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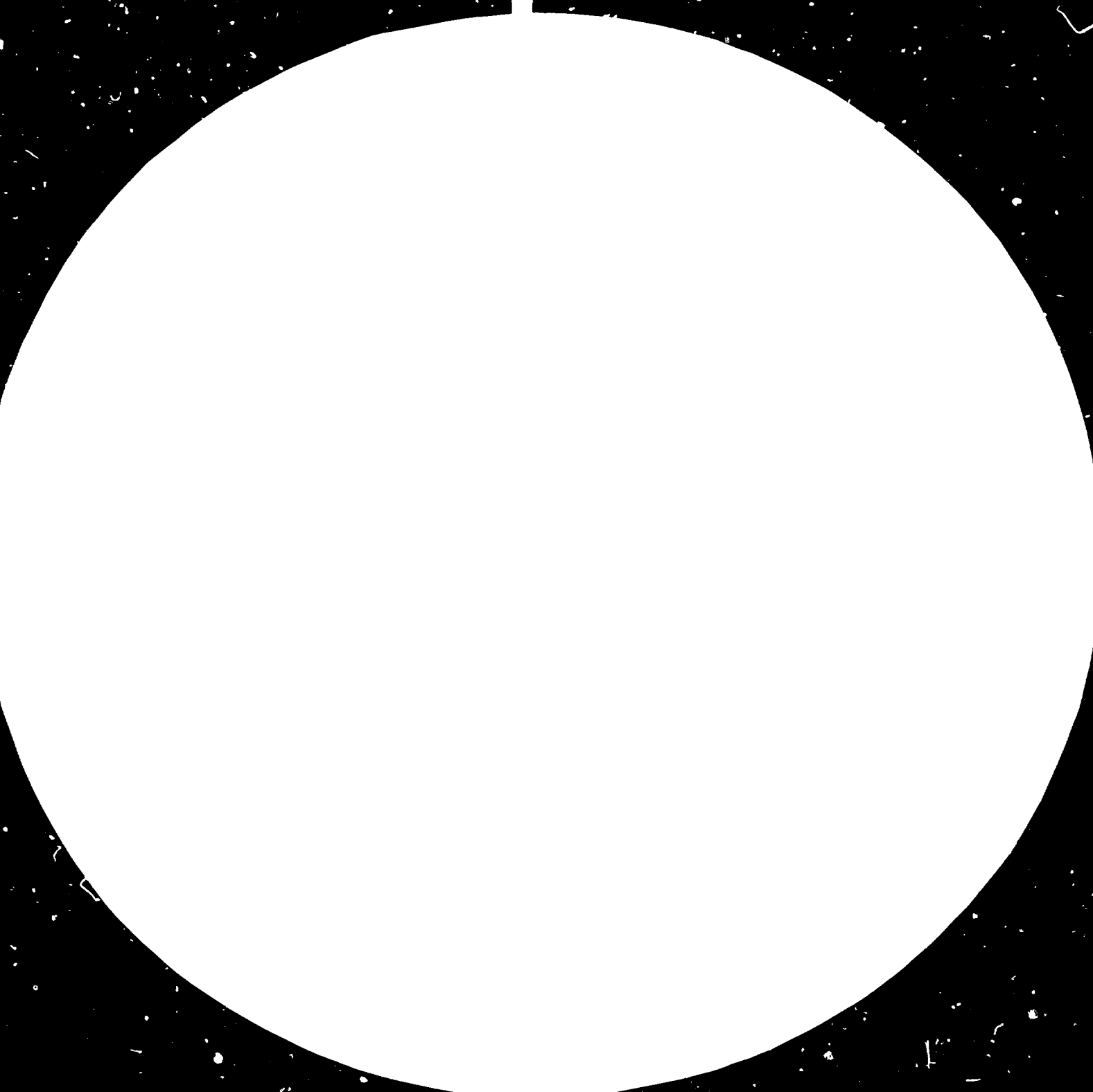
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MISSION REPORT

Group Study Tour in Cotton Textile Technology  
to People's Republic of China<sup>1/</sup>

15 August - 3 September 1980

by

Martin Minke  
Industrial Development Officer  
Division of Industrial Operations

On behalf of DIO/Training Branch  
US/INT/80/015/16-12-0

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Purpose of the mission

Under the terms of an agreement signed between the People's Republic of China and UNIDO covering the use of the voluntary contribution made to UNIDO by the People's Republic of China, a study tour in cotton textile technology for twelve participants from developing countries was organized in August 1980.

The participants were selected jointly by the Government of China and UNIDO and the practical arrangements for the tour were entrusted by the Government to the Ministry of Light Industry. I accompanied the tour as the official UNIDO representative.

Itinerary (The participants' arrival and departure dates to and from China varied to some extent (see Annex II); the following dates apply to me only).

Vienna - Frankfurt	14 August 1980
Frankfurt - Beijing	14 August 1980
arr. Beijing	15 August 1980
dep. Xiang	20 August 1980
Xiang - Shanghai	26 August 1980
Shanghai - Beijing	1 September 1980
Beijing - Frankfurt	4 September 1980

Programme in China

Friday	15 August 1980	Arrival, rest, general discussion of the programme
Saturday	16 August 1980	Mausoleum Mao Ze Dong ; Temple of the Azure Cloud;
Sunday	17 August 1980	Forbidden City; Ballet performance;
Monday	18 August 1980	Visit to the Great Wall and Ming Tombs;
Tuesday	19 August 1980	Visit to textile cotton mill - Peking No. 2; Dinner party given by the Director of the Department of Foreign Affairs of the Ministry of Textile Industry, Mr. Wang Tzen-Yen;

Wednesday	20 August 1980	Travel to Xian
Thursday	21 August 1980	Cotton Textile Mill N.W. No. 3; Chinese opera;
Friday	22 August 1980	Cotton Textile Mill N.W. No. 3; Provincial Museum
Saturday	23 August 1980	State Cotton Mill N.W. No. 4; State Dyeing/Printing Mill No. 1;
Sunday	24 August 1980	Shangshi State Cotton Mill No. 8; Visit to the tomb and excavation of the 1st Emperor of Qin Dynasty;
Monday	25 August 1980	Yellow River Cotton Weaving Mill (sheets, towels); Silk Factory (weaving only); Visit to the Big Goose Pagoda; Tea-party with discussion by the Manager of the Textile Corporation of the Xiangsi Province;
Tuesday	26 August 1980	Departure for Shanghai;
Wednesday	27 August 1980	Shanghai No. 12 Cotton Mill; Ballet;
Thursday	28 August 1980	Shanghai No. 12 Cotton Mill; Shanghai No. 8 Cotton Mill;
Friday	29 August 1980	Shanghai No. 8 Cotton Mill; China Textile Machinery Manufacturing Works; Puppet Show;
Saturday	30 August 1980	Shanghai No. 2 Dyeing and Printing Factory; Shanghai No. 2 Textile Machinery Mfg. Works (spinning frames + dyeing machines); Dinner party;
Sunday	31 August 1980	Shanghai Industrial Exhibition; Sightseeing on Huang-Poo River;
Monday	1 September 1980	Depart for Beijing.



Comments on the Programme and on the Organization of the Tour  
(Group Study Tour in the Field of Cotton Textile Technology in Beijing)

A. Due to the various arrival dates of the participants (between 13 and 18 August) the actual programme started on Tuesday 19 August 1980. The intermediate period of time was used for sight-seeing.

Three participants arrived on 24 August and joined the main group in Shanghai. These three participants were separated from the group after the Shanghai programme and went to Xiang and returned to Peking on 7 September, a few days after the main group had left China. These three participants stayed in Beijing until the first available CAAC flight back to Addis Ababa on 15 September 1980. A programme has been prepared for them during the stay in Beijing.

The programme for the main group of ten participants totalled 12 factories:

- 7 cotton textile mills, of which 2 mills were visited extensively during  $1\frac{1}{2}$  days;
- 1 silk weaving factory;
- 2 dyeing/printing factories;
- 2 textile machinery manufacturers.

In total, ten days were used as working days (including the visit to the Shanghai Industrial Exhibition).

Due to the holiday period a visit to a textile institute or college could not be incorporated in the programme.

On their request, individual members of the group were accompanied to visit a Machinery Import and Export Corporation, a Chemical and Dye-stuff Import-Export Corporation and to a agricultural commune.

The execution of the programme was well organised and smooth. At the mills we were always warmly welcomed.

On our request, the mills prepared a technical introduction sheet, which was helpful in better understanding of the technical structure of the mill and it avoided basic questions during the discussions after the mill visits.

The language barrier was bridged by non-technical interpreters. The standard of interpretation was not always quite satisfactory.

For future groups, it would be useful if interpreters could familiarize themselves on textile matters in advance. Furthermore, the group felt the necessity to learn something about the basic principles of the economy as a whole, including sufficient information on social aspects. Most of it became clear during the tour and in individual talks. For future groups I would recommend to give an introductory lecture on these subjects before the programme starts.

At the end of the tour a summarizing technical session with officials of the host country would be another recommendation. In this case I organize a final and summarizing meeting at the end of the programme.

In a final session with the Vice-Minister for the Textile Industry, Mr. Wang Rei Ting, following the remarks made during the group's visit to the machine manufacturers in Shanghai, he promised that future export deliveries of Chinese spinning frames would be fitted out with S.K.F. bearings, to begin with the deliveries to Burma, early next year.

On the suggestions from the Pakistani participants, he promised to send a team of Chinese experts to carry out a survey on the state of the installed 300,000 spindles and on the recommended replacement of spare-parts so that the equipment installed in Pakistan could be utilized to a much greater extent than it is at present.

The participants of the tour have learned a great deal, in particular, in applied technology. Their participation in the activities of the group was excellent and all of them took part in the sometimes lively discussions during and after the visits of the factories. The Chinese counterparts were very helpful and open in all discussions.

The standard of accommodation and board was excellent in Xian and Shanghai. However, the Beijing Friendship Hotel is of a lower standard and is inconveniently located far out of the centre of Beijing.

B. At the request of the Training Section I discussed the possibilities of organising a 3 months in-plant training course on cotton textiles.

An Interoffice Memorandum (Annex VII) on this subject was sent to Mrs. I. Lorenzo on 30 September 1980. The Chinese reacted positively on the proposed training course and end October this was confirmed officially. The Training Section is drafting a project document on it.

C. Initial exchange of thoughts were held about holding a seminar on the silk processing industry in the People's Republic of China. The Chinese authorities reacted positively (see note - Annex VI).

General Observations on the Textile Industry in China

No national statistics on raw materials, installed capacity, production, total labour force were disclosed. Only in personal discussions rough figures were mentioned. I had no means of checking whether the mills selected for our visits can be regarded as representative for the entire cotton textile industry in China. However, calculating the output of the nationwide installed capacity on the base of production figures given by the visited factories, for one reason or the other, the mills in the industrial provinces visited by the group seem to have a higher output than the national average.

Following notes are an attempt to give the reader a reasonably realistic picture of the situation.

The capacity of the Textile Industry in the PRC has increased considerably since 1949:

- |  |         |
|--|---------|
| - cotton textile industry increased its capacity | 3 times |
| - wool textile industry                          | 4 times |
| - jute   | 5 times |
| - silk   | 6 times |

In 1978 the estimated output of raw cotton was 2.1 million metric tons. In 1980 the yield per Ha. is expected to be much higher than in previous years. Some 0.5 million tons of raw cotton is imported from Pakistan (0.2), Sudan, Egypt, USA, Guatemala and Nicaragua. The cotton growing area cannot be increased much. Around 300.000 tons of synthetic fibre for blending is yearly produced in the country.

The chemical fibre production will be expanded during the 6th five-year plan. After realization of the plans the capacity for the production of chemical fibre will have increased up to some 1.5 million tons. Roughly 2/3 of the capacity is for polyester fibre and less than 1/3 for vinyl (natural gas as basic raw material). However, since the basic raw material for polyester, naphta is in shorter supply than originally estimated the expansion plans for polyester fibre are under revision and will show a much lower growth than anticipated.

The output of cotton yarn (including blends) for 1980 is estimated to be 2.5-2.7 million tons, that of cotton cloth well over 11 billion linear meters (including 20% knitted). Cotton cloth is rationed and per capita approximately 7 meter per year is made available.

The 4 billion remaining output is understood to be distributed over export, industrial use, army, strategic reserves and distribution stock. Export of textiles in 1979 was 28% of the country's total export volume. The main textile products exported are:

- woollen cloth
- silk
- grey cotton cloth

Installed capacity in the cotton textile industry:

14,000,000 spindles  
300,000 looms.

In Xian and Shanghai the output per hour is 30-40 kg/1000 spindles. Apparently, these figures are not representative for the whole country.

Technical Observations

The emphasis of the tour was basically on the following three subjects:

- processing technology in cotton textile mills
- maintenance
- quality control.

The processing technology is described in Annexe IV, Cotton Textile Mill NW 3 (Xian), Shanghai No. 8 Cotton Mill and Shanghai 12 Cotton Mill respectively.

The characteristics of the visited Cotton Textile Mills are virtually identical. Therefore, the data on the properties of the cotton fibre, the quality of slivers, lap and yarn, as well as the data on the spinning process as given by the Shanghai No. 8 Cotton Mill are representative for the observations of the group.

Most impressive is that all the mills are equipped with old and conventional machinery. We observed cards from 1900, 1918 etc. and spinning frames and looms ranging from 2-40 years old. All machines in spinning and weaving are Chinese made and basically their design has not changed since the beginning of this century. Most striking fact is that due to an effective maintenance system including technical renovations all installed machines are working during 24 hours per day at high speeds. We observed:

Spindle speeds of 16-18,000 Rpm, and looms speed of 157-195 Rpm (depending on the type of cloth).

The group studied intensively the maintenance and repair systems of machine and parts. Many simple but practical solutions and techniques have been observed. In particular the applied simple technology of repair of shuttles and bobbins and other parts of spinning frames and looms impressed the participants. Many of these techniques can be used in their factories back home.

#### Quality Control

Statistical quality control is not practiced. However, laboratory tests are carried out according to mill frequency schedules on all basic data on:

- raw cotton
- carding sliver
- drawing sliver
- roving
- lap irregularity (combing)
- yarn
- weaving
- final product

The attached charts provided by the Shanghai No. 12 and No. 8 Cotton Mills are good examples for the quality control checkpoints in the mills and they represent the figures, encountered by the group in other mills. Much attention is given to the quality of raw material and carding in order to achieve the best quality of yarn. High attention is given to final inspection of cloth. The laboratories were equipped with basic instruments only. No sophisticated electronic instruments were used. Evenness of yarn is tested by the Saco-Lowell method. As a result of intensive quality control in all stages of the production process, in which the channels of democracy as described in a following chapter plays an important role, an effective reporting and warning system on machine defects with immediate repair, product quality is of high standard.

#### Maintenance System

All mills visited had large and well equipped workshops capable of handling almost all spare-parts and repair needs of the factory. Therefore, the maintenance and repair staff is relatively large.

The maintenance programme for spinning as imposed on the mills by the Government is as follows (weaving has a similar programme with different timings):

- major overhaul
- minor overhaul
- repair
- cleaning
- shift fitters

### Major Overhaul

Frequency: once in 3 years (spinning); looms every 2 years  
Duration: 6 days for spinning frames of 416 spindles per machine (day-time only)  
Team: a typical mill has 4 teams of 6 mechanics each  
Result: complete renovation of machine.

### Minor Overhaul

Frequency: every 6 months (spinning and weaving)  
Duration: 2 days (day-shift only)  
Team: 4-6 mechanic each team  
Result: machine adjustments.

### Cleaning

Frequency: every 8 days; weft yarn spinning  
" 10 days; warp yarn pure cotton  
" 14 days; cotton/PES blends  
Team: a typical mill has 3 cleaning teams of 8 persons - 2 cleaners, heads of machines; 6 bodies of the machines.

### Shift Fitters (spinning):

Frequency: continuous  
Staff: 4 persons per shift for 114,000 spindles (Shanghai No. 12)

### Oiling

Frequency: continuous  
Duration: 1 hr per 416 spindles  
Laboratory checks the speed of the machine twice a week.  
The total amount in maintenance and repair is 15% of the total employed.

### Spare-parts Management

Stock keeping,

- a) major parts, such as card clothing, rollers rings, beams, etc. one year supply period.
- b) smaller parts, bearings, shaft, etc. purchasing plan per 4 months.

50% of spares is purchased  
30% is manufactured in factory workshops  
20% is re-used after repair in factory workshops.

The total cost of repair and maintenance was in one factory 4.2% of the working capital, spinning spares cost 1 yuan/1000 spindle hours.

## Factory Management and Democracy

### a) The Management Functions

The role of management is limited to the production process. This means responsibility for production output, its final quality and for the state of machinery and for the working conditions and position of the operators and auxiliary personnel.

In the near future mill managers will be given higher financial responsibilities and responsibilities with respect to product ranges (market orientation).

The group observed considerable differences in the quality of factory management.

### b) Following an article in Beijing Review democracy in factories is channelled through:

- workers conference and staff members in the factories. At present, China is reforming its system of economic management and expanding the power of an enterprise to make its own decisions accordingly the congress also has a bigger say in factory affairs. The workers conference discusses the major problems of the mill about major problems (two times this year).
- democratic election and appraisal of leaders
- trade unions
- democracy in shifts and groups
- other channels

It has to be mentioned that democracy in factories is constantly developing and new experiences are constantly translated into improved practices.

The party-general supervises the mill through management.

The Corporation of Textile Industry in each province controls the mills in its region.

It can be concluded that, due to the developments in democratisation factory management in the western sense does not really exist.

## Working Hours

The Peking Review reported:

Fewer hours, but greater efficiency - The Chinese Ministry of Textile Industry on August 14 reported increased productivity and work efficiency at textile mills that began a new shift system last year.

"More than 300,000 employees at over 120 cotton mills have been working a three-days-on, one-day off program since April last year. About 50,000 of them are new employees taken on to work the extra shifts that were introduced at the same time.

Although, China has about 240 major cotton mills. According to ministry statistics, the mills still working a standard six-day week, will generate another 100,000 jobs if they also begin the new shift system.

In the first three months of this year, the ministry said, 66 of the mills working the new hours produced 15 per cent more cloth than in the first quarter of last year - equivalent to the output of 12 medium-scale mills. Work efficiency went up by more than 5 per cent".

The schedule for the 4 shift system is as follows:

	Mon.	Tues.	Wed.	Thur.	Fri.	Sat.	Sun.	Mon.	Tues.
Morning shift	x	x							x
Afternoon			x	x			free	free	
Night					x	x			

Some factories have a 3-1 schedule or other variations.

Due to this schedule the machines are in operation for the full 24 hours instead of 22.5 hours in the three shift system. This resulted in 16% increase in production. With 7 official holidays there are 8,592 standard machine hours per year.

The four-shift system is based on 8 hours working days. However, in future experiments with 6 hours working days will determine the new outline on shifts and working hours.

#### Incentives

Teams of workers compete for the best results in quantity and quality, savings and the hours used. Reward to workers consist of:

- praising
- presents and bonuses.

Monthly appraisal and yearly rewarding will than follow. In Mill No. 8, Shanghai the average reward was 16½% over the monthly normal salaries. The highest reward for the best groups was 25-30%. The total reward value is based on the increase of the production of the mill and of the profit, of which one-third to 10% is made available for rewarding workers. The basic salary of a weaver is 45 yuan/m plus bonus up to 30 yuan so that salary can be 75 yuan per/m.



Excellent performances are awarded individually. The persons concerned are shown at special wall-boards as excellent examples for the other workers.

### Working Conditions

Dust is under control in many of the visited factories. However, in some mills the installation of air-suction system is still in a planning stage. In some of these mills the workers do not wear dust-masks.

Some factories measure the dust content in the air. The lowest observed level is  $0.3 \text{ mg/m}^3$ . The differences per factory are considerable. The Ministry of Industry intends to invite a dust control expert to advise on how to achieve internationally accepted standards.

Noise levels are high, not only in weaving but sometimes also in other departments where gears, bearings, etc. are highly charged. The Ministry wants also advice on international standards and how to achieve these. The general feeling is that much can be done in the areas of the construction of ceilings, walls, vibration of looms bearings, gears, etc.

The workers seem to have objected to the use of ear-protectors.

Welfare is well developed.

Machine efficiencies observed in the visited factories are as follows:

spinning frames 97.5% - 95%

weaving looms 92%

man efficiency up to 90%, however, because of group responsibility no exact figures were made available.

other data:

machine maintenance time < 10%  
(excluded the time used for overhaul)

cost of spares: 10 Yuan/10.000 spindles/hr.

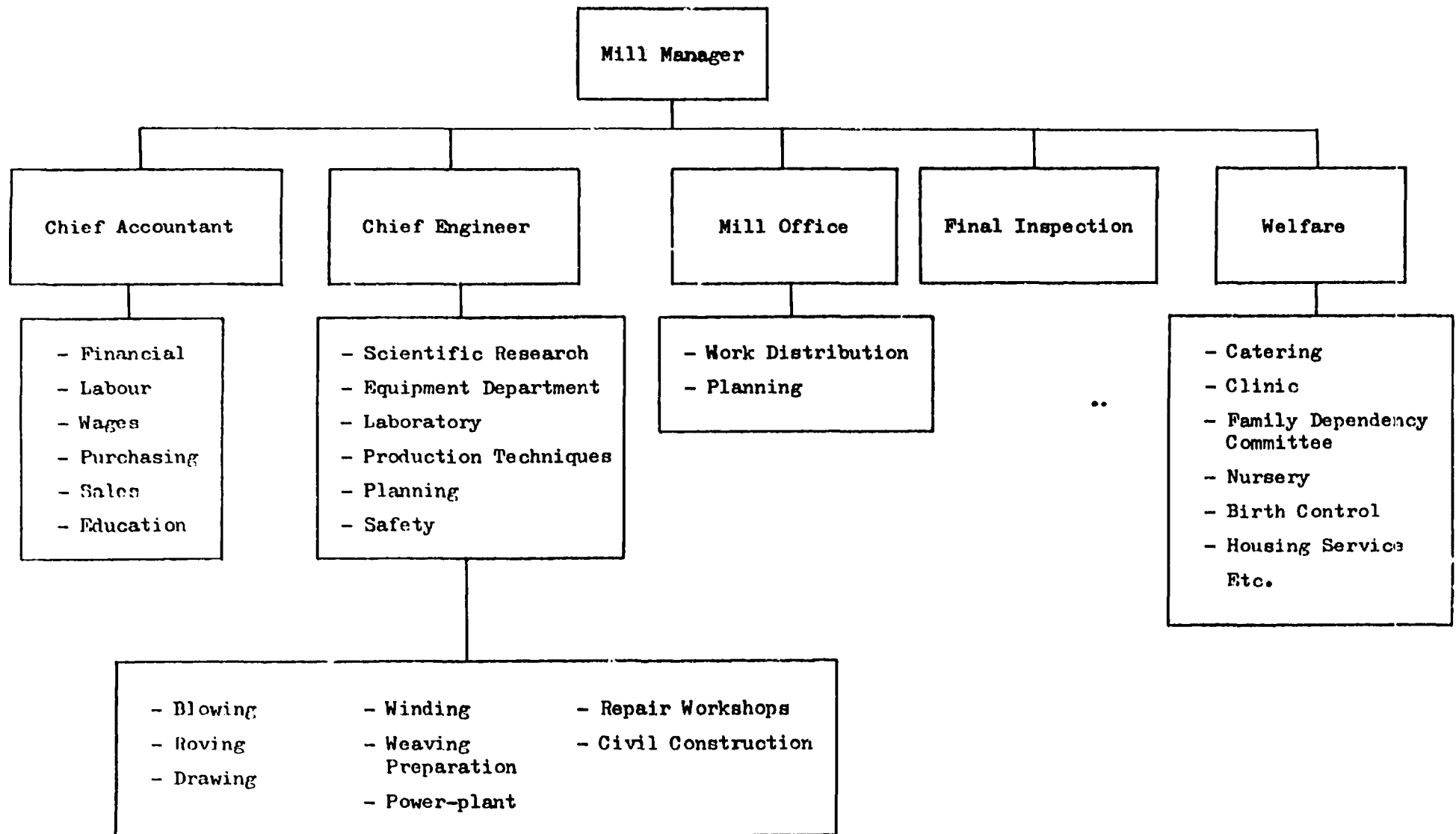
total cost of maintenance + repair was given as being 4.2% of working-capital in Shanghai No. 12.

no. of looms/  
weavers

24 - 36 (narrow looms)

16 - 24 (wide looms)

ORGANIZATIONAL STRUCTURE OF A FACTORY (NW NO. 3 FACTORY, XIAN, IS GIVEN AS A TYPICAL EXAMPLE)



Production Equipment

The machinery in the mills shown to us usually either very old but extremely well maintained or, although relatively recently manufactured, of conventional type representing roughly 1950's level of technology.

- Carding: Conventional cards, frequently very old but renovated, often chute fed and with metallic wire. Production rate 10 - 20 kg/h. Mostly with air suction system.
- Combing: Conventional ribbon lap. Production rate 12 kg/h. Six heads per frame.
- Drawing: Three processes, autolevellers now installed in some mills.
- Roving: One process.  
Drafting system: single apron, 3 line rolls usually.
- Spinning: Conventional.  
No open-end equipment.  
Relatively high speeds: 15,000 - 18,000 RPM.  
Drafting system: usually Casablanca or similar with roller weights. The A152 model has pendular weighing arms.  
Direct weft spinning in most cases.
- Warping: Usually fractional.
- Slashing: Can slashing or hot air chambers;  
Single size boxes;  
Sometimes automatic moisture control.
- Weaving: Nearly always shuttle-changing automatic looms;  
200 picks/minute.  
10-shuttle box  
Drop wires.  
Steel heddies  
Automatic let-off motion  
Individual motors.
- Bleaching: Continuous  
Chlore and/or peroxide.

- Dyeing: Continuous; sometimes also jiggers, sometimes HF dyeing.  
Dyestuffs: vat, dispersed, reactive.
- Printing: Roller printing, hand screen printing, no roller screen printing.
- Finishing: Some mills have open width mercerizing and heat-setting machines. Innovation in this area is taken up by many factories. Old equipment with small pre-shrinking machine is gradually replaced by modern imported machinery from Japan and Europe.
- Laboratories: Well equipped with mechanical instruments asking for a great number of laboratory personnel. No Uster testers, but Saco Lowell Eveness testers. Conversion formula:

$$\text{Uster CV \%} = \frac{\text{Saco Lowell}}{c (6.48)}$$

For quality data see Annex IV and V under physical testing and quality in various processes.

List of main Chinese officials connected with the tour

Mr. Wang Rei Ting	Vice Minister of Textile Industry
Mr. Wang Tzen-Yen	Director of the Department of Foreign Affairs of the Ministry of Textile Industry
Mr. Chou Weing-Cheng	Manager of the office of the Department of Foreign Affairs, Ministry of the Textile Industry
Dr. Zhu King <sup>1/</sup>	Textile Engineer and adviser to the Department of Foreign Affairs, Ministry of the Textile Industry and counterpart to the group
Mr. Qneng	Director of Textile Corporation, Xiangshi Province
Mr. Chao	Manager of the office of the Textile Corporation in the Shiangshi Province
Mr. Zao	Staff officer of the Textile Corporation in the Shiangshi Province
Mr. Kao	Textile engineer
Mr. Chang Tsao Wei	Manager of the Department of Foreign Affairs of the Shanghai Textile Bureau
Mr. Liang Si-Qing	Chief of the Department for the Department of Foreign Affairs
Mr. Yuan Tien-Wei <sup>1/</sup>	Textile engineer/interpreter
Mr. Ju Juin <sup>1/</sup>	Interpreter, China Textile Engineering Section
Mr. Wu Baoru	Interpreter
Mr. Lei Yung Chan	Interpreter

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<sup>1/</sup> Accompanied the group during the tour

List of Participants

Name	Country	Arr. in Beijing	Dept. from Beijing
Muhammad Islam	Bangladesh	13 August	3 September
Tin Pe ) Tint Swe )	Burma	13 August 13 August	3 September 3 September
Alemayehu Negussie ) Yohannes G. Medhin )	Ethiopia	25 August 25 August	15 September 15 September
Fuziyah Abdul Wahab	Malaysia	13 August	3 September
Mahesh L. Pradhan	Nepal	13 August	3 September
Ahmad Niaz ) Malik )	Pakistan	17 August 17 August	5 September 5 September
Ali Salad Dirir	Somalia	17 August	5 September
Lucas E. Mhuashi	Tanzania	25 August	15 September
Thomas Poniponi Mandla Jele	Swaziland	16 August	5 September
George Bwalya Mulenga	Zambia	16 August	5 September

Mill data

Peking No. 2 Cotton Textile Mill

Built in 1954; in operation 1955.

115,000 spindles  
27,000 spindles, twisting } Chinese made  
2,400 looms }

Production: 60 tons yarn daily  
200,000 m fabric/day

Shifts: 3 shifts - 8 hours each

Shifts' workers: 4 shifts - 1 shift rotating

Working hours: 42 per week

Total employed: 7,000 - 4,000 spinning  
2,000 weaving  
1,000 auxillary + staff

Production data:

- spinning: - 18 different counts Ne 6 - 60  
- 2/3 in cotton/PES blends  
- 1/3 pure cotton
- output: - 20 Ne 40 kg/hr/1,000 spindles  
- 40 Ne 16 kg/hr/1,000 spindles  
- average 30 kg/hr/1,000 spindles
- spindle speed: - 40 Ne : 19,000 RPM  
- 20 Ne : 16,500 RPM  
- average : 17,500 RPM
- ring diameter: - 48 mm and 45 mm
- lift: - 7"
- staple length: - for 40 Ne : 29 mm  
- 20 Ne : 27 mm
- card waste: - 3%. For 20 Ne more impurity, waste 4%
- drawing )  
roving ) waste: - 6%, which is used for Ne 6 and 10  
spinning )
- humidity control: - 55% at 30°C, spinning  
- 65 - 70% at 27°C, weaving

Mill data

Cotton Textile Mill N.W. 3

Director: Mr. Li Xi-Huan

Chief Engineer: Mr. Wang Fun-Piao

Erected: 1954

Site area: 50.000 m<sup>2</sup>

Equipment:

- 61,954 spindles
- 1,584 looms (of which 304 wide width)
- 20,900 twisting spindles
- 3 sets of combers
- 24 air-conditioning sets
- 3 newly installed refrigerations

No. of workers:

- 4,800 (60% female)  
including 200 in management and  
1,600 spinning operatives

Production:

- |   |                           |             |
|---|---------------------------|-------------|
| - | <u>1954</u>               | <u>1980</u> |
|   | yarn 7,000 tons/year      | 10,000 tons |
|   | fabric 45 mln. m          | 550 mln. m  |
|   | % first grade: 99 in yarn |             |
|   | 99 in cloth               |             |

Working hours:

- four shift system
- 1 day day-shift 8 hrs
- 2 morning 7½ hrs
- 3 night 6 hrs
- 4 rest -
- continuation

Cotton:

- mainly from the Siangshi Province

Fibre length:

- 22 - 27 mm for medium counts (21 - 29°)
- 27 - 29 mm for fine counts (40<sup>s</sup>)
- 31 mm for blends

Spinning:

- production per hour 39 kg for 20<sup>s</sup>  
eff. 97 - 98%

Carding:

- metal carding cloth
- cylinder speed 350 RPM
- take in speed 2,400 RPM
- doffer speed 20 RPM
- output 18 - 20 RPM
- dust contain 3 - 4 mg m<sup>3</sup>
- breakage at full speed 0.5%



- Drawing:
- 2 passages drawing frame cotton;
  - 3 passages drawing from blended fibre;
  - front roller speed 850 - 900 RPM
  - 1 1/8  $\phi$
  - sliver evenness 17 - 20%
- Roving:
- front roller speed 220 RPM
  - twist multiplier 1.05 cotton
  - standard weight 6 gr/10 m cotton  
7.3 gr/10 m blends
- Spinning:
- A 152 machine, Draft double apron system with pendulum
- Winding:
- slubcatchers : 1.75 x 2 x yarn count
- Sizing:
- cold starch 98°C. PH. 8 - 9. PDA in case of PES blends
- Quality:
- according to national standards, which are in many cases higher than the international standards. The R.P.C. became a member of ISO in 1978
- Maintenance system:
- as described in the chapter about maintenance production loss is 1% due to maintenance
  - maintenance staff for machines : 500 for general
  - maintenance 200

Mill data

Cotton Textile Mill N.W. No. 4

Xiang

Director: Mr. Sung

Construction: 1954, in operation in 1956

Equipment:

- spindles 100,620
- twisting 32,300
- looms 3,128 including 224 63" wide looms

Personnel:

- 8,134
- 94 staff (including 30 engineers)

Production:

- 53 tons yarn/day
- 310,000 m/day

Market:

- yarn 40% of production is sold to other mills and exported
- cloth 90% domestic market
- 10% export (grey cloth)

Products:

- average yarn count 27 Ne
- 50% of the production is finer than 40<sup>S</sup>
- the other half is courser than 23<sup>S</sup>
- no middle counts are produced

Production process:

- bale plucker - circular
- carding - web exceptionally clean and there are very few neps

Carding:

- air suction on cards, therefore, card cloth very clean; clean web
- cylinder speed: 280 - 360 RPM
- doffer: 22RPM
- take in: 1,300 RPM for cotton
- 1,000 RPM for polyester
- waste: 2 - 3%
- quality control: on the spot
  - weight of web: 408 - 414.4 gr/m
  - 1 lap = 18 kg
- output: 280 kg/hr/mach. 1 lap = 4 min

Drawing:

- 4 passages for PES/CA of which 3 passages for blending in ration 6668

Spinning:

- 42 Ne - 16,000 RPM (1954 model frames)
- front roller 250 RPM
- $\phi$  28 mm
- lift 8"

Winding:

- 3,000 RPM
- 1 cop = 609 grams for Ne 45

Yarn quality:

	<u>eveness</u>	<u>strength</u>
for Ne 20 <sup>S</sup> cotton	14 - 15	280 gr
Ne 40 <sup>S</sup> cotton	15	200 gr
Ne 21 <sup>S</sup> PES/CA	10	350 gr
Ne 45 <sup>S</sup> PES/CA	12	N.a.

Weaving:

- 14 varieties of cloth
- average picks per inch 60
- average width 41,2"
- blended 38"

Workload:

- 24 - 36 looms per weaver (narrow)
- 16 - 24 looms per weaver (wide)
- eveness: 20 Ne cotton 14 - 15  
45 Ne CA/PES 12  
21 Ne CA/PES 10
- strength singles: 20 Ne : 280 gr  
40 Ne : 200 gr  
PES/CA : 350 gr
- prices: Foreign Trade Organization determines factory price for 65/35 PES/CA.  
Ne 45 : 3,000 Yuan/bale for 40 Ne pure cotton 1,000 Yuan/bale (1 bale is 400 lbs)

Production:

- catalogue promises an output of 35 m/day
- the actual output is 33 m

Cloth construction:

- 2321 printing cloth
- 2321 39" width
- 2016 shirting
- 2121 poplin 50 picks/inch  
90 ends
- 2121 khaki drill
- 2121 reversable
- 42/221
- 4221
- etc.

Mill data

Printing and Dyeing Factory N.W. No. 1

Xian

Constructed in 1956, started up in 1958

The number employed is 2,710 (39% women)

Facilities for:

- bleaching
- dyeing
- printing
- finishing
- maintenance
- repair shop
- civil construction

Capacity:

- 180 mln meters
- of which: bleaching 5%
- dyed fabric 65%
- printed fabric 30%

Market:

- the 5 provinces in NW and some in SW - export to East Asia, Japan, Romania, in total 6% of total production

Design of prints:

- design in own plant. 17 designers
- 700 different designs are made, of which 70% are put in production
- 6 designers were rewarded in 1979 in a national contest

State of machinery:

- old, but well maintained
- technical innovation ill. be implemented, in particular in finishing of PES/CA cloth and in the prints. Most of the dyes and chemicals are made in China

Process:

- singeing, desizing, scouring, mercerizing in one process
- concentrated caustic soda for mercerizing is 260 gr/L
- mercerizing at 35 - 40°C caustic soda is not cooled (no cooling plant)
- the caustic soda is for 80°C reused
- 95% of the cloth processed is mercerized
- after heat-setting dyeing (phenol) on Chinese and Japanese HT machines in two steps
- the steamer/dryer is from Italy, Ariola, 1978
- production capacity 30 m/hr, 4 widths at the same time
- roller printing up to 6 colors
- reactive printing
- naphtol dyeing
- shrinkage is a problem. A full shrinkage process will be introduced in the near future
- dyeing cost for blended cloth is 4.20 - 4.50 Yuan for poplin shirting
- there is no water treatment in this mill, which affects the results of dyeing and finishing to some extent

Mill data

Shangshi State Cotton Textile Mill N.W. 8

Mill's foundation 1940

Site area 25,3 HA. 16.8 HA factory buildings

Processes:

- bleaching
- spinning
- weaving
- socks knitting

Equipment:

- 27,648 spindles
- 280 multi-shuttle looms
- 155 hosiery, socks machines

Raw material:

- consumption raw cotton: 3752 tons
  - terrylene: 377 tons
  - nylon
  - filament +
  - acrylic: 119 tons
- 
- 4248 tons/year
- 

Capacity:

- spinning 3900 tons
- bleaching/  
  dyeing 867 tons
- weaving 692 tons or 5.0 mln meters
- socks knitting 4.8 mln pairs

Total employed:

- 3,075
- working days per year 307.5
- there are 6 workshops and 2 auxillary workshops
- water is not treated PH7  
  hardness 60%
- hank dyeing of yarn

Socks knitting:

- (36 kinds of nylon and acrylic socks)
- two stages: borders are knitted separately and linked on to the sock knitting machine
- yarn used: nylon filament  
  EB acrylic, which is wound twice after dyeing; from hank to cone; from cone to cone  
  it was explained that this process will be simplified after installation of cone dyeing machines

- pairing of socks:

variations in foot-length of up to 2 cm for  
the same size were observed  
insufficient control on the yarn supply  
tension and the take-up tension

Weaving:

- 43 kinds of cloth
- laboratory tests show a shrinkage of 2% in  
warp, 1% in weft (no finishing)

Mill data

Yellow River Cotton Textile Mill

Xian

Manager of the mill - Mr. Yian

Erected in 1954  
Site area 52,966 m<sup>2</sup>  
Buildings 19,580 m<sup>2</sup>

Products: - towels, bedsheets, towel quilt, yarn dyeing, printing

Workers employed: - 1980

Equipment:

- weaving 231 looms
- bedsheet 126 looms
- towel 80 looms
- jacquard 32 looms

Output:

- bedsheets (2 x 2.4 m) - 1 mln/year
- towels + pillow-towels 8<sup>5</sup> mln/year
- jacquard towel quilts 50.000/year
- cotton consumption : 1,500 tons
- yarn export to 20 countries is 400 tons/year
- labour intensity is high
- mechanization of the production is authorized (6 mln Yuan)
- the towel production will then be lodged in a separate mill of 11.000 m<sup>2</sup> for 800 workers (construction cost equivalent to \$15/sq ft)
- the "Hero" brand bedsheet is considered as a famous product of the country size 80 x 90", 16 x 16 Ne, 78 picks/inch, 56 ends/inch

Process:

- spinning
- average count 21 Ne
- variation from 16 - 32 Ne
- yarn bleaching: continuous process in rope form (hanks are knotted into an endless chain)
- yarn dyeing: in hanks in tubs  
area is small and the process flow is following a poor lay-out pattern

Warping:

- extremely high number of end breaks (dyed yarn) creeling causes problems. The positioning of the cone (downward) should be changed

Weaving:

- the yarn for the pile has a twist multiplier of 14.4

Printing:

- manual block printing
- flat screen printing
- towels are de-sized before printing
- bedsheets after printing

Design:

- own design studio and screen manufacturing  
printing is done on almost all products, even  
on patterned cloth



Mill data

Silk Weaving Factory

Xian

History: 1956 private silk weaving mills were combined into one state-owned mill. Then 20 looms. Presently 200 looms and 550 employed. The target is to become a star factory.

Yearly yarn consumption:

<u>Silk</u>	<u>Viscose rayon</u>
20 - 21 den raw silk only	120 den
29 - 30 tons (33.000 Yuan/ton)	176 tons

Production of pure silk (filament approximately 200.000 m/year.

Price 2 - 9 Yuan/m

Total production 3 mln m/year in 20 varieties of silk fabrics. 1<sup>o</sup> grade 96%

Products on position:

- mainly warp viscose : weft silk or warp silk, weft rayon
- cotton setting for better luster
- width 102 cm before finishing
- warp 200 ends

Doubling:

- 4 ends

Weaving:

- plain, dobby and jacquard
- no control on weight/m<sup>2</sup>, only on picks/ends and width
- lighting in weaving shed poor. Bulbs are hanging too high

Yarn dyeing:

- jet dyeing in hanks (viscose filament)  
(silk is only dyed in fabric)

Dyeing of fabric:

- scouring 1½ hrs (degumming)  
no details were given on temperature and soap solution
- dyeing
- drying 120°C on heated roller-drums
- the entire process takes 3 - 4 hrs in the same jiggers

Stenter:

- new stenter will be installed

Flat screen printing, own manufacture

Note: the total production of pure silk in China is 17 - 18 mln meters, there seems to be an enormous waste at the cocoon stage

Mill data

Cotton Textile Mill No. 12

Shanghai

Director: Mr. Li

Constructed in 1921. After 1949 modernized.

Main data:

- 114.000 spindles
- 1.133 looms
- 6.600 employed, 65% female
- 4 shift system for workers
- 25% engineers and technicians

Output:

- 21.000 tons, of which 15% is exported
- 40% of yarn for own use
- 37,6 mln meters
- 80% of cloth is exported

Products:

- counts Ne 10 - 80
- average count 27 Ne

Plants:

- two spinning departments
- spinning dept. I is under modernization
- autolevelers and electronic yarn cleaner are installed
- main goals:
  - improve quality
  - reduce labour cost
  - reduce production cost by:
    - shortening the process;
    - larger packages;
    - increase machine efficiency;
    - increase automation;
    - increase the use of waste cotton.

The process flow for Khaki Drill is attached as an example (Annex IV including the process data for 45 Ne and 21 Ne yarn.

Calculating efficiency:

- S = speed frontroller
- D =  $\phi$
- t = t x 60
- w = weight yarn/1,000 m
- a = (1 - x%) loss in weight in length

$$- \frac{(S \times \phi \times t \times w \times a) 1,000}{1,000 \times 1,000 \times 100} = \text{theoretical output}$$

(mm) (grams) (length/m)

$$- \text{Efficiency \%} = \frac{\text{Actual output/1,000 spindles}}{\text{Theoretical output/1,000 spindles}}$$

- The rate of operation,

$$\frac{\text{Operational m of spindles x time}}{\text{Available m of spindles x time}} = \%$$

- At present 95%

Maintenance:

- (please refer to the General Observations on the textile industry in China - page 5 and 6)

Mill data

Shanghai No. 8 Cotton Mill

History of nearly 60 years

- Equipment:
- 136,800 spindles
  - 53,700 twisting spindles
  - 53 combers
  - 1,700 looms, 50" and 56"

No. of workers: - 8,470 (65.6% women)

- Use of yarn:
- 40% for own use
  - 60% sold to other factories

- Production:
- 36/2 Nm and 56/3 combed sewing thread
  - poplin, khaki, shirting
  - average yarn count 37 Ne
  - range Ne 13 - 120

The sheets attached as Annex IV give full information about the cotton spinning process and other technical data.

Additional technical information:

- classification of final product (cloth)  
3 grades + off standard
- cloth defects < 16 per piece of 40 m 1<sup>o</sup> grade  
up to 20 2<sup>o</sup>  
60 3<sup>o</sup>  
> 60 off standard

Evenness testing:

- conversion Sco Lowell - Uster:

$$CV \% = \frac{\text{Saco Lowell}}{\text{constant (6.48)}}$$

Size formula:

- for 3,036 pure cotton cloth  
30 - 40 Ne medium count
- plant starch 4% of sizing liquid
- chalk powder 0.4%
- sodium silica 0.24%
- oil grease 0.16%
- CMC 2.0%

Export of cloth (grey):

- 40" and 45" 2,413 cloth to Hong Kong -  
15.4% of total
- 50" 3,030 cotton to USA

Export of sewing yarn:

- 40/3 mm sewing yarn to Hong Kong (56% of production)

Finishing:

- 85% of the production is dyed and finished at a finishing factory, IMEX, Shanghai branch is taking care of export

Bobbins:

- no specification are given while ordering cops, there is only one quality available in China however, while repairing bobbins in own workshops, following specifications are observed:
  - appearance
  - inside surface, where the connection should be 70%
  - vibration amplitudes: test at 18,000 RPM, toll should be lower than 0,3 mm at the upper point; the lower part lower than 0,4 mm
  - hardness is 100 - 110

Spec. rubber top roller for spinning/roving:

- hardness 82° ( $\pm 2^\circ$ )
- surface should be smooth, roughness 0,2

Shuttle:

- | <u>standard data shuttles</u> | <u>Tolerance</u> |            |
|-------------------------------|------------------|------------|
|                               | <u>used</u>      | <u>new</u> |
| 343 mm length                 |                  |            |
| 46 mm width                   | -3 mm            | 0.42 mm    |
| 36 mm height                  | -1 mm            | 0.4 mm     |
- angle degree 0.2
- gravity centre 5°
- bottom straightness 0.2
- weight 20 gr
- (sliver can material is used for adjustments)

Mill data

Shanghai No. 2 Dyeing and Printing Mill

30.8.1980

Director: Mr. Lo

Activities: - bleaching, dyeing, printing

Employed: - 2,100

Output: - 130 mln meters/year  
or nearly 400.000 m/day

Product properties: - cotton cloth 50% of production  
- blended cloth 50% of production  
- main product: poplin  
- cloth width 36 - 90", however, mainly 36 - 44",  
table cloth 90"

Export: - 64%

Equipment: - 3 machines for singing, open width, blended cloth  
is bleached in open width form, pure cotton in  
rope form  
- 5 roller printing machines  
- 1 rotary screen printing machine  
- 1 dyeing machine for pure cotton) present capacity is  
- 1 dyeing machine for blends ) insufficient, new  
machine will be added  
- 7 stenters 190 - 200°C, 2 min contact time  
- 3 mercerizing units (continuous process)  
- 2 double layer mercerizing units, one for wide  
width cloth (no continuous)  
- 3 calenders  
- steam from nextdoor power plant for own generator  
30 kg/p transformed to 2 kg/p  
after generator, capacity 150 kw/hr  
- oil saving by electronically controlled supply unit

Process: - singing )  
- desizing (caustic soda) )  
- bleaching (sodium chloride) ) for PES/CA continuous  
- mercerizing )  
- bleaching (hydro peroxide) )  
- brightening  
- heat-setting  
- soft treatment  
- calender  
- anti-shrinkage  
- inspection  
- measuring  
- pucking  
- resin finishing for PES/CA. DMDATU

Maintenance:

- areas for maintenance
- inspection during operation  
(in the same way as described in this report)
- periodic weekly inspection on driving and rotating parts
- major overhaul once per 3 - 5 years, including new foundations

Impression:

- modernization is needed and factory staff is present by preparing for it. However, there are much activities on smaller savings
- equipment is well utilized, due to rather uniform range of cloth
- 50% of cloth processed is printed
- 40% of cloth processed is bleached
- 10% of cloth processed is dyed
- dyeing capacity is out of balance
- printing is a major activity (own engraving unit) in this factory

Mill data

Machine Factory No. 2

Shanghai

30.8.1980

Director: Mr. Zhou

Established around 1928

Area site: - 300.00 m<sup>2</sup>, buildings 150.000 m<sup>2</sup>

Products:  
- spinning machines  
- dyeing machines  
- extruders for chemical fibres

Personnel: - 3,500 employed of which 230 technicians, 30 engineers and 250 management staff

Production capacity:  
- spinning frames with a yearly output of 500.000 spindles for the cotton and wool industry, traditional models  
- extruders for chemical fibres: 10 sets yearly for 7,000 tons of fibre each  
- dyeing machine : 200 units (liquor ration 1:16 and 1:25)  
- air suction systems for spinning frames on request

Export:  
- since 1956 exports of machinery to 29 countries, totalling 106 million spindles  
- also spare parts on request through the Foreign Trade Department were exported  
- the factory employs an expert service team for its foreign clients

Discussion:  
- spindles installed in Pakistan do not reach the speed observed in the Chinese mills, where the group saw machines running at 16.000 RPM or higher. In Pakistan 12 - 13.000 RPM is the upper limit  
- the wear out of bobbins is high  
this is a general complaint  
future deliveries to begin with the new equipment to be sent to Burma will be fitted out with SRF bearings  
- the catalogue show a draft range between 10 - 50 other manufacturers give a range of 10 - 30 for optimum. This difference was discussed at length but no clear answer could be concluded  
- the group would appreciate more detailed information in the catalogues  
- the cost of spare parts was discussed. This is a vital point while creating interest in Chinese machinery, but the factory appeared not to be involved in price-setting and refers for this matter to the Corporation for Foreign Trade  
- the discussion was a useful exchange of views for the group as well as for the factory.



TECHNICAL DATA OF THE SHANGHAI NO.12 TEXTILE MILL

I. Khaki Drill Process Flow:

Polyester	Combed Cotton
Polyester → Bale Flucker A002A	Bale Flucker A002A
Blending, Opening, Losing, and Dust off Machine A035A	Blending, Opening, Losing, and Dust Off Machine A035A
Porcupine Opener A036C	Porcupine Opener A036A
Hopper Feeder A092C	Hopper Feeder A092C
Lap Former A076C	Lap Former A076C
Carding PL	Carding PL
	Pre-drawing Frame A272C
	Sliver Lapper A191
	Comber A201C
1st Blending Drawing Frame A272C	1st Blending Drawing Frame A272C
2nd 1242	2nd 1242
	Last 1242
Fly Frame A456A	Fly Frame A456A
Spinning Frame A513	Spinning Frame 1292
Warp	Weft
Cone Winder OKK	
Double Winder OKK	
Twisting Frame H0	
Cone Winder SG012	
Warping Machine SG081	
Sizing Machine G142	
Warp Tying Machine 68-2 3G-1	
	Twisting Setting
Loom 1511 ( <i>automatic shuttle changing</i> )	
Measuring Machine SFA	

II. Technology design for 45NB and 21NE yarn

Process		Blending & Jutching		Carding		Pre-drawing		Sliver lapping		Combing	
Machine type		A035	A076C	PL		A272C		A191		A201C	
Count	No	45 cotton	45 polyester	45 cotton	45 polyester	45 cotton	45 polyester	45 cotton	45 polyester	45 cotton	45 polyester
	Tex	13	13	13	13	13	13	13	13	13	13
weight	Grain/yard	5981	5858	53.6	53	43.4		643		61.2	
	G/M	424	415	3.8	3.78	3.08		45.56		4.34	
P.R.M		12.4	12.4	28	32	2180		330		220	
Delivery speed M/minute		9.0	9.0	60	69	273.9		39		21.9	
Theory output/set X hour (KG)		229	224	17.8	20.3	101		107		11.5	
Efficiency %		95	95	90	90	90		90		90	
Real output set X hour (KG)		206.1	202.6	16.0	18.3	90.9		90.3		10.4	
Time for operating (hour)		20	20	21	21	20		20		20	
Real output KG/day		4122	4052	336	384	1818		1926		208	
Demand output KG/day		1987	10558	6198	10199	6498		6498		5498	
Equipment in production	dema- ned	1.7	2.6	19.3	26.6	3.6		3.4		26.4	
	provi- ded	2	4	21	28	5		5		28	

Process		1st Drawing		2nd Drawing		3rd Drawing		Roving		Spinning	
Machine type		A272C		1242		1242		A456A		A513	
Count	Ne	21	45T	21	45	21	45	21	45	21	45
	Tex	28	13	28	13	28	13	28	13	28	13
Weight	grain/yarn	54.5	54.5	52.4	52.4	50.6	50.6	7.2	7.7	47.25/ 120yards	22.28/ 120yards
	G/M	3.86		3.71		3.59		0.51	0.55	2.791/ 100M	1.316/ 100M
P.R.M	W	2000		1000		950					
	T	2100	2100	1050	1050	1000	1000	262	300	323	198
Delivery speed M/minute		263.9		104.8		99.7		23		25.4	15.6
Theory output KG/Setxhour		122		93		86		76	82	17.7	5.1
Efficiency %		90		90		90		93		96.0	98.0
Real output KG/Set x hour		1098		83.7		77.4		70.7	76.3	7.0	5.0
Time for operating (hour)		20		20		20		20	20	22.5	22.5
Real output KG/day		2196		1674		1548		1414	1526	382.5	112.5
Demanded output KG/day						5192 10420		5162	10368	5085	10212
Machine sets required in production	Demanded	2.4	4.8	3.1		3.4	6.8	3.7	6.8	13.3	90.8
	Provided	5	7	5		5	7	5	7	14	92

Technology design for 45<sup>s</sup>/2 X 21 polyester khaki and 60<sup>s</sup>/2 X60<sup>s</sup>/2 combed khaki

Varieties	45/2 X 21	60/2 X 60/2
Items		
Width	38"	38"
Warp & weft count	warp 45 <sup>s</sup> /2 T65/C35 weft 21 T65/C35	warp 60 <sup>s</sup> /2 weft 60 <sup>s</sup> /2
Total pieces of warp ends	5132 pcs	5928 pcs
Selvedge warp ends	24 "	64 "
Reed-counting	65.5	75.75
Reed space	39.18"	39.13"
Density	135 X 70 ends/inch	156 X 76 ends/ inch
Shrinkage % warp	12.98	11.6
Weft	3.01%	2.89 %
Dry weight (not sized) g/M <sup>2</sup>	231.3	178.6
Breaking tenacity (KG) warp	172	136.3
Weft	88.7	53.4
Cloth struture	2/2 (twilletes)	2/2 (twilletes)

III. Quality in various process:

Items		count	45's polyester yarn		21's polyester yarn	
			cotton	polyester	cotton	polyester
Scutching	Weight unevenness		0.6-0.8	0.9-1.0	0.8-0.9	0.9-1.0
	Cross unevenness		10-12	6.5-7.5	10-11	6.5-7.5
Carding	Trash / neps		100/50	0.2/0.2	60/16	0.2/0.2
	Sliver unevenness		16-17	14-15	15.0-16.0	14.0-15.0
	Count unevenness		3.5-4.0	3.0-3.5	3.5-4.0	3.0-3.5
Yarn unevenness, caused in scutching and carding			5.0-5.5			
Drawing	Sliver unevenness		12.0-13.0		12.0-13.0	
	Count unevenness		0.75		0.78	
Roving	Sliver unevenness			21-22	18-20	
	Count unevenness			1.2-1.4	1.1-1.2	
Spinning	Sliver		9.93:0.07		0:10:0	
	Count unevenness		1.8		1.0	
	Count-strength product		2660		3420	
	Strength unevenness		4.5-5.0		3.5-4.0	
	Twisting unevenness		3.5-4.5		2.5-3.0	
	Trashes / neps		6/4		9/5	
Twist / inch			24 t/m (20-21N)		16 t/m (40-45N)	

Items	Variety	Dacran kakhi	
		45 <sup>s</sup> /2 x 21	60 <sup>s</sup> /2 x 60 <sup>s</sup> /2 Combed kakhi
Preparation	Breakage per 100 bobbin	7.47	11.97
	Breakage in warping per 100/10000M	0.68	1.37
	O.K rate insizing %	97.03	
	Elongation of sized yarn %	-0.367	0.54
Weaving	Warp ends breakage set/hour	0.23 pce./set.hour	0.43 pce./set.hour
	Weft " " "	0.16 " "	0.22 " "
	Nep	7.3 cotton nep 0.9	1.23
Physical testing	Strength (warp, bobbin, & single yarn)	524.2	353.8
	Strength unevenness (rate) %	7.08	7.12
	Elongation (warp, bobbin & single yarn) %	11.289	6.652
	Strength (weft, bobbin & single yarn) %	527.1	340.5
	Strength unevenness %	7.31	6.81
	Elongation % (weft, bobbin & single yarn)	11.01	7.001
	Single yarn strength (G) (warp beam)	513.8	358.00
	Single strand (sizing)	521.7	364.7
	Strength increasing rate %	0.03	
	Single elongation (sizing) %	10.073	6.312
	Elongation reducing rate %	14.04	

THE SPINNING TECHNOLOGY OF THE SHANGHAI NO.8 COTTON MILL

I. Cotton Spinning Technology

(1) Mixing

Tex	Ne	Mixing	Average Grade	Average Length(mm)	The Property of Mainly Cotton Fibre			
					Nm	Maturity	Single Fibre Strength(g)	Puzz Rate (%)
28 Tex	21 <sup>s</sup>	Pakstani Cotton 14.5% Guatemalan Cotton 31% Sudanesu Cotton 12.5% U.S.A. Cotton	3.28	27.00	5900	1.85	4.21	18.74
16 Tex	36 <sup>s</sup>	Guatemalan Cotton 32% Syrin Cotton 14% Sudlian Cotton 6% U.S.A. Cotton 48%	2.84	28.28	5600	2.00	4.60	15.4
14 Tex	42 <sup>s</sup>	Guatemalan Cotton 15% Indian Cotton 12% Sudanesu Cotton 0% U.S.A. Cotton 64%	2.74	28.62	6000	1.88	4.54	15.34
11.7 Tex	150 <sup>s</sup>	Sudanesu Cotton 30% Egyptian Cotton 26% XIN JIANG Cotton 44%	1.59	35.79	7700	2.04	4.61	8.78

(2) Spinning Process

Items	English Counts	Process
Carded Yarn	21 <sup>s</sup> 36 <sup>s</sup> 42 <sup>s</sup>	Bale Plucker → Hopper Feeder → Porcupine Opener → Electrical Distributor → No.43 Hopper Opener → Single Beater Scutcher and Lap Machine → Revolving Flat Card → Drawing Frame (2nd) → Simplex-Fly Frame → Ring Spinning Frame
	42/2 <sup>s</sup>	Spinning Frame → Double Winder → Twisting Frame → Cone Winder → (Sold with Bobbin) Reeling Frame → Baler (Hanks)
Combed Yarn	50#3	Bale Plucker → Hopper Feeder → Porcupine Opener → Electrical Distributor → No.43 Hopper Opener → Single Beater Scutcher and Lap Machine → Revolving Flat Card → Pre-drawing Frame → Silver Lapper → Comber → Drawing Frame (2nd) → Simplex Fly Frame → Ring Spinning Frame → Double Winder → Twisting Frame → Cone Winder → (Sold with Bobbin) Reeling Frame → Baler (Hanks)

(3) Spinning Technology Design

Lap Weight		Lap Length		Speed of the Lap Roller (r.p.m.)
Gram/Meter	Ounce/Yard	Meter	Yard	
404	356 1/3	34.78	38.04	14.5 (21 <sup>s</sup> 1s 13)

Process	Count	Weight		Mechanical		Draft Type	Doublings
		Nm (g.5 m)	Ne (Grain/5yis)	Draft	Speed		
Carding	21 <sup>s</sup>	23.7	334	62.25	20		
	36 <sup>s</sup>	16.4	231	115.2	16		
	42 <sup>s</sup>	18.4	260	105.0	10		
	J50 <sup>s</sup>	16.30	230	122.0	17		
1st Passage	21 <sup>s</sup>	22.62	310	8.260	1650	3 over 4	8
Drawing	36 <sup>s</sup>	15.50	219	8.691	880	4 over 5	8
	42 <sup>s</sup>	16.00	240	8.516	1620	3 over 4	8
	J50 <sup>s</sup>	16.30	230	6.331	820	Double zone draft	8
2nd Passage	21 <sup>s</sup>	20.66	202	8.810	1440	3 over 4	8
Drawing	36 <sup>s</sup>	14.0	198	8.071	820	4 over 5	8
	42 <sup>s</sup>	15.0	212	9.095	1620	3 Over 4	8
	J50 <sup>s</sup>	13.9	196	7.051	740	Double zone draft	6
Pre-drawing	J50 <sup>s</sup>	16.6	234	7.751	1760	3 over 4	8
Sliver		51.0	720				
Lapper	J50 <sup>s</sup>	(g/m)	(grain/yd)	1.305	580	3 rollers	20
Combing	J50 <sup>s</sup>	17.23	243	74.70	140	Single zone draft	6

Process	Ne	Constant weight		Twisting		Mechanical Draft	Roller Speed	Spindle Speed	English Twist Factor
		Nm(g/10 m)	Ne(grain/10 yds)	Twists/10cm	Twists/inch				
Roving	21 <sup>s</sup>	6.36	89.7	4.196	1.07	6.684	106	738	1.16
	36 <sup>s</sup>	3.52	40.7	5.487	1.39	8.150	186	210	1.13
	42 <sup>s</sup>	3.78	53.3	5.284	1.34	8.181	201	255	1.12
	J50 <sup>s</sup>	3.52	40.7	4.326	1.10	8.041	204	702	0.87
Spinning	21 <sup>s</sup>	2.574 (g/100m)	43.50 (grain/120 yds)	60.17	17.6	25.84	344	16600	3.84
	36 <sup>s</sup>	1.475	24.08	87.87	22.3	24.77	274	16800	3.60
	42 <sup>s</sup>	1.291	21.86	100.5	25.5	30.14	260	18200	3.94
	J50 <sup>s</sup>	1.040	17.61	100.9	25.6	35.27	256	18100	3.57
Twisting	42 <sup>s</sup> /2	2.57	43.52	85.4	21.7		85	11300	4.74
	J50 <sup>s</sup> /3	3.22	54.53	85.15	21.6		88	10500	4.32



II. Quality in Various Processes

Count		21 <sup>s</sup>	36 <sup>s</sup>	42 <sup>s</sup>	J50 <sup>s</sup>	J50 <sup>s</sup> /3	42 <sup>s</sup> /2
Items							
Lap	Irregular in weight	0.9-1.0	0.9-1.0	0.9-1.0	0.7-1.0		
Carding Sliver	Irregularity in Weight Saco-Lowell Sliver	4.2	4.2	4.5	4.5		
	Unevenness	22	18	18	20		
	Neps and Trash (pcs/gram)	80+120	35+90	45+120	15+75		
Drawing Sliver	Irregularity in Weight Saco-Lowell Sliver	0.8	0.8	0.8	0.8		
	Unevenness	21	20	22	17		
Roving	Irregularity in Weight Saco-Lowell Sliver	1.1	1.6	1.5	1.0		
	Unevenness	30	32	34	24		
Pre-drawing	Irregularity in Weight Saco-Lowell Sliver				1.2		
	Unevenness				20		
	Lap Irregularity in weight				0.7		
Combing	Irregularity in Weight Saco-Lowell Sliver				1.5		
	Unevenness				20		
	Neps and Trash (pcs/gram)				26+28		
	Waste Rate				15		
Spinning or Thread	Count	2400	2400	2400	3800	2800	4600
	Strength Product	55+55	50+50	60+60	30+5	35+40	6+4
	Neps and Trash						
	Yarn Evenness on Blackboard 1:2	10:0	10:0	0.5:0.5	0.8:0.2	10:0	10:0
	Irregularity in weight	1.8	1.5	1.5	1.4	1.3	0.9
	Twist Irregularity	4.0	4.0	4.0	4.0	4.0	3.0
	End Breakage/1000 Spindles hr.	50	30	40	20	5	5

N O T E

UF/RAS/80/124 - Phase II  
Workshop on the Integrated Silk Processing Industry

A meeting was organized by the Ministry of Textile Industry on 3 September 1980 in order to explore the possibilities of the People's Republic of China being the host country for a silk workshop.

Present were:

Mr. Wang, Director of the Department of Foreign Affairs of the Ministry of the Textile Industry;

Mr. Zhu Xing, textile engineer and advisor of the same department;

M.A.M. Minke, UNIDO;

Interpreter.

Mr. Wang emphasized on the importance for the PRC to be the host country for such a seminar. Before making any decision he would, however, study the ESCAP report which I had handed over to Mr. Zhu Xing a few days earlier.

Mr. Wang had received a draft project proposal from ESCAP. However, I informed him that this was an initial draft and that it has to be re-written for official submittance.

Mr. Wang said that the town of Wushi would be an ideal place for holding a silk seminar. The silk industry is concentrated in this town and its silk laboratory plays an active role in research and development in the silk industry. The town is attractive and offers many possibilities for excursions.

Mr. Wang suggested to consider that the programme of the workshop should concentrate on the industrial part of the silk processing only. This would facilitate both the organization of the workshop (only one ministry that of the textile industry would be involved) and the selection of participants.



# UNIDO

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

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## INTEROFFICE MEMORANDUM

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TO: Mrs. I. Lorenzo, Head  
Training Branch  
Attention: Mr. G. Stevens

DATE: 30 September 1980

REFERENCE:

Through: Mr. E.D. Manning, Acting Head  
Agro-Industries Branch, DIO

From: M. Minke  
Industrial Development Officer  
Agro-Industries Branch, DIO

SUBJECT: Group In-Plant Training Programme in the Field of the Textile Industries to be Organized by UNIDO in Co-operation with the Government of the People's Republic of China

At the request I have discussed the proposal as outlined in the Aide-memoire dated January 1979 and the In-plant Group Training Programme organized in 1979 in Poland with the authorities in China.

On 3 September 1980, a meeting was organized between Mr. Wang, Director of the Foreign Department of the Ministry for the Textile Industry, Mr. Zhu Xing of the same department and myself.

Mr. Wang said that the Ministry would gladly be willing to receive an English or French speaking training group for a 6-8 weeks In-plant training course, preferably in Shanghai.

He said that, in principle, the 1979 Polish programme, except for training in the field of non-wovens, is acceptable.

He would appreciate if participants of Arab speaking countries could also be included.

Language problems can be solved although this is the weakest point of the operation.

Mr. Wang raised the matter of local costs. He expressed his concern over the rather high cost of items such as lecturing, translation, trainers, etc. These costs will also have to be regarded. I advised Mr. Wang to calculate these costs carefully and to discuss the matter with the Sixth Department for further negotiation with UNIDO.

