

Lattakia Weaving Company

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TECHNICAL DIAGNOSIS FOR LATTAKIA WEAVING COMPANY

Date : 1~8 Sep.1997

Person in Charge : Takeohara

1. Present Situation of the Company

1.1 Location

Lattakia is located at 35.5° north latitude and 35.8° east longitude and is the largest port town in Syria. Facing on to the Mediterranean Sea. Lattakia, has the very fertile soil with orchards, crops and vegetation and plays an important role in the Syrian economy. Lattakia is the 5th largest city in Syria and has a population of 800,000. Lattakia Weaving Company is located in the southeast direction, 4 km far from the city and close to the main road to Aleppo. As it is not an industrial city, there is a sufficiently available labor pool. A tobacco company is the biggest employer in the neighborhood, and Lattakia Spinning Mill is only another fairly big company.

1.2 Outline of the Company

(1) General items

The company was established in 1976 with a capital of 196 million SP. Although an Italian company had received the order for the plant construction, due to successive troubles the company withdrew from construction. Afterwards, Military House succeeded in completing the construction in 1981. The company started test operations in 1982 and began 3-shift operation at the end of 1983.

(2) Building, site

The building is of robust concrete make and has a high ceiling : 4.6 m for the weaving room and 5.2 m for the preparatory room. Therefore, the warping machines and sizing machines are all comfortably installed. The high ceiling, however, in the weaving room is not favorable for air conditioning and lighting. The site area is 106,000m² and the building accounts for 30 % of it, 32,020 m².

There is, therefore, still abundant area to construct the new buildings. (Refer to Appendix II-F-1)

(3) Raw materials

The yarns are all supplied by spinning mills such as Idleb, Al Shaha, Hama and Jableh all under GOTI. The yarns supplied are Ne 8.5, 10, 12, 20 and 32.

(4) Products

- 12's x 12's/14 x 14/cm width 92/132cm for bags (crop)
- 10's x 8.5's/14 x 12/cm 120 cm for bags (sugar)
- 20's x 20's/20 x 20/cm 150 cm for bed cover, curtain, cloth
- 32's x 32's/30 x 28/cm 150 cm for gabardine, shirting, pants
- 16's x 12's/28 x 20/cm 140 cm same as above

(5) Sales and stocks (1997)

- Sales : bag (for sugar) 1.0 million bags
- bag (for crop) 3.0 million bags
- others nil
- Stocks : 7 million meters

All are for local demand and have never been exported.

(6) Production plan and result

	<u>Planned</u>	<u>Result</u>
• 1996	3,050 ton	2,600 ton (14 million m)
• 1997	bags (for sugar, 3.5 million bags)	4 million m
	bags (for crop, 6.0 million bags)	6 million m
	others	5.4 million m

See Appendix H-T-1.

(7) Organization and manpower

Refer to Appendix II-T-2.

The number of employees as of August, 1997 is as follows.

- Management : 78 (1 shift)
- Assistant staffs to management: 90 (3 shifts)

- Technical department : 243 (3 shifts)
- Production department : 629 (3 shifts)
- Total 1,040 (female 45 %)

67 employees have left the company during January to August, 1997 and the turnover of every year is approximately 15% - 16% of total employees.

(8) Production and equipment

Refer to Appendix H-T-3.

2. Present Situation and Problems of Production Process

The weaving looms are all first generation air jet looms, 392 sets in total (196 sets for reed space 125 cm and another 196 sets for reed space 165 cm), were made in Czechoslovakia. Furthermore, many of the air jet looms are out of operation. The temperature and humidity controls are not functioning and the lighting is not adequate because of the high ceiling. The operation of the looms is somehow going on because they are weaving fabrics for bags, using coarse yarns, which account for 90% of the total production. The gray fabrics have a defect selvage on the right hand side and also some of the weft yarn remains in the selvage due to uneven pick length of the weft yarn. Such yarns are removed manually using 24 employees on 2 shifts at the fabric finishing section. The absence ratio of workers reaches to 20%.

3. Present Situation and Problems of Management in Weaving Process

3.1 Procurement Control

(1) Raw material

Procurement plan for 1997

<u>supplier</u>	<u>Kinds</u>	<u>Yarn counts,</u>	
		<u>Quantity</u>	<u>Ratio</u>
• OE Yarn	Idleb 8.5's, 10's, 12's, 29's	1,830 t/y	61%
• Ring Yarn	AL Shahba 12's	450	15%
• Ring Yarn	Hama 32's	400	13%
• Ring Yarn	Lattakia Sp. 20's, 32's	80	11%

• Ring Yarn	Others	240
Total		3,000 t/y

- ① GOTI appoints the supplier of raw material. There is, therefore, no option to select other suppliers who have high quality yarns.
- ② All of yarns are transported in bags, therefore the yarn packages loaded at the lower layers of the bag are damaged seriously. (Refer to Appendix H-P-1,2,3)
- ③ Weight of yarn packages deviates very much, nearly by 30%.
- ④ The sizing material is supplied through lengthy procedures such as tender invitation, tender, negotiation and opening of L/C. It takes 6 months to get even starch materials.

(2) Spare parts

- ① All of looms were imported from Czechoslovakia. The preparatory machinery was imported from Germany. Only some of spare parts of no importance are available locally.
- ② The manufacture of this type of air jet loom was discontinued, therefore, spare parts are manufactured by special order and they are very expensive.
- ③ In addition, as the loom was a first generation machine and it was exported with incomplete function. The spare parts do not work satisfactorily.
- ④ Czechoslovakia was originally one country but it was divided into two. Now, the spare parts are being delivered by several manufacturers in two countries. The delivery time will be approximately one year from order.
- ⑤ The procedures of L/C opening and others are very troublesome with a lot of formalities.
- ⑥ The spare parts for warping and sizing machines are available without much difficulties, but they are very expensive.
- ⑦ The estimated cost for the overhaul of a loom inquired by the company was \$4,000. The overhaul will be meaningless, however, as it is a defective loom from the beginning. There is no option but to replace with new air jet looms of other type as soon as possible.

3.2 Inventory Control

- ① Not only the warehouse but the fabric finishing room is full of gray fabrics. Gray fabrics after the folding machine are bound by string and by pieces of

fabric and are just piled up not in orderly manner. This is not a situation where the stocks are controlled in order (Refer to Appendix H-P-11).

- ② It should be noted that the stock will affect the cash flow of the company.
- ③ The condition and arrangement of spare parts holding is good.

3.3 Process Control

- ① The present conditions are not conducive to maintain good operation. SEIRI (cleanliness) and SEITON (putting goods in order) are not sufficient at all. The weaving room is especially bad in this respect. 81 looms are covered by dust and are not in operation because of mechanical troubles or shortage of spare parts. The remaining 311 looms are able to run somehow, but 150 of them are out of service. These looms are stopped due to either shortage of yarn supply or yarn breakage.(at the time of checking) Therefore, the stoppage ratio of looms reaches up to 60% including the 81 looms. The fabrics woven have quite a few defects at the selvage. Frequent yarn breaks in the warping process and defective beams having uneven surface and diameter at one side were found here and there. The immersion roller at the size box of the sizing machine is not used, and the second squeezing roller is covered by cloth. Steam leakage is evident. Inspection of the fabric is being carried out, but the scoring of defects is incorrect (Refer to Appendix H-P-4, 5, 9).
- ② The management staffs are weak in the sense of 5S-Activity. It should be understood that 5S-Activity will be closely connected to the improvement of quality, productivity and safety (Refer to Appendix H-P-1,2,3,10,11).
- ③ The quality of the yarn being used is very bad and there is a big quality difference among suppliers.
- ④ There are yarn breaks in the warping process because of defects occurring during transportation., which is attributable to the packing of yarn packages (cheese or cone) in bags.
- ⑤ The warping machines are not sufficiently maintained. The density of the front comb is uneven and this causes the beam to have an uneven surface.
- ⑥ The sizing machines are also insufficiently maintained. The machines are incorrectly operated. The rubber roller of the sizing machines should be periodically ground to enable it to perform its function properly.
- ⑦ The weaving looms seem to have been installed as incomplete models. They have a lot of problems.

- ⑧ The technical level of the machine attendants is low. Periodical training is necessary.

3.4 Equipment Control

- ① Several of the stopped looms are covered in dust, and are found here and there, in groups, without covers.
- ② The fabric defects are mostly due to loom defects as follows:-
- The selvage cutter at the right hand side is inferior(45 defects/100 m), specially , yarn more than Ne 16 is hard to cut (Refer to Appendix H-P-6,7).
 - The length of weft yarn is uneven, sometimes not reaching to the selvage. (Refer to Appendix H-P-8)
 - The weft density changes on the way.
 - The drain water from the air compressor for the air jet looms gathers rust on the loom and badly affects the quality of the fabric.
 - The loom accessories are worn out.
- ③ The maintenance of looms are insufficient. The looms were exported to Syria in incomplete conditions. In February 1993 three of manufacturer's engineers came from Czechoslovakia, but they returned home without successful commissioning the looms.
- ④ It seems that understanding the content and the extent of the maintenance work, according to the quality requirements by product as well as the importance of supplementation of necessary parts or articles required for the production, are ignored.
- ⑤ The sizing machine is designed for maximum 5,184 threads of warp yarn, and it may extend up to 6,480 threads if the machine is converted. Also, the steam pipes were laid under ground which makes it very difficult to dig the floor to make repair (Refer to Appendix H-P-4).
- ⑥ The present situation is very serious and beyond the control of Latakia's engineers, therefore, the air jet looms should be urgently replaced without spending money on repairs.
- ⑦ A dryer should be mounted on the compressor to eliminate a drain water.
- ⑧ The present preparatory machinery and equipment will be rendered unsuitable upon the introduction of the new air jet looms, therefore, they need to be replaced completely also. If new looms for wider fabrics are introduced, the

preparatory machinery cannot accommodate the required number of warping yarns.

- ⑨ The stopped looms should be concentrated in a certain place, preferably outside the working area, creating a very comfortable working environment.

3.5 Quality Control

- ① The organization for quality control is managed under the direct control of the General Manager. The Uster tester, twist tester, and strength tester (out of order) are available as testing devices. There is a quality control manual for the air jet loom prepared by GOTI. The person in charge of quality checks weight of yarn packages received (30 % deviation), tensile strength of yarn, yarn counts, number of twists, density of fabrics, excessive length of weft yarn in selvage and the number of defects in the yarn packages.
- ② The cloth inspection is carried out by nominated workers to count the number of defects and to mark the demerit points.(less than 7 defects allowable) The excessive yarns in the selvage are removed by 24 workers per 2 shifts. The number of yarn breakages in the warping section, as the worst example, reaches 298 times per 648 warp yarns in 6,000 meter length. This is 500 times larger than that of Japanese standard. All data are to be reported to the Production Manager and fed back to the necessary divisions and sections.
- ③ Printed forms for laboratory and cloth inspection are in use, but they are primitive.
- ④ There are no printed forms for yarn breakage in the warping section. Data are reported on note paper, something like a letter.
- ⑤ The cloth inspection is merely controlled by counting the number of defects. The degree and kinds of the defects are not considered.
- ⑥ The gray fabrics for bags account for 90% of the total production, which do not require high quality controls, therefore, no practical or actual quality control is not performed in the company. No quality control manual as such has been prepared yet.
- ⑦ The feed back system to production equipment divisions is not functioning.
- ⑧ The check sheets for production process should be prepared and all such items should be controlled by using respective manuals which need to be prepared (Refer to Appendix H-T-3).

3.6 Education and Training

- ① Preparatory machines: one person in charge of training gives OJT to the workers at the sizing machines and warping machines.
- ② Looms: two looms are installed in the training center. The education is carried out by three persons in charge, consisting of one chief engineer, one from production section and one from utility section. After the training of 1 month in the training center and 5 months in production, in total 6 months, a qualification test, both written and practical, will be carried out. The person disqualified is not hired.
- ③ The training system and the facility are satisfactory.
- ④ The looms in the training center do not give the employees a proper education and training, because the looms are not in perfect condition. Specially, it is not effective for training of maintenance of the loom. The imperfect conditions are as follows :
 - weft sensor at right side (inferior);
 - length measuring meter for weft yarn (incorrect indication);
 - uneven weft density (inferior take up motion);
 - computer printed circuit board (inferior)
- ⑤ The looms in the training center can not be adjusted for normal operation, therefore , the only way is to explain the points verbally.

3.7 Environmental Preservation

- ① The central part of the room is mostly cleaned but the corners of the room are very dusty. Some employees were observed lying on the floor behind the machines. Steam leaks from pipes of the Sizer may cause burns. The iron plates insufficiently mounted around the loom may injure operators.
- ② The management's concern seems to be only on the production. They are not so serious on the environmental issues.
- ③ The layout of the factory, including the utility facilities, is not good and the machines are very old. Under these circumstances, the only advice, in respect of environmental issues, is to carry out 5-S Activity seriously with the participation of all employees.

4. Modernization Plan

4.1 Modernization of Production Process

- ① There is no process to be improved. The necessary processes and equipment are all prepared. Problems to be improved are summarized as follows:
 - Air jet loom: Because the looms are old and incomplete, there is no option but to replace all looms with new ones.
 - Inspection section: This section is not functioning and the feed back system is not functioning.
 - Preparatory section: Maintenance for the machinery is insufficient. Each machine is run with its function not fully performed.
- ② It is suggested that the company should start a committee to yield the maximum effect under the current available conditions.

4.2 Modernization of Production Management

(1) Process control

- ① The managers should move out from their rooms to the production area and take the initiative on site activities.
- ② The inferior yarns received should be returned to the supplier for replacement, specifying the details of the defects.
- ③ Even within the factory, defective samples of semi-products should be shown to the next process at once to prevent the following process from making successive inferior products. Such feed back system should be positively reinforced.
- ④ The process control and necessary instruction should be executed by documentary forms, not verbally. It should be carried out in figures, by which everybody can know the instructions concretely.
- ⑤ It is suggested to start a committee for 5S-Activity and periodical patrol or inspection of the factory (once a month) by members of the committee. The committee members should be selected from all employees, including from the office and the production sections. The term of the membership should be one year to let many employees participate and let them develop their awareness towards 5S-Activity.

(2) Equipment control

- ① The control should be carried out through written forms instead of verbal instructions and data recorded should be analyzed systematically so that they are used effectively.
- ② A preventive maintenance system should be established. In other words, maintenance program of machinery and purchasing schedule of parts should be planned in consideration of the prospective troubles which should be predicted in advance by checking past troubles records as well as consumption records of spare parts.
- ③ It is suggested to utilize the check sheet on the equipment control so that machine troubles are analyzed and countermeasures are taken.

(3) Quality control

- ① The quality control standards by each process should be prepared referring to the existing quality control system.
- ② The testing machine for quality should be renewed.
- ③ It is suggested to utilize the sample check sheet on the quality control.

(4) Education and training

- ① TWI (Training Within Industry developed in USA) system consists of JI (Job Instruction), JR (Job Relation) and JM (Job Method). The training and education should be carried out systematically by utilizing JI for operators and JM for fitters. The TWI system also provides for the training courses for trainers.
- ② The skill level of trainees depends mostly on the quality of trainers, therefore, training and education of the trainers is also necessary.

4.3 Modernization of Production Equipment

(1) Main machinery to be introduced and specifications

- Product : cotton broad, 40's x 40's/132 x72, Woven width 64" (162.5cm)
- Loom : Air jet Loom, Reed space 190cm, Revolution 900 rpm.
- Warping Machine : Beam width 1,627 mm, speed 800 m/m
- Sizing Machine: Sizing width 2,300 mm, Speed 100 m/m

- Others: Tying Machine, Reaching machine, Inspection Machine, Folding Machine

(2) Capacity calculation

(Refer to Appendix H-T-4,5)

- Loom capacity : 800 rpm, Efficiency 90 %, 365 m/day/set
(Cotton 40's , 1,996 ton /year), 32,000 m/day/88 sets
- Warping capacity : 650 m/m, Efficiency 35%, 307,000 m/ day/set
614,000 m/day/2 sets
- Sizing capacity : 45 m/m, Efficiency 65% , 42,120m/day

(3) Layout plan

(Refer to Appendix H-F-1,2,3)

- Loom : 54 m (18 m x 3 spans) X 36m (12 m x 3 spans) close to the preparatory section.
- Warper : to be installed where the present machines No.1 and No.2 are installed
- Sizer : to be installed where the present machine No.1 is installed.
- Others : to be installed respectively where the present machinery are installed.

(4) Auxiliary and utility equipment

- ① The partial conversion and reinforcement of the air condition equipment shall be carried out.
- ② The change in partition and false ceiling (lighting) of the present loom section shall be carried out.

(5) Erection plan

- Loom : 8 weeks
- Warping Machine : 4 weeks
- Sizing Machine : 4 weeks

(6) Manpower allocation

	Manager	Div. Head	Foreman	Leader	Unskilled	Total
Administration	1					
Operation		4	12	20	215	252
Maintenance		1	2	4	5	12
Research		1		2		3
Total	1	6	14	26	220	267

(7) Estimated investment cost

- Main production machinery : US \$ 6,200,000.-
 - Auxiliary machinery and equipment : US \$ 400,000.-
- Total US \$ 6,600,000.-

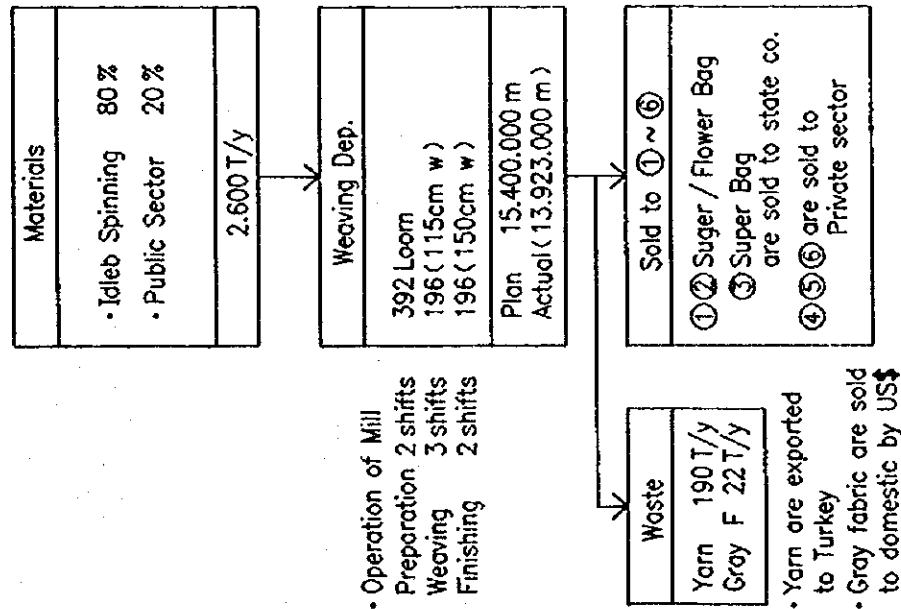
(8) Subsequent modernization plan

(Refer to Appendix H-F-4)

Another 88 sets of air jet looms are to be added in the 2nd phase. All other necessary equipment will be doubled, except the warping machine, which needs only one set to be added. The investment return will be shortened accordingly. The 2nd phase looms will be installed next to the 1st modernized looms. Therefore, the building will be fully utilized.

Appendix H-T-1

1. Production Flow Diagram



Production Plan

- Demand from Governmental Organization
- Own risk

<u>Production</u>		(1000 T/y)	
Construction	Plan	Actual	
① 12x12's 14x14 ^{cm} /m	6,000	4,370	
② 12x12's 14x14 ^{cm} /m	3,000	1,451	
③ 8.5x15's 12x14 ^{cm} /m	3,000	1,424 546	
④ 12x12's 25x28 ^{cm} /m	800	139	
⑤ 20x20's 20x20 ^{cm} /m	1,100	192	
⑥ 12x12's 14x14 ^{cm} /m	1,500	-	
Total	15,400	8,122 (13,923)	

Note : Actual (Jan ~ July '97 : 7 month)

- ①②③ : Sugar / Flower Bag
- ④⑤⑥ : Bed Sheet, Curtain, Shirts etc

- Sales price
- Large Bag 31 sp / Bag
- Small Bag 20 sp / Bag

2. Stock of Products (at present)

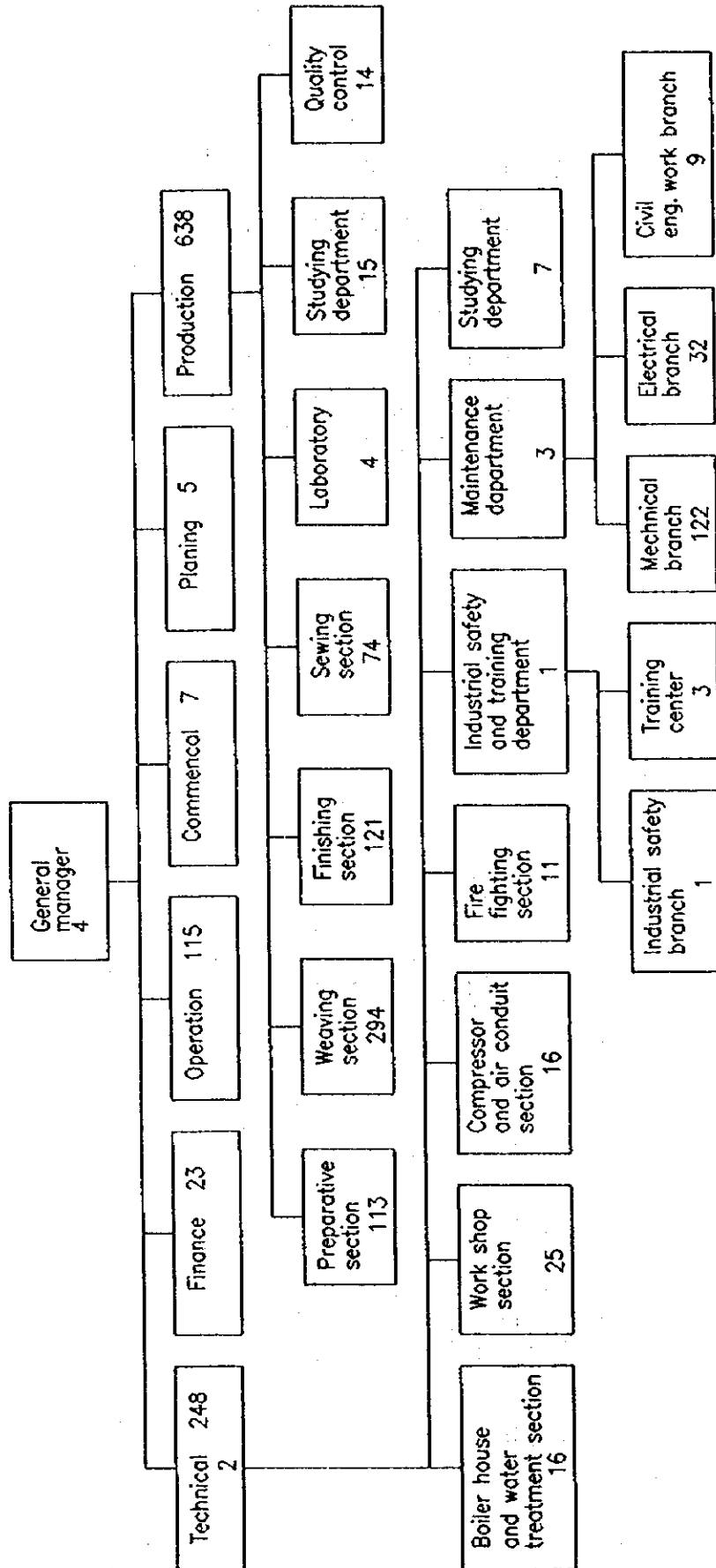
	Gray Fabric	Remarks
Quantity	1,356 T	
Estimate Value	(x 1000 sp) 269,850	(Mill US\$) Approx. 6.0

No.	Width ^{cm} g/m	x 1000m	T	⑥/m	1000sp
1	92	136	6,830	929	27
2	132	196	110	22	38
3	120	218	795	173	39
4	140	300	407	122	60
5	150	192	325	62	50
6	150	224	213	48	45
Sum			8,680	1,356	269,850

⑥ 45sp Approx 6 Mill US\$

Appendix H-T-2

Lattakia weaving co.
Organization and number of employees



APPENDIX H-T-3
LIST FOR MACHINERY OF LATTAKIA WEAVING COMPANY

M/C No.	Resource	Name of Manu.	Model	Year of Manu.	Remarks
(Warping Process)					
1~2	Germany	Schlaflhorst	MZD800	1977	width 1400mm
3~4	"	"	"	"	width 1800mm
(Sizing Process)					
1	Germany	Sucker	ZTE	1977	width 1600mm
2~3	"	"	"	"	width 2000mm
(Weaving Process)					
1~196	Czechoslovakia	Zbrojovka	P125ZB-8	1977	RS 125cm
197~392			P165ZB-8	1977	RS 165cm
(Reaching Process)					
1~4	East Germ.	Texamatic	4902	1977	
(Drawing-in Process)					
1~6	East Germ.	Texamatic	4905	1977	
(Tying Process)					
1~3	Swiss	Ustermatic	Ilmm-4	1977	
(Shearing Process)					
1	Swiss	Vollenweider	DMC-FNR	1977	width 1300mm
2	"	"	"	"	width 1700mm
(Inspecting Process)					
1~6	Czechoslovakia	TIBA	--	1977	width 1300mm
7~13	"	"	--	"	width 1700mm
(Folding Process)					
1~2	Germany	Monforts	MLE	1977	width 1400mm
3~4	"	"	"	"	width 1800mm
(Re-winding)					
1~3	Czechoslovakia	Autosuk	2006	1977	32Drums/F
(Power Supply Equipment)					
1~5			Tr'sformer		20 kv-400v
1		SKODA	Generator	1976	608 KVA
(Water Supply Equipment)					
1					Boiler

2				Air Con, Air Compressor, Generator
(Steam Generation Equipment)				
1	Czcho'vakia			6 t/Hr, 12.5bar Pressure
2	"			4t/Hr, 12.5 bar Pressure
(Air-conditioning Equipment)				
1~2		Climaco		w'out Chilier
3~4	Austria			w'out Chilier
(Air -Compressor Equipment)				
1~6	Checho'vakia			
(Fire Protection Equipment)				
1		complete set		Spronkler and Hydrant
(Waste Water Treatment)				
1		complete set		
(Work shop)				
1		complete set		

APPENDIX H-T-4
CALCULATION TABLE FOR EQUIPMENT

Meters/Hr Loom(Eff 100%)

Kind of Fabric Weft Density		Broad CM 40	
		72	72
RPM	850	17.99	17.99
"	800	16.93	16.93
"	750	15.88	15.88
"	700	12.70	12.70
"	650	11.64	11.64
"	600	10.58	10.58

Calculation Table of Production Meters & Equipment

Kind of Loom Kind of Fabric	RS 190 CM 40 Br	
	100% Production Meters/Hr.Loom	16.93
Efficiency (%)	90.0	90.0
Working Hrs(hrs/day)	24.0	24.0
Requested Meters(m/day)	32,000	64,000

Actual Meters (m/day.Loom)	365.69	365.69
No.of Loom (Theoretical)	87.51	175.01
No.of Loom (Actual)	88	176
Actual Meters (m/day)	32,181	64,361

Calculation Table of Equipment

Sizing Machine	Shrinkage & Loss (%)	2.5	2.5
	Sizing Length (m/day)	32,800	65,600
	Speed (m/min)	45	45
	Efficiency (%)	65	65
	Working Hrs (hrs/day)	24.0	24.0
	100% Production (m/hr)	2,700	2,700
	Actual production (m/day)	42,120	42,120
	Necessary No. of Machine	0.78	1.56
	No. of Beam (/set)	14	14
Necessary Yarn Length (m/day)	463,792	927,584	
Warping Machine	Speed (m/min)	650	650
	Efficiency (%)	35	35
	Working Hrs (hrs/day)	22.5	22.5
	100% Production (m/hr)	39,000	39,000
	Actual Production (m/day)	307,125	307,125
	Necessary No. of Machine	1.51	3.02
Tying Machine	Total NO. of Warp Yarn	8,512	8,512
	No. of Doffing Beam (/day)	9.07	18.14
	No. of Knotting (ends/day)	92,662	185,323
	No. of Knots (min)	200	200
	Efficiency (%)	25	25
	Working Hrs (hrs/day)	24.0	24.0
	100% Production (m/hr)	12,000	12,000
	Actual Production (m/day)	72,000	72,000
Necessary No. of Machine	0.86	1.72	

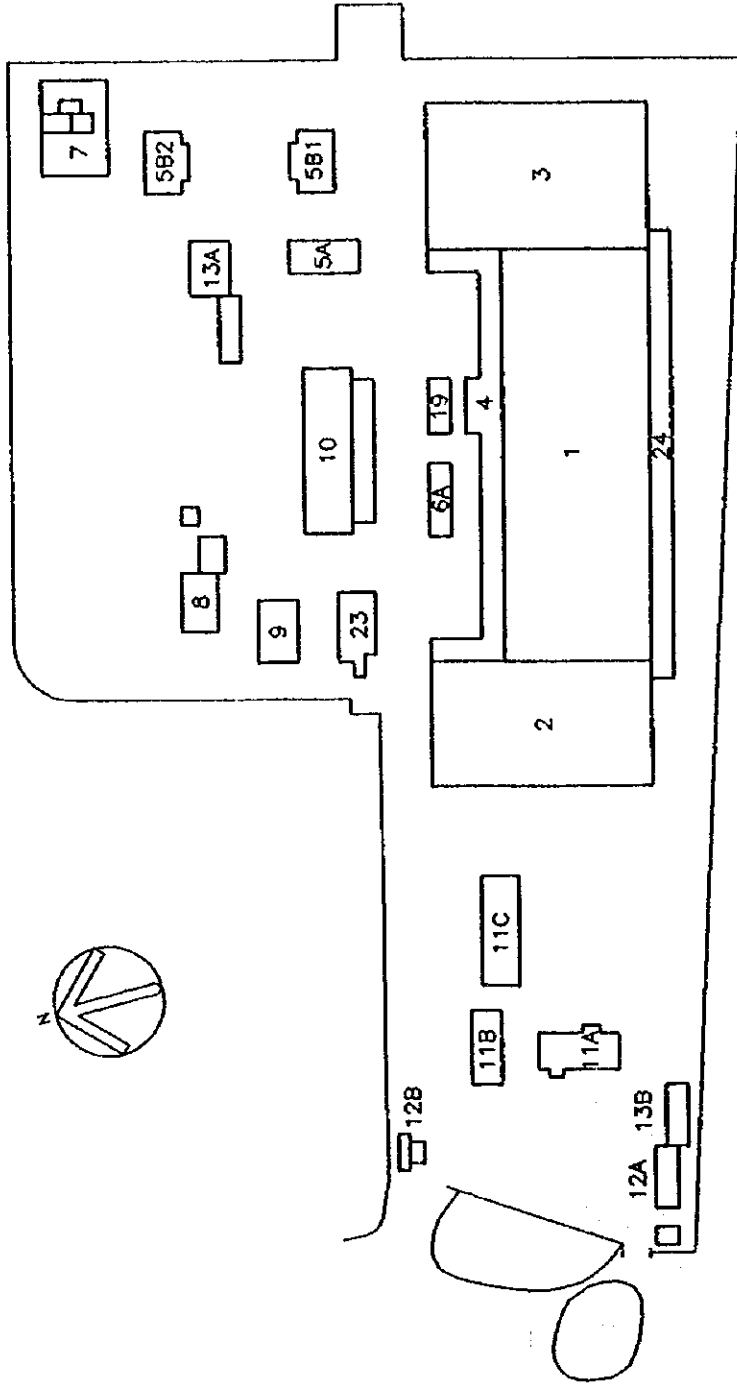
Reaching Machine	Necessary Drawing (ends/day)	25,739	51,479
	No. of Drawing (ends/min)	8	8
	Efficiency (%)	80	80
	Working Hrs (hrs/day)	22.5	22.5
	100% Production (ends/hr)	480	480
	Actual Production (ends/day)	8,640	8,640
	Necessary No. of Machine	0.99	1.99
Inspecting Machine	Necessary Inspecting (m/day)	32,000	64,000
	Speed (m/min)	30	30
	Efficiency (%)	35	35
	Working Hrs (hrs/day)	15.0	15.0
	100% Production (m/hr)	1,800	1,800
	Actual Production (m/day)	9,450	9,450
	Necessary No. of Machine	3.39	6.77
Folding Machine	Necessary Production (m/day)	32,000	64,000
	Speed (m/min)	40	40
	Efficiency (%)	50	50
	Working Hrs (hrs/day)	15.0	15.0
	100% Production (m/day)	2,400	2,400
	Actual Production (m/day)	18,000	18,000
	Necessary No. of Machine	1.78	3.56

APPENDIX H-T-5
CALCULATION TABLE FOR FABRIC STANDARD

(Air Jet Loom)

FABRIC		Broad CM 1/1	Broad CM 1/1
Warp	Ne	40	40
Weft	Ne	40	40
Warp Density	Ends/Inch	133	133
Weft Density	Ends/Inch	72	72
Width	Inch	64.00	64.00
Length	Yard/pc.	121.00	121.00
Warp Weight	Kg/m	0.1420	0.1420
Weft Weight	Kg/m	0.0701	0.0701
Total	Kg/m	0.2121	0.2121
Supply Wp Wt.	Kg/m	0.1434	0.1434
Supply Wf Wt.	Kg/m	0.0744	0.0744
Total	Kg/m	0.2178	0.2178
Yarn Supply			
Production	Meters/day	32,000	64,000
Length/pc.	Meters/pc.	109.728	109.728
Production	Pieces/day	291.63	583.26
Warp Supply	Lbs/day	10,203	20,405
Weft Supply	Lbs/day	5,289	10,579
Total	Lbs/day	15,492	30,984
Yarn Supply	(284 days/y)		
Warp Supply	Lbs/year	2,897,652	5,795,020
Weft Supply	Lbs/year	1,502,076	3,004,436
Warp Supply	Bls/year	7,244.1	14,487.6
Weft Supply	Bls/year	3,755.2	7,511.1
Total	Bls/year	11,000	21,999
Total	Tons/year	1,995.8	3,991.5

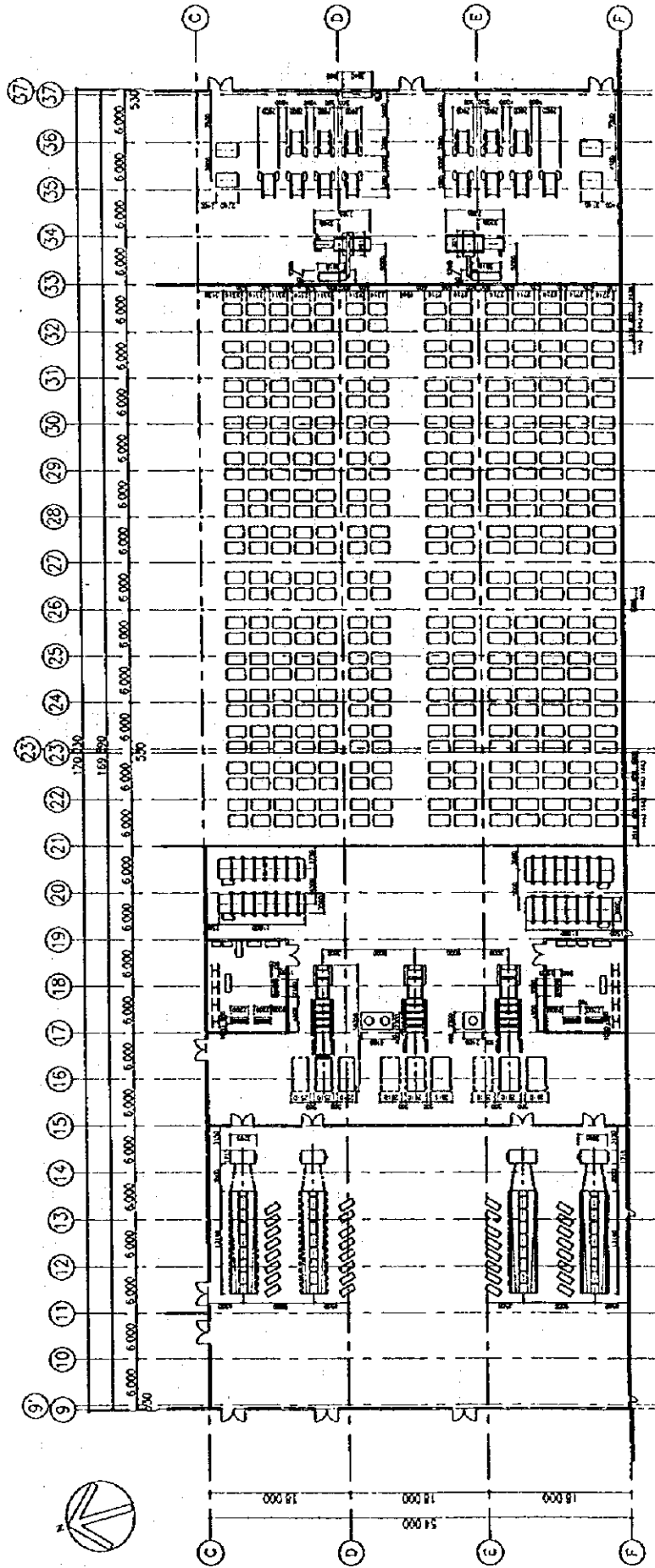
APPENDIX H-F-1
 Lattakia Weaving Company
 Factory Layout (Existing)



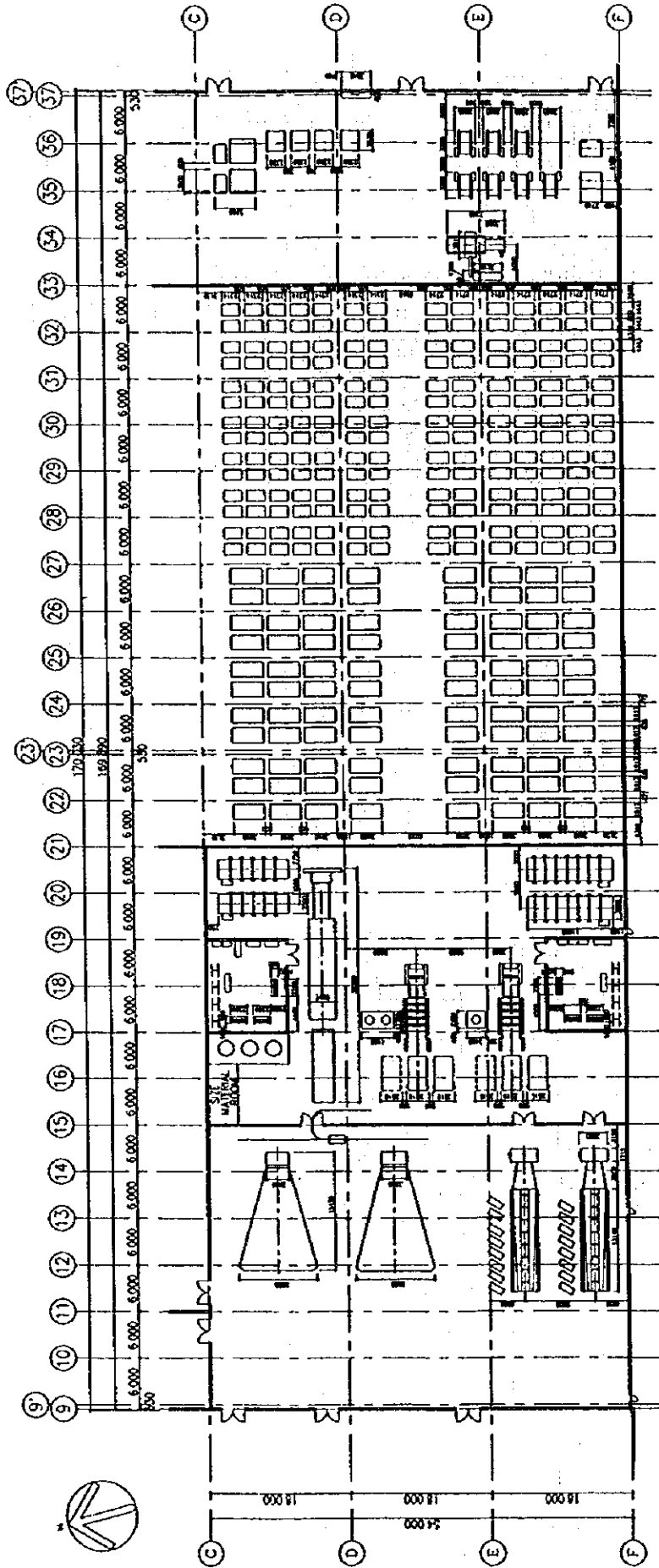
- 11A Management building
- 11B Health center
- 11C Dining hall with kitchen
- 12A Personal porter's lodge
- 12B Porter's lodge for truck

- 1 Weaving mill incl training center
- 2 Raw material store
- 3 Finished stock
- 4 Air technical plant
- 5A Boiler house
- 5B1, 5B2 fuel management
- 6A Water pumping station
- 7 Sewage disposal plant
- 8 H-V Switch station
- 9 Sewing shop
- 10 Repair shops

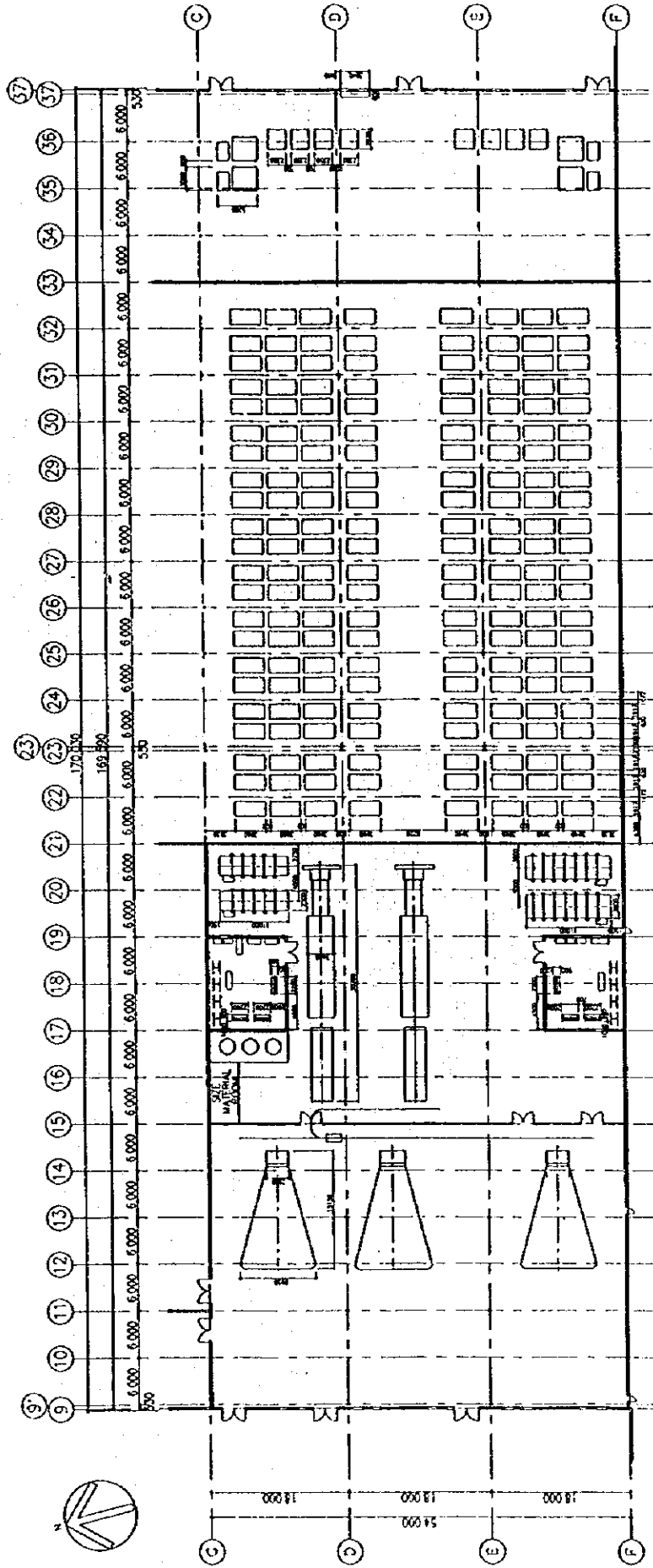
APPENDIX H-F-2
 Lattakia Weaving Company
 Weaving Section Layout (Existing)



APPENDIX H-F-3
 Lattakia Weaving Company
 Weaving Section Layout (Modernization Plan No.1)



APPENDIX H-F-4
 Lattakia Weaving Company
 Weaving Section Layout (Modernization Plan No.2)



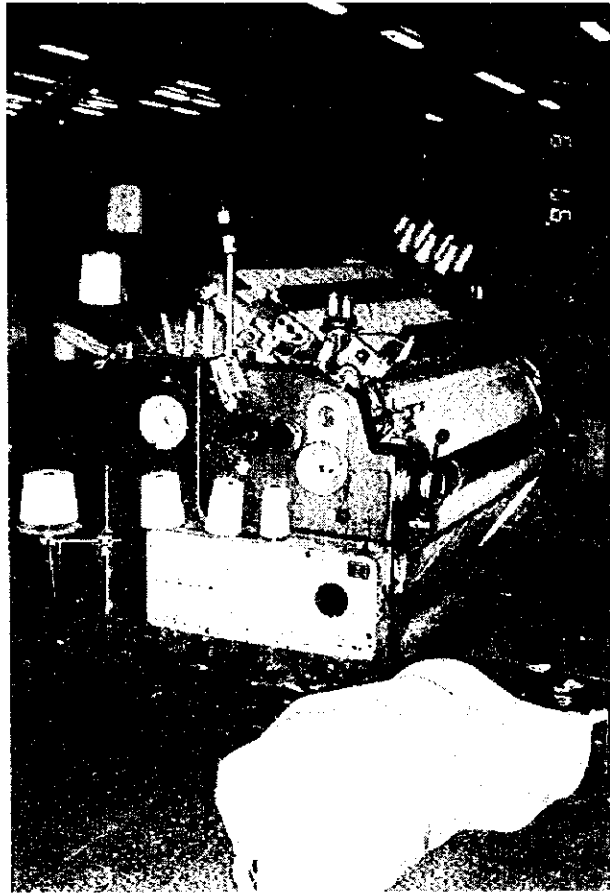
APPENDIX H-P-1 HANDLING OF YARN IN BAGS DETERIORATES ITS QUALITY



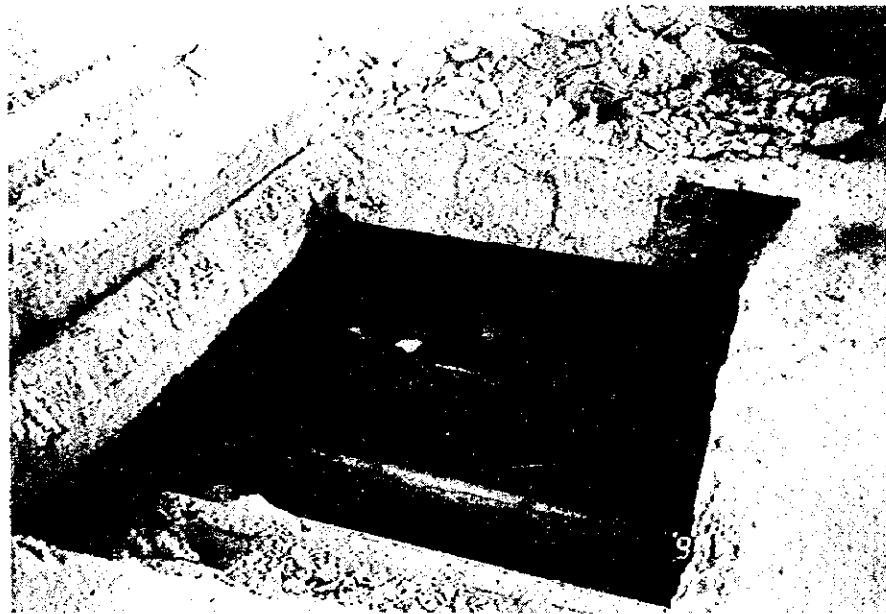
APPENDIX H-P-2 IMPROPER HANDLING OF YARN FOR WARP



APPENDIX H-P-3 IMPROPER HANDLING OF YARN FOR WEFT



APPENDIX H-P-4 DANGEROUS PIT CAUSED BY STEAM LEAKAGE



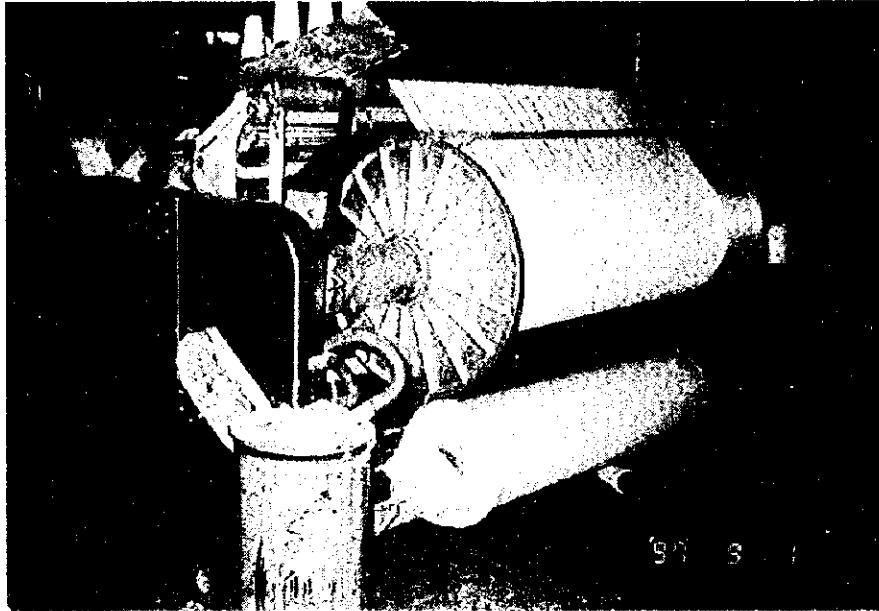
APPENDIX H-P-5 DETERIORATED IMMERSION ROLLER OUT OF SERVICE



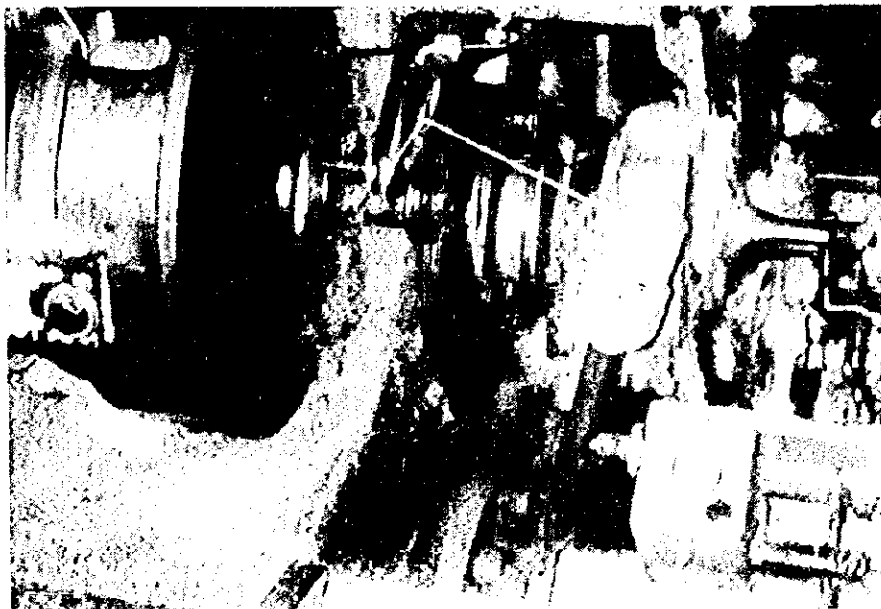
APPENDIX H-P-6 DEFECTIVE WEFT YARN CUTTER AT THE RIGHT SIDE SELVAGE



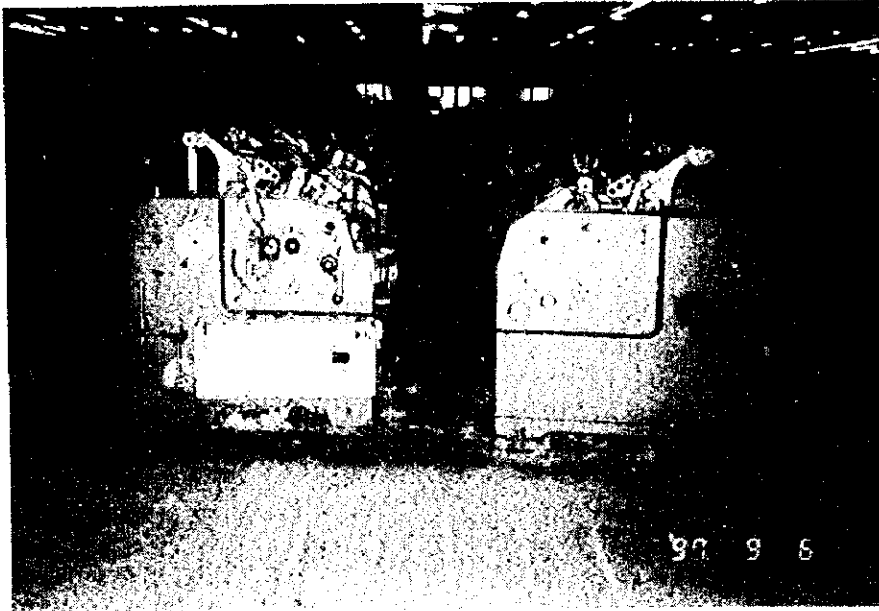
APPENDIX H-P-7 MUCH WASTE YARNS ON THE CLOTH ROLLER CAUSED BY THE DEFECTIVE WEFT YARN CUTTER



APPENDIX H-P-8 DEFECTIVE MEASURING DRUM FOR WEFT YARN



APPENDIX H-P-9 LOT OF LOOMS OUT OF SERVICE



APPENDIX H-P-10 DISORDER IN WEAVING ROOM



APPENDIX H-P-11 STOCK OF GRAY FABRIC IN DISORDER



United Arab Company

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TECHNICAL DIAGNOSIS FOR UNITED ARAB COMPANY FOR INDUSTRY

Diagnosis date : 16~20 Aug. 8 Sep, 1997

Person in charge : Ichikawa, Oshima, Takeohara, Ishii, McCorkell, Kosugi, Tsumori

1. Present Situations of the Company

1.1 Location

Situated 12 km south from the center of Damascus.

1.2 Outline of the company

(1) General Items

The company was established in 1954 as Dibs company of private sector and was taken over by the government. It is a factory having integrated processes of spinning, weaving and dyeing and finishing composed of very old machines. Its equipment except for weaving has not been modernized since its foundation, thus producing very low quality yarn which causes many yarn breakage in weaving process. The yarn cannot be used as warp due to yarn breakage and used as 14.3% of total weft yarn. Yarn required for warp yarn for weaving process is purchased from other state-owned spinning companies. Equipment of dyeing and finishing can cope with only processing of narrow width cloth and is processing only fabric ordered, with 10% operation ratio.

(2) Building site

Site area is 110,016 m² and building area is 37,586 m² (34% of site area). Its breakdown is;

Spinning	7,826 m ²
Winding	1,887
Weaving	8,883
Dye house	4,427

Yarn dyeing	393
Inspecting & folding	1,325
Boiler house	950
Workshop	4,050
Store and others	7,845

(3) Raw material

- ① For spinning : Raw cotton used : Grading 13-14 (40%), 23-24 (40%), 33-34 (20%) : 1,840 ton/year
Waste polyester coming from Hassakeh Spinning is re-used in the factory for polyester/cotton blended yarn. : 25 ton/year
- ② For weaving : Cotton yarn is purchased from state-owned spinning companies under GOTI : about 3,000 ton/year

(4) Product

Production items are as follows ;

Cotton yarn : carded yarn Ne2.25, 8, 12, 14, 16, 20

Yarn spun from waste : P/C Ne4

Gray cloth : Many types

Dyed and finished fabric : Many types. Please refer to Appendix I-T-2.

Bleached 1,170 t/y, Dyed 440 t/y, Print 1,050t/y

Sold yarn : Very few out of production 1,100 t and balance become stock.

Sold gray cloth : 1,875t/y to private sector

Please see Appendix I-F-1 for the flow of raw material and products.

(5) Sales and stocks

Please see Appendix I-T-1, 2 for sales price of yarn and processed fabric. The company is struggling to sell the products which are not sold well because of bad quality yarn and narrow width gray and processed fabric.

Situation of stock is as follows ;

(As of August, 1997)

	yarn	gray cloth	processed fabric	total
stock Q'ty	400 tons	9.5Mill.Meter	2.0Mill.Meter	—
stock Amount	1.6Mill\$	6.9Mill\$	2.5Mill\$	11.0Mill\$

(6) Production plan and result

Spinning and weaving production is speculative based on its own marketing.
Dyeing and finishing production is by orders.

Production plan for 1997

Spinning 1,600 t/y

Weaving 3,482 t/y

Dyeing/finishing 1,607 t/y

(7) Organization and manpower

Please see Appendix I-F-2.

- ① 6 departments (General affair, Commercial, Financial, Planning, Production and Technical)
- ② Number of employees : 1,707 persons

(8) Production equipment

- ① Spinning : Cotton 11,040 spindles, P/C 3,520 spindles
- ② Weaving : Broad width loom 218F (Sulzer), Narrow width loom 100F (Saurer, shuttle type)
- ③ Processing : Bleaching, dyeing and printing (only narrow width finishing).

Please see Appendix I-T-3, 4, 5 for equipment list.

2. Present Situations and Problems of Corporate and Financial Management

2.1 Present situations and problems of corporate management

(1) Sales control

- ① Free competition among state-owned companies under GOTI under the same conditions (unified selling price, etc.).
- ② Its marketing concept is very conventional, production and sales-oriented (To sell what was produced.). In principle, the production cannot be stopped and the ratio of speculative production is higher and the stock increases if orders are wrongly estimated. Order of dyed fabric is concentrated in the wide width cloth. The narrow width cloth is produced only for becoming stock.
- ③ Market research is very important in the case of speculative production, but it is hardly practiced.
- ④ Forecasting of demand and sales planning is carried out by the planning department of GOTI, but it is not clear whether the results are fed back.
- ⑤ Data of marketing are prepared in the company, but it is not clear if such data are fully evaluated and applied in the company.
- ⑥ There is no framework for the company to develop marketing strategy (reinforcement of marketing organization, stepping up of promotion strategy, etc.) due to the regulations which restrains the state-owned companies.

(2) Labor management

- ① The present recruitment control is not sufficient if the company wishes to recruit able employees and then stop the job hopping.
- ② Replacement control aiming at rationalization, personnel reshuffle, shift between companies, cities, jobs and services, etc. are not carried out at all because of various reasons and regulations. In case of Dibs, a streamline plan to shut down its problematic spinning department and be specialized in weaving and dyeing, for instance, will face many labor-related issues like labor-management relations to be sorted out.
- ③ Employment is ensured for life, therefore, temporary dismissal and lay offs are not allowed at all.
- ④ A job description (combined with SOP) for each company is practically not made the most of.

- ⑤ There is no infrastructure in place to provide education and train employees (or to develop ability) sufficiently.
- ⑥ Wage rates and systems in state-owned companies include many issues.
- ⑦ Safety and health are not satisfactorily controlled.
- ⑧ Capital and labor relations need to be improved.

(3) Cash flow control

- ① Collection of bills from public sector companies tends to be behind schedule in most cases.
- ② Dealings between public sector companies show a tendency of mutual dependence. Therefore, cash flow is not properly controlled and the emphasis is not placed on avoidance of insolvency risk, etc..

(4) Business plan management

- ① Middle and long term business plans are the responsibility of GOTI and short term divisional project plans are the responsibility of each company. If a self-supporting system is adopted in a free competition environment, whole project plans including strategic plans will be the entirely responsibility of each company.

2.2 Present situations and problems of financial management

Based on the major financial statements obtained from United Arab Company (Dibs) in the second on-site survey, financial analyses were made in order to know the current financial status in Dibs.

(1) Production

Dibs has an integrated factory using cotton with complex processes, therefore, the planned and real production in 1996 used for the cost calculation are summarized in the following table.

Planned/Real Production in 1996

Products	Unit	Production Capacity	Planned Capacity	Real Production	%
Yarn	Ton	1,861	1,861	1,333	72
Gray Fabrics	Ton	4,117	3,482	2,564	74
Bleached Fabrics	Ton	1,403	1,169	557	48
Dyed Fabrics	Ton	438	438	375	86
Printed Fabrics	Ton	1,060	1,060	203	19

From the above table, the real production of yarn, gray fabrics and dyed fabrics was higher than 70% of the planned capacity while that of bleached fabrics and printed fabrics was lower than 50% of the planned capacity. The details of production are shown in Appendix I-T-7.

The production in 1997 is planned to be the same one in 1996 except yarn production of 1,600 ton/year.

(2) Production cost

The independent unit production cost by process and the unit transportation cost to the warehouse are shown in Appendix I-T-8.

Total unit cost required for the production on each product is shown in the following table.

Total Unit Cost for Cost Calculation

Up to Products	Total Unit Cost (SP/kg)	Remarks
Yarn	126.33	Yarn
Gray Fabrics	163.16	Yarn + Grey Fabrics (Preparation + Weaving)
Bleached	208.86	Yarn + Grey Fabrics + Bleached
Dyed	193.81	Yarn + Grey Fabrics + Dyed
Printed	205.25	Yarn + Grey Fabrics + Printed

Annual production cost is calculated and is shown in Appendix I-T-9. Consequently, annual production cost including transportation cost to warehouses in 1996 is 828.02 million SP.

In the composition of production cost, raw material cost, as a largest cost factor, accounted for 57.5% of total production cost, followed by salary and wages for 20.0%, and overhead for 12.4%.

(3) Sales

From the Appendix I-T-10, annual sales revenue in 1996 at real price basis was 581.32 million SP consisting of sale of total yarn at 59.64 million SP, sales of total fabrics at 518.71 million SP and other sales at 2.97 million SP.

(4) Profit and loss

From the Appendix I-T-11, the value of stocks of complete production (products inventory) was appropriated 419.29 million SP in 1995 and 447.58 million SP in 1996, respectively.

From the above-mentioned amounts such as annual production cost, annual sales revenue and stocks of complete production, gross profit on sales is calculated by using the following formula.

$$ST96+SR96=PC96+ST95+GP96$$

where;

SR96 : Annual sales revenue in 1996

PC96 : Annual production cost in 1996

ST96 : Value of stock of complete production in 1996

ST95 : Value of stock of complete production in 1995

GP96 : Gross profit on sales in 1996

Consequently, gross profit on sales in 1996 is -218.41 million SP.

There is the big difference between the above loss and the profit of purchasing of the Appendix I-T-12. Dibs side explained that there was the problem on the assessment method for older stocks of complete production.

(5) Balance sheet

Balance sheet consisting of assets and requirements is shown in the Appendix I-T-11.

For the analysis, fixed assets and stocks are taken up as items being related to the production and having a big change from 1995 to 1996.

The item having the above condition was stocks of complete production as described in item (4).

(6) Conclusion

Annual production cost was calculated based on the explanation by DEBS Co. side after adjusting the cost of chemicals and dyestuffs.

Though the calculation, it is observed that the yarn purchased from outside is assessed at the same cost as the yarn in own factory.

Firstly, financial side should review the assessment method of production cost including that of stock of complete production (product inventory) to get more accurate information.

As the result, if production cost exceeds sale revenue, financial side should advise production side such a fact in order to reduce the production cost.

3. Present Situations and Problems of Production Process

3.1 Spinning process

Spinning equipment of European make is generally outdated and worn out (Plat, Zinser, Trutezhler of 1956~1957) and maintenance is not carried out satisfactorily because of extreme difficulty of procurement of spare parts. The factory is far from a normal image as spinning factory, because ring frames and combers out of service occupy the corner of the factory, there is P/C spinning equipment of very coarse yarn count and yarn is spun by card and ring frame of woolen yarn type, thus giving a disorderly and confused image. And the

quality of yarn is extremely bad and it is used as a part of weft yarn in its own weaving factory. About 70% of yarns becomes dead stock.

3.2 Weaving process

- ① This process is more modernized than other processes. It is operated by 218 Sulzer wide width looms (74 in No.1 mill and 144 in No.3 mill).
- ② No.2 mill is run by 100 shuttle type Saurer looms which have problems because of its low productivity, narrow width and difficulty of procuring spare parts. It is planned to run it by 1-shift operation for the next year and its operation will be reduced gradually.

3.3 Dyeing and finishing process

Necessary equipment is provided for the process, but it is old-aged equipment not being able to cope with the processing of broad width fabric. As it can produce only limited production range, it is run only for order. Therefore, it brings about only 50% of working ratio.

4. Present situations and problems of production management of spinning

4.1 Procurement control

(1) Raw material

- ① Types and quantity of cotton are requested to GOTI at every end of August. After approval of GOTI, raw cotton is purchased from Cotton Marketing Organization. Types of cotton and their grade requested by the company are obtained without problems.
- ② P/C waste has been purchased from Hassakeh Spinning Company. Whether it will be able to keep on getting is not obvious because the P/C spinning equipment in Hassakeh was conveyed to Al Ahlich factory. Way of putting and storing waste before loading the machine is not appraisable. It should be placed with orderliness, as it affects the yarn quality (See Appendix I-P-1).

(2) Spare parts

It is very difficult to get spare parts, as the machines are old and machine manufacturers are so versatile. Therefore, it makes it difficult to do maintenance (Planned maintenance is impossible because procurement of spare parts takes more than six months.), giving rise to low efficiency operation.

4.2 Stock control

- ① Confirmed stock as of August, 1997 was 500 tons.
- ② The quantity of flowing in stock is controlled but no one knows when the stock will go out.
- ③ Storing conditions of spare parts are normal (See Appendix I-P-2).

4.3 Process control

- ① Factory organization is well provided and production and process control is recorded by personnel appointed. But, this record cannot be summarized or utilized effectively (i.e., feedback of problems to previous processes) due to lack of control standards. Likewise, as such documents as production instruction and progress card, etc. are not used for control purpose, the midway products loaded on ring spinning frame, for instance, do not have any indication card and they are not controlled by group of yarn count. Who knows what kind of products are loaded where is spinning manager only. The operation is not but a superhuman feat.
- ② Significance of process control seems to be understood by nobody. For instance, re-loading of reusable cotton in the feeder is being carried out without being measured. Ratio of reusable cotton is said to be 10% but who can confirm it? Cleaning of machines and floors is not good. Strong instruction to rectify defective practices is expected.
- ③ Setting of air-conditioning is done manually and is not suitable for production activity. For instance, temperature 30°C and RH 50% in the spinning room brings about over-dried conditions.
- ④ Stock conditions of yarns are very bad and deterioration of quality is unavoidable. New stock is put on the old one and this step is repeated.

The history of yarn stock of under layer becomes difficult to know. Please see Appendix I-P-3.

- ⑤ In the winding process, many naked cones and bags containing yarn are scattered everywhere without orderliness. Please refer to Appendix I-P-4.
- ⑥ It is insufficient to control the quantity of stock in process. For instance, the quantity of ring bobbin stock is grasped by the difference between production quantity in ring frame and received quantity in winders.

4.4 Equipment control

- ① In general, cleaning is not enough in every process. One can come across many empty spindles due to difficulty to obtain spare parts. And in ring spinning frames some pendulum arms are run without aprons. Big problem is that no one regards it as extraordinary thing that yarn can be spun in such bad conditions.
- ② Survey of empty spindles in ring spinning frames tried by work sampling method resulted in ; stopped spindles with broken yarn 752 sp/30 frames, vacant spindles 869 sp/30 frames, totaling 1,621 vacant spindles. This number is converted into 4.4 frames in stoppage from 1,621/368. Refer to Appendix I-P-5.

4.5 Quality control

- ① The organization for quality control and measuring equipment in the laboratory are provided. But, data of sampled test (U% of yarn unevenness, etc.) is not fed back to the process concerned.
- ② To dig out the problems of process from quality test data collected weekly and monthly for each yarn count and to lead it to the action at the working site (improvement of operation conditions and implementation of maintenance, etc.). Such practice is not carried out.
- ③ It is problematic quality-wise to store and transport yarn cones and cheese in bags and practice to store cheese putting cheese on cheese causes the collapse of shoulder part. Please see Appendix I-P-6.

4.6 Education and training

- ① Training is important because there is much change of employees. But education and training carried out here is nothing more than a little of OJT training by veteran employees is carried out.
- ② The standard operation procedure (SOP) is treated a little in the Job Description and in fact it cannot be utilized for the work. Education of SOP is exclusively relied on the instruction of veteran employees and it is doubtful whether it is carried out properly and correctly. Employees cannot judge what is correct and what is problem. So, they follow what was ordered.

4.7 Environmental preservation

- ① There are many flies because of low humidity. Much fly is a reason of what cleaning tends to be delayed and it is also hindering smooth production activity.
- ② Standards for environment in the factory should be established.

5. Present situations and problems of production management of weaving

5.1 Procurement control

(1) Raw material

- ① Because of low quality of its own yarns which are used only for weft yarns, yarns for warp use are purchased from other state-owned spinners.
- ② Quantity of yarns purchased in the first half of 1997 : Hama Cotton Yarn 82.4 ton, Idleb Spinning 424.5 ton, Lattakia Spinning 156.4 ton, Al Furat 70 ton, Al Ahlieh 632.8 ton, Total 1,366.1 ton.
- ③ Yarn purchased from other companies account for 70% of raw material. Quality of such yarns varies widely from company to company even in same yarn count, affecting the machine efficiency. Even so, it is said to be better than to use Dibs's own yarn.

(2) Spare part

- ① Spare parts for warpers, sizers and looms (Saurer) procured in earlier stage are extremely difficult to get, thus bringing about bad maintenance conditions.
- ② It is not much problem to get spare parts for warpers, sizers and looms (Sulzer).

5.2 Inventory control

- ① Inventory control for many stocks of midway products and final products is not good. The stock is piled up in the inspecting room and warehouse without orderliness. New stock is put on the old stock and only stock of upper layers is taken out. So, the stock of under layers becomes discolored due to long period store (Appendix I-P-7).
- ② It is stored without any indication or tags.

5.3 Process control

- ① Frequent yarn breakage in warping is observed excessively. Further, not proper handling and store of the yarn increase it. Warper speed should be changed in accordance with the yarn quality. Operators are not skilled in coping with the yarn breakage. Much yarn breakage in warper is causing requirement of almost 100 yarns for repair in the Sulzer loom.
- ② Check of reasons of warper stoppage is not practiced. It should be carried out to enhance the operation efficiency.

5.4 Equipment control

- ① Maintenance of machines seems not to be carried out for other than driving part. For instance, the yarn supplying creel of warper is not the objective of maintenance. But, this should be done, because the other part also affects the quality of products.
- ② Maintenance of sizer is insufficient and its broken instruments are let alone.
- ③ Every machine is so deteriorated that its function will not be able to answer the requirement to upgrade the quality more than now.

5.5 Quality control

- ① Evaluation of quality is not based on the quality standards which do not exist but on the judge of persons in charge. It is approved, unless the product is objective of customers' complain.
- ② Significance and necessity of quality control seems out of understanding for employees. It is also not understood that quality control is not only the check of finished products but it should be also done in the way of processing products.
- ③ Evaluation of gray fabric based on number of defects is not adopted.
- ④ Causes of defective quality of cloth detected at inspecting are not fed back to the process site.
- ⑤ Low level of skill of warper operators constitutes a big cause of defective gray fabric besides yarn low quality.

6. Present situations and problems of production management of dyeing and finishing

6.1 Procurement control

(1) Raw material

- ① Raw material for this process, gray fabric, is supplied from the weaving department. Supply quantity is 1,700 ton/year, accounting for 46% of weaving production, 3,480 ton/year.
- ② Gray fabric of relatively good quality is sold and that having some quality problems is processed inside the company.

(2) Spare parts

- ① Dyestuff, chemicals and other auxiliary materials are ordered on the basis of the consumption in the last three year. Machine spare parts are ordered to the agents of the manufacturers.
- ② Test of incoming dyestuff, chemicals, other auxiliary materials and liquids (H_2O_2 , assistants) is not implemented.
- ③ It is difficult to get spare parts for old-aged machinery and it takes long time (6-12 months) to get it.

6.2 Inventory control

- ① Finished products are piled up in the delivery zone (about 540m²). Its figure is recorded but storing conditions are very bad.
- ② Storing conditions of dyestuff, chemicals and machine spare parts are normal.

6.3 Process control

- ① Processes of singeing, sanforizing and mercerizing are abbreviated in the dyeing process because such machines are in very bad conditions. Under such circumstances, proper process control is extremely difficult.
- ② There are much demand for broad width fabric more than 1,600 mm and the production is concentrated in the process with broad width jiggers.
- ③ Softened water made by water softener is used only for boiler and the raw water is used for dyeing process. This situation should be improved as early as possible because the raw water adversely affect the color developing property.

6.4 Equipment control

- ① The machines can cope with processing of multi-purposes, but they are already deteriorated and are not well maintained.
- ② The machines are run without their basic function. Because, they lack basic instruments like humidity meter, speed meter, etc.. And the surface of rollers which squeeze cloth are deteriorated.
- ③ Complain against processed fabric hollowed out is occurring. This is presumably caused by the rust in the water pipe which mixed in the machine, generating the hollowing out by the chemical reaction with H₂O₂ and Fe⁺⁺.
- ④ Many of edge yarn are attached to the batch up roll in the bleaching and dyeing process. This causes troubles in subsequent printing and finishing processes. Please see Appendix I-P-8.
- ⑤ The surface of rubber roller is in very bad condition. The surface is considerable worn out and it seems not to have been ground at all. Please see Appendix I-P-9.
- ⑥ The rope washer is maintained very badly. As seen in Appendix I-P-10, silicon scale (cause of uneven whiteness) and rust (cause of hollowing out in

the cloth) are generated in the machines. And the tension of rope is not well adjusted. This causes rope mark in the fabric.

- ⑦ Defective centering function of jigger. See Appendix I-P-11. The selvage of roll is irregular, which originates bleaching and dyeing speck.

6.5 Quality control

- ① Bad manner of handling gray and finished fabric : such practice as direct placing fabric on the floor, improper loading on the cart, walking on the processed fabric, etc. should be stopped. No care is taken of products.
- ② Equipment for test (above all, chemical test) is not enough.

6.6 Environmental preservation

- ① Residual water from dyeing process is thrown into city channel directly. But, the situation not allowing this will come soon. Installation of dyeing residual water treatment system should be studied immediately.

7. Modernization

7.1 Modernization of The Management

(1) Sales management

The following proposals to be carried out by GOTI are for the sales management and the commercial departments of GOTI companies. Under the circumstance that cotton processed fabric produced by Dibs is competing with the private sector, the marketing activity is a very important factor for Dibs.

1) Establishment of the marketing concept

In the former era when productivity was low and demand was always bigger than supply, management people were more interested in manufacturing issues rather than market issues (production-oriented). Thereafter, when the age of mass production came, the managers' interest was still on the manufacture of products without considering satisfaction of consumers and how to sell them to the consumers (sales-oriented). Now is the market-

oriented age in which all decision making of companies' management starts from customer requirements.

Nevertheless, the marketing concepts of GOTI and state-owned companies still lay emphasis on the production and sales-oriented activity, in spite of such economic and social change in the world. This is obvious because speculative production is always dominant, as the production cannot be suspended and it is not based on any scientific market research in many cases, thus resulting in stock build up due to lack of demand and/or wrong estimates.

Also in the company organization of Dibs, the commercial department is placed in parallel with other financial, general affairs, labor, planning and production departments. The commercial department does not have its subsidiary organization like market planning, market research, advertising and sales promotion groups. This is also evidence of a rather production-oriented organization.

The market-oriented marketing in compliance with the current marketing environment is to harmonize the company's profit pursuit with the users' satisfaction pursuit. It is necessary to start by understanding such marketing concept and social tendency and making its concept a company's ideology.

2) Establishment and Implementation of the micro-marketing concept

If the marketing concept of the company is established, Dibs should clearly declare to the government, GOTI and GOTI companies that Dibs will conduct marketing activities on its base (that is, that Dibs takes responsibility for micro-marketing -- it can be asserted that in the state-owned companies only the sales (*)concept currently exists and the marketing(**) concept does not exist.). It should establish and implement the system to be managed by the general manager (of course, it is necessary to revise the already existing laws and regulations for marketing in order to enable it to revise the articles of association and business rules, etc.).

* Idea on the basis of sellers' interests that sales is to sell produced goods, the future demands lie on the extension line of past demands and the after-service to customers is stressed.)

** The marketing is to serve customers' interests, based on the principle for demand creation that the future demands should be positively exploited. The service to customers is based on entire marketing that not only the after-service, but also the before-service to anticipated customers are stressed, thereby positively conducting communication services to customers including sales activities.

3) New marketing strategy to be required in the era of drastic change in management environment

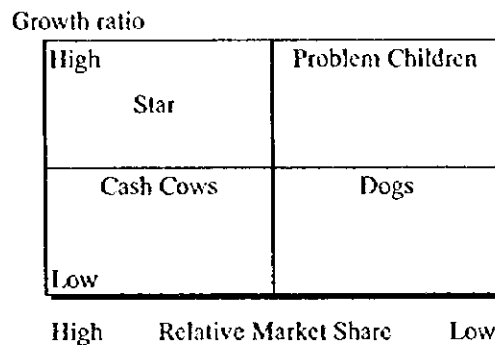
Below are some of the environmental changes in the business background in which new marketing strategies will have to be devised and carried out.

- The severe competition between enterprises has caused a market oligopoly. Under such circumstances, each enterprise has been compelled to predict the trend of the competitors, anticipate the entire market and restudy the business field.
- The progress in technological renovation has required huge amount of investment for equipment and management plans based on long term business prospects.
- The tendency to be rapidly outdated technology has been accelerated and the life cycle of merchandise has become shorter.
- The sudden change in the management environment mentioned-above has made it necessary to precisely analyze and predict the external environment, integrate all management resources in the company and unify all the functions in order to implement marketing in the directions of the strategic plans. Methodology of detailed marketing strategies are found in the marketing reference books. Here, a few representative methods shall be introduced.

a) Port folio strategy

The representative model Port Folio is that of the Boston Consulting Group. The market growth ratio is put on the vertical axis and the relative market

share on the horizontal axis, then the strategy business unit (SBU) is divided into four (4) strategy divisions.



SBU will change the position on Port Folio matrix together with the time lapse. The best procedure is : Investigate in the "PROBLEM CHILDREN" and rear it to "STARS". Then retain it as "CASH COWS" and cultivate, and at the final stage, make a retreat as "DOGS".

For example, processed fabrics of Dibs have been still placed in the current "PROBLEM CHILDREN". It is placed as materials for high class fabric, thus possessing high possibility. The improper production processes and equipment does not permit it pass in the international market. Changing them to "STARS" requires a huge amount of funds for purchase of new equipment for improvement of the qualities. Its achievement will improve the yarns from "STARS" to "CASH COWS".

b) Competitive market strategy

This is an approach in which to expect the maximum fruit in the marketing and selection of an optimum strategy in compliance with the position in which a company is situated. Companies can be divided into four prototypes from the viewpoints of their relative scales, positions and marketing strategies. The approach envisages the features of each prototype and its strategy to adopt, as follows ;

- Market leader = Entire weather type strategy
- Market challenger = Discrimination strategy

- Market follower = Imitation strategy
- Market nicher = Specific marketing strategy

Dibs is featured as a company who is going to catch up with dyeing manufacturers in private sector, the market leaders. Thus, it can be positioned as a market challenger.

It has an advantage that it has cotton material the private sector does not have. The strategies to be adopted shall be, among others, cost lowering, cheaper products, product innovation, improvements in service and manufacturing cost reduction, etc., thus being able to be competitive with synthetic fabrics of private sector. Also important is the market nicher's strategy to find niche markets other companies have missed or ignored and acquire big achievements in those markets. Cotton fabric for casual-oriented fashion may be interesting in Syrian market.

Like this, it is important to judge clearly in what position a company is placed in the competitive markets and to what type out of the four prototypes it belongs to, and to decide strategies for the development of its products and markets.

4) Market Research

It is important to clarify the properties of the markets and collect important information for marketing activities. The quantitative analysis on consumers' action in the target market is conducted through market research. It is said that at present neither GOTI nor companies are conducting any market research. However, it is better for GOTI to put into practice market research for them to know their self-market occupancy ratio and their self-market potential. The number of personnel in the existing commercial department is insufficient, so personnel requirements should be studied and revised. The methods of market research are, among others, investigation by inquiry and market observation.

5) Demand estimate and sales plan

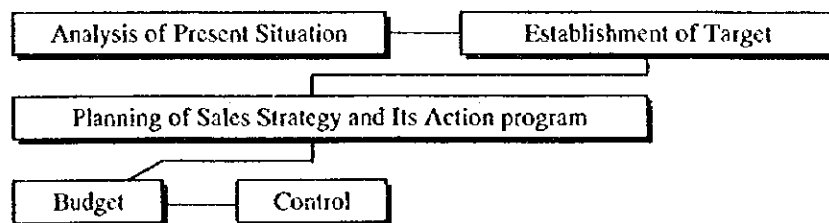
Qualitative marketing information collection is made by the market research team and the quantitative information on demand is gathered by demand

estimating methods. It was said that demand estimates are carried out by the planning department of GOTI but it is not clear whether their results are fed back to each company or not. Now that each company faces free sales competition, this methodology should be conducted by each company. The following are the main methods ;

- By discussion and approval by managers of production, commercial, financial and other departments
- Opinion polling methods of the sales department personnel
- Monitoring of anticipated purchasers.
- Analysis of time series
- Statistical demographic demand analysis.

When carrying out demand estimates, it is necessary to take into consideration seasonal variations of sales and stocks, the position of the company and price elasticity of demand, etc.

Planning of "sales plan" is better done at the company level. The following is the procedure for execution.



The settlement of the sales strategy is done by deciding target markets and the optimum marketing mix (combination of products, prices, channels and promotions). Action programs are expressed by SWIII, specifying contents, procedure, persons in charge, organization, timing and budget, etc. for action.

"Sales analysis" is an effective control method. This is a process in which sales revenue is classified according to sales price, quantity, customers, distribution channels, sales men, territories and types of products for analysis, interpretation and evaluation purposes. This method should be practiced by all means.

6) Price strategy

At present, the cost plus method (price decided by cost added to by profit) is adopted for price setting of products of state-owned textile companies. This method ensures a profit, but does not consider the price of competitors. And it is not knowing whether the price is good in the market. At present, the cotton yarns are monopolized by the government and such price problems have not been actualized but a more flexible price setting method should be adopted against the future liberalization of cotton yarn production, that is, from the cost-oriented price to the demand and competition oriented price.

In developed countries, price busting is an common practice. Textile transactions in Syria will be exposed to completely free competition sooner or later. In this case, it will be necessary to secure certain profit out of a low price strategy will be required. For that purpose, it is necessary to revise drastically the conventional price setting and introduce low cost operation structure, which allows a business under low cost management. Such a structure is that what can be sustained constantly at low levels, ie. purchase cost, manufacturing cost, sales and administrative cost, profit, etc..

7) Promotion strategy

State-owned textile companies should positively carry out man power sales strategies as one of the promotion mixes. The manpower sales promotion is an oral presentation for sales to customers by salesmen and a bilateral communication activity with customers. It aims at order maintaining activities (order addition and route sales) as well as order acquiring activities (development of new customers). As sales promotion activities to support the manpower sales, there are missionary activities conducted by companies (preparation for merchandise display and promotion tools, education and training of employees, patrolling service, etc.) and technical sales activities conducted by sales engineers.

Further, promotion strategies like advertising, sales promotions, publicities and public relations, etc. should be prepared from now for the future.

8) Other Improvement plan

a) Product discrimination strategies

Dibs is expected to manufacture fabrics, utilizing cotton material private sector does not have and to acquire discriminative priorities. Discrimination factors possible for Dibs shall be materials, packaging, quality and brands. It is important to stress a very slight psychological advantage of Dibs by means of advertising and promotions.

b) Establishment of management strategies led by marketing strategy

This means to raise the existing commercial department to a higher rank of marketing department and introduce many sub-groups, in order to enable it to implement many of the above suggested proposals.

c) Revision of laws and regulations for marketing activity

Legal constraints exist in the external environments which influence marketing activities and it contains factors uncontrollable by state-owned companies (for instance, deciding selling prices). It is necessary to revise the current marketing-related laws and regulations in order to allow the state-owned companies to practice free marketing activities.

d) Development of marketing strategies in the international markets

For Syrian state-owned textile companies to advance in the international markets, a strategy to further develop exports and foreign trade already partially developed should be adopted.

- Promotion of indirect exports which have been conducted via domestic agents and private sector enterprises.
- Trial of direct exports. It could take two forms : direct exports to users or consignment sales through agents in customers' countries. The establishment of a foreign trade department in the company is a prerequisite.

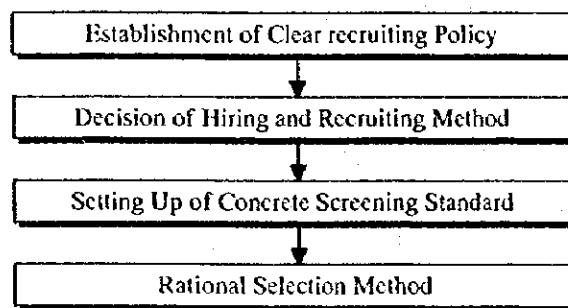
(2) Labour management

1) Employment management

Employment management involves taking a series of management actions for manpower recruitment, selection, hiring, placement, turnover, promotion and retirement. In state-owned companies like Jableh Spinning, such management activity is carried out in principle, but inadequately.

a) Hiring management

This is an organized activity to employ manpower logically and systematically.



- Every time a shortage of employees occurs, only procedures to fill the vacancies are carried out and there is no policy on how to carry out employment management. Qualifications and properties required for newcomers, as to job type, duty, class, capability, experience, character, carrier development potential, should be predetermined and stipulated.
- At present job vacancies are only advertised through newspapers. However, since it is important to employ personnel of the highest quality, wide-ranging recruitment methods such as recruitment through personnel connections, consigned recruitment, direct recruitment or by auxiliary means should also be studied. Employment of experienced personnel should be considered wherever possible.
- Selection methods on the basis of require experience, perusal of qualifications, trial terms and tests are well designed, but it is recommended that they intensify the test method, introducing vocational aptitude tests, etc..

b) Placement management

This is to create a system for welcoming newcomers as members of the organization and to promote suitable placement of employees in order to foster talented employees.

c) Turnover

- One of the purposes for turnover is a replenishment of vacancies or shortage of employees caused by revision in the organization, etc.. If state-owned textile companies under GOTI will face streamlining or reorganization in the future, ie. Employees will have to reshuffle between companies and cities and such reshuffle will be very effective against the difficulties in recruiting seen in Aleppo. Currently, such reshuffling is not carried out because of problems deriving from the provision of accommodation and separation from family, etc. which are not provided for. But, it will be required to prepare for the implementation of this system, analyzing the means to introduce the provision of company residences or providing separate allowances, etc..
- Job change or reshuffling of employees of middle and advanced age produces friction. However, it is necessary to abandon paternalism and cope with this issue by introducing aptitude tests and training. And the structure of employees should be converted into that composed of younger generation in order to be able to survive in an era of severe competition.

d) Employment adjustment

Under the life-time employment system no temporary firing and layoff is allowed. However, the adjustment of numbers employed in compliance with business fluctuations is unavoidable in an enterprise. Revisions in the law will be required to allow this.

2) Personnel management

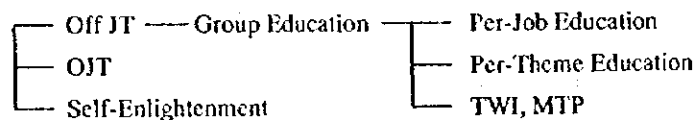
a) Job analysis

Each company had an individual job descriptions prepared for it in 1992. They now only seem to be utilized for job evaluation such as setting of pay

according to function. Further use should be made of the system for personnel assessment, reasonable hiring, suitable placement and training.

b) Education and training (Development of ability)

In Syria, education and training is indispensable if difficulties in recruiting able personnel is to be overcome and job hopping is to be avoided. However, state-owned textile companies like Dibs, first of all, the infrastructures to carry out education and training aimed at improving ability of employees so as to enable them to deal with their jobs effectively and smoothly and master the knowledge and techniques required for dealing with higher level jobs. Systems for systematic training enabling the following training within companies should be established.



- Construction of classrooms and training center to do off-JT.
- Fostering of full-time instructors.
- Atmospheric creation for promotion of self-enlightenment (Establishment of small group activities and various step-up circles).
- Funding assistance and information provision for self-enlightenment (Purchase of books, aids to step-up circles, assistance for expenses to participate in various seminars, subsidy for acquisition of official qualifications).

3) Wage management

a) Restudy of the wage system

The wage setting theory adopted in state-owned companies seems to be based on the wage for survival cost theory and not on supply and demand relationships of the labor force in the labor markets as seen in the private sector. This does not lead to securing a good and stable labor force. It is necessary to restudy the wage system and rectify low level wages.

- The present wage systems are relatively low wage systems, thus not functioning to attract talented persons and stop them job hopping. It is no exaggeration to say that the good talents leave and non-talents stay.
- The wage levels are greatly apart from the social levels, thus being contrary to social justice.
- In the present era of equalized wage rates in which labor force shortfalls and high wages are offered only in the private sector (in case of Syria), the Syrian state-owned companies should adopt a wage system based on labor compensation principles because, the current wage system is unable to promote labor mobility, rearing of multi-talented personnel and job enrichment.

b) Restudy of wage payment method

- As the ability of a company to pay wages depends on its labour productivity, it is necessary to adopt the following :-

Wage per employee = Value added amount/Number of employees

× Labor distribution ratio

*Value added amount/Number of employees = Value added produced
by one employee

Labour distribution ratio = Total wage amount/Value added amount

- It is necessary to compare with the market quotation (level of business circle and wage level of the area).

4) Safety and health management

The management of safety and health in the work site, to protect workers from disaster and disease is one of the most fundamental in labour management. Responsibilities to inhibit labor disasters lie in management's use of labor. The following points should be followed for the improved in safety and health management.

- To set safety measures against equipment. Most factories are negligent of this (installation of riskproof covers and fences)
- Encouragement of safety inspections.
- Promotion of orderliness and cleanliness in the work site - original points for safety and production.

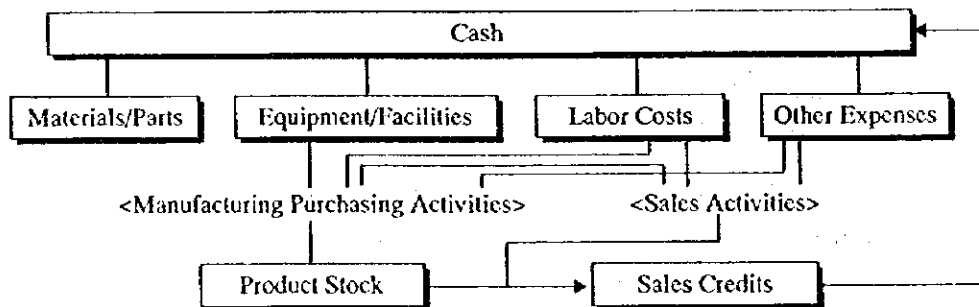
- Implementation of safety and health education at the initial training sessions.

5) Labour-management relations

The labor union has been participating in management. However, in order to achieve “live and let-live” of labor-management, the labor union must play its role to give vitality to the company and promote its modernization. Even if factory restructuring plans are proposed, the labor union should exert its position to collaborate with the company and take measures really desired by it, without rejecting it out of hand immediately.

(3) Fund management

The fund management aims at managing “ordinary fund circulating process”. That is, the cash is used not only for procuring various assets such as materials, parts, equipment and facilities (goods), but also to pay for labor costs, sales expenditures and administrative costs (labor and services). Management resources (goods, labor and services) thus acquired enables the company to develop activities for production, sales and management, creating and selling products, withdrawing the credits as accounts receivable or bills and convert them back to cash. The flow of management activities expressed in terms of funds is the “fund circulating process”. See the figure below.



It is necessary to manage this process on the basis of two different concepts (flow and stock), that is,

- to make smooth the circulation of funds (priority on safety of flow)
- to minimize total funds circulating (priority on saving of stock)

Under the present financial management, as the payment insolvency leads to bankruptcy in the black or problems of confidence for the company, to

manage flow to get stability of cash stock level is regarded as the primary purpose of fund management.

In Dibs, ordinary cash flow management is practiced. However, its management should put first priority on the safety of funds. Under the actual circumstances in which it is difficult to collect bills from the sale to the state-owned companies is very difficult, the cash flow management cannot be neglected even in the state-owned companies. Countermeasures for cash flow problem are ;

① In the cash inflow aspect, the following two points should be aimed at;

- To withdraw cash with security and rapidity.
- Smooth flow of cash.

In the cash outflow aspect, the following two points should be aimed at;

- Saving and adjustment of cash expenditure.
- Countermeasures and allowances for shortage in cash

② It is necessary to consider how to maintain proper cash balance which enables the company to avoid payment insolvency and pursue economization of cash stock. This is obtained by the following formula.

$$\begin{array}{|c|} \hline \text{Proper Cash} \\ \text{Balance} \\ \text{Standards} \\ \hline \end{array} = \begin{array}{|c|} \hline \text{Amount} \\ \text{Required for} \\ \text{Ordinary} \\ \text{Transaction} \\ \hline \end{array} + \begin{array}{|c|} \hline \text{Amount} \\ \text{Required for} \\ \text{Unforeseen} \\ \text{Affairs} \\ \hline \end{array} + \begin{array}{|c|} \hline \text{Amount} \\ \text{Corresponding} \\ \text{to Investment} \\ \text{Chances} \\ \hline \end{array}$$

③ Utilization of fund raising table

This table can be utilized for detailed and minute planning, investigation and management relating to cash funds, as countermeasures for deteriorated fund raising such as payment insolvency in the future.

(4) Business plan

The business plan (management plan) aims to connect the business strategies to the business activities. The qualitative level-up and quantitative enlargement of business activities have compelled the company to envisage

very long term plans. However, as nowadays the business environment has remarkably changed, a long-term profit plan established on the line extended from the past cannot cope with the reality, thereby allowing the introduction of strategic managing plans.

It is very common nowadays that a mid-term business plan and a short-term business plan are established, from which an overall business plan containing research and development plans and equipment investment plans, and sectional management plans, setting budget and controlling daily business activities, are made.

At present, GOTI assumes the responsibility to set up the mid-term and long-term business plans and the short-term and sectional business plans are in the hands of the state-owned textile companies. However, in the event that the state-owned company is self-supporting, it should be responsible for its own strategic plans in order for it to perform as a living business management.

7.2 Modernization of production management

7.2.1 Items common for every process

(1) Process control

- ① To draw up regulation and standards for implementing process control.
- ② To implement process control and progress control using process table, production instruction, progress card, etc.

(2) Equipment control

- ① To prepare regulation for maintenance procedure for machinery and equipment (attached with handling manuals) in order to utilize it for maintenance program.
- ② To formulate and implement preventive maintenance and cleaning program based on the maintenance regulation. The program shall be monthly and yearly and the plan and result should be compared for control purpose.
- ③ To prepare machinery register book for writing down the introduction, stoppage and scrap and recording the machinery history.

(3) Quality control

- ① To formulate quality control regulation and set up quality control items and standard figure of properties.
- ② To draw up control tables and charts on the basis of the quality control regulation in order to grasp the variation of quality of products. To make a system to take correct countermeasures for extraordinary case.
- ③ To record in the control table by every kind of product and monthly. To compare the figure of properties with the standard figure, trying to upgrade the quality.
- ④ After establishing the above control system, to practice the feedback of quality problem to the production site.

(4) Education and training

- ① As the existing standard operation procedure is not suitable for the practical use at working site, to prepare more practical procedure for each machine, thus establishing system that every workers can do the same work procedure.
- ② To build up full-scale training infrastructure (construction of training center and training of full time trainers) in order to be able to do re-training for employees.

(5) Environmental preservation

- ① It is necessary to study to draw up environmental standard inside the factory (Limit of quantity of flying cotton waste in the factory not affecting the health of workers, etc.).

7.2.2 Spinning

(1) Process control

- ① To set the conditions of air conditioning at 27°C and RH60~65%.
- ② To grasp the production result of each process and confirm the difference with planned production and to improve the problems.

(2) Equipment control

- ① Operator should do the "one spindle control", checking parts and accessories of the machines in charge and piecing the broken yarn.

- ② It is extremely difficult to keep machines well maintained, as they are so deteriorated. Such measures as to stop the defective machines and transfer the parts of stopped machines to other machines for concentrated operation, etc..

(3) Quality control

- ① To stop use of bags for transportation and storage for cones and use cone carts or carriers as shown in Appendix I-P-12. To use carton box for storing yarns, putting paper separators between cone and cone.

(4) Environment preservation

- ① To check the performance of air conditioning and dust collecting equipment in order to stabilize the set temperature and RH and reduce flying cotton waste.

7.2.3 Weaving

(1) Process control

- ① To try to reduce the number of yarns for repair of warp breakage in the loom, teaching the warper's operators the technique to treat and piece broken yarns, etc.. It is very urgent to enhance their technical level.
- ② To adjust the speed of warper according to the quality of yarn.
- ③ To make operators be careful to handling the yarns.

(2) Equipment control

- ① At maintaining the machine, to lay emphasis not only on the part of driving of the machine but also on the part related to quality issue of products (yarn supply creel, etc.).
- ② Emphatic maintenance for the sizer is required.

(3) Quality control

- ① Function of the warper influences so much the quality of weaving. To carry out without fail the survey of stoppage of warper.

7.2.4 Dyeing and finishing

(1) Process control

- ① To maintain the set up process and fundamental processing conditions. To restore the function of machines in stoppage which are skipped and not used now, repairing their thermometers, speed meters, or other instruments as soon as possible.
- ② To repair and maintain the machines indispensable for quality maintaining. To study introduction and renewal of new machines which can cope with the processing of broad width fabric and give value added, like mercerizing machine, continuous dyeing range, steamer, resin finishing machine, sanforizing machine, etc.)
- ③ To use softened water for dyeing process, otherwise dyeing speck is provoked.
- ④ To prevent the hollowing out accident of fabric caused by the rust in the pipe, by replacing the piping by stainless or polyvinyl chloride pipe or by putting sequestering agent or stabilizer in the dye liquor.

(2) Equipment control

- ① "There is no thermometer, tachometer." "Roller surface is worn out." Such situation adversely affects the basic function of processing machinery. Some measures are required.
- ② It is necessary to repair the selvage cutter device so that the edge yarn of batch up roll is cut in the weaving process.
- ③ Surface deterioration of rubber roller should be remedied by surface grinding or roll change.
- ④ Defective centering function of the jigger is attributable to the machine worn out.
- ⑤ Generation of silicon washer and rust in the rope washer and its irrelevant tension is attributable to the machine worn out. There is no other choice than replacement.

(3) Quality control

- ① Awareness of quality to pay attention to handling of gray fabric, midway product and finished fabric is important.

(4) Environmental preservation

- ① To study effluent water treatment system for the future. Pond and lagoon system should be studied, as well.

7.3 Modernization of production process

7.3.1 Spinning process

To stop the production of spinning process and to specialize in weaving and dyeing is best. As the next best proposal, step-up renewal plan is proposed. As the first step, 10 ring frames among 30 existing ones, which are in one spun between two columns and corresponding preparatory machines are scrapped and parts available from 10 machines shall be used for remaining 20 machines so as to operate them completely. Then, 4 new frames (672 sp x 4 frame = 2,688 sp) and preparatory to winding machines are introduced. This step is repeated three times until 3rd time, replacing 30 old ring frames and preparatory machines and winders by 12 new ring frames and other machines (From 2nd step, machines from cards to winders).

7.3.2 Weaving process

To scrap 30 old shuttle type Saurer looms and introduce 20 new air jet looms which can weave yarns from new 12 ring frames and to renew one sizer at the same time.

7.3.3 Dyeing and finishing process

To replace the existing machinery, according to the modernization of weaving and spinning processes.

7.4 Modernization of production equipment

7.4.1 Spinning equipment

1) Main machinery to be introduced

Machines and its number (Mean yarn count : Ne 14)

	1st Step	2nd Step	3rd Step	Total	Remarks
Daily production	2,670Kg	2,670Kg	2,670Kg	8,010Kg	3shifts
Blow Room	1line	---	---	1line	
Carding m/c	4sets	3sets	3sets	10sets	Chute Feeding system
Drawing F/M	2F×2P 4D	2F×2P 4D	2F×2P 4D	6F×2P 12D	2passage
Simplex Fly F/M	2F 192 Sp	1F 96 SP	1F 96 SP	4F	96SP/F
Ring Spinning F/M	4F 2,688SP	4F 2,688SP	4F 2,688SP	12F 8,064SP	672SP/F
Auto Winder	1Set 60D	1Set 60D	1Set 60D	3Sets 180D	60D/Set

b) Specifications of introduced machinery

NO	Items	Specification
1	<u>Blow Room</u> Production Total production	350 kg/Line/H 8,400 kg/Line/day
2	<u>Carding M/C</u> Delivery Sliver weight Delivery Speed Production Efficiency Actual production No. of Machine Total production	400 gr/6 yards 141 m/min 40 kg/H 85 % 816 kg/day 4 Frames 3,264 kg/day
3	<u>Drawing F/M</u> Delivery Sliver weight Delivery Speed Production Efficiency Actual production No. of Machine Total production	(2 passage) 400 gr/6 yards 300 m/min 85 kg/Head/H 80 % 1,632 kg/Head/day 2 sets 3,264 kg/day
4	<u>Simplex Fly F/M</u> Roving yarn weight Flyer speed Twist Factor(constant) Twist Production Efficiency Actual production No. of Machine Total production	(96sp) 300 gr/30 yards 1,100 r.p.m 1.25 1.14 t/in 1.043 kg/sp/H 80 % 20.03 kg/sp/day 96×2: 182 spindles 3,644 Kg/day
5	<u>Ring Spinning F/M</u> Yarn counts Spindle speed Twist Factor(constant) Twist Production Efficiency Actual production No. of spindles Total production	(672 sp) 14 Ne 11,000 r.p.m 4.1 15.36 T/in 0.046 kg/sp/H 90 % 0.994 kg/sp/day 672×4: 2,688 spindles 2,672 kg/day
6	<u>Auto Winder</u> Yarn weight Winding Speed Production Efficiency Actual production No. of production Total Production	(60D) 71.4 gr/120/yards 1,000 m/min 2.53 kg/D/H 90 % 54.65 kg/D/day 60 Drums 3,279 kg/day

(2) Capacity calculation

Please see Appendix I-T-6.

(3) Layout

Please see Appendix I-F-2 for existing machines

Please see Appendix I-F-3 for modernized machines

(4) Auxilliary equipment (for first step)

Cans for card	40inch	75
Cans for drawframe	24 inch	75
Cans for roving frame	24 inch	290
Bobbin roving frame to ring frame	6,000	
Bobbin ring frame to winder	15,000	
Metallic wire mounting machine		1 set

(5) Erection schedule (for first step)

for machine erection	3 months
for machine adjustment	1 month

(6) Manpower allocation

	<u>Operator/shift</u>	<u>Shift/day</u>	<u>Total persons/day</u>
Blow room	2 persons/shift	3	6
Carding	1	3	3
Drawing	1	3	3
Roving	2	3	6
Ring spinning	3	3	9
<u>Winding</u>	<u>1</u>	<u>3</u>	<u>3</u>
Total	10	3	30

(7) Estimated investment amount

4.2 million dollars

7.4.2 Weaving equipment

Weaving modernization plan (first plan) corresponding to the spinning modernization envisages as weaving construction : 14's x 14's/56 x 55, woven width 60 inches

(1) Main machinery introduced and specifications

- ① Loom : Air Jet Loom 20 Frame RS190cm 900r.p.m
- ② Sizer : (Eagle Type) 1F Beam width 300cm, speed 100m/min
- ③ Accessory (Including traveling cleaner)/Spare parts 1 lot

(2) Capacity calculation

- ① Loom : Actual production
700r/m, efficiency 90% 419m/Day/F, 8340m/Day/20F
- ② Sizer : Actual production
80m/min, efficiency 60% 69,120m/Day
- ③ Existing Benninger warper is used as it is.
Production required 60,450m/Day

(3) Layout

Please see Appendix I-F-4 and I-F-5.

(4) Estimated investment cost

2.2 million dollars.

7.4.3 Dyeing and finishing process

[Product mix]

- 1) Ne 14 x Ne 14/56 x 55 bleached, dyed, printed and yarn dyed
59 inch finished width
- 2) Other items dyed and yarn dyed, 98 inch finished width

(1) Main machinery introduced and main specifications

- ① Jigger : 1 set : large batch type for exclusive bleaching purpose, max. 1.2m dia., working width 3,000 mm
- ② Jigger : 1 set : large batch type for exclusive dyeing purpose, max. 1.2m, working width 3,000 mm
- ③ Singeing/Desizing machine : 1 set : LPG type for singeing, max 100 m/min, working width 3,000 mm
- ④ Mercerizing machine : 1 set : clip type for mercerizing, max 60m/min/batch working width 2,000 mm
- ⑤ Sanforizing machine : 1 set : rubber type for shrinking flexible processing, max. 60 m/min, working width 2,000 mm
- ⑥ Baking/Steaming machine : 1 set : for sticking print dye, capacity 90 m, temperature 150°C, working width 2,000 mm
- ⑦ Washing and drying machine : 1 set : for washing after printing, 6 cisterns, working width 2,000 mm

Flow diagram is shown in Appendix I-F-6.

(2) Capacity calculation (for newly installed machine)

Machine	Speed	Cap.	Eff.	Production /hour	Operating hour	Production /day	Required production	Nos. of machine
Jigger dyeing		3000m per Batch		10h/batch	8h/shift	300m/h	8,340m/d	1.2/2
Jigger bleaching		3000m per Batch		10h/batch	8h/shift	300m/h	(8,340m/d)	(1.2/2)
Singeing/Desizing	30m/min	4800m/h	60%	2,880m/h	22.5h/d	64,800m/d	8,340m/d	0.13/1
Mercerizing	30m/min	1800m/h	80%	1,440m/h	22.5h/d	32,400m/d	8,340m/d	0.26/1
Compress. Shrinking	30m/min	1800m/h	60%	1,080m/h	22.5h/d	24,300m/d	8,340m/d	0.34/1
Baking	30m/min	1800m/h	60%	1,080m/h	22.5h/d	24,300m/d	8,340m/d	0.34/1
Washing & Drying	30m/min	1800m/h	60%	1,080m/h	22.5h/d	24,300m/d	8,340m/d	0.34/1

It was calculated supposing all the quantity is processed by jiggers for bleaching and dyeing.

(3) Layout

Appendix I-F-7 for existing equipment

Appendix I-F-8 for new equipment

(4) Auxilliary equipment (Testing equipment)

Light fastness tester (Fade-O-meter), Rubbing fastness tester, Shrinkage tester (3 sets device comprising Laundry washer, Press dryer, Centrifugal extractor), Strength tester, Color measuring instrument, Chemical titration device, Reagent, Electronic balance

(5) Erection schedule

2 months

(6) Manpower allocation

Operator	Jigger (bleaching)	1 person/shift	1 x 2 = 2 persons
	Jigger (dyeing)	1	1 x 2 = 2
	Singeing/desizing	1	1 x 1 = 1
	Mercerizing	2	2 x 1 = 2
	Sanforizing	2	2 x 1 = 2
	Baking/steamer	2	2 x 1 = 2
	Washing/drying	2	2 x 1 = 2
	Total		13 persons

(7) Estimated investment cost

3.7 million dollars.

APPENDIX I-T-1 YARN PRICE LIST

Count	Processing	Price SP/kg
2. 29	Raw	100. 75
2. 25	Bleached	119. 65
2. 50	Raw	100. 75
6. 50	Carded	108. 30
8. 50	Carded	112. 05
12/1	Carded	115. 85
14/1	Carded	119. 00
16/1	Carded	122. 20
20/1	Carded	127. 20
24/1	Carded	134. 80
30/1	Carded	162. 45
32/1	Carded	168. 80
29/1	Combed	153. 60
30/1	Combed	170. 60
32/1	Combed	176. 30
36/1	Combed	221. 70
40/1	Combed	253. 20

Source : DIBS

APPENDIX I-T-2 FABRIC PRICE LIST

United Arab Company for Industry
General Company

Price list for the continuous produced and the new Fabrics for the year 1995

Due to the order of the minister of industry No. 25 29 dated on 30/9/1995,
to amend prices, and according to the fax letter of GOTI No. 635/g dated on 30/9/1995.

serial No. for grey fabrics.	Kind	component	width of fabric by cm	weight of grey fabric by gm	whole sale price by sp.
1	103	<u>16x14</u> 17x15	120	167	26.75
2	106	<u>16x14</u> 17x15	205	184	45.70
3	150	<u>16x14</u> 18x15	150	213	34.30
4	636	<u>16x14</u> 17x15	95	136	21.95
5	651	<u>16x16</u> 20x20	165	664	42.80
6	683	<u>20x20</u> 22x21	140	600	33.55
7	795	<u>24/2x12</u> 40x21	127	115	73.85
8	1000	<u>20x20</u> 20x20	96	127	21.40
9	1011 flat	24x30 combed 26x30	195	270	53.00
10	1020	<u>24/1x30</u> Imported 26x30	302	914	77.45
11	1021 combed	<u>24x30</u> flat 23x27	150	685	36.50
12	1109	<u>24x12</u> 18x16	155	211	33.80
13	1203	<u>24/2x12</u> 40x21	85	682	50.15
14	1405	<u>20x20</u> Imported 23.5x24	160	648	41.15
15	1407	<u>16x16</u> 20x19	235	272	60.55
16	1410	<u>20x20</u> 19x20	150	93	32.35
17	1414	<u>20x20</u> 21x22	215	302	52.00
18	1418	<u>20x20</u> 21x22	92	34	22.75
19	1423	<u>20x20</u> Imported 23.5x24	150	232	28.45
20	1425	<u>20x20</u> 21x19	114	154	25.60
21	1412	<u>16x14</u> 16x12	150	679	28.85
22	1520	<u>20x16</u> 15x15	188	613	35.10

continued - Grey Fabrics

serial No. for grey fabrics.	Kind	component	width of fabric by cm	weight of grey fabric by gm	whole sale price by sp.
23	1521	20x16 15x15	114	132	21.80
24	1522	1/16x20 17x15	138	166	27.75
25	1600	12x8.5 colored 21x12	102	314	50.75
26	1606	2/30x8.5 36x18	127	385	71.05
27	1801	24x24 15x15	190	153	27.55
28	1802	24x24 15x15	116	94	16.25
29	628	20x20 32x21	97	167	28.45
30	671	12x12 14x14	92	142	22.10
31	525	20x20 Importedx20 Imported	158	315	52.65
32	210	16x16 20x20	206	325	54.50
33	630	16x8.5 22x14	128	255	39.35
34	1800	24x24 15x15	153	125	21.75
35	104	16x14 17x15	138	193	31.40
36	688	12x12 21x12	127	239	36.05
37	1002	20x20 24x24	91	147	24.85
38	1012	24x30 combed 26x30	195	270	55.70
39	1013	24x30 26x30	302	414	85.35
40	1017	24x30 26x30	150	207	38.80
41	1101	20x8 16x15	100	126	26.70
42	1102	2/30x24 24x24	159	253	51.85
43	1103	24x2/30 Imported 21x25	159	260	51.70
44	1104	20x8.5 19x17	97	110	29.00
45	1110	24x12 18x18	155	232	37.00
46	1200	2/24x2/24 40x24	126	430	82.25
47	1308	2/30x7 Imported 32x16	147	425	75.75
48	1309	2/30x7 Imported 31x19	158	478	82.25

continued - Grey Fabrics

serial No. for grey fabrics.	Kind	component	width of fabric by cm	weight of grey fabric by gm	whole sale price by sp.
49	1401	16x16 22x20	140	239	38.95
50	1409	16x16 22x20	235	398	64.95
51	1415	16x14 20x17	235	375	60.30
52	1416	16x16 20x17	207	310	50.60
53	1417	16x20 20x20	205	304	50.60
54	1419	16x20 22x20	230	363	60.55
55	1421	16x20 21x19	200	306	50.95
56	1422	20x20 24x24	155	344	14.25
57	1507	16x12 17x12	95	133	12.25
58	1510	16x14 17x15	75	106	16.90
59	1514	16x14 17x17	206	302	48.35
60	1515	16x16 17x15	205	267	34.55
61	1517	24x16 15x18	152	173	28.75
62	1519	16x16 17x15	95	182	21.00
63	1523	16x14 17x17	205	302	48.35
64	1524	16x14 17x17	95	145	23.25
65	1525	16x16 17x15	188	246	40.10
66	1526	16x16 17x15	140	183	29.90
67	1527	16x20 17x15	164	196	32.70
68	1607	16x12 32x12	130	253	40.95
69	1608	20x20 30x18	145	230	39.20
70	1609	16x12 27x15	131	252	40.35
71	1703	12x8 28x12	94	256	39.70
72	1/51	2/30x12 33x18	99	240	46.55
73	1501	3/12x3/12 6x6	122	244	40.05
74	1427				40.95
75	1530				37.10
76	1804	24x20 15x12			21.30

bleached fabrics

serial No. for grey fabrics.	Kind	component	width of fabric by cm	weigh of grey fabric by gm		whole sale price by sit
1	103	$\frac{16 \times 14}{17 \times 15}$	120	657	31.65	28.50
2	106	$\frac{16 \times 14}{17 \times 15}$	200	265	54.35	48.95
3	150	$\frac{16 \times 14}{17 \times 15}$	140	193	40.60	36.55
4	636	$\frac{16 \times 14}{16 \times 15}$	90	128	25.90	23.35
5	651	$\frac{16 \times 16}{20 \times 20}$	160	245	50.85	45.80
6	683	$\frac{20 \times 20}{22 \times 21}$	135	186	39.30	35.40
7	100	$\frac{20 \times 20}{20 \times 20}$	90	120	24.75	22.25
8	1011	$\frac{24 \times 30 \text{ flat}}{36 \times 30}$	185	256	61.45	55.30
9	1021	$\frac{24 \times 30 \text{ flat}}{23 \times 27}$	140	170	42.15	37.95
10	1109	$\frac{24 \times 12}{18 \times 16}$	150	188	40.45	36.80
11	1405	$\frac{20 \times 20 \text{ imported}}{23 \times 24}$	150	227	48.50	43.65
12	1407	$\frac{16 \times 16}{20 \times 19}$	225	342	71.90	64.75
13	1410	$\frac{20 \times 20}{19 \times 20}$	140	180	38.35	34.50
14	1414	$\frac{20 \times 20}{21 \times 22}$	200	279	61.45	55.30
15	1418	$\frac{20 \times 20}{21 \times 22}$	90	123	26.75	24.10
16	1423	$\frac{20 \times 20}{23.5 \times 24}$	140	215	45.35	40.80
17	1512	$\frac{16 \times 14}{16 \times 12}$	140	165	34.15	30.75
18	1520	$\frac{20 \times 16}{15 \times 15}$	180	200	41.40	37.25
19	1521	$\frac{20 \times 16}{15 \times 15}$	110	120	25.70	23.25
20	1522	$\frac{2/16 \times 20}{17 \times 15}$	140	154	32.65	29.40
21	1804	$\frac{24 \times 24 \text{ Impoted}}{15 \times 15}$	180	137	32.25	29.05
22	1802	$\frac{24 \times 24 \text{ Imported}}{15 \times 15}$	110	86	18.65	16.85
23	628	$\frac{20 \times 20}{32 \times 21}$	90	148	33.40	30.05
24	1002	$\frac{20 \times 20}{24 \times 24}$	85	135	29.20	26.30
25	1006	$\frac{24 \times 24 \text{ ccombed}}{26 \times 20}$	150	194	44.05	39.65
26	1101	$\frac{20 \times 8}{16 \times 15}$	95	170	33.50	30.15
27	1102	$\frac{2/30 \times 24}{24 \times 24}$	150	232	61.45	55.50

continued bleached fabrics

serial No. for grey fabrics.	Kind	component	width of fabric by cm	weight of grey fabric by gm	%	whole sale price by sp.
28	1425	20x20 21x19	110	140	30.15	27.15
29	1104	20x8.5 19x17	90	175	36.25	32.65
30	1110	24x12 18x18	150	213	45.50	40.95
31	1307	20x16 6.7x15.7	140	213	45.40	40.85
32	1308	2/20x7 Imported 34x16	140	391	88.80	79.95
33	1309	2/30x7 Imported 31x19	150	440	97.35	87.15
34	1400	16x16 20x20	90	134	28.20	25.30
35	1401	16x16 22x20	135	220	45.95	41.40
36	1409	16x16 22x20	225	377	77.10	69.40
37	14015	16x14 20x17	225	345	71.70	64.55
38	1416	16x16 20x17	200	287	60.05	54.10
39	1417	16x20 20x20	200	282	59.90	53.95
40	1419	16x20 22x20	225	325	71.65	64.50
41	1421	16x20 31x19	200	306	60.30	54.30
42	1507	16x12 17x12	90	117	25.10	22.65
43	1509	16x14 17x15	225	300	63.60	57.25
44	1510	16x14 17x15	70	95	19.65	67.70
45	1511	16x14 17x15	180	240	49.80	44.85
46	1514	16x14 17x17	200	280	57.55	51.80
47	1515	16x16 17x15	200	250	51.65	46.50
48	1517	24x16 15x18	140	160	33.90	30.50
49	1519	16x16 17x15	90	116	24.75	22.25
50	1523	16x14 17x17	200	276	57.55	51.80
51	1525	16x16 17x15	180	214	47.35	42.65
52	1524	16x14 17x17	90	135	27.55	24.80
53	1526	16x16 17x15	135	170	35.30	31.80
54	1527	16x20 17x15	150	180	38.50	34.70

continued bleached fabrics

serial No. for grey fabrics.	Kind	component	width of fabric by cm	weight of grey fabric by gm	%	whole sale price by sp.
55	1703	$\frac{12 \times 8}{28 \times 12}$	90	235	47.40	42.70
56	1/51	$\frac{2/30 \times 12}{33 \times 18}$	90	220	53.75	48.40
57	210	$\frac{16 \times 16}{20 \times 20}$	200	315	64.75	58.30
58	795	$\frac{2/24 \times 12}{40 \times 21}$	120	305	86.60	77.95
59	1203	$\frac{2/24 \times 12}{40 \times 21}$	80	265	58.85	53
60	1606	$\frac{2/30 \times 8.5}{36 \times 18}$	120	365	82.95	74.65
61	671	$\frac{12 \times 12}{14 \times 14}$	88	130	26.30	23.65
62	525	20x20x20	150	290	62.10	55.90
63	688	$\frac{12 \times 12}{21 \times 12}$	120	422.10	42.75	38.50
64	1012	$\frac{24 \times 30 \text{ combed}}{26 \times 30}$	190	250	64.15	57.75
65	1013	$\frac{24 \times 30 \text{ combed}}{26 \times 30}$	295	385	98.30	88.50
66	1017	$\frac{24 \times 30}{26 \times 30}$	140	190	45	40.55
67	1105	$\frac{24 \times 8.5}{21 \times 13}$	150	225	45.85	41.30
68	1200	$\frac{2/24 \times 2/23}{40 \times 16}$	120	410	95.85	86.30
69	1406	$\frac{20 \times 20}{23 \times 24}$	135	215	42.95	38.65
70	4	$\frac{2/24 \times 30 \text{ imported}}{26 \times 30}$	295	385	90.25	81.25
71	1422	$\frac{20 \times 20}{24 \times 24}$	140	225	48.50	43.65
72	1516	$\frac{16 \times 16 \text{ mixed}}{17 \times 15}$	140	185	34.15	30.75
73	1607	$\frac{16 \times 12}{32 \times 12}$	125	240	48.75	43.95
74	1608	$\frac{20 \times 20}{30 \times 18}$	140	215	46.05	41.55
75	1609	$\frac{16 \times 12}{27 \times 15}$	125	235	48	43.25
76	1800	$\frac{24 \times 24}{15 \times 15}$	140	115	25.45	22.90
77	1427				48.65	43.80
78	1530				43.75	39.40

Dyed fabrics

serial No. for grey fabrics.	Kind	component	width of fabric by cm	weight of grey fabric by gm	%	whole sale price by sp.
1	black	$\frac{2/30 \times 8.5}{36 \times 18}$	120	365	94.20	84.80
2	khaki	$\frac{2/24 \times 12}{40 \times 31}$	120	385	114.70	103.25
3	colored	$\frac{16 \times 16}{22 \times 20}$	220	370	83.85	75.50
4	navy	$\frac{2/30 \times 12}{33 \times 18}$	95	220	63	56.70
5	khaki	$\frac{2/24 \times 12}{40 \times 21}$	80	262	75.70	68.15
6	khaki	$\frac{20 \times 12}{31 \times 12}$	150	3.25	80.90	72.85
7	off white	$\frac{30 \times 20}{19 \times 20}$	140	178	38.90	35
8	white pastel colours	$\frac{20 \times 20}{32 \times 21}$	90	152	34.80	31.35
9	off white pink	$\frac{16 \times 16}{20 \times 20}$	160	245	52.85	47.60
	dyed: green		160	245	74	66.65
	dark andrenyn		160	245		
	dyed navy		160	245	58.85	53
	off white				52.30	47.10
	black				60	54
					58.55	52.70

printed Fabrics

serial No. for grey fabrics	Kind	component	width of fabric by cm	weight of grey fabric by gm	¢	whole sale price by sp.
1- 103	light-traditional	<u>16x14</u> 17x15	115	159	34.05	30.65
	light	=	=	=	34.80	31.35
	medium	=	=	=	36.75	33.5
	plenty	=	=	=	38.35	34.50
	fully	=	=	=	39.85	35.85
2- 150	light traditional	<u>16x14</u> 17x15	140	203	43.60	39.25
	light	=	=	=	44.55	40.10
	medium	=	=	=	46.95	42.25
	plenty	=	=	=	49.40	44.45
	fully	=	=	=	50.90	45.85
3- 636	light traditional	<u>16x14</u> 16x15	90	120	27.85	25.10
	light	=	=	=	28.45	23.60
	medium	=	=	=	29.95	27.00
	plenty	=	=	=	31.50	28.40
	fully	=	=	=	32.45	29.20
4- 651	light traditional	<u>16x16</u> 20x20	150	240	54.20	48.80
	light	=	=	=	55.25	49.80
	medium	=	=	=	57.90	52.15
	plenty	=	=	=	60.60	54.55
	fully	=	=	=	62.25	56.10
5- 683	light traditional	<u>20x20</u> 22x20	135	185	42.55	38.30
	light	=	=	=	43.40	39.10
	medium	=	=	=	45.65	41.10
	plenty	=	=	=	47.90	43.10
	fully	=	=	=	49.30	44.40
6- 1000	light traditional	<u>20x20</u> 20x20	90	117	27.15	24.45
	light	=	=	=	27.75	25.00
	medium	=	=	=	29.30	26.40
	plenty	=	=	=	30.85	27.80
	fully	=	=	=	31.85	28.65

continued printed Fabrics

serial No. for grey fabrics	Kind	compon ent	width of fabric by cm	weight of grey fabrio by gm	%	whole sale price by sp.
7- 1405	light- tradtional	<u>20x20</u> 23x24	150	230	51.90	46.70
	light	=	=	=	52.90	47.65
	medium	=	=	=	55.0	49.95
	plenty	=	=	=	58.05	52.25
	fully	=	=	=	59.70	53.70
8- 1410	light tradtional	<u>20x20</u> 19x20	140	180	41.15	37.05
					42.5	37.85
	light	=	=	=		
	medium	=	=	=	44.45	40.05
	plenty	=	=	=	46.15	42.25
	fully	=	=	=	48.40	43.55
9- 1512	light tradtional	<u>16x14</u> 16x12	140	173	36.75	33.05
	light	=	=	=	37.70	33.95
	medium	=	=	=	40.10	36.15
	plenty	=	=	=	42.55	38.30
	fully	=	=	=	44.05	39.65
10- 1522	light tradtional	<u>6.1x20</u> 17x15	140	159	35.05	31.55
	light	=	=	=	35.95	32.35
	medium	=	=	=	38.20	34.35
	plenty	=	=	=	40.40	36.35
	fully	=	=	=	41.80	37.65
11- 525	light tradtional	20x20x20	150	290	66.15	59.50
	light	=	=	=	67.10	60.45
	medium	=	=	=	69.60	62.70
	plenty	=	=	=	72.20	65.00
	fully	=	=	=	73.80	66.45
12- 688	light tradtional	<u>12x12</u> 21x21	120	215	45.80	41.25
	light	=	=	=	46.60	52.00
	medium	=	=	=	48.65	43.80
	plenty	=	=	=	50.25	45.70
	fully	=	=	=	52.00	46.85

continued printed Fabrics

serial No. for grey . fabrics	Kind	componen t	width of fabric by cm	weight of grey fabric by gm	%	whole sale price by sp.
13- 1002	light- traditional	<u>20x20</u> 24x24	85	140	31.25	28.15
	light	=	=	=	31.85	28.65
	medium	=	=	=	32.95	29.70
	plenty	=	=	=	34.80	31.35
	fully	=	=	=	35.65	32.10
14- 1006	light traditional	<u>24x24</u> 26x20	150	187	46.90	42.20
		=	=	=	47.85	43.05
	light	=	=	=	50.40	45.40
	medium	=	=	=	52.90	47.65
	plenty	=	=	=	54.45	49.05
15- 1101	light traditional	<u>20x8</u> 16x15	95	168	34.20	30.80
	light	=	=	=	34.85	31.40
	medium	=	=	=	36.40	32.80
	plenty	=	=	=	38.05	34.30
	fully	=	=	=	39.05	35.15
16- 1102	light traditional	<u>30.2x24</u> 24x24	150	240	63.00	56.70
	light	=	=	=	64.00	57.65
	medium	=	=	=	66.55	59.95
	plenty	=	=	=	69.15	62.24
	fully	=	=	=	70.75	63.70
17- 1102	light traditional	<u>24x30.2</u> 21x25	150	240	63.10	56.85
	light	=	=	=	64.15	57.75
	medium	=	=	=	66.65	60.00
	plenty	=	=	=	69.25	62.35
	fully	=	=	=	70.85	63.80
18- 1104	light traditional	<u>20x8.5</u> 17x19	90	181	37.10	33.40
	light	=	=	=	37.70	33.91
	medium	=	=	=	39.25	35.35
	plenty	=	=	=	40.80	36.75
	fully	=	=	=	41.85	37.70

continued printed Fabrics

serial No. for grey . fabrics	Kind	componen t	width of fabric by cm	weight of grey fabric by gm	%	whole sale price by sp.
25- 1517	light- traditional	<u>24x16</u> 15x18	140	164	36.45	32.85
	light	=	=	=	37.45	33.70
	medium	=	=	=	39.85	35.85
	plenty	=	=	=	42.30	38.10
	fully	=	=	=	43.80	39.45
26- 1519	light traditional	<u>16x16</u> 17x15	90	118	26.20	23.60
	light	=	=	=	27.15	23.45
	medium	=	=	=	28.65	25.80
	plenty	=	=	=	30.20	27.20
	fully	=	=	=	31.20	28.05
27- 1524	light traditional	<u>16x14</u> 17x17	90	135	29.50	26.55
	light	=	=	=	30.10	27.10
	medium	=	=	=	31.65	28.50
	plenty	=	=	=	33.25	29.95
	fully	=	=	=	34.15	30.75
28- 1520	light traditional	<u>16x16</u> 17x15	180	230	50.90	45.85
	light	=	=	=	52.10	46.90
	medium	=	=	=	55.10	49.65
	plenty	=	=	=	58.15	52.35
	fully	=	=	=	60.05	54.10
29- 1526	light traditional	<u>16x16</u> 17x15	135	170	37.90	34.15
	light	=	=	=	38.80	34.95
	medium	=	=	=	41.10	37.00
	plenty	=	=	=	43.35	39.05
	fully	=	=	=	44.75	40.25
30- 1527	light traditional	<u>16x20</u> 17x15	150	182	41.40	37.25
	light	=	=	=	42.40	38.10
	medium	=	=	=	45.05	40.60
	plenty	=	=	=	47.75	43.00
	fully	=	=	=	49.35	44.45

continued printed Fabrics

serial No. for grey . fabrics	Kind	componen t	width of fabric by cm	weight of grey fabric by gm	%	whole sale price by sp.
31- 1607	light- traditional	<u>16x12</u> 32x12	120	232	51.90	46.80
	light printing	=	=	=	52.70	47.40
	medium =	=	=	=	54.80	49.30
	plenty full =	=	=	=	56.90	51.25
	fully =	=	=	=	58.15	52.35
32- 1608	light traditional	<u>20x20</u> 30x18	140	204	49.20	44.30
	light printing	=	=	=	50.10	45.10
	medium =	=	=	=	52.50	47.20
	plenty full =	=	=	=	54.85	49.35
	fully =	=	=	=	56.30	50.70
33- 1609	light traditional	<u>16x12</u> 27x15	125	239	51.15	46.05
	light	=	=	=	51.95	46.80
	medium	=	=	=	54.05	48.65
	fully plenty	=	=	=	57.45	51.70
34- 1600	medium printed	<u>12x8.5</u> 21x12	140	300	47.55	60.80
35- 630	fully printed	<u>16x8.5</u> 22x14	120	255	56.45	50.80
36- 104	light traditional =	<u>16x14</u> 17x15	135	180	39.85	35.85
	light printed	=	=	=	40.70	36.65
	medium =	=	=	=	42.90	38.65
	plenty full =	=	=	=	45.10	40.60
	fully =	=	=	=	46.55	41.95

APPENDIX I-T-3
MACHINE LIST (EXISTING)

Name of M/C	Q'ty (Set)	Name of manu.	Model	Year of Manu.	Remarks
Blowing MC	2lins	Platt TRUZTCHELER	lline lline	1956	
Carding MC	50	Platt		"	
Drawing MC	8	Zinzer		"	
Roving MC	6	Zinzer		"	
"	4	Platt		"	Roving Yarn Ne2.5 Spinn.
Ring Spinning MC	30	Whitin	11,040 SP	"	Cotton 100% Spinn.
Carding MC	16	TOYODA			P/C Spinn. 8sets, No used
Drawing MC	4	Zinzer			P/C Spinn. 2sets, No used
Roving MC	2	Tex tima			P/C spinn. 1set, No used
Ring Spinning MC	8	Platt	3,120 SP		P/C Spinn. 4set, No used
Winding MC	2	Schlafhorst	Auto		
"	4	Mettler		1956	
"	4	Schlafhorst		"	
Doubling MC	5	Hamel		"	1set, Not used
Twisyting MC	2	Allma		"	2set, Not used
"	1	Weller		"	Not used
Combing MC	4	Whitin		"	All, Not used

APPENDIX I-T-4

LIST FOR MACHINERY FOR WEAVING PROCESS

Loom

Number of Machine	Country of Origin	Name of Manu.	Model	Year of Manu.	Remarks
	Swiss	Sulzer	DU	1982 84	RS 110",130",154"
	"	"	130ES	1974	RS 110",130",154"
	Germany	Saucer	100W	1958	RS 160cm,180cm

Warping

Number of Machine	Country of Origin	Name of Manu.	Model	Year of Manu.	Remarks
2	Germany	Schlafhorst	MDZ06972	1958	
3	"	"	"	1984	
4	U.K	Leesona		1975	
1	Swiss	Benninger	103426512	1994	

Sizing

Number of Machine	Country of Origin	Name of Manu.	Model	Year of Manu.	Remarks
1	UK	Leesona	008770	1975	
3	"	Hibbert	959 6×6	1955	
2	Germany	Sucker	WN	1984	

Sizing

Number of Machine	Country of Origin	Name of Manu.	Model	Year of Manu.	Remarks
1	Italy	--	--	1973	260cm
2	"	--	--	"	325cm
3	"	--	--	"	180cm
4	"	--	--	"	295cm

Tyeing

Number of Machine	Country of Origin	Name of Manu.	Model	Year of Manu.	Remarks
1	Swiss	Uster	--	1973	
2	"	--	--	1978	

Inspecting

Number of Machine	Country of Origin	Name of Manu.	Model	Year of Manu.	Remarks
1	?	Schwing	--	1992	330cm
2	?	"	--	"	"
3	?	"	--	"	"
4	?	"		"	"
5	?	"	--	"	"

Folding

Number of Machine	Country of Origin	Name of Manu.	Model	Year of Manu.	Remarks
1	Italy			1973	--
2	"			"	--
3	"			"	--
4	"			"	--
5	"			"	Large Type

APPENDIX I-T-5-1

Machine List : Dyeing & Finishing Section

No.	Machine Name	Q'ty	Mfg.	Model	W. Width	Note
1	Roller Printing M/C	1	Kleineweff (Germany)	1956	1000	5 Color, Rollers are made by outside
2	Rotary Screen P.M/C	1	Zimmer (Dutch)	1969	1600	12 Color
	Engraving Equip.	1				
3	Stenter (Clip Type)	1	Kranz (Germany)	1969	2000	4 Chomb. Steam
4	Stenter (Pin & Clip Type)	1	Monforts (Germany)	1976	1600	3 Chomb. Thermal. Oil
5	Stenter (Clip Type)	1	Monforts (Germany)	1958	1600	3 Chomb. Steam
6	Stenter (Clip Type)	1	Dobor Hambolt ()	1957	2000	No Used
7	Stenter (Pin Type)	1	Artos (Germany)	1960	2500	2 Chomb.
8	Jigger	3	Gerber (-)		1000	150kg
	Jigger	2	Gerber (-)		1500	200kg
	Jigger	2	Gerber (-)		1700	250kg
	Jigger	1	Gerber (-)		2300	300kg
9	Padder	1	Monforts (Germany)	1958	2000	For Cold Batch-No Used
10	Washing M/C	1	Goler (Germany)	1974	1700	20 m/Min
	Washing M/C	1	Clinowevers (Germany)	1958	1600	No Used
11	Scouring & Bleaching M/C	1	Biger	1958	Rope	J-Box Type
12	Cylinder Dryer	1	Monforts (Germany)	1974	2500	16 CD
	Cylinder Dryer	1	Monforts (Germany)	1958	2500	16 CD
13	Hot Flue (Baking)	1	Monforts (Germany)	1958	1600	Steam, No Used
14	Steamer	2	Clinowevers (Germany)	1958	1400	Steam, No Used
15	Mercerizing M/C	1	Gerber	1956	1800	Chain Less Type
	None recovery NaOH	-				
16	Sanforizing M/C	1	Hamter (English)	1959	1300	Rubber, Felt No Used
17	Calender	1	Clinowevers (Germany)	1959	2000	Paper + Steel + Cotton
	Calender	1	Aleppo		2500	Steam

APPENDIX I-T-52

No.	Machine Name	Q'ty	Mfg.	Model	W. Width	Note
18	Singeing M/C	1	Walter (England)	1957	Cap 100kg	No Used
19	Yarn Dyeing M/C	3	Thies (Germany)		100kg	
	for Bleaching & Dyeing	1	Thies (Germany)			No Used
20	Cheese Dryer Box	2	HIRANO, Aleppo		400kg 600kg	
21	Hank Dyeing M/C	3	MIYASHITA IRON CO.	1960	1600	No Used
22	Hank Dyeing M/C	1	HIRANO	1961	1600	No Used
23	Yard Folding M/C	1	MUZZI	1958	1250	
24	Doubling & Folding M/C	1	Monforts	1958	1600→ 800	
25	Doubling Winding M/C	1	Monforts	1958	1250→ 625	
26	Plating & Winding M/C	1	-	-	-	
27	Inspecting M/C	3	PIETRO		1800	
			MUZZI (Italia)		1000	
			-		2000	
28	Doubling & Plating Winding M/C	1	Monforts	1958	1600→ 800	
29	Doubl Winding M/C	1	PIETRO & MUZZI	1961	1600	

Machine List : Utility Equipment List

1	Boiler					
2	Air Conditioner					
3	Raw Water + Softening					
4	Drain water Treatment					
5	Generator	2	SEIMENS	25 Years Old	3250kw	No Used
6	Well	2	x 30 Ton/Hr=60 Ton/Hr Max			

APPENDIX I-T-6 SPINNING CALCULATION TABLE 2,688 SPINDLES

	Blowing	Carding	Drawing	2 nd Drawing	Roving	Spinning	Winding
① Count						14	14
② Fed grain		14 OZ/l	400/6	400/6	400/6	300/30	71.43/120
③ Produced grain	14 OZ/l	400/6	400/6	400/6	300/30	71.43/120	71.43/20
④ Twist					1.14	15.36	
⑤ Twist multiplier					1.25	4.1	
⑥ Speed		141m	300m	300m	24.5m	18.2m	1,000m
⑦ Calculated production	350	40	85	85	1.043	0.046	2.53
⑧ Efficiency	—	85	80	80	80	90	90
⑨ Actual production	8,400	816	3,264	3,264	1,922	667.7	3,279
⑩ Total No. of M/C	1	4	1	1	2 × 96 = 192SP	4 × 677 = 2,688SP	1 × 60D
⑪ Total production	8,400	3,264	3,264	3,264	3,844	2,671	3,279

APPENDIX I-T-7

Planned / Real Production in 1996 at DEBS Co.

Process	Unit	Production Capacity	Planned Capacity	Real Production
1- Spinning Department	Ton	1,861	1,861	1,333
	1000 k.m	47,575	47,595	25,526
2- Mixed yarn (cotton + polyester)	Ton	483	73	6
	1000 k.m	9,813	2,966	167
3- Cotton Thread waste	Ton	61	61	23
	1000 k.m	414	414	152
4- Grey Fabrics	Ton	4,117	3,482	2,564
	1000M	20,227	16,928	12,673
	Million pick	21,351	17,216	12,678
	1000 k.m pick	53,375	45,244	32,734
5- Bleached cotton Fabrics	Ton	1,403	1,169	557
	1000 M	8,250	6,875	2,962
6- Dyed and coloured Fabrics	Ton	438	438	375
	1000 M	1,750	1,750	1,148
7- Printed cotton Fabrics	Ton	1,060	1,060	203
	1000 k.m	6,500	6,500	1,134
8- Bleached and Dyed yarns	Ton	184	184	214

Table I-T-8 PRODUCTION COST IN 1996 AT DEBS CO.

(Unit : SP/kg)

Description	Class*	Yarn	G. Fabric Prepare	G. Fabric Weave	G. Fabric Store	Bleached	Dyed	Printed	Finished Store
Raw Material	R	82.45	-	-	-	-	-	-	-
Production Duties and export	R	3.67	-	-	-	-	-	-	-
Salaries and wages	S	18.84	4.16	10.33	1.47	13.11	1.34	14.20	2.62
Electricity power	U	2.22	-	1.65	0.02	1.60	1.27	1.74	0.03
Spare parts	M	1.96	0.99	2.33	-	1.59	1.26	1.73	0.07
Tools	M	0.01	0.01	0.01	-	-	-	0.01	-
Materials and requirements	R	2.13	0.03	0.15	0.01	0.59	0.47	0.64	0.01
Oil + lubrication	U	0.21	0.09	0.16	-	1.36	1.07	1.47	0.01
Office needs and printed matters	O	0.04	0.02	0.02	0.01	0.02	0.01	0.01	0.03
Water + Steam	U	2.20	1.76	1.07	-	12.01	9.48	13.01	-
Indirect expenses	O	6.12	1.44	3.35	0.52	4.69	3.69	5.07	0.96
Stoves expenses	O	0.71	0.18	0.43	0.01	0.38	0.30	0.41	0.01
Expenses of Service Department	O	1.62	0.21	0.51	0.05	1.37	1.08	1.49	0.01
Maintenance and Building repair	M	0.20	0.10	0.10	0.02	0.22	0.17	0.24	0.01
Deprecations	O	0.28	0.64	1.77	-	0.52	0.41	0.56	0.03
Administrative and Financial expenses	O	1.88	0.43	1.00	0.16	1.40	1.10	1.51	0.29
Distribution and Marketing expenses	O	-	-	-	-	-	-	-	-
Chemicals and Dyestuffs	R	-	-	-	-	6.84	9.00	(28.95)	according to Receipt
Stock Materials	R	-	3.89	-	-	-	-	-	-
Packing Materials	R	1.79	-	-	-	-	-	-	0.15
Total	-	126.33	13.95	22.88	2.27	45.70	30.65	42.09	4.23

(Note) * R : Raw material & submaterial, U : Utility, S : Salary and wages, O : Overhead, M : Maintenance

Table I-T-9 Annual Production Cost Calculation (1/2)

Input	Unit Cost SP/kg	Consumption kg, MM	Annual Cost SP,MM
Yarn			
- Raw Materials	90.04	1.333	120.03
- Utility	4.63	1.333	6.17
- Salary	18.84	1.333	25.11
- Overhead	10.65	1.333	14.20
- Maintenance	2.17	1.333	2.89
Sub-Total	126.33	1.333	168.40
Grey Fabrics			
- Raw Materials	94.11	2.564	241.29
- Utility	9.36	2.564	24.00
- Salary	33.33	2.564	85.46
- Overhead	20.65	2.564	52.95
- Maintenance	5.71	2.564	14.64
Sub-Total	163.16	2.564	418.34
Bleached			
- Raw Materials	101.54	0.557	56.56
- Utility	24.33	0.557	13.55
- Salary	46.44	0.557	25.86
- Overhead	29.03	0.557	16.17
- Maintenance	7.52	0.557	4.19
Sub-Total	208.86	0.557	116.33
Dyed			
- Raw Materials	103.58	0.375	38.84
- Utility	21.18	0.375	7.94
- Salary	34.67	0.375	13.00
- Overhead	27.24	0.375	10.21
- Maintenance	7.14	0.375	2.68
Sub-Total	193.81	0.375	72.67
Printed			
- Raw Materials	94.75	0.203	19.23
- Utility	25.58	0.203	5.19
- Salary	47.53	0.203	9.65
- Overhead	29.70	0.203	6.03
- Maintenance	7.69	0.203	1.56
Sub-Total	205.25	0.203	41.66

Table I-T-9 Annual Production Cost Calculation (2/2)

Input	Unit Cost SP/kg	Consumption kg, MM	Annual Cost SP,MM
Store (Grey Fabrics)			
- Raw Materials	0.01	2.564	0.03
- Utility	0.02	2.564	0.05
- Salary	1.47	2.564	3.77
- Overhead	0.75	2.564	1.92
- Maintenance	0.02	2.564	0.05
Sub-Total	2.27	2.564	5.82
Store (Others)^{*1}			
- Raw Materials	0.16	1.135	0.18
- Utility	0.04	1.135	0.05
- Salary	2.62	1.135	2.97
- Overhead	1.33	1.135	1.51
- Maintenance	0.08	1.135	0.09
Sub-Total	4.23	1.135	4.80
Total inc. Store	-	-	828.02
Total exc. Store	-	-	817.40

(Note) *1 : Including Bleached, Dyed and Printed