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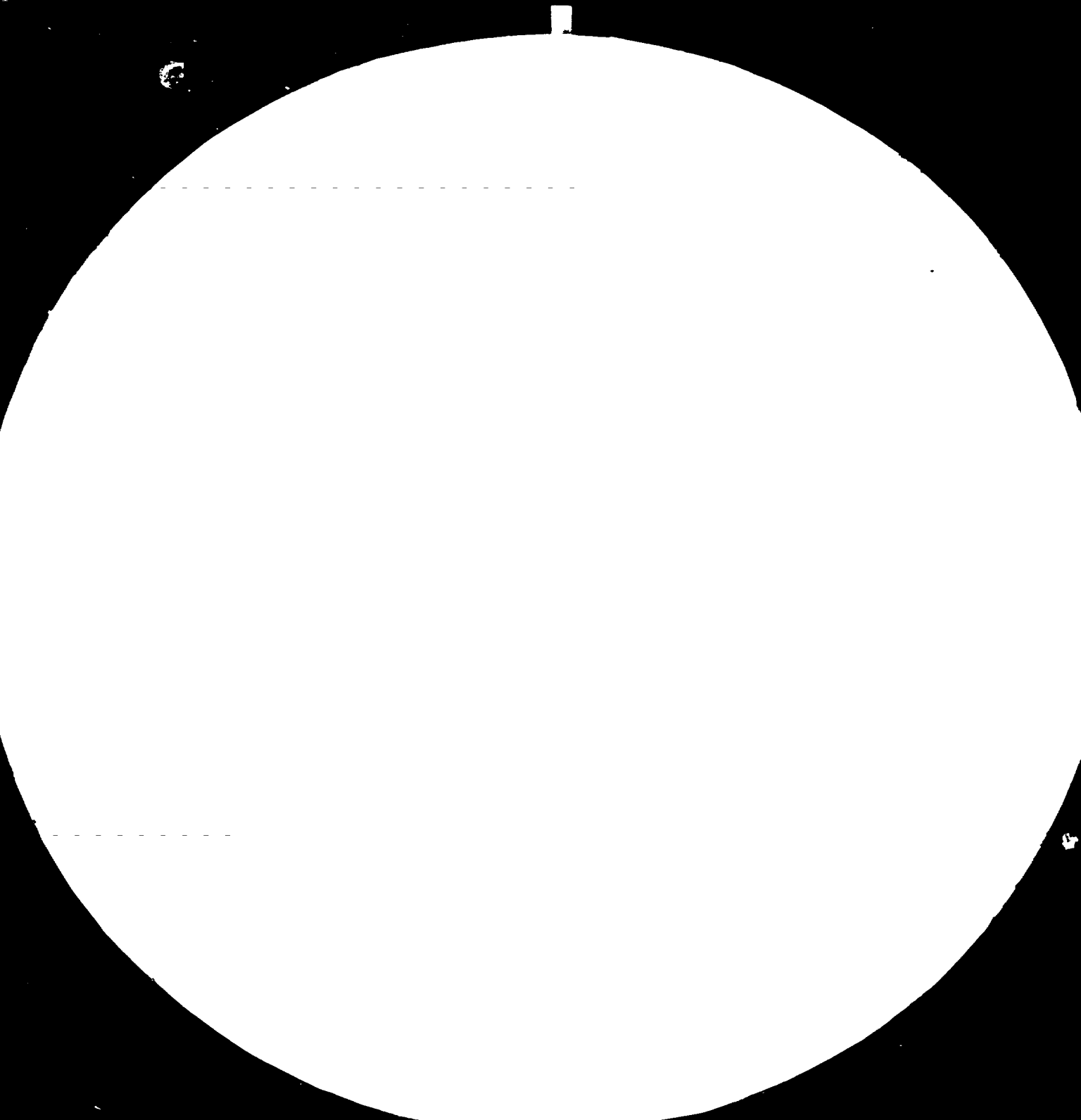
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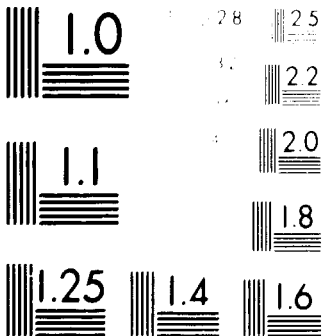
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TEXTILE DEVELOPMENT CENTRE, PHASE II

DP/EGY/77/008

EGYPT

Terminal Report*

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

Based on the work of Carlo Palizzotto,
Expert in Garment Manufacturing and Design

United Nations Industrial Development Organization
Vienna

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EXPLANATORY NOTES

- TDC - Textile Development Centre
- CTCF - Cotton Textile Consolidation Fund
- TQCC - Testing and Quality Control Centre
- UNDP - United Nations Development Programme
- UNIDO - United Nations Industrial Development Organization

Abstract

The Textile Development Centre (TDC) is a project designed to give to the textile industry full co-operation, including on ready-made garments. The Executing Agency of the project is UNIDO, the project is DP/EGY/77/008.

In order to introduce new processing technologies to knitted garments UNIDO appointed an expert for 3 months, from 6 September to 5 December 1982. The expert, Mr. Carlo Palizzotto, Italian, started his activities in the TDC Alexandria on the 8 September 1982. The National Counterpart of the expert was Eng. Soheir Seif El Nasr and Eng. Nabila Attar.

In order to get local background information guidance during his assignment the expert visited some mills in Alexandria, both public and private. During the visits the expert gave some practical suggestion on production methods. Jointly with Eng. Magdi El Aref, project manager, a working programme was drafted which was done in accordance to the job description and the future activities of the TDC, aimed at giving the most effective technical assistance and services to the textile industry on ready-made garments. Some mills, processing woven fabrics insisted on getting direct assistance in the plant. The programme was expanded to garments made of fabrics other than knitted. Orient Linen, making summer suits and Arab-German making men's shirts were given in-plant assistance on design and process of production. Because during the visit to the mills was found out that the more urgent priority was to fill the gap on design. Therefore, the expert organized a course of technical lectures on design at TDC. Due to a short time for the preparation of the technical material the lectures were limited to construction and grading of blouses, skirts, and shirts for men only. At the end of the lectures all technicians expressed their satisfaction to the Project Manager Eng. Magdi El Aref. They also declared that this kind of technical lectures are exactly of what is needed and that the subject should include all style of garments. The expert should also go to the mills and give practises applications of design technology on garment processing and that the project should devote more time to the garment sector. Recommendation are given for the extension of the activities on garments and services to industries. As well as activities for remodelling old-fashioned factories.

Introduction

The importance of the textile industry to the economy of Egypt is well known. Recent developments in textile technology and the increased awareness in consumer demand for end-use properties make it imperative that adequate facilities be made available to assist the industry in surviving the competition in external markets, and producing goods for the local market at a reasonable cost. There is already a modern and up-to-date Textile Testing and Control Centre in Alexandria which has been further developed with the assistance to UNDP and has generated quality consciousness in the industry, among other things as technical consultants by providing trouble-shooting services, and technical consultancy. The team will assist the already existing one of senior technical consultants attached to the Egyptian General Organization for spinning and weaving, who have wide experience of the textile industry of the country. The combined team will constitute a considerable potential, but will need the support of the facilities of a Textile Development Centre. The chief objectives of the Centre when it is fully established will be:

- a) to provide pilot-plant and testing laboratories to carry out work on the industrial problems, both of short and long-term duration, which would be of immediate use to the textile industry;
- b) to carry out pilot-plant studies on the materials used, particularly cotton and its blends, and the machines involved in the conversion of fibres into finished products. This would include investigations on the raw materials such as new fibres, dyes, finishes, machines and processes which are being developed elsewhere and at the Centre itself;
- c) to carry out qualitative and operational studies of industrial processes in textile mills with a view to increasing productivity and efficiency with the modern industrial engineering techniques;
- d) to provide technical consultancy in management and technological problems and extend modern testing facilities to textile mills;
- e) to communicate at all levels of the industry by organizing conferences, seminars, symposia and group discussions on various technical subjects and training courses for mill technicians and other;

- f) to disseminate technical information to the industry by issuing periodical bulletins to assist the mill technicians in keeping abreast of the latest development in textiles;
- g) to assist the industry in setting and maintaining standards.

In order to carry out its technical assistance on knitted garments, UNIDO, as executing agency appointed an expert for three months. The duties of the expert were the following:

- 1) Assist the local textile industry to extend its applied research activities in the field of ready-made knitted garments made from cotton and man-made fibres.
- 2) Assist in devising and implementing applied research programmes within the TDC and in mills, including studies of:
 - a) the optimum processing conditions for the manufacture of knitwear, etc. from local cotton and various types of man-made fibres;
 - b) how to increase efficiency and productivity of garment processes;
 - c) how to reduce waste and second quality in garment processes.
- 3) Render direct assistance to mills through technical consultancy, e.g.:
 - a) assist in setting and maintaining standards;
 - b) assist in the modernization of garment making technologies.
- 4) Make qualitative and operational studies in garment manufacture.
- 5) Communicate at all levels with the industry by helping to organize (and participating in) conferences, seminars, discussion groups and training courses.
- 6) Train counterpart personnel to such a standard that they will be able to take over and continue the work at the end of his assignment.

- 7) Suggest possible future developments of the TDC and its activities for the ultimate benefit of the local textile industry.
- 8) To prepare a final report, setting out the findings of his mission and his recommendations to the Government on further action which might be taken.

I. FINDINGS

A. Equipment

Machinery in the TDC, in Garment Section was found uncomplete. There is no pressing machine and no press for attaching fusing interlining. Some basic machines are missing namely the ones to prepare collarettes and also flatlock machines for assembling operations on knitted fabrics, namely chain-stitch type 401. A complete list of lacking machinery was addressed to Eng. Magdi El Aref, Project Manager (see Annexe 2). Machines which could not be used up till now, can only be put into operation if the machines listed in Annexe 2 would be added to the Garment Section.

B. Staff

The staff in charge of the Garment Section, Eng. Soheir Seif El Nasr and Eng. Nabila Attar have acquired some knowledge in the national industry. They are very eager to learn and specialize in their new job. There is no mechanic in charge. The expert suggested to appoint a part-time mechanic in order to start and maintain machines and also to give knowledge on operations to Eng. Nabila and Soheir.

C. Services of the TDC to Industry

Due to insufficient knowledge of garment operations the staff in charge of the Garment Section cannot give any services to the Garment Industry. This was discussed between the Project Manager and the Expert and a programme of activities was designed to be started in the Centre for extension services to the Garment Industry all over the country (Annexe 3 refers).

D. Visits

Visits were paid to six companies in Alexandria, among them there is one private company.

- 1 - El Nasr Wool and Selected Textiles (VESTIACO).
- 2 - Orient Linen Cotton Co.
- 3 - Arab German Co.
- 4 - Kabc El Bozha.
- 5 - National Spinning and Weaving Co.
- 6 - Arafa Co.

1. VISIT TO EL NASR WOOL AND SELECTED TEXTILE
(VESTIACO)

Address : El Nozha, Alexandria.
Type of production: Suits for men.
Concern : Joint Venture Egyptian - French.
Management : National
Supervision : French
Technology : French
Technicians : Nationals
Labours : Nationals
Raw materials : Nationals
Auxiliary materials: Partly national, partly imported.

The manager warned not to give suggestions. Any co-operation was to be authorized by the General Manager.

The time allowed for the visit was too short for the size of the factory and only the jacket's assembling section was surveyed. Management stated that the output was 500 jackets per day with 100 operators. Both equipment and methods used are of the latest technology. The standard of quality they have reached so far, in just 6 months is excellent and can be compared with international standards. It must be said that this is for a great part due to the close attention of all employees in the process. Although the standard of technology is very high, the expert feels that some suggestions to improve style and process would be useful.

2. VISIT TO ORIENT AND LINEN COTTON CO

Address : P.O. Bag Sidi Gaber - Alexandria
Concern : Public Company
Type of production: Summer suits for Gents and garments
for children. Galabis trousers.
Raw material : Own manufacture.

Their production is based on summer suits and garments for children.

Part of their production is exported to Belgium, mainly children garments. In this case the patterns are supplied by the contractor, but the raw material is made in Egypt.

Although the mill has a large size garment factory they lack badly in design technology. This results in excessive diversification of models and subsequently in the level of production performances.

During the visit the expert gave some suggestion to improve some of the styles of jackets and traditional cloth bags.

3. VISIT TO ARAB-GERMAN CO

Address : Moharam Beak
Type of production: Shirts
Concern: : Public Joint-Venture with German Co.
Management : National
Technology : German
Supervision : German
Raw Material : National

This factory processes only shirts for gents. The major part of the production is exported. The finished product can be classified as medium quality. Machinery and equipments are not up-to-date, there is lack of some essential machines for making shirts in bulk production. Output, according to the number of labours employed in the process, is very low.

Operators are willing to collaborate and quick, but due to the confused layout workflow is tangled they cannot give the best of their devotion. Moreover, some operations are unnecessary. It is evident that by a proper layout and technology, even without new machines the output can be increased greatly.

The General Manager expressed concern in the future of the project with regards to the assistance expected for his garment factory.

4. VISIT TO KABO

Address : El Nozha - Alexandria
Concern : Public Company
Type of production: Underwear, blouses, shirts for children.
Raw Material : Made by themselves.

Part of their production is exported. There is a limited number of designs, operators are of good will and deft on the handling.

Flow of production is acceptable regarding their standard of machinery and equipment. A better layout would improve methods and increase the production.

Technicians lack design capability so that creation of new styles is almost absent. Diversification of products therefore, is poor.

Technicians said they would appreciate any kind of co-operation from the project in order to improve everything in the factory, such as increasing design capability, diversification of products, better floor layout and production methods, performance measurement and increased productivity.

5. VISIT TO NATIONAL SPINNING AND WEAVING CO

Address : 132 Canal El Mahmodia Street
Concern : Public Company
Type of production: Pyjamas, shirts for gents, and children's
night-gown
Raw material : Own manufacture

According to information received from management the mill employs about 18.000 labours. The visit was limited just to the garment section.

The garment section is somewhat old-fashioned and some sections of machines are totally stopped. They look like decayed. It is evident that this factory needs innovation badly.

A great part of machines are in good condition and when reshaping the factory they can be used as basic machines, but new machines are necessary in order to up-date the production quantitatively and qualitatively.

Reorganization of this factory should be done with great care while considering the amount of raw material consumed. More value can be added on processing it in the garment section. This also would be of great benefit to the people living in the area.

The factory lacks the required technology both in garment design and production organization. Technicians are of good academic background: labours are of goodwill and swift-handed and if properly trained and organized the factory could turn into a more profitable concern. Garments produced are of medium level quality.

6. VISIT TO ARAFA CO

Address : Moharam Beak
Type of production: Underwears and sport outerwear
Concern : Private company
Raw material : Made by themselves

This factory processes underwear and a limited number of styles of knitted outerwear. Part of their production is exported.

The layout is not very bad, but can be improved. The produced garments are of medium quality.

Among their technical problems, the most urgent one to solve was the assembling of collarettes to the garments, which after assembling were too loose and in some cases even damaged.

By reducing the speed of the collarette roller feeder the problem was solved by the expert at once. After that the garments had a better looking, with great satisfaction of everybody.

They asked for more assistance in the future.

E. Other Activities carried out by the Expert:

- Continuous training of counterparts on:
 - Research of fashion ideas.
 - Sketching of fashion-design.
 - Tracing of basic patterns for blouses, skirts, trousers and men's shirts.
 - Giving lecturers on pattern making technology.
 - Grading of different sizes on the above said styles.
 - Notions on assembling garments.
- One-week assistance in plant to Orient Linen Co. (pilot plant) on design of patterns.
- One-week assistance in plant to Arab German Co. (pilot plant) on layout and production processes for the start of a new line of production different of their current bundle system (Annexe 4 refers).
- Preparation with the counterpart of 23 sheets of cardboards 1.00 x 0.70 mt. for demonstration and reference for instructors.
- One-week technical lectures to technicians from the industry (Annexe 5 refers).
- Preparation of written material for lectures on industrial pattern construction for technicians (Annexe 6 refers).

II. CONCLUSIONS

The short-term activities of the project on the Garment Sector has yielded the following:

- a) Awareness of the need to acquire the TDC know-how in order to fulfill its function to the Garment Sector of the country.
- b) Provided the staff in the TDC Garment Section with the basic ideas for future activities.

- c) Strengthened the relations between industry and the TDC.
- d) The activities of the Project DP/EGY/77/008 should give a new dimension to the Egyptian garment industry.
- e) Created awareness of the need for design and processing technologies in industry.
- f) Created awareness of the need to acquire the basic technological know-how in order to become independent from foreign expertise.
- g) Created awareness for the need to reorganise the garments processing factories.
- h) Demonstrated that activities on garments technology be expanded to the entire garment industry.
- i) Created the need to extend the services of the Project to the entire garment industry.

III. RECOMMENDATIONS

- TDC should try to install the required machinery in the Garment Section as soon as possible in order to allow the Garment Section to start full activities.
- To appoint a mechanic for the maintenance of the sewing machines. The mechanic also should train the staff in the Garment Section in the mechanics of sewing machines.
- Following the programme of the lectures given by the expert and using the same material the counterpart to the expert should start short-term courses on patterns making and grading. The course should be given in Cairo Mehalla and also be repeated in Alexandria where many technicians have applied for it.
- The counterpart should get practical training in national factories and afterwards be sent to international institutions for upgrading his know-how. For this end the project should provide suitable additional fellowship/candidates.
- TDC should extend the activities in the Garment Section and also include expertise in making up of knitted garments.

- The activities of the Project on garments should have two lines:
 - a) Manufacturing - introducing new technologies on design-process-and organization.
 - b) Production organization - for remodelling factory layouts of the existing factories both in the public and private sector.

- The re-organization activities should be programmed as follows:
 - a) Re-organization of factories, selected by the Ministry of Industry, based on reports from the TDC.
 - b) An international consultant from UNIDO should render assistance to TDC's staff in preparing the re-organization of the selected factories.
 - c) While taking the future average output into consideration for each factory the floor layout and a list of the required machinery should be prepared.
 - d) Assistance in the selection of the new machinery.
 - e) Assistance on drafting investment plans for the innovation project.

- The re-organization of the Garment Sector should be effected by a Development Project for the following:
 - a) Machines should come from one source on order to reduce problems on maintenance and spares.
 - b) The country of the chosen supplier of the machinery could grant a long term loan for the purchasing of machines and equipment.
 - c) The machine suppliers could station some technicians in the country in order to train national technicians and to check-up machines during the running-in period.

ANNEXE 1

ACTIVITIES FOR POST 11-08 (Carlo Palizzotto),
UNIDO Consultant of Garments

September

- 6 - Travel Rome - Cairo
- 7 - 8 - Briefing UNDP Cairo and travel to Alexandria.
- 9 - First day activity in the TDC. Visit at the TDC.
- 11 - 16 - Visits to factories in Alexandria and report on the said visits.
- 18 - 23 - In the TDC training of the counterpart.
- 25 - 30 - No activities in the TDC due to holiday, but the expert worked home on the preparation of a plan, for the assistance to the ARAB-GERMAN CO.

October

- 2 - 7 - Assistance in plant to ARAB-GERMAN CO. in order to improve their output.
- 9 - 14 - Assistance to ORIENT-LINEN CO. in order to improve design and process of production.
- 16 - 21 - In the TDC preparation of technical material for lectures. Training of counterpart.
- 23 - 28 - In the TDC preparation of technical material for lectures. Training of counterpart.

November

- 4 - In the TDC preparation of technical material for lectures. Training of counterpart.
- 6 - 11 - Technical course of lectures to technicians from garment factories.
- 13 - 18 - In the TDC development (making) of 2 prototype garments by the counterpart.
- 20 - 27 - Final report.
- 28 - 29 - Travel to Cairo - Debriefing at UNDP.
- 30 - Travel to Vienna.

December

- 1 - 2 - De-briefing at UNIDO - Vienna.
- 3 - Travel Vienna - Rome.
- 4 - 5 - Weekend and termination of appointment.

ANNEXE 2

LIST OF MACHINES AND EQUIPMENT FOR THE GARMENT SECTION

This is to bring to your attention that the following machines and equipments are necessary in order to have the Garment Section equipped for the starting of operations.

<u>Quantity</u>	<u>Description</u>
2	Sewing Machines - 1 needle - 2 threads - chain - stitch type 401 - (Flat bed).
1	Sewing Machine - 1 needle - 2 ZIG - 2 ZAG - Chain stitch type 404 (Flat bed).
1	Sewing Machine - Curved needle - 2 threads - Blind - Stitch STROBEL C.L 310 - 23 (or similar machine).
1	Press Fusing Machine for attaching interlining - (small).
1	Pressing Machine for knitted garments (small).
1	Machine for the preparation of rollers of knitted fabric before cutting it into strips.
1	Machine for cutting rolls of fabric into strips of different widths.
1	Vertical Electric Cutting Machine 4 inches.
1	Electric Cutting Machine 2 1/2 inches rotating knife.
1	Drilling hot Marking Machine for knitted fabric.
1	Head Notchers.
1	Pattern perforator.
5	Tailoring Dummy (mannequin) for lady S. 42 - 44 - 46 - 48 - 50.
5	Tailoring Dummy for Gents S. 46 - 48 - 50 - 52 - 54.
5	Tailoring Dummy for Children S. 4 - 6 - 8 - 10 - 12.
1	Equipment for controlling knitted garments.

For your convenience I am indicating down the addresses of two companies.

- Juki - 23 Kabuki
CHO - Shinjuko-ku
Tokyo
Japan

- Rimoldi
Via; Vespri Siciwani N.g.
?0146 Milano
Italy

ANNEXE 3

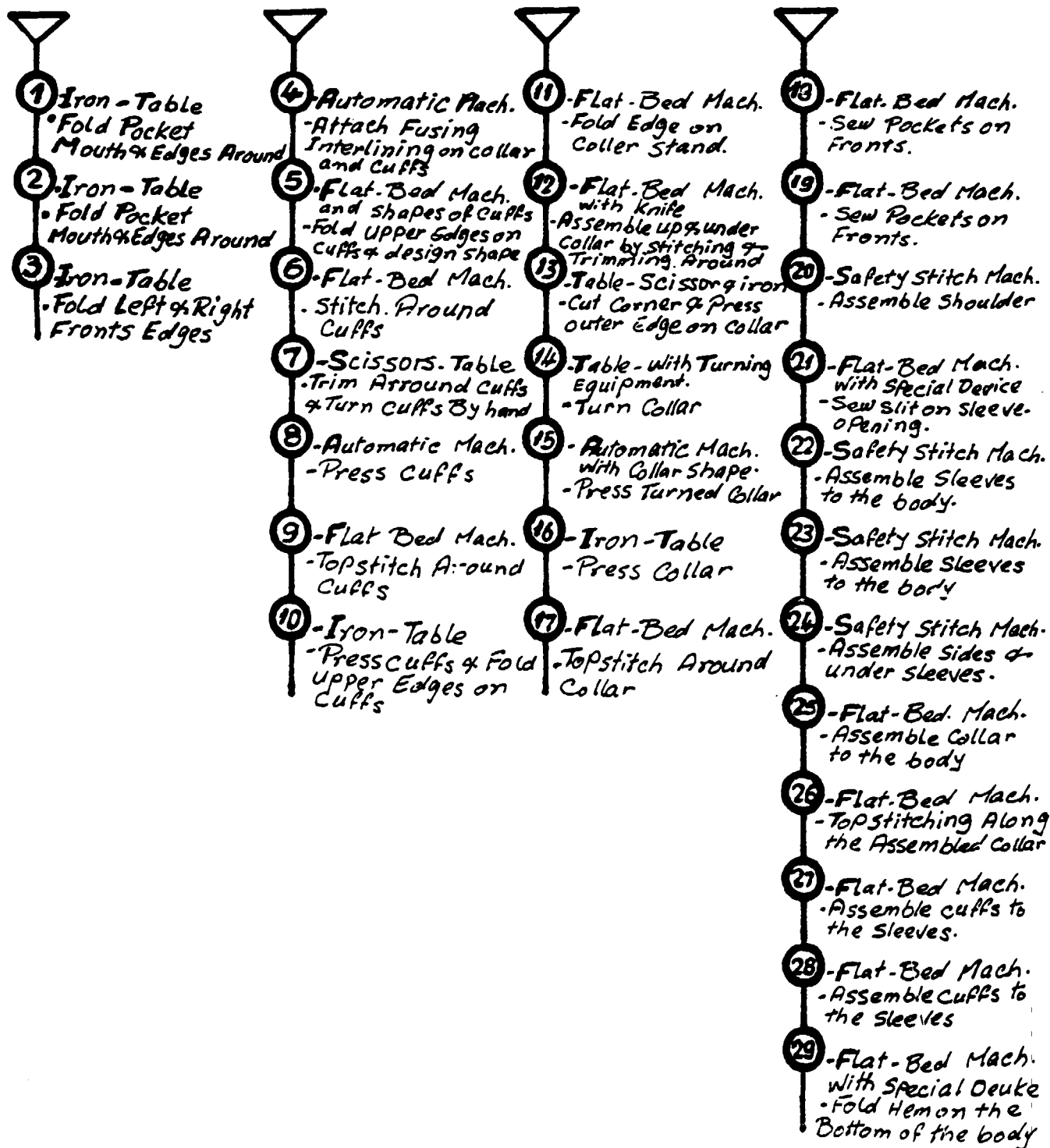
ACTIVITIES TO BE DEVELOPED IN THE TDC
FOR SERVICES TO THE GARMENT INDUSTRY

- Specialization on industrial patterns making.
- Research on processes of production.
- Demonstration on processes of production.
- Research on international fashion trends.
- Information to manufacturers on international fashion trends.
- Assistance in plant on layout.
- Assistance in plant on processes of production.
- Assistance on selecting new machinery.

The expert's working programme was designed in such a way that his counterpart got the most possible preparation in order to enable them to give assistance to the home industry on the above said activities established in the TDC's Garment Section.

PROCESS CHART FOR MEN'S SHIRTS

The following process was designed according to a style of shirt and also to machinery and equipment available in the ARAB-GERMAN Co. It should be regarded out of date. Nevertheless employing trained labours it should give an output of 120 pieces per hour. Each operation at each working station is estimated to last 30 seconds. Methodology of process was not entirely changed because the short time available.



ANNEXE 5

PARTICIPANTS IN THE TECHNICAL LECTURES

<u>Name</u>	<u>Address</u>
Eng. Nadia Mohamed Mab Rouk	National Spinning and Weaving Co., Alexandria
Eng. Mohamed Sami Hamed	The Egyptian Co. of Spinning, Cairo
Eng. Mohamed Sabib El Said	El Nasre Spinning and Weaving Mahalla
Eng. Ahamed Mohamod Haggag	Misr. Mehalla Spinning and Weaving Co.
Eng. Samia Attia El Nadi	Orient Linen Co., Alexandria
Eng. Modila Saad Roshdy	Orient Linen Co., Alexandria
Eng. Hakan El Sherping	Orient Linen Co., Alexandria
Eng. Fetouh El Rawi	Misr. Mahalla Spinning and Weaving Co.
Eng. Samia Mohamed El Assar	The Egyptian and France Co. "SOFICO"
Eng. Amal Hanafy Mahmed	El Nasr for Textile and Clothing C. KABO.
Eng. Amal Abd El Monen Mohamed	El Nasr for Textile and Clothing C. KABO.
Eng. Mona Mohamed Abed El Fattah	El Nasr for Textile and Clothing C. KABO.
Eng. Amal Farawila	El Nasr for Textile and Clothing C. KABO.
Eng. Amr Ghamen	Myzran Garment Manuf. Co. Ltd., Alexandria.
Eng. Mirvat El Chafi	Tricon, Cairo
Eng. Sabria Gaben	Tricon, Cairo
Eng. Faiza Wafai	Tricon, Cairo
Eng. Zeinab El Kholi	Misr. Fine Spinning and Weaving Co.
Eng. Azza El Shazly	Misr. Fine Spinning and Weaving Co.
Miss Suzan El Rahen	Misr. Fine Spinning and Weaving Co.
Miss Abab El Cabeil	Misr. Fine Spinning and Weaving Co.
Eng. Said Okby Azeb	Misr. Fine Spinning and Weaving Co.

ANNEXE 6

ANATOMICAL PROPORTIONAL RULES

DIAGRAM NO. 1

Introduction

To develop a pattern for garments, tailors and dressmaker use to measure the customer's body; a garment made in this way will be very personal and, although it can fit properly on the body for which it was made and fitted it hardly can be suitable to other bodies.

A pattern or a basic pattern for ready-made garments can be constructed accordingly to anatomical proportional rules, on doing so the pattern will be suitable to everybody having ideal anatomical characteristics.

According to anatomical and to anthropometrical studies, subjects of one tallness having ideal characteristics, namely, alike each to another, are in large percentage, at least 70% then, it is clear that a pattern constructed according to scientific anatomical rules must fit to this large percentage of body pertaining to the same tallness, the tallness is understood from top to toe without shoes.

The study we are going to follow shows the technology to construct a basic pattern for ladies, men and children according to anatomical rules which means that every part or point of the pattern will be a fraction of circumferences or tallness. The diagram No. 1 shows the proper division of the body for the construction of a pattern for industrial ready-made garments.

DEVELOPMENT OF BASIC PATTERNS

Introduction

The basic pattern is the model constructed according to specific measurements or to a chosen size; we are going to develop our basic pattern for industrial production and consequently only by sizes - our basic pattern will be constructed on a size "44" and meter "1.65" tallness.

Regarding to size there are European sizes, and English/American sizes, although our study will be by the European sizes in the part concerning the "Grading" we will see the equivalent between European, and English/American sizes.

The pattern for a garment may be used to process different kind of raw material (fabric), and according to the kind of fabric requires different easiness around the circumference of the bust.

Easiness is the amount of loose fabric along the semi-circumference of the bust needed to allow the wearer easy movements. The required easiness is different for each type of fabric. The following list is a guideline:

- | | |
|------------------|------------------------|
| - knitted fabric | - no need of easiness. |
| - Cotton fabric | - 2 cm. easiness. |
| - Silk fabric | - 2 cm. easiness. |
| - Light wool | - 2 cm. easiness. |
| - Heavy wool | - 4 cm. easiness. |

OUTLINE OF BASIC PATTERNS FOR BLOUSE AND DRESS

DIAGRAM NO. 2

Size 44

Tallness met. 1.65

Development Modulus 22 cm = (1.65 meters - 7.5)

Point 1 Trace a 60 cm. horizontal line and a 110 cm. vertical line; mark the angle No. 1. The angle must be to your right hand.

Point 2 From Point 1 along the horizontal line advance $\frac{1}{6}$ of 44 = 7.3 cm.

Point 3 From Point 2 along the horizontal line advance $\frac{1}{4}$ of 44 = 11 cm.

Point 4 From Point 3 along the horizontal line advance $\frac{1}{4}$ of 44 = 11 cm.

Point 5 From Point 4 along the horizontal line advance $\frac{1}{4}$ of 44 = 11 cm.

Point 6 From Point 5, along the horizontal line advance $\frac{1}{5}$ of 44 = 8.8 cm. Trace vertical lines along 110 cm. From Point 3-5 and 6.

Point A From Point 1 along the vertical line go down the measure of one modulus = 22 cm.

Point B From Point A along the vertical line go down the measure of one modulus = 22 cm.

Point C From Point B along the vertical line go down the measure of one modulus = 22 cm.

Point D From Point C along the vertical line go down the measure of one modulus = 22 cm.

- Point E From point D along the vertical line go down the measure of one modulus = 22 cm.
Run 60 cm. horizontal lines from points A-B-C-D-E.
- Point F Mark F-G-H-I-J the crossing lines between the vertical
G.H.I.J. line from 6 and the horizontal lines from A-B-C-D-E.
- Point 7 From point 4 trace a vertical line until the horizontal line coming from A; mark 7 the crossing.
- Point 8 From point 6 along the horizontal line go inside $\frac{1}{8}$ of 44 = 5.5 cm.
- Point 9 From point 8 vertically to it go up 5 millimeters.
- Point 10 From point 5 along the vertical line go down 5 millimeters, by a line join point 10 to 9.
- Point 11 From point 5, backward, take $\frac{1}{5}$ of 44 = 8.8 cm.
- Point 12 From point 10 go down the measure of one modulus = 22 cm. plus $\frac{1}{10}$ of itself = 24.2 cm.
Run an oblique line between 11 and 12.
- Point 13 From point 12 along the oblique line go up the same distance between 10 - 12 = 24.2 cm.
- Point K From point 6 along the horizontal line, take half distance between 6 and 1 = 25.6 cm, add to it 1 cm. = 26.6 cm., mark this point K. From K trace a vertical line until the horizontal line E-J. Mark L-M-N-O-P the crossings formed on tracing the vertical line from K.
- Point 14 From point K go down 9 cm; run an oblique line joining 13 to 14.
- Point 15 Mark 15 the crossing between the vertical line from 3 and the horizontal line from A.
- Point 16 From point 7 go down 1 cm. mark a dot.

- Point 17 From point 15 go down 1 cm, trace a line from point 16 to 17.
- Point 18 From point 1 along the vertical line go down 4 cm.
- Point 19 From point 2, vertically to it, go down 2 cm. by a curve line join 19 to 18.
- Point 20 From point 3 along the vertical line go down 5 cm. by an oblique line join 19 to 20.
- Point 21 From point 15 go up 4 cm.
- Point 22 From point 9 to 10 and from 13 to 22 equal the distance between 19 - 20 on the back shoulder.
- Point 23 From point 7 go up 4 cm; outline the armhole from point 22, by point 23, tangent to the line 16 - 17, until point 21.
- Point 24 From point 6 go down $\frac{1}{3}$ of the modulus measure = 7.3 cm., by a curve line join point 24 to 9.
- Point 25 From point 18 go inside 1 cm.
- Point 26 From point B go inside 2 cm. join by lines points 25 - 26 - C.
- Points O-0 From point M both sides go inside 2 cm., by straight lines join points O-0 to L and by curve lines points O-0 to N.
- Point R Mark R the crossing between vertical 5 and horizontal B-G.
- Point S From point R go down $\frac{2}{3}$ of the modulus measure = 14.6 cm.
- Points T-T From point R both sides go out 1 cm., by straight lines join points T-T to 12 and by curve lines points T-T to S.
- Point V Mark this point in the middle between points M-B.

- Points VV From point V both sides go out 1.5 cm.
- Point Z From point V go down $\frac{2}{3}$ of the modulus measure = 14.6 cm.
- Point Y From point V go up $\frac{2}{3}$ of the modulus measure = 14.6 cm., by straight lines join points V-V to Y, and by curve lines points V-V to Z.

Now our basic patterns is complete, it is NET on cutting it out we MUST ADD the allowance of seams and hems.

Diagram No. 3

Outline of Basic Pattern for One Piece Sleeve for Dress and Blouse.

- Point 1 Trace a 40 cm. horizontal line and from the middle of it a 65 cm. vertical line; mark the angle No. 1.
- Point 2 From point 1, along the vertical line go down the measure of 1 modulus less 4 cm. = 18 cm. mark the crossing No. 2.
- Point 3 From point 2 along the vertical line go down the measure of 1 modulus = 22 cm.
- Point 4 From point 3 go down the measure of 1 modulus = 22 cm. mark the crossing No. 4 from points 2-3-4 trace 40 cm. horizontal lines as the one from point 1.
- Point 5 From point 2 along the vertical line go up 4 cm. mark the crossing No. 5; from point 5 run a horizontal line as the one from point 2.
- Point 6 From point 5 go out $\frac{1}{5}$ of 44 = 3.8 cm.
- Point 7 From point 5 go out $\frac{1}{5}$ of 44 = 8.8 cm.

- Points 8-9 From points 6 and 7 trace vertical lines until the horizontal line from point 1, mark the crossings 8 and 9. From points 8 and 9 run oblique lines until point 5.
- Point 10 From point 6 go out $1/6$ of $44 = 7.3$ cm.
- Point 11 From point 7 go out $1/6$ of $44 = 7.3$ cm.
- Points 12 - 13 From point 4 by both sides go out 12 cm, joint by vertical lines point 10 to 12 and point 11 to 13.
- Point 14 From point 7 go up 4 cm.
- Point 15 From point 9 along the oblique line go down 4 cm.
- Point 16 From point 8 along the oblique line go down 5 cm.
- Point 17 From point 6 go up 5 cm. Outline the head of the sleeve along points 11-14-15-1-16-17 and 10.

Note: Point 1 is the point to be joined to the shoulder seam, point 14 indicated the front part of the sleeve. The patterns is NET, on cutting it out we MUST ADD the allowance for seams and hems. The circumference of the head of the sleeve must be checked and put in accordance with the armhole, and also with regard to the kind of fabric for the required gathering along the armhole-seam-line.

Diagram No. 4

The basic pattern which we have constructed can be used for developing different styles of dresses and blouses. Because our study will be only for blouses we will cut the basic pattern along the line C.N.H. which corresponds to the hip line, as shown on diagram No. 4 and we will use it for the construction of different styles of blouses.

Collar and Cuff

As for Collar and Cuffs apply the technology for men's shirts on the following lectures.

SIZES

INTERNATIONAL STANDARD ACCORDING TO EUROPEAN/ITALIAN
SIZES AND EGYPTIAN STANDARD

EUROPEAN-ITALIAN SIZES

Size	42	44	46	48	50
Circumference Bust	84	88	92	96	100
Circumference Waist	62	66	70	74	78
Circumference Hip	92	96	100	104	108

EGYPTIAN SIZES

Size	42	44	46	48	50
Circumference Bust	84	88	92	96	100
Circumference Waist	70	74	78	82	86
Circumference Hip	100	104	108	112	116

The prospects of sizes above show that the Egyptian sizes have 8 cm. more around waist and hip.

The basic pattern we have designed is according to European-Italian sizes. In order to bring it to the equivalent Egyptian size, we must add 8 cm. around waist and hip circumferences. Our basic pattern is at semicircumferences so we must add to it 4 cm. on the waist line and 4 cm. on the hip line. We make that corrections by adding 1.3 cm. on the centre back, 1.3 cm. on the back side and 1.3 cm. on the front side.

The diagram No. 4 shows the basic pattern already cut along the hip line for the blouse; the dotted lines are the ones we traced on constructing the basic pattern and the continued lines are the ones after correcting the pattern according to Egyptian sizes. From now on we will use the basic pattern already corrected according to Egyptian Standard.

GRADING THE BASIC PATTERN OF BLOUSES

Diagrams 5, 6 to 10

Difference between one size and the following one, bigger or smaller consists in 4 cm. in European sizes and 2 inches in English-American sizes; this is all around each circumference, namely, Bust, Waistline and Hip. We will use the European Technology, because we develop half pattern that above said difference becomes 2 cm. at each semicircumference in European sizes and 1 inch in English-American sizes, at each half part of the pattern, namely from centre front to centre back.

According to international custom the pattern also is lengthened for bigger sizes and shortened for smaller sizes. The diagrams No. 5 and 6 show the division of the difference on the pattern by millimetres (European sizes). At those points the pattern must be shifted upward and onward on developing bigger sizes and downward and backward on developing smaller sizes.

On developing sizes by inches the equivalent differences for the shifting of the pattern has to be calculated.

In the Diagrams No. 7 and 8 we can appreciate a bigger size already developed, in the diagrams No. 9 and 10 we can appreciate a smaller size already developed.

Construction of Basic Pattern for Skirts

On developing the basic pattern for skirts we will do it according to the Egyptian sizes.

Our basic pattern will be constructed on size 44 and tallness mt. 1.65; so according to our prospect of sizes it will be as following:

- Semicircumference waist line 37 cm.
- Semicircumference hip line 52 cm.
- Length 77 cm.
- Development modulus 22 cm. (namely tallness wt. 1.65:7.5).

Diagram No. 11

Front Part Section A

- Point 1 Trace a 30 cm. horizontal line and a 80 cm. vertical line, mark 1 the angle. The angle must be to your right hand.
- Point 2 From point 1 along the vertical line go down the measure of 1 modulo = 22 cm.
- Point 3 From point 2 along the vertical line go down the measure of 1 modulo = 22 cm.
- Point 4 From point 3 along the vertical line go down the measure of 1 modulo and half = 33 cm. From points 2-3-4 trace 30 cm. horizontal lines.
- Point 5 From point 1 along the horizontal line advance half of the hip semicircumference + 1 cm. = 27 cm.
- Point 6 From point 5 to down trace a vertical line until the line from 4; mark the angle No. 6.
- Point 7 From point 5 along the vertical line go down 18 cm.
- Point 8 From point 5 go inside $1/16$ of 52 = 3.3 cm., by a curve line join point 8 to 7.

Point 9 From point 1 along the vertical line go down 1 cm.,
join by a line point 9 to 3.

Point 10 From point 9 go inside $1/5$ of 52 = 10.4 cm.

Point 11 From point 10 vertically to it go down $1/3$ of the
modulus measurement = 7.3 cm.

Points 12-13 From point 10 both sides take 1 cm., by curve lines
join points 12-13 to point 11.

Now the front part is completed.

Back Part - Section B

Point 14 Trace a 30 cm. horizontal line and a 80 cm. vertical
line; mark the angle 14. The angle must be to your
right hand but at the opposite side of the one on the
front part which we marked No. 1.

Point 15 From point 14 along the vertical line go down the
measure of one modulus = 22 cm.

Point 16 From point 15 along the vertical line go down the
measure of one modulus = 22 cm.

Point 17 From point 16 go down the measure of one modulus and
half = 33 cm. From points 15-16-17 trace 30 cm.
horizontal lines.

Point 18 From 14 along the horizontal line advance half of the hip
semicircumference less 1 cm. = 25 cm.

Point 19 From point 18 trace a vertical line until the horizontal
line from point 17; mark the angle 19.

Point 20 From point 18 along the vertical line go down 18 cm.

Point 21 From point 18 go inside $1/16$ of 52 = 3.3 cm. by a curve
line join point 21 to point 20.

- Point 22 From point 14 go down 1 cm. join by a line point 22 to point 21.
- Points 23-24 Divide by 3 parts the distance between points 22-21.
- Points 25-26 From points 23-24 vertically to them go down $\frac{2}{3}$ of the modulus measurement = 15 cm.
- Points A-A From point 23 both sides take 1.5 cm. and by curve lines join points A-A to point 25.
- Points B-B From point 24 both sides take 1.5 cm. and by curve lines join points B-B to point 26.

Now the Basic Pattern is complete we will use it for developing all different styles of skirts we may wish to.

Note: The pattern is NET. On cutting it out add seams and hems allowances according to own requirements.

Grading of Skirts

On grading the pattern for skirts we will do it according to the "Grading Technology" already applied to blouses, please read it again on page No. 27 (Diagram No. 5).

Diagram No. 12

Diagram No. 12 shows the pattern already prepared for grading, in it we can also see the "Marks" indicating the right points where the pattern is to be shifted and the amount of the grading development.

Diagram No. 13

Diagram No. 13 shows a bigger size already graded.

Diagram No. 14

Diagram No. 14 shows a smaller size already graded.

Construction of Basic Pattern for Mens' Shirts

Introduction

On constructing the basic pattern for mens' shirts we will do it on size 48 according to European sizes which corresponds to size 38 according to English-American sizes. As for tallness it will be made according to mt. 170 for it seems that, the said tallness is the most featured in Egypt. Our basic pattern will be used for developing all the other sizes by grading it. The above said size refers to the body, and only for technical reference in the Design Section of Factories because it is custom to indicate the size of the shirts according to the size of the collar, namely 14 - 14 1/2 - 15 - 15 1/2 - 16 - 16 1/2 - 17. Those symbols are to indicate the circumference of the collar by inches. But now it is custom to indicate the sizes of mens' shirts by centimetres namely 38 - 39 1/2 - 41 - 42 1/2 - 44. Also, since short time in mens' sport wear shirts is custom to indicate sizes by XS - S - M - L - XL equivalent to collar sizes 14 - 14 1/2 - 15 - 15 1/2 - 16. Leaving apart the way sizes are defined, the matching of the body with collar according to their size is done according to fashion and market requirements, the latter because for anatomical reasons. One proper matching could be between body 48 with collar 16, but also to body 48 can be matched collar 15 1/2 if we wish a looser fitting of the shirt body and collar 16 1/2 if we wish a tighter fitting of the shirt body.

Development of the Outline for Mens' Shirts

Diagram No. 15 (BODY)

Size of the body cm. 48
Tallness mt. 1.70
Size according collar 16 (inches)
Development Modulus cm. 22.6 = to Mt 1.70 : 7.5
according to the technology on Diagram No. 1

- Point 1 Trace a 70 cm. horizontal line and a 80 cm. vertical line; mark the angle No. 1.
- Point 2 From point 1 along the vertical line go down the measure of one modulus = 22.6 cm. trace a 60 cm. horizontal line.
- Point 3 From point 2 along the vertical line go down the measure of one modulus = 22.6 cm. trace a 70 cm. horizontal line.
- Point 4 From point 3 along the vertical line go down the measure of one modulus = 22.6 cm. trace a 70 cm. horizontal line.
- Point 5 From point 4 along the vertical line go down $\frac{1}{3}$ of the modulus measurement = 7.6 cm. trace a 70 cm. horizontal line.
- Point 6 From point 1 along the horizontal line advance $\frac{1}{6}$ of 48 = 8 cm.
- Point 7 From point 6 vertically to it go up 2 cm. by a curve line join point 7 to 1.
- Point 8 From point 6 advance $\frac{1}{4}$ of 48 plus 1 cm. = 13 cm.
- Point 9 Trace a vertical line from point 8 until the horizontal line from point 2.
- Point 10 From point 8 along the horizontal line advance $\frac{1}{4}$ of 48 plus 1 cm. = 13 cm.
- Point 11 From point 10 trace a vertical line until the horizontal line from point 2.
- Point 12 From point 10 advance $\frac{1}{4}$ of 48 plus 1 cm. = 13 cm.
- Point 13 From point 12 advance $\frac{1}{8}$ of 48 plus 1 cm = 7 cm, trace a vertical line from point 13 until the horizontal line from point 5. Mark 14 - 15 - 16 - 17 the crossing formed on tracing the vertical line from point 13.
- Point 18 From point 8 go down 4 cm.

- Point 19 Place a rule along points 7 - 18 and starting from point 7 trace a line until 2 cm. beyond point 18.
- Point 20 In the middle between points 8 - 9.
- Point 21 From point 20 go out 1 cm.
- Point 22 From point 9 go up 3 cm.
- Point 23 In the middle between points 14 - 2 trace a vertical line from point 23 until the horizontal line from 5 and mark the crossings 24 - 25 - 26.
- Point 27 From point 23 go down 2 cm, design the armhole along the points 19 - 21 - 22 - 27.
- Point 28 From point 24 take backward 1 cm., by lines join points 27 and 28 to 26.
- Point 29 From point 13 go down $\frac{1}{6}$ of 48 plus 1 cm. = 9 cm. by a curve line join point 12 to 29.
- Point 30 From point 29 go out 1.5 cm., by a line join point 30 to 29. Trace a vertical line from point 30 until the line from point 5.
- Point 31 From point 10 go down 4 cm.
- Point 32 Place a ruler along points 12 - 31 and starting from point 12 run a line long as the distance between points 7 - 19 in the back side.
- Point 33 From point 11 go up $\frac{1}{3}$ of modulus = 7.6 cm.
- Point 34 From point 11 go up 2 cm., draw the armhole along points 32 - 33 - 34 - 27.
- Point 35 From point 24 go inside 1 cm. by lines join point 27 to 35 and point 35 to 26. On wishing the bottom sides rounded do it according to the diagram.
- Point 36 Divide in two parts the distance between points 24 - 3.
- Point 37 From point 36 vertically to it go up $\frac{2}{3}$ of the modulus measurement = 15.2 cm.

- Point 38 From point 36 vertically to it go down $\frac{2}{3}$ of the modulus measurement = 15.2 cm.
- Points 39-40 From point 36 both sides go out 1 cm., by lines join points 37 and 38 to 39 and 40.

Now the Body Basic Pattern for Mens' Shirt is completed. Note that it is NET. ADD every seam allowance required according to the specific process of production.

The neck line roundness will be corrected according to personal wish and also according to the size of the collar we may wish to match to the body 48. The button-holes also will be marked according to personal wish.

Outline of Sleeve for Mens' Shirts

Diagram No. 16 Section A

- Point 1 Trace a 50 cm. horizontal line and from the middle of it a 65 cm. vertical line; mark No. 1 the angle.
- Point 2 From point 1 along the vertical line go down the measurement modulus less 4 cm. = 18.6 cm.
- Point 3 From point 2 along the vertical line go down the measurement of one modulus = 22.6 cm.
- Point 4 From point 3 along the vertical line go down the measure of one modulus = 22.6 cm. trace 50 cm. horizontal line from points 2 - 3 - 4 as the one already traced from point 1.
- Point 5 From point 1 advance $\frac{1}{4}$ of 48 = 12 cm. trace a vertical line from point 5 to the line from point 2.

- Point 6 From point 1 take backwards $\frac{1}{4}$ of 48 = 12 cm. by a vertical line join point 6 to the horizontal line from point 2.
- Point 7 From point 6 go out $\frac{1}{5}$ of 48 = 9.6 cm.
- Point 8 From point 5 go out $\frac{1}{6}$ of 48 = 8 cm., by vertical lines join point 7 and 8 to the horizontal line from point 4.
- Point 9 Mark 9 the crossing between vertical 7 and horizontal 4.
- Point 10 Mark 10 the crossing between vertical 8 and horizontal 4.
- Point 11 From point 8 go down half the modulus measurement = 11.3 cm.
- Point 12 From point 5 go down $\frac{1}{4}$ of the modulus measurement plus 1 cm. = 6 - 7 cm.
- Point 13 From point 6 go down $\frac{1}{6}$ of the modulus measurement = 3.8 cm.
- Point 14 From point 7 go down half the modulus measurement = 11.3 cm. Design the head of the sleeve along points 11 - 12 - 1 - 13 - 14. Make a diagonal mark on point 13 in order to indicate that it is the front part of the sleeve.
- Point 15 From point 9 go up 5 cm.
- Point 16 From point 10 go up 5 cm. by horizontal line join point 16 to 15. This is the bottom line.
- Point 17 From point 15 go inside 4 cm, join it by line to point 14.
- Point 18 From point 16 go inside 4 cm; join it by line to point 11.
- Point 19 Mark point 19 in the middle between point 18 and the vertical line coming from point 1.

Point 20 From point 19, vertically to it go up 10 cm. and join it by line to point 19. The line 19 - 20 will be the opening on the bottom of the sleeve.

Now the sleeve outline is complete being NET after cutting. Then ADD the required allowances according to the specific process of production.

Outline of Collar for Mens' Shirts
"Stand" Diagram No. 16 Section B

Points 1-2 Trace a horizontal line long 16 inches (21 cm.) plus 1.5 cm., Mark 1 the starting point and 2 the ending point.

Points 3-4 From points 1 and 2 go up 3 cm. join by horizontal line point 3 to 4.

Point 5 From point 4 go up 1.5 cm.

Point 6 From point 2 go up 1.5 cm.

Point 7 In the middle between points 1 - 2.

Point 8 In the middle between points 3 - 4, by curve lines join point 5 to 8 and point 6 to 7.

Point 9 From point 6 along the curve line go inside 1.5 cm. Smooth the corner at point 6.

The line 3 - 8 - 5 will be assembled to the neck line of the shirt and the line 1 - 7 - 9 to the collar.

"Collar" Diagram No. 16 Section C

- Points A-B Trace a horizontal line long as the distance 1 - 9 on the stand previously traced.
- Point C In the middle between points A - B.
- Point D From point B go up 1.5 cm. by a curve line join point P to C. and by straight line C to A.
- Point E From point A go down by vertical line 4 cm.
- Point F Place the right angle of a square on point D and one side on point E and from point D trace a line downwards 6 cm. long.
- Point G From point C go down vertically to it 4 cm. By lines join E to G and G to F. The line A - C - D will be assembled to the line 1 - 7 - 9 on the stand.

The outline is complete. Net. Add seam allowances according to proper process of production.

Outline of Cuffs for Mens' Shirts

Diagram No. 16 Section D

- Points 1-2 Trace a 26 cm. horizontal line and mark 1 the beginning and 2 the ending.
- Points 3-4 From points 1-2 trace vertical lines 7 cm. long join points 3-4 by a horizontal line. Smooth the corner at points 3-4.
- Point 5 From point 2 go down 2.5 cm., for button hole mark.

Point 6 From point 5 go down 2.5 cm. for button hole mark.

The cuffs outline is complete, it is NET, ADD seam allowances on cutting it out.

Grading of Shirts
Diagram No. 17 - BODY

The Grading of Shirt Patterns will be made according to the technology shown on page no. 27.
On Diagram No. 17 is shown the Grading technology for the shifting of the pattern applied to the body.

Sleeve Cuffs-Collar
Diagram No. 18

On Diagram No. 18 is shown the grading technology for the shifting of the pattern applied to the sleeve. Collar and cuffs.

Diagram No. 19

Diagram No. 19 shows a bigger size of the body already developed.

Diagram No. 20

Diagram No. 20 shows a bigger size of the sleeve cuffs and collar already developed.

Diagram No. 21

Diagram No. 21 shows a smaller size of the body already developed.

Diagram No. 22

Diagram No. 22 shows a smaller size of the sleeve cuffs and collar already developed.

Creation of Yoke on the Basic Pattern

Diagram No. 23

<u>Points</u> <u>A-B</u>	From points 12 and 32 go down 3 cm., by a line join points A to B.
<u>Point C</u>	From point 1 go down 8 cm.
<u>Point D</u>	From point 19 go down 4 cm., by a line join point D to C.

Cut the pattern along the lines A - B and C - D. Place on a paper the two pieces of shoulders already cut in such a way to get matched points 7 to 12 and points 19 to 32. Design around the outer edge of the two matched pieces. Mark a notch on the crossing between the previous shoulder line and the armhole. This notch will be the mark on which we will join the hanging point of the sleeve, namely point 1 on our sleeve outline.

Construction of Basic Pattern for Men's Trousers

Introduction

There are styles of trousers very tight, like blue jeans, and others with easiness around the hip in order to give to wearers comfort of movements. According to that we will design 3 different styles of trousers, namely: tight - medium easiness - full easiness; consequently we will trace 3 outlines of trousers.

The outlines will be according to gentlemen measurements but the same technology may also be applied to trousers (slacks) for ladies, although some changes are necessary in order to bring the waist line circumference to ladies sizes.

Specification of Size Measurement

Size 48 - Drop 4 - (Here "DROP" is used to indicate that the waist line circumference will be 4 inches less against the bust circumference, namely: Bust circumference 96 cm - Waist-line circumference 86 cm.).

Waist-line Semicircumference cm. 43 - (DROP 4)

Tallness of the body mt. 1.70

Development - Modulus 22.6 cm. (The development modulus has been given by dividing the tallness by 7.5 according to the technology on pages 19 and 20).

Our Basic Pattern will be constructed by fractions of body tallness (modulus) and by fractions of circumference calculated on 50, which is the measurement of the semicircumference Hip for size 48. According to statistic indications in Egypt a great part of men having 96 circumference bust (size 48) have 100 cm. circumference hip.

Outline of Tight Trousers - Diagram No. 24

Front Part - Section A

- Point 1 Trace a 40 cm. horizontal line on a 110 cm. vertical line, mark the angle No. 1. This horizontal line will be our waistline.
- Point 2 From point 1 along the vertical line go down the measure of one modulus plus 2 cm. = 24.6 cm. This line is the crotch line.
- Point 3 From point 2 along the vertical line go down the measure of one modulus = 22.6 cm. This is the thigh line.
- Point 4 From point 3 along the vertical line go down the measure of one modulus = 22.6 cm. This is the calf line.
- Point 5 From point 4 along the vertical line go down the measure of one modulus = 22.6 cm. This is the ankle line.
- Point 6 From point 5 along the vertical line go down half the measure of one modulus = 11.3 plus the supposed height of the heels, i.e. 2 cm. our point 6 will be set from point 5 by $11.3 + 2 \text{ cm.} = 13.3 \text{ cm.}$ This is the bottom line.
- Point 7 Mark point 7 in the middle between points 3 - 4. This is knee line. From points 2 - 3 - 4 - 5 - 6 - 7 trace 40 cm. horizontal lines.
- Point 8 From point 1 along the horizontal line advance half the semicircumference of the hip = 25 cm. From point 8 trace a vertical line until the line from 6 (bottom line) and from up to down mark the crossings 9 - 10 - 11 - 12 - 13 - 14.
- Point 15 From point 9 advance $1/12$ of 50 = 4.2.
- Point 16 In the middle between point 15 and point 2.
- Point 17 In the middle between points 14 and 6. Trace oblique lines from points 15 and 2 until point 17.

- Point 18 Place a rule on points 16 and 17 and starting from point 17 upwards run a vertical line until the horizontal line from point 1, mark this crossing 18. The lines 18 - 16 - 17 are the "CREASE-LINE". On placing the pattern on the fabric this line MUST follow the straight grain of the fabric.
- Point 19 From point 9 go up $\frac{1}{3}$ of modulus measurement = 7.6 cm.; by a curve line design the front crotch by joining 9 to 15.
- Point 20 From point 1 along the horizontal line go inside $\frac{1}{16}$ of 50 = 3.2 cm.
- Point 21 From point 1 along the vertical line go down 18 cm., by a curve line join points 20 to 21.
- Point A From point 14 go inside 2 cm.
- Point B From point 6 go inside 2 cm.
- Point C From point 2 go down 15 cm. along the oblique lines 2 - 17.
- Point D From point 15 go down 12 cm. along the oblique lines 15 - 17.

The front part of our outline is now complete. The side line is the one along points 20 - 21 - 2 - C - B; the inner leg line is the one along points 15 - D - A.

Back Part - Section B

The back part of a trousers outline must be designed according to the front part outline, namely, following the shape of the front part and also its style.

Cut out the front part along the seam lines, place it on a sheet of paper. Because the crossings along the knee line may be cut off, shift point 7 just on the crossing between the knee line and the side line and also shift point 11 just on the crossing between the knee line and the inner leg line.

Point 22 From point 20 go out $1/13$ of 50 = 3.2 cm.

Point 23 From point 2 go out 1 cm.

Point 24 From point 7 go inside 1 cm.

Point 25 From point B go inside 1 cm. design the side line along points 22 - 23 - 24 - 25.

Point 26 From point 15 go out $1/12$ of 50 = 4.2 cm.

Point 27 From point 11 go out 2 cm.

Point 28 From point A go out 2 cm. Design the inner leg along points 26 - 27 - 28.

Point 29 From point 9 take backwards 1 cm., join by horizontal line points 29 to 26.

Point 30 From point 8 go inside $1/16$ of 50 = 3.2 cm.

Point 31 From point 30 go up 1 cm., by straight line join points 31 to 29 and points 31 to 22.

Point 32 From point 29 go up 5 cm. Design the crotch line from point 32 to point 26.

Because the style of our basic pattern is very tight around the hip line there is no need of darts along the waist line.

Now our outline is complete and remember that it is NET on cutting it out ADD along every seam line the required allowances and also ADD the allowancy on the bottom line.

Outline of Basic Pattern for Medium Easiness

Diagram No. 25

On developing the basic pattern of medium easiness we apply the same technology as for the outline of tight style on diagram No. 24, but we have some modification to apply in order to bring it to the new different style.

Front Part

- Points 1-8 Half the semicircumference of the hip plus 2 cm. namely $25 + 2 = 27$ cm.
- Point A From point 14 go inside 3 cm.
- Point B From point 6 go inside 3 cm.
- Point C From point 2 go down 15 cm.
- Point D From point 15 go down 15 cm.
- Point E From point 18 take backwards 2 cm. The distance between 18 and E is the deepness of the pleat on the front part of the trousers, point 18 will be leaned on to point E. On wishing the pleat leaned towards the centre front, point E will be set onwards from point 18 instead of backwards as we did previously. In this case point 18 will be leaned on point E turning the pleat towards the centre front of the trousers.

Back Part

- Point 29 From point 9 take backwards 2 cm.
- Point 31 From point 30 go up 2 cm.
- Point 32 From point 29 go up 7 cm.
- Point F In the middle between points 22 - 32.
- Point G From point F go down 7 cm.
- Points 0-0 From point F both sides take outsides 1 cm., join points 0-0 to point G.

