APPENDIX D-T-1 EXSITING MACHINERY OF IND. CO. FOR RMG.

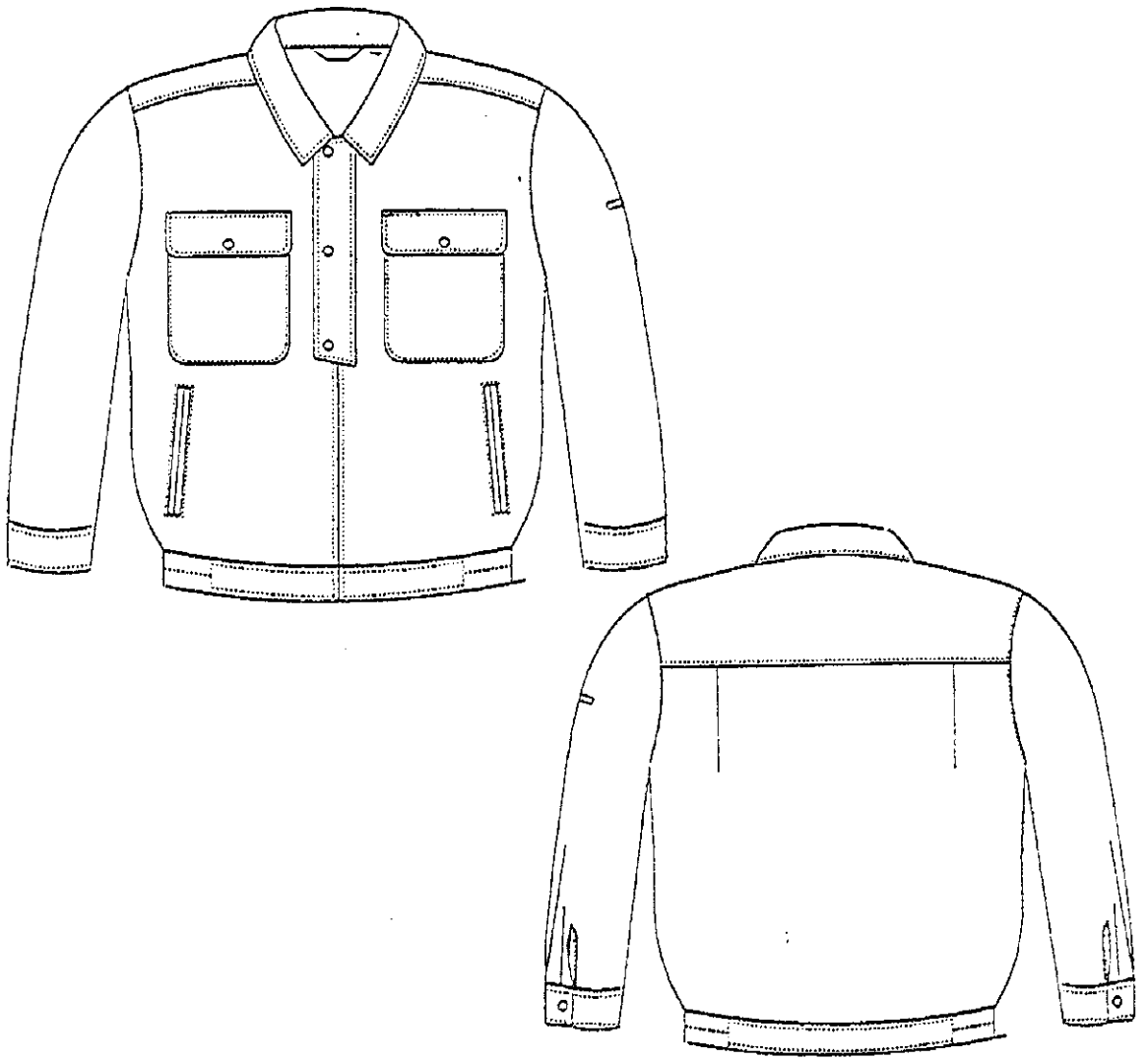
CUTTING SECTION	
1. CUTTING TABLE (36m)	6
2. PACE MAKER	3
3. TRICCERCHANPION	3
4. TURN TABLE	3
5. BAND KNIFE DA	4
6. DIE CUTTING	4
7. PATTERN PRINTER J	1
8. FEED RAIL (36m)	6
9. CUTTING MACHINE 625-7	12
10. THREAD MARKER	1
11. CLOTH DRILL AT-66	1
12. SOBAR LABELLING M/C 16	4
13. TYLNG M/C TM-45	2
14. SLITTING M/C 320	1
15. YARLTOR	1
16. ROUND LFE CUTTING M/C	2
17. STRAIGHT CUTTER	3
SEWING SECTION	
18. LOCK STITCH SEWING M/C	305
19. NEEDLE FEED, LOCK STITCH	20
20. LOCKSTITCH WITH KNIFE	6
21. LONG BAR TACKING	13
22. SHORT BAR TACKING	8
23. BUTTON SETTING	9
24. ZIG ZAG SEWING	1
25. INTER LOCKING	5
26. OVER LOCKING	19
27. 2-NEEDLE,NEEDLE FEED	1
28. 2-NEEDLE,CENTER KNIFE	6
29. DISENGEABLE TWIN NEEDLE	4
30. STRAIGHT BUTTON HOLE	1
31. W-CHAINE STICH 2-NEEDLE	17
32. TUBULAR TYPE W-CHAIN	14
33. REECE BUTTON HOLE	8
34. DURKOPP ARM HOLE	6
35. 〃 NEEDLE FEED	7
36. 〃 EDGE TRIMMER	6
37. 〃 REVERSE FEED,KNIFE	3
38. 〃 2-NEEDLE,NEEDLE FEED	10
39. TREASURE BLIND STITCH	4
40. MITSUBISHI CHAIN STITCH	2
41. TREASURE BLIND STITCH	8
42. KANSAI-SPECIAL BELT LOOP	1
43. STROBEL BASTING	4
44. LEWISS BLIND STITCH	4
45. ELECTRIC STEAM IRON	13
46. HEAT-LESS STEAM IRON	125
47. FINISHING BOARD	143
48. CREASING & FOLDING	3
49. CANVAS PRESS	2
50. 〃	2
51. EDGE PRESS	2
52. LEGGER SEAM OPENING	2
53. SEAM OPENING	1
54. ROLLER PRESS	3
55. ROLLER PRESS	6

56. FLAT BASTING	16
57. POST BASTING	4
58. IRO MASTER	5
59. 〃	3
60. 〃	3
61. 〃	2
62. 〃	2
63. KOBE PRESS	1
FINISHING SECTION	
65. SLEEVE PRESS	2
66. COAT FRONT PRESS	1
67.	1
68.	2
69. SHOULDER PRESS	1
70.	1
71. ARM HOLE PRESS	2
72. VACUUM PUMP	5
73. LEGGER PRESS	3
74. TOPPER PRESS	3
75. HEAT LESS STEAM IRON	6
76. ELECTRIC STEAM IRON	21
77. SLEEVE OFF PRESS	2
78. COLLAR PRESS	2
79. FINISHING BOARD	27
80. TYING MACHINE	2
TRANING SCHOOL	
1. LOCK STITCH SEWING M/C	30
2. NEEDLE FEED SEWING M/C	2
3. INTER LOCKING SEWING M/C	1
4. DYER LOCKING SEWING	2
5. TUBULAR W-CHAIN 2-NEEDLE	5
6. "MITSUBISHI" BASTING,FLAT	3
7. STRAIGHT BUTTON HOLE M/C	1
8. 2-NEEDLE,W-CHAIN FLAT,	4
9. "TREASURE" BLIND STITCH	1

APPENDIX D-T-2 MACHINE LIST FOR WORKING JACKET

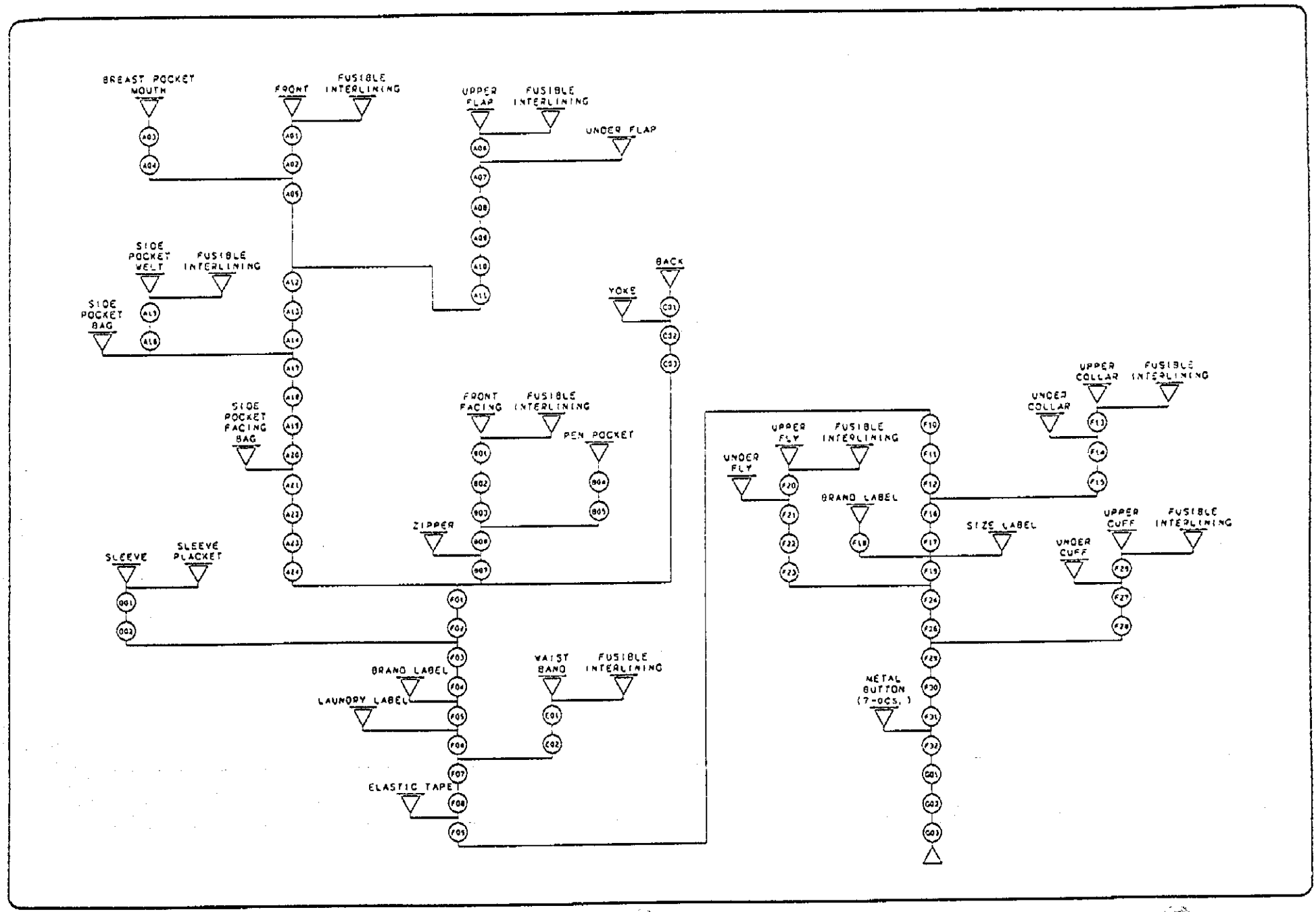
TYPE OF MACHINE	DESCRIPTION	MAKER	QUAN-TITY
《SEWING SECTION》			
AMP-184	1-Needle,Lockstitch,Computer-Controlled Cycle Machine with Automatic Label Feeder	JUKI	2
AMS-210CST	Computer-Controlled Cycle Machine(Standard Magnet-type Inverted Clamp)	JUKI	1
APW-192N/SP-26N	Automatic lockstich Welting Machine(Compact type)/Stacker	JUKI	2
ASN-395TAD	Automatic Serging Machine(Standard Airless type)	JUKI	2
AVP-870	Automatic Pocket Setter	JUKI	2
DDL-5550N-7-WB/CP230/AK/85	1-Needle, Lockstitch Machine with Automatic Thread Trimmer	JUKI	14
DDL-5550N-7-WB/CP230/AK/85/A75D	1-Needle, Lockstitch Machine with Automatic Thread Trimmer/Single Downturn Feller	JUKI/SUISEI	2
DDL-5550N-7-WB/CP230/AK/85/CR10	1-Needle, Lockstitch Machine with Automatic Thread Trimmer/Presser Foot	JUKI/SUISEI	4
DDL-5550N-7-WB/CP230/AK/85/CR20	1-Needle, Lockstitch Machine with Automatic Thread Trimmer/Presser Foot	JUKI/SUISEI	14
DDL-5550N-7-WB/CP230/AK/85/HO15	1-Needle, Lockstitch Machine with Automatic Thread Trimmer/Stitch Ruler	JUKI	38
DDL-5550N-7-WB/CP230/AK/85/H5017	1-Needle, Lockstitch Machine with Automatic Thread Trimmer/Upturn Top Stitch Feller Foot	JUKI/SUISEI	2
DDL-5550N-7-WB/CP230/AK/85/NO23	1-Needle, Lockstitch Machine with Automatic Thread Trimmer/Sleeve Placket Binder	JUKI	3
JSF-341K/PE05	Compact-type Fusing Press Machine/Return Device	JUKI	5
JVB-958/JES-356V	Vacuum Board with a Monolithic Boiler(Flat Board)/Iron	JUKI	16
LK-1850U	High-speed, 1-Needle,Cylinder Bed, Lockstitch Bartacking Machine	JUKI	1
MO-3916E-DE4-300/T042/MC-8	Superhigh-speed,2-Needle, Overlock Machine/pneumatic side cutter/Pneumatic chain-off	JUKI	8
		JUKI	7
		—	3
—	Fastening Machine for Metal Button	—	
—	Working Table		
	Total		**126**
《FINISHING SECTION》			
JVB-958/JES-356V	Vacuum Board with a Monolithic Boiler (Flat Board)/Iron	JUKI	7
—	Working Table	—	5
	Total		**12**

Appendix D-F-1 Basic Data

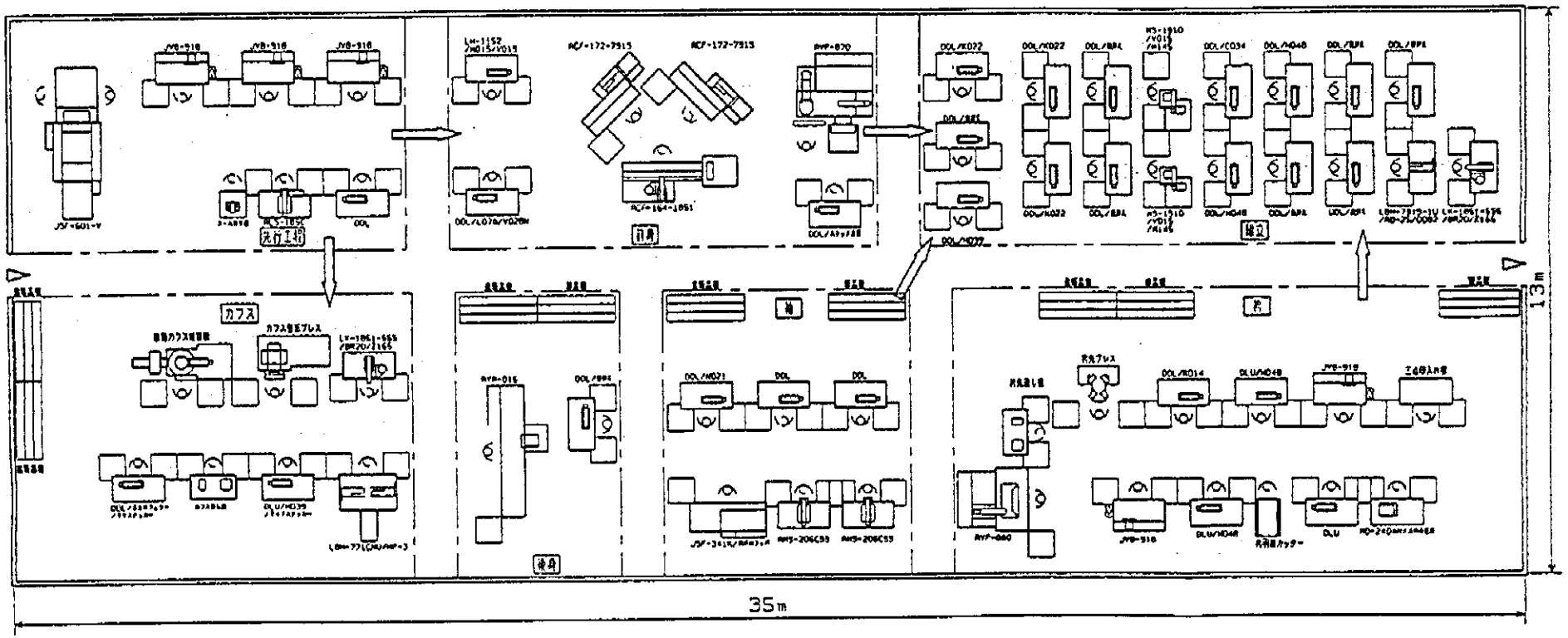
PRODUCTION ITEM	WORKING JACKET
SKETCH for GARMENT	

Appendix D-F-2

FLOW CHART FOR WORKING JACKET

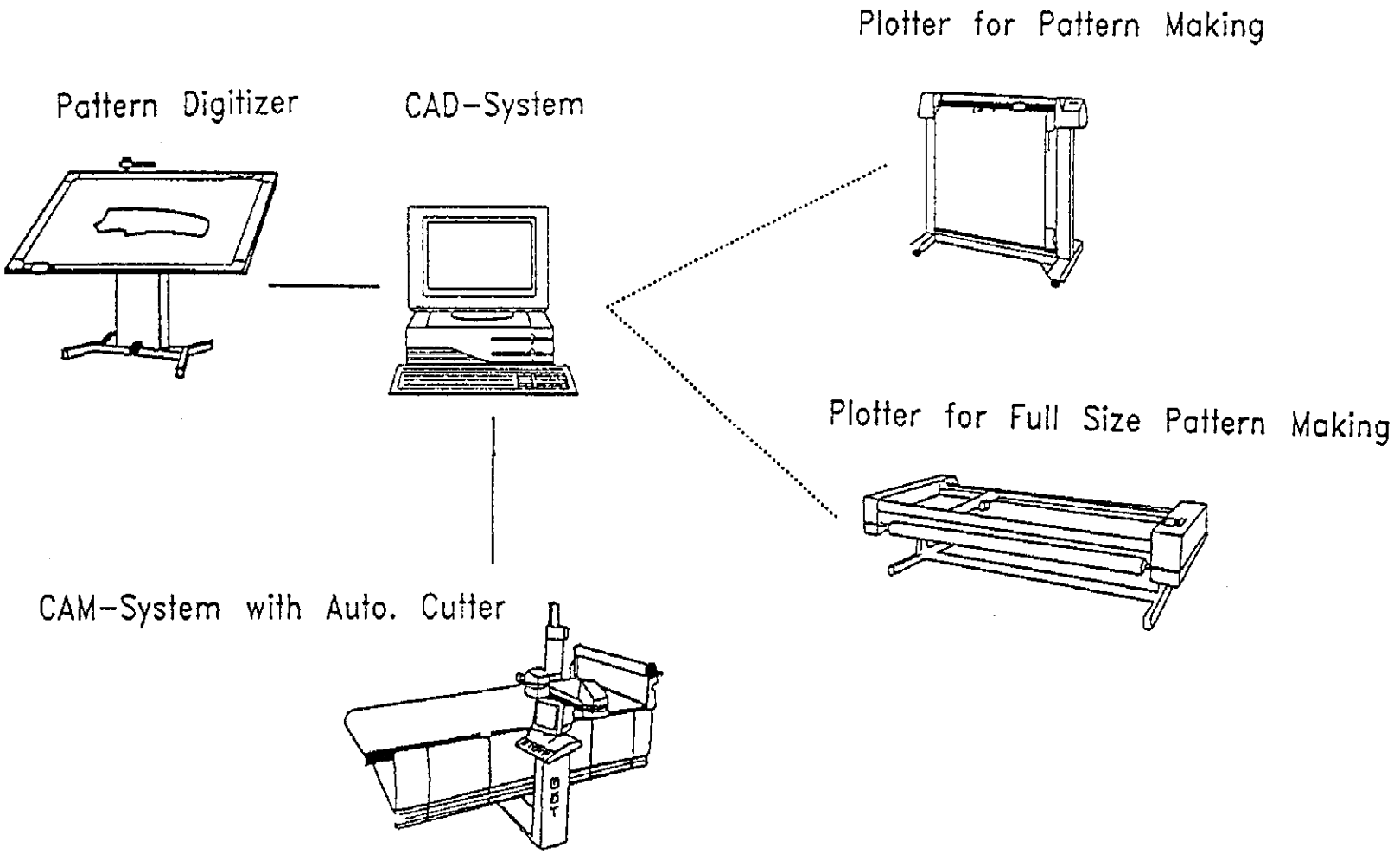


Appendix D-F-3
General Company for RMG
Reference Layout for Modernization plan



APPENDIX D-F-4

『CAD/CAM-Apparel Computer System-Proposal Flow Drawing』



5

Al Ahlieh Company for Spinning and Weaving

CONTENTS

TECHNICAL DIAGNOSIS FOR AL AHLIEH COMPANY FOR SPINNING AND WEAVING

Date : 24 Aug. 26 Aug.~7 Sept1997

Person in Charge : T. Kimura, T.Oshima, M.Takeohara, Y. Ishii

1. Present Situation of the Company

1.1 Location

The factory is located within the industrial estate of Aleppo City and divided into No.1, No.2 and No.3 factory. Though these three factories were originally independent of each other, they were put together as one company after nationalization.

No.2 factory, which has an overall administration office, is the control center of the company. No.1 factory is located 1 km away from it, using vehicles for various communications. No. 3 factory is located across the main road which has heavy traffic.

1.2 Outline of the Company

(1) General items

① No.1 factory is an integrated wool factory, having spinning, weaving and finishing processes. However, its operation is mostly suspended due to a lack of raw materials (Merino wool and polyester fiber) which need to be imported.

② No. 2 factory is also an integrated factory dealing with cotton/polyester blended fabrics.

③ No. 3 factory is an Open End spinning factory for coarse yarns using waste cotton. This is the only spinning factory using waste cotton in Syria.

(2) Building, site

① The site area of No. 1 factory is 35,000m^2. A worsted yarn facility is positioned in a new building of 16,000m^2 and weaving and finishing facilities are in an old building of 9,000m^2.

② The site area of No. 2 factory is 110,000m^2, consisting of a spinning building of 7,000m^2, a weaving building of 6,000m^2 and a finishing building of 6000m^2.(Refer to Appendix E-F-1)

③ No. 3 factory has an area of 19,000m^2 and the building area of the waste cotton spinning is 8,000m^2.

(3) Raw materials

① Raw materials used for worsted spinning are mainly Australian or European Merino wool (fiber diameter: 21 micron). For blending purpose, polyester staple of 3 denier is used. But both raw materials are not available at this moment due to foreign currency problems.

② As for cotton spinning, presently polyester cotton blended yarn (PC yarn) is produced by using high quality waste cotton (comber noil) and polyester fiber (1.5 d x 38 m/m). Comber noil is supplied from government-run spinning factories.

③ No. 3 factory, for waste cotton spinning, uses 1,100 tons of waste cotton at a price of 40 SP/kg from the state-owned factories, which generate 8,000 tons of waste cotton yearly, most is exported through GOTI. The quality of waste cotton used is not so good.

(4) Products

① As mentioned before, no production of worsted blended wool yarn and fabrics is going on at this moment.

② They produce 240 tons/year of polyester/cotton blended yarn (Nc 16-30) and 1.1 million meter of cotton fabrics. Cotton fabrics are used for bed sheets, poplin and army clothes.

③ 1,000 tones /year of coarse yarn (Nc 4-8) is being produced. The prices of Nc 4.5 and 8.5 were 82 SP/kg and 92 SP/kg respectively. They are used for flour bags for grain, bed-mat covers, cotton rope, jeans and workwear.

(5) Sales and stocks

① One fifth of polyester cotton blended yarn (polyester 65 % /cotton 35 %) produced is sold to Aleppo General Company, etc. and the rest is for in-house use. Cotton fabrics for bed sheets using dyed yarns are in good demand. The stock at present is 50,000 m.

② The coarse yarn made of waste cotton is used in various ways. But its market for jeans is very competitive because yarn for jeans is required to be high quality. The price of coarse yarn from waste cotton is relatively low but this is considered to be a strong selling point. Current stocks of 300 ton is normal.

(6) Production plan and result

	Blended yarn	Cotton Fabrics	Waste Cotton Yarn	Worsted Yarn	Worsted Fabrics	Commission Basis Operation
Plan	550 tons	3.0 mil. M	1,600 tons	1,000 tons	3.0 mil. M	10% against sales
Actual	240 tons	1.1 mil. m	1,000 tons	Nil	Nil	6 %

(7) Organization and number of employees

(Refer to Appendix E-F-2)

① The company consists of six divisions, like production division, technical division, finance division, etc. under a top management; and a general manager. The mill manger of each factory is directly positioned under the general manager.

② The number of employees for administration and auxiliary division is 81, while the number of production workers in No. 1, No. 2 and No. 3 factories are 334, 278 and 127 respectively.

(8) Production equipment

Factory	Kind	Spinning	Weaving	Finishing	Yarn Dye
No. 1	Worsted Wool integrated	* 18,000 sp	192 looms	* 1 line	1,520 kg/batch
No. 2	Cotton integrated	5,040 sp	* 124 looms	1 line	
No. 3	Waste Cotton integrated	1,008 Drams			

Note: Asterisk sign (*) means machines not operated.

2. Present Situation and Problems of Production Process

2.1 No. 1 Factory

All wool related processes such as worsted spinning, weaving, and finishing are not being operated, thus investment efficiency is very low at this moment. The wool top dyeing equipment is now being used for cotton yarn dyeing, the winding machines is being used for commission winding of yarns from outside, weaving machinery is being used for cotton fabrics (yarns from outside) and polyester/cotton blended fabrics (yarns from No.2 factory) and the finishing machinery is being used for polyester/cotton blended fabrics.

2.2 No.2 Factory

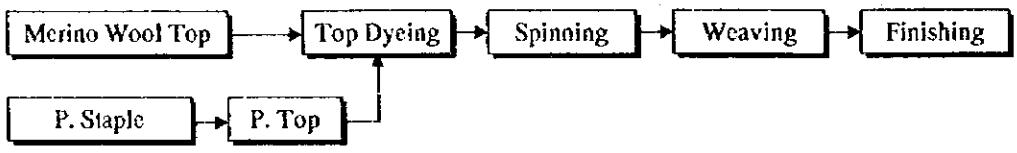
Although this factory is integrated, only the spinning factory is producing PC yarns and weaving machinery is completely stopped. The dyeing factory is doing finishing for the yarn dyed fabric woven in the No.1 factory. The No. 2 factory has very complicated process flows as shown in Appendix E-F-3.

2.3 No. 3 Factory

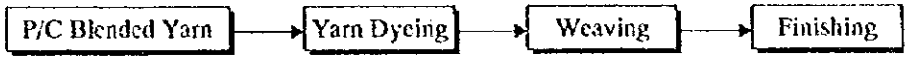
This factory is producing coarse yarns by using waste raw cotton. There are fluctuations in production due to old machines which often break down. As this yarn produced through the OE spinning machinery is quite unique with less production cost due to the cheap raw materials and automated process, it will yield high profits. However, due to the obsolete production machinery, the productivity is not high at this moment and consequently results in increased operation costs.

2.4 Worsted Wool Production Process

(1) Worsted (Wool/polyester blended) fabric production process



(2) Bed sheeting production process



(3) Waste cotton spinning

(4) Cotton and P/C fabric for Bed sheet.

P/C yarn is made in the No. 2 factory while its weaving is done in the No. 1 factory. No.1 factory is located 1 km away from No.2 which makes unable to do an unified process control and quality control.

(5) Waste cotton coarse yarn

As the production speed of the coarse yarn is very high, the arrangement of production among processes tends to be behind this speed. Moreover, the flow of smooth production is apt to be disturbed by the maintenance and machine troubles.

(6) Worsted yarn spinning process

Only the doubling twisters are in operation on a commission basis. It is expected to work out a more efficient utilization of the existing machinery, which comprises an expensive machine like combers.

3. Present Situation and Problems of Production Management

3.1 Procurement Control

(1) Raw materials

① Purchasing of wool fibers are now suspended due to the market conditions and foreign exchange problem.

② The raw cotton used for P/C yarn in the No.2 factory is mainly of high quality waste cotton.

③ Waste cotton consumed for the production of waste yarn in the No.3 factory accounts for 14 % of the total production by the state-owned spinning factories and it is preferentially supplied to the Al Ahlich Company. The purchase price

is 40 SP/kg. However, this belongs to the medium-low class of lower price. Therefore, it causes a problem for removal of the foreign matters and impurities in the spinning process. Good quality waste cotton is exported.

④ They have a strong desire to re-start the production of the No.1 factory, procuring the imported wool fiber and polyester tow /fiber.

⑤ Polyester fiber is imported from Taiwan, not because of the quality but the cheap price.

(2) Spare parts

① Much efforts have been done to purchase as many as spare parts locally manufactured. And it is reported that the parts of about 50% of necessary quantities are available locally. The company also has been exerting efforts in manufacturing parts in their own workshop.

② The situation of using parts removed from the existing machines out of service was not observed on the scene.

③ It is said that almost all parts of weaving machinery are now able to be supplied locally.

3.2 Inventory control

① The size of warehouses and system to control the inventory is normal. But, it is necessary to do inventory adjustment and control according to each item of commodities, which are versatile.

② P/C yarns have a good demand for the water-proof tents and tarpaulins and no stocks were observed. There was a stock of about 5,000m of the bed sheets as of the study period, but this amount is not serious at all.

③ There was a stocks of 300 tons of coarse yarns made of waste cotton in the off-season of study period. But, the demand for the jacquard bed covers, mat clothes, etc. is expected to increase when the season comes, thus not creating problem.

④ Cotton sheeting belongs to low price zone category and is not highly appreciated in the market. So, if the stock increases, some measures like production adjustment, etc. will be required.

⑤ The coarse yarn made of waste cotton is often used for a winter wear. Therefore its demand fluctuates by season. Development of new commodities to use this yarn, whose demand is not affected by the season is underway, i.e., cotton ropes, base fabrics for belts, etc..

3.3 Process Control

① The process control is not used to attain the target plan. Further, control to attain planned progress and delivery is not carried out.

② Management system of each process and its operation conditions are not clearly established. It is difficult to know if the product is processed in each process in accordance with relevant process and operation conditions.

③ An excessive number of workers and a low efficiency prevails. There are some employees to be idle when not watched. In general, it is doubtful whether they are working with awareness to achieve the target.

④ Generally, the practice of putting goods in good order and cleaning is not permeated in the working site.

3.4 Equipment Control

(1) No.1 Factory

The maintenance control of the spinning and yarn dyeing processes seem to be sufficient. But maintenance on the Gilbos winder was not good which has caused poor efficiency in the winding process. As for the weaving process, the maintenance is based on repairing works due to the obsolete weaving machinery, thus it is necessary to do "cannibalisation" performance. As for the finishing machinery, except for beam dyeing machine and dryer, the others are almost out of operating condition due to insufficient use in finishing of cotton fabrics. (Refer to Appendix E-P-1). In addition, the yarn dyeing process needs special machines for cone drying.

(2) No. 2 Factory

Although the spinning machinery is very old, their maintained condition is good. They are operated well supported by a good air conditioning system. However, the carding engines and cone winders are too old-fashioned thus rehabilitation or replacement should be considered. The weaving machinery is stopped and now the weaving business is complete shutdown. The finishing machinery is well operated, although the types of machinery available are not sufficient. (Refer to Appendix E-P-4~5)

(3) No. 3 Factory

① There are quite a few stopped machines due to parts scarcity and maintenance problems. Improving tests on the doffing device of one of the carding engines is underway. The blow room has poor capability in blending and removing contamination of raw cotton. (Refer to Appendix E-P-7~8) In general, the spinning machines are getting old and can not maintain their target or design capacities. In addition, the expensive parts which are being purchased are not economical. It would be better to install new machines instead.

② Blow room for the cotton spinning shows poor performance because of the poor opening ability and poor maintenance. It is necessary to improve such ability so as to accommodate any kind of cotton fiber.

③ Dyeing and finishing of fabrics are carried out mainly in No.2 factory but some finishing is done in No.1 factory. However, it is advised to centralize these into No. 2 factory to improve managerial efficiency.

④ It is also advised to collect all necessary parts from those stopped machinery and fit them to machines which are still in operational condition.

3.5 Quality Control

① P/C bed sheeting is added value with stripe patterns of dyed yarn and the demand of this fabric is high. As waste cotton is used for decreasing production cost, a few yarn irregularities were found in the fabrics when investigated. (Refer to Appendix E-P-3/6)

② Waste cotton yarn of Ne 4.5 is normally categorized as low grade thus quality concern is small. While waste cotton yarn of Ne 8 is used for jeans and working uniforms, this quality requirement is high.

③ P/C fabric for military summer uniform has a steady demand. But there are a few yarn irregularities which need to be improved. Due to Jigger dye (common pressure), color fastness is not good and this also has to be improved.

④ The quality of yarn dyed P/C fabrics is good. If finer counts of yarn are possible to produce, the fabrics will be able to be used for shirting.

⑤ It is recommended to increase the production of Ne 8 waste cotton yarn to increase application for jeans and uniforms which are more profitable. Now, the production of Ne 4.5 exceeds that of Ne 8.

⑥ Yarn dyeing equipment is of high temperature and high pressure type but fabric dyeing is of atmospheric type. This is causing technical problems in dyeing of the P/C fabrics.

3.6 Education and Training

① There are no notice boards of production, quality and safety on the walls in the factory. In order to motivate workers, notification systems should be incorporated.

② There is no training school for employees. Vocational training of the newly employed workers is presently done by the foremen for a duration of 2~3 months, and then, only selected employees are allocated to each respective workplace.

③ Systematic education on quality control and production control is not adopted but a practical education system is used. Site-wise education and training are carried out under the direction of the mill manager.

④ Aleppo region is an industrial area and the competent engineers and workers are mobile due to earning differentials. So, training is indispensable but difficult to implement efficiently.

⑤ Process layout in the factory is disorderly, which puts education and training for the quality control of products in difficulty. It is necessary from time to time to carry out systematic education and training.

⑥ Generally speaking, the motivation and discipline of workers in state-owned companies are inferior to those in private sector companies.

3.7 Environmental Preservation

① Cotton fly in the spinning factory is not so bad. The air conditioners are functioning well.

② There are 3 finishing factories but they have no effluent treatment plant and waste water is being discharged directly to sewer. The treatment plant should be constructed as soon as possible. Dyeing factories in private sector have the effluent treatment system. The state-owned companies should also analyze to install the system.

③ It is recommended to commence a "Cleaning and Decorating" campaign in the factory and those who have time should clean around their workplace at first.

4. Modernization Plan

4.1 Modernization of production process

① Centralization of the finishing machinery and equipment is advised through shifting beam dyeing machinery and winee type dyeing machinery in No. 1 factory to No.2 factory. The other dyeing machinery in No.1 factory are used only for wool-related finishing.

② As yarn dyeing equipment is very good, it should be utilized fully. Employing a new yarn dryer, it becomes possible to get orders from the private companies for commission yarn dyeing. (Refer to Appendix E-P-2)

③ Activation of the worsted wool process is necessary through co-operating with Modern Industry Company in respect of the production plan. It is recommended to produce and get orders for the most suitable products using production facilities available from both companies, and to make a common purchase plan of raw material for worsted spinning.

④ In the future it is advised to construct a cotton weaving mill in No.2 factory by either shifting the present cotton weaving machinery in No.1 factory to No.2 factory or purchasing new weaving machinery.

2) Modernization of production management

(1) Process control

① It is indispensable to adopt a system of progress management by schedule plan and come up system in order to respond quickly to the requirements of the market.

② It is recommended to make use of various papers and notices relating to production orders and progress checks such as production instruction papers, progress cards, process papers, daily reports, monthly reports, notification boards, etc. For example, it is useful to record by type of fabric (lot) production process, delivery time, quality check points etc. on the progress control paper in the dyeing and finishing process of fabrics. This paper avoids making mistakes to a great extent.

③ It is necessary to notify all employees of the production plan and the actual progress of production. It is also important to enlighten them of the company's slogan and ways of thinking by managerial personnel.

④ It is also important to train and educate employees to become multi-skilled workers by which increase in productivity is expected.

⑤ It is also necessary to implant in the mind the 5-S. By doing so, the old machinery can look new and workers have more motivation on their jobs.

(2) Equipment control

① Gilbos winders in worsted wool process shall be replaced by new ones to maintain 1,200 tons/year production line (Refer to Appendix E-P-1).

② Carding engines and cone winder in No. 2 factory shall be replaced by new ones to maintain cotton spinning capacity of 500 tons/year.

③ New high temperature and high pressure dyeing machines together with Jiggers shall be installed in the dyeing process for P/C fabrics It should also be considered to employ continuous pad dyeing range.

④ It is also considered to install Projectile Looms for wide fabrics.

⑤ It is necessary to employ a dryer for exclusive use of cheese dyeing.

(3) Quality control

① Problems relating to the quality mentioned under Section 3.5 will be solved through taking the modernization measures described in this chapter. On top of that, it is quite important to research the market to develop new products which correspond to the market requirements.

(4) Education and training

① It is recommended to construct a training center in the idle space of the factory where basic knowledge of factory management such as 5-S activity as well as the quality control method will be lectured to trainees.

② It is necessary to foster multi-skilled working. This will be achieved by activating personnel ability and achieving efficient utilization of workers.

③ "Cleaning" and "Putting in order" minds should be enlightened completely.

(5) Environmental preservation

① A cleaning and tidiness campaign shall be performed. All employees should participate in the campaign. Men feel fresh and do with enthusiasm, if they are assigned different works.

② As for waste water treatment, it is recommended to construct a simple lagoon-type pond as a 1st step which will help to minimize pollution problems in the surrounding area.

③ The road between No.2 and No.3 factories is very congested and dangerous. It is necessary to install traffic signals or signboard to prevent employees from any possible accident.

4.2 Modernization of Waste Cotton Spinning Equipment

① The state-owned spinning factories produce yearly 8,000 tons of waste cotton. The No. 3 factory only consumes 1,100 tons out of this amount. Along with the expansion of spinning related projects in the country, it is expected that the production of waste cotton will increase in the near future.

② As present machines for waste cotton spinning are old-fashioned, it is advised to employ new Open End spinning machinery with 1,296 drums which will consume approx. 4,000 tons of waste cotton. Exports of Nc 8 cotton yarn is more profitable than that of simple waste cotton.

(1) List and specification of main machinery

Name of Machines	No. of Machines	Deliver per M/C	Total Delivery	Remarks
Blowing Room	2 lines	1	2	
Carding Engine	14 sets	1	14	High Speed 40 "cans
Drawing Machines	6 sets	2	12	High Sped 24 " cans
Open End machine	6 sets	216	1,296	20 " cans

(2) Capacity calculation

(Refer to Appendix E-T-2)

- Yarn Count : Waste cotton (100 %) yarn Ne. 8
- Production quantity : 4,265 tons per year by 3 shifts (284 working days/year)
- Raw materials : Waste cotton from the Government-run spinning factories

(3) Layout

(Refer to Appendix E-F-4)

- Building area required : 34 m x 115 m = 3,910 m^2
- Building site : Weaving mill in No. 2 factory may be the possible site as the building is not used at this moment. Existing air conditioners of this building may possibly be usable

(4) Allocation of manpower

	Operators	Leader	Total
Blow Room	6 persons	3 persons	21 persons
Carding Engine	6		
Draw Frame	6		
OE Machine	6	3	9
Total	24	6	30

APPENDIX E-T-1

LIST OF PRODUCTION MACHINERY(1) (EXISTING)

No.1 Factory

Name of M/C	Origin	Origin	Name of manuf.	Model	Year of Make	Remarks
(1) Spinning						
Converter	3	Japan	OKK		1976	
Drafter	13	Japan	OKK		-do-	
Comber	24	Japan	Mitshubishi		-do-	
Drafter	4	Japan	OKK		-do-	
Auto leveler	5	Japan	OKK		-do-	
Roving	5	Japan	OKK		-do-	
Spinning	30	Japan	Fukushima		-do-	
Winding	19	Japan	Murata		-do-	
Doubling	4	Japan	Murata		-do-	
Twister	25	Japan	Murata		-do-	
(2) Top Dyeing						
Top press	2	Japan	Nihon Dye.		1976	
Top dyeing	5	Japan	-do-	250kg	-do-	
-do-	2	Japan	-do-	100kg	-do-	
-do-	2	Japan	-do-	35kg	-do-	
Centrifugal	2	Japan	-do-		-do-	Hydro Extractor
Back washer	3	Japan	-do-		-do-	
(3) Weaving						
Warping	1	Germany	Franz Muller		1954	
Sizing	1	England	Joseph Hibber		-do-	
Winder	3		Hakoba		-do-	
Looms	36	England	Northrop	Reed w. 115cm	-do-	
-do-	40	-do-	-do-	Reed w. 160cm	1962	
-do-	13	-do-	KOVO	Reed w. 160cm	1955	
-do-	12	-do-	Northrop	Reed w. 170cm	1962	
Warping	1	Swiss	Benninger	145cm	1962	
Auto winder	1	Germany	Karl Mayer	$24^{Drum} \times 2$	1956	
(4) Dyeing & Finishing						
Dryer	1		Artos		1973	
Pressing	1	Germany			1956	
Rope Dyeing	4	Denmak			1972	
Shearing	1	Germany			1977	
Decatizer		Germay			1960	

LIST OF MACHINERY(2)(EXISTING)

No.1 Factory(continued)

Name of M/C	Origin	Origin	Name of Manuf.	Model	Year of Make	Remarks
Washing	2	Germany			1977	
Inspecting	5	Germany			1959	

No.2 Factory

Name of M/C	Origin	Origin	Name of Manuf.	Model	Year of Make	Remarks
(1) Spinning						
Blow room	1	England	Platt		1948	
Carding	2	Germany	Ingolstadt		1957	
Carding	5	Japan	HOWA		-do-	
Drawing	3	Japan	-do-		-do-	
Roving	2	Germany	Ingolstadt		1981	
Spinning	14		Edera		1975	
Doubler	2	Japan	Kamitsu		-do-	
Twister	7		Weeler		1977	
Winder	1		Metorer		1975	
(2) Dyeing & Finishing						
Gas singeing	1	Germany	.Osthoff		1960	
Jigger	8	-do-	V.Henriksen		1970	
Tenter	1	-do-	Farnatex		1970	
Calender	1	-do-	Kleinewefers		1959	

No.3 Factory

Name of M/C	Origin	Origin	Name of Manuf.	Model	Year of Make	Remarks
(1) Spinning						
Blow room	1	Swiss	Rieter		1976	air feed
Carding	10	-do-	-do-		-do-	
Drawing	4	-do-	-do-		-do-	
Roter spinning	7	-do-	-do-		-do-	Ne 4.5'S 5, 8.5'S 2

APPENDIX E-T-2

WASTE COTTON OPEN-END MILL PLANNING

It is planned to construct a new Open-end spinning mil by using the waste cotton, and to produce working wear and denim products.

(1) Production Capacity : 6 Frames × 216 roters = 1,216 roters

(2) Raw Material and Yarn Count : waste cotton 100% Ne8

(3) Production : 4,265 ton/year(3 shift,284 days operating)

(4) Production machinery

① Blowing M/C : 2line

② Carding M/C(High Speed Type) : 14 sets Tandem 40"Φ cans × 48"H

③ Draw Frame(High Speed Type) : 6sets×2 Delivery 24"Φ cans × 42"H

④ Open-end M/C : 6sets with knotting m/c 24"Φ cans × 42"H

(5) Auxiliary Machinery and Equipment

① Cans 40" Φ× 48"H 130 pcs

② Cans 24" Φ× 42"H 100 pcs

③ Cans 24" Φ× 42"H 2,600 pcs

(6) Estimated Investment Cost

- Production Nachinery ¥ 600,000,000.-
- Auxiliary machinery ¥ 100,000,000.-
- Air Conditioning ¥ 300,000,000.-

Total ¥ 1,000,000,000.-

(7) Erection of Machinery

3 months for erection period and 1 month for test-run and commissioning

(8) Necessary Number of Operators

M/C	Operators/shift	Operators/3 shift	No.of Leader/3shift	Total/3 shifts
Blowing	2	6	3	9
Carding	2	6	3	9
Draw Frame	2	6	3	9
Open-End	2	6	3	9
Total	8	24	12	36

(9) Calculation of Capacity by Process

① Open-end 6×216D = 1,296D

- Yarn count Ne8'S
- Roter speed 65,000r.p.m.
- Efficiency 85%
- Production 2,503kg/24H
- Total production 2,503kg×6 = 15,018kg/day

② Draw Frame 3 sets (6 deliveries)

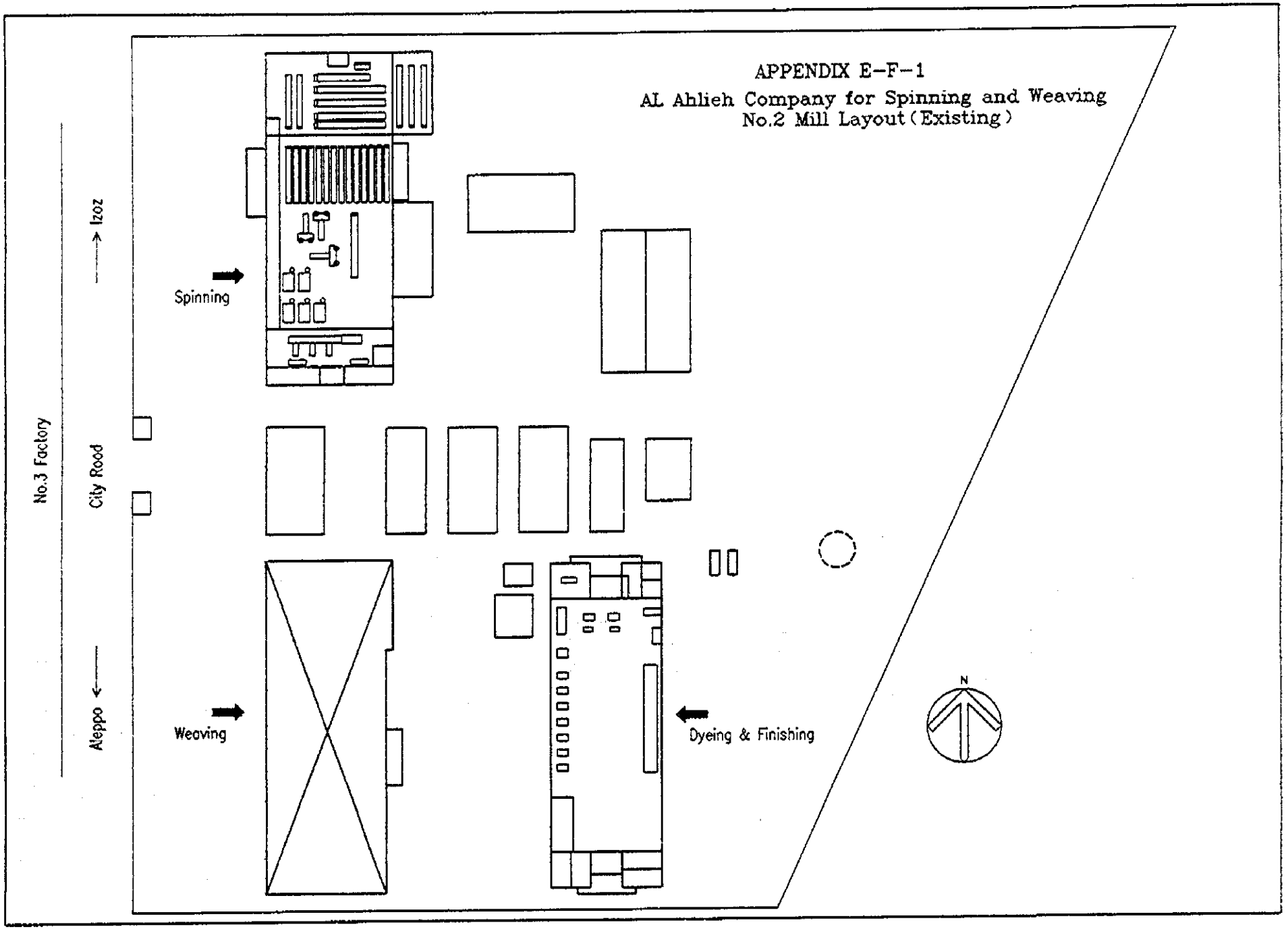
- Sliver weight 450 grains/6 yds
- Speed 450m/min.
- Efficiency 80%
- Production 5,530kg/24H
- Total production 5,530kg × 3 = 16,590kg/day

③ Carding M/C 14sets

- Sliver weight 480 grains/6 yds
- Speed 155m/min.
- Efficiency 85%
- Production 1,076kg/24H
- Total production 1,076kg × 14 = 15,064kg/day

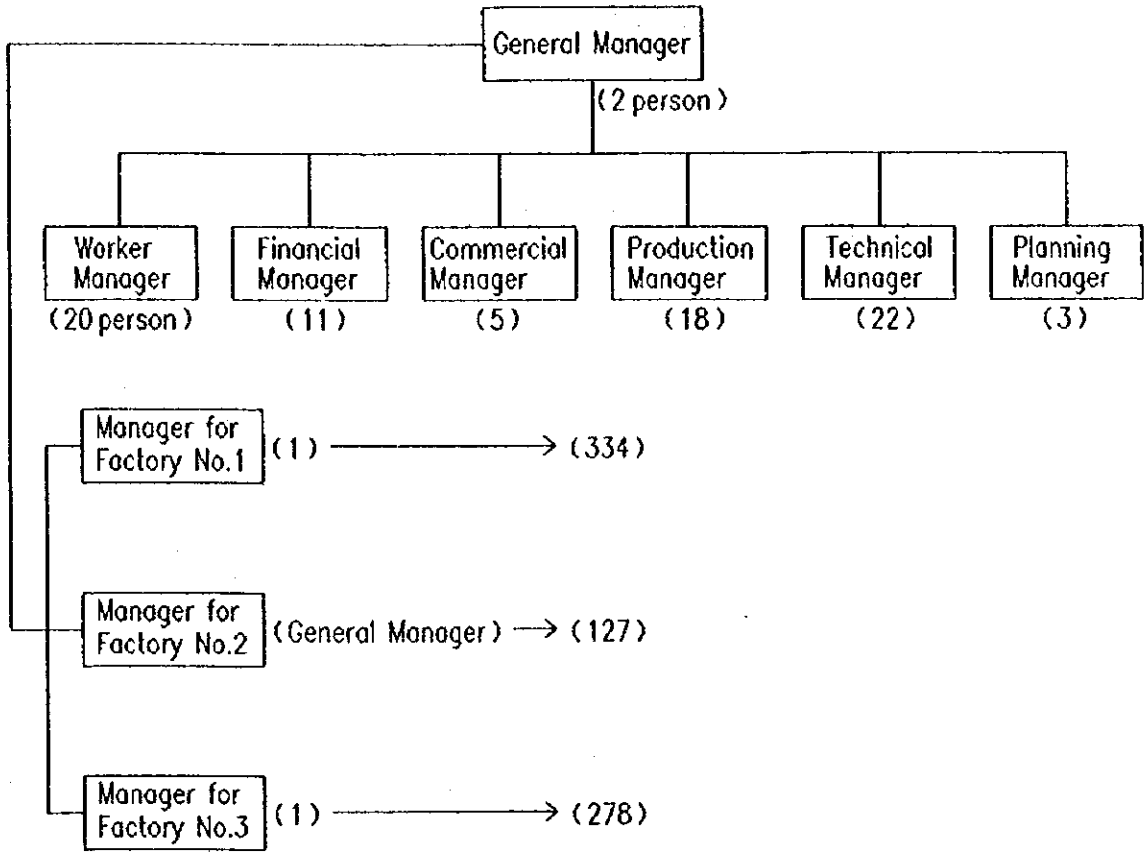
④ Blowing M/C 2 lines

Total Production 400 kg × 2 × 24H = 19,200Kg/day


APPENDIX E-F-1
AL Ahlieh Company for Spinning and Weaving
No.2 Mill Layout (Existing)
No.3 Factory
Izoz
City Road
Aleppo
Spinning
Weaving
Dyeing & Finishing
N

APPENDIX E-F-2

Organization and Number of Employees



APPENDIX E-F-3

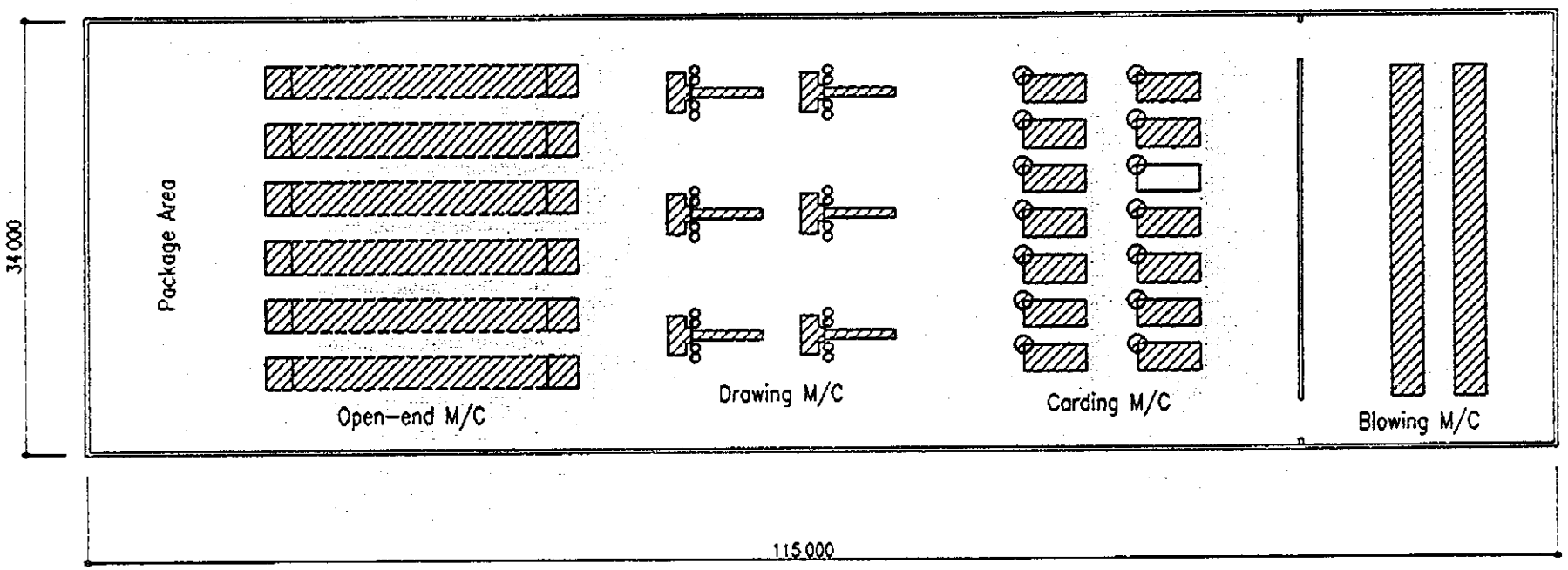
Production Process Flow Chart

INDEX
○ : Actual Production Process
⊠ : No Operated Process

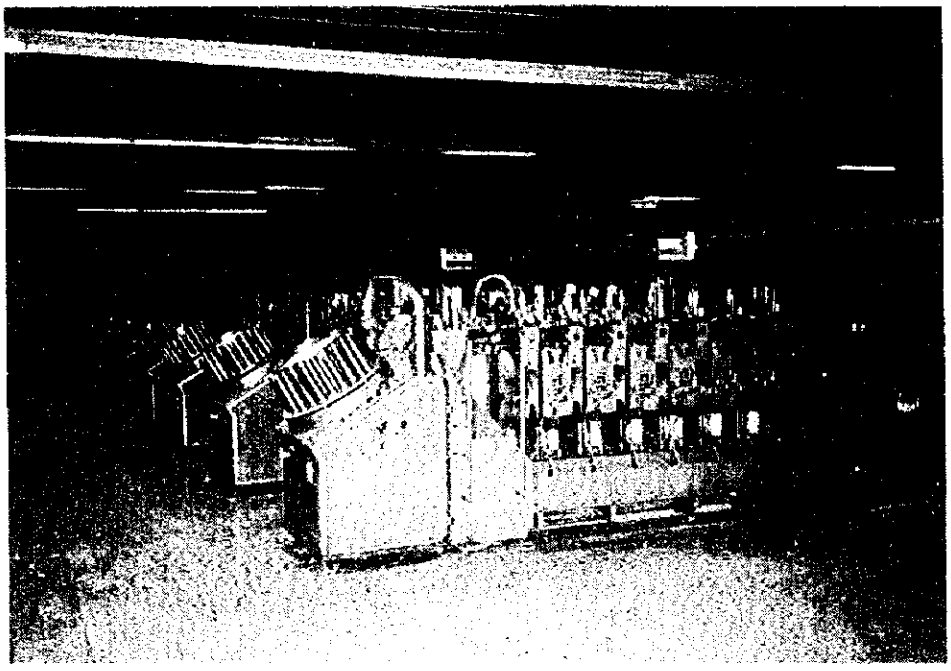
Mill / Process	Al Ahieh Company for Spinning & Weaving					
	No.1 Mill			No.2 Mill		No.3 Mill
Raw Material	(Wool)	(Cotton)	(Cotton)	(Poly E.)	(Waste C.)	(Waste Coorse C.)
Procurement	Import	Supply	Purchase	Import	Purchase	Supply
Production System	Self Product	Commission	Self Product	Self Product		Commission
Spinning	⊠	○ (200 T/y)		○ (240 Ton/y) → Yarn Sale		○ → Shipping (1000 Ton/y)
Yarn Dyeing		Shipping (Twisting Process) Ne 25/2	○			
Weaving			○ (1.1 Mill L. m/y)	⊠		
Dyeing			○			
Finishing			○			
Appliration		Curtain P/C Uniform for Interia Army, School		Yarn Dyed Stripe, P/C Fabric Bed Sheet		Water Proof Fabric Edge Yarn for Loom Canvas Sheet, Mat Cover Rope, Jeans Fabric

APPENDIX E-F-4

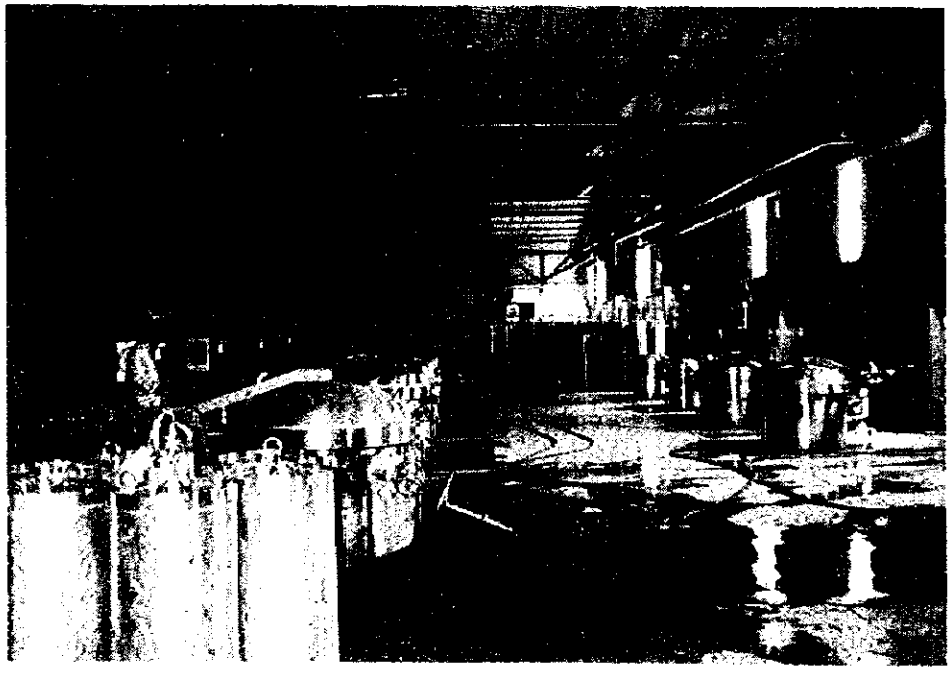
AL AHLIEH Company For Spinning & Weaving
(Modernization Plan applied No.2 Mill)



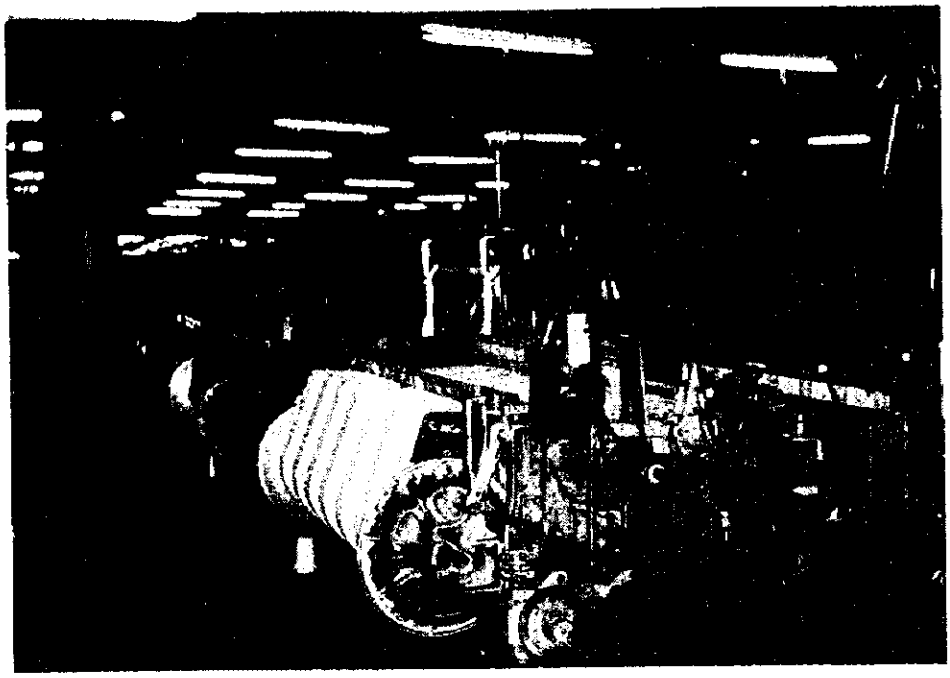
APPENDIX E-P-1 GILBOS WINDER PROBLEM (NO.1 FACTORY)



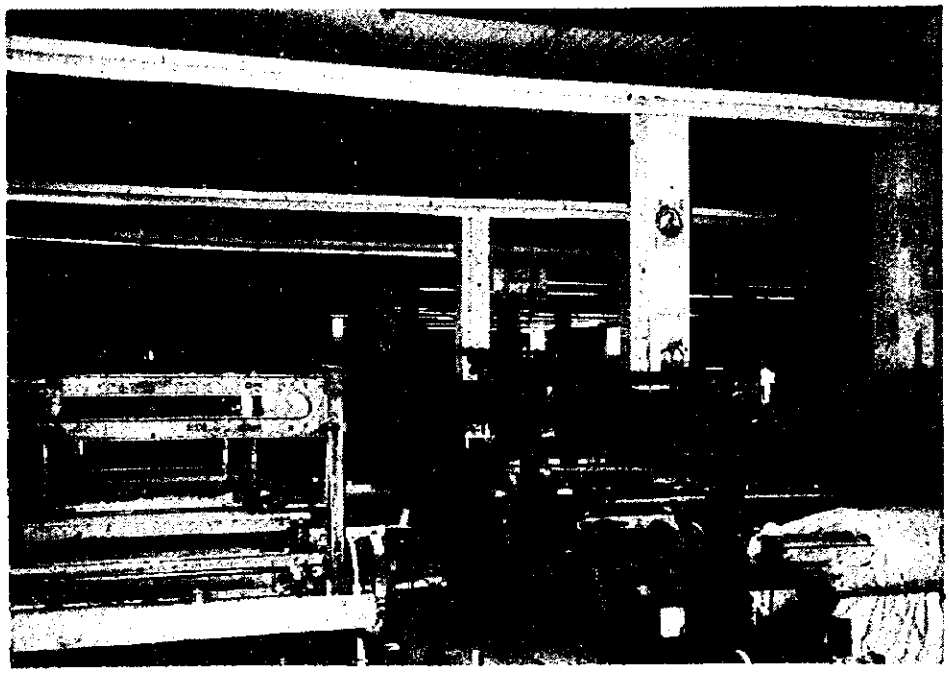
APPENDIX E-P-2 YARN CONE DYEING EQUIPMENT (NO.1 FACTORY)



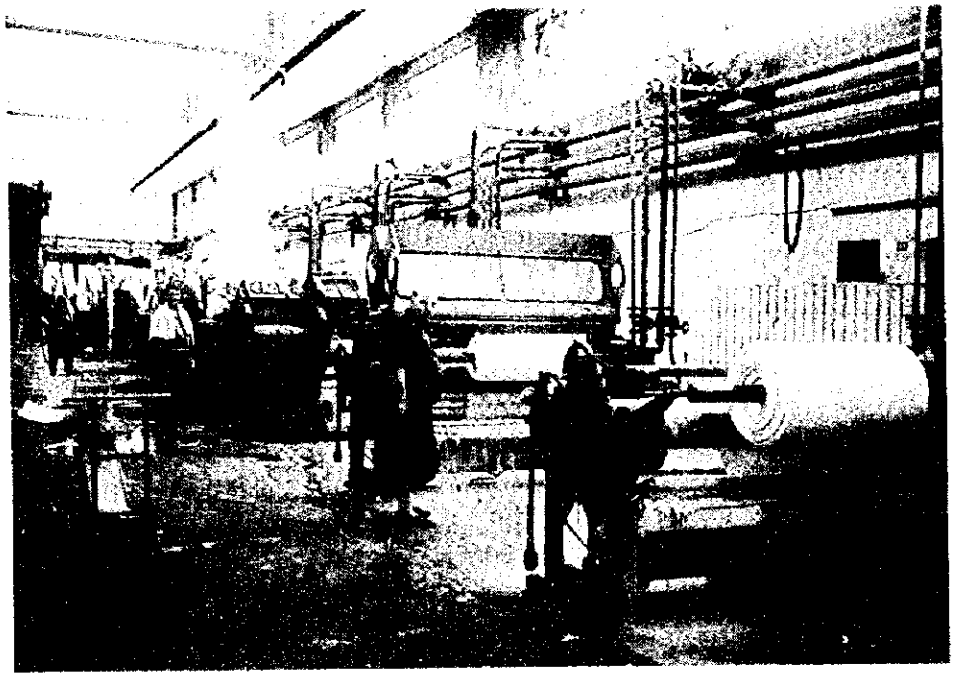
APPENDIX E-P-3 BED SHEETS WEAVING (NO.1 FACTORY)



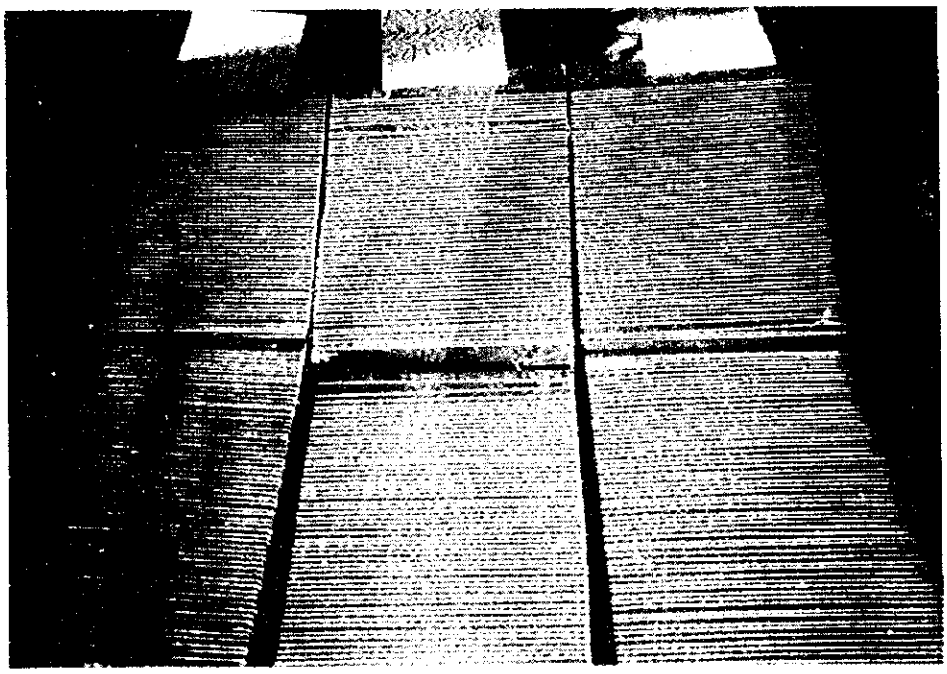
APPENDIX E-P-4 STOPPED LOOMS (NO.2 FACTORY)



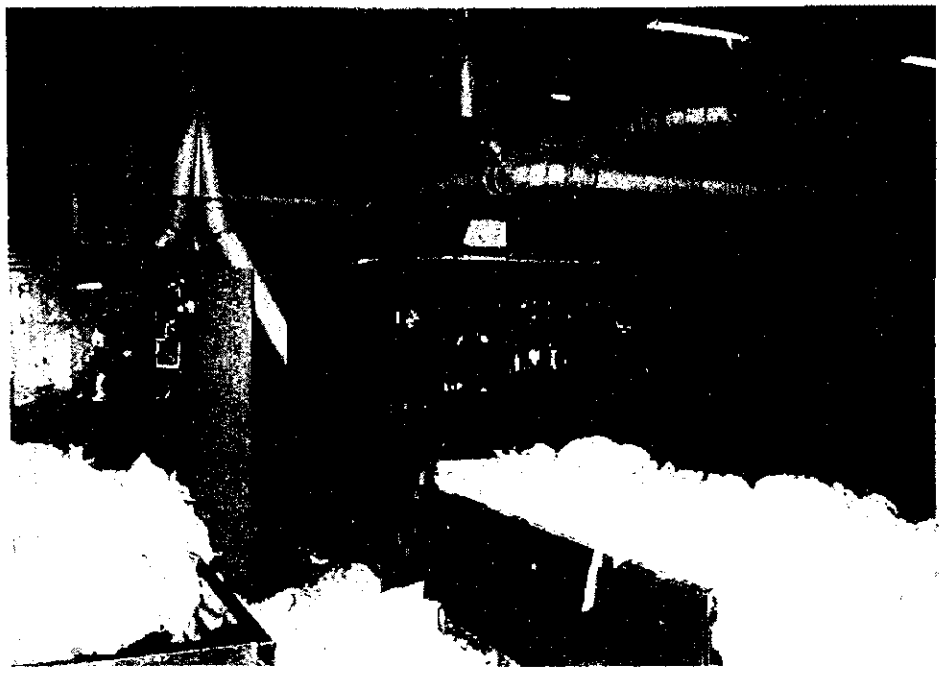
APPENDIX E-P-5 DYEING & FINISHING (NO.2 FACTORY)



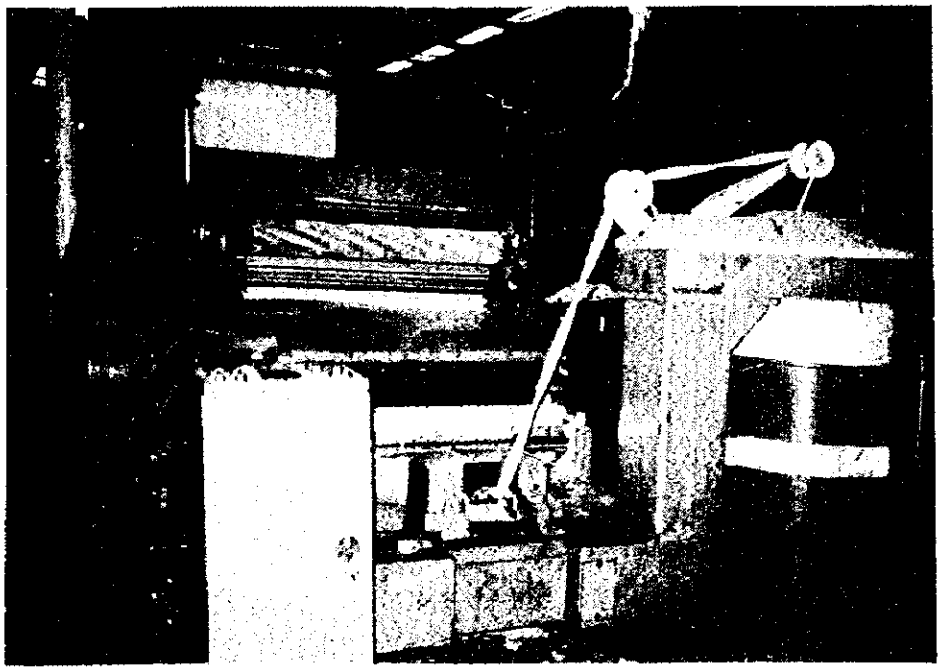
APPENDIX E-P-6 YARN QUALITY SAMPLE (NO.2 FACTORY)



APPENDIX E-P-7 BLOWING MACHINE PROBLEM (NO.3 FACTORY)



APPENDIX E-P-8 CARDING MODERNIZATION (NO.3 FACTORY)



6

Syrian Company for Spinning and Weaving

CONTENTS

TECHNICAL DIAGNOSIS FOR SYRIAN COMPANY FOR SPINNING AND WEAVING

Date :23 Aug.~1 Sep.,1997
Person in Charge :Takeohara, Ishii

1. Present Situation of the Company

1.1 Location

The factory is located in the outskirts of Aleppo, the second largest city next to Damascus in Syria and in the northwest direction approximately 8 km (about 15 minutes by car) far from the center of Aleppo. Aleppo which is near Turkey and has plenty of stone made buildings is a city having history over 4,000 years and known as a city which endured the invasions by the crusade of 12th century and by Mongolia of 13th century. The population is estimated approximately 2 million including the outskirts area.

1.2 Outline of the Company

(1) General items

The factory was established in 1933 and became independent as a public sector company in 1965. It will be merged with the Al-Shahba Spinning and Weaving Company which is situated against the company with a road of 25 m width in-between.

(2) Building, site

The site area is about 130,000㎡ and the buildings are estimated to occupy about 50 % of the total area. 30 % (estimated) out of which are buildings which are used to store the stock of commodities and miscellaneous goods ,etc. Generally the factory layout is entangled. It is shown in Appendix F-F-1.

(3) Raw material

The raw material is all Syrian cotton which is supplied every two months by the Cotton Marketing Organization (CMO). Its consumption in 1997 is estimated 2,500 tons/year against the plan in 2,500 tons/year

(4) Product

(1) Spinning section : 16's , 20's , 24's , 24'S/2

(2) Main products of weaving section and dyeing/finishing section:

	Gray width		Finished width	
· 24/2 × 12's / 9 × 50 (pc/in)	× 830mm	→	800mm	For Army use (19%) Twill 2/3, Dyed
· 16 × 20's / 53 × 23	×1900mm	→	1880mm	For bed sheet (23%) Twill 2/3, Dyed
· 20 ×20's / 53 × 36	× 850mm	→	800mm	For children use (6%) Plain weave, Printed
· 20 ×20's / 48 × 46	× 880mm	→	850mm	For bed cover (23%) Plain weave, Yarn dyed
· 20 × 16's / 71 × 56	×1900mm	→	1850mm	For bed covert (-) Plain weave, Yarn dyed
· 20 ×16'S / 33 × 25	×1800mm	→	1800mm	For gauze (11%) Plain weave, Bleached
· 16 ×12's / 58 × 46	×1450mm	→	1400mm	For curtain (2%) Plain weave, Printed
· The others				(16%)

(5) Sales and stocks

The sales plans and results for January to July,1997 and the examples of sales price are shown as below.

No	Classification	Plan (ton)	Actual (ton)	Average (ton)	Achievement ratio (%)	Sales Price
1	Bleached Fabric (Include Y.D)	400	252	36	63	For Bed Cover188cmW @54.5sp/l..m
2	Dyed Fabric	226	250	36	111	For Army 80cmW @70.0sp/l..m
3	Printed Fabric	424	133	19	31	For Curtain Fabric 140cm W @64.5 sp/l..m
	Sub Total	1,050	635	91	60.5	
4	Gray Fabric (Including YD)	248	67	10	27	-

Note : l.m - linear meter

Stocks at July/1997 are shown as below

Unit : ton

No	Item	Stock quantity (ton) (A)	Actual output/day (ton) (B)	A/B= Days of stock equivalent to production days
1	Raw Cotton			
2	Spinning Yarn			
3	Raw Fabric	565	4.3	131
4	Dyed and Finished Goods	149	6.3	24
	a) Bleached Fabric	(106)	(3.4)	(31.2)
	b) Dyed Fabric	(4)	(1.7)	(2.4)
	c) Printed Fabric	(39)	(1.2)	(32.5)
	d) Yarn Dyed	(0)	(0.26)	(0)

(6) Production plan and result

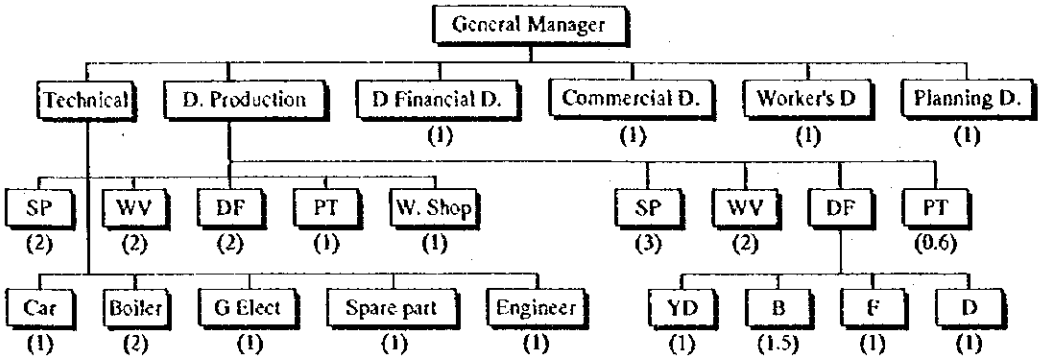
Production Plan and Result (Calculated by the data of following term 1997/Jan-July)

Inside figures of ( ) show the converted ones to length.

	Spinning Yarn	Woven Fabric	Dyeing & Finishing			
			Bleach.	Dye.	Print.	Yarn Dye.
Plan (T/y)	2,700	2,289	1,505	561	748	*298
		(11,799km)	(8,540km)	(2,473km)	(4,154km)	
Actual (T/y)	2,295	1,224	966.5	490.5	349.3	*72.4
		(6,080km)	(5,710km)	(2,066km)	(2,886km)	
			*1,806.3 (T/y) (10,662km)			*Included in Bleach.

* This amount does not correspond to weaving capacity, but it may include stocks and commission dyeing goods.

(7) Organization and manpower(at July/1997)



Number of inside ( ) show the actual operation shift.

(Man Power) (Unit : Persons)

	Production Dept.		Service Dept.	Administ. Dept.	Manager Class	Total
	Technical	Production				
Plan	170	930	73	157	65	1,395
Actual	157	520	51	128	49	905

There is much turnover of employees because wages are low and they are not happy with contents of the jobs. For example, 150 employees have left company during January 1997 -July,1997 although 126 new employees have joined the company during the same period.

8) Production equipment

The production equipment list is shown in Appendix F-T-1 & 2.

2. Present Situation and Problems of Production Process

2.1 Weaving Process

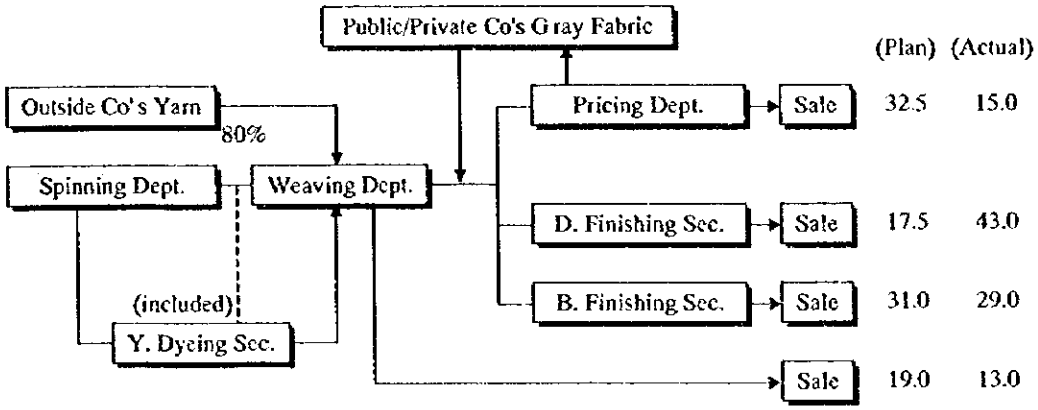
① Cotton yarn is supplied by the company's own spinning mill, therefore, its stocks are not so much in the factory as in the Dibs, but the bags containing yarns are abandoned in the work site without orderliness (shown in Appendix F-P-1).

② Preparatory section has a sufficient space where each one complete set of warping machine and sizing machine is separately installed respectively in one room. This is very favorable for the process control.

③ The preparatory section here is more completely provided than the same of Al Shahba Co.. However, looms have become very decrepit. Therefore, it is suggested that the looms should be modernized.

2.2 Dyeing and Finishing Process

Process flow chart with the percentage of output is shown as follows:



Note.- D. - dyeing, B. - bleaching

- This chart shows that actual production of printing has decrease to about half of the plan. The reason is that the factory can not satisfy the market demands for wider fabrics, quality and price, etc. On the other hand the ratio of dyeing production increases. This is because stable orders are coming from the Army regardless of the market trend.

3. Present Situation and Problems of Management in Weaving

3.1 Procurement Control

(1) Raw materials

① The yarn for weaving process is supplied by both its own spinning department and Al Shahba Company, by 200 tons approximately a year. Its procurement is not problematic.

② Cotton yarn 12's, however, is procured from the outside, because it is not produced in the company. It should be produced in-house.

(2) Spare parts

① The stock of spare parts is insufficient because of the shortage of the funds.

② The parts for selvage cutter for Picanol loom are not available, therefore, the cutter is not being used.

③ The local procurement of the substitute has been tried, but it easily wears out due to the bad quality of metals available locally.

3.2 Inventory control

① Flow of gray cotton fabric:

Woven Fabric → 81% To the dyeing section in its own Company

→ 19% To sell outwards

② The gray cotton fabric is supplied to the company's own dyeing process, therefore, stock should be nil. However, the stock of 565ton (corresponding to about 5.5 months weaving production) exists..

3.3 Process Control

Because of shortage of labor force, all the looms are not running. The looms are stopped in the unit of some block. The operation is just intended for achievement of the production plan. Many operators are young around 14 to 16 years old and their job level is very low. In addition, they may not have

interest in quality and are not properly educated and trained. Woven fabrics have a lot of defects and are not inspected. Large defects such as double weft insertion, wrong warp reaching, and crevice mark or shed mark, etc. occur frequently. (shown in Appendix F-P-2) The defects of the preparatory process of Syrian Company are not so much seen than expected. This would be why the process equipment, warping machine and sizing machine have just been replaced.

3.4 Equipment Control

① There are many machines in stoppage because of the damage and shortage of spare parts.

② The preparatory machines are in a good condition since they have just been replaced. Furthermore the machines are sufficiently maintained. (specially Sucker's sizing machine)

③ Picanol looms are operated under defects in succession in the selvage part without corrected. Urgent measures should be taken.

④ Picanol looms were introduced in 1982. The model is not so old, but its manufacture was suspended, therefore, spare parts procurement is not smooth.

⑤ The fundamental points at issue are;

- Technical level of maintenance staffs is very low.
- Many of workers are not experienced. Few skilled workers.
- The inferior repairing causes damages in succession and it creates a vicious cycle.
- It is said that wage's level is too low to secure operation and maintenance people.

3.5 Quality Control

① The quality control section exists as the organization, but it does not function well at all. There is no check sheet form for quality control. Woven fabric is not satisfactorily inspected according to the quality standard. The fabric is just sold by certain length after eliminating defective parts.

② There is no awareness of quality in the factory and no situation driven by needs. (shown in Appendix F-P-3)

③ The present situation is that the management, putting aside the matter of quality, is busy to control manpower allocation and production plan due to the shortage of employees. It is necessary to change the recognition from the top management.

3.6 Education and Training

① Newcomers receive the OJT in outline. The OJT is carried out by old-experienced persons on the site.

② Necessity and shortage of education and training is well understood, but its detail and the level are not properly grasped.

③ Because of the shortage of manpower, even fresh employees are used as labor potential..

④ Trainers themselves are not experienced, therefore, proper training is not given. There is no system to train and educate trainers.

⑤ Talented labor force are not gathered. (mostly young between 14 -16 years old)

3.7 Environmental Preservation

① Cotton yarn prepared for the warping machines is not placed in order.

② There are many damaged places on the floor, which are dangerous to walk near.

③ Education for environmental preservation is not given and nobody is concerned about its importance.

4. Present Situation and Problems of Management in Dyeing and Finishing

4.1 Procurement Control

(1) Raw materials

① The cotton gray fabrics are mainly supplied by the weaving section. Some of fabrics are supplied by other companies for commission dyeing.

② Main construction of the cotton fabrics are shown in 1.2-4). They are for the most part not value added articles such as narrow drill fabric, bed sheet and yarn dyed bed sheet.

③ The cotton gray fabrics corresponding to the production for 4-5 months have been stocked in the storehouse. This corresponds to the finishing production in about 90 days.

④ The stocks of yarn, gray fabric and finished fabric are accumulated as shown in 1.2-5). However, the production cannot be reduced to adjust the stocks. This is a big problem in the public sector company. It will be necessary to change such system in order to solve this difficult matter.

(2) Spare parts

① Most of the machines are more than 20-50 years old. Dyeing and finishing machines have seldom been replaced.

② The rotary screen printing machine is 22 years old. The spare parts procurement is now hard job for every machines.

③ There are considerable spare parts deposit in the warehouse, but they are hardly required. Some parts have been stored for more than 20 years.

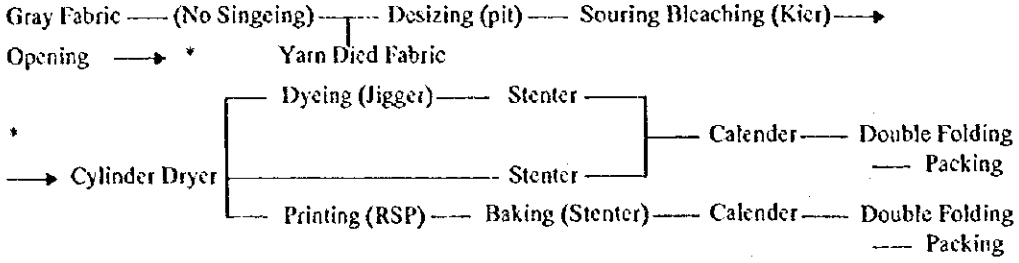
④ Machinery makers cannot supply parts inquired for very old machines because of no stock. Such parts are specially made with higher prices and the delivery time is long. Therefore, it seems meaningless to repair the existing machinery spending much money.

4.2 Inventory Control

The stock of each section is controlled by skilled persons in charge, but SEIRI=Tidiness and SEITON=Clean up are not satisfactorily performed. 5S-Movement is indispensable.

4.3 Process Control

① The process is very simplified and basic one for low value added articles. Products loaded - home products, uniforms, gauzes, etc.- are low value added and complains about their quality are very rare. As such, a severe process control has not been implemented.



② The process is simple as above. Besides, the process conditions are uncertain at each machine. For example, a recipe of bleaching process is fixed, but there is no indication anywhere except for in the mind of persons-in- charge. No wonder the concentration, temperature and timing control is not accurate. Furthermore, measuring equipment is not fully given. (Shown in Appendix F-P-4,5)

③ There is no progress cards, color and whiteness samples.

4.4 Equipment Control

① As stated above, all the dyeing and finishing equipment became decrepit. Consequently, the preventive maintenance and the periodical lubrication are not being carried out. It is taken for granted that it is OK if the machines can run even with low speed (20-30m/min). (show in Appendix F-P-6)

② Utility equipment and technical facilities are well equipped and invested. The work shop also fully equipped although the equipment is already old. The work shop makes spare parts, which cannot be available.

③ The water can be taken from a well, from which 30-40 ton/hr of water is available because there is a river at the back of the factory. The hardness of the water, however, is high reaching 400-500 ppm, although the volume is enough.

④ Almost no equipment will not be able to run continuously in the future, except for calenders (provided the cover for rollers are replaced) .

⑤ The utility equipment and the buildings can be used. However repairs and replacement will be necessary. For example, the air condition equipment and fire fighting equipment needs to be renewed.

⑥ Overall factory layout should be improved. A new layout should aim at "production first policy", removing unnecessary buildings and facilities.

⑦ Power failure of the whole factory happens 10 to 15 times a month. This will cause problems of quality and productivity, although it is said to be attributable to the power supply company.

4.5 Quality Control

① At present, there is no awareness of quality control among the employees and no one feels it's necessity. For example, nobody checks a final product before dispatching even by eyesight. It may pass if a fabric is continuing and has a necessary length.

② When tried to educate employees how to improve quality and correct defects on the site, employees used to excuse their position citing old machines, no spare parts availability, no chemical availability, etc..

③ It is necessary to establish the inspection standard, inspection organization including machinery, a powerful feed back system (managed directly by the General Manager), responsibility management, and target setting and management system, etc.

4.6 Education and Training

① Under a situation of frequent job change, new recruitment always cannot catch up with the necessary number of employees. Employees are decreasing and their quality is deteriorating gradually. It should be recovered by the training, but no specialized education and training system for them is available.

② There is no target setting system, award system for result and no opportunity to reconsider the subjects. There is no notice board, chart and enlightening movement in the factory.

4.7 Environmental Preservation

① Even management staffs do not have a sense of safety. Some of dangerous places can be seen in the factory. (For examples, no thermal insulation cover on steam pipe, no protection cover at revolving part, and direct handling of chemicals, etc.) (shown in Appendix F-P-7)

② Effluent is not satisfactorily processed. (under investigation by technical dept.). Lack of effluent treatment regulation, countermeasures and facilities.

③ Fire fighting and its regulation are not severe. (For examples, smoking while walking and non periodical inspection of fire fighting equipment, etc.)

④ Establishment of the organization for safety

5. Modernization Plan

5.1 Modernization of Production Management in Weaving

(1) Process control

① The process control standard of each process should be specified as a control manual. This intends that the situation of process control should be checked and confirmed by every body.

② To specify and establish the parameter for each proces

(2) Equipment control

① Ledger of machinery should be prepared and kept.

② The details of trouble or damage, its date and spare parts used should be recorded, according to which a cost for repair should be included in a budget. The systematic maintenance will consequently let the machinery last long and maintain the stable quality.

(3) Quality control

① Quality control standard of each process should be specified as a control manual. This intends that the situation of quality control should be checked and confirmed by every body.

② When new looms are introduced, the looms should be equipped with monitor control. Quality control should be promoted by such control system as it saves time and labor.

③ It is suggested to start with the cloth inspection (employing control defects points).

(4) Education and training

① It is suggested to train employees efficiently and systematically following JI (Job Instruction) of TWI (Training Within Industry, developed in USA)

② TWI includes training course for trainer. It should be started from the training of trainers.

(5) Environmental preservation

① A committee for safety and health should be organized. Members should be participated from all divisions, whether from even the office to do mutual inspection on the spot. It is important and effective to see the spot from different points of view.

5.2 Modernization of Production Management in Dyeing and Finishing

(1) Process control

① Preparation of order form indicating dyeing and finishing conditions according to style or articles and setting up of it's observation system.

② Introduction of the necessary measuring equipment, analyzing equipment, testing chemicals, etc. and setting up of their practical use. (for examples, H_2O_2 manual titration equipment and testing chemicals, thermometer, viscosity meter, measuring paper for padder squeezing pressure, etc.) (show in F-P-8)

③ Preparation of progress control card and processing instruction card.

④ Establishment of inspection system including inspection at incoming and outgoing of materials and commodities and establishment of feed back system.

(2) Equipment control

① Preparation of preventive maintenance, lubrication regulation and SOP and setting up of management method for periodical cleaning ,etc.

② Establishment of countermeasure for power failure and inspection system for automatic on/off motion of generator

③ Introduction of effluent treatment equipment and study of water recycle use.

④ Establishment of the education and training facility or system for computer engineers because the computers will be used more and more for machinery and equipment in the future, and electric engineers are also necessary because inverter motors are mostly used.

(3) Quality control

① Preparation of quality inspection standards and establishment of it's execution system

② Preparation of "Cause and Defect Diagram" to trace causes of defects and establishment of it's execution system

③ Preparation of "Pareto Diagram" for each defect and establishment of execution of countermeasures.

④ Preparation of "Control Chart" (for example, chemicals solution concentration control for the bleaching process)

⑤ Preparation of samples for whiteness, color difference and color standard and inspection equipment (standard light box) and establishment of its practical use

⑥ Preparation of chart for 1st class fabric, 2nd class fabric and waste fabric and establishment of it's practical use

(4) Education and training

① Establishment of an education and training organization from the basic education course to specialized knowledge and technical training course.

② Comprehensive collection of knowledge and information taking all opportunity (for examples, visit to exhibition, collection of foreign information, distribution of catalogues and instruction manual for machinery and equipment). GOTI needs to establish a translation department to translate such materials in English into Arabic)

③ Promotion of documentary communication system instead of verbal communication

④ Establishment of concept of cost analysis, specially for management staffs

5.3 Modernization of Weaving Equipment

The following is the first modernization plan for cotton weaving equipment.

(1) Main machinery to be introduced and its main specifications

① Production: product and weave : Denim 7'Sx7'S/70x46x64"(Gray width)

② Equipment:

- Air jet loom, RS190cm, 900rpm 24 sets
- Traveling Cleaner 2 sets
- Accessory and Spare Parts 1 lot
- Warping and Sizing Machine do not need to be replaced.

(2) Capacity calculation (shown in Appendix F-T-3,4)

① Loom: Actual Production

600 rpm, Efficiency 90% 429 m/dayx24sets = 10,296 m

② Necessary warp yarn length for preparatory process:

For warping machine 104.150 m/day

For sizing machine 10,310 m/day

(3) Layout plan

(Shown in Appendix F-F-2,3)

(4) Auxiliary and utility equipment

There is nothing to be modernized. This plan is narrowed down to a plan to be carried out with minimum investment cost

(5) Erection Plan

Loom : 4weeks

Cleaner : 1week

(6) Manpower allocation

For Loom : (2 persons x24 looms /shift) x 3 shift = 6 persons

Loom attendants for Picanol /24looms should be reduced.

(7) Investment capital cost (Estimated)

US $ 1.4 Million

(8) Subsequent modernization plan (shown in Appendix F-T-4)

Product is denim as same as the first plan. We recommend proper quantity of machines considering most economical operation:

①	Loom AJL	72 sets
②	Warping Machine	1 set
③	Sizing Machine	1 set
④	Tying machine	2sets
⑤	Reaching machine	3sets
⑥	Inspecting Machine	4sets
⑦	Folding machine	2sets
⑧	Accessory Parts	1lot

Investment Capital Cost (Estimated)

US $ 8.2 Million

Necessary space required:5,400㎡ (72x75m) for air condition equipment, office, maintenance room and cotton yarn stock area, etc.

5.4 Modernization of Cotton Dyeing and Finishing Equipment

[Premise]

The spun yarn and gray fabric which will be produced in Al Shahba Co., after the modernization are supposed as follows:

(1) New Product Mix of Al shahba co,

Spun yarn : OE 7'S output ; 6962kg/Day

Woven fabric : $\frac{7'S \times 7'S}{70 \times 40 pcs/in}$ ×64"(1625mmw) Twill 3/1

Product	For Denim
Out put	9,820m/day
Weight	0.68kg/L.m.

(2) Existing Product Mix of Syrian Co.

- Woven fabric: Product List —— shown in the clause of 1,2-4)

  Out put(plan) —— 2,289ton/y(11,800km/y)

  ∴ 8 ton/D(42,000m/D)

  Total Capacity ——— 492,000m/month(16,800m/D)

- The modernization plan shall envisage as follows;
  The clause of 1) & 2)-Gray fabric shall be bleached, dyed or printed in Syrian Co.'s Dyeing and Finishing section. And yarn dyed woven fabric also shall be processed in the same section.

(3) The processing conditions in the dyeing & finishing section are supposed as follows;

① Gray fabric for denim use shall be processed for the upholstery use without indigo-dyeing for the denim for the time being.

- Printing goods for Curtain (Pigment or Reactive dye) or Bed cover : 50% of all.
- Dyeing goods for Army -pants (Reactive Dye) : 50% of all.

② Processing output of the existing Syrian Company's products shall be 42,000m/day (11,800Km/year, weaving production plan in 1997) and new production increased by the modernization of weaving equipment (9,820 m/day) shall be added, getting new processing capacity of 56,000 m/day, after taking account of 7% growing ratio. This figure shall be base for designing a modernization plan.

(4) Product mix at the modernization plan

No	Process	From Al shahba Co.	From Syrian Co.	Total	%
1	Printing & Finishing	5,000m/D	15,000m/D	20,000m/D	35
2	Dyeing & Finishing	5,000	9,000	14,000	25
3	Bleaching & Finishing (Including Yarn dyed fabric)		22,000	22,000	40
	Total	10,000	46,000	56,000	100

Ne. 7 yarn produced for denim use in Al Shahba after modernized shall be used, which shall be woven in the renewed looms in Syrian Company.

(5) Main machinery to be introduced and its main specifications

Main machinery Specification List : (Shown in Appendix F-T-5)

(6) Capacity calculation

Flow chart : (Shown in Appendix F-T-6)

Calculation Table : (Shown in Appendix F-T-7)

(7) Layout plan

Existing Layout : (Shown in Appendix F-F-5)
Modernization Plan Layout : (Shown in Appendix F-F-6)

(8) Auxiliary and utility equipment

- Dye solution mixing equipment
- Bleaching solution mixing equipment
- Wheeled carrier
- Testing equipment (fastness tester , crimp tester, test dyeing machine, test steam mangle, drying oven, electronics balance, etc.)

(9) Erection plan

- 4 months in total depending on the progress of foundation work
- Necessary service engineers from machinery manufacturer :1 or 2 persons for machinery and 1 person for electricity
- Necessary local workers: 15 persons(2 groups) for machinery and 10 persons (2 groups) for electricity

(10) Manpower allocation

(Unit : Persons)

	1shift	2shift	3shift	Manager& Assist	Total
Bleaching section	11	11	8	2	32
Dyeing Section	7	3		2	12
Printing section	9	9	-	2	20
Finishing & Inspections	10	9	6	2	27
Laboratory	5			1	6
Dept. Manager				1	1
Total	42	32	14	10	98

(11) Investment Capital cost (Estimated)

US$7.9Million

(12) Subsequent modernization plan

① Yarn dye machinery and equipment
② Color matching equipment (CCM,CCK)
③ Other automated machinery and equipment
④ Denim dyeing machinery and equipment

5.5 Suggestion for Factory Management after the Merger

① Both factories should work in harmony after the merger. A sense of discrimination to the other company and person should be removed as soon as possible.

② The optimum product mix should be restudied considering the production of the both totally (redistribution of the total production).

③ Cotton yarn for weaving and cotton fabric for dyeing should be dealt with internally in the new company to utilize the increased capacity effectively. (The product or raw material available in the new company should not be purchased from outside).

④ Operators and production equipment are to be exchanged between the both factories as needed.

⑤ An optimum production scale should be realized by an optimum production capacity. For that purpose, it is required to review the equipment, including the scrap of stopped and unnecessary machines and their renewal. For instance, preparatory machinery in Syrian Company which is run with good conditions should be made the most of and a part of preparatory machinery deteriorated of Al Shahba should be scrapped.

APPENDIX F-T-1

Machine List - Weaving section (Existing)

No.	Name of M/C	Q'ty	Origin	Mfg. Co.	Year	Model	Spec.
1	Warper	1	Germany	Schlafhorst	1982	-	672 sp, Max, 800 m/Min
		1	Germany	Benninger	1997	-	672 sp, Max, 1200 m/Min
2	Sizer	1	Germany	Zucker	1982	WN	Max, 120 m/Min
		1	Germany	Zucker	1997	S 222	Max, 100 m/Min
3	Loom	238	Belgium	Picanol	1982	RS 218	218 cm^{W} 220 Picks
						PGW-C1	
4	Rewinding M/C	2	Germany	Mettler	-	-	No Used
		1	Germany	Schlafhorst	-	-	No Used
5	Process Tyeing M/C	2	Germany	Fischor	1993	PU/ELA-CC	
		2	Germany	Knotex	1982	RS 4208	

APPENDIX F-T-2

Machine List (Existing)

< Dyeing & Finishing M/C >

No.	Name of M/C	Q'ty	Mfg. Co	Model	Working Width	Note
1	Desizing Pit	2	Local		mm	Cap : 4 m²x2
2	Rope Washer	2	Elezacio (France)	1939	3,000	
3	Kier for SC & BL	4	Elezacio (France)	1939	–	450 kg/Kier
4	Scutcher Openner	1	Elezacio (France)	1939	1,600	
5	Cylinder Dryer	1	Elezacio (France)	1939	1,600	8 CD : Steam
6	Jigger	2	V. Henriksen	1970	1,800	130 kg/Batch
	Jigger	3	Benninger	1955	1,500	No used
	Jigger	4	Benninger	1955	1,500	90 kg/Batch
	Jigger	2	Mezzera		1,700	130 ~ 150 kg/Batch
					2,000	
7	Stenter with padder	1	Mulhouse	1939	1,600	
			Elezacio (France)	1939	1,600	Clip Steam, 4 cham
8	Stenter with padder	1	Kranz	1969	2,000	Clip Steam & Elect. 4 cham
9	Folding M/C	1		–	2,000	
10	Doubling & Winding	1		–	2,000	
11	Rotary Printing M/C	1	Peter Zimmer (Dutch)	1975	1,600	8 Color 640 Repeat
12	Steamer	1				No used
13	Ageing M/C	1				No used
14	Stenter	1	Famatex	1955	1,600	Oil – 2 cham
15	Calender	1	Wakayama	1977	2,400	Stainless & Paper
16	Doubling & Winding	1	Motroll (Italy)	1950	2,000	
17	Yarn Dyeing M/C	3	This (Germany)	1969		90 kg
		3	Ober Maier (Germany)	1939		85 kg No used

< Utility Equipment >

1	Boiler	1	Standard Chasd (Germany)	1962	10 ton/hr	B-Heavy Oil	
2	Boiler	1	Wannson (France)	1977	12 ton/hr	Price	1.32 sp/kg
3	Boiler	1	VIA (Sweden)	1982	13 ton/hr		
4	Soft Water Treatment	1	Wansson	1977			
		1	FIA (Sweden)	1982			
5	Well Water	3				30 ~ 35 m Deep	
		1				for stand by	
	City Water						
	Cost Per m³						18 sp/m³
	Consumption					6,000 m/m³/Month	
6	Effuent Treatment	none				for WV. & Adm.	
7	Transformer 20 kv/380 v	2				for SP.	
		2					
	Consumption	4			630KVA	for SP. & DF>	
					1,088 kw/hr		
	Cost Per KWH				26,129kwh/day	st 1.25/kwh	1.25 sp/kwh
8	Generators	1	MANN (Germany)	1935	125 kw	428 rpm	Running
		1	MANN (Germany)	1936	125 kw	428 rpm	Stopped
		1	Sulzer (Swiss)	1939	400 kw	250 rpm	Stopped
		1	Sulzer (Swiss)	1946	500 kw	428 rpm	Stopped
		1	Borbmaster (Denmark)	1957	25 kw	for Light	Running
		1	Sulzer (Swiss)	1955	350 kw	428 rpm	Running
		1	Sulzer (Swiss)	1961	900 kw	300 rpm	Running

APPENDIX F-T-3

CALCULATION TABLE FOR EQUIPMENT(WEAVING SECTION)

Meters/Hr.·Loom(Eff.100%)

Kind of Fabric / Weft Density		Denim OE 7'S	
		46	46
RPM	850	28.16	28.16
"	800	26.50	26.50
"	750	24.85	24.85
"	700	19.88	19.88
"	650	18.22	18.22
"	600	16.57	16.57

Calculation Table of Production Meters & Equipment

Kind of Loom / Kind of Fabric	RS 190 / OE 7 Den	
100% Production Meters/Hr.Loom	19.88	19.88
Efficiency (%)	90.0	90.0
Working Hrs(hrs/day)	24.0	24.0
Requested Meters(m/day)	9,670	30,900
Actual Meters (m/day.Loom)	429.41	429.41
No.of Loom (Theoretical)	22.52	71.96
No.of Loom (Actual)	23	72
Actual Meters (m/day)	9,876	30,917

Calculation Table of Equipment

Sizing Machine	Shrinkage & Loss (%)	5.0	5.0
	Sizing Length (m/day)	10,311	32,445
	Speed (m/min)	45	45
	Efficiency (%)	65	65
	Working Hrs (hrs/day)	24.0	24.0
	100% Production (/hr)	2,700	2,700
	Actual production (m/day)	42,120	42,120
	Necessary No. of Machine	0.24	0.77
	No. of Beam (/set)	9	9
	Necessary Yarn Length (m/day)	93,727	294,925
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	0.31	0.96
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	20
	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 Nachine	Necessary Drawing (ends/day)	25,739	51,479
	No. of Drowing (ends/min)	8	8
	Effiency (%)	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 F-T-4

CALCULATION TABLE FOR FABRIC STANDARD(WEAVING SECTION)

(Air Jet Loom)

FABRIC		Denim OE 3/1	Denim OE 3/1
Warp	Ne	7	7
Weft	Ne	7	7
Warp Density	Ends/Inch	70	70
Weft Denisty	Ends/Inch	46	46
Width	Inch	64.00	64.00
Length	Yard/pc.	63.50	63.50
Warp Weight	Kg/m	0.4297	0.4297
Weft Weight	Kg/m	0.2573	0.2573
Total	Kg/m	0.6870	0.6870
Supply Wp Wt.	Kg/m	0.4383	0.4383
Supply Wf Wt.	Kg/m	0.2702	0.2702
Total	Kg/m	0.7085	0.7085
Yarn Supply			
Production	Meters/day	9,670	30,900
Length/pc.	Meters/pc.	57.150	57.150
Production	Pieces/day	169.20	540.68
Warp Supply	Lbs/day	9,494	30,338
Weft Supply	Lbs/day	5,852	18,701
Total	Lbs/day	15,346	49,039
Yarn Supply	(284 days/y)		
Warp Supply	Lbs/year	2,696,296	8,615,992
Weft Supply	Lbs/year	1,661,968	5,311,084
Warp Supply	Bls/year	6,740.7	21,540.0
Weft Supply	Bls/year	4,154.9	13,277.7
Total	Bls/year	10,896	34,818
Total	Tons/year	1,977.0	6,317.4

APPENDIX F-T-5

Main Machine & Spec. List(Modernization Plan)

No.	Name of Machine	Set	Specification
1	Joining M/C(Sewing M/C)	1	Overlock Sewing M/C
2	Gray Fabric Inspecting M/C	1	2000 mm^W, Max. 50 m/Min
3	Gas Singeing & Desizing M/C	1	2000 mm^W, Max. 100 m/Min Batch up Type
4	Scouring & Bleaching Range	1	2000 mm^W, Max. 80 m/Min 1 stage Type
5	Mercerizing M/C	1	2000 mm^W, Max. 80 m/Min Chain Type
6	Pad Drying & Dyeing M/C	1	2000 mm^W, Max. 80 m/Min
7	Thermafixing M/C	1	2000 mm^W, Max. 80 m/Min Cap. 114 m
8	Pad-Steaming M/C	1	2000 mm^W, Max. 100 m/Min
9	Rotary Screen Printing M/C	1	2000 mm^W, 12 Cobr., 3 Chamber
	with Engraving Device		640 mm^W Repeat
10	Steaming & Baking M/C	1	2000 mm^W, 80 m/Min Combination Type
11	Washing & Dryer	-	
12	Resin or Softener Padding	1	2000 mm^W, Max. 80 m/Min, Clip Type
	& Stenter Range		Gas & Steam Source
13	Compressive Shrinking M/C	1	2000 mm^W, 100 m/Min
14	Calendering M/C	1	2000 mm^W, 80 m/Min
15	Inspecting & Winding M/C	3	2000 mm^W, 60 m/Min
16	Doubling & Plate Winding M/C	2	2000 mm^W, 60 m/Min
17	Packing M/C	-	

APPENDIX F-T-6

Flow Chart of Dyeing, Printing and Finishing Process (Modernization Plan)

No.	Material / Process / Machine Name	Cotton 100%				Note
		Printing	Dyeing	Bleaching		
				White	Y. Dyed Fab	
	(Output)	(20,000m/D)	(14,000m/D)	(11,000m/D)	(11,000m/D)	Ratio : White/Y. Dyed Fabric
						= 50/50
1	Joining M/C (Sewing M/C)					
2	Gray Fabric Inspecting M/C					
3	Gas Singeing & Desizing M/C					Batch Up Type
4	Scouring & Bleaching Range					1 Stage Type
5	Mercerizing M/C					Clip Type, 50% Pass
						of Bleaching Goods
6	Pad Drying & Dyeing M/C					
7	Thermafixing M/C					
8	Pad-Steaming M/C					
9	Rotary Screen Printing M/C					
10	Steaming & Baking M/C					
11	Washing & Dryer					
12	Resin or Softener Padding Stenter					
13	Compressive Shrinking M/C					80% Pass in Total
14	Calendering M/C					30% Pass in Total
15	Inspecting & Winding M/C					
16	Doubling & Plate Winding M/C					50% Pass in Total
17	(Packing M/C)					By hand initially

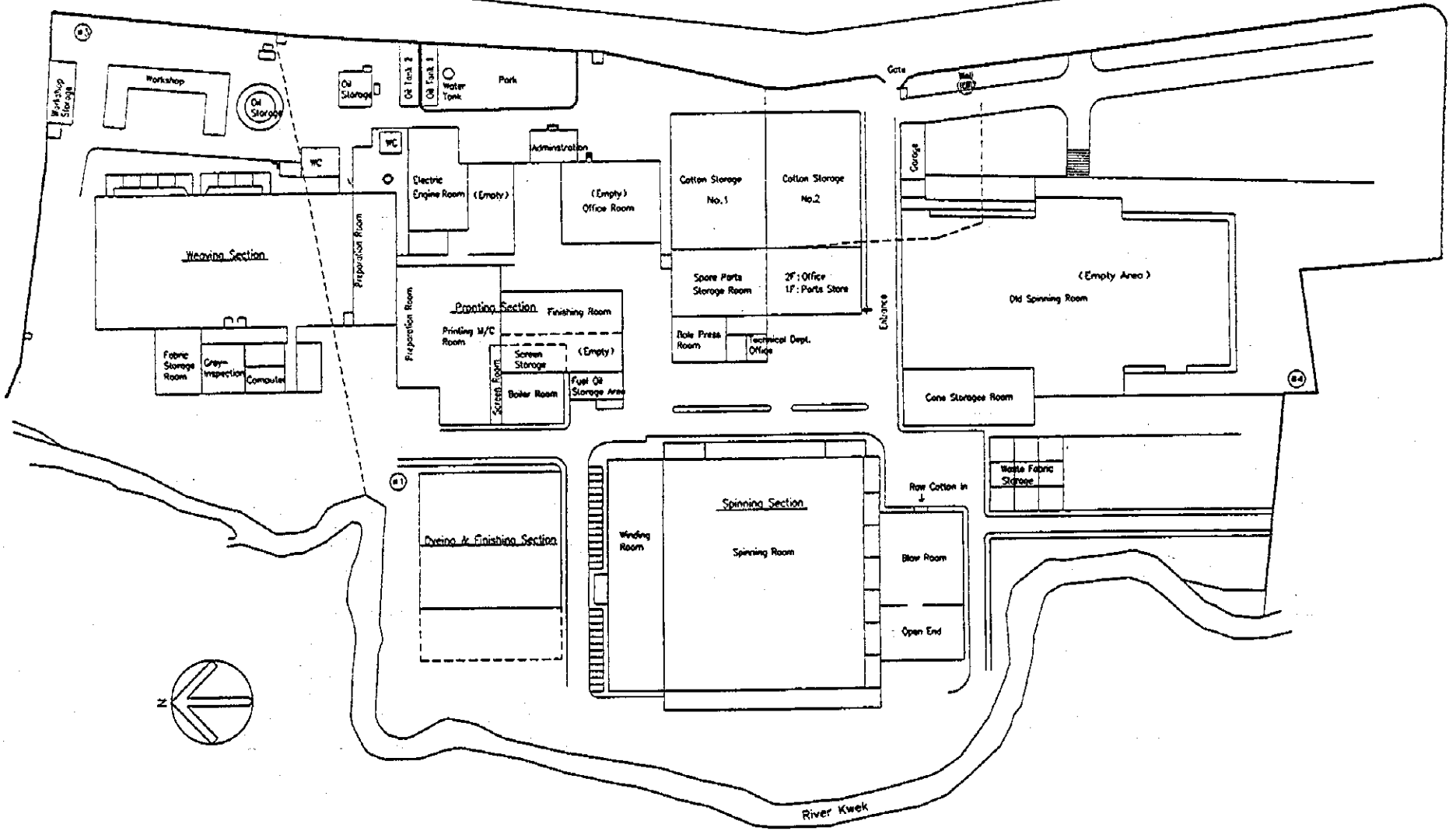
APPENDIX F-T-7

Calculation Table for Printing, Dyeing and Finishing Process

No.	Calculation favtor / Machine Name	M/C set	Delv spd. m/min	pdt. cap. m/hour	eff. (%)	Act. Pdt. m/hour	Req. Pdt. m/day	Cal. op. hour/day	op. sft. shift/day
1	Joining M/C(Sewing M/C)	1						24	3
2	Gray Fabric Inspecting M/C	1	40	2,400	60	1,440	28,000	19	3
3	Gas Singeing & Desizing M/C	1	80	4,800	80	3,840	56,000	15	2
4	Scouring & Bleaching Range	1	60	3,600	80	2,880	56,000	19	3
5	Mercerizing M/C	1	60	3,600	80	2,880	45,000	16	2
6	Pad Drying & Dyeing M/C	1	60	3,600	60	2,160	14,000	7	1
7	Thermofixing M/C	1	50	3,000	60	1,800	7,000	4	1
8	Pad-Steaming M/C	1	60	3,600	60	2,160	34,000	16	2
9	Rotary Screen Printing M/C	1	50	3,000	50	1,500	20,000	13	2
10	Steaming & Baking M/C	1	50	3,000	60	1,800	20,000	11	2
11	Washing & Dryer	-	-	-	-	-	-	-	-
12	Resin or Softener Padding Stenter	1	60	3,600	80	2,880	56,000	19	3
13	Compressive Shrinking M/C	1	60	3,600	70	2,520	45,000	18	3
14	Calendering M/C	1	50	3,000	70	2,100	16,800	8	1
15	Inspecting & Winding M/C	3	40	7,200	60	4,320	56,000	13	2
16	Doubling & Plate Winding M/C	2	40	4,800	60	2,880	28,000	10	2
17	(Packing M/C)	-	-	-	-	-	-	-	-

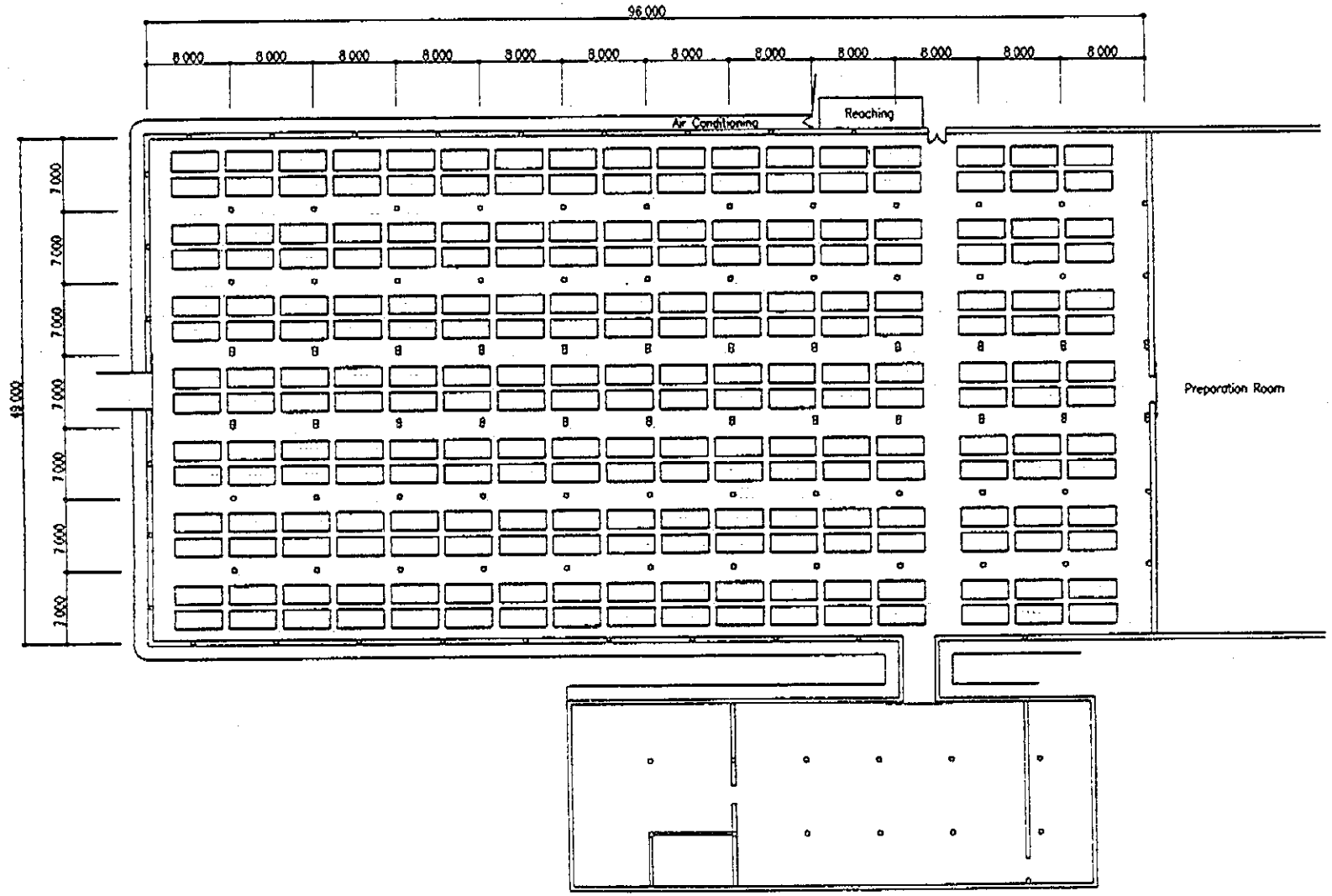
APPENDIX F-F-1

Syrian Company for Spinning and Weaving
Factory Layout (Existing)



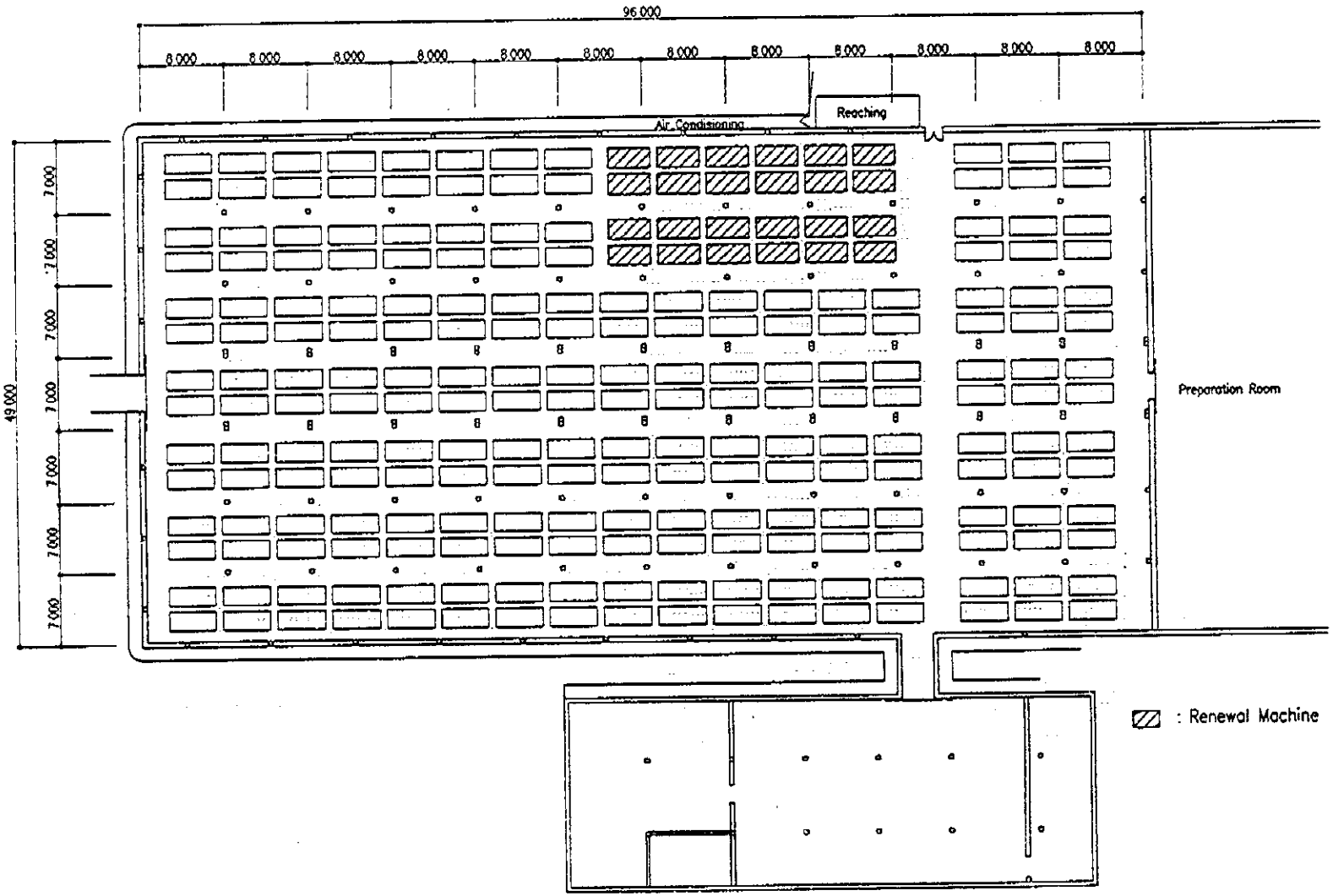
APPENDIX F-F-2

Syrian Company for Spinning and Weaving
Weaving Section Layout (Existing)



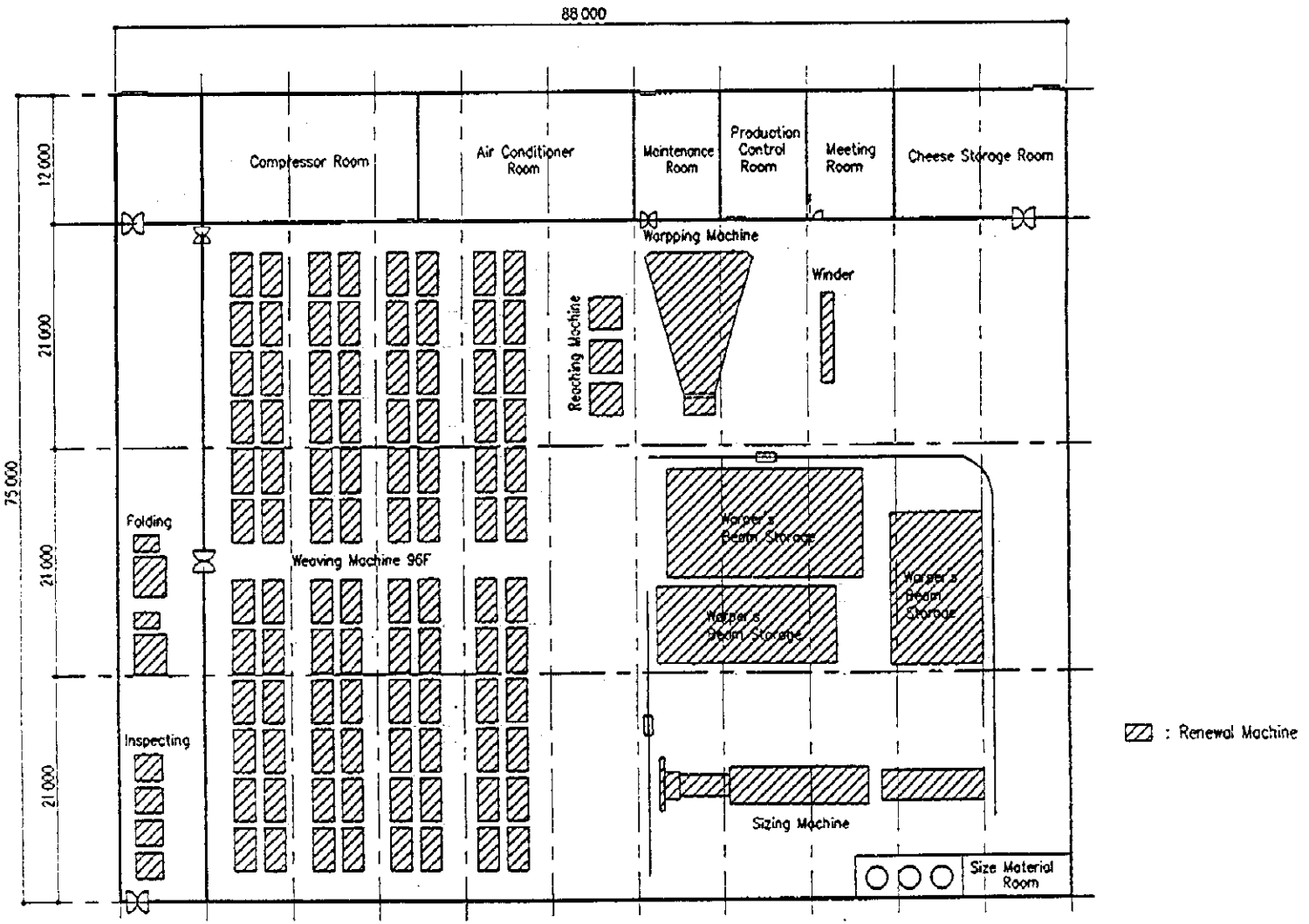
APPENDIX F-F-3

Syrian Company for Spinning and Weaving
Weaving Section Layout (Modernization Plan)



APPENDIX F-F-4

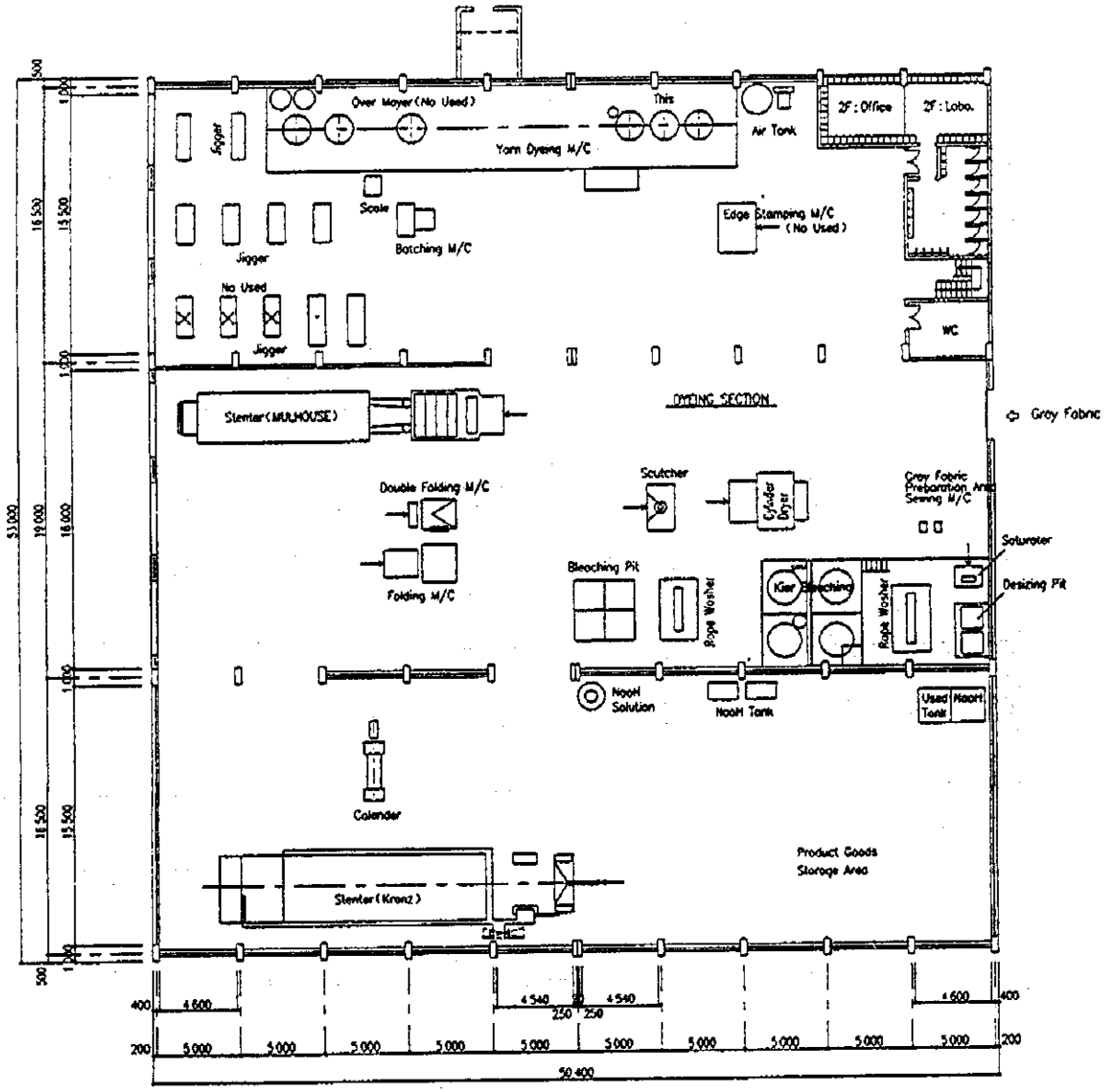
Syrian Company for Spinning and Weaving
Weaving Section Layout (Modirnization Plan No.2 Stage)



APPENDIX F-F-5

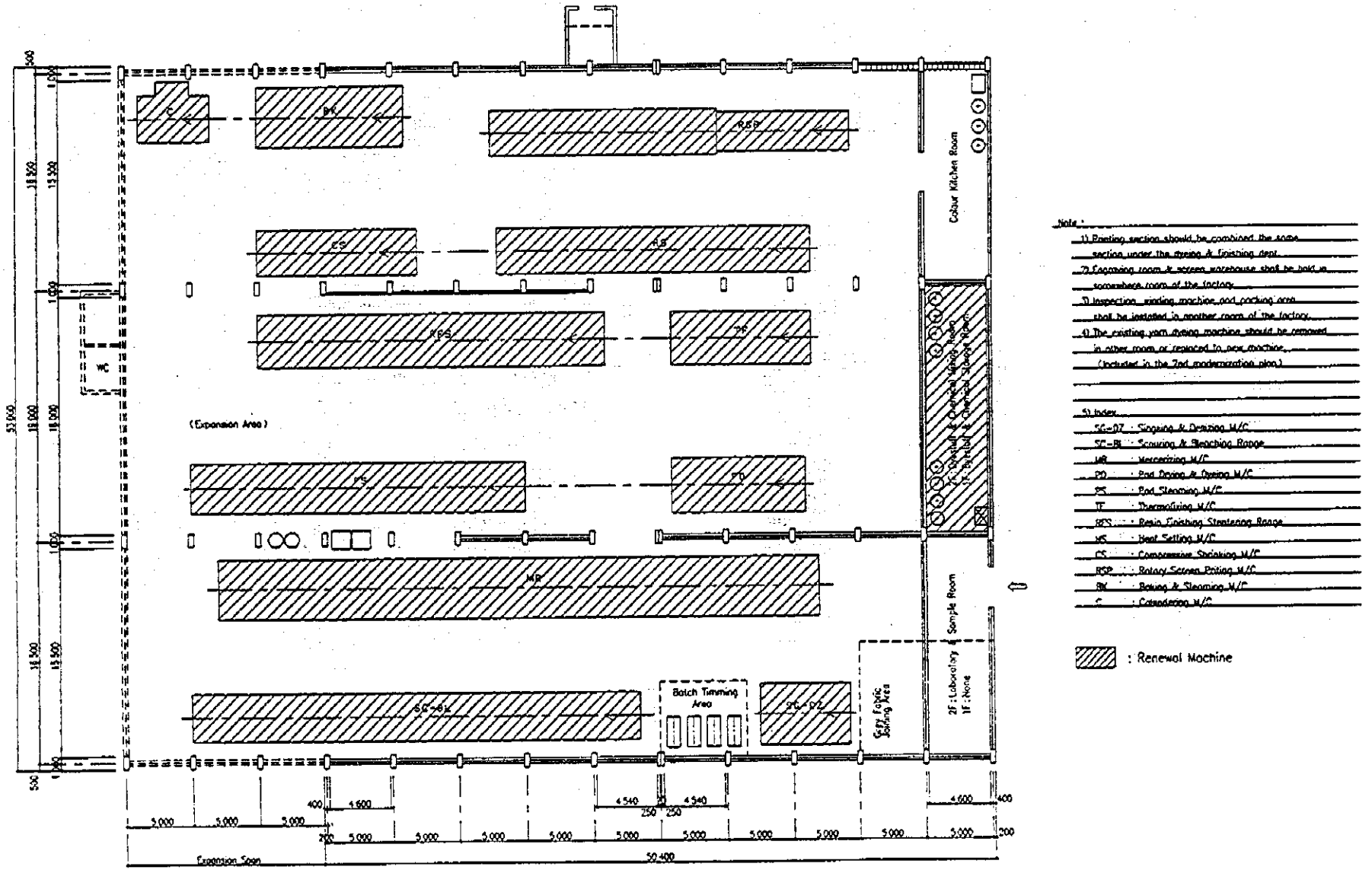
Syrian Company for Spinning and Weaving

D. Finishing Section Layout (Existing)

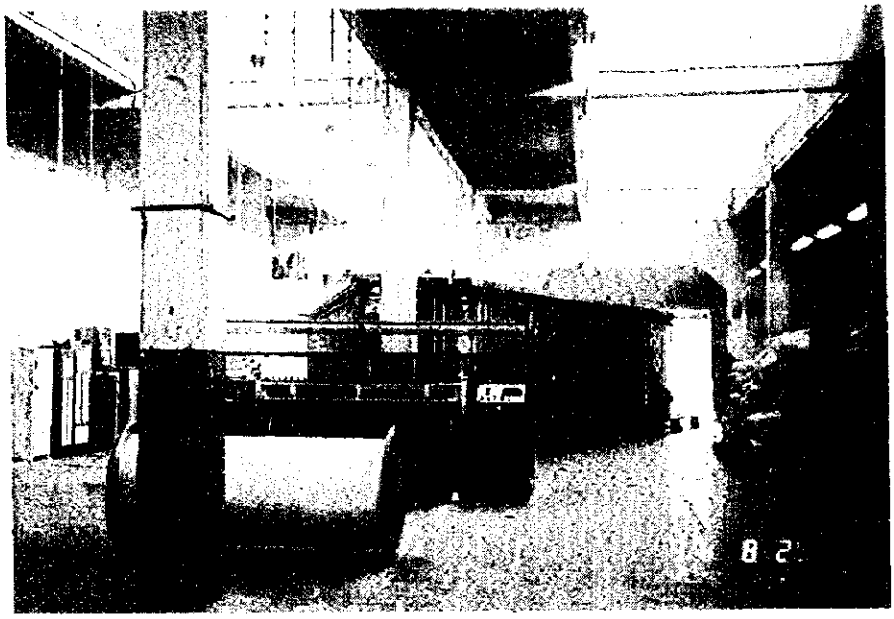


APPENDIX F-F-6

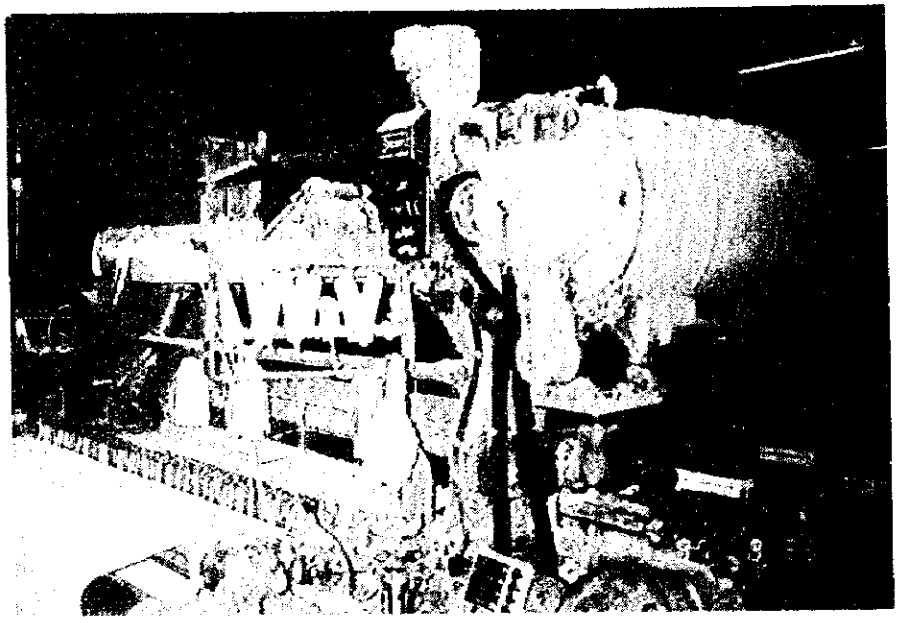
Syrian Company for Spinning and Weaving
D. Finishing Section Layout (Modernization Plan)



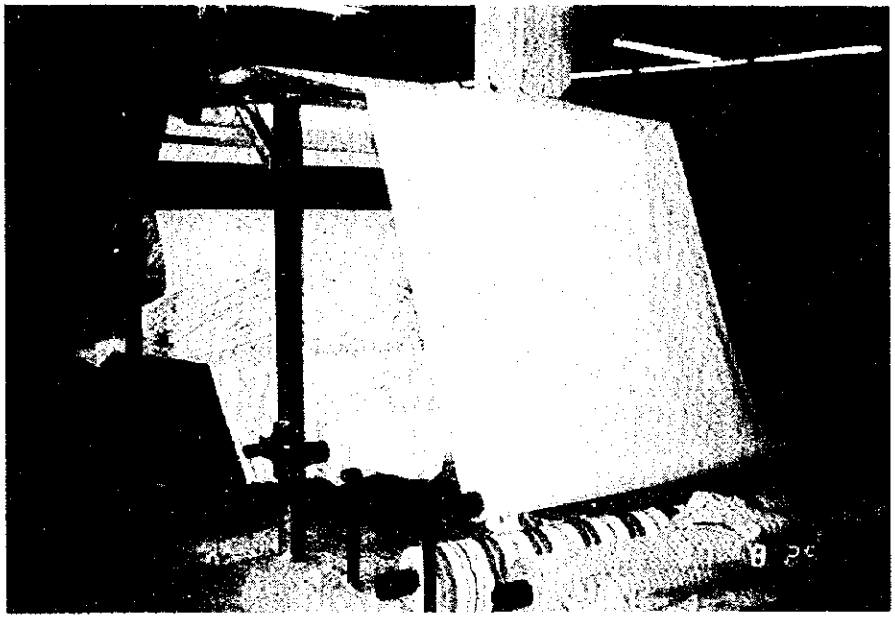
APPENDIX F-P-1 PILED CHEESE YARN IN BAGS (RIGHT BACK IN PHOTO)



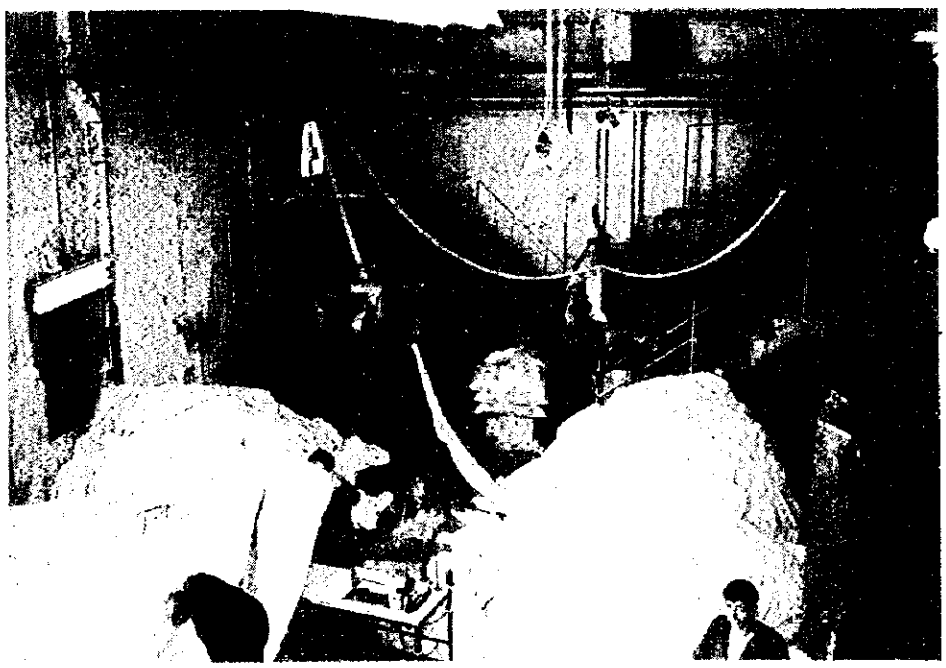
APPENDIX F-P-2 SHORTAGE OF YARN IN THE BEAM IS SUPPLEMENTED BY THE YARN CHEESE ON THE LOOM



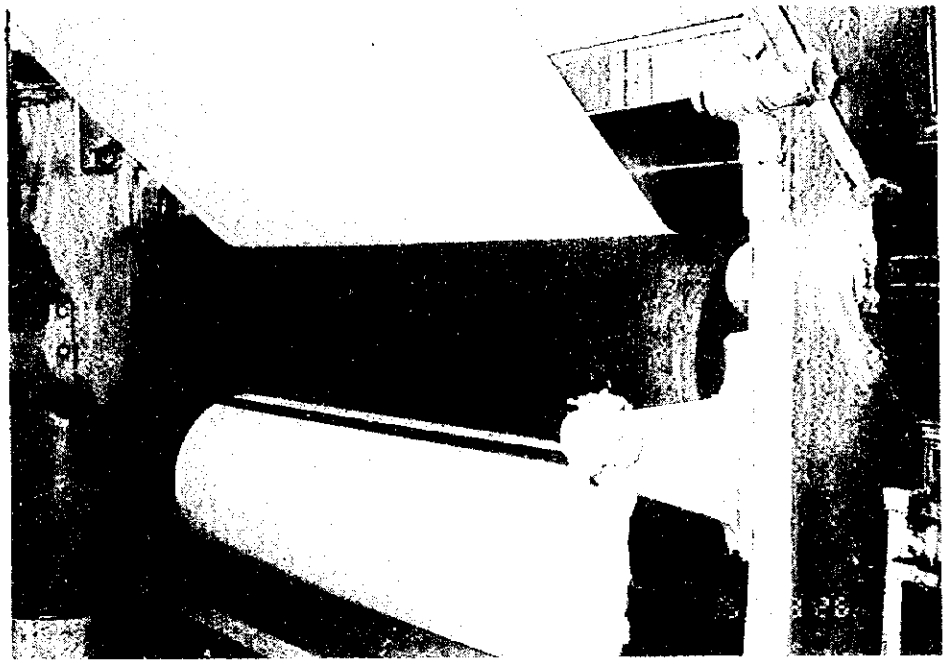
APPENDIX F-P-3 FABRIC SENT TO FOLDING WITHOUT BEING INSPECTED



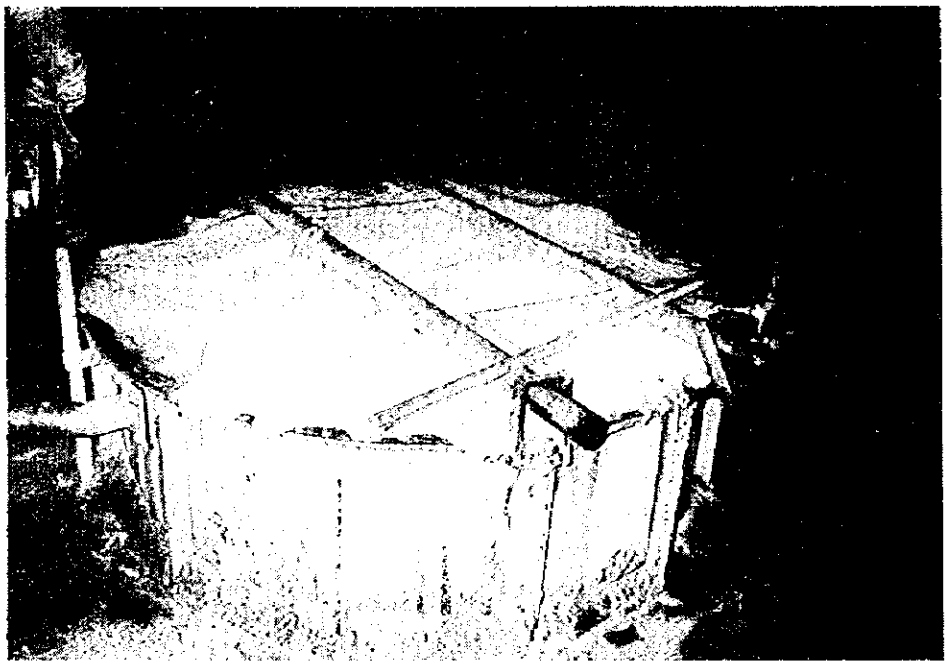
APPENDIX F-P-4 ROPE TYPE BLEACHING M/C



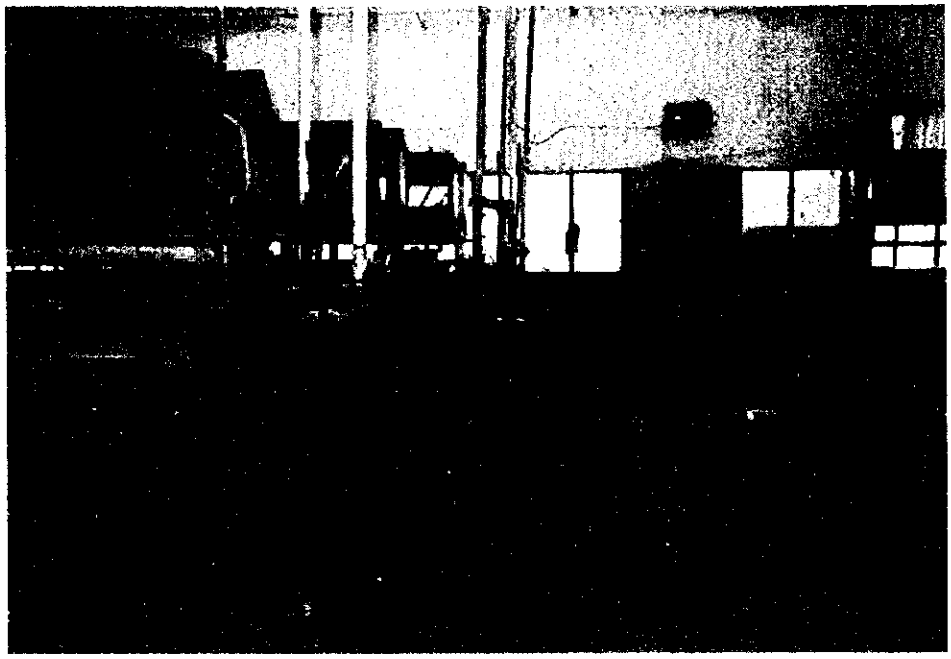
APPENDIX F-P-5 BAD SURFACE CONDITION OF CALENDER ROLLERS



APPENDIX F-P-6 VERY OLD FASHIONED BLEACHING



APPENDIX F-P-7 NO SAFETY CONSIDERED ON JIGGER M/C



APPENDIX F-P-8 VERY POORLY EQUIPPED LABORATORY

APPENDIX F-P-9 DIRTY AND DANGEROUS SITE REQUIRING "5S" ACTIVITY

7

Al Shahba Spinning and Weaving Company

CONTENTS

TECHNICAL DIAGNOSIS FOR AL SHAHBA SPINNING AND WEAVING COMPANY

Date:23 August-31 september,1997
Person in Charge: Takeohara,Ishii

1. Present Situation of the Company

1.1 Location

The factory is located within minutes on foot from the Syrian Company for Spinning and Weaving which face each other across the road of 25 m width between them.

1.2 Outline of the Company

(1) General items

The company was established as a private company in 1934. Afterwards, it was nationalized and became a public sector company in 1965. And it will be merged with the Syrian Company for Spinning and Weaving in the end of 1997. Therefore, one general manager will control both factories, but each organization will operate independently of each other.

(2) Building, site

The site area is about 41,000㎡ formed by a wide frontage of about 400 m width and about 110 m depth. The building seems to account for about 50% and the layout of the buildings was complicated with increases of various auxiliary facilities.(shown in Appendix G-F-1)

(3) Raw material

The raw material is 100% raw cotton (all Syrian cotton). In 1996, the production was 4,500ton/year planned and 3,900ton/year actual. The raw cotton is supplied by C.M.O.(Cotton Marketing Organization) every two months.

(4) Product

Spun Yarn: Ring spun yarn Ne 12's, 16's, 29's (average Ne 13's)
OE yarn 10's , 12's

Woven fabric: 10's x 8's/36 x 30 picks/inch x 920 mm width
(double weave) for flower,sugar bag 90%
16's x 16's/51 x48picks/inch x2000mmwidth
(plain weave)for bed sheet 10%

Waste cotton: waste cotton from blow room machinery and card,etc.,all exported to Italy and Turkey, etc.

(5) Sales and stocks

50% of the spun yarn is supplied to the company's weaving division. The other 50% is sold to companies in Syria. 10% of gray fabric is supplied to the Syrian Company for spinning and weaving and processed in it's dyeing and finishing division. The remaining 90% is, used for bags and other products, all purchased by the Government. The stock as of July, 1997 is shown as follow:

	Quantity	Estimated Value	Remarks
Yarn	645 ton	75 M.SP	Ring Yarn 160ton
Gray Cloth	--	--	O/E Yarn 485 ton

(6) Production plan and result

The production plan and the results (1996) are as follow:

	Plan	Results	Note
Yarn	3,607 ton/y	3,400 ton/y	50% for own Co,50% to sell
Gray fabric	1,720 ton/y	1,668 ton/y	90% for Bags, 10% for Bed sheet

(7) Organization and manpower

The organization of a public sector company differs in its subordinate organization with each section, according to the product, while the organization over the divisions are same.

Employees as of March,1997:

	Production division	Service division	Adminis-tration division	Managemen t	Total
Planned	572	60	100	70	802
Results	430	42	79	51	602

(8) Production equipment

Refer to Appendix G-T-1

2. Present Situation and Problems of Production Process

2.1 Spinning Process

① The spinning process is for production of 100% cotton yarn;

Ring spinning machines:26 sets x 384 spindles = 9,984 spindles

Open end spinning machines:14 sets x 200 spindles = 2,800 spindles

total 12,784 spindles

② Among the preparatory spinning machinery, the blow room machinery and cards are Trutzschler make, and the roving frame is Zinser. The modernization plan has started with the preparatory machinery and the replacement of spinning and winding process equipment is expected to follow.

③ The open end spinning machines (14 sets x 200 spindles) are Czechoslovakian make and are very old. The OE machines are also expected to be replaced to produce yarn for denim.

2.2 Weaving Process

① The cotton yarn is supplied by the company's own spinning division. Much of yarn stock is not found in the production area as seen in DIBS, but it is laid

on the floor, at random, packed in the bags. This is the same situation as Syrian Company for spinning and weaving.

② Many looms are stopped and are covered with dust. The production operations are far from normal due to manpower shortages.

③ The preparatory machines are not satisfactorily maintained, especially squeezing rollers which are covered with many defects on the surface (shown in Appendix G-P-1).

④ 12 sets of Sulzer looms are stopped due to spare parts shortages. Such looms are left uncovered and still with the warp beam on the beam stand (shown in Appendix in G-P-3).

3. Present Situation and Problems of Production Management in Spinning

3.1 Procurement Control

(1) Raw material

① The raw cotton (cotton 100%) is supplied by C.M.O. systematically according to request.

② Inspection on acceptance is carried out for appearance only. The table of the material characteristics and of the inspection results are not submitted.

③ Aging of raw cotton is not carried out. Before being put into the production process, raw cotton should be opened to allow uniform moisture regain and to acclimatize to it certain temperature and humidity conditions in the spinning room. Normal aging conditions are as follows:

24 hours under 30° C and 65% relative humidity

(2) Spare parts

① In the same way as is done in other companies, spare parts are included yearly in a budget and are purchased under the approval of GOTI.

② The spare parts for the old machines are procured with much difficulty and on long delivery times.

3.2 Stock Control

① The stock is controlled only on the basis of quantity.

② Adjustment of stock by means of production adjustment, etc. is not carried out for various reasons.

3.3 Process Control

① Many yarn breakages are found in the spinning process, although this should decrease because of improved spinning conditions as a result of the modernization of the pre-spinning process. However, the average yarn breakage is still many and 20 pieces/machine and more than 50 yarn brokerages on an average were found in some machines.

② The process is not satisfactorily controlled. For example, spinning cops, bobbins and spares, etc. are found here and there on the floor. Periodical cleaning of the machines seems not to have been properly carried out.

③ The open end spinning section is cleaned a little bit better than the ring spinning section is. However, waste cotton, recycled cotton waste and waste sliver, etc. are scattered on the floor. It can hardly be said that process control is good.

④ Because of inferior process control, spinning conditions are not maintained satisfactorily.

⑤ Poor education and training of employees through OJT is evident in the process control.

⑥ Inferior process control in the spinning and finishing sections affects the pre-spinning modernized processes, which creates a vicious cycle.
Waste of lap, sliver, and roving yarn, etc. are not arranged in order.

3.4 Equipment Control

① The spinning machines are not satisfactorily maintained. Idle spindles are left due to the lack of spare parts. 8 sets of spinning machines are stopped out of the 26 installed due to the lack of spare parts.

② Modernized carding machines 16 sets are stopped and 2 set are completely disconnected. One or two machines of other process areas were found be stopped.

③ There are many machines and spindles stopped because of a lack of spare parts.

④ Even modernized machines are not operating satisfactorily because of inadequate machine adjustment. The performances of the machines are not

fully released. For example, the air pressure of the blow room machinery is incorrectly adjusted.

⑤ Mixing of cotton fly into the process occurs frequently because of inadequate cleaning of machines. This causes slub yarn, specially on the drawing frames, roving frames and spinning machines.

⑥ 20KV power from the city is supplied by overhead cable to the Syrian Company for spinning and weaving. In Al Shahba Company the cable is connected to the transformer station by underground cable, therefore, maintenance control is very inconvenient and dangerous.

⑦ Air conditioning equipment, steam boiler, generator, work shop, etc. are all provided, although all are old..

⑧ Effluent is discharged directly to the city sewer. At present this does not become an issue.

⑨ Fire fighting is left to the fire fighting equipment of the city. The scope of responsibility is unknown.

⑩ The door of the switch gear room for the air conditioning equipment does not work satisfactorily to open and to close. An electric spark when switched may cause a fire. Maintenance chiefs in charge seem not be nervous about this.

3.5 Quality Control

① The carding machines were modernized, therefore, stable and good yarn having no unevenness, no neps, excellent web should be produced. However, many uneven and slub yarns are found at present.

② Only the minimum required testing equipment are provided in the laboratory. (for examples, Uster tester, single yarn tensile strength tester, twist meter, lap reel, constant temperature dryer, and lea tester, etc.)

③ Data obtained in the laboratory is not used practically in the actual operation of the machines. Data collection results in nothing.

3.6 Education and Training

① Employees do not master fundamental knowledge, training, practice or habits, etc. in the spinning mill. Necessary systems and facilities are not provided.

② Employees and managerial staff members lack proper knowledge or a sense of the necessity for quality.

③ At present there is no environment for employees to improve quality and production even gradually and to contribute to the prosperity of the factory.

3.7 Environmental Preservation

① In the pre-spinning process dust collectors for waste fly were fully replaced by means of new blow room machinery, therefore, dust collection from the air is satisfactory. There is no point at issue as for air circulation.
② 5S-Activity is absolutely necessary, specially for the floor and storerooms.
③ The counterplan for safety is inadequate.

4. Present Situation and Problems of Production Management in Weaving

4.1 Procurement Control

(1) Raw material

① Cotton yarn is supplied by the company's own spinning division and by the state-owned spinning companies by fifty fifty.
② The merger with Syrian Company should be characterized by mutual cooperation on procurement between the two companies. For example, Syrian Company may produce 12's cotton yarn and sell it to Al-Shahba Company, who may not procure it from other companies.

(2) Spare parts

① Because of money shortage spare parts are insufficiently stocked in both companies. Specially 12 sets of Sulzer looms are stopped in Al Shahba Company because of spare parts shortage.
② Substitute parts have been tried to procure locally, but the local metal material wears out easily because of hardness reasons, etc..

4.2 Process Control

① Because of insufficient labor force, all of the machines are well below normal operating standards. Some looms are running, but others are stopped in a block. The operation is intended merely to get out the planned production. Operators are mostly young around 14 to 16 years old and the job level is very

low. Besides, they have no interest in quality and have no proper education and training. Woven fabric have a lot of defects seen when inspected. Large defects such as double weft insertion, erroneous warp reaching ,and open shed, etc. occurs frequently. This is the same as Syrian Company.

② Problems on the process control, above all on the operation control are as follows:

- Lack of morale of employees as well as the whole factory
- Lack of education and training for skilled workers and a high turnover ratio
- Lack of recognition of quality, productivity and cost and lack of the information

4.3 Equipment Control

① Many machines are stopped because of damage and spare parts shortage.

② In Al Shahba Company 12 sets of Sulzer looms out of newer 66 sets 1975 are stopped without having necessary covering sheets, but are covered with dust (shown in Appendix G-P-W4).

③ Problems are the same as Syrian Company;

- Technical level of maintenance workers is very low.
- Experienced technicians are very few.
- Inferior repairing causes successive damage and it creates a vicious cycle.

4.4 Quality Control

① The quality control section exists as an organization, but it does not work functionally at all. There is no check sheets for quality control. Gray woven fabrics are not sufficiently inspected. The fabric is sold just on the basis of a certain classified length after cutting defective parts.

② There is no sense or recognition of quality in the factory and no demands to drive it by need.

③ The present situation seems to be that the management, leaving the matter of quality, is busy to control manpower allocation and production planning due to employees shortage.

④ All production can be supplied without having a claim from customers, therefore, such conditions do not require quality control. Under these circumstances, the establishment of systems for control target setting or other

targets and endeavor for their attainment should be set aside from the points at issue.

⑤ The priority is to create a climate and build morale by managerial staff members.

4.5 Training and Education

① New employees are given training and education in outline. OJT is given by senior persons on the spot. The necessity for education and training and it's shortage are well understood, but the contents and level are not properly grasped.

② Because of the shortage of manpower, even fresh employees have to be used as on line, whoever they are.

③ Trainer themselves have not sufficient experience. Therefore proper training is not given. There is no system to train and educate trainers.

④ Talented labors are not gathered (they are mostly young between 14 to 16 years old).

4.6 Environmental preservation

① There are many damaged portions to be repaired on the floor, which are dangerous for pedestrians.

② The preparatory section and the weaving section are separated by a road and the floors differs in level in some place by more than 1 meter.

③ Education and training of environmental preservation are not given.

④ Most of employees are not aware of the importance of safety. Covers for rotational parts are not mounted on machines (shown in Appendix G-P-4).

5. Modernization Plan

5.1 Modernization of Production Management in Spinning

(1) Process control

① To maintain the performance of the replaced new machines fully by means of exhaustive maintenance and cleaning of the machines

② Various miscellaneous articles and waste, etc. scattered on the floor or other places should be arranged in order. It should be recognized that this arrangement affects quality of maintenance and machine performance.

(2) Equipment control

① Preparation and implementation of a preventive maintenance plan and lubrication plan.

② Preparation of an instruction manual for SOP of each machine and education and training according to it.

(3) Quality control

① Practical use of inspection data

② Reinforcement of a sense of quality

③ Introduction of quality control methods

④ Introduction of TQC (Total Quality Control) and small group activity

⑤ Establishment of a special committee and development of it's activity (committee should be given authority)

(4) Training and education

① Establishment of a training facility (preparation should be made when the factory is inactive)

② Preparation of information material for education

③ Collection and reinforcement of information

(5) Environmental preservation

① To make a tour of inspection through the factory headed by the general manager and exchange views with employees, on the spot, to improve various matters , for example, safety issues, quality, employee morale).

5.2 Modernization of Production Management in Weaving

(1) Process control

① Control standards for each process should be prepared as a control manual. This aim is that the situation of process control should be checked and confirmed by every workers.

② To clarify parameters for each process and keep them as a record.

(2) Equipment control

① A ledger of machinery and equipment should be prepared and maintained. The details of trouble and damage and the date of the spare parts used should be recorded in the ledger, according to which the necessary cost for repairs should be included in a budget. Systematic maintenance will consequently let the machinery and equipment last longer and maintain stable quality.

(3) Quality control

① Quality control standards for each process should be prepared as a control manual to check quality control situation and to confirm it by every employee.

② When new looms are introduced, they should be equipped with monitor control. Quality control should be carried out by such control systems as for saving time and labor.

③ It is suggested to start with fabric inspection (defects points counting) at once.

(4) Education and training

① It is suggested that the company should train employees efficiently and systematically following JI (Job Instruction) of TWI (Training Within Industry, developed in USA).

② TWI includes training courses for trainers. It should start with fostering of trainers.

(5) Environmental preservation

① It is suggested that a committee for safety and health should be organized. Members from all divisions including office worker should participate to carry out mutual inspection on the spot. It is important and effective to see the actual situations from different points of views.

5.3 Modernization of Spinning Process

① 14 sets of OE-BD200 should be replaced with new OE machines and the factory should specialized in yarn for denim.

② Draw frames, 7 sets should be replaced with new models one by one.

5.4 Modernization of Spinning Equipment

[Guideline of Modernization]

Some of the pre-spinning processes have already been replaced with new equipment, but some of them are currently under way and completion is expected within half a year. The company has a desire to produce yarn for denim. This is proper, considering the characteristics of Syrian cotton. It is proposed as follows, considering the technology and investment capital requirements.

[Introduction of New Machinery]

① At present OE yarn is the main currency for denim, except yarn for special brand denim. The existing OE machines (Czechoslovakia make) can not spin yarn of soft twist, therefore, it is not suitable for yarn for denim.

- Existing OE yarn Ne7's : Twist Constant 5.0, Twist 13.2/in
- New OE yarn Ne7's : Twist Constant 4.0-4.2, Twist 10.38/in

② The new OE machine can produce yarn with more soft twist, suitable for denim. First as a step, 6 sets of existing 14 OE machines will be replaced with two sets of new OE machines. By phasing this will give education and training of employees on how to operate and control them. Afterwards, another 2 new OE machines will be installed. In this way existing machines should be replaced in succession corresponding to market demand.

③ Drawing Frame: The existing machines are fitted for 8 inches diameter cans, which are not usable for the new OE machines. Therefore, all 7 sets of draw frame should be replaced. As a procedure, 4 draw frames should be removed and 4 new draw frames should be installed in their place. Afterwards, successive removal and installation should be done according to production considerations. 8 sets of draw frame should finally be installed.

(1) Main machinery to be introduced and it's main specification

The machines and their main specifications are summarized in the following table.

No	Machine Name	Set	Specification	Unit	SP. Condition
1	OE Machine	3	Delivery : 120	Drum	3×120=360
	Yarn Count		70'S	Ne	
	Rotor Speed			rpm	65,000
	Twist Factor			/in	4.2
	Delivery Speed			m/min	156
	Production			kg/day/hr.	0.790
	Efficiency			%	85
	Actual Production			kg/machine/day	1, 934
	Total Production			kg/day	5,802
2	Draw Frame	2	Delivery 2	Drum	2×2=4
	Production			Grain/6yd	450
	Speed			m/Min	400
	Production			kg/day/hr	128
	Efficiency			%	80
	Actual Production			kg/mach/day	4,985
	Total Production			kg/day	9,380

(2) Capacity calculation

It is shown in the above summary.

(3) Layout plan

It is shown in Appendix G-F-1,2,3.

(4) Accessories (for 1st modernization plan)

- Can 20" ϕ for OE 120x3x2=720pcs
- Can 20" ϕ for draw frame 4x2=8pcs

Total 800 PCs

(5) Erection plan(for 1st modernization plan)

- For erection of machines : 2 months
- For adjustment of machine : 1 month

total : 3 months

(6) Manpower allocation

OE	1 person/shift	3 shifts/day	3 persons/day
Draw frame	1 person/shift	3shifts/day	3 persons/day
Total	2 persons	3 shift/day	6 persons/day

(7) Estimated investment capital cost

1.5 million dollars

(8) Subsequent modernization plan

- OE spinning machine 4 sets
- Draw frame 1 sets
- Auxiliary equipment for above 1 complete set

5.5 Suggestion for Factory Management after the Merger

- Both companies should work in harmony. Any sense of discrimination one to the other, company and employees, should be removed as soon as possible.
- The optimum product mix of both companies should be prepared. (Re-distribution of all products).
- Cotton yarn for weaving and cotton gray fabric for dyeing should be dealt with internally in the new company to utilize excess process equipment effectively. (Products available in the company should not be purchased from outside)
- The optimum process equipment should be fully operated under optimum conditions. Of course operators are to be exchanged between the two factories. For example, the weaving preparatory equipment of Syrian Co.

is working better, therefore, it should be operated 100 % fully operated. Al Shahba should reduce the use of some of its equipment accordingly.

- Surplus equipment, including stopped equipment due to shortage of labor should be concentrated in one factory, whichever it is.
- Some of the process equipment should be exchanged between the factories, if necessary.

APPENDIX G-T-1

Machine List : Spinning Section

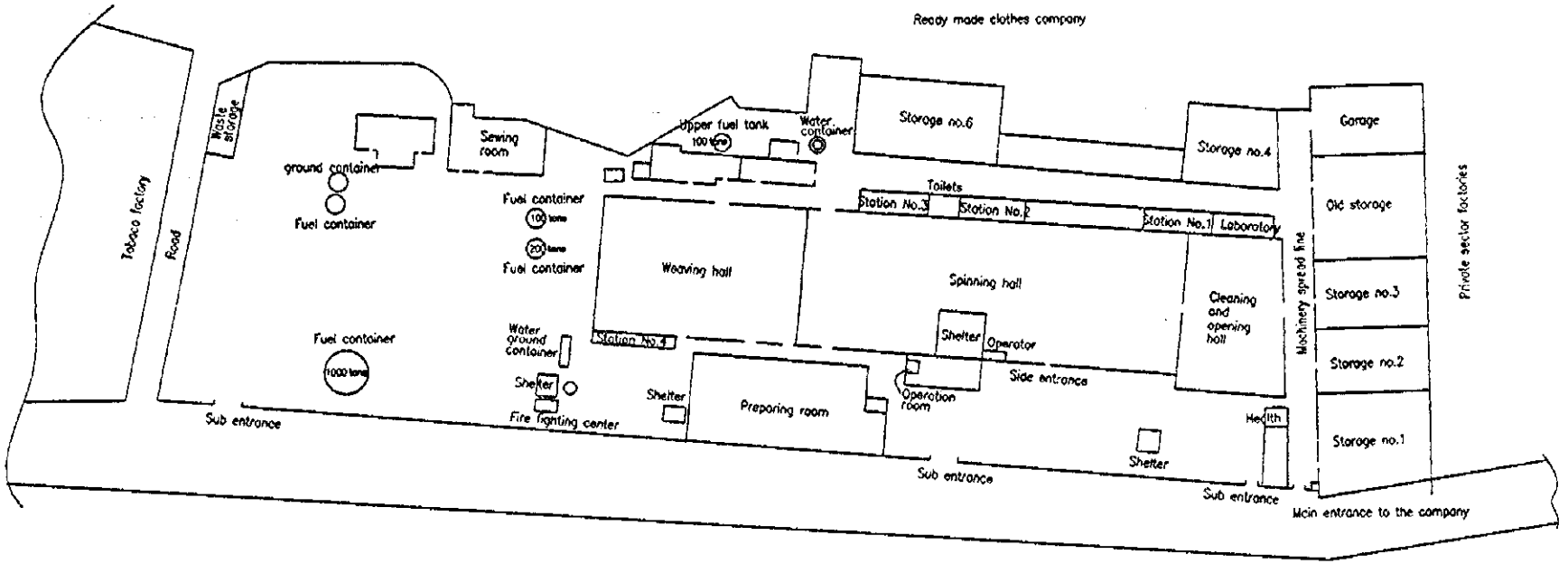
M/C Name	Set	Origin	Name of Mfg.	Model	Year	Note
Blow Room	1		TRUZTSCHLER		1983	
Blow Room	1		TRUZTSCHLER		1996	
Card M/C	16		TRUZTSCHLER	DK-760	1996	
Draw Frome	15x2 D		Zinser		1969	
Roving M/C	2		Zinser		1970	
Roving M/C	3x84sp		Zinser		1969	
Ring Frame	14x384sp	USSR			1996	
Ring Frame	12x384sp	USSR			1996	Creel Modified
Open End	14x200sp	Czechos.	-	BD-200	-	
Winder	3x24 D		Korl Meyer		1975	
Winder	4x96 D		Mettler		1968	
Warper	1	Swiss	Benninger	ZDA	1978	wide H Creel
Warper	1	Germany	Hacoba	NHZ-o	1975	Wide H Creel
Sizer	1	USA	Barbercolman	Slasher Compounents	1949	Wide - Becter
Sizer	1	UK	Hibbert	UC2-Wi	1963	Narrow
Loom	6	Swiss	Sulzer	130ES	1969	RS, 300 cm Gripper
Loom	66	Swiss	Sulzer	130ES	1975	RS, 300 cm Gripper
Tyeing M/C	1	Germany	Fisher	PU-ELA	1972	
Tyeing M/C	1	Germany	Fisher	PU-ELA-C-KK	1993	

< Utility Equipment >

1. Power Supply			City	20KV		
2. Transformer				630KV x 4 Consumption		1.5 MW
3. Generator			Russion	500KVA x 1	1958	
			Rolls Loyce	625KVA x 1	1976	
4. Work Shop				Lothe, Milling, Shaper, etc		
5. Water Supply			City			for Air Conditioner
			Well x 1			
6. Boiler			Wanson	10 T/Hr x 1	1982	
				5 T/Hr x 1	1967	
				5 T/Hr x 1	1971	

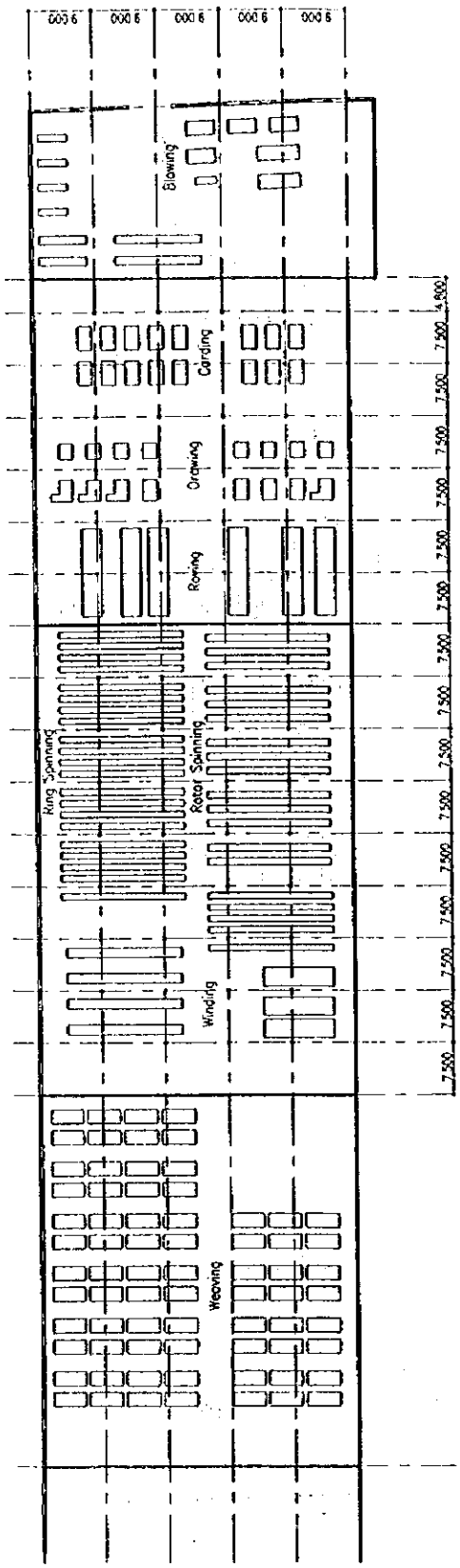
APPENDIX G-F-1

Al Shahba Spinning and Weaving Company
Factory Outline Layout (Existing)



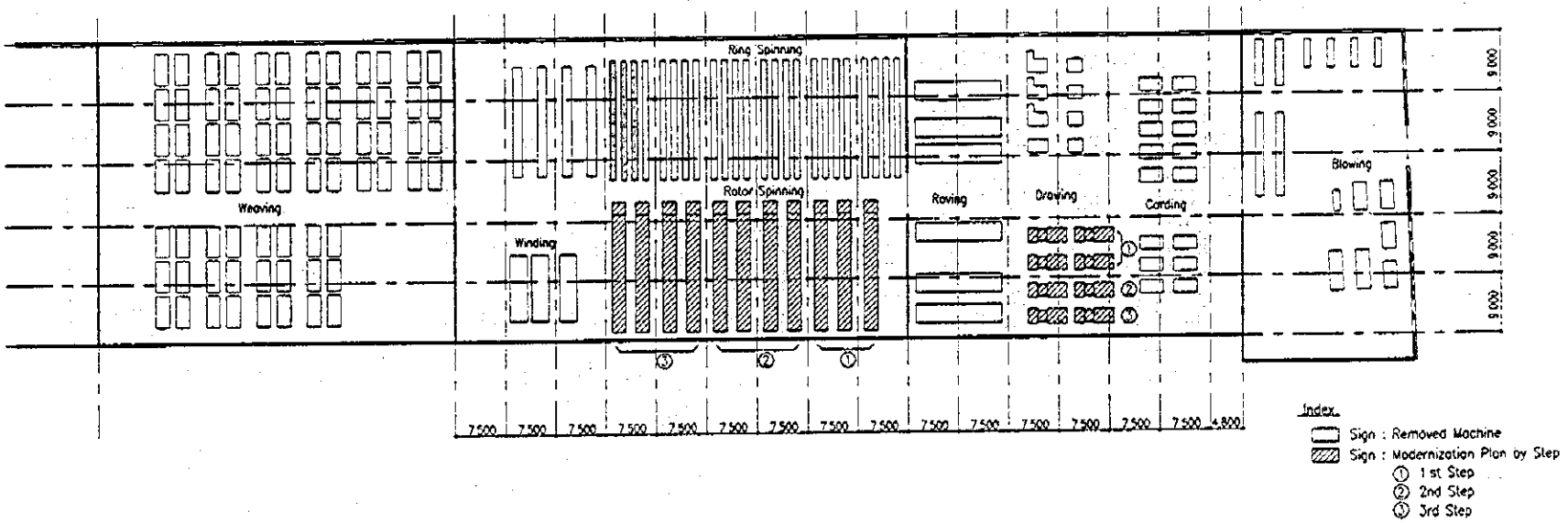
APPENDIX G-F-2

Al Shahba Spinning and Weaving Company
Spinning Section Layout (Existing)

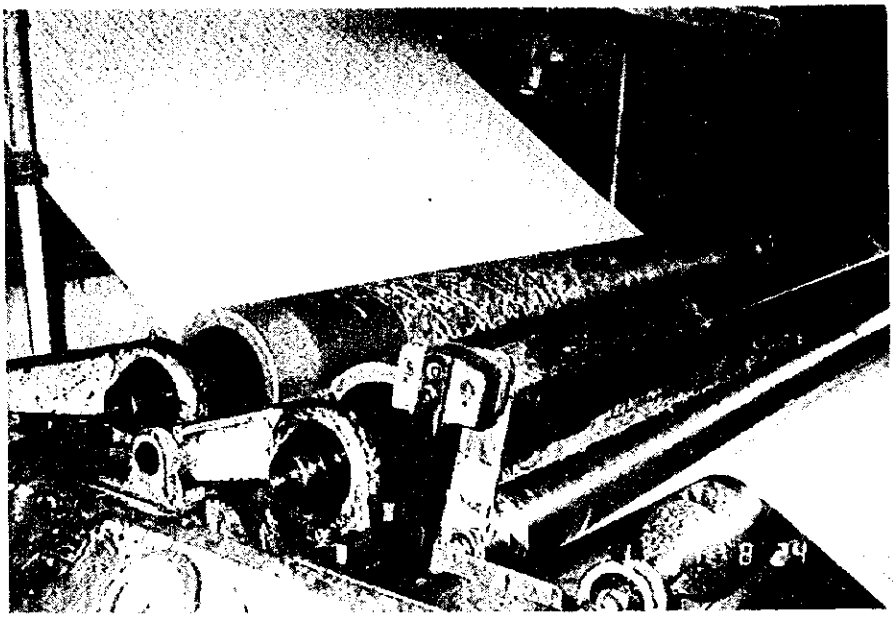


APPENDIX G-F-3

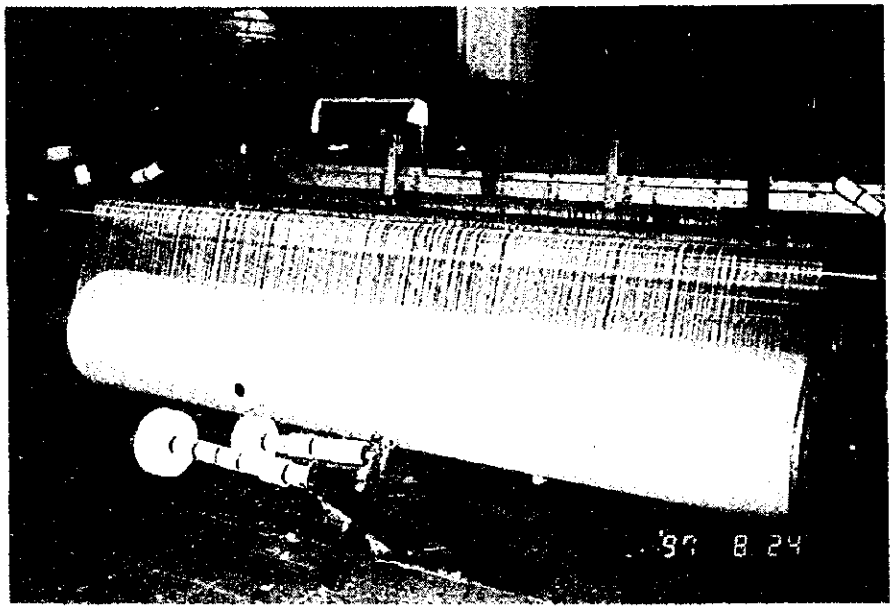
Al Shahba Spinning and Weaving Company
Spinning Section Layout (Modernization Plan)



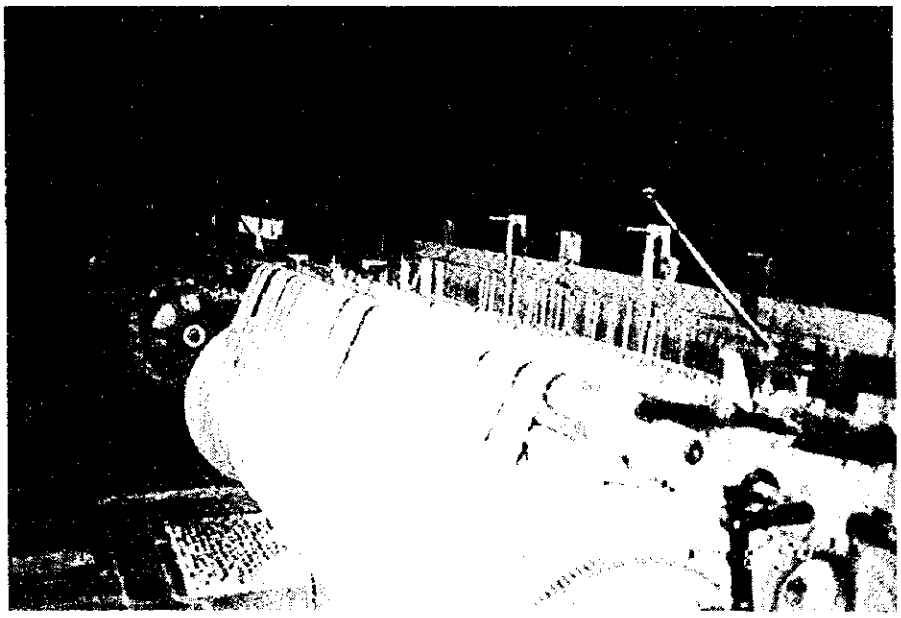
APPENDIX G-P-1 DEFECTIVE SQUEEZING ROLLER AND DEFECTIVE CLEANING OF SIZE BOX



APPENDIX G-P-2 SHORTAGE OF YARN ON THE BEAM CAUSED BY YARN BREAKAGE SUPPLEMENTED BY THE YARN CHEESE ON THE FLOOR



APPENDIX G-P-3 LOOMS ARE ABANDONED WITHOUT REMOVING SIZING BEAM AND NOT COVERED UP



APPENDIX G-P-4 NO AWARENESS OF SAFETY (WARPER RUNS WITHOUT COVER)