

APPENDIX I

ESSENTIAL EQUIPMENT FOR B.M.R. & E. PROJECT

QUESTION 1

1. A company has a net operating loss of \$100,000 in 2018. The company's tax rate is 21%.

PART (I)

ESSENTIAL EQUIPMENT AND PARTS

FOR REPLACEMENT

1910

1911

1912

Qty

Description

SECTION: RAYON FILAMENT PLANT

Slurry System

2	Slurry feed pump
2	Flanged press roll
2	Plain press roll
2 sets	Roll bearing ass'y
2 sets	Seal plate
2 sets	Roll seal & cleaner ass'y

Pneumatic Conveying System (A line)

1	Cooler & heater
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Ageing Tower Ass'y

8	Solenoid valve for servo mechanism
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Alkali-cellulose Conveying System (B line)

1	Alkali-cellulose condenser
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Alkali-cellulose Measuring

1 set	Chain and sprocket
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Xanthation

1 set	Packing, setting bolt, valve seat for dry churn
6 sets	CS ₂ charging pipe (reinforced type)
6 sets	Magnet brake for dry churn drive motor
2	Rotor for Nash type pump
2	Rotor for Nash type pump

<u>Q'ty</u>	<u>Description</u>
	<u>Ripening & Filtration System</u>
5 sets	Gear set
12	Gauge glass
	<u>Deaeration System</u>
20	Cock
	<u>Acid Bath</u>
1 set	Lead sheet for repairing of bottom part in No. 2 tank, No. 1 return tank, filtrate tank, and No. 2 acid tank.
1 set	Lead piping materials for repairing of acid bath
	<u>Acid Recovery</u>
1 set	Repairing materials for the 1st evaporator vessel
1 set	Mechanical seal & shaft sleeve for intermediate acid pump
	Worm gear for rotary vacuum filter
	<u>Jet Laboratory</u>
1	Microscope for spinnerette inspection
1	Projector for spinnerette hole inspection
	<u>SECTION: ANHYDROUS SODIUM SULPHATE PLANT</u>
	<u>Melting</u>
1 set	Repairing materials for melting tank
	<u>Evaporator</u>
1 set	Repairing materials for evaporating vessel

Q'ty

Description

1 set

Mechanical seal & shaft sleeve for forced circulation pump

1

Receiver

Centrifuge

1 set

Repairing parts, consisting of:

2

Basket

2

Brake pulley

2

Brake lining

5

Ampere meter

1 set

Agitator for settling tank

Rotary Dryer

1 set

Rotary burner with gear pump for rotary dryer

SECTION: AIR CONDITIONING

Spinning Room

240

Air outlet register, VS type

4

Roller bearing for main exhaust fan

SECTION: CS₂ & Na₂S PLANT

12 sets

Conductive band (For 2 furnaces)

1

Exhaust fan

1

Circulation water pump, with motor, c.i.

2

Caustic soda circulation pump, with motor

Q'ty

Description

SECTION: WATER PLANT

SB Type Clarator

- | | |
|---|--|
| 1 | SB clarifier, ferro-concrete center column, to be modified and reinforced. |
| 1 | Inner equipment, to be reinforced and/or replaced. |

SECTION: REFRIGERATION

Refrigerator unit, 440 RT for General Cooling

Repairing parts, consisting of:

- | | |
|-------|--------------------------------|
| 1 | Oil pump with accessories |
| 1 | Oil heater |
| 1 | Oil cooler |
| 1 | Impeller with accessories |
| 1 | Gear (Large) |
| 1 | Gear (Small) |
| 1 | Gear coupling ass'y |
| 1 set | Bearing ass'y |
| 1 set | Thrust bearing ass'y |
| 1 | Lever for valve control |
| 1 | Packing and seal for chamber |
| 1 | Pipe and flange for oil cooler |
| 1 | Standard tools |
| 1 | Gas leakage checker |
| 1 set | Condenser |

SECTION: BAMBOO DISSOLVING PULP PLANT

Cooking

- | | |
|---|---|
| 1 | Pre-heater for digester, shell & tube type, SUS |
|---|---|

<u>Q'ty</u>	<u>Description</u>
1 set	Desuperheater with turbo-pump
1 set	Steam control valve for digester
	<u>Blowing</u>
1	Gear reducer for blow tank
	<u>Washing & Screening</u>
2	Pulp pump, centrifugal, casing c.i.
2	Pulp pump, centrifugal, casing c.i.
	<u>Bleaching & After Screening</u>
1	Pump for 3rd centri-cleaner
1	Agitator, type KR-4, SUS
1 set	Agitator for new Belmer chest, type KR-4, SUS
1	Motor for above
1 lot	Acid proof tile and cement for Midfeather type concrete chest
1	Pinion and gear set for HCl thickener
1	HCl pump, centrifugal, rubber lined m.s.
1	Motor for HCl pump
1	Chlorine mixer
53	Nozzle for Centri-cleaner
	<u>Bleaching Chemical</u>
1 lot	Tile and acid proof cement for NaOCl storage tank
2	NaOCl feeding pump, centrifugal, SUS
1	Constant volume pump, twin plunger type, SUS
1	Motor for Constant volume pump
2	SO ₂ blower, NGK type

Q'ty

Description

Sheet Making

4	Chain stepless gear reducer, type 2SVb-4:1
	Copper flexible pipe with fittings
1 set	Hot water pump with motor
	Various knives for sheet cutting
1	Fly knife gear pinion
1	Motor for conveyor

SECTION: CAUSTIC SODA & CHLORINE PLANT

Brine Purification Plant

10	Brine pump, centrifugal gland packing seal, DK-CU type, 30 mH, 36 m ³ /h, with enclosed fan cooled motor, 15 KW;
	2 sets - For saturator transfer
	2 sets - For sand filter transfer
	2 sets - For head tank transfer
	2 sets - For dechlorinator supply
	2 sets - For purifier transfer
250 m ²	Lining materials for clarifier (FRP)
1 set	Driving unit for clarifier
1,000 kg	Lining materials for purified brine tank
2,000 kg	Lining materials for filtered brine tanks
1 set	Salt conveyor, Merric type scale, with motor and starter
1 set	Magnetic vibrator

Electrolysis Plant

440 pcs.	Graphite anode plate, 0.99 m x 0.28 m x 75 mm t.
880 pcs.	Graphite stem, 110 mm dia. x 300 mm L
4,000 kg	Graphite pellet, 10 mm dia. x 10 mm L
30 sets	Short circuit switch, 8,000 amp. oil immersed, enclosed type

Qty

Description

Refrigeration

1 set

Refrigeration unit, 25 RT

SECTION: HYDROCHLORIC ACID PLANT

1 set

Hydrogen blower

PROCEEDINGS OF THE CONFERENCE ON THE HISTORY OF THE UNITED STATES

AND THE HISTORY OF THE WORLD

HELD AT THE UNIVERSITY OF CHICAGO

ON THE OCCASION OF THE FIFTY-FIFTH ANNIVERSARY

OF THE FOUNDING OF THE UNIVERSITY OF CHICAGO

IN THE YEAR 1892

EDITED BY

WALTER DILL KAMPP

CHICAGO, ILL.

UNIVERSITY OF CHICAGO PRESS

1942

PART (II)

INSTRUMENTS NECESSARY FOR REPLACEMENT

THE UNIVERSITY OF CHICAGO

PH.D. THESIS

BY

Q'ty

Description

SECTION: PUMP MILL

1 set	Flow indicator for various application
1 set	Level indicator for various application
1 set	Flow integrating recorder for various application
1 set	Temperature indicator for hot water tank
1 set	6-point temperature recorder
1 lot	Wiring and piping materials
2 sets	Temperature recording controller for warm water, complete with control valve
6 sets	Spare controller unit for above TRC
6	Amprifier unit
1 set	Level indicating controller
3 sets	6-point temperature indicator
4 sets	Bobbin resistance for above
2 sets	2-point pressure recorder
2 sets	DP transmitter for above
4 sets	Rayon pulp consistency recording controller for washing, bleaching, after screening plants
1 set	Pressure indicating controller for rayon digester
2 sets	Level controller for 1st stage screen head box, with DP cell

SECTION: ClO₂ Plant

1 set	Flow indicator for various application
1 set	6-point temperature recorder
1 set	2-point manometer with 5-channels
1 set	Level controller for chilled water
1 set	Panel board in the spot
1 lot	Wiring and piping materials
2 sets	ARC-6-6-4, SO ₂ and air mixture
6 sets	Rotameter

Q'ty

Description

SECTION: RAYON MILL

1 set	Acid flow indicator for various application
4 sets	Flow indicator and recorder with totalizer for steam
1 set	Acid flow recorder
1 set	Level switch for Na_2SO_4 melting tank
1 set	pH-indicating recorder for Na_2SO_4
2 sets	Flow indicator with totalizer for steam
1 set	Multi-point temperature recorder for evaporator, complete with sensing element
1 set	Panel board in acid recovery
2 sets	Flow recorder for NaOH in slurry room
2 sets	Psychrometer for temperature recorder in air-conditioning system
1 set	Panel board in the spot
1 lot	Wiring and piping materials

SECTION: WATER PLANT

1 set	Turbidity meter for raw water
1 set	Conductivity recorder for delonized water

SECTION: CS₂ PLANT

2 sets	Flow meter
1 set	Temperature recorder for SC_2 refining unit
2 sets	6-point temperature recorder for furnace
1 set	Panel board in the spot, complete with wiring and relay system
7	Dial thermometer
2 sets	Flow integrator for sulphur distributor
1 set	Alarm for auxiliary tank
1 set	Instruments for refrigerator
6 sets	HT fuse with base
1 set	OCR, CT, PT for HT circuit breaker

Q'ty

Description

SECTION: SULPHURIC ACID PLANT

1 set	Temperature recorder for furnace outlet
1 set	6-point temperature recorder
1 set	Multi-point temperature indicator
1 set	Flow indicator for outlet air of drying tower
	Flow indicating integrator for H ₂ SO ₄
1 set	Density recorder for SO ₂ gas
1 set	Density recording controller for H ₂ SO ₄
1 set	Panel board in the spot
1 lot	Wiring and piping materials
1 set	Cast iron pipes with bend for irrigation cooler and acid circulation line

SECTION: CAUSTIC SODA & CHLORINE PLANT

1 set	Flow indicator (rotameter) for various application
1 set	Density recording controller for brine
2 sets	Level indicating controller for dilute brine
1 set	pH recording controller for mixing tank
1 set	Instruments for CHl section shown hereunder are to be accommodated in an instrument panel
	Controllers shall be complete with control valves.
10	Thermometer
1 set	Flow indicator
1 set	Pressure indicating alarms
1 set	Level indicating controller
1 set	Flow indicator (rotameter)
1 set	Shut down valve for N ₂

THE HISTORY OF THE

ROYAL SOCIETY OF LONDON

... the first meeting of the Society was held on 28th December 1660, at the house of Sir Robert Boyle in Oxford. The members present were Sir Robert Boyle, Christopher Wren, Robert Boyle, and others. The Society was founded to promote the study of natural philosophy and to encourage the advancement of science.

THE FOUNDING MEMBERS

The founding members of the Royal Society included Sir Robert Boyle, Christopher Wren, Robert Boyle, and others. They were all prominent figures in the scientific community of the time. The Society's early work focused on the study of natural philosophy, particularly the properties of matter and the laws of nature. Over time, the Society's interests expanded to include a wide range of scientific disciplines, from astronomy to biology.

PART (III)

ESSENTIAL EQUIPMENT AND PARTS

FOR BALANCING & MODERNIZATION

THE UNIVERSITY OF CHICAGO
DEPARTMENT OF CHEMISTRY
5301 SOUTH CAMPUS DRIVE
CHICAGO, ILLINOIS 60637

Qty

Description

SECTION: CAUSTIC SYSTEM

Caustic Recovery

1

Filter press, c.i.

Piping, Valve, Cock & Fitting

Necessary parts and accessories

SECTION: SLURRY SYSTEM

1 set

Control unit for beam scale, modified

1

PIV, 4Hc-6:1

1 set

Al-cell conveying system with condenser roll

The system ensures interchanging delivery of Al-cell with the Rayon Filament line in an emergency case

1

Alkali-cellulose feeder, relocation

1 set

Alkali-cellulose transport pipe with fittings, modified

1 set

Semi-graphic panel

SECTION: AGEING

One continuous ageing line to be added to conform

Alkali-cellulose quality to staple fiber production

Piping, Valve, Cock & Fitting

Necessary parts and accessories for functioning the following ageing machine.

Continuous Ageing Machine

1

Continuous ageing machine, horizontal square box, with endless belt conveyor, capacity equivalent to 15 T/D staple fiber production

<u>Q'ty</u>	<u>Description</u>
1 set	Control panel
1 set	Measuring instruments
<u>Alkali-cellulose Pneumatic Conveying System</u>	
1	Alkali-cellulose feeder, plastic coated
2 (1)	Blower, 5,000 Nm ³ /H, with suction filter
1	Heater & Cooler
1 set	Transport line, plastic tube
1	Cyclone, plastic coated, m.s.
1	Dust collecting cyclone, m.s.
1	Intermediate hopper, m.s.
1 set	Insulating material
1	Alkali-cellulose condenser
1 set	Platform
1 set	Measuring/controlling instrument & panel
1 set	Alkali-cellulose transport pipe with fittings, modified

Al-cell Measuring

1	Scale hopper, with automatic weighing unit
1	Chute, m.s.
1 set	Control panel

SECTION: XANTHATION

Two additional dry churns as well as four dry churns existing are necessary for composing the 15 T/D staple fiber production line

2	Dry churn ass'y 7,000 L, with heat insulation
2	Operating platform, m.s.
2	Hopper for xanthate, m.s.
2	Frame, m.s.
1	Nash pump, with air ejector
2	CS ₂ measuring tank
1 set	Piping, valve, cock & fitting

<u>Qty</u>	<u>Description</u>
1 set	Measuring instruments & panel

SECTION: DISSOLVING

Two additional dissolvers with viscose grinding devices as well as four existing dissolvers reinforced with viscose grinding devices are necessary for composing the 15 T/D staple fiber production line. Two additional grinders are provided for two dissolvers for rayon filament line.

2	Dissolver, equivalent capacity to 450 kg pump feed, with insulation
8	Viscose grinder with pump
1 set	Measuring instruments

Dissolving Caustic Measuring System

1 set	Autometering system control panel
1	Intermediate tank, 10 m ³ m.s.
2	Pump, c.i.
1	Cooler
1	Oval flow meter
1 set	Piping, valve, cock & fitting
1 set	Measuring/controlling instruments

SECTION: VISCOSE RIPENING

To conform the facilities to different viscose, an independent viscose ripening line is to be installed.

Viscose Blending System

1	Blender, 18 m ³ m.s., with agitator and insulation
2	Gear pump, c.i.
1	Gear pump, c.i., with PIV & G-O motor
1 set	Measuring/controlling instruments and panel

<u>Q'ty</u>	<u>Description</u>
1	Viscose cooler, scraping type
1	Oval flow meter
1	Graphic panel

Viscose Ripening & Filtration System

2	"A" tank, 12 m ³ m.s.
1 set	Automatic filtration unit, complete with instrumentation
1	Gear pump, c.i., with PIV & G-O motor
1	"D" tank, 12 m ³ m.s.
1 set	Measuring/controlling instruments and panel

Viscose Deaeration System

A small deaerator tank is to be installed in the rayon filament line, and existing 60" deaerator tank is to be utilized in the new staple fiber line

1	Gear pump, with PIV & G-O motor
1	Butterfly valve
1	Panel board
1 set	Measuring/controlling instruments and panel
1	Vacuum ejector
1 set	Structural support
1	Hot well tank
1 set	Piping, valve & fitting
	Discharge pump, screw type, with PIV & G-O motor
1	Deaerator, 48", SUS lined

Spinning Viscose Feed System

1	Feed tank, 20 m ³ with jacket, insulation and agitator
4	Feed pump, screw type, with PIV & G-O motor
6	"Z" filter, rubber lined
6	Drip pan, m.s.
1 set	Measuring instrument

<u>Q'ty</u>	<u>Description</u>
1	Nash pump
1	Drip recovery tank, m.s.
1 set	Measuring instrument
	<u>Filtration Medium Recovery</u>
1 set	Recovery system, semi-automatic
	<u>Piping, Valve, Cock & Fitting</u>
1 set	Connecting piping, parts and accessories
	<u>SECTION: ACID BATH</u>
1	Spinning head tank, 24 m ³ concrete, lead lining
1	Spinning bath heater, carbon
1 set	Supporting structure, platform, stairs
2 (1)	Spinning acid pump
1	Polychloro vinyliden fiber filter, 4 m ² x 3 sections concrete, lead lined
1	Filtrate tank, 37 m ³ concrete, lead lined
1 set	Connecting piping, parts and accessories
1 set	Supporting structure, platform and stairs
	<u>SECTION: ACID RECOVERY</u>
1 set	Double effect evaporator ass'y, capacity 5.5 T/H evaporation, with heaters, pumps and condensers
2	Acid pump, Si-c.i.
1 set	Piping materials and steel structure necessary for functioning the "ACID RECOVERY" section
1 set	Measuring/controlling instruments
	<u>SECTION: JET LABORATORY</u>
5	Level gauge for pot installation

<u>Q'ty</u>	<u>Description</u>
50 m	Roller conveyor for maintenance room
1 set	Pot motor vibration tester
2 sets	Hand press for pot motor maintenance

SECTION: REFRIGERATION

Refrigerator-unit, 70 RT for process cooling

1 set	Cooling unit for dissolving caustic solution cooling, consisting of:
1	Compressor with motor
1	Evaporator ass'y for special coolant
1	Condenser ass'y
1	Coolant circulation tank
2 (1)	Circulation pump with motor, for coolant
1 set	Control panel
1 set	Piping, valves, fittings for special coolant
1 set	Piping, valves, fittings for limed water
1 set	Heat insulating materials

SECTION: VENTILATION

1 set	Ventilator for the automatic filtration unit
1 set	Connecting ducts for supply air to the spinning, stretching, cutting, and purification section
1 set	Damper for supply duct
1 set	Outlet register
1 set	Main exhaust ducts from the spinning, stretching, cutting, and purification section to the main exhaust fan room
1 set	Duct supporting/hanging steel structure

Q'ty

Description

SECTION: WATER PLANT

Limed Water Ass'y

1	Limed water pump
1	Limed water pump
1 set	Piping materials for additional pump
1 set	Valve & fitting for above piping

SECTION: AUXILIARY LABORATORY

1 set	Measuring/testing instruments
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SECTION: CS₂ STORAGE (IN THE RAYON MILL SITE)

2 sets	CS ₂ storage tank, m.s.
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SECTION: CS₂ PLANT

5	Sulphur cock
1	Sulphur distributor
1	Flow integrator for above
1	Electric furnace body
1 set	Fire brick
6	Electrode, 405 dia. x 1,800 L
3	Electrode operating system
3	Nipple joint
1	Charcoal hopper
1	Temperature recorder for furnace, 6 points
3	Sealing tank
1 set	Deck for furnace
1 set	Exhaust duct
1 set	Copper plate with flexible band
1	Rail for hoist
1	Sulphur separator

<u>Q'ty</u>	<u>Description</u>
1	Water spray cooler
1	Brine cooler
1	Sealing column
1 set	Pipe for gas
1	R 12 refrigeration compressor, 24 RT, hermetic seal type
1 set	Accessory for refrigerator
1 set	Steel piping materials
1 set	Valve & cock
1 set	Heat insulating materials
1 set	Platform, stair and support
1 set	500 KVA transformer, with accessories

SECTION: BAMBOO DISSOLVING PULP PLANT

Bleaching & After Screening

1	Jordan type light refiner, conical type Quantity and application will be decided after test result in the actual production line obtained
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SECTION: ADDING AGENT SYSTEM

2 sets	Tank, 1.5 m ³ , SUS
2 sets	Agitator with motor, SUS
1 set	Spray nozzle, SUS
1 set	Piping materials

PART (IV)

ESSENTIAL EQUIPMENT FOR PRODUCING

RAYON STAPLE FIBER

1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes that this is essential for ensuring transparency and accountability in the organization's operations.

2. The second part of the document outlines the various methods and tools used to collect and analyze data. It highlights the need for consistent and reliable data collection processes to support informed decision-making.

3. The third part of the document focuses on the role of technology in modern data management. It discusses how advanced software solutions can streamline data collection, storage, and analysis, thereby improving efficiency and accuracy.

Q'ty

Description

SECTION: SPINNING

1

Spinning machine, capacity equivalent to 15 T/D staple fiber production, 80 positions, double sided, each two spinning positions are combined to one godet. Each side is equipped with a second bath trough and a separate motorized PIV. for driving godet draw-off rolls and spinning pumps.

The machine is supplied with an enclosure having counter weighted sliding access doors on each side.

The following parts are supplied with the machine;

90

Spinning pump, high precision gear type, 28 cc/rev., with outer gear

90

Mounting bracket for spinning pump, body c.i.

90

Gooseneck, with connector

120

Spinnerette, Au/Pt alloy

120

Spinnerette holder, hard rubber, with nozzle cap, disc, packing, nut, etc.

1 set

Thread guide ass'y

50

Godet wheel

2

Hand cart for waste fiber

1 set

Materials for hard lead parts and lead plate for lining

2nd Bath Make-up

1 set

2nd bath make-up consisting of;

Q'ty

Description

Materials for hot water tank, 5 m³ m.s.

Steam injector for hot water tank

Steam injector for bath supply pipe line

Pump, c.i.

Piping, valve, and fitting

Measuring/controlling instruments

Enclosure and Ducts

Materials for enclosure doors, exhaust duct and connecting duct for spinning machine

SECTION: JET LABORATORY

The following essential equipment are to be added to the existing laboratory.

2

Dryer

1

Ultrasonic cleaner

SECTION: STRETCHING & CUTTING

1

Stretching machine; capacity equivalent to 15 T/D staple fiber production, double sided, equipped with draw rolls each side. The Rolls are composite type, including replaceable phenolic resin bodies.

1 set

Lead materials for stretcher

1 set

Materials for enclosure doors, exhaust hood and drip pan

3 (1)

Cutter, capable of cutting up to 900,000 denier tow, centrifugal type, with a pull roll and enclosure cover.

<u>Q'ty</u>	<u>Description</u>
1 set	Chip conveyor, with materials for enclosure cover
1	Strobo-light
<u>SECTION: PURIFICATION</u>	
1	Distribution chute, with swivelling device and cover
1	Sluice pan
1	Purification machine, capacity equivalent to 15 T/D staple fiber production, conveyor type, multiple treatment system including fleece forming device, first washing, desulphuring, second washing, bleaching souring, third washing, and finish treatment sections.
1	Squeeze roll ass'y, equipped with chute
1 set	Belt conveyor with beater, from the squeeze roll to the fleece feeding device
1 set	Materials for enclosure, exhaust hood, covers, connecting duct
1 set	Materials for supporting structure, platform
<u>SECTION: PURIFICATION SOLUTION SYSTEM</u>	
1	Materials for sluice bath tank, m.s., plastic lined
2 (1)	Centrifugal pump, Si-c.i.
3 (1)	Heat exchanger, impervious graphite
1	Materials for desulphuring bath tank, m.s.

<u>Q'ty</u>	<u>Description</u>
2 (1)	Centrifugal pump, c.i.
2 (1)	Heat exchanger, m.s.
1	Materials for bleaching bath tank, m.s. plastic lined
2 (1)	Centrifugal pump, Si-c.i.
1	Materials for NaOCl, m.s., plastic lined
1	Materials for souring bath tank, m.s., plastic lined
2 (1)	Centrifugal pump, Si-c.i.
1	Materials for finishing bath tank, m.s., plastic lined
2 (1)	Centrifugal pump, SUS
2 (1)	Heating coil, SUS
1	Materials for hot water tank, m.s.
1	Steam injector
2 (1)	Centrifugal pump, c.i.
1	Dissolving tank, with jacket and agitator, SUS
2 (1)	Storage tank, with jacket and agitator, SUS
1	Centrifugal pump, SUS
2 (1)	Metering pump, volumetric type
1	Materials for washing bath tank, m.s.

<u>Q'ty</u>	<u>Description</u>
2 (1)	Centrifugal pump, c.i.
1	Steam injector
1	Materials for recovered water tank, m.s., plastic lined
2 (1)	Centrifugal pump, Si-c.i.
1	Scale
1 set	Piping, valve, cock & fitting necessary for functioning the "PURIFICATION SOLUTION SYSTEM" and the "PURIFICATION MACHINE"
1 set	Measuring/controlling instruments

SECTION: DRYING

1	Fleece feeding unit, consisting of a hopper, a lattice conveyor with a comb, a feed conveyor and drive unit.
2	Dryer, capacity equivalent to 15 T/D staple fiber production, suction drum type, with pre-drying zone, intermediate fiber opener, after-drying zone and cooling zone. Air heater can be operated with high pressure steam to get optimum drying efficiency. A fine opener opens dry staple before delivery. Pneumatic transport system, consisting of a chute, a blower, ducts and a static condenser, to feed fiber into a baling machine.
1 set	Intake & exhaust duct
1 set	Materials for supporting structure, operation deck

Q'ty

Description

1 set

Measuring/controlling instruments

SECTION: BALING

1

Baling machine, capacity 15 T/D in product, pressing force:
100 tons

1

Scale, balance type

2

Hand truck, m.s.

1 set

Oil pump unit

1

Operating panel

APPENDIX II

FINANCIAL STATUS OF KRC

1912

1912

KARNAPHULI RAYON & CHEMICALS LIMITED
Balance Sheet as at 31-12-1978

PARTICULARS	AS AT		FUND POSITION	
	30-6-1978	31-12-78	Sources	Application
A) CURRENT ASSETS:				
Cash in hand & with Bank	18.83	18.95		0.12
Trade Debtors	5.35	8.31		2.96
Advance, Deposit & Prepayments	220.80	233.86		13.06
Inventories incl. Loose Tools etc.	852.33	802.37	49.96	-
BCIC Current Account	95.81	68.38	27.43	-
Sub-Total:	1,193.12	1,131.87		
B) CURRENT LIABILITIES:				
Bank Loan (LIM/LAM) including provision for interest	369.23	396.23	27.00	-
Trade Creditors for Goods & Exps. BCIC, Dacca	225.72	247.79	22.07	-
Current Liabilities of BSRS Loan	22.41	24.43	2.02	-
Interest on Assumed Yen Credit	35.27	39.46	4.19	-
Creditors for Other Finance	74.36	86.00	11.64	-
Excise Duty & Sales Tax	66.91	66.91	-	-
Karnaphuli Paper Mills Ltd.	600.30	563.81	-	36.49
SRDA Grant	100.76	139.88	39.12	-
Dawood Corporation Ltd.	95.98	96.84	0.86	-
Sub-Total:	1,590.94	1,661.35		
C) Working Capital	(397.82)	(529.48)		
D) Fixed Assets at Cost	2,471.31	2,533.26		58.95
Less: Depreciation	908.68	954.26	45.58	-
Net Fixed Cost:	1,565.63	1,579.00		
E) NET ASSETS:	1,167.81	1,049.52		
FINANCED AS FOLLOWS:				
A) Capital & Reserve				
Share Capital	450.00	450.00	-	-
Advance against Share Capital	710.00	710.00	-	-
Marine Risk Reserve	0.57	0.57	-	-
Tax Holiday	95.70	95.70	-	-
Profit/(Loss) Account Balance	(1,830.26)	(1,948.55)	-	118.29
Sub-Total:	(573.99)	(692.28)		
B) Borrowed Capital				
4 1/2% Debenture (Agrani Bank)	444.52	444.52	-	-
Yen Credit (Assumed)	851.74	851.74	-	-
Yen Credit (Unassumed)	431.38	431.38	-	-
Grant for Reconstruction and Rehabilitation	4.26	4.26	-	-
Annual Development Programme	9.90	9.90	-	-
Sub-Total:	1,741.80	1,741.80		
C) Equity and Loan	1,167.81	1,049.52	229.87	229.87

KARNAPHULI RAYON AND CHEMICALS LIMITED
Profit and Loss Account for the month of Dec. 78

(Value in Lacs)

PARTICULARS	THIS MONTH		CUMULATIVE	
	Actual	Budgeted	Actual	Budgeted
<u>INCOME:</u>				
Local Sale (Rayon & Dilphane)	100.39	112.53	530.33	598.98
Export Sale (Rayon & Dilphane)	2.57	6.28	21.72	36.70
Chemicals/Recoveries/Services	12.81	16.47	63.26	65.95
Export Rebate/XPL (Rayon & Di.)	.20	1.10	4.12	6.44
Total Income:	116.00	136.38	619.43	708.07
<u>EXPENDITURES:</u>				
a) Variable Cost				
Raw Materials incl. Packing	42.88	42.88	179.74	171.19
Stores and Spares	14.16	6.28	64.00	37.32
Utilities	36.05	36.28	150.67	152.08
H & T Expenses	.36	.35	3.96	2.10
Sub - Total:	93.45	85.79	398.37	362.69
b) Fixed Cost				
Salaries and Wages	21.22	18.22	127.34	109.32
Depreciation	11.89	12.81	46.37	53.66
Insurance	.68	.68	4.10	4.10
Interest	6.75	6.75	40.50	40.50
Overheads	7.08	7.39	41.19	43.91
Sub - Total:	47.62	45.85	259.50	251.49
Total (A & B)	141.07	131.64	657.87	614.18
Less Stock Adjustment	(26.77)	(0.69)	79.85	124.44
Cost of Sales:	114.30	130.95	737.72	738.62
Profit/(Loss):	1.70	5.43	(118.29)	(30.55)

APPENDIX III

BMR & Eの工事費、役務費見積の基礎

1970

1971

BMR & E 工事費、役務費見積の基礎

第 8-1 表に記載された下記の工事費、役務費並びに、第 8-2 表に記載された役務費の見積の基礎データは次の通りである。

- ① 海上運賃及び保険料
- ② 内陸輸送・荷役費
- ③ 土木工事費
- ④ 建築工事費
- ⑤ 機器据付・組立工事費
- ⑥ 据付・組立指導費
- ⑦ 試運転指導費

① 海上運賃及び保険料

第 8-1 表には下記の数値が記載されている。

Machinery & Equipment (FOB)	2,806,645 千円
Construction Materials (FOB)	65,540 千円
計	2,872,185 千円

バングラデシュの近傍国向のこの種のプラント用機器の海上運賃及び保険料の経験値は、FOB 価格の約 3.5% であるから

$$2,872,185 \times 0.035 = 100,526 \text{ 千円}$$

従って、本費目の見積は 100,000 千円とした。

② 内陸輸送・荷役費

第 8-1 表によれば Inland Transportation & Handling Charge は、TK 3,876,000 と見積っている。

この費用の見積は、i) 機器 CIF 価格、ii) エンジニアリング料、iii) 指導員費の合計額の 1.5% 程度であることが経験的にわかっているので、この基準により算出してある。すなわち、

Machinery, Equipment & Construction Materials (CIF)	2,972,185 千円
Engineering Fee	269,100
Supervising Fee	117,000
計	3,358,285 千円

$$3,359,000,000 \times 0.015 = 50,385,000 \text{ 円}$$

TK 1 = 13円ベースで換算するとTK 3,875,769 切上げてTK 3,876,000

③ 土木工事費

第8-1表によればCivil workの費用はTK 1,166,000と見積られている。その内訳は次の見積表に示す通りである。

コンクリート構築物及び機器基礎の量(㎡)

	ステーブル プラント	フィラメント プラント	溶解バルブ プラント	塩素・苛性 ソーダプラント	二酸化炭素 プラント	二酸化塩素 プラント	硫 酸 プラント	水処理 プラント	合 計
コンクリート 構築物	45			100				45	190
機器基礎	195	12	15	5	30	3	—	3	263

コンクリート構築物及び機器基礎の量当り単価(TK/㎡)

	材料費	仮幹費	鉄筋施工費	コンクリート 打 掛 費	合 計
コンクリート 構築物	2,380	128	40	64	2,612
機器基礎	2,380	64	40	64	2,548

この表のデータより

コンクリート構築物の建設費 $190 \times 2,612 = \text{TK } 496,300$

機器基礎設置費用 $263 \times 2,548 = \text{TK } 670,100$

計 $\text{TK } 1,166,400$

④ 建築工事費

第8-1表によればBuilding workの費用はTK 2,079,000である。その見積は次のデータに基づいている。

建屋増設・改修工事面積(延㎡)

	ステーブル プラント	二酸化炭素 プラント	合 計
増 設	463	600	1,063
改 修	272		272

一階建々屋の単位面積当りの工事費(含材料代)

TK 1,700 / m²

建屋改修の単位面積当りの工事費(含材料代)

TK 1,000 / m²

従って、増設工事費 $1,063 \times 1,700 = \text{TK } 1,807,100$

改修工事費 $272 \times 1,000 = \text{TK } 272,000$

合 計 $\text{TK } 2,079,100$

⑤ 機器据付・組立工事費

第8-1表によれば Erection workは、TK 1,090,000と見積られており、また第7章に見積機器重量、工数が記載してある。その内容は次表の通りまとめられる。

プラント機器据付、取替、接続工事の人工(人・日)

プラント 及び工事区分	機器重量 (ネット・トン)	所 要 見 積 人 工 (人・日)			
		直 接 作 業 者		間 接 作 業 者	
			計	補助者	管理者
ステープル プラント	約530	約5,400	13,300	8,100	3,000
二酸化炭素 プラント	約40	約450			
上記プラント 用配管・配線 構造物工事	約150	約7,400			
溶解バルブ プラント		約1,500	9,900		
フイメントプラント O ₂ プラント 硫酸プラント 二酸化塩素プラント 水処理プラント 接続工事	約320	約8,400			
駄目詰工事		3,440			500
合 計	1,050	26,640		8,100	3,500
	1,050	34,740			3,500

作業者の賃金：熟練者 TK800/人・月 20% } 平均TK560/人・月
 非熟練者 TK500/人・月 80% }
 管理者 TK1,200/人・月

とし、1ヶ月を25日稼働とすると合計費用は

$$\frac{34,740 \times 560}{25} + \frac{3,500 \times 1,200}{25} = \frac{23,654,400}{25} = \text{TK}946,176$$

その他、動力費・消耗品費・仮設材料費・建設機械・工具類を合わせて、TK144,000と見込むと、

$$946,000 + 144,000 = \text{TK}1,090,000$$

⑥ 据付・組立指導費

第8-1表指導員費用は117,000千円と記載されている。

その算出に当たっては、修理・改修工事は指導は不要と考え見積には入れず、レーヨン・スフ・プラントの機器、二酸化炭素プラントの増設機器についての指導費のみを見積に入れた。見積の基礎は、以下の通りである。

指導員数：17人

指導員延人工：63.5人・月

内 訳

担 当	資 格	人 数	滞 在 月	旅 遣 費 千 円
団 長 兼 空 調 ・ 主 配 管	チ ー フ エ ン ジ ニ ャ	1	12	25,770
紡 糸 ～ 仕 上	技 能 士 エ ン ジ ニ ャ	2 3	8 9.5	12,740 17,860
ビスコース製造冷却 及 び 梱 包 機	技 能 士 エ ン ジ ニ ャ	2 4	7.5 10.5	12,015 20,130
付 属 設 備 (酸回流・回収, 精 練浴, 鈉張工事)	技 能 士 エ ン ジ ニ ャ	2 1	6 4	9,840 7,370
電 気 機 器 ・ 配 線	エ ン ジ ニ ャ	1	3	5,670
計 器 ・ 配 線 ・ 配 管	エ ン ジ ニ ャ	1	3	5,670
合 計		17	63.5	117,065

以上繰数を切捨てて、117,000千円とした。

⑦ 試運転指導費

第8-2表にTRST RUN Supervising Fee は21,000千円と見積っている。

その見積ベースは次の通りである。

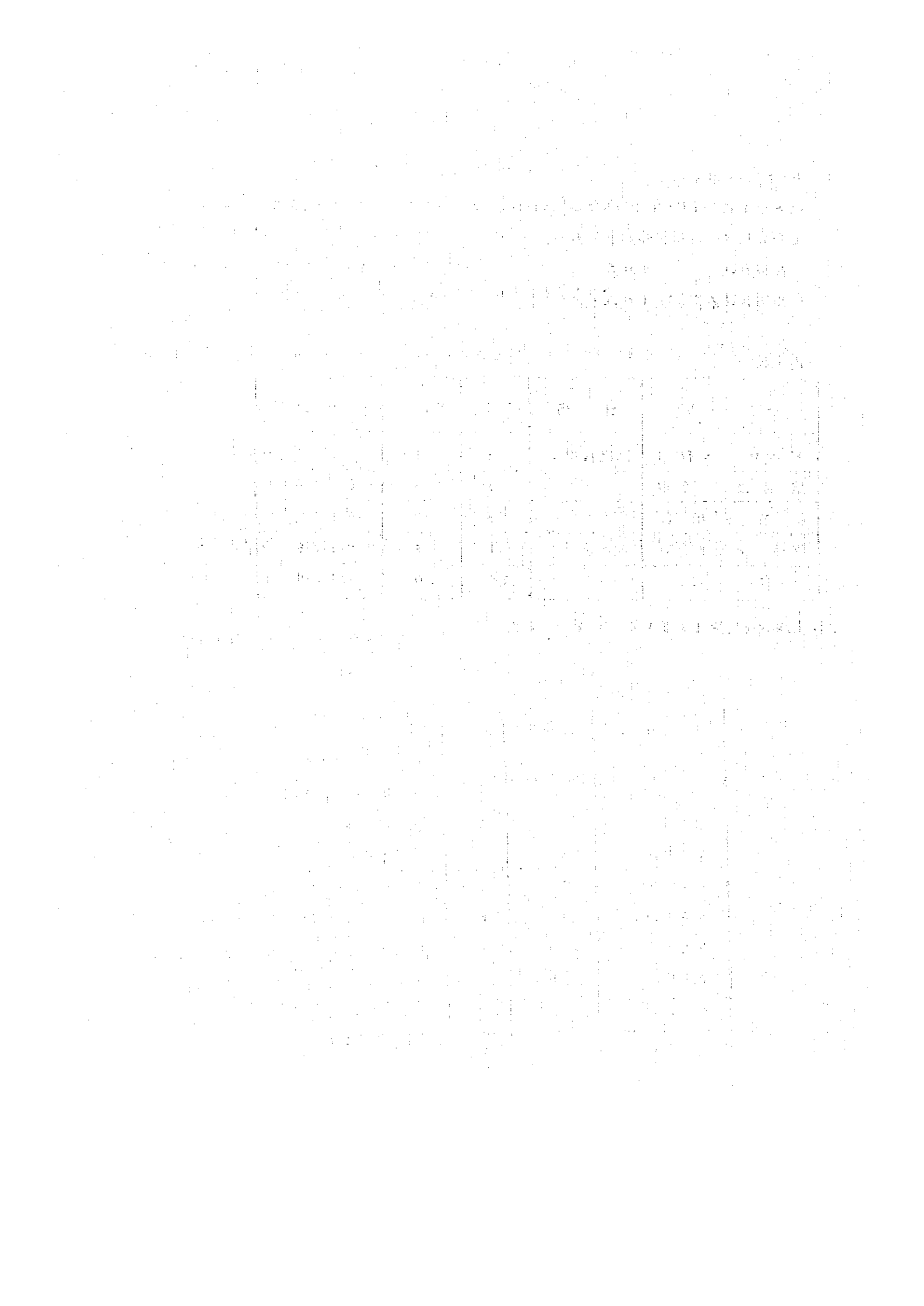
指導員数 : 10人

指導員延人工 : 10人・月

内訳

担 当	資 格	人 数	滞 在 月	派 遣 費 千 円
ビスコース製造	熟練技能士	3	3	6,360
酸回収・回収	・	3	3	6,360
紡糸～梱包	・	3	3	6,360
総括・とりまとめ	エンジニア	1	1	2,270
合 計		10	10	21,350

以上総数を切捨てて21,000千円とした



APPENDIX IV

**PLANT-WISE BREAK-DOWN OF
MACHINERY & EQUIPMENT**

THE UNIVERSITY OF CHICAGO

DEPARTMENT OF CHEMISTRY

PHYSICAL CHEMISTRY

BREAK DOWN PRICE LIST

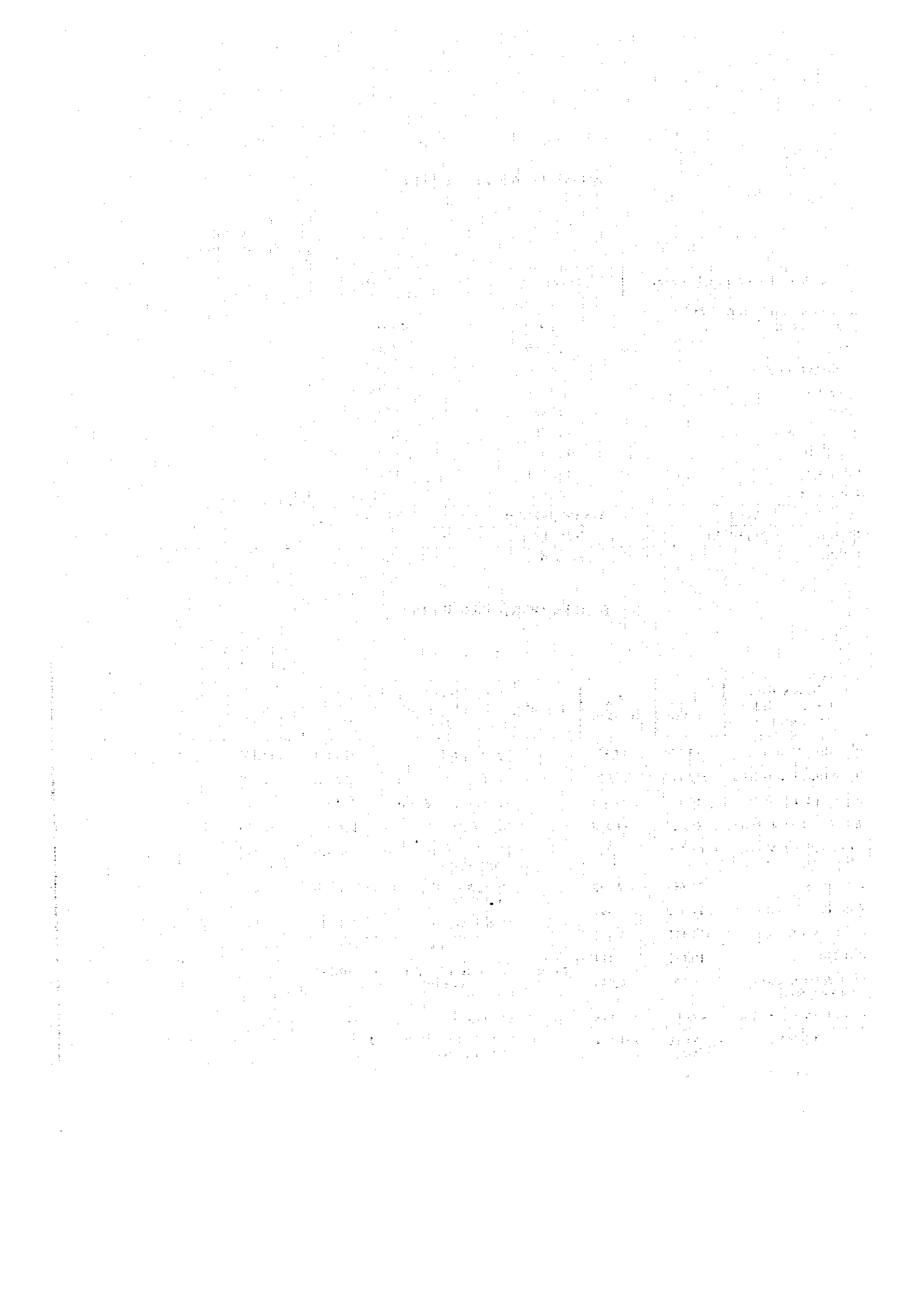
Unit = 1,000
Tk. 1 = Yen 12,987
\$ 1 = Tk. 15.4 = Yen 200

Section & Plant for Replacement	Price in Yen	Price in Tk.	Remarks
Rayon Filament (incl. Acid Bath for Filament)	139,930	10,775	
Anhydrous	35,900	2,764	
Air Conditioning	4,250	327	
CS ₂ Plant	20,970	1,615	
Water	64,250	4,955	
Refrigeration	20,850	1,605	
DKP Plant	191,820	14,770	
C.C. Plant	170,750	13,148	
Instrument	43,120	3,320	H ₂ SO ₄ pipe included
Total	Yen 691,940 (FOB)	Tk. 53,279	
Insurance & Freight (3.48%)	Yen 24,080		
CIF Price	Yen 716,020	Tk. 55,130	

BREAK DOWN PRICE LIST

Unit: 1,000
Tk. 1 = Yen 12,987
\$ 1 = Tk. 15.4 = Yen 200

Section & Plant for Balancing & Modernisation	Price in Yen	Price in Taka.	Remarks	Section & Plant for Expansion (RSF)	Price in Yen	Price in Taka.	Remarks
Pulp Mircellization	193,360	14,889		Spinning & Jet Labo.	205,840	15,850	
Xanthation & Dissolving	182,170	14,027		Stretching & Cutting	109,160	8,405	
Ripening & Filtration	384,305	29,591		Purification & Solution	242,380	18,663	
Acid Bath Circ. & Recov.	184,520	14,208		Drying & Baling	154,200	11,873	
Refrigeration & Ventilation	61,350	4,724		Elect. & Instrument for Spin Baling	96,320	7,417	
Laboratory	36,860	2,838		Piping & Ducting for above Area	41,270	3,178	
Water Plant	12,900	993		Steel Structure	15,440	1,189	
CS ₂ Plant & Storage	124,410	9,589		TOTAL	864,610	66,375	
DKP Plant	10,180	784	Jordan Refiner	Insurance & Freight (3.48%)	30,090		
Elect. & Instrument for Visc. Section	78,500	6,045		CIF PRICE	894,700	68,892	
Piping for Visc. Section	47,080	3,625		SUPERV. FEE.	117,000		17 persons 63.3MM
TOTAL	1,315,635 (FOB)	101,304		CONTINGENCY	100,000		
Insurance & Freight (3.48%)	45,830			CIF PRICE	Yen 1,111,700	Tk. 85,600	
CIF PRICE	Yen 1,361,465	Tk. 104,833					



APPENDIX V

PROCESSING TECHNOLOGY AND EQUIPMENT

FOR RAYON STAPLE FIBER

1954

1954

1954

Processing Technology and Equipment for Rayon Staple Fiber

BTMC's capacity to produce cotton yarn is about 930 thousand spindles, and also BTMC and HLD have enough capacity to consume these yarn for making various cotton fabrics. Rayon staple fiber is a kind of cellulose fiber similar to cotton and is a man-made fiber the character of which can easily be adjusted to desired value.

To produce better blended yarn, it is desirable that their staple length of each component fiber has the same staple length and that the elongation of blended fiber is higher than that of cotton. The staple length of rayon staple fiber can easily be adjusted to the length of the blended cotton. The elongation of rayon staple fiber is higher than that of cotton, therefore good blended yarn can be produced by using cotton and rayon staple fiber, provided that the parameters of both fibers are coincided and optimum operating conditions for blended yarn are applied in manufacturing process.

In the case of producing polyester-cotton blended yarn, the same equipment and manufacturing technology as cotton spinning can not be used because the character of polyester is quite different from that of cotton.

However in the case of producing rayon-cotton blended yarn the same equipment as that of cotton can be used with minor adjustment owing to the abovementioned reasons. Moreover higher efficiency and less waste are expected in rayon-cotton blended yarn production by the reason of uniformity of rayon staple fiber.

The quality of rayon-cotton blended yarn is almost same as that of cotton yarn, provided that the blend ratio of rayon is kept less than 20% and adequate operating conditions are applied. Especially the dry properties are same as that of 100% cotton yarn because the dry tenacity of rayon staple fiber is almost same as that of ordinary Indian cotton.

But properties of rayon-cotton blended yarn are a little inferior to 100% cotton yarn and especially durability for caustic soda of rayon is lower than that of cotton, then in drying and other wet processes the adequate operating conditions suitable for rayon should be applied for blended yarn. Namely the caustic concentration must be below 7% in terms of NaOH and instead of using high caustic treatment NaClO_2 , bleaching is preferable.

In conclusion, the existent textile processing equipment can be applied for rayon-cotton blended yarn production as long as the adequate operating conditions are kept and 100% cotton yarn can almost be substituted by rayon-cotton blended yarn.

