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URGENT ASSISTANCE TO THE ARGENTINE WOOL INDUSTRY

SI/ARG/86/836/11-02

THE ARGENTINE REPUBLIC

Technical report: To increase the competitiveness of Argentina's exporting wool industry*

Prepared for the Government of the Argentine Republic
by the United Nations Industrial Development Organization,
acting as executing agency for the United Nations Development Programme

Based on the work of Eberhard Bernkopf
Expert in Spinning

Backstopping officer: A. Eräneva, Agro-based Industries Branch

United Nations Industrial Development Organization
Vienna

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Purpose of the project

To increase the competitiveness of Argentine's exporting wool industry

To assist the Argentinean Textile Research Centre by :

- giving practical advice to, at least five woolen and worsted yarn manufacturing mills on improving quality and efficiency.

- training at least one CIT staff trained in modern woolen and worsted spinning and providing the ability to continue the activities carried out by the expert.

Introduction

This technical report is a summary report of visits to several plants in the textil manufacturing area of Argentina in the month of September 1987.

This report does not list the whole equipment at each mill. It shows the main problems, findings, gives recommendations and advice. The target is improving quality of yarn, efficiency of machinery, the improved productivity, reduced manufacturingcosts in order to increase the competitiveness of exporting.

All the mills are working with modern technology, with machine equipment from old to most modern. In most of the mills the machine conditions were acceptable.

The managing directors were very interested and gave their best to provide a clear picture of the mills they are responsible for.

Thanks to all managers for their cooperation and also to the members of CIT, Mr. Vasquez, Mrs. Marino, Mss. Varela, Mss. Barès and Mr. Garofal, for their help and courtesy.

I/1 Survey at the worsted spinning manufacturing plant of :

HISILAN S.A.I.C.

Hilanderia de Lana Penida
Sintèticos y Fantasias

Habana 404

1603 VILLA MARTELLI

PCIA. DE BUENOS AIRES

ARGENTINA

Duration of the survey : 9. and 15 th of Sept. 1987

Local currency : 1$ = 2,35 Australes (A)

Mill manager : Victor Löb

A. Description of the plant

Situated in a flat building with three different departments.

- preparation, spinning, twisting
- winding, doubling, shrinking, hanking
- fancy-yarn

The manufacturing area is narrow and the transportation as well as the production flow is not arranged in one line but crosses.

The lighting condition all over is fair to good. No air-conditioning but overhead humidifier in preparation and spinning.

Main production are acrylic-yarns, mainly

count variation : Nm 5 - Nm 40
batch variation : 120 - 3000 kg in different colours.

overall picture : small but well managed mill.

B. Organization

The mill manager is also working on the floor in manufacturing area.

The mill workes two shifts.

Per shift two supervisors and two helpers :

- preparation, spinning, twisting
- winding, doubling, shrinking, hanking.

The fancy-yarn department is supervised by the plant manager.

The whole transportation is done by supervisors and helpers.

In process stocks along the wall because of little space.
Transport has to cross several times.

A small test laboratory with normal equipment to control the output

- Uster evenness
- twist
- break and tension strength
- Nm

In-line-control is additionally done by supervisors and manager.

C. Equipment and its condition

Preparation:

Melangense and normal three passages sortiment with NSC-finisher, 16 heads. Two flyers, make unknown, are also available but more or less spare mach. 40 Spdl. each

Spinning :

six spinning frames, Cognetex, are installed

3 x 400 spindles, open draftzone } total
3 x 536 spindles, doubleapron draft } 2808

Twisting :

Volkmann VTS-06 two for one, 110 spdls.
Volkmann VTS-07 " " " , 144 "

Winding :

1 x Savio autom. winder, 48 spdls.
1 x " manual " , 96 "

Doubling :

1 x Savio doubling , 96 spdls.

Shrinking :

1 x Superba, 32 spdls.

Hanking :

2 x selfmade, 20 spdl. each

Fancy-yarn :

1 x PAFA Segafil / s, 110 spdl.
1 x PAFA Expo 90, 30 spdl.
1 x Hank to cone winder, Savio, 24 spdl.
1 x sortiment SACM (recycling for facy)
2 frieze mach. selfmade

The condition of the whole machinery is fair to good. Rollercoating and fallers good, fancy mach., new, very good.

D. Labour complement, wages, incentives

The total labourforce are 60 people, included supervisors.

28 operators per shift and 2 supervisors.

Absenteeismen rate = 5%

Fluctuation = 6%

Wages/hour = 1.33 ₨

Incentive = 20 - 30% (no base)

Premium = 30% ' present)

Total = about 2.0 ₨/hour

If one operator is absent only one day per month he loses the whole "present premium" for that particular month.

Jobload in spinning :

1 operator/machine
(spinning, doffing, lotchange, cleaning)

E. Production, efficiency in spinning

Count range from Nm 5 to Nm 40
Material : ACRYL 3 den. 90 mm
6 den. 120 mm

Average Nm 26

Average production per 16 hours
about 1000 kg

theor. production : av. spindle rpm = 8000
av. T/m = 440
av. m/min = 18.18

$$P\text{-theor.} = \frac{18.18\text{m/mm} \times 60\text{min}}{\text{Nm } 26} = 41.95 \text{ g/spdl.hour}$$

theor. production per 16 hours :

$$P\text{-theor(16h)} = \frac{41.95\text{g/sph} \times 2808 \text{ spdl} \times 16 \text{ hours}}{1000} = 1884 \text{ kg}$$

Efficiency real:

$$\text{Eff \%} = \frac{\text{real prod./day}}{\text{theor.prod./day}} \times 100$$

$$= \frac{1000}{1884} \times 100 = 53 \%$$

Idle spindle = 5 %, downtime due to lotchange about 40 %.
Endbreakes/1000 spindle hour = 30 - 40

F. Productivity (spinning)

Production = 1000 kg/day (16 hours)

Operators total = 6 spinners, two helpers / shift

total = 16 operators

= 128 operatorhours

productivity = $\frac{1000}{128}$ = 7.8 kg/op.hour

≙ 7.9 min/kg

G. Working methods

The methods in all operations are the right ones but to slow.
In spinning the spinner and his helpers do all jobs. No job splitting.

H. Maintenance

General maintenance during vacation.

Daily maintenance, repairing (mech. & electr.) as well as greazing are done by two fixers.

I. Quality

Acrylic-yarns for local market only, most of them highbulk. No quality problems.

Fancy-yarn, good quality.

K. Bottle necks

Bottle neck is the finisher in preparation.

The capacity is with an average Nm 1.6
about 1300 kg/16 hours (theor).

The need of capacity about 1050 - 1100 kg

efficiency = 82 % (very high)

II/1 RECOMMENDATIONS

1. Bottle neck finisher
fine counts in spinning (Nm 32 - 40)
reduce count on finisher to Nm 1.4

* + 12.5 % more capacity (Nm 36 - 40)

2. Highdraft spinning frames
Use for fine counts a draft of 25

spinning speed increase to 1000rpm.

* + 20 % more capacity (3 frames)

or about 10 % + in the whole spinning

3. Idle spindlehas to be reduced to 2.5 % max.

* + 2.5 % more capacity

4. Total plus capacity in spinning room

* + 12.5 % min

about 1125 kg/av./day

5. Productivity

Training of operators in spinning.

Splitting in
- spinners
- doffers

Jobload of spinner : mend endbreaks
Jobload of doffer : doffing, creeiing, cleaning

result : reducing of downtime
increasing of productivity

prese situation : (6 spinner + 2 helper) x 2
1000 kg / 16 hours

= 7.8 kg / op. hour

after training : (2 spinner + 4 doffer) x 2

= 96 op. hours / day

Splitting the jobs will provide an additional reducing of downtime for lotchanging and cleaning of about 15 - 20 %

Result :

Production = $\frac{1125 \times 15}{100}$ = about 1300 kg

Productivity = $\frac{1300}{96}$ = 13.5 kg/op. hour

30 % production increase

42 % productivity increase

III/1 CONCLUSION

The results of this survey can be outlined as follows :

This well managed mill can improve the output
+ 15 % , minimum, production

Well trained operators guarantee better quality

Well trained operators and job splitting bring
an increase of 35 - 40 % of productivity

I/2 Survey at the worsted spinning manufacturing plant of :

ESTABLECIEMENTOS TEXTILES ITUZAINGO S.A.C.F.I.

Suipacha 1159

1874 VILLA DOMINICO

Avellaneda Buenos Aires

ARGENTINA

Director : Ing. Mr. Juan Rocha

Duration : 8. and 14.th of Sept. 1987

Local currency : 1$ = 2.65 A

A. Description of the plant

The plant produces tops and yarns.
Top - producing area :

- scouring mach.
- cards
- intersectings
- combers
- intersectings

Yarn - producing area :

- raw-white
- coloured

Own drye house, open aparaturs.

Two floors :

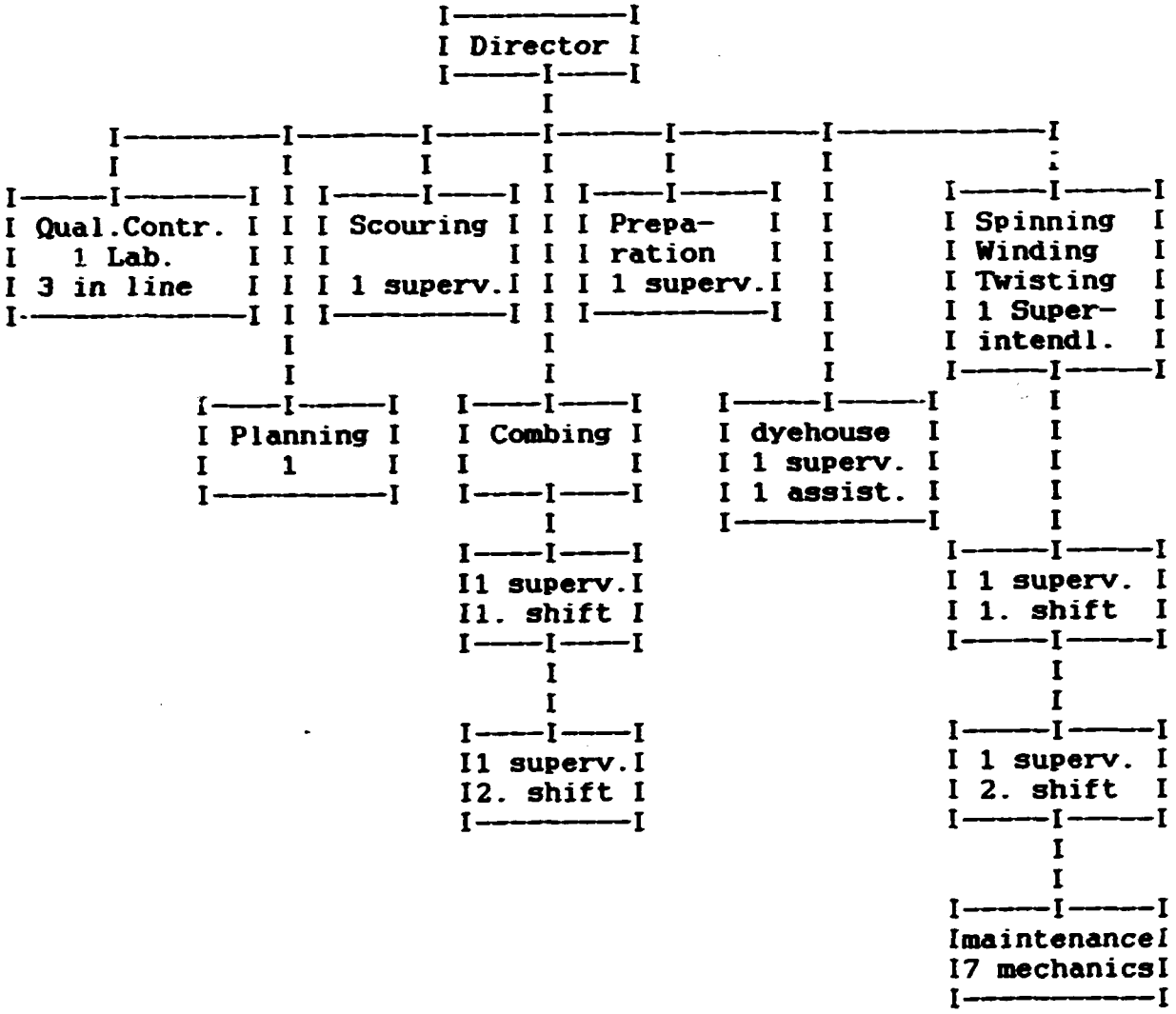
base : - scouring, carding, combing
- preparation raw-white
- preparation coloured

first floor : - spinning, winding, twisting

The lighting in the whole plant is poor !
No air-conditioning, only humidifier.

The count variation is large and also the blend variation.
Nm 5 - Nm 48
100 % wool to 100 % acryl N to acryl HB
and all variations in between.
Cotsizes about 400 - 3000 kg

B. Organization



The mill is working different shifts in different sections

- preparation 1 shift
- spinning , 2 shifts 12 mach.,3 rd shift 4 mach.
- cone winding 3 shifts
- doubling 1 shift
- twisting, one mach. 2 shifts, 1 mach. 3 shifts
- controlling, packing, 3 shifts

C. Equipment

Scouring - Combing

* 1 Fleißner scouring mach. 3 drum dryer
* 2 For - cards
* 2 Intersecting pre combing NSC
* 18 combers NSC PB 26, 27, 29
* 2 intersecting after combing NSC

Preparation : 2 x III Pass. gill
2 x finisher NSC FM3 32 ropes

Spinning : 16 Ringspinning frames
COGNETEX

* 5 FL 16	- 516 spdl.	
* 2 FL 14	- "	
* 2 FL III	- "	
* 5 St. Andrea	- 432 spdl.	1948
* 2 Alsazienne	- 416 spdl.	1948
total	= 7636 spindles	

Winding : 2 Savio a 48 spdl. (24 splicer) autom.

Doubling
etc. : 1 Savio handwinder 96 spdl
2 Doubling Savio 80 spdl

Twisting : 1 Volkmann VTS 07 120 spdl
2 Cognetex 402 spdl ring
1 " 200 " "

The condition of the whole equipment is fair to good, spinning floor good.

D. Labourcomplement, wages, incentives

because of the different shifts, only spinning floor is interesting.

Spinners and helpers = 60 operators
spinning, creeling, lotchange, cleaning
= 480 operatorhours total

Absenteeismen rate about 3.5 %

Fluctuation rate about 2.0 %

Wages : 1.95 ₨/hour

Incentive system really doesn't exist, but the incentive rate is 0.59 ₨/hour, so each operator earns

2.54 ₨/hour

E. Production, efficiency in spinning

The production per day for the time being is
about 2300 kg/day
the average count Nm 32.

The total output produced by all spindles is much higher.

With all installed spindles, average rpm 9000, T/m 450, m/min 20, av. Nm 32

P.theor - 5170 kg/day

Efficiency about 45 %

F. Productivity (spinning)

2300 kg/day, operator hours = 304

productivity = $\frac{2300}{304}$ = 7,6 kg/op.hour
≙ 7,9 min/kg

G. Working methods

working pace slow, skilled operators, no splitting of jobs.

H. Maintenance

Planned maintenance during vacation.
7 fixers maintain mach. when empty (spinning through twisting).
Faller shop (needle setter), two operators
Grinding shop, one operator.
Rollercoatings on spinning, very good condition.

I. Quality

Tops - wool 26 mikron, 65 mm HT
wool 22 mikron, 56 mm HT
Export quality but no bumbs.

Yarn - that wide range of counts, biends and lotsizers for the home market, There are no quality questions.

Exportmarket claims foreign fibers in yarn and curling locks on cones.

Therefore the mill has an intensive endcontrol of yarn and cones to eliminate the faults.

Quality control

- fibre fineness
- fibre length
- cleanness of sliver
- shrinking, softness
- colour

} input, lab.control

* Uster evenness
* " resistence
* thread waxing
* yarn shrinkage
* Uster classimal

} output, lab.control

endbreaktest spinning & winding
endcontrol each cone
endcontrol of hanks

K. Bottle necks

A plant working like this has not to have bottle neck, because the whole equipment is not used 100 %.

II/2 RECOMMENDATIONS

1. Bottle neck in preparation III. passage

Increase draft on finisher up to 16. Output III. passage then 7.2 g/m = 8 % more capacity equal 2670 kg/16 hours. The efficiency drops to 87 %, which is also very high. Better use sparecapacity in third shift.

2. Finisher

Reduce Nm from 2.2 to Nm 1.8 output.
The draft of spinning machines - open draft system also - can be increased up to 24. In that case, reduce the finisher speed to 110 m/min. About -6 %, that will be better for both machine and material.

3. Spinning, winding, doubling, twisting

Increas of production per machine is not advisable because lot of sparecapacity.

4. Productivity

The workpace and jobload in spinning is low.
Reduce downtime at least to 10 % by having special trained groups.

- spinners
- doffer - creeler - cleaner

Present situation : 38 operators = 304 op. hours
producing 2300 kg/16 hours
Productivity = 7,6 kg/op. hour (7,9 min/kg)

An intensive training of these operators results in three types of specialists:

- spinner
- doffer
- creeler / cleaner

A spinner is then able to take over 2 machines. Doffergroup, 4 operators, reduces downtime of doffing machine to max 5 minutes. Creeler & cleanergroup, 4 operators, reduces downtime lotchange % cleaning per machine enormously.
Total downtime reduction about 15 %.

More production of about 15 % equal on present base = + 350 kg/day

Productivity (spinner, doffer, creeler)
- 14 spinners
- 8 doffers
- 8 creelers

} 30 persons

production $\frac{2650 \text{ kg}}{30 \text{ pers} \times 8 \text{hours}}$ = 11.0 kg/op. hpur
(5.45 min/kg)
or an increase of productivity of
+ 44 %

III/2 CONCLUSION

The results of the survey are as follows :
- it was outlined how to reduce the bottle neck in preparation
- it was recommended to instal better lighting-facilities

The main problem is the low productivity. The market here and worldwide is asking for high quality products at a reasonable price.

Only a highly qualified personnel makes both possible. Highly qualified personnel is only available by qualified training of the operators in order to achieve the target " increase of competitiveness".

I/3 Survey at the worsted spinning plant of :

INDUSTRIAL HAEDO S. A.

Ruta 202 y Burgos

1611 Don Torenato

Prov. Buenos Aires

ARGENTINA

Managing Director : Ing. Carlos Monczor

Duration : 10. and 17.th Sept. 1987

Local currency : 1$ = 2.65 A

A. Description of the plant

This plant produces mainly Acrylic-Yarns in count Nm 40.
Situated in flat building with seven different departments

- preparation raw-white
- preparation coloured
- spinning raw-white
- spinning coloured
- autom. spinning
- winding and twisting
- winding coloured

The production flow is streamlined without crossing transportation.

The lighting is good to exellent. No air-conditioning, overhead humidifier devices are installed in all departments, except new autom. spinning frames, which will be installed in the near future.

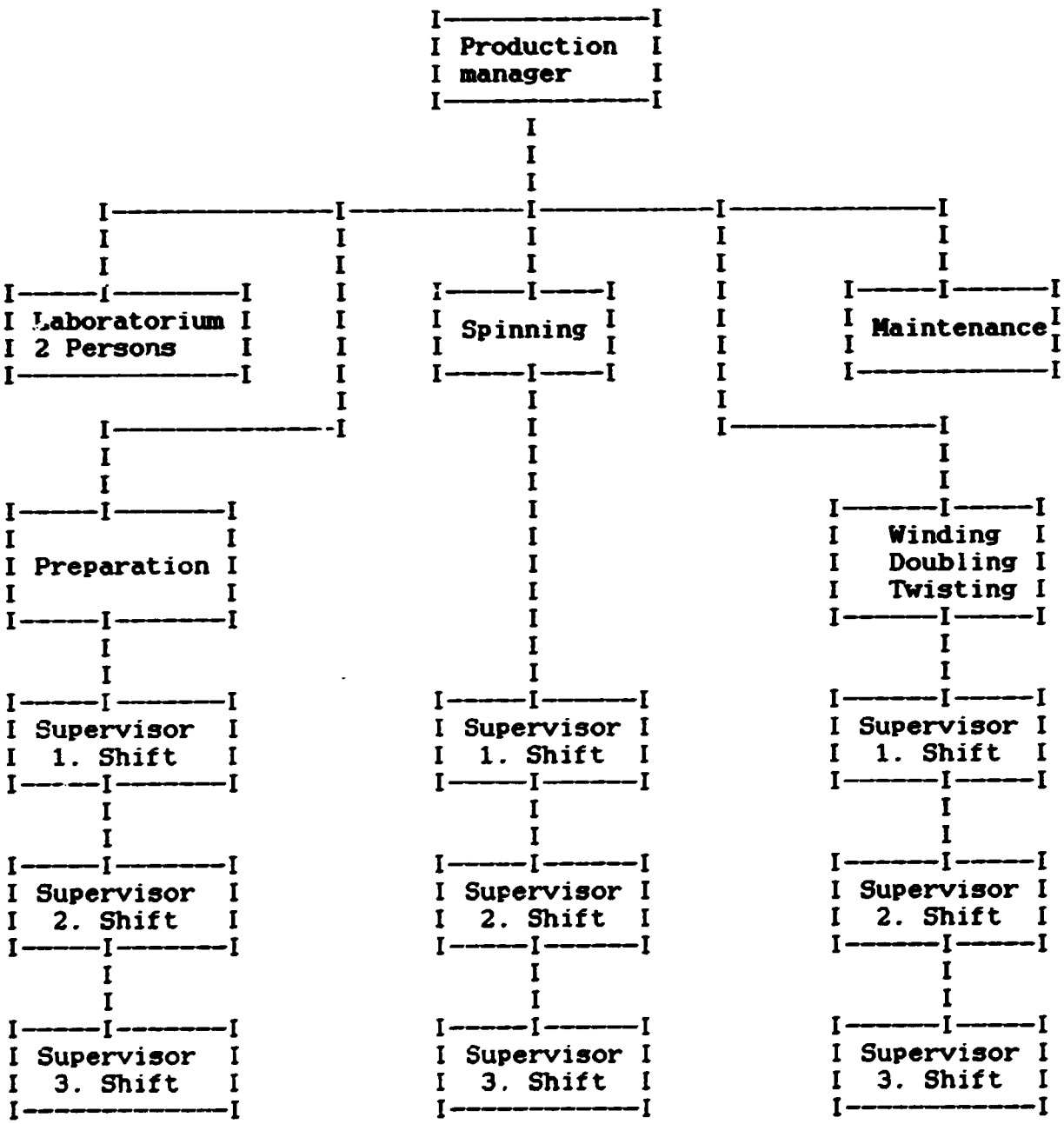
Batches average 2000 kg, from 400 - 10 000 kg

The existing buildings are optimally used, in process stocks exist with enough space.

Contamination of fibers, coloured / white is reduced to a minimum.

A well managed, medium-sized mill.

B. Organization



C. Equipment

Preparation :

1. Blending + III passage - Flyer
2. I - III passage, finisher NSC 7
3. Blending + III passge, seldom used

Spinning :

1. Department = 9 mach. raw-white
   total spindles = 4432

2. Department = 5 mach. coloured
   total spindles = 2240

3. Department = 2 mach. autom. Doffer Siro - spun
   total spindles = 1280

Grand total = 7952 spindles
all Cognetex make
6672 spindles with open draft system
1280 spindles with high draft double apron

Winding :	2 autoconer	50 spdl. each
	5 Savio	48 spdl. each
Doubling :	1 Savio	96 spindles
Twisting :	2 Volkmann VTS-07	110 spdl. each
Hanking :	3 Croon & Lucke	20 spdl. each
Steamer :	Welker	

Condition of all the machinery is good.

D. Labour complement, wages, incentives

The total labourforce consists of 165 operators per shift = 14 spinner, 2 doffer, 2 creeler, 2 copscleaner (spinning)

Absenteeismen rate = 4.5 - 7 %

Fluctuation " = 20 - 25 %

Wages / hour = 1.40 A

Present premium = 0.35 A / hour

two day absent / month, lost this premium
one day absent / month, 50 % lost of premium

Incentive : yes 100 % standard + 20 %

133 % " + 33 %
Standard is estimated production per month.

Total wages per hour = max. 1.87 A

Jobload in spinning : 1 operator = 1 machine

Doffer group : 2 oper./ 14 mach.
Creeler group : 2 oper./ 14 mach.

E. Production, efficiency in spinning

Count Nm 40, T/m 470, 74, rpm 9400
about 20 m/min

Average production per day = 4800 kg/ day (August 87)

Theor. production (100 %)

$$= \frac{6672 \text{ spdl} \times 18.2 \text{ m/min (real)} \times 60}{\text{Nm } 39.3 \text{ (real)}}$$

= 185 kg/hour (100 %)
= 4450 kg/ 24 hours

$$+ \frac{1280 \text{ spdl} \times 23 \text{m/min} \times 60}{\text{Nm } 20 \text{ (Siro-spun)}} = 88 \text{ kg/hour (100\%)}$$

= 2120 kg/24 hour
total = 6570 kg/24 hour (100 %)

$$\text{Efficiency} = \frac{4800 \text{ kg (real)}}{6570 \text{ kg (theor)}} \times 100 = 73 \%$$

Idle spindle : less than 1 %

Endbreakes/1000 spdl. hours = 30 - 40

The real efficiency is :

4450 x 0.88 = 3916
2120 x 0.94 = 1992
5908 kg/day

$$\text{Efficiency real} = \frac{4800}{5908} = 81.2 \%$$

Those figures are realistic because they are based on average figures of August 87.

F. Productivity in spinning

Direct labour = 16 spinner + 2 doffer + 2 creeler
= 20 operator x 3 = 60 operator
= 480 operator hours

Production av. $\frac{4800 \text{ kg/24 hour}}{480 \text{ op. hours}}$ = 10.0 kg/op. hour (6 min/kg)

G. Working methods

working pace fair for spinners, good for doffers, splitting of jobs.

H. Maintenance

spinning : 2 fixer / day + 1 oiler
winding : 2 fixer / shift

Maintenance follow up day by day. One side of ring-spinningframe, 48 operatorhours maintenance, including spindleoiling and centre. Mainenance groups, both spinning and winding are working properly and fast.

Rollercoatings all over the machiner good. Fuller-shop (needle setter) external Grindingshop, internal, fast and excellent.

I. Quality

Because only one count Nm40 in Acryl 3 den 90 mm, 6 den 110 mm and a very quality minded owner, the output in yarn is on the line of 50 % USTER standards, this must be considered as good to very good.

Quality control

- Uster evenness tester, each lot each passage
- Nm control
- Twist control
- Shrinking control
- Splicer control
- Uster yarn control, U %, thick, thin, neps
- strength & tension control

K. Bottle neck

The bottle neck is the finisher FM 7 from NSC
20 spdl = 40 roving Nm 1.6

II/3 RECOMMENDATIONS

1. Bottle neck

Because of this bottle neck at the finisher FM 7, the plant bought another finisher, which will be delivered next month. The plant manager does not want to use the existing finisher (Savio) for quality reasons.

2. Cops utilisation

All of the open draft spinning frames should use the optimum cops format. Diameter, feet and head of cops are not at the optimum.
Optimum means ringdiameter - 3 mm = copsdiameter.
Feet and head of tube only 10 mm free. The cycletime of cops running can be increased up to 10 %.

3. Jobload of spinners

The jobload of spinners in this well organised mill can be increased. Considering the low endbreak rate from 30 - 40/1000 spdlh, well trained spinners can easily take over two or three machines. That is an increase of productivity 100 % minimum. For the total spinning floor a reduction of 9 operators is possible.

9 mach - 18 sides = 6 operators, 3 sides/operator
5 mach - 10 sides = 4 operators, 2.5 sides/operator
2 mach new 4 sides = 1 operator, 4 sides/operator
4 doffer = 4
2 creeler = 2

total = 17 x 3 = 51 = 408 op. hours

productivity = $\frac{4800}{408}$ = 11.76 kg/op. hour

+ 18 % (minimum)

III/3 CONCLUSION

This well managed plant with high quality products and well maintained machine equipment is well balanced in the whole production line.

Product flow is at optimum at this time. The future planning reduces the bottle neck in the preparation.

With a trained personnel in the spinning rooms the productivity can be increased to appr. 13 - 20 %. With a better incentive system the fluctuation can be reduced to a minimum.

I/4 Survey at the worsted spinning manufacturing plant of :

WELLS S.A.

Pasaje No. 30, Nr. 23

San Martin

Prov. Buenos Aires

ARGENTINA

Plant Director : Ing. Hèctor Marsan

Dir. of Spinning : Ing. Antonio Mantegna

Duration of the survey : 11. and 21 th Sept. 1987

Local currency : 1 $ = 2.65 ₳

A. Describtion of the plant

The spinning manufacturing area is situated on the first floor of a vertical plant of finished goods. The spinning area produces only the yarn needed for weft and warp.

The manufacturing area input are dyed tops, tops from own dyehouse, only centrifugalized not dried.

The spinning area includes

- recombing
- preparation
- spinning
- winding
- twisting

The production flow is streamlined with in process stores.
The lighting is fair.
No air conditioning, only overhead humidifier devices.

The plant is producing mainly wool-polyester-yarns. The main counts are Nm 24 and Nm 48.
The batches range from 100 - 1000 kg, av. 400 kg.

The floors are very clean and the mill is well managed except a lot of small faults. The manufacturing director has been there only for one year yet. He is also responsible for weaving.

B. Organization

The mill is working two shifts, except 4 mach. in spinning in the third shift.

Each shift has two supervisors

one in recombing & preparation

one in spinning - twisting

Transportation is no problem because of streamlined production flow.

Laboratory exists, it controls :

input : Fibrediagramme, HM - baibe, CV %
output : NM, T/m, colour, classimat

in line control : endbreake/ 1000 spdl.hours, T/m, spindle rpm, m/min delivery speed

C. Equipment and its condition

Recombing : one sliver breaker I. passages
second & third passage Gillboxes
7 PB 25 NSC combers
one topmaking machine
all machines are old.
condition of these machines fair

Preparation : III passage Savio Gillboxes
1 finisher NSC FM 3 12 heads
2 Saco Lovell Flyer, 48 spdl each

Spinning : 7 SACM - Spinning machines
432 spdl each, drive per
side / 216 spdl 65 mm ringdiam.

4 Repco MK1 16 spdl total
2 Repco MK2 10 spdl total
6 Repco, kannibalised for spareparts

Winding : two autoconer
1 GKN - 50 spdl weft
1 GKS - 50 spdl warp

Twisting : 4 BARMAG two to one twister

The conditioning of machinery varies.
preparation fair, needle on fallers too

narrow 8/ cm I passage
9/ cm II passage
10/ cm III passage

ringspinning : rings and pigtails have
to be centered.
Roller coates different diameter
Pigtailes have cuts

All other machines are is fair to good condition.

D. Labour complement, wages, incentves

The total labourforce consists of
46 operators spinning to twisting
18 operators in recombing & preparation

Total 64 operators + 4 supervisors

Absenteeismenrate : about 5.5 %

Fluctuation : 0.8 %

Wages / hour = 1.60 R

Incentive = 40 %

Present = 25 %

Total = 2.895 R / hour

Incentive base does not exist

Premium presence = 1 day off - 50 % from 25 %
2 days off - 100 % from 25 %

Jobload in spinning :

756 spdl/ operator
2 doffer
3 creeler
1 cleaner
1 helper

Direct operators in spinning = 9 / 2 shifts
2 / 3rd shift

E. Production, efficiency in spinning

Count : Nm 24, Nm 48

Material :

60 % wool 27/28 mikron 68 mm Hm
CV % = 40
40 % polyester 3 den, 57 mm, CV = 20 %

Average Nm 32

Average production (August 87)

ringspin = 20280 kg
repco = 2674 kg

The efficiency in ringspin = 83.7 % real
The efficiency in repco = 74.0 % real

The daily production is about 1240 kg total

idle spindles = about 3.3 % ring
= about 4.8 % repco

downtime = 6.4 % ring
= 2.0 % ring

} stated by the director

F. Productivity ringspinning

Production in August 87 = 20 280 kg
≙ 416 kg/ shift
(calculated in shifts for whole month, because difficult with 7 mach/ 16 hours, 4 mach 8 hours, Saturday and Sunday)

9 direct operators = 72 op.hours

$\frac{416}{72}$ = 5.8 kg/ op.hour
(10.3 min/kg)

G. Working methods

In all operations skilled but slow.
Job splitting in spinning, but not optimal.

H. Maintenance

No planned maintenance.
Maintenance personnel : 4 fixer, 1 oiler, 1 supervisor
Daily maintenance = repairing.

I. Quality

The quality of the yarn Nm 24 is fair,
the same of Nm48 is poor. U = 17 %

Because of using wool with 27 - 28 mikrons 60 % and polyester 3 den 40 % fibres in cross-section of yarn are only 41. That is too low for coloured yarn which should be 45 - 50.

Endbreake rate = 100 - 120 / 1000 spdlhours This high rate occurs to wrong counting because only 1/2 hour and 2/6 spindle. So 1 real endbreak is theor. 4.6, the lapping %tage is very high about 60 %.

K. Bottle necks

This plant has no bottle necks because in each department there is a lot of spare capacity.

II/4 RECOMMENDATIONS

1. Quality :

The yarn count Nm 48 has only 40 fibres in cross - section. That is the lowest limit for raw-white yarn.
For coloured yarn is recommended :

- 27 mikron wool	50 %	Fibres in cross-s = 45
- 3 den polyester	50 %	

- use of 25.5 mikron 60%, 40 % 2 den polyester than fibres in cross-s = 44 minimum

2. Maintenance :

In the ringspinning frames rings and pigtails have to be centered. A lot of pigtails are cut; they have to be replaced.

Preparation, the fallers have to be changed.

I passage	5 needle/ cm
II "	6 needle/ cm
III "	7 needle/ cm

3. Slivers in recombing :

The slivers in recombing are wet, causes of laps! The plant will have a new centrifuge with appr. 900 rpm. Maybe, the slivers will be drier then. Because there is no stock of raw material, it is essential to have tops going into production which are not so wet.

4. Nm on flyer

Increase the Nm on flyer to Nm 1.7 the draft on ringspinning is 28 then, now it is 32, which is too high.

5. Endbreak-test

Make endbreak-test one hour on one operator, follow up the operator. Make sometimes endbreak-test over a whole cycle time (full cops), for getting real results.

6. Lapping on spinning-frames front-roller

Use spinning powder to reduce the laps. Grinding of all front-roller-coats, same diameter of all front-rollers per machine-side!

7. Productivity

When reduced the endbreak - rate by recommendation 5. and 6. thus rate should be appr. 60 - 70/ 1000 spdl.hours. With trained personnel it will be possible as follows :

1 spinner 1 mach Nm 24
1 spinner 3 mach Nm 48
4 doffer per 7 machines
total = 7 persons direct for same production than now.

$$\text{Productivity} = \frac{\text{about 420 kg/shift}}{56 \text{ op.hours}} = 7.5 \text{ kg/op.hour}$$

compared to present, an increase of 30 %.

8. Indirect operators in spinning to twisting

Spinning:

reduce to only one cleaner,
save one operator/ shift

Winding :

reduce to two operators, for helping and doffing per shift save one operator/ shift

Preparation :

eliminate the helpers per shift. there are direct operators enough to do all the things the helper does now

That is a total saving of six operators per day.

9. Waste

The waste in spinning will be reduced by 1.5 - 2.0 % by following recommendation 6. Saving of about 1 % waste will be the result.

III/4 CONCLUSION

This mill does not need to increase the output because its production is sufficient to feed the own weaving.

The maintenance of ringspinners should be done as soon as possible to reduce endbreaks and laps.

The productivity is very low; a training of spinner and doffer ensures an increase of productivity of about 30 %.

To reduce the cost per kg yarn it is also neccessary to reduce the indirect operator costs.

The biggest problem is the consumption of coarse wool 27 - 28 mikrons for fine count Nm 48. That creates problems in quality U%, endbreakes and knots, because only 20 % of all winderspindles do have splicers.

The money saved by buying coarse wool for fine count is distributed in production, high endbreakes, bad U%, low production.

Use for fine counts wool of 25.5 mikrons, coarse wool 27/ 28 mikrons for count Nm 24.

5. Short visit at the semi-worsted manufacturing plant of

EL ESPARTANO S.A.

Vedia 2838 ,
Prov. Buenos Aires

short visit : 23 rd Sept. 1987

Semi-worsted manufacturing plant for carpet yarn in 100 % wool and also blends with polyester. Blendmixing in bed, 2 drums modern card-set. one for wool, one for polyester, modern St. Andrea high-speed drawframes III (IV) passages. Ringspinning machine direct, doubling doubling from cops, twisting two for one. Yarn will be steamed on twisted cones.

Machinery condition fair to good, except rebuilt spinning frames, some of the frontcylinders are too smooth, they shouldn't be used. Steaming time now 30' and 100 degr.C has to be reduced because thread is death. Trials have to be started to find our where the optimum steaming time lies.

6. Short visit at the top making plant of

TAPIALES

Buenos Aires

short visit : 18 th Sept. 1987

Scouring and top making plant. 5 scouring lines about 40 to/day Modern carding (Duesb. Bous) and high speed drawframes HMG. Comber PB 25 and PB 29, After combing drawframes with auto autoleveller and ball-delivery (Top). From ball to bumbs two coiler-heads are installed. 2 Bumbspress.

Output : about 20 to/day top (20 % Bumbs)
about 20 to/day scoured wool

This plant is exporting and can be considered a well managed top maker plant with a very good in-line and off-line control. Recommendations : increases bumbs weight to 10 - 12 kg/bumbs

7. Short visitat the carpet yarn manufacturing plant of

INDUSTRIAS ATLANTIADES S.A.C.I.F

Maipu 521 , Buenos Aires

short visit : 24 th Sept. 1987

Semi-worsted and woolen system carpet yarn manufacturing plant. Blending in bed, card set, III passages preparation and finisher. 2 sets woolen cards and ringspinning frames. Doubling frame cops, two for one twister and special twister with nylon. Modern Superba shrinking device. Equipment old, except shrinking and two for one twister. Production streamlined, lighting good, floor clean. A well managed mill.

8. Short visit at the worsted spinning manufacturing plant of

HILANDERIA M.G.s.a.

Gral Roca 3220

1702 Ciudadela

Buenos Aires prov.

short visit : 24 th Sept. 1987

Well managed small plant only one count Nm 20 acrylic siro-spun producing. Quality of yarn very good 25 - 15 % U.Standarts. Owner = manager is a perfectionist and his really small plant is outstanding in all areas. Machines are in optimum condition. Equipment : Sydel-stretch-breaker, Rebreaker, three passages high speed draw frames, finisher four Zinser ringspinner automatic doffer, Schweiter automatic-carousel-winder with splicer and Superba-shrinking machine.

That small mill has a high efficiency and high productivity. The output quality is first class.

IV. GENERAL SUMMARY

9 mills were visited in the Buenos Aires area in the month of September, 1987.

- worsted system hand knitting yarn
- " " machine knitting yarn
- " " weaving yarn
- woolen system carpet yarn
- semi-worsted-system carpet yarn

Most of those mills have a wide range of counts and blends.
The technology is the same as in Europe. The machine equipment ranges from old to most modern and the average condition of machinery in those mills is fair to good.

The operating conditions in most of the plants are fair, poor in only one. All plants, except the topmaker factory, have a lot of spare capacity.

- the production is low
  efficiency av. 65 %

- the productivity is low
  average count Nm 40 = 7.5 kg/ operator/ nour

- the quality of output is fair and accepted by the home market, only two spinners reach export quality.

It's a long way to increase the competitiveness of Argentine's wool industry - spinning factories - to a world standard in qualified yarns.

An increase of the output in kg/operator/hour, at least reduction of the cost per kg yarn, needs intensive training ,

* training in jobsplitting (spinner, doffer)

* training of supervisors

* training in maintenance

* training in costing (cost-thinking)

With skilled supervisors, skilled fast specialists in spinning, doffing, creeling and cleaning and in the other production areas, with specialists in maintenance to reduce downtime due to overhanling - and by training in cost thinking there will be a way within the next five years for Argentine's wool industry to be able to fight on the world market as a competitor.

V. Recommendations to Unido in Buenos Aires and in Vienna

The most effective method to increase the competitiveness of Argentine's wool industry is to build up a training centre.

In this centre there will be trained the CIT-staff first and some selected spinners to become training supervisors and instructors.

The first 3 - 4 months the training will be done by an Unido expert. For example, the training of spinners takes 4 weeks. After the third or fourth course, the expert of Unido should only be in a control position, to enable the CIT and special staff to continue the training of operators from all the wool - and later also cotton spinning mills.

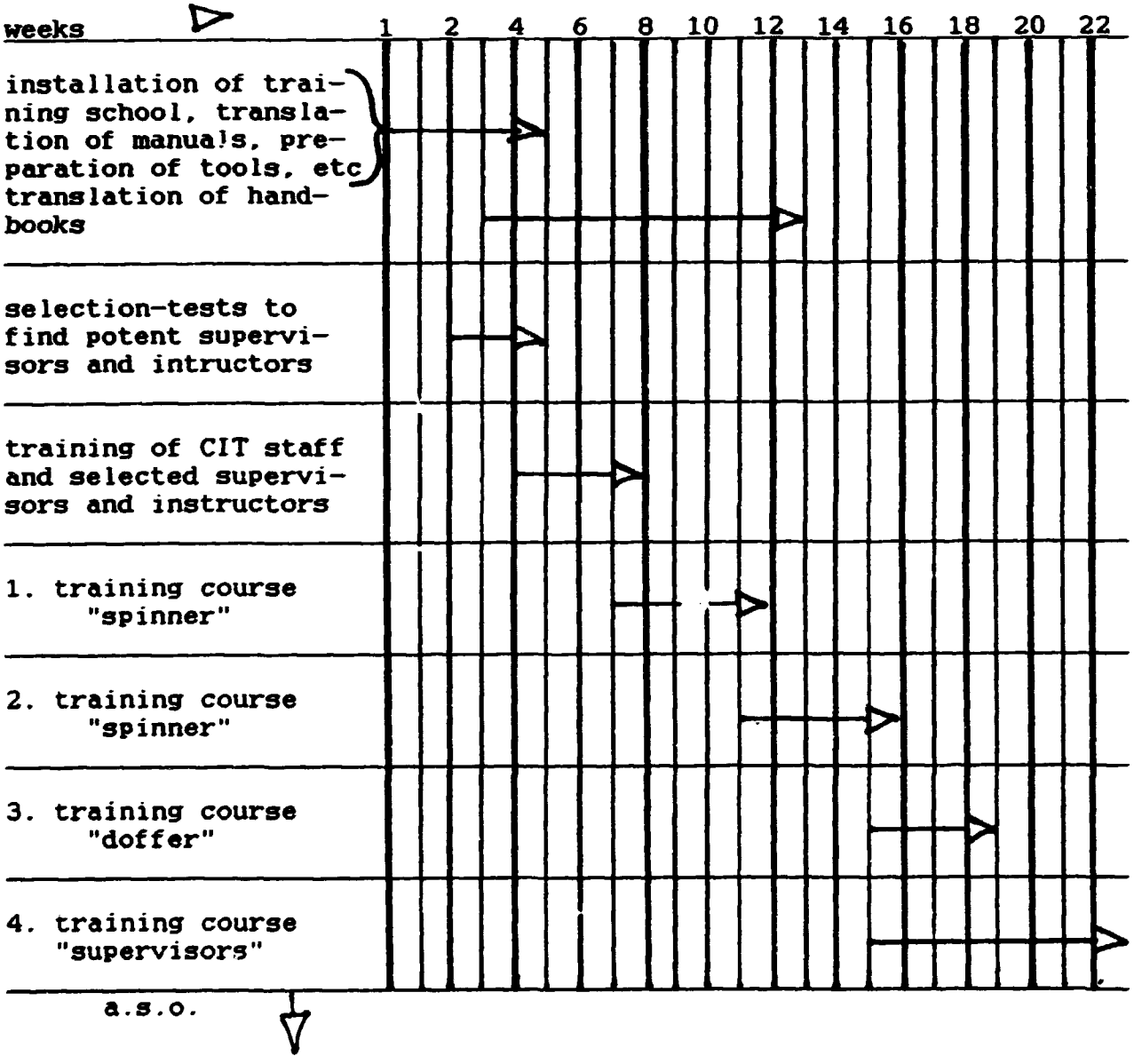
Also supervisor, maintenance and costing system training could be provided by Unido experts.

So at least the knowledge of world standards could be adapted by Argentine's textile industry.

That step into the future has to be made if Argentine's textile industry will not remain behind its possible compretitors.

A possible training sequence is shown on the following page.

time schedule of training



Appendix 1

Seminar held at Sept. 28, 29, 30 th 1987

in the auditorium of FITA, Av. Leandro N. Alem. 1067, Buenos Aires and arranged by CIT, Textile Research Centre.

The seminar was held as a workshop.

Themes :

first day : Speaking about findings and recommendations in general

second day : modern spinning in Europe (Germany) to day and an outlook for the future.

third day :
- Mill control
- Maintenance in spinning
- Training methods
- Outlook ITMA 87, Paris