secondary Substation	1 lot
	1) Distribution Board for Transformer	2 units
	Indoor type, with lock-door	
	(a) -Potential Transformer	
	Phase 1ϕ	
	Voltage 6,600V/110V	
	-Circuit Breaker for 1,500KVA Transformer	

Item No.	Machine/Specification	Quantity
	-Circuit Breaker for 1,200KVA Transformer	
	Truck Type, Switch Gear V.C.B.	
	Voltage 7.2KV	
	Rated Current 600A	
	Current Transformer 200A/5A	
	(b) -Circuit Breaker for Lighting Transformer	
	-Circuit Breaker for H.T. Motor of Chiller	
	Voltage 7.2KV	
	Rated Current 600A	
	Current Transformer 200A/5A	
	2) Distribution Transformer	1 unit
	Type: Oil-immersed, Self Cooling	
	Capacity 3 phase 1,500 KVA	
	Primary Voltage 6,900, 6,600, 6,300, 6,000V	
	Secondary Voltage 400V	
	Connection Delta-star	
	3) Distribution Transformer	1 unit
	Capacity 3 phase 1,200KVA	
	4) Bus Duct for Secondary-side of Transformer	2 units
	Indoor type 3 phase 3 wire	
	Capacity 600V 2,500A	
	5) Low Tension Distribution Panel	1 lot
	Indoor enclosed no fuse Breaker (NFB)	
	Board	1 set
	NFB Board for first-half Spinning	1 set
	NFB 600V 400AF/400AT	4 circuit
	NFB 600V 400AF/300AT	4 circuit
	NFB Board for later-half Spinning	1 set
	NFB 600V 600AF/500AT	1 circuit
	NFB 600V 400AF/400AT	7 circuit
	Low Tension Distribution Panel for Lighting	1 set
	NFB 250V 100AF/100AT	7 circuit
	NFB 250V 100AF/50 AT	3 circuit
(for CP-2)		
RE-2-1	Secondary Substation	1 lot
	1) Circuit Breaker Board for Distribution Transformer	1 unit
	Type: Indoor cubicle, with lock-door	
	Voltage Transformer	1 set
	Phase 1ϕ x 2 pcs	
	Voltage 6,600V/110V	
	Circuit Breaker for 1,500KVA Transformer	1 set

Item No.	Machine/Specification	Quantity
	Circuit Breaker for 1,200KVA Transformer	1 set
	Truck Type, Switch Gear V.C.B.	
	Voltage 7.2KV	
	Rated Current 600A	
	Current Transformer 200A/5A	
	2) Distribution Transformer	1 unit
	Type: Oil-immersed, Self Cooling	
	Capacity 3 Phase 1,500KVA	
	Primary Voltage 6,900, 6,600, 6,300, 6,000V	
	Secondary Voltage 400V	
	Connection Delta-star	
	3) Distribution Transformer	1 unit
	Capacity 3 phase 1,200KVA	
	4) Materials of Low Tension Distribution Panal for Production Machinery	1 lot
	NFB Board for first-half Spinning Machinery	
	NFB 600V 400AF/400AT . . . . . 4 circuit	
	NFB 600V 225AF/225AT . . . . . 2 circuit	
	NFB Board for later-half Spinning Machinery	
	NFB 600V 600AF/500AT . . . . . 1 circuit	
	NFB 600V 400AF/400AT . . . . . 7 circuit	
	5) Main Switch Board for Lighting	1 lot
	Indoor enclosed, NFB Board	
	NFB 250V 100AF/100AT . . . . 10 circuit	
(for CP-1 & CP-2)		
RE-1/2-2	H.T. Equipment for Chiller	1 lot
	6.6KV H.T. Switch Board for Chiller Motor	3 units
	Indoor enclosed cubicle, with lock-door	
	Voltage 7.2KV	
	Current 200A	
(for CP-1 & CP-2)		
RE-1/2-3	H.T. Distribution Equipment of Important Load	1 lot
	Indoor cubicle, with lock-door	
	NFB Board for Power and Lighting	
	NFB 250V 400AF/400AT . . . . . 2 circuit	
	NFB 250V 400AF/300AT . . . . . 1 circuit	
	NFB 250V 225AF/225AT . . . . . 1 circuit	
	NFB 250V 100AF/100AT . . . . . 2 circuit	
RE-1/2-4	Diesel Generator System	1 lot
	1) Diesel Engine Generator Equipment	1 lot
	Engine Output 600 pcs	

Item No.	Machine/Specification		Quantity
	Generator Capacity	500KVA	
	Generator Voltage	6,600V	
	2) Automatic Starting Panel	1 unit	
	3) Circuit Breaker Panel	1 unit	
	V.C.B.	7.2KV 400A	
(for CP-1)			
RE-1-2	L.T. Power Wiring Equipment		1 lot
	Number of Board:	12 units	
(for CP-2)			
RE-2-2	L.T. Power Wiring Equipment		1 lot
	Number of Board:	16 units	
(for CP-1 & CP-2)			
RE-1/2-5	L.T. Power Wiring Equipment for Chiller Room		1 lot
	Number of Board:	4 units	

* Regarding RE-1-2, RE-2-2 and RE-1/2-5

– Wiring Scope

From low tension (L.T.) distribution board in secondary substation for CP-1 or CP-2 to control panel for production machinery which is wupplied by machine manufacturer through local distribution board.

– Wiring Condition

(a) From low tension distribution board to local distribution Board: Cable Tray

(b) From local distribution to control panel for production Machinery: Underground buried pipe and/or underground pit

– Local Distribution Board

Type: Indoor, Self-standing
Metal enclosed with lock-door

No Fuse Breaker: Breaking Current 30KA

(Reference to Figures 15 & 16)

(for CP-1)			
RE-1-3	Lighting Equipment		1 lot
	1) Local Distribution Board	7 units	
	Number of Branch:	10 to 6 each Board	
	2) Lighting Fixture		
	(a) Fluorescent Light	912 pcs	
	(b) Incandescent Light for Filter Room	30 pcs	
	60W to 100W, 220V, with Globe		

Item No.	Machine/Specification	Quantity
(for CP-2)		
RE-2-3	Lighting Equipment	1 lot
	1) Local Distribution Board 7 units	
	Number of Branch: 10 to 6 each Board	
	2) Lighting Fixture	
	(a) Fluorescent Light 941 pcs	
	(b) Incandescent Light for Filter Room 30 pcs	
	60W to 100W, 220V with Globe	
(for CP-1 & CP-2)		
RE-1/2-6	Lighting Equipment for utility	1 lot
	1) Local Distribution Board 1 unit	
	Number of Branch: 6 circuit	
	2) Lighting Fixture	
	(a) Fluorescent Light 50 pcs	

Regarding RE-1-3, RE-2-3 and RE-1/2-6,

- Local Distribution Board
  Type: Wall mounted no Fuse Breaker (NFB) Board
  NFB: 250V 3 pole, 20A or 15A

- Fluorescent Light
  40W x 2, 220V, Glow Start Type
  White Colour, with Reflector Shade
  Low Power Factor

5-3-3 Outline of Utility Facility

1) Air Conditioning Facility:

(a) Outline of Air Conditioning Facility:

Adjusting air condition is very important factor not only in respect of maintaining working environment, but also in regard of the efficiency in working process, as well as improvement in quality of products. Particularly, in spinning process, it is important to maintain humidity at a prescribed level in a certain range of temperature, on which the productivity depends. Therefore, under this project, a system is to be adopted where the mill's inside is equipped with a full-scaled central-type air conditioning facility and temperature and humidity are controlled within a prescribed standard range.

Tables 26 and 27 indicate the temperature and humidity conditions outside and inside a building, and Figure 17 shows positioning of the utility facilities.

Table 26 Outdoor Condition

	Dry bulb °C Temperature	Wet bulb °C Temperature	Relative % Humidity
Maximum Temperature	33.0	27.0	63
Minimum Temperature	20.5	20.0	95

Table 27 Indoor Condition

Production Process	Dry bulb °C Temperature	Relative % Humidity
Mixing and Blowing	28.0 ± 3	65 ± 5
Carding	29.0 ± 3	55 ± 5
Drawing ~ Roving	29.0 ± 3	55 ± 5
Ring Spinning	29.0 ± 3	55 ± 5
Winding and Twisting	28.0 ± 3	65 ± 5
Laboratory A	27.0 ± 3	55 ± 5
Laboratory B (Constant Temp.)	20.0 ± 2	65 ± 2

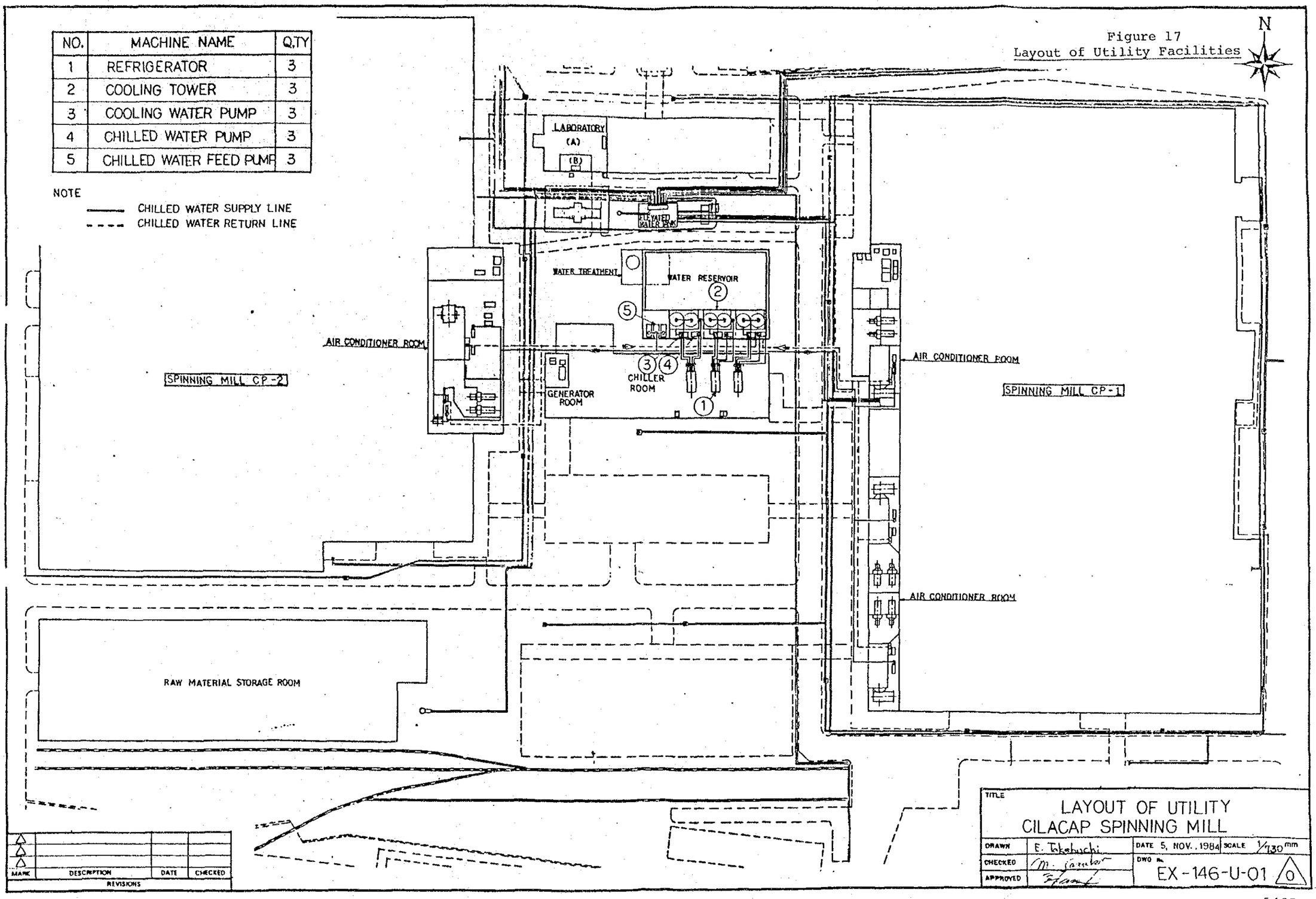
Figure 17
Layout of Utility Facilities

NO.	MACHINE NAME	Q.TY
1	REFRIGERATOR	3
2	COOLING TOWER	3
3	COOLING WATER PUMP	3
4	CHILLED WATER PUMP	3
5	CHILLED WATER FEED PUMP	3

NOTE

——— CHILLED WATER SUPPLY LINE

- - - - CHILLED WATER RETURN LINE



MARK	DESCRIPTION	DATE	CHECKED
	REVISIONS		

TITLE	LAYOUT OF UTILITY CILACAP SPINNING MILL		
DRAWN	E. Takeuchi	DATE 5, NOV., 1984	SCALE 1/730 mm
CHECKED	M. Sazaki	DWG No.	EX-146-U-01
APPROVED			0

(b) Specification of Air Conditioning Facility in CP-1 Mill:

In production processes in the spinning, the specific temperature and humidity are required for each production process.

By calculating load conditions for each production process, the required capacity of the air conditioner is set as follows;

Blowing volume 2,500 m^3/min. : 3 sets

3 sets of air conditioner is to be equipped for all production process, of which blowing volume is determined correspondingly to the load condition at the production process concerned.

An automatic cleaning filter is to be provided for each return air to remove floating fiber and clean up inside a room, as well as to clean the air being discharged outside of the mill, avoiding environment pollution. Further, soils in air conditioners and ducts are lessened. Exhaust air mixed with floating fiber from various machines during process from the drawing frame to the fly frame and ring spinning frame flows through an underground duct to be collected and got rid of the floating fiber at the aforesaid automatic cleaning filter, and cleaned air will be returned to the air conditioner. As high humidity is required in the mixing and blowing as well as automatic winding processes, a direct humidifier is also used at the same time.

Further, in order to save energy, a centralized blower is equipped in the automatic winder, whereby the exhaust air of high temperature is discharged directly to outside of the room through a exhaust duct. Based on the above idea, the air conditioning plan for CP-1 mill is shown in Figure 18.

All existing facilities are to be disassembled, removed and replaced by new ones. Air conditioners, blowers, pumps and air return filters are to be supplied in units or prefabricated conditions from foreign countries to be installed at site.

Air conditioning ducts (including duct materials and hanging metal fixtures) are to be procured, processed and fitted locally, however, they should be strictly checked of their quality and anti-corrosion measures against exfoliation of zinc etc. should be carried out.

Other parts than the air conditioning duct are to be supplied from foreign countries to be processed and fitted locally.

Automatic control equipments and direct spraying devices are to be supplied from foreign countries to be installed locally.

Auxiliary materials are to be procured and installed locally.

The painting materials, excluding special paints such as tar epoxy paint, are to be procured locally for coating works. The basic design is to be supplied from Japan.

(c) Specification of Air Conditioning Facility in CP-2 mill:

Figure 19 indicates the air conditioning plan for CP-2 mill.

The basic idea is alike to that for CP-1, however, it differs from CP-1 in that the existing facilities are used in CP-2. By visual checks, it is noted that the following equipments could be still used in future;

- Supply and return duct for blowing: 1 set
- Air conditioner's casing for prespinning and ring spinning processes, as well as concrete water tank: 1 set
- Air conditioner for winding process and supply fan: 1 set

• A part of return fan

However, there may be a case where repairs are required as a result of further check for detail.

Capacity of the air conditioner shall be as follows;

Blowing volume for prespinning and ring spinning process: 6,250 m^3/min. 1 set
Blowing volume for winding process: 1,150 m^3/min. 1 set

Other specifications are same with that for CP-1.
Further, the regulations to adhere to;

JIS (Japan Industrial Standards)
HASS (Regulations of Japan Air-conditioning & Safety Standards)

2) Dust-collecting Facilities:

(a) Summary:

The dust-collecting work is considered for the carding engine.

In particular, to maintain high quality of products and to keep better working environment, the exhaust air is to be absorbed by a centralized duct to be separated into the floating fiber and the return air. Then the system discharges the floating fiber automatically to outside and the return air is sent back to the air conditioner.

(b) Specification of Dust-collecting Facility for CP-1 mill:
(Refer to the positioning chart of air conditioning facility in Figure 18)

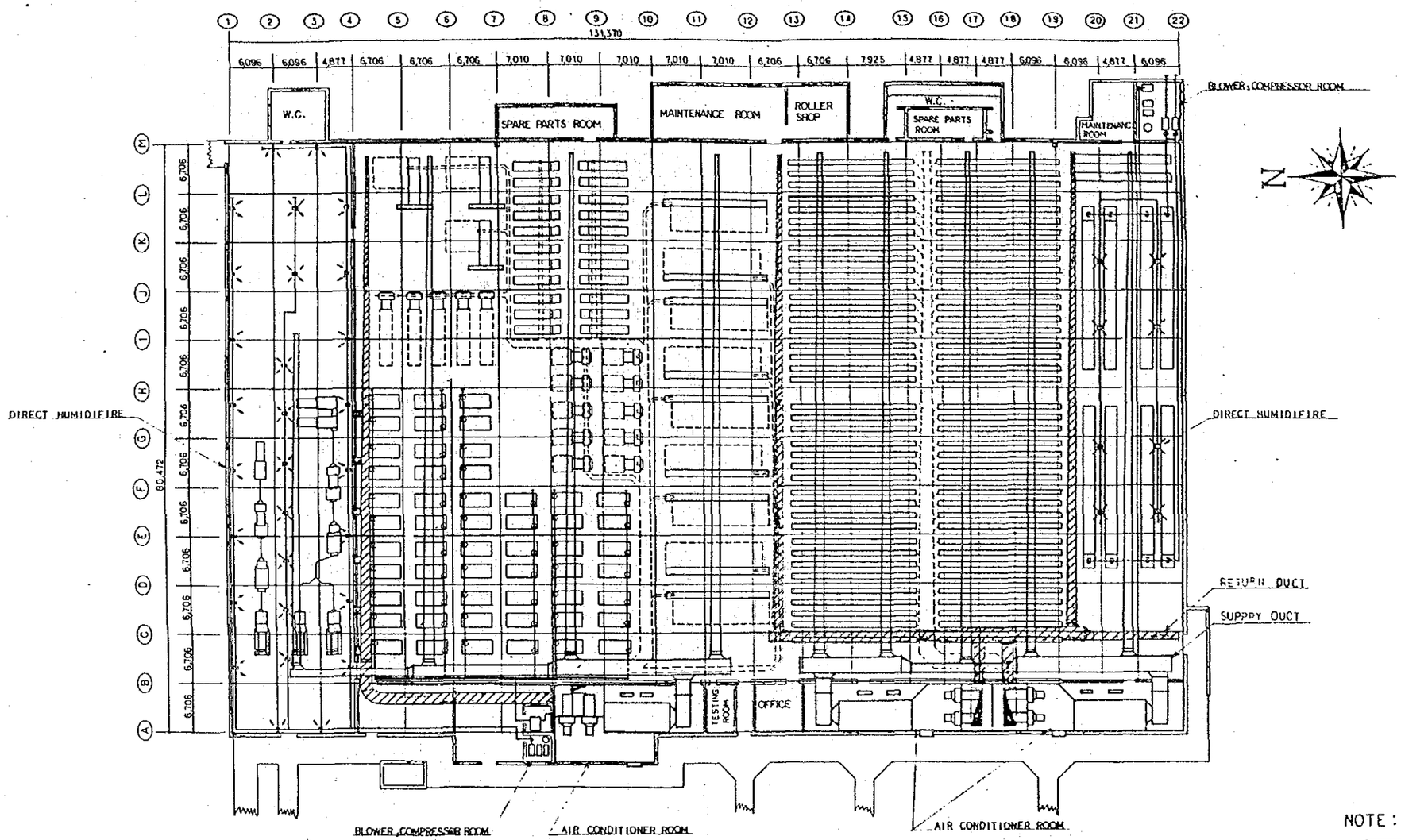
Air volume for dust collection is to be set at 650 m^3/min. Materials and hanging metal fixtures for the centralized duct are to be procured, processed and fitted locally, however, the special attention must be paid to that the duct does not catch a floating fiber inside, nor has any air leak. It should be required that inside the duct a fire preventive damper to prevent a fire caused by the carding engine from expanding should be installed. Other equipments and parts are to be supplied from foreign countries in units or prefabricated condition to be fitted locally.

(c) Specification of Dust-collecting Facility for CP-2 mill:
(Refer to the positioning chart of air conditioning facility in Figure 19)

Suction volume for dust collection is to be set at 450 m^3/min. The other specifications are alike to that applicable to CP-1.

Figure 18

Air Conditioning Plan for CP-1



NOTE :

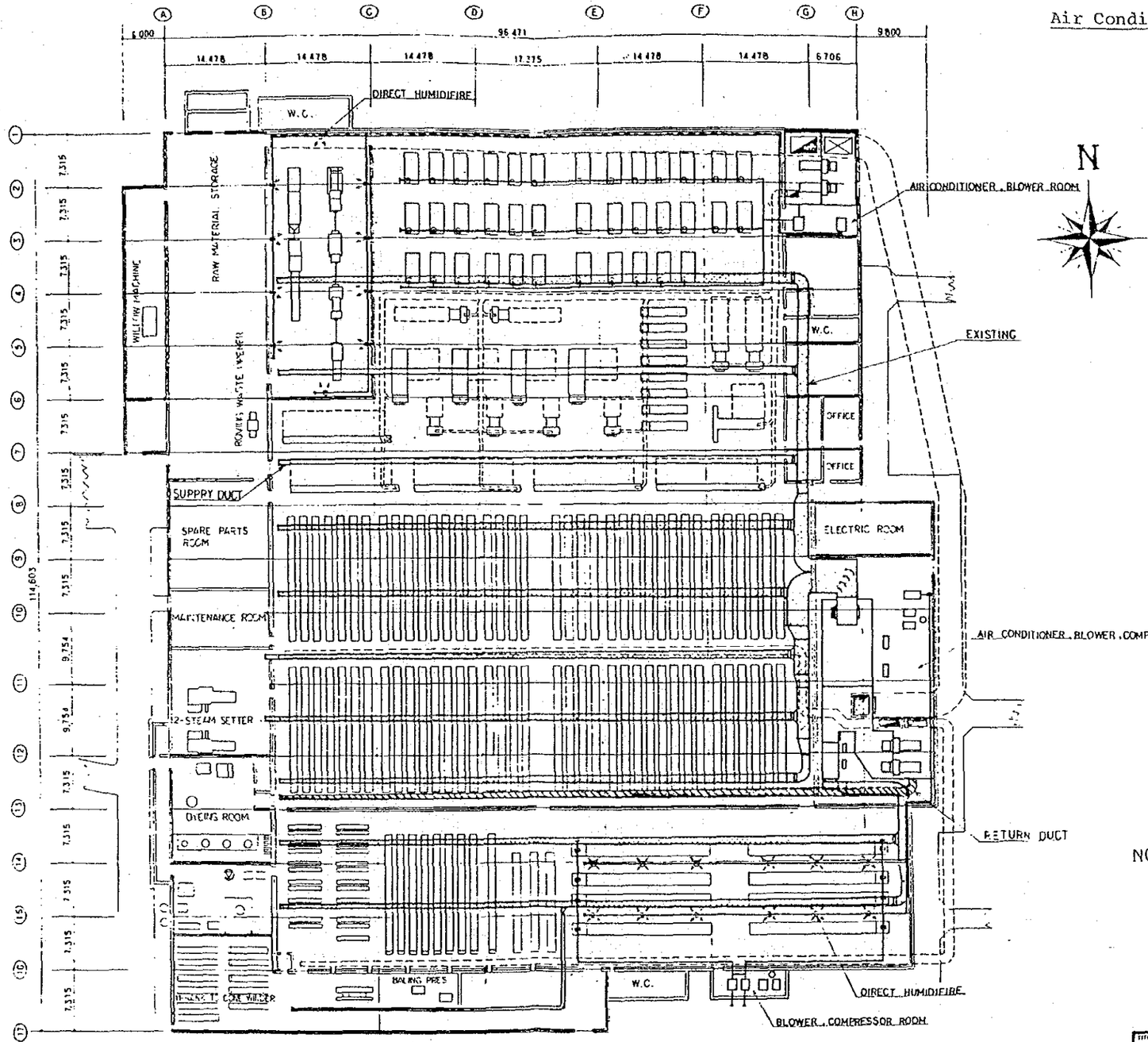
- SUPPRY DUCT
- RETURN DUCT
- UNDERGROUND DUCT

MARK	DESCRIPTION	DATE	CHECKED
	REVISIONS		

TITLE	AIR CONDITIONING PLAN CILACAP SPINNING MILL CP-1		
DRAWN	E. Tokuyoshi	DATE 14, SEP, 1984	SCALE 1/600 mm
CHECKED		DWG NO. EX-146-U-1	0
APPROVED			

Figure 19

Air Conditioning Plan for CP-2



NOTE:

- SUPPRY DUCT
- RETURN DUCT
- UNDERGROUND DUCT
- EXISTING

MARK	DESCRIPTION	DATE	CHECKED
	REVISIONS		

TITLE: AIR CONDITIONING PLAN
CILACAP SPINNING MILL CP-2

DRAWN	E. Takeuchi	DATE 28,SEP,1984	SCALE 1/600 mm
CHECKED	M. Tokuda	DWG No.	EX-146-U-2 0
APPROVED			

3) Refrigerator:

(a) Summary:

Each air conditioner installed in CP-1 and CP-2 is to maintain temperature and humidity of the discharge air from the air conditioner at the prescribed level by means of the chilled water being sent from the central refrigerator. The chilled water once returned to the chilled water tank is again supplied to the refrigerator.

As the auxiliary equipments to the refrigerator, a cooling tower and cooling water pump are to be used.

(b) Specification:

The facilities in CP-1 and CP-2 Mills are to be centralized and located at the center of each Mill. The refrigerating capacity, as calculated from the load on the air conditioning facility, is set to be as follows:

Refrigerating capacity: 600 US Rt., 3 sets

3 sets are to be installed, with 2 sets to be operated always and 2 set held in standby condition. Refrigerators are to be installed in existing iron work shop. The cooling tower is to be erected at the same place with the existing one which is to be removed before the erection. The cooling water pump, chilled water pump and chilled water feeding pump are to be installed near the refrigerator.

The refrigerator includes the standard type and the energy-saving type, which according to data from makers concerned can be classified as follows;

Item \ Type	Standard Type	Energy-saving Type
Motor Output	430 ~ 450 KW	360 ~ 380 KW
Price Ratio	1	1.15

Under this project, the above energy-saving type is choiced for promotion of the energy savement to be imported from a foreign country. Similarly other machines are also to be purchased from foreign countries to be assembled and installed at the site.

However, in order to prevent corrosion and scaling, the water quality must be sufficiently checked beforehands.

4) Water Treatment Facility:

(a) Summary:

The water pumped up at each well is sent to the raw water tank.

The water in the raw water tank is then sent to the quick filtration tower and further sent to the disposal tank after having been filtered. The system thus supplies the water from the disposal tank to places of use by means of each feeding pump. As the auxiliary equipments, a water-sofening device and anti-corrosive agent feeding device to cooling water for the refrigerating facility are to be installed. Water consumption volume is shown in Table 28.

In order to prevent deterioration of water quality due to salification of the well water as well, it should be required that endeavour is made to decrease water consumption volume furthermore.

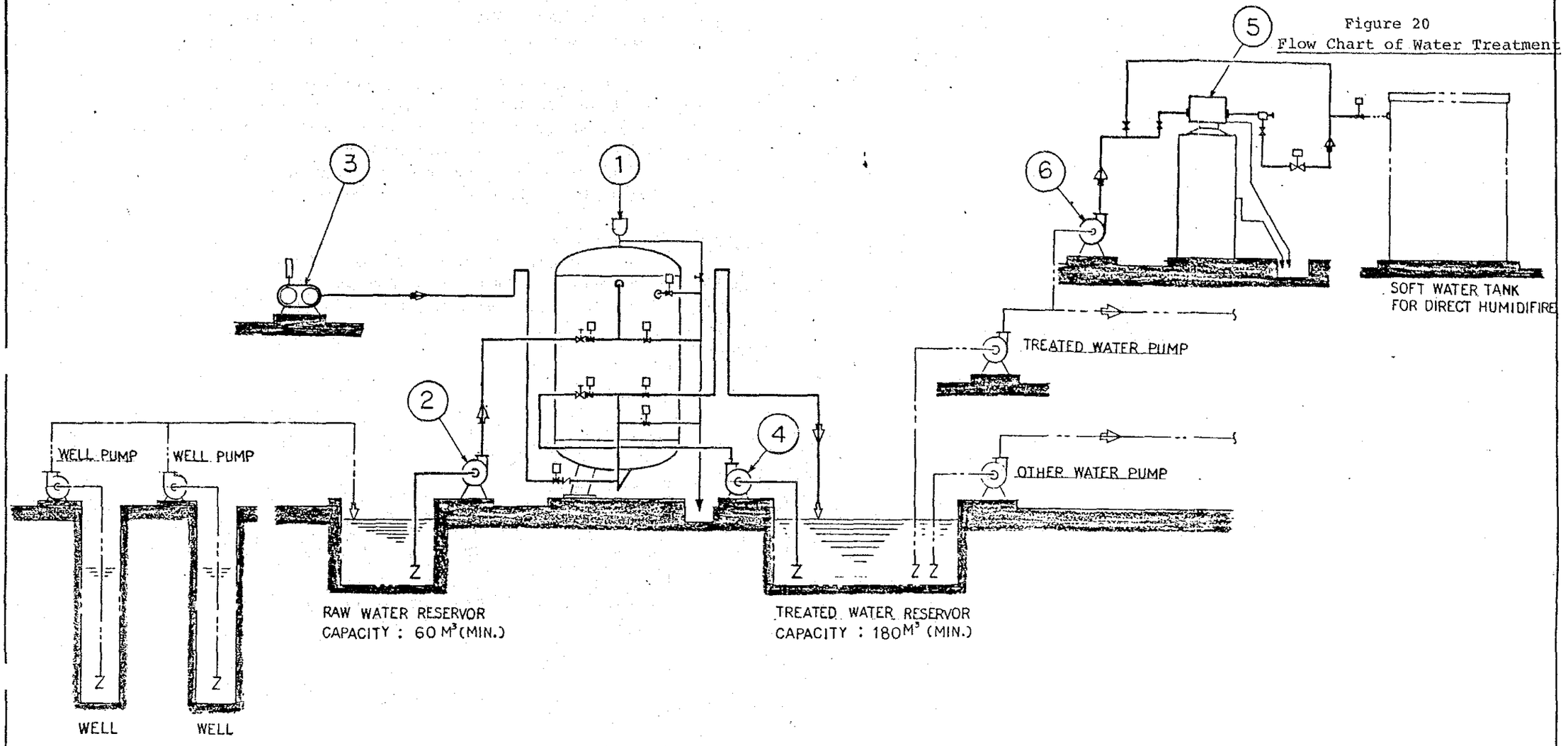
Figure 20 indicates a flow chart of water treatment.

Table 28 Water Consumption

Kind	Where to be used	Average Quantity Consumed	Remark
Chilled Water Cooling Water Supply Water	Air Conditioning and Refrigeration	30 m^3/Hr.	New
	Compressor	8 m^3/Hr.	New
	Other Supply	5 m^3/Hr.	New
	Diesel	0 m^3/Hr.	New, Emergency
Softened Water (Production)	Yarn Dyeing	423 m^3/Day	Existing Actual Value
	Boiler	7.2 m^3/Day	Existing Actual Value
Softened Water (Others)	Steam Setter	3.0 m^3/Day	Existing Actual Value
	Yarn Dyeing	3.0 m^3/Day	Existing Actual Value
	Humidifying	0.25 m^3/Day	New
Drinking Water	Administration	20 m^3/Day	Existing Actual Value
	Auxiliary Dept.	400 m^3/Day	Existing Actual Value
	Company House	550 m^3/Day	Existing Actual Value
	Guest House	100 m^3/Day	Existing Actual Value

Note: Actual volume of pumped up well water in May, 1984 was 64.8 m^3/Hour.

Figure 20
Flow Chart of Water Treatment



NO.	MACHINE NAME	Q'TY
1	QUICK FILTRATING	1
2	FILTER WATER PUMP	1
3	BLOWER	1
4	REVESE WATER PUMP	1
5	WATER SOFTENING	1
6	SOFT WATER PUMP	1

TITLE	FLOW OF WATER TREATMENT CILACAP SPINNING MILL
DRAWN BY E. Takebuchi	DATE 1, NOV, 1984 SCALE NONE
CHECKED BY M. Sagalea	DWG. NO. EX-146-U-02 ⓪
APPROVED BY	

(b) Specification:

Existing equipment of the well and pipings are to be used in future as well. The quick filtration equipment shall be the one equipped with the automatic filtration and reverse washing functions.

The raw water tank and treated water tank are to be procured locally. Their installating positions are to be near to the elevated water tank. Machines and valves are to be supplied from foreign countries to be installed at the site. Materials for piping and other auxiliary parts are to be procured, processed and fitted locally. Though we decided to apply JIS standards to the equipments to be supplied from foreign countries, however, this point needs further study as there is no such standard applicable as being adhered to at all times.

Further, in respect of using the anti-corrosive agent feeding device to cooling water for refrigerating facility, the density of the cooling water should be controlled to be at 3 times, and the anti-corrosive agent to be used should be with the scale-preventive performance as well. Table 29 indicates the estimated quality of supply water and cooling water.

Table 29 Estimated Quality of Water

	Supply Water	* Cooling Water
pH	7.7 ~ 7.9	8 ~ 9
DHL (μs/cm)	590 ~ 985	1770 ~ 2955
Ca (mg/ℓ)	44 ~ 55 (110 ~ 137.5 $CaCO_3$)	132 ~ 165 (330 ~ 412.5 $CaCo_3$)
Mg (mg/ℓ)	50 ~ 64 (205.8 ~ 263.3 $CaCO_3$)	150 ~ 192 (617.5 ~ 790.1 $CaCo_3$)
SiO_2 (mg/ℓ)	60	180
HCO_3 (mg/ℓ)	302 ~ 426 (247.5 ~ 349.2 $CaCO_3$)	906 ~ 1278 (742.5 ~ 1047.6 $CaCo_3$)
Cl (mg/ℓ)	43 ~ 156	129 ~ 468
SO_4 (mg/ℓ)	5 ~ 42	15 ~ 126

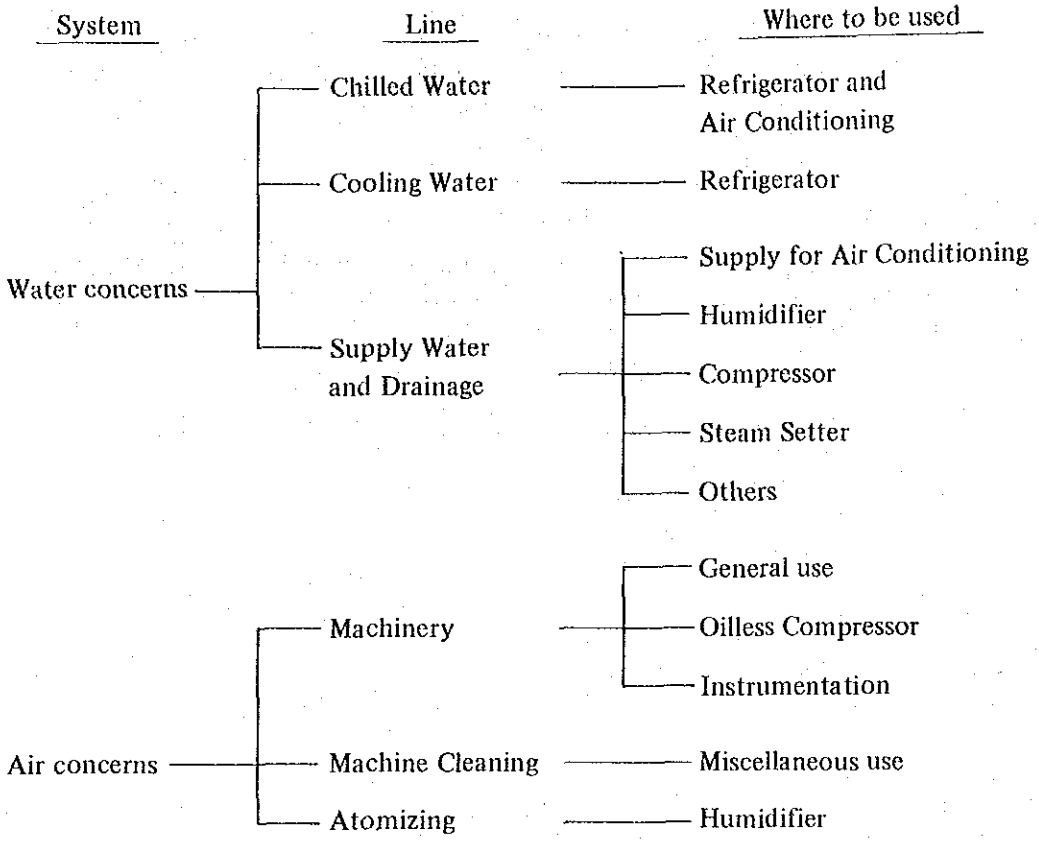
* Estimated Value (Condensation multiple 3)

5) Piping Facility:

(a) Summary:

Largely classified, the piping facility is for water and air, for which the piping lines and their use are as follows;

For the other items, the existing facility is to be used.



(b) Specification:

As for the water concerns, especially, dewing has to be prevented. For the air concerns, as the oil in piping gives much influence on quality of products, special attention must be paid to cleaning inside the pipes.

Raw materials and auxiliary parts for the piping are to be procured locally, but valves and gauges are to be supplied from foreign counteries, for which attention must be paid to their agreement with the standards. In order to prevent corrosion, burying pipes underground must be avoided as far as possible, which if required to do so, anti-corrosion measure must be applied.

6) Compressed Air Facility:

(a) Summary:

The compressed air required in the production process and for various equipments are to be produced, for which purpose, devices and equipments are to be installed for its specific use. The compressed air facility is largely divided into an oil-supply type and non-oil-supply type. The non-oil-supply type is to be used for the automatic winder. Further, the existing compressed air facilities are to be used for the equipments (yarn dyeing equipments etc.) which are not included in the scope of this project.

Consumed Quantity of Compressed Air	Average Consumed Quantity
Oil-supply Type: CP-1 Mill	3.9 m^3/min.
CP-2 Mill and others	4.5 m^3/min.
Non-oil-supply Type:	
CP-1 Mill	3.5 m^3/min.
CP-2 Mill	3.5 m^3/min.

No. of Air Compressor installed	Discharged Volume per Set	Installed No.
Oil-supply Type: CP-1 Mill	2.8 m^3/min.	2 sets
CP-2 Mill	2.8 m^3/min.	2 sets
Non-oil-supply Type:		
CP-1 Mill	2.2 m^3/min.	2 sets
CP-2 Mill	2.2 m^3/min.	2 sets

(b) Specification:

The compressed air supplied by the oil-supply type air compressor is divided into that for general use and for instrumentation. With the compressed air facility of non-oil-supply type to be used for the instrumentation, air dryers and air filters are to be equipped. However, in this case, specification of the air filter is to be examined according to volume of mist generated by the air compressor. Machines and equipments are to be supplied from foreign countries to be installed on the site.

7) Fire Fighting Facility:

(a) Summary:

In principle, the existing fire fighting facility is to be used. The facility is to be installed for raw cotton warehouses, sub-stations and other buildings which have been newly erected or largely remodelled.

(b) Specification:

For the raw cotton warehouse, outdoor fire hydrant units are to be equipped. However, in this case special attention must be paid so that the new hydrant units will be well adapted to the existing equipments. As the proper measure for the initial fire fighting activities, the powder type C02 fire extinguisher which is effective for general, oil and electric fires is to be equipped. So far, positioning of the fire extinguisher is considered to have been made roughly at a rate of 1 for every 200 m^2 in both CP-1 and CP-2, to which the new lay-out will adhere. The equipments are to be supplied from foreign countries to be fitted on the site.

8) Energy-saving Facility:

(a) Summary:

To save consumption of electricity in promoting energy-saving, centralization of blowers for the automatic winder.

Below, efficacy of the energy-saving is described;

Electricity required for single blower	15 kw/set x 8 sets = 120 kw
Electricity required for centralized blower	30 kw/set x 2 sets = 60 kw
Electricity saved	60 kw

(b) Specification:

From the centralized blower, suction ducts are to connect to each machine, where the automatic winders are to be so made that they are adapted to receive the centralized blowing.

The centralized blower is to be supplied from a foreign country to be installed on the site. Materials and hanging metal fixtures for the suction duct are to be procured, processed and fitted locally, however, as high suction pressure is applicable to the blower, attention must be paid to their strength and air leakage.

5-3-4 Utility Facilities List and Specification:

Table 30, 31 and 32 indicate the UT. facilities and their specification based on the idea mentioned in the summary for UT. facilities in the last item. In the tables, the data are shown for each of CP-1 and CP-2, as well as for both of them.

Table 30 UTILITY EQUIPMENT LIST

(CP-1 Mill)

Item No.	Equipment/Specification	Quantity
RU-1-1	Central Air-Conditioning Equipment	3 units
	1) Air Washer 3 sets Evaporative Cooling System, Horizontal Type Air Volume: 2,500 m^3/min. Composed of: Casing, Eliminator, Thermal Insulation Spray Holder, Stand Pipe and Nozzle Support, Access Door, Piping Water Strainer, Damper and Others	
	2) Supply Fan 3 sets Centrifugal Type Air Volume: 2,500 m^3/min. Motor: 45KW x 380V x 50HZ	
	3) Return Fan 6 sets Axial Flow Type Air Volume: 1,200 m^3/min. Motor: 18.5KW x 380V x 50HZ	
	4) Spray Pump 6 sets Centrifugal Type Capacity: 3,000 ℓ/min. Motor: 22KW x 380V x 50HZ	
	5) Air Return Filter 6 sets Automatic Cleaning System Air Volume: 1,200 m^3/min. Composed of: Dust Collector, Air Filter, Chamber	
	6) Spare Parts 1 lot	
RU-1-2	Duct for Air-Conditioning	1 lot
	1) Supply Air Duct 1 lot Galvanized Iron Sheets Composed of: Air Outlet, Access Door, Thermal Insulation, Volume Damper Painting and Others	
	2) Return Air Duct 1 lot Galvanized Iron Sheets Composed of: Air Inlet, Access Door, Measuring Hole and Others	
	3) Suction Duct for Auto Winder 1 lot	
	4) Spare Parts 1 lot	
RU-1-3	Instrument for Automatic Control	1 lot

Item No.	Equipment/Specification	Quantity
	Temperature Control of Supply Air Pressure Control for Chilled Water Composed of: Control Panel, Piping and Others Spare Parts 1 lot	
RU-1-4	Direct Humidifier Equipment 1) Root Blower Supply Air Volume Blow Room: 9.9 m^3/min. Winding Room: 4.2 m^3/min. 2) Atomizer for Blow Room: 29 sets for Winding Room: 8 sets Supply Water per Nozzle: 1.5 ℓ/Hr. Supply Air Pressure: 0.35 kg/cm^2 3) Humidity Controller 2 sets 4) Spare Parts 1 lot	1 lot
RU-1-5	Dust Collecting Equipment Automatic system Capacity: 650 m^3/min. Composed of: Pre Separator, Main Fan, Fiber Separator, Transport Fan, Control Panel, Fire Damper, Suction Duct and Others Spare Parts 1 lot	1 lot
RU-1-6	Air Compressor 1) Vertical Type Air Compressor 2 sets Water Cooled, Indoor Type Capacity: 2.8 m^3/min. Pressure: 7.0 kg./cm^2 Motor: 22KW x 380V x 50HZ 2) After Cooler and Separator 2 sets 3) Compressed Air Tank 1 set 4) Air Dryer and Air Filter 1 set 5) Piping Device 1 lot 6) Spare Parts 1 lot	1 lot
RU-1-7	Oil-Free Air Compressor 1) Vertical Type Air Compressor 2 sets Water Cooled, Indoor Type Capacity: 2.2 m^3/min. Pressure: 7.0 kg/cm^2 Motor: 18.5KW x 380V x 50HZ 2) After Cooler and Separator 2 sets	1 lot

Item No.	Machine/Specification		Quantity
	3) Compressed Air Tank	1 set	
	4) Air Dryer	1 lot	
	5) Air Filter	2 sets	
	6) Piping Device	1 lot	
	7) Spare Parts	1 lot	
RU-1-8	Blower Centralization for Auto Winder		1 lot
	1) Blower	2 set	
	Centrifugal and Direct Connected Type		
	Capacity:	150 m^3/min. x 800 mmAq	
	Motor:	37KW x 380V x 50HZ	
	2) Spare Parts	1 lot	

Table 31 UTILITY EQUIPMENT LIST

(CP-2 Mill)

Item No.	Equipment/Specification	Quantity
RU-2-1	Central Air-Conditioning Equipment for First-Half Spinning and Spinning	1 unit
	1) Air Washer for First-Half Spinning and Spinning	1 set
	Evaporative Cooling System, Horizontal Type	
	Air Volume: 6,250 m^3/min.	
	Composed of: Painting for Casing and Damper, Eliminator, Thermal Insulation, Spray Header, Stand Pipe and Nozzle Support, Access Door, Piping Water Strainer, Others	
	2) Supply Fan for First-Half Spinning and Spinning	1 set
	Centrifugal Type, Double Suction	
	Air Volume: 6,250 m^3/ min.	
	Motor: 110KW x 380V x 50HZ	
	3) Return Fan for First-Half Spinning	2 sets
	Axial Flow Type	
	Air Volume: 1,025 m^3/min.	
	Motor: 22KW x 380V x 50HZ	
	4) Return Fan for Latter-Half Spinning	2 sets
	Axial Flow Type	
	Air Volume: 2,400 m^3/min.	
	Motor: 37KW x 380V x 50HZ	
	5) Spray Pump for First-Half Spinning and Spinning	2 sets
	Centrifugal Type	
	Capacity: 7,000 ℓ/min.	
	Motor: 45KW x 380V x 50HZ	
	6) Air Return Filter for First-Half Spinning	2 sets
	Automatic Cleaning System	
	Air Volume: 1,025 m^3/min.	
	Composed of: Dust Collector, Dust Collector Fan, Air Filter Chamber, Others	
	7) Air Return Filter for Latter-Half Spinning	2 sets
	Automatic Cleaning System	
	Air Volume: 2,400 m^3/min.	
	Composed of: Dust Collector, Dust Collector Fan, Air Filter Chamber, Others	
	8) Spare Parts	1 lot
RU-2-2	Central Air-Conditioning Equipment for Winder	1 unit

Item No.	Equipment/Specification	Quantity
	1) Air Washer for Winder 1 set Evaporative Cooling System, Horizontal Type Air Volume: 1,150 m^3/min. Composed of: Painting for Casing and Damper Eliminator, Thermal Insulation Spray Header, Stand Pipe and Nozzle Support, Access Door, Piping Water Strainer, Others	
	2) Spray Pump for Winder 1 set Centrifugal Type Capacity: 1,200 ℓ/min. Motor: 11KW x 380V x 50HZ	
	3) Spare Parts 1 lot	
RU-2-3	Duct for Air-Conditioning	1 lot
	1) Supply Air Duct 1 lot Galvanized Iron Sheets Composed of: Air Outlet, Access Door, Thermal Insulation, Volume Damper Painting and Others	
	2) Return Air Duct 1 lot Galvanized Iron Sheets Composed of: Air Inlet, Access Door Painting and Others	
	3) Suction Duct for Auto Winder 1 lot	
	4) Spare Parts 1 lot	
RU-2-4	Instrument for Automatic Control Temperature Control of Supply Air Pressure Control for Chilled Water Composed of: Control Panel, Piping and Others Spare Parts 1 lot	1 lot
RU-2-5	Direct Humidifier Equipment	1 lot
	1) Root Blower Supply Air Volume Blow Room: 2.6 m^3/min. Winding Room: 6.3 m^3/min.	
	2) Atomizer for Blow Room: 10 sets for Winding Room: 12 sets Supply Water per Nozzle: 1.5 ℓ/Hr Supply Air Pressure: 0.35 kg/cm^2	
	3) Humidity Controller 2 sets	
	4) Spare Parts 1 lot	

Item No.	Equipment/Specification		Quantity
RU-2-6	Dust Collecting Equipment		1 lot
	Automatic System		
	Capacity:	450 m^3/min.	
	Composed of: Pre Separator, Main Fan, Fiber Separator, Transport Fan, Control Panel, Fire Damper, Suction Duct and Others		
	Spare Parts	1 lot	
RU-2-7	Air Compressor		1 lot
	1) Vertical Type Air Compressor	2 sets	
	Water Cooled, Indoor Type		
	Capacity:	2.8 m^3/min.	
	Pressure:	7.0 kg./cm^2	
	Motor:	22KW x 380V x 50HZ	
	2) After Cooler and Separator	2 sets	
	3) Compressed Air Tank	1 set	
	4) Air Dryer and Air Filter	1 set	
	5) Piping Device	1 lot	
	6) Spare Parts	1 lot	
RU-2-8	Oil-Free Air Compressor		1 lot
	1) Vertical Type Air Compressor	2 sets	
	Water Cooled, Indoor Type		
	Capacity:	2.2 m^3/min.	
	Pressure:	7.0 kg./cm^2	
	Motor:	18.5KW x 380V x 50HZ	
	2) After Cooler and Separator	2 sets	
	3) Compressed Air Tank	1 set	
	4) Air Dryer	1 lot	
	5) Air Filter	2 sets	
	6) Piping Device	1 lot	
	7) Spare Parts	1 lot	
RU-2-9	Blower Centralization for Auto Winder		1 lot
	1) Blower	2 sets	
	Centrifugal and Direct Connected Type		
	Capacity:	150 m^3/min. x 800 mmAq	
	Motor:	37KW x 380V x 50HZ	
	2) Spare Parts	1 lot	

Table 32 UTILITY EQUIPMENT LIST

(CP 1/2 Mill)

Item No.	Equipment/Specification	Quantity
RU-1/2-1	Air Conditioning for Laboratory	1 lot
	1) Air-Conditioner (A) 1 set Cooling Capacity: 30,000 kcal/Hr Composed of: Electric Heater, Humidifier and Others	
	2) Air-Conditioner (B) 1 set Cooling Capacity: 6,000 kcal/Hr Composed of: Electric Heater, Humidifier and Others	
	3) Ducting 1 lot	
	4) Piping 1 lot	
	5) Instrument for Automatic Control 1 lot Temperature and Humidity Control	
	6) Spare Parts 1 lot	
RU-1/2-2	Refrigerating Equipment	3 units
	1) Refrigerator 3 sets Centrifugal and Save Energy Type, Freon Use Refrigerating Capacity: 600 USRT Motor: about 360KW x 6,000V x 50HZ Operation Panel: 1 set	
	2) Cooling Tower 3 sets Cross Flow System Cooling Capacity: 600 RT Flow Rate: 7,800 ℓ/min. Entering Temp.: 37°C Leaving Temp.: 32°C Web Bulb Temp. for Outdoor: 27.5°C Motor: about 7.5KW x 380V x 50HZ x 2 sets	
	3) Cooling Water Pump 3 sets Centrifugal Type Capacity: 7,800 ℓ/min. Motor: 37KW x 380V x 50HZ	
	4) Chilled Water Pump 3 sets Centrifugal Type Capacity: 6,000 ℓ/min. Motor: 30KW x 380V x 50HZ	
	5) Chilled Water Feed Pump 3 sets Centrifugal Type Capacity: 6,000 ℓ/min.	

Item No.	Equipment/Specification	Quantity
	Motor: 37KW x 380V x 50HZ	
	6) Water Strainer 1 lot	
	7) Spare Parts 1 lot	
RU-1/2-3	Water Treatment Equipment	1 lot
	1) Quick Filtrating Equipment 1 set	
	Automatic System	
	Capacity: 60 m^3/Hr	
	Composed of: Automatic Valve, Filter Gravel Filter Water Pump, Reverse Water Pump, Blower, Control Panel and Others	
	2) Water Softening Equipment 1 set	
	Automatic System	
	Capacity: 1 m^3/Hr	
	Composed of: Automatic Valve, Soft Water Pump, Control Panel and Others	
	3) Anticorrosive Pouring Equipment 1 set	
	Composed of: Tank of fiberglass reinforced plastics, Dosing Pump, Control Panel and Others	
	4) Spare Parts 1 lot	
RU-1/2-4	Piping Equipment	1 lot
	1) Chilled Water Piping and Device 1 lot	
	Chilled Water for Air-Conditioning CP-1 and CP-2	
	Size: 15A ~ 350A	
	Pressure: 10 kg/cm^2	
	Composed of: Pipe, Fitting, Valve, Support, Strainer, Air Vent, Flexible Joint, Pressure Gage, Thermometer, Flowmeter, Thermal Insulation, Anti Corrosion Painting and Others	
	Spare Parts 1 lot	
	2) Cooling Water Piping and Device 1 lot	
	Cooling Water for Refrigerator	
	Size: 15A ~ 350A	
	Pressure: 10 kg/cm^2	
	Composed of: Pipe, Fitting, Valve, Support, Air Vent, Flexible Joint, Pressure Gage, Thermometer, Flowmeter, Painting, Anti Corrosion and Others	
	Spare Parts 1 lot	

Item No.	Equipment/Specification	Quantity
	3) Piping and Device for Supply Water and Drainage	1 lot
	Make up Water for Air-Conditioning	
	Soft Water for Direct Humidifier	
	Cooling Water for Air Compressor and Steam Setter	
	Size: 15A ~ 100A	
	Pressure: 5 kg/cm²	
	Composed of: Pipe, Fitting, Valves, Support, Air Vent, Pressure Gage, Thermometer, Painting Anti Corrosion and Others	
	Spare Parts 1 lot	
	4) Compressed Air Piping and Device	1 lot
	(a) For Actuator	
	Size: 15A ~ 100A	
	Pressure: 10 kg/cm²	
	Composed of: Pipe, Fitting, Support, Valve, Flexible Joint, Pressure Gage, Anti Corrosion Painting and Others	
	Spare Parts 1 lot	
	(b) For Cleaning	1 lot
	Size: 10A ~ 50A	
	Pressure: 5 kg/cm² and 10 kg/cm²	
	Composed of: Pipe, Fitting, Support, Valve, Flexible Joint, Pressure Gage Anti Corrosion, Vinyl Hose Painting and Others	
	Spare Parts 1 lot	
	(c) For Air Source of Direct Humidifier	1 lot
	Size: 10A ~ 150A	
	Pressure: 5 kg/cm²	
	Composed of: Pipe, Fitting, Support, Valve Flexible Joint, Pressure Gage, Strainer, Painting and Others	
	Spare Parts: 1 lot	
	5) Fire Fighting Piping and Device	1 lot
	Outdoor Hydrant	
	Size: 50A ~ 65A	
	Pressure: 10 kg/cm²	
	Composed of: Pipe, Valves, Fitting, Support, Anti Corrosion Painting and Others	

Item No.	Equipment/Specification	Quantity
RU-1/2-5	Fire Fighting Equipment	1 lot
	1) Outdoor Hydrant Valve Unit 1 lot One Mouth/Ground Type Composed of: Hydrant Valve, Hose and Hose Nozzle, Hose Box and Others	
	2) Fire Extinguisher 1 lot Dry Chemical Fire Extinguisher	

5-4 Civil and Building Works

5-4-1 Layout Plan of the Mill

Although there would be the following civil and building works due to the renovation of both production and utility equipment, there would be no major modifications in the overall layout plan of the mill. It is however noted that the transportation route of raw cotton bales from the new raw cotton warehouse to both the Spinning Mill No. 1 and No. 2 shall be decided taking into consideration the material flow lines within the mills, safety, etc.

New Construction:	Raw Material Warehouse, Substation
Enlargement of Building:	CP-1 Mill: Roller Maintenance Shop
	CP-2 Mill: Blower Room
Remodeling of Building:	from Praying Room to Laboratory
Improvement:	Partition, floor, underground ducts, drainage pipes in both CP-1 and CP-2 Mill
Repairing:	Roof, valley gutter, skylights, ceiling, sanitary equipment, etc. in both CP-1 and CP-2 Mill

The overall layout plan of the mill after renovation is shown on the figure 8 to 11.

5-4-2 Outline of New Construction and Enlargement Plan

The building works to be included in this renovation plan are the new construction of the Raw Material Warehouse, and the enlargement of both the Roller Maintenance Shop and the Blower Room. Their foundation structure shall be the reinforced concrete structure. Both the upper structure and the finishing materials shall be decided taking into consideration the use of respective building, durability, construction costs, harmony with circumstances, etc.

The location of the Raw Material Warehouse shall be, as shown on Figure 8, at the west of the Bleder River which runs around the middle of the mill site. The results of soil tests obtained through test drilling indicate difficulty in soil load, groundwater level, etc. Careful attention should be paid during the detailed designing of the building.

The Outline of the buildings to be newly built or enlarged is shown on the table 33.

Table 33. Outline of the Buildings to be Newly Built and Enlarged.

	Raw Material Warehouse	Roller Maintenance Shop	Blower Room	Substation
Building Works	New Construction	Enlargement of Mill No. 1	Enlargement of Mill No. 2	New Construction
Structure	Steel structure	Blicks with reinforced concrete columns	Blicks with reinforced concrete columns	Steel structure
Building Area	2,162 m^2	220 m^2	40 m^2	80 m^2
Roofing Material	Corrugated asbestos-cement sheet	Concrete slab with water proof of asphalt	Concrete slab with water proof of asphalt	Corrugated asbestos-cement sheet
Wall Finishing	Blick wall with plastering and Vinyl paint	Blick wall with plastering and vinyl paint	Blick wall with plastering and vinyl paint	Blick wall with plastering and vinyl paint
Floor Finishing	Concrete slab with epoxy resin painting	Concrete slab with epoxy resin painting	Concrete slab with epoxy resin painting	Concrete slab with plastering
Ceiling	Nil	Nil	Nil	Nil
Ceiling Height or Effective height up to beam	4.8 m	3.0 m	3.0 m	4.0 m

5-4-3 Outline of Improvement and Repairing Plan

The following is the list of the improvement works which are directly related to this renovation plan of both the production and utility equipment, and the repairing works which are considered appropriate to be carried out at this renovating occasion, namely such as water proofing, anti-rusting, reinforcing, painting works, etc.

1) Improvement Works

Improvement of Floor. All the floor in both the CP-1 and CP-2 Mill shall be renewed thoroughly. The production area shall be made up with concrete slab with epoxy resin painting. Other areas shall be the terrazzo floor taking into consideration durability. In addition, the existing inside drainage lines shall be thoroughly improved, too.

Improvement of Wall. Taking into consideration the Layout of the new production machines and the new material flow, some existing wall shall be partically demolished, and some new partition shall be made, instead.

Underground Ducts Works. A complete set of underground ducts shall be constructed in the CP-1 Mill. As regards the CP-2 Mill the existing ducts shall be in principle utilized and the new underground ducts for pneumatic suction system would be taken into consideration.

Machinery Foundation Works. Due to the introduction of new machinery and equipment, new foundations shall be constructed taking into consideration the fixing-down of the machinery and prevention of vibration.

Finish Carpentry. In order to improve the degree of air tightness of the buildings, repairing and/or replacement of doors and openings shall be carried out.

2) Repairing Works

Repairing of Abestos-cement Roofing. The broken parts of corrugated asbestos-cement roofing and corroded setting bolts shall be either repaired or replaced.

Replacement of Valley Gutter. The leaking of rain in both the CP-1 and CP-2 Mill has been mostly caused by the corrosion of valley gutter. It is a good chance to replace the valley gutter completely.

Repairing of Skylights. In order to improve the conditions for air conditioning, all the existing skylights shall be thoroughly examined. Then all the broken portions shall be repaired, all the gaps shall be packed and sealed, and all the defaults shall be repaired.

Repairing of Wall Plastering. Since the skirting of wall has been seriously damaged so far, it shall be thoroughly repaired and re-painted. Damaged portions of the upper walls shall be also repaired and the joint of wall shall be made between the upper part and skirting of the walls. In addition, all the walls shall be re-painted by vinyl-paint.

Repairing of Ceilings. The damaged parts of plain asbestos-cement boards, deteriorated materials, and corrosion of setting nails for ceilings shall be repaired or replaced. In addition, the ceiling shall be completely re-painted.

Repairing of Sanitary-wares. The sanitary-wares, especially the water taps, shall be mounted. The toilet bowls and washing basins shall be repaired. And the tiles on both walls and floors shall be replaced.

Painting Works. In addition to the painting works for walls and ceilings mentioned above, wooden fittings and steel structures shall be re-painted.
It is recommendable, during the course of this renovation plan, to implement the color coordination within the mills which is expected to give some good improvement in productivity and efficiency through the better working environment in terms of mental and psychlogical approach.

5-4-4 Designing Schedule

Since there is no detailed designing drawings and no construction records for the existing production buildings, all the enlargement, improvement, and repairing works, that is excluding the new construction only, shall be inevitably carried out by measuring the actual dimensions. Since neither special structures nor finishing shall be required in this renovation plan, it is considered the best recommendation that the detailed designing works shall be carried out by means of the cooperation of the local consultants and the persons who are in charge of the buildings maintenance of the Mill.

There does not exist so-called "Standards of Construction Act" in Indonesia. Instead the "Standards of Construction in the Republic of Indonesia", which was prepared by the Bandung Architectural Laboratory under the supervision of the Ministry of Public Corporations, is the guideline of the respective sections of government. It is therefore necessary to consult with the Construction Authority of Cilacap City, as the basic design shall be ready for review. It is not considered that there would be any legal difficulties for this project because of the nature of this project.

There is almost no difficulty in designing. Attention should be however paid to the estimate of soil bearing power, underground water level and earth works, drainage schedule, and availability of materials in the local market, etc. In addition, it is necessary to clarify the specifications and standards for the workmanship and materials, especially mixing ratio of concrete, strength of concrete, quality of reinforcing bars, etc.

5-4-5 Outlines and Schedule of Works

1) Placing of Construction Order

It is required to carry out tendering for selection of the contractor, evaluation of tenders, negotiations of the contract, and the signing of the contract after completion of basic design and detailed design. It is one of the most crucial points for the construction period required and convenience of the construction to select the superior and reliable contractor.

Taking into consideration the scale, scope of works, and characteristics of the civil and building works to be involved in this renovation plan, it is considered preferable to make contracts with a few contractors rather than a big contract with a contractor on the so-called turn-key basis. It is an idea that one contractor would take new construction and enlargement works, the second would take improvement works, and the third would take repairing works. It is considered speedy and appropriate that 4 – 5 tenderers shall be selected among private and government-owned companies for the respective area of works and the competitive bidding among nominated tenderers system shall be applied in order to select reliable contractors.

2) Works for Temporary Facility

Although the temporary power and water shall be easily supplied from the existing mills, there would be difficulty in the availability of temporary storage space for materials and temporary site office area. It is therefore necessary to discuss such issues with the Client beforehand.

3) Preparatory Works

The major preparatory works are the removal of existing floor and machinery foundations, temporary fences, setting of temporary passage for transportation of scrap materials, etc. Careful attention shall be paid in terms of safety, dirt protection, etc., especially in the case of the removal of existing structures.

4) Earth Works

Good soil should be used for back-filling and banking and enough compaction should be carried out in order to safeguard future settlement or cave-in. In addition, it is crucial to look into the handling method of underground water in the case of deep digging, because the underground water level is about 2 meters lower than the ground level.

5) Reinforced Concrete Works

The reinforced concrete work is the most crucial and expensive work among the civil and building works to be involved in this renovation plan. As regards reinforcing bars and cement, their quality standards should be clearly stipulated, and their quality should be tested in order to ensure the required strength. Furthermore the arrangement of reinforcing bars should be examined at the site and the quality tests should be certainly carried out.

Since the underground water level is considerably high, water proofing measures should be carefully implemented, for example utilization of water tight concrete, utilization of waterstop along the junction.

6) Steel Structure Works

The following tests should be surely implemented: –

– Strength test for steel structure and bolts,
– Dimension examination,
– Products quality tests, and especially
– Defaults examination at welding places,
– Bolt tightness test after construction.

In addition, since the structures shall be always exposed to the salty sea breeze, the anti-rust painting should be carefully implemented.

7) Masonry and Plasterer Works and Wall Works

Similar to the existing walls, the structure of walls shall be in principle bricks, plastering and vinyl painting. In order to make strong walls, columns and beams of reinforced concrete shall be constructed at every appropriate distance. As regards the plastering, smooth surface shall be completed, paying attention to the mixing ratio, plastering thickness, curing, and period of drying. Since most defaults are due to the skill level of masonries in most cases, their selection should be carefully made.

In addition, in order to prevent the cracks in walls, joints of walls shall be made at every appropriate distance.

8) Painting Works

Appropriate painting works shall be implemented in compliance with the surfaces and availability of paints. Since thorough re-painting of both ceilings and walls of both the Mill No. 1 and No. 2 is included in this renovation plan, careful attention shall be paid to the treatment of existing paint, surface preparation, etc. Furthermore, it is recommendable to implement the color coordination.

9) Floor Works

As regards floor finishing, after taking into consideration durability, dirt prevention effect, and fine view, the floor around machinery foundations shall be finished with epoxy resin painting over concrete slab, and other areas shall be finished with terrazzo. Difficulties which may arise during the course shall be carefully looked into through the color samples and test finishing.

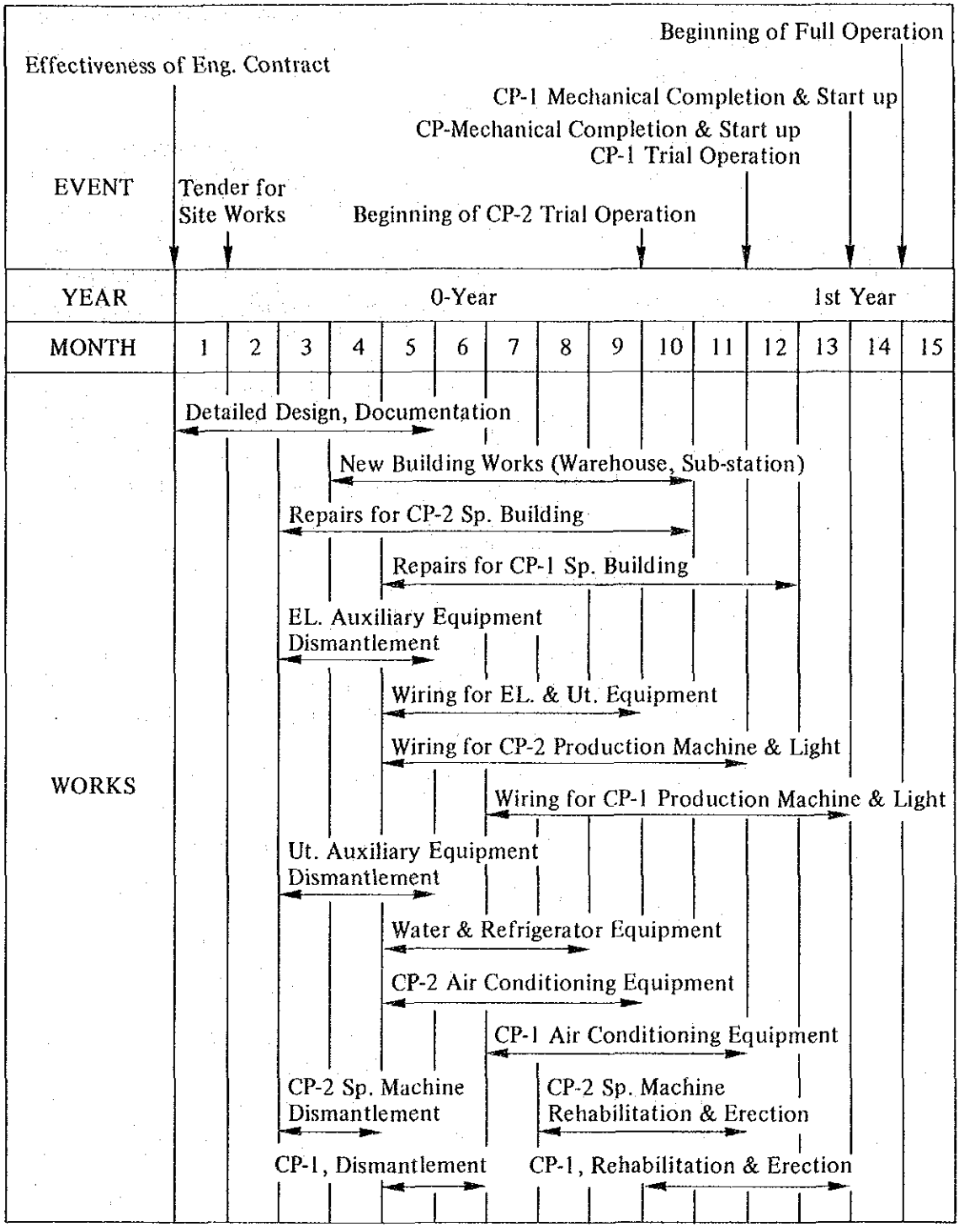
10) General Notes on Repairing Works

The repairing works include repairing of corrugated asbestos-cement roofing sheets, replacement of valley gutters, repairing of plain asbestos-cement ceiling boards, sealing of skylights, and repairing of wall plastering. After preparing the detailed repairing work schedule, it is recommendable to discuss the scope of works to be ordered, methods of works, and sequences and procedures of works prior to the commencement of works.

5-5 Implementation Schedule:

In the following, the planning for new erection and repair of the building, removal and transfer of the facilities concern, as well as installation of the newly purchased machines, which are to be effected during a period from the effective date of the contract of this project to the stage of the full operation of production machines, is indicated.

Table 34 IMPLEMENTATION SCHEDULE



5-6 Personnel Organization and Planning:

5-6-1 Number of Personnel per Department:

In order to have the mill operated smoothly and produced high quality products with high productivity, not only machines and facilities are important, but also those personnel who operates and control those machines and facilities are indispensable. Particularly, because the textile industry is the labour-intensive industry, it is very important that the required personnel is to be positioned at the required working place. Even though too many personnels are recruited and organization is made larger, the smooth operation cannot be expected, and to the contrary, having the subordinates under the controlling personnel's command, as well as training those subordinates will pose problems.

If number of transmission spot where orders from the superiors pass through is numerous and number of personnel belonging to these transmission spots are also numerous, not only the order transmission will take longer time, but also leakage will take place in the transmitting period. In addition, by the longer transmission time, taking up comments from the lower level personnel will also become incomplete. Consequently, the ideal status should be that less numbers of well-trained personnel work in an organization which is simplified.

The organization and personnel set-up planning are considered on the assumption of the following points:

1) In order to increase number of working days, current attendance system of 3 groups and 3 shifts shall be changed into 4 groups and 3 shifts which is continuous operations.
2) As for production departments, with due consideration made on abilities and diligence of the local people, organization and personnel set-up which are considered to be ideal, shall be decided.
3) As for Utility and Administration departments, in consideration of requests from managements of Sandang II and Cilacap mill, the current status of the organizations and number of personnel shall be maintained.

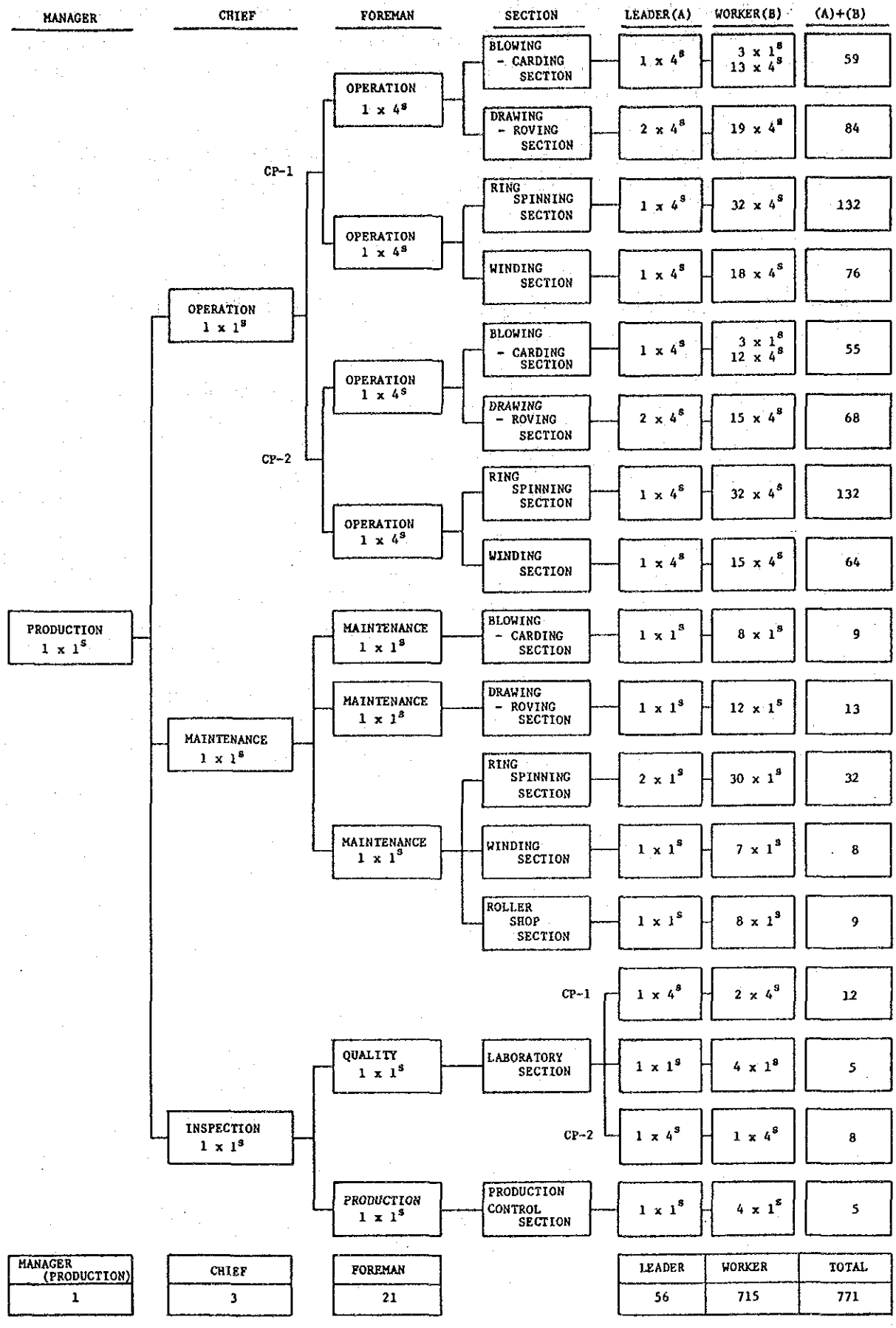
Table 35 indicates the total numbers of personnel per grade per department, and Table 36 shows the detailed organization and numbers of personnel in production departments.

Table 35 TOTAL PERSONNEL ORGANIZATION AND COLLOCATION

Mill Manager	Manager	Chief	Foreman	Leader/Worker	Total
	(Spinning) 1	3	21	771	796
1	(Utility) 1	3	7	80	91
	(Administration) 2	7	16	133	158
				(Mill Manager)	1
Total 1	4	13	44	984	1,046

Table 36 SUGGESTIVE ORGANIZATION OF SPINNING MILL

Note: The mark s means shifts.



5-6-2 Personnel Set-up Planning before Operation Commencement:

After the contract for renovation is concluded, various preparations for the renovation will start. That is, the preparations include those diversified items such as accepting preparations and procedures for machines and equipments, remodelling mill's building, removal, transfer and remodelling of the existing facilities, as well as installation and trial run of the new machines and equipments.

Therefore, it is required that numbers of personnel sufficient for carrying out these works rationally and efficiently are got ready. Tables 37, 38 & 39 indicate the required numbers of personnel per department, month and grade, while Table 40 shows the total numbers of personnel.

Table 37 LOCAL STAFF OF ADMINISTRATION DEPT. BEFORE OPERATION

Event / Month / Item	Effectiveness of Engineering Contract								CP-2 Trial Operation		CP-2 Mechanical Completion and Start up	Man-Month
	1	2	3	4	5	6	7	8	9	10	11	
Mill Manager	1	1	1	1	1	1	1	1	1	1	1	11
Manager	1	1	1	1	1	1	1	2	2	2	2	15
Chief	2	2	2	2	2	2	2	4	4	7	7	36
Foreman			4	4	4	4	6	8	10	16	16	72
Officer/Worker			20	20	20	40	60	80	100	133	133	606
Total	4	4	28	28	28	48	70	95	117	159	159	740

Table 38 LOCAL STAFF OF UTILITY DEPT. BEFORE OPERATION

Item \ Month	1	2	3	4	5	6	7	8	9	10	11	Man-Month
	Effectiveness of Engineering Contract							CP-2 Trial Operation			CP-2 Mechanical Completion and Start up	
Scrap & Movement												
Manager	1	1	1	1	0.5							4.5
Chief	1	1	1	1	1.5	1						6.5
Foreman		3	4	4	4	3						18
Leader/Worker		6	37	22	32	16						113
Total	2	11	43	28	38	20						142
Erection												
Manager					0.5	1	1	0.5	0.5	0.5		4
Chief					1.5	2	2	2	1	1		9.5
Foreman					3	4	4	3	3	2	1	20
Leader/Worker					19	20	27	27	26	22	15	156
Total					24	27	34	32.5	30.5	25.5	16	189.5
Operation												
Manager								0.5	0.5	0.5	1	2.5
Chief							1	1	2	2	3	9
Foreman							3	4	4	5	6	22
Leader/Worker							2	3	41	49	60	155
Total							6	8.5	47.5	56.5	70	188.5
Total												
Manager	1	1	1	1	1	1	1	1	1	1	1	11
Chief	1	1	1	1	3	3	3	3	3	3	3	25
Foreman		3	4	4	7	7	7	7	7	7	7	60
Leader/Worker		6	37	22	51	36	29	30	67	71	75	424
Grand Total	2	11	43	28	62	47	40	41	78	82	86	520

Table 39 LOCAL STAFF OF SPINNING DEPT. BEFORE OPERATION

Item \ Event / Month	Effectiveness of Engineering Contract							CP-2 Trial Operation			CP-2 Mechanical Completion and Start up	Man-Month
	1	2	3	4	5	6	7	8	9	10	11	
Scrap & Movement												
Manager	1	1	1	1	1							5
Chief	1	1	1	1	1	1						6
Foreman			5	5	5	10						25
Leader/Worker			41	65	39	73						218
Total	2	2	48	72	46	84						254
Erection												
Manager						0.5	0.5	0.5	0.5	0.5	0.5	3
Chief					1	1	2	2	2	1	1	10
Foreman						4	8	11	11	11	3	48
Leader/Worker							24	60	86	89	74	333
Total					1	5.5	34.5	73.5	99.5	101.5	78.5	394
Operation												
Manager						0.5	0.5	0.5	0.5	0.5	0.5	3
Chief					1	1	1	1	1	2	2	9
Foreman						4	10	10	10	10	18	62
Leader/Worker							82	323	369	652	667	2,093
Total					1	5.5	93.5	334.5	380.5	664.5	687.5	2,167
Total												
Manager	1	1	1	1	1	1	1	1	1	1	1	11
Chief	1	1	1	1	3	3	3	3	3	3	3	25
Foreman			5	5	5	18	18	21	21	21	21	135
Leader/Worker			41	65	39	73	106	383	455	741	741	2,644
Grand Total	2	2	48	72	48	95	128	408	480	766	766	2,815

Table 40 TOTAL LOCAL STAFF BEFORE OPERATION

Event / Month / Item	Effectiveness of Engineering Contract							CP-2 Trial Operation		CP-2 Mechanical Completion and Start up		Man-Month
	1	2	3	4	5	6	7	8	9	10	11	
Mill Manager	1	1	1	1	1	1	1	1	1	1	1	11
Manager	3	3	3	3	3	3	3	4	4	4	4	37
Chief	4	4	4	4	8	8	8	10	10	13	13	86
Foreman		3	13	13	16	29	31	36	38	44	44	264
Leader/Worker		6	98	107	110	149	195	493	622	945	949	3,674
Total	8	17	119	128	138	190	238	544	675	1,007	1,011	4,075

5-6-3 Personnel Set-up Planning after Operation has commenced:

The operation starts at 12th month after the contract for renovation is concluded, at which time, CP-2 mill starts operation with initial 1 shift to be increased to 2 shifts after half a month and then further to be increased to full operation of 3 shifts at further one month later which is 13th month after the contract conclusion.

For the CP-1 mill, the operation commences with 1 shift from 14th month from the contract, which is then increased to full operation by 3 shifts from further one month later which is 15th month from the contract. Consequently, when considering CP-1 and CP-2 mills combined, this means that the operation commences from 12th month from the contract, and full operation starts from 15th month from the contract.

Table 41 LOCAL STAFF OF ADMINISTRATION & UTILITY DEPT. AFTER OPERATION

Item / Staff	Administration		Utility	
	No. of Staff	Man-Month/year	No. of Staff	Man-Month/year
Mill Manager	1	12	0	0
Manager	2	24	1	12
Chief	7	84	3	36
Foreman	16	192	7	84
Leader/Worker	133	1,596	80	960
Total	159	1,908	91	1,092

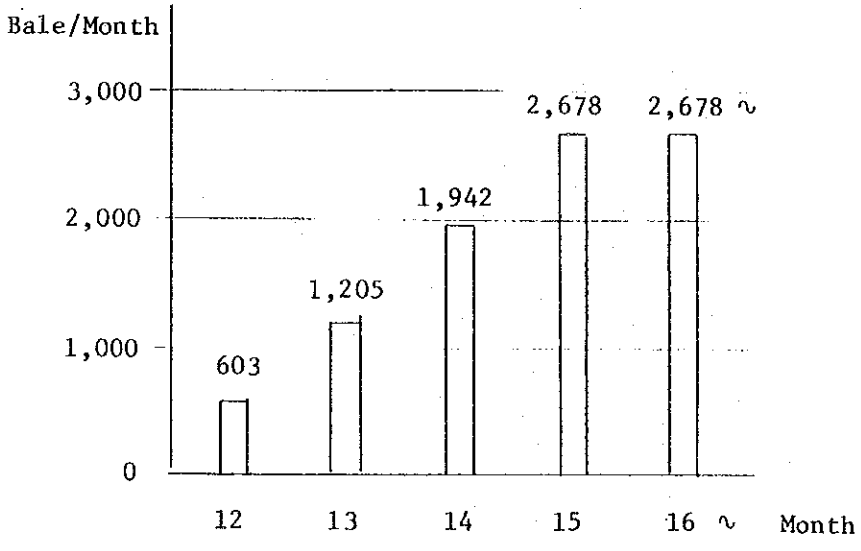
It should be very busy period up till 15th month when the trained employees will be required to be positioned for the actual operations. Up till the full operation, possibilities of occurrence of injuries, breakdown of machines and defective products are considered to be high, and therefore, sufficient attention should be paid to these possibilities during this period.

Numbers of staff in administration and utility departments are considered to be constant from the operation commencement month, which are shown in Table 42. Table 42 indicates numbers of personnel per month and grade in production departments.

Table 42 LOCAL STAFF OF SPINNING DEPT. AFTER OPERATION

Event / Month / Staff	CP-2 Operation Start	CP-1 Operation Start	Full Operation Start			1st-Year Man-Month	2nd-Year and after Man-Month
	12	13	14	15	16 ~		
Manager	1	1	1	1	1	12	12
Chief	3	3	3	3	3	36	36
Foreman	21	21	21	21	21	252	252
Leader/Worker	741	761	771	771	771	9,212	9,252
Total	766	786	796	796	796	9,512	9,552

Suggestive Production at each month



5-7 Education and Training Plan

It is sincerely recommendable to receive not only the spinning production technology but also the technology and knowledge of quality control and preventive maintenance, and maintenance technology and knowledge of the auxiliary equipment. These technology and knowledge have been rapidly developing, as the production machines and auxiliary equipment develop and as the product quality levels required internationally has been getting higher. It is therefore recognized that the current production management can be hardly implemented only by the technology and knowledge obtained past.

It is the best way to carry out such education and training from the stage of making the renovation plan for the Mill through the stage of selecting machinery and equipment, rehabilitation, installation, test runs, commissioning, and operation of the new Mills. It is sometimes observed that the training consultant is different from the engineering consultant, though, it is considered difficult to get the intended results due to the lack of consistency in the equipment and training. It is therefore recommendable to get the consultant services for both the comprehensive engineering and education/training altogether from one source. Consequently it can be considered the key point for the sucess of the project to select a company which should have excellent comprehensive engineering standards and experiences.

As regards the method of education and training, it is preferable that the staff of the Mill shall take such training courses at first and then such staff themselves shall train their workers. Although the principle of training is to understand and obtain the technology of the equipment in the own mill, it is also supposed to be useful to observe the developed management technology in order to understand promptly and therefore it may be worthwhile to include some training courses for a short period in Japan.

The following is supposed to be the actual measures of education and training:–

1) Education on the selection of machinery and equipment, and methods of rehabilitation and erection by means of the actual engineering works on the fundamental designing, detailed designing, preparation of documents and drawings, etc.

2) Fundamental on-the-job training in the existing and operating Mill in Japan for a short period on the various field of management.

3) Training on the basic maintenance and operation skills by means of participating in the machinery installation works, test runs, and commissioning operations.

4) Education and training on the production control, quality control, preventive maintenance, maintenance technology and knowledge of the auxiliary equipment through the period of expanding operation after commissioning the mills.

5-7-1 Period of Training

The period of training is planned to be 30 months in total beginning from the signing of the engineering contract to 17 months after the completion of the renovation plan. This period shall be classified into the following stages, although some parts are overlapped somehow:–

1) The first stage

the training through actual engineering works ..... about 5 months

2) The second stage

on-the-job training in Japan ..... about 2 months

3) The third stage

training through installation and test runs at the mill ..... about 10 months

4) The fourth stage

training through actual operation of the mill ..... about 1 month

Although the training courses mentioned above shall be completed for the time being, it is further recommended to continue education and training for the higher levels in some way in accordance with the achievement made by the end of the training courses, since it is not so easy to obtain the management technology in detail. The details of such staged training period are shown on the table 43: Despatching Schedule of Training Staff.

5-7-2 Training Staff

Although the number of staff to be despatched to the site from Japan for the engineering services has not been decided yet, the following indicates the numbers and periods of staff to be despatched for the actual erection works for the machinery:–

Job Title	Number	Period
1) Project Manager	1 person	27 months
2) Spinning Chief Engineer	2 persons	24 months
Spinning Chief Engineer	1 person	12 months
3) Utility/Electricity Chief Engineer	1 person	27 months
Utility/Electricity Chief Engineer	1 person	15 months
4) Civil/Building Chief Engineer	1 person	10 months
Total	7 persons	139 man-months

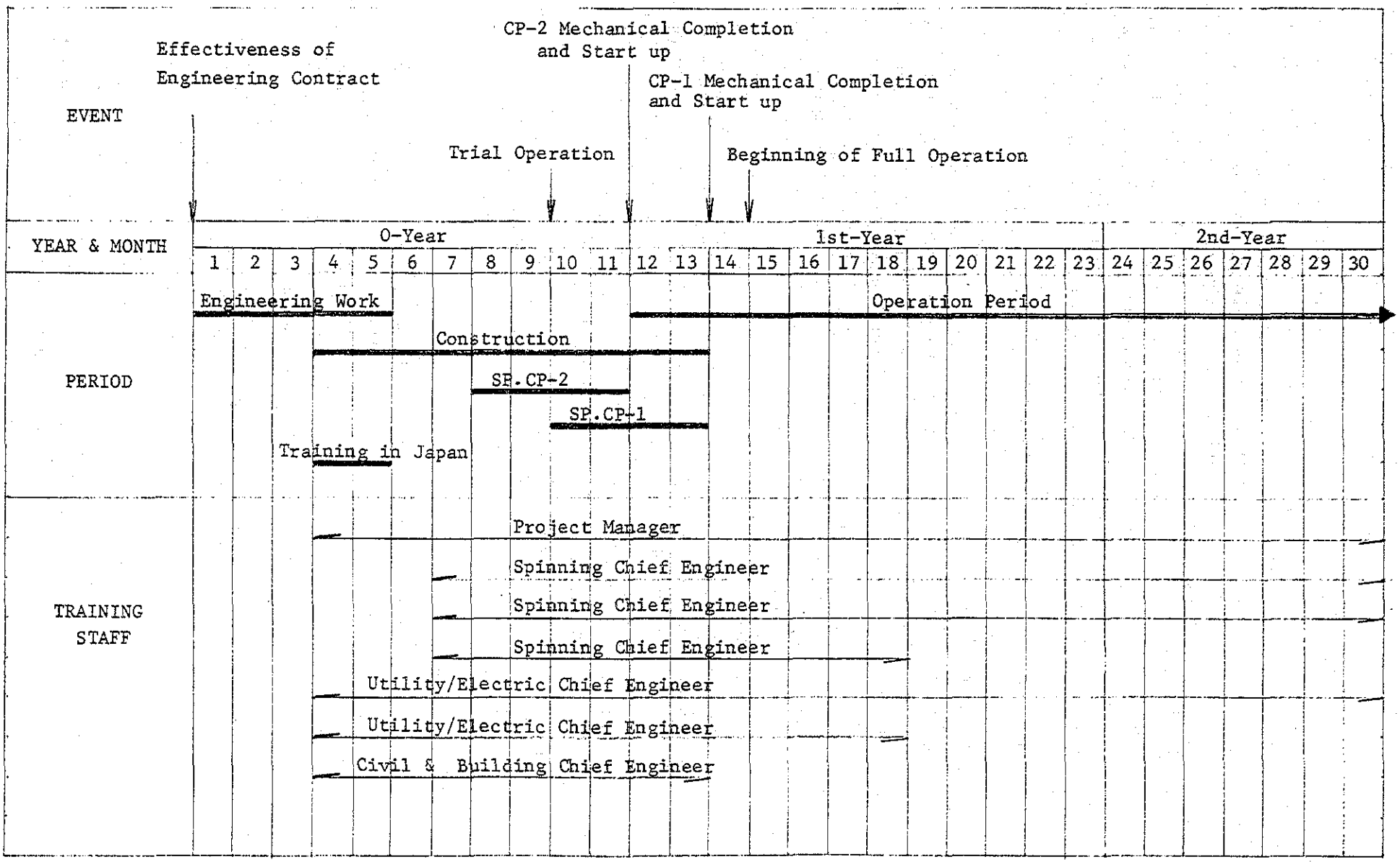
The time schedule for despatching these staff is shown on the table 43: Despatching Schedule of Training Staff.

5-7-3 Trainees to be Sent to Japan

The following is supposed to be the number of trainees to be sent to Japan and the expected training period in the various field:–

Kind of Job	Number	Period
1) Electricity	2 persons	1 month
2) Air conditioning	2 persons	1 month
3) Diesel Generator	1 person	1 month
4) General Spinning Operation	2 persons	2 months
5) Spinning Maintenance	8 persons	2 months
6) Laboratory	1 person	2 months
Total	16 persons	27 man-months

Table 43 DISPATCHING SCHEDULE FOR TRAINING STAFF



5-7-4 Viewpoint of training

1) Purpose of Work Training:

The purpose of work training is to make all employees working at their job site capable of effecting their given works correctly, safely, conscientiously and yet speedily. From viewpoint of responsibility in an organization, each controller or supervisor is taking their share of the total responsibility of the whole of the organization. Then, it should be the status of course that this whole responsibility is divided and shared to employees under their jurisdiction in forms of concrete works, whereby the ultimate goal is accomplished through cooperation, participation and endeavour of each employee concerned.

(a) Following are the result of classification of the work training by purpose;

Preparatory Training:

This is the training to be conducted before a certain job is taken by an employee, its purpose being to give the employee the required techniques at works in a mill as conducted for new recruits or in in-house technical school. As the preparatory training is in any sense *Preparatory*, the training course is conducted based on a curriculum drafted from the result of "about to this extent, the knowledge is required". Therefore, the effect of the training is relatively indirect.

Proficiency Training:

This training is conducted with an aim that the working ability of employees now working is improved more. Because control as well as technology are progressing day by day, if the training is not always leading the advancement, the mill will be left from the front. This is required for all people at any level of the organization.

Promotional Training:

This is the training for those whom the company schedules to promote, for his fulfillment of duty after the promotion. In other words, it could be called as training for deputies.

General Culture Training:

This seems to have no direct relation with the work. However, this has been approved in respect of personnel control as well, as one of the training item having to be conducted in working places, the reason being that if human being is not always given a spiritual nourishment such as mental food, he would have a danger of falling into corruption. The method may well be lectures, movies or theatregoing.

(b) The following 2 items are the result of classification of the work training by its contents:

Those by which the required knowledge is given:

By this training, the knowledge proper to each employee's job such as mechanism or principle of a machine, knowledge about materials, knowledge concerning the job such as about products or knowledge on job responsibilities such as annual and monthly target, labour agreement and rules of employment are given.

Those by which the required technique is given:

Mainly, 3 techniques in common for every supervisor such as how to instruct them in works, how to improve in work method and how to treat others in human relations are considered to be dealt with.

(c) The following 2 items are the result of classification of the work training by its place:

On-the-job Training:

This training is conducted directly on the works being done.

Off-the-job Training:

This training is conducted at a place off the site of the work.

Depending on contents of the training, the training may be conducted off job site or off the work, which sometimes produces better results. However, generally speaking, in-house training is conducted by on-the-job method for 80 to 90% of them all, which is said to be more effective.

2) Executional Method of Work Training:

As for details of current executing method according to the training program, there are standard tactics.

There must be some rules for the job training to make the training effective. Namely, the fundamental rule must be to teach according to the procedure set forth in the Standard Operations Manual.

Even the scientific training method can only be effective if the method follows this procedure. To achieve more effect, the training must be conducted using the five senses. Shares of the senses contributing to the training are as follows:

- Sense of vision 60%
- Sense of Hearing 20%
- Sense of Touch 15%
- Sense of Taste 3%
- Sense of Smell 2%

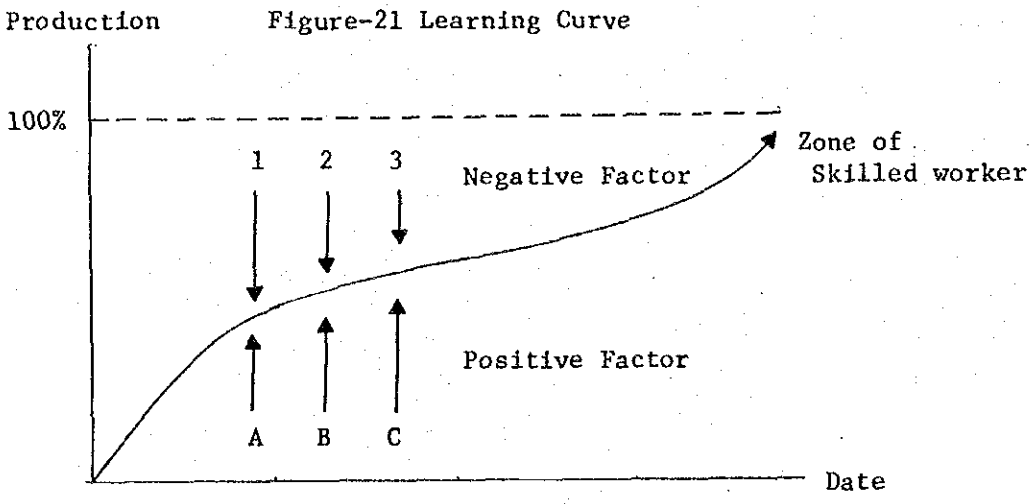
The positive motive which induces an unskilled worker toward the job are;

- To earn living expenses (Measure)
- Universally accepted idea that working is a matter of course (Duty), and
- To wish to be skilled in work and improve himself. (Objective)

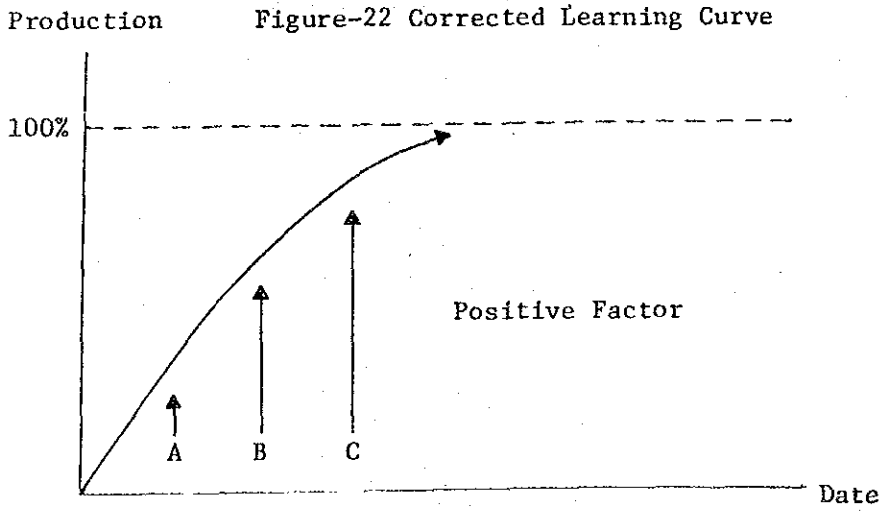
Contrary to the above, there are another factors influencing the unskilled worker negatively as the result of nature of the work and working environment in the mill, which are;

- Overwhelmed by the need of learning several techniques at the same time, being shrinked back,
- Among skilled workers, losing his composure, and
- A problem of being unable to be accustomed to the place of "production".

With the above factors giving the positive and negative influences to the learning desire of the trainees, the training course is developed. When these relationships are indicated in a diagram by means of an average representative learning curve deduced from hundreds of data, we can obtain the following Figure 21.



As indicated in the figure, the beginner progresses by 30–50% in the beginning, however, his subsequent progress speed becomes slow. Therefore, if the negative factor could be got rid of and the positive factor could be encouraged, the learning curve would emerge as the following;



From the above you will note that a period required for getting to 100% production level on an average over the whole mill is remarkably shortened. This is the aim of the training programme.

Shortcoming in individual worker's ability is discovered and incorporating this shortcoming into systematical training program is required. For this purpose, the problem of whom, for which work, by what date should be trained up, must be clarified, and the points must be filled in the Training Schedule.

The filling order of the Training Schedule and items to be filled in are shown in Table 44.

Table 44 Filling Order of the Schecule

Filling Order	Items to be filled in
1	Job Place, Name and date, Kind of work Names of subordinates
2	Circle the work he is in charge Check for works he can do
3	Changes in production Changes in personnel For which to be trained Working attitude
4	Whom, for which work, by what date Scheduled date

Moreover, what is to be prepared and considered before teaching particulars of work is that the contents of works to be taught should be well assorted. For this purpose, a supervisor (teacher) should refrain himself from such instances that he overlooks the important point while analysing the work and tabulating it into a table, or he even does not think of the technique for conveying an idea to the other. Table 45 indicates a procedural example or preparing method of a Work Analysis Table.

Table 45 Preparing method of work analysis table

Filling order	Items	Procedures
1	Fill in title	Clarify name of work to be taught, parts (objects of the work), tools (to be used at work) and materials (consumable goods, etc.)
2	Decide major working orders and fill them in	At teaching works, teach by section of the work without doing it in slovenly way. Consider how to section the work to teach the trainee in explicit terms, and decide the working orders one by one while practicing the work actually.
3	Fill in with the point determined	Consider, for each major working order, where the point is while doing the work by yourself. The point means the determinant (the deciding factor of whether the work is accomplished or failed), safety (things by which workers are likely to be injured) and ease (percepted or knack). Make sure whether it could be the point or not, by the 6 queries.
4	Check it once again	Check the following while doing the work once again: Is the volume of work to be taught at a time appropriate? Is there anything overlooked?

6 INVESTMENT AND FINANCING

6 INVESTMENT AND FINANCING

6-1 Investment

6-1-1 Investment total according to respective condition of fund raising

1) Setting up of fund raising condition
Following 3 cases shall be set up as fund raising methods.

Table 1 Setting up of condition for fund raising

Item / Kind	Equity	Debt (Long-term)		Interest	
		Foreign	Local	Foreign	Local
Case-1	0%	80%	20%	8%	18%
Case-2	0%	80%	20%	6%	18%
Case-3	30%	56%	14%	10%	18%
		80 vs 20			

2) Precondition for calculation of investment amount

(a) Facilities to be procured
All taxes are exempted for the procurement of facilities from abroad. Prices of delivery after installation and test run are shown regarding the facilities to be purchased from local suppliers.

(b) Work at sight
This work is executed by local contractors.

(c) Materials for construction
These materials shall be procured in local markets and only those which are not available shall be imported.

(d) Exchange rate
US$1 = Rp1,040 = ¥241.30 ¥100 = Rp431

3) Investment amount of total investment

(a) Construction and repair costs
Construction and repair costs for Cilacap Mill (fixed capital excluding interests during construction) is estimated to be 22.7/billion Rp (5.27 billion yen), including indirect costs. Required fixed capitals added by interests during construction are 23.6 billion Rp for the case 1, 23.4 billion Rp for the case 2 and 23.37 billion Rp for the case 3, breakdowns of which are shown in table 2.

(b) Working Capital
The net amount of working capital will be 4 billion Rp (0.94 billion yen) for all of 1 ~ 3 cases. Its detail is shown in table 2.

Table 2 SUMMARY OF CAPITAL COST ESTIMATE

Capital Requirements

Item	Foreign (¥1,000)	Foreign RP. 1,000	Local RP. 1,000	Total RP. 1,000
A. Civil Works:				
a. Buildings			1,285,200	1,285,200
b. Structures			19,000	19,000
Sub-total (A)			1,304,200	1,304,200
B. Equipment and Materials:				
a. Spinning Machinery & Equipment	(3,469,750)	14,954,622	16,119	14,970,741
b. Utility Equipment	(378,200)	1,630,042	611,680	2,241,722
c. Electricity Equipment	(134,100)	577,971	711,390	1,349,361
Sub-total (B)	(3,982,050)	17,162,635	1,399,189	18,561,824
C. Ocean Freight and Insurance	(286,335)	1,234,105		1,234,105
D. Porthandling and Local Freight			165,598	165,598
E. Erection Cost:				
a. Maker Erection Supervising Fee	(79,950)	344,584	53,600	398,184
b. Local Staff Erection Fee			37,282	37,282
Sub-total (E)	(79,950	344,584	90,882	435,466
F. Preoperational Expenses:				
a. Engineering & Know-how Fee	(85,725)	369,475	20,800	390,275
b. Grand Supervising & Training Fee	(64,650)	278,641	37,600	316,241
c. Salaries Local Staff			212,566	212,566
d. Electric Power			89,446	89,446
Sub-total (F)	(150,375)	648,116	360,412	1,008,528
G. Base Cost Estimate (ΣA ∿ F)	(4,498,710)	18,389,440 (85%)	3,320,281 (15%)	22,709,721 (100%)
H. Interest During Construction:				
a. Case-1	(181,435)	781,983 (88%)	108,986 (12%)	890,969 (100%)
b. Case-2	(136,309)	587,490 (85%)	105,976 (15%)	693,466 (100%)
c. Case-3	(153,408)	661,190 (100%)		661,190 (100%)
(Including . Preoperational Expenses)				
I. Total Fixed Capital Requirements				
a. Case-1 (G + H.a)	(4,680,145)	20,171,423 (85%)	3,429,267 (15%)	23,600,690 (100%)
b. Case-2 (G + H.b)	(4,635,019)	19,976,930 (85%)	3,426,257 (15%)	23,403,187 (100%)
c. Case-3 (G + B.c)	(4,652,118)	20,050,630 (86%)	3,320,281 (14%)	23,370,911 (100%)
J. Working Capital (Case 1 ∿ 3 Sameness)	(194,520)	838,382 (21%)	3,196,986 (79%)	4,035,368 (100%)
K. Grand Total Financing Required				
a. Case-1 (I.a + J)	(4,874,665)	21,009,805 (76%)	6,626,253 (24%)	27,636,058 (100%)
b. Case-2 (I.b + J)	(4,829,539)	20,815,312 (76%)	6,623,243 (24%)	27,438,555 (100%)
c. Case-3 (I.c + J)	(4,846,638)	20,889,012 (76%)	6,517,267 (24%)	27,406,279 (100%)

(c) Total amount of investment

Total amount of investment composed of fixed capital and working capital is estimated ot be 27.64 billion Rp for the case 1, 27.44 billion Rp for the case 2 and 27.41 billion Rp for the case 3. The ratio of foreign currency against local currency in the total amount of investment is 76: 24 for all cases of 1 ~ 3. Such details are shown in table 2.

6-1-2 Costs of Civil and Architectural Works

Works at site will be implemented by local constractors and all materials required for the works are to be supplied from local markets. Expenses for each work are shown in table 3.

Table 3 CIVIL WORKS

Buildings	Foreign (¥1,000) RP. 1,000	Local RP. 1,000	Total RP. 1,000
Initial Construction Works Raw Cotton Warehouse		268,700	268,700
Preparating (removal) Works		49,400	49,400
Repair and Re-construction Works (CP-1)		504,900	504,900
Repair and Re-construction Works (CP-2)		426,200	426,200
Other Repairs & Re-construction Works		36,000	36,000
Total		1,285,200	1,285,200
Structures			
Repairs and Re-construction Works for Roads and Bridges etc. in the compound		19,000	19,000
Total		19,000	19,000
G. Total		1,304,200	1,304,200

6-1-3 Price of imported and locally available production machinery

1) Price of spinning and auxiliary machinery

(a) Price of production and auxiliary machinery to be imported.
F.O.B. prices of each machine are shown in following table 4-1 to 2 and its summary is shown as follows.

Item	CP-1 Mill	CP-2 Mill	Total
Production machine	1,883,100	1,200,450	3,083,550
spare parts	57,200	36,300	93,500
Sub-total	1,940,300	1,236,750	3,177,050
Auxiliary equipment	–	–	257,559
Laboratory equipment	–	–	35,141
Total			3,469,750

(FOB Japan Port ¥1,000)

(b) Price of auxiliary equipments to be locally purchased
Such equipment are to be procured inside Indonesian markets at ex-factory price after erection and test run. Detailed prices of each equipment are shown in table 4-3, 4 and summed up as follows.

Auxiliary equipment	14,395 thousand Rp
Laboratory equipment	1,724 thousnad Rp
Total	16,119 thousand Rp

Table 4-1 ~ 4 show the price of production machinery and auxiliary equipment.

Table 4-1 PRODUCTION MACHINE PRICE (CP-1 MILL)

FOB Japan Port (¥1,000)

Item No.	Production machine	Quantity	Unit Price	Amount Price
RS-1-la	Blow Room Machinery for A-line	1 line		62,900
RS-1-lb	Blow Room Machinery for B-line	1 line		43,000
RS-2-1	Semi High Production Card	54 sets	3,100	167,400
RS-3-1	High Speed Drawing Frame (Pre-Drawing)	5 sets	5,500	27,500
RS-3-2	Sliver Lap Former	3 sets	10,400	31,200

Item No.	Production machine	Quantity	Unit Price	Amount Price
RS-3-3	High Production Comber	22 sets	8,300	182,600
RS-4-1	High Speed Drawing Frame (1st-Drawing)	5 sets	5,200	26,000
RS-4-2	High Speed Drawing Frame (2nd-Drawing)	5 sets	5,200	26,000
RS-5-1	High Speed Simplex Fly Frame	9 sets	12,500	112,500
RS-6-1	Ring Spinning Frame	78 sets	11,400	889,200
RS-7-1	Automatic Cone Winder	8 sets	36,500	292,000
RS-7-2	R.T. Cone Winder	2 sets	11,400	22,800
	FOB Japan Port Total			1,883,100
	Spare Parts			57,200
	(Measurement)			(2,796 m^3)

Table 4-2 PRODUCTION MACHINE PRICE (CP-2 MILL)

FOB Japan Port (¥1,000)

Item No.	Production Machine	Quantity	Unit Price	Amount Price
RS-1-1	Blow Room Machinery for Cotton	1 line		42,000
RS-1-2	Blow Room Machinery for Polyester	1 line		13,500
RS-2-1	Semi High Production Card for Cotton	19 sets	3,100	58,900
RS-2-2	Semi High Production Card for Polyester	18 sets	3,100	55,800
RS-3-1	High Speed Drawing Frame (Pre-Drawing)	2 sets	5,500	11,000
RS-3-2	Sliver Lap Former	1 set		10,400
RS-3-3	High Production Comber	8 sets	8,300	66,400
RS-4-1	High Speed Drawing Frame (Grain Adjust Drawing for Polyester)	2 sets	5,500	11,000
RS-4-2	High Speed Drawing Frame (1st Drawing for P.65%: C.35%)	2 sets	15,600	31,200

Item No.	Production Machine	Quantity	Unit Price	Amount Price
RS-4-3	High Speed Drawing Frame (1st Drawing for P.48%: C.52%)	2 sets	15,600	31,200
RS-4-4	High Speed Drawing Frame (2nd Drawing for P.65%: C.35%)	2 sets	5,200	10,400
RS-4-5	High Speed Drawing Frame (2nd Drawing for P.48%: C.52%)	2 sets	5,200	10,400
RS-5-1	High Speed Simplex Fly Frame (P.65%: C.35%)	3 sets	12,500	37,500
RS-5-2	High Speed Simplex Fly Frame (P.48%: C.52%)	2 sets	12,500	25,000
RS-6-1	Ring Spinning Frame (P.65%: C.35%)	38 sets	6,200	235,600
RS-6-2	Ring Spinning Frame (P.48%: C.52%)	36 sets	6,200	223,200
RS-7-1a	Full Automatic Vacuum Steam Setter Type-6	1 set		16,700
RS-7-1b	Full Automatic Vacuum Steam Setter Type-4	1 set		2,600
RS-7-1c	Small Boiler	1 set		4,200
RS-8-1	Automatic Cone Winder (P.65%: C.35%)	4 sets	36,500	146,000
RS-8-2	Automatic Cone Winder (P.48%: C.52%)	4 sets	36,500	146,000
RS-8-3	R.T. Cone Winder (Re-Winding)	1 set		11,450
	FOB Japan Port Total			1,200,450
	Spare Parts			36,300
	(Measurement)			(1,638 m^3)

Table 4-3 AUXILIARY EQUIPMENT AND ACCESSORIES PRICE

Item No.	Equipment/Accessories	Quantity		Price			
		Import	Local	Import FOB Japan Port (¥1,000)		Local (RP. 1,000)	
				Unit Price	Amount Price	Unit Price	Amount Price
AUX-1	(AUX-1 Blowing Section)						
1-1	Cart for Lap Transport		7 sets			130	910
-2	Carrier for Waste and Reusable Fiber		20 "			110	2,200
-3	Hand Lift Truck	4 sets		100.0	400		
-4	Lap Sheet	370 pcs		1.6	592		
	Sub. Total				992		3,110
AUX-2	(AUX-2 Carding Section)						
2-1	Metallic Wire Mounting Machine Complete Set	2 sets		1,815.0	3,630		
-2	Bare Surface Grinder	1 set			700		
-3	Licker-in Roller Mounting Machine	1 "			1,600		
-4	Flat Clipping Machine	1 "			1,850		
-5	Flat Grinding Machine	1 "			1,600		
-6	Flat Tester	1 "			275		
-7	Traverse Hose Roller Grinder for MCC	4 sets		218.5	874		
-8	Traverse Hose Roller Grinder for Top	4 "		206.5	826		
-9	Stripping Roller	2 "		138.0	276		
-10	Burnishing Roller	2 "		134.0	268		
-11	Long Grinding Roller	2 "		185.0	370		
-12	Movable Motor Device for Stripping & Burnishing Roller	2 "		260.0	520		
-13	Chain Washing Machine	1 set			550		
-14	Truck for Flat Bar		4 sets			65	260
-15	Truck for Traverse Hose Roller		2 "			105	210
-16	36"ϕ Can with Spring & Caster	440 sets		39.5	17,380		
-17	Side Scope	2 "		160.0	320		
-18	Cylinder & Doffer Jack Set	2 "		220.0	440		

AUXILIARY EQUIPMENT AND ACCESSORIES PRICE

Item No.	Equipment/Accessories	Quantity		Price			
		Import	Local	Import FOB Japan Port (¥1,000)		Local (RP. 1,000)	
				Unit Price	Amount Price	Unit Price	Amount Price
2-19	Cylinder Balance Tester Set	1 set			200		
	Sub. Total				31,679		470
AUX-3	(AUX-3 Combing Section)						
3-1	Bobbin for Comber	550 pcs		10.0	5,500		
-2	20"ϕ Can with Spring & Caster	200 sets		13.0	2,600		
	Sub. Total				8,100		0
AUX-4	(AUX-4 Drawing Section)						
4-1	20"ϕ Can with Spring & Caster	3,000 sets		13.0	39,000		0
AUX-5	(AUX-5 Roving Section)						
5-1	Cart for Roving		25 sets			146	3,650
-2	Cart for Roving Bobbin		20 "			80	1,600
-3	Bobbin for Simplex Fly Frame	94,000 pcs		0.26	24,440		
-4	Polivel Picker	25 sets		15.0	375		
	Sub. Total				24,815		5,250
AUX-6	(AUX-6 Spinning Section)						
6-1	Cop Box with Separator	570 sets		6.5	3,705		
-2	Hanger for Doffing	36 "		13.0	468		
-3	Cart for Cop Transportation		10 sets			95	950

AUXILIARY EQUIPMENT AND ACCESSORIES PRICE

Item No.	Equipment/Accessories	Quantity		Price			
		Import	Local	Import FOB Japan Port (¥1,000)		Local (RP. 1,000)	
				Unit Price	Amount Price	Unit Price	Amount Price
6-4	Spira Clean for Spindle Oil	2 sets		630	1,260		
-5	Clearer Cleaning Machine	4 "		820	3,280		
-6	Heating Press for Spindle Tape	2 "		100	200		
-7	Roller Picker with Hose	16 "		29	464		
-8	Can Containing Travellers	800 pcs		4.0	3,200		
-9	Traveller Magazine	310 sets		0.7	217		
-10	Bobbin for Ring Spinning Frame	260,000 pcs		0.145	37,700		
-11	Blow Cleaner for Ring Spinning Frame	152 sets		528.0	80,256		
-12	T.T. Collector	31,000 "		0.22	6,820		
	Sub. Total				137,570		950
AUX-7	(AUX-7 Winding Section)						
7-1	Cart for Cone		40 sets			80	3,200
-2	Scale for Auto Winder	10 sets		8.0	80		
	Sub. Total				80		3,200
AUX-8	(AUX-8 Maintenance Section)						
8-1	Movable Tool Box with Vise	4 sets		110	440		
-2	Movable Tool Box	3 "		100	300		
-3	Handling Carrier	7 "		29.0	203		
-4	General Tool	1 lot			745		
-5	Maintenance Parts for Existent Auxiliary Equipment		1 lot		705		
-6	Portable Crane with Chain Block	1 set			500		
	Sub. Total				2,893		940

AUXILIARY EQUIPMENT AND ACCESSORIES PRICE

Item No.	Equipment/Accessories	Quantity		Price			
		Import	Local	Import FOB Japan Port (¥1.000)		Local (RP. 1,000)	
				Unit Price	Amount Price	Unit Price	Amount Price
AUX-9	(AUX-9 Roller Shop)						
9-1	Gum Cot Grinding Machine with Attachment	1 set			6,000		
-2	Roller Eccentricity Tester	2 sets		415	830		
-3	Heavy Type Roller Assembling Machine	2 "		600	1,200		
-4	Roller Tester	2 "		200	400		
-5	Automatic Ultraviolet Rays Rubber Roller Treatment Machine	1 set			4,000		
-6	Miscellaneous Accessories		1 lot				475
	Sub. Total				12,430		
	Grand Total				257,559 (Measurement: 733m³)		14,395

Table 4-4 LABORATORY EQIPMENT PRICE

Item No.	Equipment/Accessories	Quantity		Price			
		Import	Local	Import FOB Japan Port (¥1.000)		Local (RP. 1,000)	
				Unit Price	Amount Price	Unit Price	Amount Price
LAB-1	Digital Fibrograph	1 set			8,750		
-2	Micronaire with Balance	1 "			1,156		
-3	Stelometer (Fineness/Maturity Tester)	1 "			1,100		
-4	Microscope with Photographing Device	1 "			732		
-5	Cotton Standard Box	3 sets		3.0	9		
-6	Irregularity Sample	14 "		8.0	112		
-7	Evenness Testing Installation	1 set			10,347		
-8	Compressor with Sub Tank	1 "			945		
-9	Wrap Reel	3 sets		450	1,350		
-10	Wrap Block	1 set			165		
-11	Grain Balance	3 sets		150	450		
-12	Yarn Fault Classifying Installation with to modify existent R.T. Winder	1 set			5,125		
-13	Comber Waste Percentage Balance	1 "			200		
-14	Mini Evenness Tester	1 "			800		
-15	Single Yarn Tension Strength Tester	3 sets		800	2,400		
-16	Lap Yard Testing Machine	1 set			1,500		
-17	Miscellaneous Equipment & Accessories	1 lot					1,724
	Total				35,141 (Measurement: 15m^3)		1,724

2) Price of electricity and utility

Breakdown prices of all electric and utility equipments are shown in table 5 and 6 and total prices are summerized as follows.

(a) Price of electric equipments to be imported

	CP-1 Mill	CP-2 Mill	Common	Total
FOB (1,000Rp)	26,040	24,230	83,830	134,100

(b) Price of electric equipments locally available

These are procured inside Indonesian markets at ex-factory prices after erection and test run

	CP-1 Mill	CP-2 Mill	Common	Total
(1,000Rp)	228,555	259,513	283,332	771,390

(c) Price of utility equipments to be imported

	CP-1 Mill	CP-2 Mill	Common	Total
FOB (1,000Rp)	130,800	94,100	153,300	378,200

(d) Price of utility equipments locally available

These are procured inside Indonesian markets at ex-factory prices after erection and test run.

	CP-1 Mill	CP-2 Mill	Common	Total
(1,000Rp)	244,515	105,615	261,550	611,680

Table 5 and 6 show the price of electricity and utility equipment.

Table 5 ELECTRIC EQUIPMENT PRICE

Item No.	Equipment/Accessories	Quantity		Amount Price	
		Import	Local	Import FOB Japan Port (¥1,000)	Local (Rp.1,000)
(for CP-1&CP-2)					
RE-1/2-1	Incoming Substation 1 lot				
	1) Allotment for PLN		1 lot		152,550
	2) Incoming Cable and Wiring				
	(a) 20 KV CVT Cable and Miscellaneous Materials	1 lot		1,230	
	(b) Wiring of H.T. Cable		1 lot		1,300
	3) Incoming Substation Equipment				
	(a) Isolator Board, including Lightning Arrester and Earth Switch	1 unit			
	(b) Metering out-fit Board	1 "			
	(c) Incoming Circuit Breaker Board	1 "			
	(d) H.T. Bus Duct	1 "			
	(e) Main Transformer	1 "		39,700	
	(f) 6.6 KV Distribution System	1 "			
	(g) 6.6 Bus Duct	1 "			
	(h) Grand Voltage Transformer of 6.6 KV Bus live	1 "			
	(i) D.C. Electric Power Source Equipment	1 "			
	(j) Supervisory Control Panel	1 "			
	(k) Installation		1 lot		14,845
	(l) Earthing Device		1 lot		
(for CP-1)					
RE-1-1	Secondary Substation 1 lot				
	1) Wiring of Feeder Cable				
	(a) Feeder Cable	1 lot		440	
	(b) Wiring of Feeder Cable		1 lot		1,300

ELECTRIC EQUIPMENT PRICE

Item No.	Equipment/Accessories	Quantity		Amount Price	
		Import	Local	Import FOB Japan Port (¥1,000)	Local (Rp.1,000)
	2) Substation Equipment				
	(a) Circuit Breaker Board for Distribution Transformer	2 units			
	(b) Distribution Transformer 6.6 KV/400 V 1500 KVA	1 unit			
	1200 KVA	1 "			
	(c) Bus Dust of Trans-secondary	2 units		23,100	
	(d) L.T. Distribution Panel and Lightning Main Switch Panel	1 lot			
	(e) Installation		1 lot		8,600
(for CP-2) RE-2-1	Secondary Substation 1 lot				
	1) Wiring of Feeder Cable				
	(a) Feeder Cable	1 lot		330	
	(b) Wiring of Feed Cable		1 lot		1,075
	2) Substation Equipment				
	(a) Circuit Breaker Board for Distribution Transformer	1 unit			
	(b) Distribution Transformer 6.6 KV/400 V 1500 KVA	1 "			
	1200 KVA	1 "		21,900	
	(c) Re-construction Materials of L.T. Distribution Panel	1 lot			
	(d) Main Switch Board of Lighing	1 "			
	(e) Installation		1 lot		15,050
(for CP-1&CP-2) RE-1/2-2	H.T. Wiring for Chiller 1 lot				
	1) Feeder Cable and H.T. Motor Feed Cable	1 lot		4,250	
	2) 6.6 KV H.T. Switch Board for Chiller Motor	3 units			
	3) Installation		1 lot		2,150

ELECTRIC EQUIPMENT PRICE

Item No.	Equipment/Accessories	Quantity		Amount Price	
		Import	Local	Import FOB Japan Port (¥1,000)	Local (Rp.1,000)
RE-1/2-3	H.T. Distribution Equipment of Important Load 1 lot				
	1) Feeder Cable	1 lot		2,650	
	2) L.T. Power Distribution and Lighting Main Switch Panel	1 unit			
	3) Installation		1 lot		4,300
RE-1/2-4	Diesel Generator System 1 lot				
	1) Diesel Engine Generator Equipment	1 lot		36,000	
	2) Automatic Storing Panel of Generator	1 unit			
	3) Circuit Breaker Panel of Generator	1 "			
	4) Wiring Materials		1 lot		10,750
	5) Installation		1 "		
(for CP-1)					
RE-1-2	L.T. Power Wiring Equipment 1 lot				
	1) L.T. Power Main Cable Equipment				
	(a) Cable	1 lot		2,500	
	(b) Cable Rack and Wiring Material		1 lot		71,855
	(c) Wiring		1 "		
	2) L.T. Power Distribution Board		12 units		18,000
	3) L.T. Power Wiring				
	(a) P.V.C. Copper Wire and Conduct Tube		1 lot		63,150
	(b) Wiring Work		1 lot		

ELECTRIC EQUIPMENT PRICE

Item No.	Equipment/Accessories	Quantity		Amount Price	
		Import	Local	Import FOB Japan Port (¥1,000)	Local (Rp.1,000)
(for CP-2)					
RE-2-2	L.T. Power Wiring Equipment 1 lot				
	1) L.T. Power Main Cable Equipment				
	(a) Cable	1 lot		2,000	
	(b) Cable Rack and Wiring Materials		1 lot		} 87,920
	(c) Wiring		1 lot		
	2) L.T. Power Distribution Board		16 units		24,000
	3) L.T. Power Wiring				
	(a) P.V.C. Copper Wire and Conduit Tube		1 lot		} 63,150
	(b) Wiring Work		1 lot		
(for CP-1&CP-2)					
RE-1/2-5	L.T. Power Wiring Equipment for Chiller Room 1 lot				
	1) L.T. Power Main Cable Equipment				
	(a) Cable		1 lot		} 40,898
	(b) Wiring Work		1 lot		
	2) L.T. Power Distribution Board		4 units		10,000
	3) L.T. Power Wiring				
	(a) P.V.C. Copper Wire and Conduit Tube		1 lot		} 21,375
	(b) Wiring Work		1 lot		
(for CP-1)					
RE-1-3	Lighting Equipment 1 lot				
	1) Lighting Main Cable Materials		1 lot		} 65,650
	2) Lighting Switch Board		7 units		
	3) P.V.C. Copper Wire and Conduit Tube		1 lot		
	4) Race Way and Supporting Materials for Fluorescent Lamp		1 "		
	5) Lighting Fitting		1 "		

ELECTRIC EQUIPMENT PRICE

Item No.	Equipment/Accessories	Quantity		Amount Price	
		Import	Local	Import FOB Japan Port (¥1,000)	Local (Rp.1,000)
(for CP-2)					
RE-2-3	Lighting Equipment 1 lot				
	1) Lighting Main Cable Materials		1 lot		
	2) Lighting Switch Board		7 units		
	3) P.V.C. Copper Wire and Conduit Tube		1 lot		68,318
	4) Race Way and Supporting Materials for Fluorescent Lamp		1 "		
	5) Lighting Fitting		1 "		
(for CP-1&CP-2)					
RE-1/2-6	Lighting Equipment for Utility 1 lot				
	1) P.V.C. Copper Wire and Conduit Tube		1 lot		
	2) Supporting Materials for Fluorescent Lamp		1 "		2,914
	3) Lighting Fitting		1 "		
RE-1/2-7	Temporary Installation and Materials 1 lot		1 lot		12,000
RE-1/2-8	Remove of Electric Equipment 1 lot		1 lot		10,240
	Total			134,100 (Measurement : 560 m^3)	771,390

Table 6 UTILITY EQUIPMENT PRICE

Item No.	Equipment/Accessories	Quantity		Amount Price	
		Import	Local	Import FOB Japan Port (¥1,000)	Local (Rp.1,000)
(for CP-1)					
RU-1-1	Central Air Conditioning Equipment 3 units				
	1) Air Washer	3 sets			
	2) Supply Fan	3 "			
	3) Return Fan	6 "		62,040	
	4) Spray Pump	6 "			
	5) Air Return Filter	6 "			
	6) Spare Parts	1 lot			
	7) Erecting, Part-making and other works		1 lot		25,500
RU-1-2	Duct for Air Conditioning 1 lot				
	1) Supply Air Duct	1 lot	1 lot		
	2) Return Air Duct	1 "	1 "	35,300	
	3) Spare Parts	1 "	1 "		189,180
	4) Suction Duct for Auto-winder	1 "	1 "		
	5) Erecting, Part-making and other works		1 "		
RU-1-3	Instrument for Automatic Control 1 lot				
	1) Instrument and Spare Parts	1 lot		8,760	
	2) Erecting, fitting, ducting and other works		1 lot		6,600
RU-1-4	Direct Humidifier Equipment 1 lot				
	1) Root Blower	1 lot			
	2) Automizer	1 "		6,200	
	3) Humidity Controller	1 "			
	4) Spare Parts	1 "			
	5) Erecting, Part-making and other works		1 lot		3,080

UTILITY EQUIPMENT PRICE

Item No.	Equipment/Accessories	Quantity		Amount Price	
		Import	Local	Import FOB Japan Port (¥1,000)	Local (Rp.1,000)
RU-1-5	Dust Collecting Equipment 1 lot				
	1) Equipment and Spare Parts	1 lot	1 lot	8,900	19,540
	2) Erecting, Part-making and other works		1 "		
RU-1-6	Air Compressor				
	1) Vertical Type Air Compressor	2 sets		2,800	
	2) After Cooler and Separator	2 "			
	3) Compressed Air Tank	1 set			
	4) Air Dryer & Air Filter	1 "			
	5) Piping Devoce	1 lot			
	6) Spare Parts	1 "			
	7) Erecting, Part-making and other works		1 lot		150
RU-1-7	Oil-free Air Compressor				
	1) Vertical Type Air Compressor	2 sets		3,800	
	2) After Cooler and Separator	2 "			
	3) Compressed Air Tank	1 set			
	4) Air Dryer	1 lot			
	5) Air Filter	2 sets			
	6) Piping Device	1 lot			
	7) Spare Parts	1 "			
	8) Erecting, Part-making and other works		1 lot		165

UTILITY EQUIPMENT PRICE

Item No.	Equipment/Accessories	Quantity		Amount Price	
		Import	Local	Import FOB Japan Port (¥1,000)	Local (Rp.1,000)
RU-1-8	Blower Centralization for Auto Winder				
	1) Blower	1 lot		3,000	
	2) Spare Parts	1 "			
	3) Erecting, Part-making and other work		1 lot		300
	CP-1 Total			130,800	244,515
(for CP-2)	----- Existing Equipment shall be used partially.				
RU-2-1	Central Air Conditioning Equipment 1 unit				
	1) Air Washer	1 set		47,950	
	2) Supply Fan	1 "			
	3) Return Fan for Blow Room to Paving section	2 sets			
	4) " for Ring Spinning and Winding Section	2 "			
	5) Spray Pump	2 "			
	6) Air Return Filter for Blow Room to Paving Section	2 "			
	7) " for Ring Spinning and Winding Section	2 "			
	8) Spare Parts	1 lot			
	9) Erecting, Part-making and other works		1 lot		25,080

UTILITY EQUIPMENT PRICE

Item No.	Equipment/Accessories	Quantity		Amount Price	
		Import	Local	Import FOB Japan Port (¥1,000)	Local (Rp.1,000)
RU-2-2	Central Air-conditioning Equipment for Winder 1 lot				
	1) Air Washer for Winder	1 set		4,500	
	2) Spare Pump for Winder	1 "			
	3) Spare Parts	1 lot			
	4) Erecting, Part-making and other works		1 lot		5,360
RU-2-3	Duct for Air Conditioning 1 lot				
	1) Supply Air Duct	1 lot	1 lot	11,000	51,760
	2) Return Air Duct	1 "	1 "		
	3) Suction Duct for Auto Winder	1 "	1 "		
	4) Spare Parts	1 "			
	5) Erecting · Ductin, Part-making and other works		1 "		
RU-2-4	Instrument for Automatic Control 1 lot				
	1) Instrument and Spare Parts	1 lot	1 lot	8,850	6,500
	2) Erecting, Ducting, Part-making and other works		1 "		
RU-2-5	Direct Humidifier Facilities 1 lot				
	1) Root Blower	2 sets		5,600	
	2) Atomizer	22 "			
	3) Humidity Controller	2 "			
	4) Spare Parts	1 lot			
	5) Erecting, fitting and other work		1 lot		2,900
RU-2-6	Dust Collecting Equipment 1 lot				
	1) Equipment and Spare Parts	1 lot		6,600	
	2) Erecting, Part-making and other works		1 lot		13,400

UTILITY EQUIPMENT PRICE

Item No.	Equipment/Accessories	Quantity		Amount Price	
		Import	Local	Import FOB Japan Port (¥1,000)	Local (Rp.1,000)
RU-2-7	Air Compressor				
	1) Vertical Type Air Compressor	2 sets			
	2) After Cooler and Separator	2 "			
	3) Compressed Air Tank	1 set			
	4) Air Dryer	1 lot		2,800	
	5) Air Filter	2 sets			
	6) Piping Device	1 lot			
	7) Spare Parts	1 "			
	8) Erecting, Par-making and other works		1 lot		150
RU-2-8	Oil-free Air Compressor				
	1) Vertical Type Air Compressor	2 sets			
	2) After Cooler and Separator	2 "			
	3) Compressed Air Tank	1 set			
	4) Air Dryer	1 lot		3,800	
	5) Air Filter	2 sets			
	6) Piping Device	1 lot			
	7) Spare Parts	1 "			
	8) Erecting, Part-making and other works		1 lot		165
RU-2-9	Blower Centralization for Auto Winder				
	1) Blower	1 lot		3,000	
	2) Spare Parts	1 "			
	3) Erecting, Part-making and other work		1 lot		300
	CP-2 Total			94,100	105,615

UTILITY EQUIPMENT PRICE

Item No.	Equipment/Accessories	Quantity		Amount Price	
		Import	Local	Import FOB Japan Port (¥1,000)	Local (Rp.1,000)
(for CP-1 & CP-2)					
RU-1/2-1	Air Conditioning Equipment for Laboratory 1 lot				
	1) Equipment	2 sets		5,800	
	2) Ducting and Piping Materials	1 lot			
	3) Instrument for Automatic Control	1 "			
	4) Spare Parts	1 "			
	5) Erecting, Ducting, Part-making and other works		1 lot		3,200
RU-1/2-2	Refrigerating Equipment 3 units				
	1) Refrigerator	3 sets		81,300	
	2) Cooling Tower	3 "			
	3) Cooling Water Pump	3 "			
	4) Chilled Water Pump	3 "			
	5) Chilled Water Feed Pump	3 "			
	6) Water Strainer	1 set			
	7) Spare Parts	1 lot			
	8) Erecting, Part-making and other works		1 lot		7,350
RU-1/2-3	Water Treatment Equipment 1 lot				
	1) Quick filtrating Equipment (filter)	1 set		25,600	
	2) Water Softening Equipment	1 "			
	3) Anticorrosive Pouring Equipment	1 "			
	4) Spare Parts	1 lot			
	5) Erecting, Part-making and other works		1 lot		7,700

UTILITY EQUIPMENT PRICE

Item No.	Equipment/Accessories	Quantity		Amount Price	
		Import	Local	Import FOB Japan Port (¥1,000)	Local (Rp.1,000)
RU-1/2-4	Piping Equipment 1 lot				
	1) Chilled Water Piping and Device	1 lot	1 lot		
	2) Cooling Water Piping and Device	1 "	1 "		
	3) Piping and Device for Supply Water and Drainage	1 "	1 "		
	4) Compressed Air Piping and Device				
	4-1) For Actuator	1 lot	1 lot	38,600	228,670
	4-2) For Cleaning	1 "	1 "		
	4-3) For Air Source of Direct Humidifier	1 "	1 "		
	5) Fire Fighting Piping and Device	1 "	1 "		
	6) Erecting, Part-making and other works		1 "		
RU-1/2-5	Fire Fighting Equipment				
	1) Outdoor Hydrant Valve Unit	1 lot		2,000	
	2) Fire Extinguisher	1 "			
	3) Erecting, Part-making and other work		1 lot		1,140
RU-1/2-6	Remove of Utility Equipment		1 lot		13,490
	CP-1/2 Total			153,300	261,550
	Total			378,200 Measurement: 3,035m³	611,680

6-1-4 Freight, insurance, other charges and CIF price

1) Freight

Calculation Base

Item	US$/m³
(a) Base Rate	86.52
(b) Banker Adjustment Factor Base Rate x 25.5% up	22.06
(c) Surcharge of Heavy Lift and Long Length (It is assumed that 10% of total cargos are required.) Base Rate x *13.5% x 10% *13.5% up in case the measured ton of one package is 3.048 ~ 4.064	1.17
(d) Currency Adjustment Factor (1+2+3) x 10.5%	11.52
Total	US$121.27/m³ = ¥29,262/m³

(Exchange Rate: US$1 = ¥241.30)

US$1 = Rp. 1,040 (A)
¥1 = Rp. 4.31 (B)
(A)/(B) = ¥241.30

Ocean freight in yen account calculated by above-mentioned method shall be;

	Total Measurement	Ocean Freight
Spinning Production Machine	5,182 m³	¥151,636,000
Included Auxiliary Equipment, Accessories & Laboratory Equipment		
Utility Facilities	3,035 m³	¥88,810,000
Electric Facilities	560 m³	¥16,387,000
Total Ocean Freight	8,777 m³	¥256,833,000

Between Japan port and Cilacap Port

2) Marine & inland insurance premium

Insurance premium against all risk, war risk, strikes, riots, civil commotions and special replacement by air freight (C & F Cilacap x 0.00696) is calculated as follows, on condition that (1) transport from Cilacap port to site (Patal CLP) is carried out within 21 days and (2) packages are opened within 90 days since arrival to site.

Spinning Production Machines

¥3,621,386,000 x 0.00696 ≒ ¥25,205,000

Utility Facilities

¥467,010,000 x 0.00696 ≒ ¥3,250,000

Electric Facilities

¥150,487,000 x 0.00696 ≒ ¥1,047,000

Total	¥29,502,000

3) Charges incurred at Cilacap Port

(a) Charge for unloading

Unloading and landing charges are included in ocean freight.

(b) Charge for custom clearance and port handling charge

These charges are composed of charges for custom clearance, dock work and commission of discharging company.

Charge for measurement m^3 = Rp17,500

	Total Measurement	Port Charge
Spinning Production Machines	5,182 m^3	Rp.90,685,000
Utility Facilities	3,035 m^3	Rp.53,113,000
Electric Facilities	560 m^3	Rp. 9,800,000
Total	8,777 m^3	Rp.153,598,000

(c) Custom duties and import sales tax

Preferential treatment of import license makes thorough exemption of import duties and taxes for imported textile machines and equipments.

That is, custom duty (5%) and import sales tax (2.5%) are exempted.

4) Charges for inland transport
(between Cilacap port and Patal Cilacap)

(a) Charges for load and off-load

Shown below are total hours and charges for service of forklifts and cranes to be used for loading at port and off-loading at site:

Total Service Hours	Lease Charge
• 5-ton forklift (8hrs/day x 14) x Rp15,000/hr	= Rp1,689,000
• 40-ton crane (8hrs/day x 7) x Rp60,000/hr	= Rp3,360,000
Total 168 hrs	Rp5,040,000

The above costs are distributed according to ratio of measurement m^3 as follows:

	Total Volume	Total Charge
Spinning Production Machines	5,182 m^3	Rp.2,976,000
Utility Facilities	3,035 m^3	Rp.1,743,000
Electric Facilities	560 m^3	Rp. 321,000
Total	8,777 m^3	Rp.5,040,000

(b) Inland transport charge

Transport tariffs surveyed on are:

- Trailer: Rp. 250,000 one round trip between port and site
- Lorry: Rp. 10,000 one round trip between port and site

Loading quantity per one vehicle is:

- Trailer: W2.5 x L6.8 x H2.5 x 0.8 = 34 m^3
- Lorry: W2.3 x L4.2 x H2.3 x 0.8 = 18 m^3

Required number of vehicles multiplied by charges are:

M/C & Equip	Total Volume	Trailer		Lorry	
		Number	Rp.	Number	Rp.
SP.	5,182	2	500,000	284	2,840,000
UT.	3,035	3	750,000	163	1,630,000
EL.	560	4	1,000,000	24	240,000
Total	8,777	9	2,250,000	471	4,710,000

As stated above, total service charge for transport vehicles are computed as Rp. 6,960,000 and total inland transport charges obtained by adding (a) and (b) are as follows:

Spinning Production Machines	Rp.6,316,000
Utility Facilities	Rp.4,123,000
Electric Facilities	Rp.1,561,000
G. Total Charge	Rp.12,000,000

5) CIF price of production machines and auxiliary equipments to be imported.

CIF prices at ex-Cilacap factory (FOB price + freight, insurance premium, port charge and inland transport freight) divided into foreign and local currencies are shown in table 7.

Table 7 PRICE LIST OF PRODUCTION MACHINES AND EQUIPMENT TO BE IMPORTED

Description	Spinning	Utility	Electricity	Total
FOB Japanese Port	¥3,469,750,000	¥378,200,000	¥134,100,000	¥3,982,050,000
Ocean Freight Between Japanese Port & Cilacap	¥151,636,000	¥88,810,000	¥16,387,000	¥256,833,000
C & F Cilacap	¥3,621,386,000	¥467,010,000	¥150,487,000	¥4,238,883,000
Marine & Inland Insurance Premium	¥25,205,000	¥3,250,000	¥1,047,000	¥29,502,000
CIF Patal Cilacap	¥3,646,591,000	¥470,260,000	¥151,534,000	¥4,268,385,000
Cilacap Port Charge	Rp.90,685,000	Rp.53,113,000	Rp.9,800,000	Rp.153,598,000
Inland Transportation charge by truck	Rp.6,316,000	Rp.4,123,000	Rp.1,561,000	Rp.12,000,000
GRAND TOTAL CIF Cilacap				
Foreign Currency	¥3,646,591,000	¥470,260,000	¥151,534,000	¥4,268,385,000
Local Currency	Rp.97,001,000	Rp.57,236,000	Rp.11,361,000	Rp.165,598,000

Note: Neither duties nor taxes shall be applied.

6-1-5 Costs for local labour and energy for trial run before start up

1) Local labour costs before start up

Table 8 shows the breakdown of labour costs for local staffs employed during pre-operational stage from contract till start up (Refer to table 37 to 40 "Personnel plan before operation commencement")

Table 8 Labour Cost of Local Staff before Operation

	Man·Month/Year				Salary/Wage Wage Per Man·Month (Rp)	Total Salary/ Wage (Rp)
	Administration Dept.	Utility Dept.	Spinning Dept.	Total		
Mill Manager	11	–	–	11	360,500	3,965,500
Manager	15	11	11	37	229,500	8,491,500
Chief	36	25	25	86	165,500	14,233,000
Foreman	72	60	135	267	106,500	28,435,500
Leader/Worker	606	424	2,644	3,674	53,000	194,722,000
Total	740	520	2,815	4,075	–	249,847,500

Total sum Rp.249,847,500 shall be imposed on the following fixed assets.

Fixed assets	Standard of imposition	Amount
(a) Machinery and Equipment	Erection labour cost for Spinning department	Rp.25,105,000
(b) Electric and Utility equipment		Rp.12,177,000
Electricity	Erection labour cost for electric department	(Rp. 5,826,000)
Power	Erection labour cost for Utility department	(Rp. 6,351,000)
(c) Pre-operational expenses	Expenses for removal and trial run of direct department and labour cost for administrative department	Rp.212,565,500
	Total	Rp.249,847,500

2) Energy costs for trial run

This energy costs include all costs required for trial run of production machinery (power cost, fuel cost for diesel generation, etc.). This is classified as preoperational expenses. Rp.89,446,000

6-1-6 Foreign engineers, engineering and know-how fee

1) Foreign grand supervisor's fee for removal, erection, trial run and adjustment

This is fee for chief supervisors who make necessary organization, adjustment and progress of civil works, removal work of machinery to be withdrawn and erection of production and auxiliary machinery. These works are carried out in respective departments under control of each chief supervisor. Such supervisors are to be dispatched from the engineering company that takes charge of basic design.

A project manager organizing and controlling the job of chief supervisors of each department is generally included here.

Likewise, technical assistance fee as per each department necessary for preparation and execution of trial run and training before operation is included here.

Fee for foreign grand supervisors shall be placed to the account of pre-operational expenses before starting up and to the account of manufacturing cost (account: technical assistance fee). Breakdown of pre-operational expenses is shown below:

Project manager	1 pr x 8 mon	¥11,400,000
Chief supervisor of spinning department	3 prs x 5 mon	¥19,650,000
Chief supervisor of electric and utility department	2 prs x 8 mon	¥20,400,000
Chief supervisor of civil and architectural department	1 pr x 8 mon	¥10,400,000
Total	47 man-month	¥61,850,000

The following expenses are not included in the above amount.

Return air fare
Accommodation and board charge

The above staying period covers departure and arrival dates of and from their country of residence.

2) Foreign supervisor's fee for the erection of imported machinery

This is fee for supervisors dispatched from each manufacturer, who instruct the erection of production machinery and electric and utility equipments imported. The number of supervisors and periods required are set up in accordance with the erection schedule. This cost is incorporated in the fixed assets.

(a) Before operation

Spinning	36 man-month	(14 supervisors)	¥37,800,000
Electricity	8 man-month	(4 supervisors)	¥ 3,400,000
Utility	13 man-month	(4 supervisors)	¥13,650,000
Total	57 man-month	(22 supervisors)	¥59,850,000

(b) After operation (1st year)

Spinning	6 man-month	(4 supervisors)*	¥ 6,300,000
Electricity	2 man-month	(2 supervisors)**	¥ 2,100,000
Utility	2 man-month	(2 supervisors)***	¥ 2,100,000
Total	10 man-month	(8 supervisors)	¥10,500,000

Remark: *All 4 supervisors give services continued from before operation.
**1 supervisor gives service continued from before operation.
***1 supervisor gives service continued from before operation.

The following expenses are not included in the above amount.

Return air fare
Accommodation and board charge

The above staying period covers departure and arrival dates of and from their country of residence.

3) Accommodation, board and commutation charges incurred at site for foreign supervisors.

These include accommodation and full board charge, commutation charge between the hotel and site, which are incurred for foreign supervisors during the stay at site, and return air fare to and from Indonesia.

Return air fare for every 6 month leave for the supervisor staying at site during more than 1 year is included here.

(a) Grand supervisor

This charge incurred before operation is passed to the account of pre-operational expenses and to the account of manufacturing cost during first 2 years after start up.

– Return air fare before operation

Project manager	1.5 round trip	¥ 600,000
Chief supervisor of spinning	1.5 round trip	¥ 600,000
Chief supervisor of electricity and utility	3 round trip	¥1,200,000
Chief supervisor of civil	1 round trip	¥ 400,000
Total	7 round trip	¥2,800,000

-- Accommodation and board charge before operation

Project manager	8 man-month	Rp. 6,400,000
Chief supervisor of spinning	15 man-month	Rp.12,000,000
Chief supervisor of electricity and utility	16 man-month	Rp.12,800,000
Chief supervisor of civil	8 man-month	Rp. 6,400,000
Total	47 man-month	Rp.37,600,000

(b) Erection supervisors

This charge is treated as fixed assets.

– Return air fare before operation

Spinning department	12 round trip	¥4,800,000
Electric department	3.5 round trip	¥1,400,000
Utility department	3.5 round trip	¥1,400,000
Total	19 round trip	¥7,600,000

– Return air fare after operation (1st year)

Spinning department	2 round trip	¥ 800,000
Electric department	1.5 round trip	¥ 600,000
Utility department	1.5 round trip	¥ 600,000
Total	5 round trip	¥2,000,000

– Accommodation and board charge before operation

Spinning department	36 man-month	Rp.28,800,000
Electric department	8 man-month	Rp. 6,400,000
Utility department	13 man-month	Rp.10,400,000
Total	57 man-month	Rp.45,600,000

– Accommodation and board charge after operation (1st year)

Spinning department	6 man-month	Rp. 4,800,000
Electric department	2 man-month	Rp. 1,600,000
Utility department	2 man-month	Rp. 1,600,000
Total	10 man-month	Rp. 8,000,000

4) Engineering fee and know-how fee

Scope of engineering work is as follows:

(a) Design and specification

– Execution of basic design and check of detailed design of civil and architecture
– Execution of basic design and check of detailed design of service facilities (electricity and utility)
– Setting up of basic and detailed specification of imported production machinery
– Execution of basic and detailed design relating to the erection of production machinery
– Drawing up of time schedule of renovation