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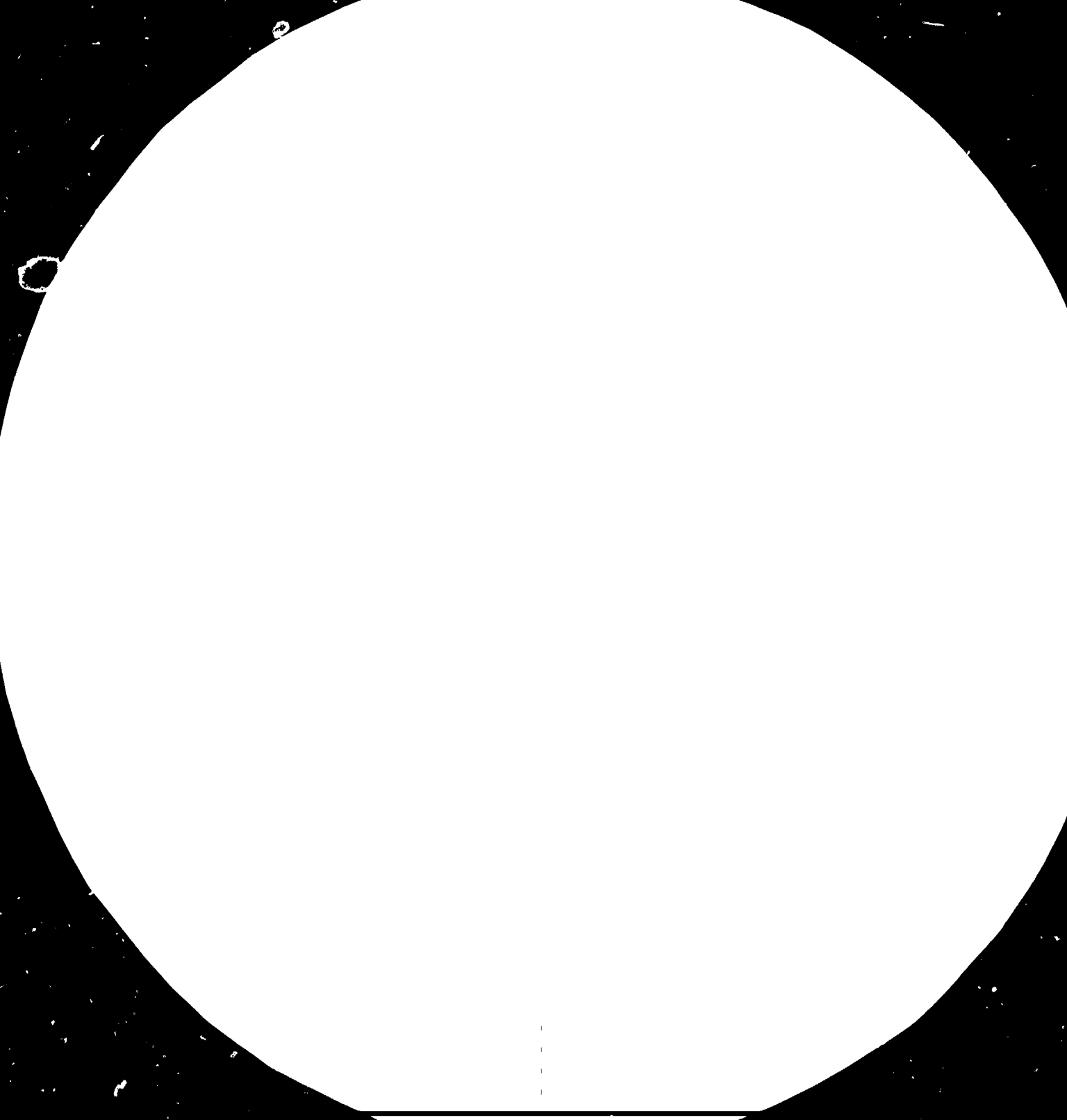
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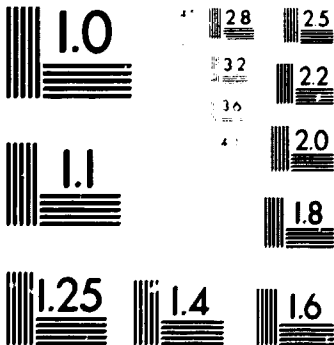
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ASSISTANCE TO THE UBUNGO GARMENT FACTORY (TEXCO)

SI/URT/83/801

TANZANIA .

Technical report: Technical recommendations for all  
operations in the garment factory\*

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

Based on the work of <sup>(Carlo)</sup> Palizzotto  
Garment Industry Expert

United Nations Industrial Development Organization  
Vienna

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EXPLANATORY NOTES:

TEXCO - National Textile Corporation

UGL - Ubungo Garments Limited

UNDP - United Nations Development Programme

UNIDO - United Nations Industrial Development Organization

Currency (Sh.)- US\$ = Sh. 12.320

## ABSTRACT

Ubungo Garments Limited is a Company of TEXCO Group. In order to upgrade the performance of the Company, the Government requested UNDP to prepare a Programme of Technical Assistance at UGL.

UNIDO as Executing Agency of the Project SI/URT/83/801 - Assistance TEXCO-UGL appointed the Italian, Carlo Palizzotto, Garment Industry Expert for six months from 1 June - 1 December 1983. The expert began the operations at UGL on 14 June 1983.

The Job Description for the expert's activities was the following:

- Establish the basic production organization for a flow line garment factory;
- Assist in the re-organization of work place and material flow to achieve maximum productivity;
- Review and adjust individual operations within each processing line;
- Improve factory management;
- Establish optimum operations in garment construction and spreading in the cutting room;
- Optimize fabric utilization, stock control and spare part usage;
- Define work load and establish output standards.

(Explanations of the above Activities and related Work Plan are defined in Part II.B and Part II.C. consecutively).

The expert was able to achieve all the objectives of the Project except for the "Incentive System" due to the wish of the Administration to postpone its establishment for the time being.

The achievements attained by the Project can be summarized as follows: If the production figures achieved during the expert's presence and under his supervision, on the various machinery lines, are projected to the full plant capacity, some 2,800 garments per day, one shift, are possible - given the proper amount of supervision and incentive. If only T.Sh. 20.00 per garment net profit is made, and this is a conservative figure, it will be seen that T.Sh. 1.4 million per month is feasible. This Company could be the most profitable, size for size, in the TEXCO Group.

The expert would like to point out that some urgent actions will have to be taken with respect to renew machinery and equipment immediately for in five years, at the most, the machinery and equipment will be totally unusable.

Recommendations are given on how a "Follow-up Assistance Programme" should be formulated and implemented.

### INTRODUCTION

Ubungo Garments Ltd. with an authorised share capital of Shs. 10.0 million is a garment manufacturing firm owned jointly by the Tanzania Government through the National Textile Corporation (75%) and the Tanganyika Development Finance Company Ltd (25%). The Company, whose construction started in March 1976 and completed in April 1977, is located in the Ubungo Industrial Area of Dar Es Salaam. It was incorporated on 21 May 1976.

UGL has an annual capacity of 1.5 million garments of various types. These are produced either from 100% Tanzanian cotton fabrics or from imported blended fabrics. The entire factory production is currently for the local market substituting for imports. Except for a few other factories which manufacture a small quantity of men's trousers and shirts the rest of the trousers and shirts are either imported or made-to-measure by the thousands odd tailors in the country.

Early in 1975, a two-men team from Romania (ICE-RCMSIT State Enterprise for Foreign Trade Bucharest) visited Tanzania and collected data for a feasibility study to establish the company. The study was prepared and accepted by the Government and a technical assistance protocol was signed under which TEXCO would receive Romanian assistance in setting up UGL. Romania supplied machinery valued at T.Shs. 6.123 million (FOB value) and technical assistance personnel.

The total project cost for the company was T.Shs. 15.409 million broken as follows:

Civil works and design	Shs.	2.806	million
Plant and machinery	"	5.027	"
Freight, insurance, clearance	"	0.720	"
Furniture and fittings	"	0.314	"
Vehicles	"	0.198	"
Industrial furniture	"	1.345	"
Pre-operational and development cost	"	2.980	"
Training fees	"	0.855	"
Technical assistance	"	0.707	"
Design fee	"	0.457	"
		<hr/>	
	Shs.	15.409	million
		<hr/>	

The building in which the factory is accommodated was built by the now defunct National Textile Industries Corporation Ltd. (NATEX) for use as a godown.

The Company started production in July 1977 initially with one shift operation but later on in October the same year went into two shift operation with about 900 employees. Most of the operators were skilled in tailoring having acquired such skills in other tailoring firms in the country. Those who were employed unskilled received training at the factory with help of Romanian experts.

The Supervisory level personnel were sent to Romania for training, on their return they formed the nucleus of the company's management. Due to high absenteeism rate and low production performance the company was forced to revert to one shift operation effective 1 January 1980.



The company has been facing operational problems resulting in poor financial performance. These are enumerated as hereunder:

- Shortage of suitable shirting and suitings materials and necessary auxiliaries;
- Low labour productivity due to workers' dissatisfaction over low salary scales compared to private garment units and level training;
- Slow moving garments during the first two years of operation creating a severe strain on the financial resources of the company;
- Absenteeism during the time the company operated two shifts;
- Frequent changes in garment styles as a result of exposure to wide fashions;
- Too much emphasis on bespoke operations rather than garment mass production.

National Textile Corporation (TEXCO), the major share holder in the company, has endeavoured to assist the company in solving its problems. It has directed its other subsidiary companies to sell to UGL suitable suitings and shirtings materials in order to satisfy its stitching requirements. This has worked satisfactorily but lack of foreign exchange has also affected the production of such materials as their inputs are imported.

The Government has been approached with a view to getting its assistance in this regard, and some foreign exchange has normally been allocated for purposes of importing polyester yarn and cloth and garment accessories. The supply has however, not been adequate to cover all UGL's needs. TEXCO is still pressuring the Government to make UGL the sole importer of textiles in the country, a function now being performed by the Household Supplies Company (HOSCO) so that the problem of raw material shortage is sorted out once and for all.

Three trainee instructors from Ubungo Garments Ltd. participated in the Fielden House Instructor Training Course organized by the Manpower Development Expert in Project DP/URT/78/018 - during 2 November to 17 December 1982. The success of the course is reflected in the fact that eleven out of twelve participants will be awarded a certificate of City and Guilds.

This project would be a logical follow up of the initial step of training machine operator instructors and aims at further establishing full scale processing techniques at Tanzania's largest garment factory.

UNIDO, as executing agency of the project appointed an expert for six months in order to carry out the project's activities. The duties assigned to the expert were the following:

- Establish the basic premises of a production oriented, flow line garment factory is implemented;
- Assist in the re-organization of work place and material flow to achieve maximum productivity;
- Review and adjust individual operations within each processing line;

- Establish satisfactory management approach to optimum solutions;
- Establish optimum operations in garment construction, lay-up cutting room;
- Procedures, fabric utilization, stock control and spare part usage;
- Define work load and establish output standards.

I.  
FINDINGS

A. Plant

The plant is good enough, well aired with sufficient daylight and adequate electric lighting. The planning and realization of the factory was a good achievement; proper basic layout, definite departments and technologies. It could be useful here to remember that the establishment of the factory was aimed at supplying the local market substituting for import. The walls need to be painted, the nets on the windows along the ceiling are to be replaced in order to avoid doves to live in the plant.

B. Departments

In the factory there are already established all the necessary departments essential for the running of a ready-made garment activity, namely:

- Work planning;
- Work study;
- Production record;
- Design;
- Styling;
- Cutting;
- Assembling;
- Finishing;
- Pressing;
- Quality control;
- Maintenance;
- Store;
- Show room.

C. Technologies in the Departments

The survey showed that when the factory was planned and established all the duties and technologies for the running of almost all the departments were defined and recorded. On the walls of some departments still there are attached the charts of duties and operations to be performed.

D. Working Technologies in the Departments

The few departments operating according to proper technologies are:

- Production record;
- Finishing;
- Store.

The others either have neglected every fundamental technology and go on according to empirical knowledge or have totally forgotten their basic duties and have changed orientation to their jobs.

E. Design and Styling Departments

The two departments have been merged and devoted solely to tailoring, namely, they make garments by order to measure for special customers.

The department is properly equipped as "Design Department" but the technicians working there really do not know how to create new designs for ready-made garments. Perhaps the design department shows an oversight in the technological planning of the factory for no proper training was foreseen to the technicians on the construction of industrial patterns.

In the department there are many patterns but the technicians are unable to renew them, time to time, according to fashion and raw material. The grading technology known in the department is out of date and not according to international standards, but it is good for the local market. Owing to the above said situation the merging of the two activities and the tailoring activity established was the sole possible solution otherwise the technicians had to stay in the department doing nothing. If the designers in the department are trained on the technology of patterns making for ready-made garments the department of tailoring can be closed entirely, thus eliminating the tailoring activities which disturb the industrial activities.

F. Work Planning and Work Study Departments

Work planning is limited to the preparation of sheet of order to the cutting department and collection of data for the accountant department calculate the cost price of items from production.

Work study is not practised; owing to that the assembling department operates without chart of flow and operations, without indications of work load, processing time and methodology of process. In the design department still there are, attached on the walls, the charts of "Documentation Schedule" and the "Programme of Activities in the Design Department", the above said charts are the definition of technologies established in the department when the factory was set up. Moreover, the "Instructor Training Course" carried out by Mr. H.L. Mayhew from the Fielden House of London, last December, dealt deeply with the activities of Work Load and Time Measurement. The course was very useful and thank to it the expert found some technicians with a good preparation.

G. Assembling Department

The layout as basic disposition of machinery and equipment shows a good design. Totally there are 18 rows of 15/16 working stations. Two rows of working stations form one unit with as many operators as working stations. Some overlock machines and ironing tables are placed between the plain sewing machines. One foreman is in charge at each unit. The layout is kept unchanged and owing to the different style of garments in process very often machines or equipment do not fit with the operation of the process and the garments go ahead and back to the right working station. The inconvenience is also created by the many machines out of order, unused, still kept in the production lines. Operators are used to stay for long time idle for lack of work in process. Foreman shares idleness of the machine operators.

#### H. PRESSING DEPARTMENT

The pressing department is equipped with 8 automatic pressing machines; four of plain surface and four shaped. Owing to shortage of water the department is totally inoperative; when pressing is unavoidable it is done by normal manual iron.

#### I. CUTTING DEPARTMENT

The cutting department is situated in the same room as the assembling department. There is one Foreman in charge and 14 technicians. There are sufficient tables for the job but some of them have already got the surface uneven. Tracing is done on a layer of fabric by ball-point pen. The cardboard patterns (temples) are not of double copy, namely they are prepared in the way tailors do for marking on folded up fabrics. In industrial cutting the laying up of fabrics is done with fabrics totally spread, (unfolded), for this reason the marking of the pattern is done over unfolded fabric or better (when available) over one sheet of paper as wide as the width of the fabric. In order to have the whole view on placing pieces of patterns over the layer of fabric or paper, all the pieces of patterns must be double, that helps on reducing the consumption of raw material. Some patterns are worn out and deformed, nevertheless they are recopied on a new cardboard.

The laying up of the fabrics is done manually, cloth from roll is laid up by four people, each layer is walked along the table over its surface, piling fabric upon other fabric, sometimes the smoothing is not done properly and the fabric remains loose; the ends are cut by scissors. At least one manual cloth-sprayer is badly needed for a minimum of accuracy on laying up fabrics.

There is only one straight-knife cutting machine and two band-knife machines. The two band-knife machines are situated too far from the cutting table and the layer of fabrics after separation into small parts is moved manually to the far band-knife machine for the final cutting around the outline. The shifting often is done with little care and owing to the totally absence of clips the layer is displaced causing faulty cuttings. When necessary the garments after the final cutting are marked by ball-point pen. The marking should be done by a labelling marking machine. The vertical straight-knife cutting machine is connected to a floor-socket installed between the tables with a long cable: that is very dangerous. The connection of this type of cutting machine has to be an aerial socket running by means of trolleys along a wire over the cutting table. The cutting machine used is very worn out causing unsharp cutting edges. There are no spare parts, if it should happen going out of order the cutting will be totally stopped and consequently all the production. Drilled marks (small holes) for darts, pockets and others are made by means of a nail and hammer thus one marking drill (electric for cloth) is indispensable.

#### J. MAINTENANCE

In the maintenance department there is a team of six mechanics and one foreman; there is a workshop for major repairs. All of them are of good technical level. Their job is limited just to little repairs in the plant owing to lack of spare parts for major repairs.

K. Machinery

Machinery in the factory are as follows:

- Plain stitching	212
- Overlock	35
- Button-holes	7
- Button-stitching	7
- Blind-stitching	17
- Bar taking	3
- Loop-stitching	1
- Collar turning (pedal equipment)	2
- Cutting machine (straight knife)	3 (two are out of order)
- Band knife	2
- Hook and eye caulking (pedal equipment)	4

All machines are somewhat decayed and show to have been neglected. They are used up at about 65%; in not more than five years all machinery will be totally unusable. About 40 machines, mostly special machines as overlocks, button-holes, button-stitchings, bartaking, loop-stitching, are out of order and cannot be repaired for lack of spare parts which cannot be imported for shortage of foreign currency. There is just one straight-knife cutting machine, if it happens to go out of order the cutting department will be totally stopped and with it all the plant.

L. Raw Material

Raw material for fashionable garments, namely shirts, trousers, suits, is imported; local made raw material 100% cotton is used only for working clothes, bed sheets and pillow cases. When imported material is delayed production is almost stopped. There is the strong conviction that the local made 100% cotton fabrics cannot be accepted in the home market for fashionable garments. All over the world sportswear garments (casual) are mostly made from 100% cotton fabrics, there is no reason why in Tanzania should not be the same.

M. Workers

Workers are of intelligent looking and they can operate (when job reaches their working station) at normal standards, mostly are deft enough. Many of them have learnt the job in tailoring workshops, others have started as apprentices in the factory. If properly organized and directed they can yield a satisfactory output. It seems that in Tanzania there is a natural predisposition for tailoring and every manufacturing handicraft.

N. Foremen

Foremen are from tailoring training and experience. They know their job well but they show tendency to indulge on artisan habits and behaviour. Some of them have been in Romania for training, but perhaps the training was too short to turn them into foremen of industrial mentality; undoubtedly a longer training had been more useful.

O. Management

Managerial responsibilities are mostly placed upon the Production Manager. He is overloaded by his own and others responsibilities with the result that sometimes he appears tired and exhausted. If he could accept to be unburdened from some duties not totally concerned with his specific job, both factory and productivity could undoubtedly benefit from his dynamic and intelligent direction. There is no work of team, no technicians from other departments discussing for choices. On doing so the factory is nourished with one sole brained-manager and other fresh mentalities are ignored without a chance to give their own active contribution. There can be the suspect that many departments and technicians have been atrophied by the one man management. The one man management has been abolished even in small concerns since long time. The activities of the Project have to pass through the Production Manager and the success of the Project depends on how he will accept both Project and expert.

P. Store

Customers have free admittance to the plant; owing to the location of the store at the end of the plant, any customer going to the store has to walk through the processing lines. This inconvenience could be avoided by creating an additional entrance to the store directly to it from the garden in the same area of the factory.

Q. Tailoring

The many customers going to the "Tailoring Department to Measure" have also free admittance upstairs, in the department which is located in the same room of the design department. Admittance of those customers could be avoided by establishing one "Section for Tailoring to Measure" in the area of the offices which is totally separate from the production area; this in case the tailoring to measure has to be continued as delightful hobby.

R. Discipline

Discipline in the plant is observed as self-discipline. Foremen do not regard themselves empowered to limit any exuberant cheerfulness, on the contrary they take part in the almost general liveliness. Most of the workers are young and so prone to brightness. Management should induce everybody to maintain adequate discipline and when necessary apply the disciplinary rules undoubtedly already established in the regulations of the factory.

S. PRODUCTIVITY

Output is very poor; it is also inexplicable to which extent low production in some days has been recorded. The following examples drawn from the Production Record Book in the factory are self-explanatory.

1983

3 January	-	Units No.	5/6;	Operators	22 - Men shirts	Prod.	10 pcs.
1 February	-	" "	3/4;	"	22 - Men shirts	"	16 pcs.
15 March	-	" "	5/6;	"	20 - Boy shirts	"	15 pcs.
7 March	-	" "	7/8;	"	21 - Overalls	"	17 pcs.
11 April	-	" "	3/4;	"	26 - Men shirts	"	12 pcs.
2 May	-	" "	3/4;	"	28 - Men shirts	"	7 pcs.
18 May	-	" "	5/6;	"	25 - Short/Trous.	"	3 pcs.
2 June	-	" "	15/16;	"	26 - Short/Trous.	"	2 pcs.
9 July	-	" "	7/8;	"	22 - Boy/Trousers	"	5 pcs.
11 July	-	" "	5/6;	"	27 - Men/Trousers	"	11 pcs.

But in some days the same Units were able to produce from 100 to 200 pieces of the same items, which is also a poor output. It shows that operators have got some degree of efficiency and that gives hope for improvements.

Annex No. II shows the total amount of output from January to October 1983. At the foot of the above said Annex is shown the total amount of working-days manpower employed for each month in order to give an idea of the average output per operator.

During January 1983 were made 32.289 pieces mostly shirts, employing 6.857 working days manpower, this means each operator produced about 4.8 shirts per day. During October 1983 the innovation introduced by the Project raised the average production of the shirts at 11 pieces per day, 8 working hours per operator. This indicates that the production was increased more than 100%.

II.

EXPERT'S ACTIVITIES RELATED TO THE JOB DESCRIPTION AND WORKPLAN

A. WORKING PROGRAMME (see Annex I)

The working programme was prepared in accordance with the job description, the objectives in the project document and the experience from the survey for familiarization with the factory. It was defined with the CTA of project DP/JRT/78/018 and the UGL's General Manager who undersigned the document for approval.

The expert felt that the scope of the Project should be extended to the introduction of new lines of garments from local made 100% cotton fabrics and also to the upgrading of the technicians in the design department in order to become the factory self-sufficient on industrial patterns making and to acquire knowledge on international standards of sizes and grading of sizes.

Accordingly the expert planned a course of technical lectures to ten technicians in the factory and introduced the production of sportswear shirts from local made 100% cotton fabrics. Afterwards he also introduced a line of jeans for children, girls, young men and gents.

B.(i) ESTABLISH THE BASIC PREMISES OF AN ORIENTED PRODUCTION (see Annex I)

The work planning department was reorganized; a chart for the layout of the assembling department was designed into scale 1:100 by the technician in charge in the same department and attached on to the wall. The layout will be studied and defined from time to time according to the specific process of production required by the style and also to the quantity of garments to be processed.

An Information Bank was established, namely, each worker or technician in the factory is listed on a card with personals and specializations. On organizing a new production line the operators required for a specific working station will be selected from the Information Bank according to proper specializations. The Information Bank has to be completed in the future when all possible specialization of the workers are known by the production manager and will be communicated continuously to the Work Planning Department.

B.(ii) ASSIST IN THE REORGANIZATION OF WORK PLACE AND MATERIAL FLOW TO ACHIEVE MAXIMUM PRODUCTIVITY

All existing machines out of order were removed from the processing lines in order to attain a continuous flow of process. Now the processing lines are planned in such a way to be operated full time. In order to avoid stoppage, owing to absenteeism, there is one processing line for small orders without urgency; any operative absent in the other lines will be replaced by the ones from this line, but for the replacement of absent workers there could also be a training line. The following examples of output are self-explanatory:

9	September	-	One Unit Operators	18	Short/Sleeve Shirts	220	pcs.
13	"	-	" " " "	18	" " "	250	pcs.
15	"	-	" " " "	18	" " "	260	pcs.



During January 1983 the factory produced 32,289 pieces, mostly shirts employing 6,857 working days manpower, this means each operator produced about 4.8 shirts per day. This indicates that although the figures above for September production are not very satisfactory, the output was increased by more than 100%.

B.(iii) REVIEW AND ADJUST INDIVIDUAL OPERATIONS WITHIN EACH PROCESSING LINE

All processes of production of styles usually made in the plant were studied carefully in the design department. In order to have, the technicians, practical knowledge of the entire process and also to establish the proper Methodology of Process, some prototypes were actually made in the design department. The layout was then reorganized according to the series of operations resulted from the study of the process in order to have the proper machine or equipment at each working station. The chart of operations and flow was supplied to the foreman-in-charge; at each working station was attached the Operation Card for the operator. Emphasis was placed on the handling technology. These are valuable tools of management and enabling much better control of individual performances as well as a complete control of the order flow.

B.(iv) ESTABLISH A SYSTEM OF PRODUCTION CONTROL PER WORKER UNIT

The technician previously in charge as foremen for quality control was instructed for the job of Production Control Foreman. He is of good eye-sight and is able to show the operator any detail of the operation. His duty is to conduct full time a floor (Patrolling) inspection, checking at every machine in order to achieve:

- Discovery and quick correction of defects;
- Reduce handling of material in process;
- Avoiding to disrupt the flow of process.

Other control of production was established at key operations, i.e.;

- Checking every shirt before setting in sleeves and assembling collar;

At the end of each Unit (processing line) one technician carries out a final inspection. The Foreman-in-charge in the processing line controls full time the flow of production caring also the distribution of work to be processed at each working station.

B.(v) ESTABLISH SATISFACTORY MANAGEMENT APPROACH TO OPTIMUM MIX SOLUTION

The activity was somewhat limited owing to the overload of duties of the Management represented only by the Production Manager and consequently time available for inductive and tactful lectures on the matter was very short. Nevertheless if the daily practical work of the expert will be taken as a pattern it will undoubtedly help the Management to achieve the optimum mix solutions desired.

B.(vi) ESTABLISH OPTIMUM OPERATIONS IN GARMENT CONSTRUCTION AND LAY-UP  
IN CUTTING ROOM

A number of patterns were altered according to more suitable anatomical features and better design. Almost all the old patterns were copied on a new cardboard and made in double copy for a proper placing over unfolded fabric. Indications were given in order to reduce consumption of fabric although the expert found there was no undue wastage. All tables with damaged surfaces were removed and employed as auxiliary tables. One small table was fitted with slides to move the pieces of layers to the band knife machine in order to reduce the displacement of the layer. The operation of the laying up of fabrics could not be improved too much for any serious improvement calls at least for a manual cloth-spreading machine; nevertheless recommendation were given in order to avoid excessive gathers over the surface of the layer.

B. (vii) PROCEDURES, FABRIC UTILIZATION, STOCK CONTROL, SPARE PARTS USAGE

Procedures (Documentation) already established in the factory are good enough and so there was no need for improvements.

Fabric utilization is the choice of the Production Manager who knows deeply the trend of the local market; moreover there is very little variety of raw material.

Stock control is governed by the general procedures which are good enough as above stated.

Spare parts were not available during the assignment of the expert and the matter was not approached, but the control of spare parts, when in stock, as well as machinery and equipment, is assigned to the Production Manager.

B.(viii) DEFINE WORK LOADS AND ESTABLISH OUTPUT STANDARDS

All the processes of production usually processed in the factory were scientifically studied and each operation was assigned a specific time of execution. The job was carried out through in the design department by five technicians, namely:

- |                         |                          |
|-------------------------|--------------------------|
| - Mr. Jamari Munish     | Work load; Foreman       |
| - Mr. Andrew George     | Designer; Technician     |
| - Mr. Kiondo Elifurana  | Designer; Technician     |
| - Mr. Elizeus Pontian   | Time study; Technician   |
| - Miss Suzanne Ngahyoma | Method study; Technician |

Subsequently the single operations were grouped so as to define one balanced flow of production and consequently a definite work load. Flow of production and work load were set down in a Chart of Flow for the Foremen; the Work Load, with specification of operations, was recorded on Operation Cards for the operator at each working station. Annexes Nos. 3-4-5-6-7-8-9-10; show the work load at each working station and the standard time for each group of operations.

C. (i) INVENTORY AND SURVEY OF MACHINES OUT OF ORDER  
(see Annex I - Work Plan)

All machines out of order were removed from the production lines and gathered in one corner of the plant for a technical survey. The survey showed that some 40 machines, mostly special machines, could not be repaired for lack of spare parts; the spare parts could not be imported for shortage of currency. The expert suggested and UNIDO approved an additional allocation of US\$ 10,000 raising the total amount of funds in the Project at US\$ 17,900. The above said funds are being used for the importation of spare parts and small equipment for the cutting department according to the list of items supplied by the same Company.

C. (ii) INTRODUCTION OF NEW LINES OF PRODUCTION FROM LOCALLY MADE 100% COTTON FABRICS

In order to establish a lasting productivity in the factory the expert suggested to introduce to the country market the use of sportswear shirts from 100% local made cotton fabrics. Up to now people in the country have given their preferences to shirts made from imported blended fabrics. The new line of cotton shirts was made into four sizes, namely:

- (S) Small
- (M) Medium
- (L) Large
- (XL) Extra Large.

The experiment was positive, the first 700 cotton shirts were sold in a few days and if the raw material is supplied according to the need it is estimated that at least 250 shirts per day can easily be produced and marketed in the home market. The manufacturing of well designed cotton shirts as shown by this experiment should lead to substitution of imports.

Subsequently the expert suggested a new line of Jeans also from local made 100% cotton fabrics. Although the sewing machines in the factory are not the ones specifically used on making Jeans, the expert devised one process which gives the Jeans the appearance like the ones processed with the proper sewing machines. The Jeans were made into 19 different sizes, namely:

- |                         |                                       |
|-------------------------|---------------------------------------|
| - Children/shorts       | Sizes: 5,6,7,8,9 years                |
| - Children/long         | Sizes: 7,8,9 years                    |
| - Boys and little girls | Sizes: 24,24 1/2,25, 25 1/2,26        |
| - Gents and girls       | Sizes: 27 1/2,29,30 1/2,32,33 1/2,35. |

The introduction of the above said lines of garments from local made 100% cotton fabrics will yield the following benefits:

- Establishing in the factory a lasting productivity for the specific style of garments allows large stocks without fear of losses owing to changes in fashion trends;
- Enabling the Company to plan production in bulk quantity with at least one year in advance;

- Saves the country foreign currency due to reduced importation of blended fabrics;
- Will give orientation to a future exportation of finished products instead of raw material for both Jeans and Sportswear shirts are exportable in the markets of Africa and Asia.

**C.(iii) REORGANIZATION OF THE DESIGN DEPARTMENT**

The expert was able to restore the design department to its proper functions. This implied the removing of the tailoring department to another separate room. The technicians in charge in the design department are:

- |                         |                               |
|-------------------------|-------------------------------|
| - Mr. Jamari Munish     | Foreman                       |
| - M. Andrew George      | Designer                      |
| - Mr. Kiondo Elifurana  | Designer                      |
| - Mrs. Irene Baruti     | Designer cum Product Designer |
| - Miss Susanne Ngahyoma | Designer cum Product Designer |

The technicians above listed were trained in theoretical and practical technologies on construction of basic patterns limited to the following styles:

- Trousers;
- Shirts;
- Skirts.

They were initiated in the technology of Grading of Sizes "Shifting Method" and the International Standards of Sizes European and English/American Standards.

The patterns for the new lines of Shirts and Jeans were made by them under the guidance of the expert.

The Technicians themselves wrote a Syllabus for the teaching of the above said technologies into English and Kiswahili and also designed ten Demonstrative Outlines on cardboard sheets. The Demonstrative Outlines are attached to the walls of the design department.

They were trained in the teaching methodology and they can give lectures to other Technicians on the above said styles of garments.

Mrs. Irene Baruti and Miss Susanne Ngahyoma were also given lectures on "Sketches of Fashion" and they were able to sketch all the styles of garments usually processed in the factory. The sketches are attached on a wall of the design department.

The two Technicians in charge as "Stylists Part Time" Mr. Hasan Jambia and Mr. Omar Kalimanyile owing to their charge as Tailors did not participate in the programme and are to be regarded solely as Tailors making Suits to Measure for special customers.

C.(iv) LECTURES ON PATTERN MAKING-GRADING-INTERNATIONAL STANDARDS OF SIZES

The course of technical lectures was organized by the expert in order to establish in the factory and the country the first basic know-how on Patterns Scientific Construction; Grading of Sizes and International Standards of Sizes both European and English/American Standards.

The styles of basic patterns to be studied in the course of lectures was planned as follows:

- Trousers;
- Shirts;
- Skirts;
- Dresses;
- Blouses.

But during the progressing of the course the lectures were limited just to Trousers, Shirts, and Skirts owing to the following:

- Some Technicians did not show interest and after the second lectures did not come back; the two are Mr. Hasan Jambia and Mr. Omar Kalimanyile.
- Mr. Jamari Munishwas assigned to follow another training outside the factory on work load study;
- Some Technicians were from the processing lines and due to shortage of operators to replace them, during the lectures, were unable to attend the course.

At the beginning of the lectures the Technicians were twelve; (see Annex 11).

The technology for the Grading of Sizes introduced in the factory is the "Shifting System" officially recognized and taught in England and United States.

The technology for the construction of basic industrial patterns is a part of the Teaching Method once in use in the Training Centre of the expert in Rome and successfully introduced in industries and official institutions of many countries by the same expert in UNIDO projects.

C.(v) TRAINING OF THREE INSTRUCTORS/GARMENT ENGINEERS IN CONDUCTING THE SKILLS AFTER THE EXPERT'S DEPARTURE

Among the Technicians who co-operate closely with the expert the ones whom can be indicated as trained instructors are the following:

- |                         |  |
|-------------------------|--|
| - Mr. Jamari Munish     | Work Load; Methology of Process;         |
| - Mr. Elizeus Pontian   | Time Study;                              |
| - Mr. Kiondo Elifurana  | Pattern Making; Grading;                 |
| - Mr. Andrew George     | Pattern Making; Grading;                 |
| - Mrs. Irene Baruti     | Product Design; Pattern Making; Grading; |
| - Miss Susanne Ngahyoma | Product Design; Pattern Making; Grading; |

The knowledge acquired by the above technicians on Pattern Making and Grading is limited to the styles of Trousers, Shirts and Skirts basic styles. They are able to work in team and capable of teaching to other technicians. They can assist other factories on establishing lines of production of medium standard of quality in the limits of the above said knowledge.

C.(vi) ESTABLISH AN INCENTIVE SYSTEM PER MACHINE OPERATOR

The Administration showed no positive will for the establishment of an incentive system and so the activity was not carried out, nevertheless the expert wishes to give some suggestions hoping that they can come of use in the future.

The operation time for the workload shown in the Annexes 3 to 10 includes only the allowance time for breaking of thread, rewinding of spool and for handling. Other allowance time for personal needs the expert was not able to define. Time for personal needs at UGL is governed by self-discipline. The following examples show lacking in discipline:

- Operators may leave the working place for personal reasons at any time and any duration;
- If an operator suddenly does not feel well for any unknown reasons they may slow down or even stop working at their working place;
- Chatting seems to be allowed unlimitedly.

The above examples of unforeseen incidents prevent a realistic determination of the Operation Time needed for the establishment of any incentive system.

Workers at UGL are deft and capable of sacrifices and endurance. In order to stimulate them a "Motivation" is indispensable. Moreover an incentive system for a motivation should also be extended to the Supervisory Management, and to some departments strictly involved in the productivity.

The amount of incentive accumulated by the machine operators should be redoubled and the redoubled part be divided among Supervisory Management and operators of departments to be defined. The following prospect shows the profit for the company from the establishment of an incentive according to the expert's suggestion.

- Production according to target ..... 180 pcs per 8 hours
- Production achieved without incentive ..... 153 pcs per 8 hours
- Production lost as per above figures ..... 27 pcs per 8 hours
- Production with incentive ..... 198 pcs per 8 hours
- Over production above target due to incentive ... 18 pcs per 8 hours
- Incentive to be paid as per above figures 10% of daily operative salary.

- Redoubling of incentive for other departments 10% -  
Total incentive to be paid will be 20% of daily operator's salary.
  
- Actual amount of production attained will be the difference between the 153 pcs. without incentive and the 198 pcs attained with incentive, that is  $27 + 18 = 45$  pcs., namely 25% target production profit for the company, who will pay just 20% of the daily operator's salary.

If in some days operators are not able to accumulate incentives they, on the effort to achieve incentive production, will perform according to target or near to it the company only pay the basic salary without extra incentive premium.

#### Sewing Thread

The kind of sewing thread in use at this moment in the plants is not good and a lot of time is wasted in re-threading the machines. The number title of thread to be used is N.50 for light material, i.e. shirting materials, and N.40 for medium heavy materials, i.e. industrial clothes and Jeans.

ANNEX I

PROPOSED WORKING PROGRAMME

(The activities of the Project will be carried out according to the job description and the Project Outputs on paragraph 4 of the Project Document).

The new line of sportswear shirts, at the beginning will be started as "Tentative" and limited to only 500 shirts in order to test the reaction of the market.

The pattern prototype will be supplied by the expert but the counterparts will be trained in the grading technology in order to enable them to design all the sizes of the shirts.

In order to facilitate the preparation of the new line of shirts the showroom will be equipped accordingly and used for the Project's activities.

Starting from the 1st August the expert will start a course of technical lectures to the technicians working in the factory, limited to ten technicians.

The aim of the above said lectures is to upgrade the level of the technicians and to establish in the country scientific technology for industrial pattern making.

The time-table of the lecture will be as follows:

3 times a week from 12.30 to 3.30 p.m.  
from 1st August to 30th October 1983

The items of the lectures will be the following:

- Construction of basic patterns for gents and ladies trousers;
- Construction of basic patterns for armhole dress;
- Construction of basic patterns for skirts;
- Construction of basic patterns for shirt for gents;
- Construction of basic patterns for blouses.
  
- Full knowledge on international standard of sizes;
- Equivalence of European and English/American sizes;
- Grading of sizes by the English world wide accepted "Shifting" technology.

R. A. Mshana  
General Manager

Carlo Palizzotto  
UNIDO Expert





**UNITED NATIONS  
DEVELOPMENT PROGRAMME**

**DAR ES SALAAM. TANZANIA**

**MATASALAMAT MANSION  
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**Telex 41284 Telephone: 27411-5**

**Reference UNIDO/CTA/83**

**Mr. C. Palizzotto  
Garments Industry Expert  
Project SI/83/801**

Dear *MR. PALIZZOTTO*,

I refer to the activities chart you have prepared accompanying the letter to Mr. Mshana, General Manager, Ubungo Garments Limited dated 8th July 1983.

This chart establishes clearly your programme for the project.

All the activities listed will in fact be carried out with the co-operation of the respective management personnel.

With regard to activities 6 and 10.

- Establishment of system for determination of operation and time for workload.
- Establishment of an incentive system

These should be carried out in conjunction with Texco's Textile Technologist responsible for Industrial Engineering.

All incentive payment schemes in the group are devised in co-operation with the above person to ensure that equitable schemes exist throughout the group and no payment anomalies are created, also that TEXCO is in a position to continue to monitor the future performance of these schemes.

Yours sincerely,

*R.A. Ryder*

**R.A. RYDER  
CHIEF TECHNICAL ADVISER  
78/018**

c.c. Managing Director --- Texco

c.c. Director of Operations --- Texco

RAR/ger

BAR CHART OF ACTIVITIES FOR UNIDO  
PROJECT SI/URT/83/801

ACTIVITIES	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
Familiarization with the Garment Factory; Visit to Textile Mills	→						
Organization of Planning Dept.		→	→				
Inventory + Survey of Machinery out of order; Tentative reparation		→	→				
Introduction of new lines of Sports-wear Shirts from local made 100% Cotton Fabrics: - Phase I - Making of Prototypes; - Phase II - Making of 500 shirts for testing the market reaction; - Phase III - Production of 1000 shirts per day.		→	→				
Establishment of conditions for increasing productivity in the sewing room; (that depends mainly on the restoration of the plant: Nets on the windows and painting)				→	→		
Establishment of system for determination of Operations and Time for Workload.				→	→		
Establishment of Quality Control and Final Inspection				→	→		
Ordering of Spare Parts for Machinery from Project's Funds			→				
Lectures on Pattern Making and International Standards of Size; Grading; (10 Technicians 9 hrs. a week)				→	→		
Establishment of Incentive System				→	→		
Training of 3 Instructors (Foremen) in conducting the skills				→	→		
Establishment of system for improving technology and reduce wastage in the cutting room				→	→		
Final Report						→	
Expert's leave - Travel and de-briefing in Vienna							→

**Note:** The establishment of the new systems can become operative when the shortage of raw materials is solved and productivity in full; otherwise they will be established for the knowledge of Department/Heads

ANNEX II (A)

Output Prospect January to October 1983 (from UGL's Production Record Book)

This study has been compiled in order to supply a guide for the future if losses are to be avoided. It shows the say manpower has been employed during 1983 and also the items profitable to process and the others totally unprofitable for an industry to process. The total amount of the monthly production shows the achievements during September and October in comparison to other months. July and August should not be regarded for many workers were on annual leaves.

Spec. of Items	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.
Men Shirts	27,168	3,961	12,055	11,253	11,533	5,655	4,579	3,568	5,851	7,463
Boy Shirts	1,872	103	4,093	835	3,102	3,428	1,005	1,418	737	1,451
Bed Sheets	14	33	7,203	-	-	-	153	925	6,142	3,533
Shirts (Ladies)	1	73	822	172	786	331	36	-	29	110
Dresses (Ladies)	343	114	24	290	100	49	2	-	25	-
Trousers (Men)	2,031	4,894	1,757	367	416	325	375	690	2,872	865
Boy's Shorts	29	30	877	468	845	1,147	333	267	1,357	4,570
Child. Pants	172	49	197	248	372	400	306	-	-	-
Child. Floks	656	30	-	-	1	532	1	52	969	-
Shirts (girls)	2	14	-	-	-	-	-	-	-	-
Overcoats	-	309	-	-	188	67	-	-	73	-
Apron	-	30	160	-	-	-	-	-	-	-
Jackets	-	3,151	1,144	-	25	-	-	-	3	63
Pillow Cases	-	10	638	-	-	-	74	-	1,101	672
Kitenge/Sheets	-	257	400	752	1,106	274	-	-	1,137	-
Overalls	-	84	1,052	-	-	30	203	30	710	542
Trousers (Boy)	-	9	254	1,178	570	485	254	324	154	-
Bags	-	-	228	-	-	-	-	-	-	-
Curtains	-	-	15	-	-	4	-	-	3	-
Ladies' Blouses	-	-	-	5	-	-	-	46	44	-
Dresses (Child.)	-	-	-	11	-	379	100	-	-	-
Ft. Ball/Buctor	-	-	-	-	-	397	292	-	624	-
Ft. Ball/Buctor	-	-	-	-	-	12	-	-	-	-
Gloves	-	-	-	-	-	-	-	2,591	180	-
Bags	-	-	-	-	-	-	-	-	273	-
Coach Covers	-	-	-	-	-	-	-	-	-	10
Jeans	-	-	-	-	-	-	-	-	-	1,549
G.Total/Month	32,289	12,881	30,582	15,848	18,690	14,347	7,966	9,911	22,184	20,828
Manpower/Month	100%	100%	100%	100%	100%	100%	50%	50%	60%	60%

ANNEX II(B)

This Annex shows the achievements attained during September and October in the Production Lines, the following figures were copied from the UGL's Production Record Book. Comments are made in order to give orientations for the proper solution of unsatisfactory performances where they may be found.

Sept.	5	Unit/Short-Sleeve-Shirts	-	Operators No. 18	-	Pcs. 176	in 8 hours;
"	6	"	"	"	"	182	" " "
"	9	"	"	"	"	209	" " "
"	13	"	"	"	"	250	" " "
"	15	"	"	"	"	260	" " "

The above examples are self-evident of the progressing in the processing lines, but in some days the same Unit gave a very poor production due to lack of discipline which is beyond the project's duties.

Sept.	5	Unit/Men's trousers	-	Operators No. 26	-	Pcs. 96	in 8 hours;
"	7	"	"	"	"	122	" " "
"	8	"	"	"	"	95	" " "
"	9	"	"	"	"	113	" " "
"	22	"	"	"	"	174	" " "

The above examples show the increasing of production until 22 September, but afterwards production was unsatisfactory due to lack of discipline and perhaps also to lack of motivation.

October	11	Unit/Short-Sleeve-Shirts	-	Operators No. 18	-	Pcs. 114	in 8 hours;
"	13	"	"	"	"	133	" " "
"	19	"	"	"	"	199	" " "
"	22	"	"	"	"	114	" " "
"	27	"	"	"	"	205	" " "
"	28	"	"	"	"	171	" " "

The above examples show that productivity in the same Unit never is steady, moreover this is the same Unit of the first example above which in September was able to attain even 260 pcs. per day of the same shorts. Workers and Foremen were the same.

October	19	Unit/Long-Sleeve-Shirts	-	Operators No. 26	-	Pcs. 114	in 8 hours;
"	20	"	"	"	"	126	" " "
"	25	"	"	"	"	135	" " "
"	31	"	"	"	"	230	" " "

The above examples show the following:

- The Foreman-in-charge was unexperienced and from 19 to 25, namely in six days was not able to increase production.
- On 31st a good Foreman went in charge in the same line and immediately was able to get from the same workers 230 pcs in a day, namely 95/100 pcs. more. This Foreman in September, in the same line, with the same workers and some shirt was able to get a daily production of 230/250 pcs. This show the importance of a good Foreman in the production lines.

Introduction to the Annexes III to X - Workload

The workload at each working station consists of a group of short operations to be performed by one operator.

The execution time was defined in the processing lines, taking the operational time for ten times the execution of the workload and dividing it by ten in order to attain the average execution time for one single performance.

The execution time includes time allowance for the following:

- Breaking of thread;
- Rewinding of spool;
- Handling.

Ratio Time Allowance for personal needs could not be defined for lack of rules at UGL governing personal needs in a gathering of hundreds of people. The following examples can be useful:

- Operators may leave the working place for personal reasons at any time and any duration;
- If an operator suddenly does not feel well for any unknown reasons they may slow down or even stop working at their working place;
- Chatting seems to be allowed unlimitedly.

The above examples of unforeseen incidents prevents from a realistic determination of the Actual Operation Time. Balancing of workload is possible for the above examples of personal needs are common to all workers at UGL.

Although the execution time for every workload is long enough, really it never was achieved for lack of "Motivation" of the operators.

The execution time in the Annexes III to X should be regarded as "Local" and it has nothing to see with international standards even in comparison with other industries in developing countries with the same kind of machinery and equipment. The following example is self-explanatory:

- Process for Sportswear Shirts-Long/Sleeves - Two piece collar - One breast pocket-Front Shirt - Style No. 102 - Annex No. III;
- Execution Time for workload at each working station 2.00 minutes;
- Total number of working station only for sewing operations are 26;
- $26 \times 2.00 = 52$  (52 is the amount of minutes time for sewing the shirt).

If we add to the above said processing time to the following:

- Cutting time;
- Finishing time;
- Pressing time;
- Folding time;
- Ratio Allowance Time for Personal Needs.

the result is to spend more than one hour for processing one shirt of medium standard of quality.

This shows that at UGL, at floor management level, much can be improved with the striking co-operation from the side of the workers. UGL has a great potential to improve efficiency and quality.

ANNEX III

Workload for Process of Sportswear Shirt - Style No. 102

Operation Time at each working station is 2.00 minutes.

Basic Production Data

- Production Item	:	Men's Sportswear Shirt
- Design	:	Two piece collar - Long Sleeves - Single cuffs - One breast pocket - with shirt front
- Used Material	:	Cotton 100% Local made.
- Operation time	:	Cutting sect.        5 minutes Sewing sect.        52 minutes Finishing Pressing Folding                5 minutes
		<hr/>
Total:		62 minutes
		<hr/>

Ration Time Allowance already included for: Breaking of thread;  
Rewinding of spool;  
Handling.

Ration Time Allowance for Personal Needs not included; (refer to page 23  
- Introduction to the Annexes III to X for Workload).

- |   |  |
|---|--|
| No. 1 - Fold front pleats and pockets;                                    | No. 17 - Sew stand to collar;  |
| No. 2 - Top stitching both fronts pleats;                                 | No. 18 - Top stitching joint of collar with stand - mark the centre; |
| No. 3 - Top stitching upper pocket edge - sew pocket on the front;        | No. 19 - Sew collar along the neck;                                  |
| No. 4 - Preparation of loops - fold the pleat at back - insert the loop;  | No. 20 - Counterstitch collar - insert label;                        |
| No. 5 - Sew and top stitch yoke to back;                                  | No. 21 - Fold/sew cuffs with interlining - stitch around the cuffs;  |
| No. 6 - Sew shoulders;  | No. 22 - Trim - turn and press the cuffs;                            |
| No. 7 - Bind along the sleeve slit;                                       | No. 23 - Topstitch around cuffs;                                     |
| No. 8 - Sew sleeves along armholes;                                       | No. 24 - Sew cuffs with bottom sleeves;                              |
| No. 9 - Overlock armholes;  | No. 25 - Counterstitch along cuffs;                                  |
| No. 10 - Top stitching around shoulder and yoke;                          | No. 26 - Fold/sew bottom.  |
| No. 11 - Form/sew pleat on bottom sleeve;                                 |  |
| No. 12 - Sew side seams;  |  |
| No. 13 - Overlock side seams from op. 12;                                 |  |
| No. 14 - Fold/sew stand with interlining stitch around collar outer edge; |  |
| No. 15 - Trim-turn and press collar;                                      |  |
| No. 16 - Top stitching around collar;                                     |  |

ANNEX IV

Workload for Process of Jeans (Adults and Children)

Operation time at each working station is 2.00 minutes

Basic Production Data

- Production item	:	Jeans for adults and children.
- Design	:	Two side pockets, coin pocket, two hip pockets, zipper fly, six loops.
- Used material	:	Home made 100% from Musoma Textile Ltd. and otherwise 100% cotton from Urafiki but this is somewhat light.
- Operation time	:	Cutting sect. 5 minutes Sewing sect. 54 minutes Finishing sect. 5 minutes
		<u>Total 64 minutes</u>

Ratio Time Allowance already included for: Breaking of thread;  
Rewinding of spool;  
Handling.

Ratio Time Allowance for personal needs not included: (please refer to page 23 - Introduction to the Annexes III to X for Workload).  
Moreover for this specific process should be considered that the machines at UGL are not the ones appropriate for jeans processing, some operation are made in two operations for lack of the proper machine.

- |  |   |
|--|---|
| No. 1 - Overlock according design on the chart;                        | No. 15 - Sew the front crotch and reinforce end of fly;                             |
| No. 2 - Iron/fold back and coin pockets;                               | No. 16 - Sew left side seam;  |
| No. 3 - Draw and topstitching back pockets;                            | No. 17 - Sew right side seam;   |
| No. 4 - Topstitching coin pocket and sew it on the side pocket facing; | No. 18 - Topstitch left side seam;  |
| No. 5 - Sew facings on side pocket lining;                             | No. 19 - Topstitch right side seam;   |
| No. 6 - Sew pockets on the fronts and trim the seam allowance;         | No. 20 - Sew crotch and topstitch;  |
| No. 7 - Turn inside pocket lining and topstitching along the edge;     | No. 21 - Sew inner legs;  |
| No. 8 - Sew the pocket edge around the front, mark the size on lining; | No. 22 - Prepare loops;   |
| No. 9 - Sew yoke to the back, topstitching;                            | No. 23 - Press to measure the belt;   |
| No. 10 - Sew the back pockets, insert label;                           | No. 24 - Attach the belt from inside;   |
| No. 11 - Same operation as the one on No. 10;                          | No. 25 - Sew termination of belt, counter stitch the belt, inserting the six loops; |
| No. 12 - Attaching left fly, topstitching, attach the zipper;          | No. 26 - Fasten/sew the loops on the upper side of the belt;                        |
| No. 13 - Sew the zipper along the right fly and topstitching outside;  | No. 27 - Hemming the bottom.  |
| No. 14 - Topstitching the shape on the fly;                            |   |



ANNEX V

Workload for Process of Men's Trousers Style No. 5

Operation time at each working station is 2.00 minutes

Basic production data

- Production item	: Trousers for men;
- Design	: Two side pockets, one hip pocket, zipper:
- Used material	: Blended fabric, imported;
- Operation time	: Cutting sect. 5 minutes
	Sewing sect. 52 minutes
	Finishing sect. 10 minutes
	<u>Total 67 minutes</u>

Ratio Time Allowance already included for: Breaking of Thread;  
Rewinding of spool;  
Handling.

Ratio Time Allowance for personal needs not included: (refer to page 23  
- Introduction to the Annexes III to X for Workload).  
The quality standard of this trousers is below medium and advisable  
for the home market.

- |   |  |
|---|--|
| No. 1 - Overlock front and back panels;   | No. 15 - Topstitch on side seams<br>and mark position of loops;                                |
| No. 2 - Sew facings on pockets - sew<br>pockets to the front - turn<br>inside;    | No. 16 - Preparation of loops, attach<br>the reinforcement at the<br>ends of belt;             |
| No. 3 - Topstitch edge of pocket, fasten<br>facings on pocket lining;             | No. 17 - Press/fold belts with gauge,<br>fold belt lining one side<br>2 cms. the other 4 cms.; |
| No. 4 - Trim pocket seams, turn, fasten;  | No. 18 - Sew belt inserting loops<br>on the marks;   |
| No. 5 - Sew rear darts, mark pocket level,<br>sew pocket velts;                   | No. 19 - Attach fasteners;   |
| No. 6 - Cut pocket mouth, turn inside<br>welt, fasten terminations;               | No. 20 - Sew lining on the belts;  |
| No. 7 - Sew facings on pocket lining,<br>turn pocket inside and stitch<br>around; | No. 21 - Sew inner legs;   |
| No. 8 - Overlock around pocket facing,<br>loopers and pocket lining;              | No. 22 - Sew crotch and termination<br>of right fly on the seam;                               |
| No. 9 - Preparation of flies (right and<br>left) turning and topstitching;        | No. 23 - Fold inside the belt lining,<br>topstitch along outside seam;                         |
| No. 10 - Attach zipper on fly, sew fly<br>on left front;                          | No. 24 - Fasten the upper end of the<br>loops on the edge of the<br>belt;                      |
| No. 11 - Topstitch edge of fly and shape;   | No. 25 - Press open the bottom part<br>of the inner leg seams;                                 |
| No. 12 - Sew and topstitch fly on right<br>front;                                 | No. 26 - Hem the bottom.   |
| No. 13 - Sew front crotch, reinforce<br>termination of fly;                       |  |
| No. 14 - Sew side seams;  |  |

ANNEX VI

Workload for Process of Military Shirt - Style No. 2093/A

Operation time at each working station is 2.00 minutes

Basic Production Data

- Production item	: Military shirt;
- Design	: Two pockets with pleats and flaps; yoke on the back; collar of one piece; epaulettes(Major) on the shoulder.
- Used material	: Home made cotton;
- Operation time	: Cutting sect. 5 minutes
	Sewing sect. 52 minutes
	Finishing sect. 10 minutes
	<u>Total 67 minutes</u>

Ratio Time Allowance already included for: Breaking of thread;  
Rewinding of spool;  
Handling.

Ratio Time Allowance for personal needs not included; (refer to page 23

- Introduction to the Annexes III to X for Workload).

- |  |  |
|--|--|
| No. 1 - Sew pocket pleats and edges;                             | No. 17 - Fold 1 cm. and stitch upper collar also stitch around the collar edge;                  |
| No. 2 - Sew around edges of flaps and epaulettes (Major);        | No. 18 - Trim, turn and press collar;  |
| No. 3 - Turn epaulettes and flaps;                               | No. 19 - Topstitching collar;  |
| No. 4 - Press pockets, flaps, and epaulettes;                    | No. 20 - Attach collar; (mark centre, start sewing from centre and restart from the front edge); |
| No. 5 - Topstitch edge on epaulettes and flaps;                  | No. 21 - Topstitching along collar stand;  |
| No. 6 - Attach flaps at both fronts;                             | No. 22 - Fold 1 cm. and stitch cuffs, also stitch around cuff edges;                             |
| No. 7 - Attach pocket on left front;                             | No. 23 - Trim, turn and press cuffs;   |
| No. 8 - Attach pocket on right front;                            | No. 24 - Attach cuffs and fasten the termination of the slit;                                    |
| No. 9 - Fold downwards the flaps and topstitch the folded edge;  | No. 25 - Topstitch along cuffs;  |
| No. 10 - Sew the yoke on the back;                               | No. 26 - Hem bottom.   |
| No. 11 - Sew shoulders;  |  |
| No. 12 - Binding the slit sleeves;                               |  |
| No. 13 - Set sleeves on the armholes, insert epaulettes (Major); |  |
| No. 14 - Overlock armholes and one side of cuffs;                |  |
| No. 15 - Sew side seams;   |  |
| No. 16 - Overlock side seams;                                    |  |

ANNEX VII

Workload for Process of Overall - Style BF/703

Operation time at each working station is 2.00 minutes

Basic Production Data

- Production item	: Overall (industrial clothes)
- Design	: Trousers and bodice jointed at the waist line; five pockets; collar shirt one piece;
- Used material	: Local cotton fabric;
- Operation time	: Cutting sect. 5 minutes Sewing sect. 58 minutes <u>Finishing sect. 10 minutes</u>
	<u>Total 73 minutes</u>

Ratio Time Allowance already included for: Breaking of thread;  
Rewinding of spool;  
Handling.

Ratio Time Allowance for personal needs not included; (refer to page 23  
- Introduction to the Annexes III to X for Workload).

- |  |  |
|--|--|
| No. 1 - Sew facings on front pockets and fold on pocket lining;                          | No. 17 - Sew bodice centre back, darts and shoulders;        |
| No. 2 - Sew pocket lining from inside, sew pockets on the waist line folding the pleats; | No. 18 - Overlock shoulders, facings and left fly;           |
| No. 3 - Sew rear darts, mark pocket level, stitch velts;                                 | No. 19 - Sew outer edge collar, turn, hem bottom of sleeves; |
| No. 4 - Cut pocket mouth, turn inside welt, fasten termination of pocket mouth;          | No. 20 - Topstitch centre back and shoulders;                |
| No. 5 - Sew facings on pocket lining, turn it in and stitch;                             | No. 21 - Attach collar, counterstitch;                       |
| No. 6 - Overlock front and back panels;  | No. 22 - Attach sleeves;                                     |
| No. 7 - Preparation of both flies, turn in, topstitching;                                | No. 23 - Overlock armholes and side seams;                   |
| No. 8 - Join fly to left side, topstitch edge and outside shape;                         | No. 24 - Sew side seams;                                     |
| No. 9 - Join fly to right side, topstitch, join front crotch, fasten end fly;            | No. 25 - Topstitch around bodice edge;                       |
| No. 10 - Sew side seams;   | No. 26 - Joint sew bodice and trousers along waist line;     |
| No. 11 - Fasten front pockets and on the fly;  | No. 27 - Sew belt at joint;                                  |
| No. 12 - Sew inner legs;   | No. 28 - Cover belt;   |
| No. 13 - Sew crotch and fly end on the seam;   | No. 29 - Hem bottom.   |
| No. 14 - Press flod pocket and belt;   |  |
| No. 15 - Attach the pocket;  |  |
| No. 16 - Sew facings to the front edges;   |  |

ANNEX VIII

Workload for Process of Boy's Suit - Style BSU 001/83

Operation time at each working station is 2.00 minutes

Basic Production Data

- Production item	: Boy's suit;
- Design	: Binding on pleats, back belt, patch pockets, elastic at the waist line;
- Used material	: Imported blended;
- Operation time	: Cutting sect.           5 minutes Sewing sect.           58 minutes Finishing sect.        5 minutes
	<hr/>
	Total                   68 minutes
	<hr/>

Ratio Time Allowance already included for: Breaking of thread;  
Rewinding of spool;  
Handling.

Ratio Time Allowance for personal needs not included; (please refer  
to page 23 - Introduction to the Annexes III to X for Workload).

- |  |   |
|--|---|
| No. 1 - Sew under collar with interlining;                 | No. 18 - Attach collar;                                       |
| No. 2 - Sew around outer edge of collar;                   | No. 19 - Counterstitch collar;                                |
| No. 3 - Trim, turn and press collar;                       | No. 20 - Hem bottom;  |
| No. 4 - Press/fold back belt and pockets;                  | No. 21 - Overlock pocket facings;<br>belt, front and crotch;  |
| No. 5 - Topstitching around collar;                        | No. 22 - Press pockets;                                       |
| No. 6 - Sew the upper edge of pockets<br>and centre back;  | No. 23 - Sew front and back crotch;                           |
| No. 7 - Iron front pleats and binding;                     | No. 24 - Sew facings on front<br>pockets and topstitching;    |
| No. 8 - Topstitch left front pleat and<br>insert binding;  | No. 25 - Sew front pockets;                                   |
| No. 9 - Topstitch right front pleat<br>and insert binding; | No. 26 - Attach belt on the front<br>and topstitch;           |
| No. 10 - Stitch left and right pockets;                    | No. 27 - Sew side seams, insert<br>elastic at the waist line; |
| No. 11 - Fold bottom sleeve, insert<br>binding;            | No. 28 - Attach belt on the back<br>while covering elastic;   |
| No. 12 - Topstitch centre back and<br>back belt;           | No. 29 - Hem bottom and sew inner<br>legs.                    |
| No. 13 - Sew yoke to back;                                 |   |
| No. 14 - Sew shoulders;                                    |   |
| No. 15 - Attach sleeves;                                   |   |
| No. 16 - Overlock centre back, armholes<br>and side seams; |   |
| No. 17 - Sew side seams;                                   |   |

ANNEX IX

Workload for Process of Men's Shirt -  
Classical Style BA/17

Operation time at each working station is 2.00 minutes

Basic Production Data

- Production item	: Classical men's shirt;
- Design	: Collar one piece; short sleeves;
- Used material	: Imported blended;
- Operation time	: Cutting sect. 5 minutes
	Sewing sect. 36 minutes
	Finishing sect.
	Pressing
	<u>Folding 5 minutes</u>
	<u>Total 46 minutes</u>

Ratio Time Allowance already included for: Breaking of thread;  
Rewinding of spool;  
Handling.

Ratio Time Allowance for personal needs not included: (please see  
page 23 - Introduction to the Annexes III to X for Workload).

- |   |  |
|---|--|
| No. 1 - Fold/sew upper collar with interlining;               | No. 11 - Hem bottom sleeves;               |
| No. 2 - Sew around outer edge collar;                         | No. 12 - Sew shoulders;                    |
| No. 3 - Trim and turn collar;                                 | No. 13 - Attach sleeves;                   |
| No. 4 - Press collar;   | No. 14 - Overlock armholes and side seams; |
| No. 5 - Topstitch collar;                                     | No. 15 - Sew side seam and under sleeves;  |
| No. 6 - Topstitch edge of pocket and the band on interlining; | No. 16 - Attach collar;                    |
| No. 7 - Press the pocket;                                     | No. 17 - Cover collar insert label;        |
| No. 8 - Topstitch left front edge;                            | No. 18 - Hem bottom.                       |
| No. 9 - Sew pocket on the shirt;                              |  |
| No. 10 - Sew yoke with back;                                  |  |

ANNEX I

Workload for Process of Men's Shirt -  
Classical Style BFS/82

Operation time at each working station is 2.00 minutes

Basic Production Data

- Production item	: Classical men's shirt;
- Design	: Collar one piece, long sleeves;
- Used material	: Imported blended;
- Operation time	: Cutting sect. 5 minutes
	Sewing sect. 40 minutes
	Finishing sect.
	Pressing
	<u>Folding 5 minutes</u>
	<u>Total 50 minutes</u>

Ratio Time Allowance already included for: Breaking of thread;  
Rewinding of spool;  
Handling.

Ratio Time Allowance for personal needs not included; (please see  
page 23 - Introduction to the Annexes III to X for Workload).

- |   |  |
|---|--|
| No. 1 - Fold/sew upper collar with interlining;   | No. 11 - Sew side seams;                                 |
| No. 2 - Sew around outer edge collar;             | No. 12 - Overlock side seams;                            |
| No. 3 - Trim and turn collar;                     | No. 13 - Topstitch around collar;                        |
| No. 4 - Press collar; fold pocket;                | No. 14 - Attach collar;                                  |
| No. 5 - Sew pocket on left front;                 | No. 15 - Fold/sew cuffs with interlining;                |
| No. 6 - Sew yoke with back;                       | No. 16 - Trim, turn and press cuffs;                     |
| No. 7 - Sew shoulders;                            | No. 17 - Sew cuffs on sleeves;                           |
| No. 8 - Binding the sleeve slit;                  | No. 18 - Topstitch on cuffs and fasten slit termination; |
| No. 9 - Attach sleeves;                           | No. 19 - Cover collar, inserting label;                  |
| No. 10 - Overlock armholes and one side of cuffs; | No. 20 - Hem bottom.                                     |

ANNEX XI

List of Technicians in the Lectures for Design of Industrial Patterns,  
Grading of Sizes, International Standards of Sizes

- No. 1 - Miss S. Ngahyoma;
- No. 2 - Mr. H. Jambia; Attended two lectures
- No. 3 - Mr. O. Kalimanyile; Attended two lectures
- No. 4 - Mr. E. Pontian;
- No. 5 - Mr. K. Elifurana;
- No. 6 - Mr. J. Lyimo;
- No. 7 - Mr. Y. Munish;
- No. 8 - Mr. D. Timuth;
- No. 9 - Mr. C. Liombe;
- No. 10 - Mr. S. Abdul;
- No. 11 - Mr. M. Haule;
- No. 12 - Mr. G. Andrew;
- No. 13 - Mrs. I. Baruti.

ANNEX XII

SYLLABUS FOR LECTURES ON DESIGN

Anatomical Proportional Rules

On developing a pattern for a garment, tailors and dressmakers need to measure the customers' body; a garment made in this way will have a very personal fit.

A pattern or a basic pattern for ready made garments will be constructed accordingly to anatomical proportional rules. On doing so the pattern will be suitable to a large number of customers with general anatomical characteristics.

As a result of anatomical and anthropometrical studies sizes will be divided into groups according to body lengths. The study we are going to follow shows the technology for constructing a basic pattern for men and ladies, according to anatomical rules which means that every part or point of the pattern will be a fraction of circumference or tallness, the Diagram no. 1\* shows the proper division of the body for the construction of a pattern for industrial made garments. The tallness of the body is 176 metre for gents. The tallness of the body is divided by 7.5 parts according to the Canon of POLICLETO; the result of the division which is 23.5 cm will be the development modulus we will use for the construction of the basic pattern of our study.

Construction of Basic Pattern for Men's Trousers

Introduction

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

Measurement of the size:

- Hip circumference  $96 \text{ cm} = 48 \text{ cm semi-circumference}$ ;
- Waist line circumference  $84 \text{ cm} = 33 \text{ inches}$ ;
- Tallness of the body  $176 \text{ metre} - 7.5 = 23.5$ ; Development modulus  $23.5 \text{ cm}$ ;
- Symbol of size 33 namely the waist line circumference.

---

\* Diagrams no. 1 and 2: the diagrammes cited herein were left with UGL, attached on the wall; they are demonstrative cardboard sheets.



FRONT PART OUTLINE OF MEN TROUSER. (Style tight) Diagram no. 2\*

- POINT 1:- Trace a 40cm horizontal line and 120 cm vertical line, mark the angle no. 1.
- POINT 2:- From point 1 along the vertical line go down the modulus measurement plus 2cm = 25.5cm and trace a 40cm horizontal line.
- POINT 3:- From point 2 along the vertical line go down one modulus measurement equal to 23.5cm and trace a 40cm horizontal line.
- POINT 4:- From point 3 along the vertical line go down a modulus measurement = to 23.5cm and trace a 40cm horizontal line.
- POINT 5:- From point 4 along the vertical line go down a modulus measurement = to 23.5cm and trace a 40cm horizontal line.
- POINT 6:- From point 5 go down half the modulus measurement equal 11.8cm and trace a 40cm horizontal line.
- POINT 7:- In the middle between point 3 and 4, trace a 40cm horizontal line.
- POINT 8:- From point 1 along the horizontal line advance half the hip semi circumference equal 24cm, from point 8 down ward trace a vertical line till the line from point 6; mark the crossings 9, 10, 11, 12, 13, 14 (from up to down).
- POINT 15:- From point 9 advance  $1/12$  of 48cm equal 4cm.
- POINT 16:- In the middle between point 15 and 2.
- POINT 17:- In the middle between point 14 and 16.
- POINT 18:- Place the ruler on to the points 16 and 17 and starting from points 17 upwards trace a vertical line untill the line from point 1, mark this crossing point 18.

POINT 19:- From point 9 go up a  $\frac{1}{4}$  of the distance between 8 and 9 equal 6.4 cm by a curved line joint 15 to 19. Trace oblique lines from point 15 to 17 and from point 2 to 17.

POINT A:- From point 2 along the oblique line go down 8 cm.

POINT B:- From point 15 along the oblique line go down 8 cm.

POINT C:- From point 5 go inside 2 cm, by a straight line join point A to point C.

POINT D:- From point 14 go inside 2 cm, by a straight line join point B to point D.

POINT 20:- From point 1 along the horizontal line go inside  $\frac{1}{16}$  of 48 equal 3 cm. By a slightly curved line join point 20 to point 2.

NB:- As we said before this style is very tight and there is no need for pleats or darts, Remember, the outline is NET, on cutting it out add every allowance for seams and bottom hem, according to the specific process of production.

#### BACK PART OUTLINE

The back part of a trousers is designed according to the front part. Cut out the front part and place it over a sheet of paper. Shift point 7 on the crossing between the knee line and the side line and point 11 on the crossing between the knee line and the inner leg line.

POINT 21:- From point 20 go outside 1 cm.

POINT 22:- From point 2 go outside 1 cm.

POINT 23:- From point 7 go inside 1 cm.

POINT 24:- From point C go inside 1 cm, design the side line along point 21, 22, 23, 24.

POINT 25:- From point D go outside 2.5 cm.

POINT 26:- From point 11 go outside 2.5 cm.

POINT 27:- From point 15 go outside  $\frac{1}{12}$  of 48 = 4 cm. Design the inner leg line along points 25, 26, 27.

POINT 28:- From point 9 go inside 1 cm.

POINT 29:- From point 8 go inside  $1/16$  of 48 = 3 cms, trace a line from point 28-29.

POINT 30:- Prolong up-ward 2 cm the line from 29; join by a line 30-21.

POINT 31:- From point 28 go up-ward  $1/4$  of the distance between point 28-30 equal 7 cm. Design the crotch, straight from 27 to 15 and curved from 15-31.

Now the back outline is complete Remember that the entire outline is NET on cutting it out add seam and bottom allowances.

NOTE The upper part of the pattern is designed along the waist line, add a normal belt.

OUT LINE OF BASIC PATTERN FOR MEDIUM EASINESS STYLE

On developing the basic pattern of Medium easiness style we apply the same technology as for the outline of tight style, but we have some modifications in order to bring it according the new different style.

Front Part

POINT 1-8:- Half the semicircunference of the Hip plus 2 cm equal to 26 cms.

POINT A:- Cms 12 from point 2.

POINT B:- Cms 12 from point 15.

POINT C:- Cms 3 from point 6.

POINT D:- Cms 3 from point 14.

POINT E:- From point 18 take back-wards 2 cm (The distance between 18 and E is the deepness of the pleat on the front part).

POINT F:- From point E trace a 10 cms vertical line, on forming the pleat point 18 will be placed on point E.

Back Part

POINT E:- In the middle between point 21 and 30.

POINT F:- From point E trace 10cms vertical line parallel to the line 30 - 31.

POINT G:- From point E both sides take one cm. By lines join points

OUTLINE OF BASIC PATTERN FOR FULL EASINESS STYLE

On developing the Basic Pattern of Full Easiness style we apply the same technology as for the outline of tight style, but we have some modifications in order to bring it according to the new different styles.

Front Part

POINT 8:- From point 1 equal  $24 + 4$  easiness = 28 cm.

POINT E:- From point 18, 2 cm backwards.

POINT F:- In the middle between point E and 20.

POINT G:- From point F, 2 cms backwards From points E, F, from point G trace A 10 cms vertical lines. The space between 18 and E is the deepness of one pleat, the space between points F, G is the deepness of the other pleat.

BACK PART

POINTS H-H:- Divide by three parts the distance between point 21 and 30.

POINTS I-I:- From points H-H trace 8 cms vertical lines parallel to the line 30-31.

POINTS J-J: From points H-H both sides take respectively one cm. By lines form the darts joining points J-J to points I.I.

CONSTRUCTION OF BASIC PATTERN  
FOR MEN'S SHIRTS

INTRODUCTION:

On constructing the basic pattern for men's shirts, we will do it on size 48 according to European size which corresponds to size 38 according to English/American sizes. As for tallness it will be made according to 1.76 metre for it seems that the said tallness is the most featured in Tanzanians. Our basic pattern will be used for developint all other sizes by grading it.

The above said size refers to the body and only for technical reference in the designing section of the factory/factorics, because it is custom to indicate the size of the shirt according to the size of the collar namely 14,  $14\frac{1}{2}$ , 15,  $15\frac{1}{2}$ , 16,  $16\frac{1}{2}$ , 17. Those symbols are to indicate the circumference of the collar by inches/but nowadays it is a custom to indicate also the size of men's shirts by cm. namely 38,  $39\frac{1}{2}$ , 41,  $42\frac{1}{2}$ , 44. The above said symbols are the sizes of the collars by cms. Also since short time in men's sportswear shirt, it is custom to indicate the sizes by XS, S, M, L, and XL equivalent to collar sizes 14,  $14\frac{1}{2}$ , 15,  $15\frac{1}{2}$ , 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. One

proper matching could be between body 48/38 with collar 15, but also the body 48 can be matched with the collar 15½ if we wish a looser fitting of the shirt body, and collar 16½ when we wish a tighter fitting of the shirt body.

- (S) Shall Body = Size 42-44.  
 (M) Medium " = Size 46-48.  
 (L) Large " = Size 50-52.  
 (EX) Extra Large = Size 54-56.

#### HOW TO CONSTRUCT A PATTERN FOR MEN'S SHIRT.

SIZE 48 - MODULUS DEVELOPMENT 23.5 cm = TALLNESS 1.1-6:½/5

Trace a vertical line of 30cm and a horizontal line of 70cm mark the angle on your right hand side as point 1 (Top line):

POINT 2:- From point 1, along the vertical line go down 23.5 trace a 70cm horizontal line.

POINT 3:- From 2 along the vertical line go down 23.5 cm trace 70cm. horizontal line.

POINT 4:- From point 3 along the vertical line go down 23.5 cm, and there a horizontal line of 70cm.

POINT 5:- From point 4 along the vertical line go down 1/3 of the modulus = 8cm trace a horizontal line of 70cm.

POINT 6:- From point 1 along the horizontal line advance 1/6 of 48 = 8cm.

POINT 7:- Go-up 2cm from point 6, trace a vertical line. Join point 7 to point 1 by a curved line.

POINT 8:- From point 6 along the horizontal line advance 1/4 of 48+1 cm equals to 12+1 = 13cm.

POINT 9:- From point 8 trace a vertical line until the line from point 2.

POINT 10:- From point 8 along the horizontal line advance 1/4 of 48+1cm equal to 12+1 = 13cm.

POINT 11:- Trace a vertical line until the line from point 2.

POINT 12:- From point 10 advance 1/4 of 48+1 cm equals to 12+1 = 13.

POINT 13:- From point 12 advance 1/8 of 48+1 = 6+1 = 7cm.

POINTS 14,15,16,17:- Trace from point 13 a vertical line until the line from point 5 mark the crossings - 14,15,16,17.

POINT 18:- From point 8 go down 4cm and place the rule over point 7 and 18 and starting from point 7 trace a line 2cm beyond point 18; mark the POINT 19.

POINT 20:- In the middle between point 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 point 14 and point 2, trace vertical line until bottom line mark the crossings from up-down, 24, 25, and 26.

POINT 27:- Go down 2cm from point 23, design the armhole along points 19, 21, 22, 27.

POINT 28:- From point 24 go backwards 1 cm; by straight line join 27, 28, 26.

POINT 29:- From point 13 go down  $\frac{1}{6}$  of  $48+1$  cm =  $8+1=9$  cm by a curved line join point 12 to point 29.

POINT 30:- From 29 go out 1.5cm and trace a line from point 29 to 30. From point 30 trace a vertical line until the line from point 5.

POINT 31:- From point 10 go down 4cm.

POINT 32:- Place a ruler along points 12-31 and starting from point 12 run a line long as the distance between point 17 and 19 in the back side.

POINT 33:- From point 11 go up  $\frac{1}{3}$  of modulus = 8 cm.

POINT 34:- From point 11 go up 2 cm, design the armhole along points 32, 33, 34, 27.

POINT 35:- From point 24 go inside 1 cm; by a line join point 27 - 35 and point 35 - 26 (you can design the bottom round shaped if you wish it).

POINT 36:- Divide in 2 parts the distance between 24 and 3.

POINT 37:- From point 36 vertically to it go up  $\frac{2}{3}$  of the modulus = 16 cm.

POINT 38:- From point 36 vertically to it go down  $\frac{2}{3}$  of the modulus = 16 cm.

POINT 39 & 40: From point 36 both side take 1 cm; by a line join point 37 and 38 39 to 40.

NOTE:- The outline is not add seam allowance when cutting.

### S L E E V E

Trace a 50 cm horizontal line and in the middle of it trace a 55 cm vertical line mark the crossing point 1.

POINT 2:- From point 1 along the vertical line go down one modulus measurement less 4 cm = 19.5 cm.

POINT 3:- From point 2 go down one modulus measurement = 23.5 and trace a 50 cm horizontal line.

POINT 4:- From point 3 go down one modulus measurement = 23.5 cm and trace a 50 cm horizontal line.

POINT 5:- From point 1 advance  $\frac{1}{4}$  of 48 = 12 cm and trace a vertical line until the line from point 2.

POINT 6:- From point 1 go back a  $\frac{1}{4}$  of 48 trace a vertical line from point 2.

POINT 7:- From point 6 go out  $\frac{1}{5}$  of 48 = 9.6 cm and mark the crossing point 7.

POINT 8:- From point 5 go out  $\frac{1}{6}$  of 48 = 8 cm, trace vertical lines from point 7 and 8 until the bottom line (line from point 4).

POINT 9:- The crossing between the vertical line of horizontal line 4.

POINT 10:- The crossing between the vertical line 8 and horizontal line 4.

POINT 11:- From point 8 go down half modulus measurement = 11.8 cm.

POINT 12:- From point 5 go down a  $\frac{1}{4}$  of the modulus = about 6 cm.

POINT 13:- From point 6 go down  $\frac{1}{6}$  of the modulus = 4 cm.

POINT 14:- From point 7 go down  $\frac{1}{2}$  measurement modulus = 11.8 cm. Now trace the head of the sleeve from point 11, 12, 13, & 14. Mark a diagonal line on point 13 to indicate that this is the front part.

- POINT 15:- From point 9 go up 5 cm.
- POINT 16:- From point 10 go up 5 cm, trace horizontal line from 15 - 16.
- POINT 17:- From point 15 go inside 5 4 cm join point 17 to point 14.
- POINT 18:- From point 16 go inside 4 cm; join point 18 to point 11.
- POINT 19:- Mark this point in the middle between point 13 and the vertical line from point 1.
- POINT 20:- From point 19 vertical to it go up 10 cm.
- NOTE: The sleeve outline is NET we have to add seam allowances.

OUTLINE OF COLLAR WITH STAND

STAND

Trace one horizontal line  $21 \text{ cm} + 1 \frac{1}{2} = 22.5 \text{ cm}$  mark point 1 at the starting point and 2 at the end.

- POINT 3:- From point 1 go up 1 cm.
- POINT 4:- From point 2 go up 3 cm and join point 3 and 4.
- POINT 5:- From point 4 go out 1.5 cm.
- POINT 6:- From point 2 go up 1.5 cm.
- POINT 7:- Between point 1 & 2.
- POINT 8:- In the middle between 3 & 4 by a curve line join 5 - 8 and point 6 - 7.
- POINT 9:- From point 6 along the curve line go inside 1.5 cm smooth the corner at point 6.

COLLAR

Trace a horizontal line of same length like point 1-2 = 21 cm mark A & B.

- POINT C:- In the middle between A & B.
- POINT D:- From point B go up 1.5 cm by curve line join D - C.



POINT E:- From point 4 go down ward trace a 4 cm vertical line.

POINT F:- Place the angle of a square on point D and on E side on point E, and starting from point D trace A vertical line 6 cm long.

POINT G:- From point C go down with a 4 cm vertical line; join point E - G and G - F.

NOTE: Point F may be changeble from point D according to fashion.

C U F F S

POINT 1 & 2 Trace a 26 horizontal line and mark no. 1 at the begining and no. 2 at the end of the line.

POINT 3:- From point 1 trace a 7cm vertical line downward.

POINT 4:- From point 2 trace a 7cm vertical line downward join point 3 to 4 by horizontal line smooth the corner at point 3 and point 4.

POINT 5:- From point 2 go down  $2\frac{1}{2}$  cm.

POINT 6:- From point 5 go down  $2\frac{1}{2}$  cm. Point 5 & 6 are the button holes mark.

NOTE: The pattern is net on cutting it out add all sean allowance.

CONSTRUCTION FOR SKIRT BASIC PATTERN

The basic pattern for skirt we are going to design will be constructed on size 44 European size equal to 34 English/American size. Measurement will be the following:

Circumference bust cm 88

Circumference waist line cm 74

Circumference hip cm 104

Tallness metre 1.65

Development modulus = 22cm namely 1.65-7.5. The above said measurement of the size are as tentative for using in the country after a short survey to be conducted by Miss Susan they will be defined accordingly.

FRONT PART:

POINT 1:- Trace a 30cm horizontal line and 80cm vertical line mark the angle no 1. The angle must be to your right hand; This is the top part of the pattern.

POINT 2:- From point 1 along the vertical line go down the modulus measurement equal = 22cm trace a 30cm horizontal line.

POINT 3:- From point 2 along the vertical line go down the measurement of one modulus equal = 22cm, and trace a 30cm horizontal line.

POINT 4:- From point 3 along the vertical line go down 1 modulus and  $\frac{1}{2}$  equal to 33 cm, trace a 30cm horizontal line. The line no. 4 is the bottom line.

POINT 5:- From point 1 along the horizontal line advance  $\frac{1}{2}$  of the semi circumference of hip + 1 cm = 27 cm.

POINT 6:- From point 5 trace down ward a vertical line until the horizontal line coming from point 4, mark the crossing no. 6.

POINT 7:- From point 5 along the vertical line go down 18 cm.

POINT 8:- From point 5 go inside  $\frac{1}{16}$  of 52 equal 3.3, by a curve line join point 8 to point 7.

POINT 9:- From point 1 along the vertical line go down 1 cm, trace a straight line from 8-9. This line 8-9 is the waist line.

POINT 10:- From point 9 go inside  $\frac{1}{5}$  of 32 equal 10.4 cm.

POINT 11:- From point 10, vertical to it, go down  $\frac{1}{2}$  of the modulus measurement equal 7.3 cm.

POINT 12 & 13:- From point 10 both side take 1 cm. Join point 12 & 13 to point 11.

BACK PART.

POINT 14:- Trace a 30 cm horizontal line and 80 cm vertical line, mark the angle no. 14. The angle must be to your right hand but at the opposite side the one of the front part which we have marked no. 1.

POINT 15:- From point 14 along the vertical line go down the modulus measurement = 22 cm and trace a 30cm horizontal line.

POINT 16:- From point 15 along the vertical line go down 1 modulus measurement equal 22cm, trace a 30cm horizontal line.

POINT 17:- From point 16 go down 1 modulus and  $\frac{1}{2}$  of the modulus measurement equal 33cm, from point 17 trace a 30cm horizontal line.

POINT 18:- From point 14 along the horizontal line take  $\frac{1}{2}$  the semi circumference of the hip less 1 cm = 25cm.

POINT 19:- From point 18 trace a vertical line until the horizontal line from point 17, mark the angle no. 19.

POINT 20:- From point 18 along the vertical line go down 18 cm.

POINT 21:- From point 18 go inside  $\frac{1}{16}$  of 52 equal 3.3 cm by a curve line joint point 21-20.

POINT 22:- From point 14 go down 1 cm, by a straight line join point 22-21.

POINT 23-24: Divide by three parts the distance between point 21-22, mark one point 23 and the other 24.

POINT 25-26: From point 23-24 go down  $\frac{1}{2}$  the modulus measurement equal 15 cm, mark one point 25 and the other 26, trace a vertical line.

POINT A - A: From point 23 both side take  $1\frac{1}{2}$  cm and by curved line join points A-A to point 25 and form the dart.

POINT B-B: From point 24 both sides take  $1\frac{1}{2}$  cm and by curve line join B-B to point 26,

NOTE: The skirt out line is NET add every seam allowance on cutting it.

INTERNATIONAL STANDARDS OF SIZES

In the field of Garments we have two Standards of sizes, that is, English/American sizes, and European sizes American/English size are 32, 34, 36, 38, 40, 42, 44, and so on, this numbers in English/American size is to indicate the intire circumference of bust by inches, the others two circumference namely waist line & hip line are according to this measurement and according to anatomical propotions n European sizes are 42, 44, 46, 48, 50, 52, 54, and so on. This numbers indicate the semi - circumference of the bust, the other two circs., namely waist line and hip line, are in accordance to anatomical propotions. The hip circumference in men's body mainly is the some of the bust, but some men have from 2-6 cms. more than the bust around the hip circumference as for waist line there is a grate variety of differences against the bust circumference. This differences are also classified by drops.

The above said rule applies both to American/English and European sizes. In English/American sizes the difference between one size and the next one be it smaller or bigger is two Inches at each circumference. In European sizes the difference between on size and the next be it smaller or bigger is 4 cm at each circumference.

It is custom in both technologies to legthen the pattern on developing bigger sizes and to shorten the pattern when developing smaller sizes. The amount of the above said leghtening or shortening is applied in stand-ard propotion at each portion of the pattern. The quantity of this amount is: 3cm. in European sizes and 1/8 of inchs in English/American sizes.

GRADING.

We call grading the operation by which we develop one size from another althoug in Tangania we use English/American symbols sizes, it is custom to apply tailoring and Industrial technologies by centimetres for this reason we construct every pattern by centinetres and we grade all sizes by centinetres althoug in English/American sizes the difference between one size and another (English/American) is two Inchs in order to bring the range of sizes the nearest possible to the European range of sizes, it is custom nowadays to grade sizes with 1½ Inch difference between one size & another; on doing so also in English/American size the difference between one size and another is equivalent to 4 cm. The phototype of the pattern is made in size 48, when by European sizes and in size 38 when in English/American sizes. In fact the size 48 which is 96cm at the full circumference around the bust is equivalent to size 38 in English/American sizes.



UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

UNIDO

11 March 1983

Request from the Government of the United Republic  
of Tanzania

JOB DESCRIPTION

SI/URT/83/301/11-01/31.7.B

**Post title** Garment Industry Expert

**Duration** 6 months

**Date required** April 1983

**Duty station** Dar es Salaam

**Purpose of project** Short term assistance to the National Textile Corporation with a view to improving the technical operation of Ubungo Garments Limited.

**Duties** Working in close co-operation with the Chief Technical Adviser of Project URT/78/018, the expert will

- Assist in the re-organization of work and material flow to achieve maximum productivity;
- Review and adjust individual operations within each processing line;
- Review and advise on garment construction, lay-out and cutting room practices;
- Advise on procedures, fabric utilization, stock control and spare part usage;
- Define work loads and establish output standards.

The expert will also be expected to prepare a final report setting out the findings of the mission and recommendations to the Government on further action which might be taken.

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Applications and communications regarding this Job Description should be sent to:

Project Personnel Recruitment Section, Industrial Operations Division  
UNIDO, VIENNA INTERNATIONAL CENTRE, P.O. Box 300, Vienna, Austria

**Qualifications**

Experience in the garment industry (particularly cut and sew operations) at senior technical production management level.

**Language**

English

**Background information**

Ubungo Garments Limited with an authorised share capital of Shs. 10.0 million is a garment manufacturing firm owned jointly by the Tanzanian Government through the National Textile Corporation (75%) and the Tanganyika Development Finance Company Limited (25%). The Company, whose construction started in March 1976 and completed in April 1977, is located in the Ubungo Industrial Area of Dar es Salaam. It was incorporated on 21 May 1976.

UGL has an installed capacity of 1.5 million garments of various types per annum. These are produced either from 100% Tanzanian Cotton fabrics or from imported blended fabrics. The entire factory production is currently for the local market substituting for imports. Except for a few other factories which manufacture a small quantity of men's trousers and shirts the rest of the trousers and shirts are either imported or made-to measure by the thousand odd tailors in the country.

Early in 1975, a two-men team from Romania (ICE-ROMSIT State Enterprise for Foreign Trade Bucharest) visited Tanzania and collected data for a feasibility study to establish the company. The study was prepared and accepted by the Government and a technical assistance protocol was signed under which TEXCO would receive Romanian assistance in setting up UGL. Romania supplied machinery valued at T.Shs. 6.123 million (f.o.b. value) and technical assistance personnel.

The total project cost for the company was T.Shs. 15.409 million broken down as follows:

Civil works and design	Shs.	2.806	million
Plant and machinery	"	5.027	"
Freight, insurance, clearance	"	0.720	"
Furniture and fittings	"	0.314	"
Vehicles	"	0.198	"
Industrial furniture	"	1.345	"
Pre-operational and development cost	"	2.980	"
Training fees	"	0.855	"
Technical assistance	"	0.707	"
Design fee	"	0.457	"

Shs. 15.409 million

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The building in which the factory is accommodated was built by the now defunct National Textile Industries Corporation Limited (NATEX) for use as a godown.

The Company started production in July 1977 initially with one shift operation but later on in October the same year went into two shift operation with about 900 employees. Most of the operators were skilled in tailoring having acquired such skills in other tailoring firms in the country. Those who were employed unskilled received training at the factory with the help of Romania experts. The Supervisory level personnel were sent to Romania for training, on their return they formed the nucleus of the Company's factory management. Due to high absenteeism rate and low production performance the Company was forced to revert to one shift operation effective 1 January 1980.

The Company has been facing operational problems resulting in poor financial performance. These are enumerated as hereunder:

- Shortage of suitable shirting and suiting materials and necessary auxiliaries;
- Low labour productivity due to workers' dissatisfaction over low salary scales compared to private garment units and low level of training;
- Slow moving garments during the first two years of operation creating a severe strain on the financial resources of the company;
- Absenteeism during the time the company operated two shifts;
- Frequent changes in garment styles as a result of exposure to wide fashions;
- Too much emphasis on bespoke operations rather than garment mass production.

National Textile Corporation (TEXCO), the major share holder in the Company, has endeavoured to assist in solving its problems. It has directed its other subsidiary companies to sell to UGL suitable suiting and shirting materials in order to satisfy its stitching requirements. This has worked satisfactorily but lack of foreign exchange has also affected the production of such materials as their inputs are imported.

The Government has been approached with a view to getting its assistance in this regard, and some foreign exchange has normally been allocated for purposes of importing polyester yarn and cloth and garment accessories. The supply has, however, not been adequate to cover all UGL's needs.

.../..

TEXCO is still pressurising the Government to make UGL the sole importer of textiles in the country, a function now being performed by the Household Supplies Company (HOSCO) so that the problem of raw material shortage is sorted out once and for all.

There is currently a training instructors course being conducted, through TEXCO, under the training budget of the UNIDO Project URT/78/018. This should improve the operating standards of the factory and is a prerequisite to early follow up of re-organization in mass production methods.

It is expected that the proposed assignment from a garment industry mechanical expert, under the SIS Programme, will enhance the work to be undertaken in this re-organization.



