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**WERNER INTERNATIONAL
MANAGEMENTS CONSULTANTS**

**FINAL REPORT
ON CORPORATE ANALYSIS OF THE
DEBRE BERHAN WOOL FACTORY S.C.
IN ETHIOPIA**

VOLUME I - CHAPTERS I TO III

**GRANTED TO:
UNITED NATIONS INDUSTRIAL DEVELOPMENT
ORGANISATION
GENEVA, SWITZERLAND**

WERNER INTERNATIONAL
MANAGEMENT CONSULTANTS

Reference : Project No. IS/ETH/73/006.

FINAL REPORT
ON
CORPORATE ANALYSIS
OF THE
DEBRE BERHAN WOOL FACTORY S.C.
IN ETHIOPIA

Volume I - Chapters I to III.

Submitted to:

United Nations Industrial Development Organization
Vienna, Austria.

Submitted by:

Werner International
Management Consultants
New York, U.S.A.

January 1975.

WERNER INTERNATIONAL
MANAGEMENT CONSULTANTS

United Nations Industrial
Development Organisation,
Lerchenfelderstrasse 1
A-1070 Vienna, Austria.

January 1975

Dear Sirs,

Re : No. P-74/12, Reg.No. IS/ETH/73/006.

In compliance with our contractual arrangements, we are submitting our Final Report.

During the course of our work we have tried to keep the management of the Debre Berhan Wool Factory fully informed of our activities.

The sincere and full co-operation to which we referred in our interim report continued throughout the remainder of the project.

We would like to express our appreciation for the hospitality and co-operation which we received. The management of the Debre Berhan Wool Factory have worked diligently toward achieving a successful and profitable company and we sincerely hope that our efforts will benefit the company to some substantial degree.

WERNER INTERNATIONAL

S Y N O P S I S .

The following report covers the findings, conclusions, activities and recommendations relating to a corporate analysis of the Debre Berhan Wool Factory S.A. The aim of the project was to furnish assistance to the management of the Debre Berhan Wool Factory S.A., which would result in improving the efficiency of its operations.

The present management is capable and competent and have made commendable progress during the past year to the point where the company is on the verge of making a profit. The lack of working capital is, however, hampering the progress of the company. The infusion of sufficient working capital can move the company into a modestly profitable operation provided most of the numerous recommendations contained in this report are carried out. Capital investment for new machinery, plant expansion or export activities is not required at this time. The present equipment, if properly repaired, is satisfactory for the product lines. There is equipment installed which is idle but this equipment should be ignored for the immediate future.

The blanket market is strong and there are good indications that it will continue to be so for a long period. The management should use the immediate future (18 months) to implement the recommendations and establish a record of profitability. Confidence by the Board of Directors in the future and the viability of the Debre Berhan Wool Factory S.C. is warranted.

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I. INTRODUCTION.

I. INTRODUCTION.

The Debre Berhan Wool Factory is a Government-owned textile spinning, weaving and finishing mill, employing approximately 400 persons. It produces blankets and carpets. The primary raw material is wool/man-made fibres waste.

Production began in the year 1964/65. The company has incurred losses annually although for a short period during 1967/68 a profit was achieved. Under new management during the past 18 months the company again reached a break-even or marginal profit this summer (1974).

Prior to the recent improvements which have taken place, it was decided to have a corporate analysis conducted of the total company with the aim of furnishing assistance to the company which would improve the efficiency of its operations.

In greater detail, the objectives of the analysis were :

- To examine in detail the manufacturing facilities and production methods, the marketing organization and methods, the financial controls and cost accounting and the management organization, their functions and their effectiveness.
- To identify the ways in which profitability can be improved.

- To analyse the problems which confront the company and determine the inter-relating effects on the total company operations.
- To develop a detailed programme of activities which can be applied in a practical manner which will result in the financial improvement of the operations.

The following report reveals our findings, our conclusions and our recommendations relating to the numerous items which were examined. The report also includes the work which was implemented in the manufacturing and costing during the period of our stay in Ethiopia plus an outline of procedures to follow to continue the implementation work.

After conducting our preliminary survey, we decided that, in addition to fulfilling our objectives, we could actually implement, with the co-operation of the company management, some of our recommendations. The two areas, Production Standards and Standard Costing, were selected because we felt jointly with management that the installation of these two programmes would provide the greatest benefit to the company. Consequently, the implementation of this work was initiated and outlines of procedures to follow were drawn up. Instruction time was applied to selected personnel so that the programmes as outlined could be completed in due time by the Debre Berhan Wool Factory Personnel.

There are numerous recommendations made throughout the report accompanied by reasons for our conclusions and recommendations. An index to these recommendations has also been compiled in the appendix in summary form.

II. EXECUTIVE SUMMARY.

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II. EXECUTIVE SUMMARY.

1. Capital Investment.

An estimated capital investment of E.£. 630,000.- in working capital is required to bring the company to its full potential. This is required principally to purchase raw material and machinery supplies.

2. Short range Plan - 18 months.

Concentrate on blanket production and secondarily on carpets. Do not invest in any new production equipment or new products. Work toward the goal of achieving a solid and continuous profit for a period of time before making new basic changes.

3. Exports.

We do not recommend any investment be made during the next 18 months to develop exports. If requests are received at profitable prices, they should be considered. Exports should never exceed 3% of productive capacity to one client. Until the company has an export marketing organisation, exports should not exceed 5%.

4. Manufacturing Division.

a) Uniformity of Equipment.

With the exception of carding and spinning, the equipment is reasonably uniform and is considered suitable for the products made.

b) Maintenance.

The quality of maintenance in general is poor. No preventive maintenance is in existence.

c) Utilisation of Equipment.

The following equipment is idle :

raw wool scouring range (scouring section),
Hacoba pirn winding equipment,
10-Lenz looms,
2 inspection perchs,
milling machine,
twoblade shearing machine,
rotary press,
Montfort semi-decatizing machine,
rolling stand.

d) Balance of production and imbalance of equipment.

There is an imbalance of production between the spinning and weaving. The carding and spinning run three shifts, the blanket weaving runs two shifts. The remainder of the equipment in finishing is reasonably well balanced on a two shift basis with the weaving.

We do not recommend the purchase of additional processing equipment at the present time.

e) Obsolescence.

None of the equipment can be considered as being obsolete. We do not recommend that any of the equipment be scrapped as obsolete. Even the equipment which is idle may, in future, have some use.

The only machine that appears to have no value whatsoever for the future of the mill are portions of the wool scouring machine and even here the first part of the machine the hopper is planned to be used in the blending process. The latter part of the machine, the dryer, is presently being used to dry the dyed raw material. The only part of the machine which is not being used is the scouring area. We see no advantage in dismantling and scrapping this machine at the present time. It has virtually no commercial value in the country and none abroad.

f) Spare-parts and supplies.

The number of spare-parts on hand are in general insufficient. In some instances the lack of supplies is adversely affecting production. This applies to carding, spinning, weaving and carpet weaving.

g) Production programme.

The production programme must be handled by factory management. This is being done presently on a day to day basis due to the low raw material inventory position. This should be done on a weekly basis but can only be done when there is sufficient raw material supply to plan for this period of time. The manner in which the planning is done is satisfactory.

h) Raw material.

The primary raw material as mentioned, is in very short supply. It must be recognised that for this type of work the raw material is extremely varied and cannot be otherwise. It is necessary for a good running mill to have a large stock of raw material from which to draw in order to maintain a steady flow of material and as consistent a blend as possible.

The United Kingdom is the best source of supply for this type of raw material. However, we recommend that at least 15% be purchased from Belgium, because of the constant threat of strikes and late delivery from the U.K.

Dyestuffs and raw materials. The stock of dyestuffs is intolerably low. It is impossible to operate efficiently with such limitations. It is recommended that a year's supply of these basic materials be kept in stock.

ij Raw material Store.

Some of the area which should be used for raw material store is being used for spare-parts, chemicals and old waste. All of this should be removed to other locations. Plans have been made to do so.

k) Pulling.

This process is operating reasonably well. The machines must however be maintained with more care and greater frequency. When the main machine in this department is stopped, the consequences for the mill are drastic.

1m) Blending.

There is insufficient blending bin capacity. Plans have been made to construct additional blending bins. There is no buffer stock between the blending and carding. We concur that six additional bins behind the cards would be very advantageous.

The hopper-feeder already mentioned is planned to be installed as a feeder to the blending machines. This is a good plan and should be carried out.

n) Carding.

The carding machines have been given a great deal of attention by the present factory management. This process is not only the bottle-neck of the mill, it is also very vulnerable. In spite of the tremendous attention which has been given to these machines, they still are in rather poor shape due to the fact that there are many replacement parts which are not in stock. These machines need to be completely overhauled and repaired where necessary with new parts. An estimate of E.₯. 100,000.- during a two year period is required.

Calculations show that when the machines are properly maintained and properly supervised, an efficiency of 71% can be achieved.

The production for August '74, which was the highest production in recent years, was about 20% below this figure.

It has been agreed that it is possible before the replacement parts are received, to reach 10% below the 71% figure, i.e. 63.9%, which would give 21.343 kg per week of Nm. 1.5, in quality 1800.

op) Carding/Spinning Balance.

The spinning machinery is not in exact balance with the carding. One side of one of the spinning machines balances one of the cards.

Improved material handling at doffing and more condenser bobbins and spinning bobbins are required to bring the efficiency of this operation up to an acceptable level.

Considerable time was spent in the carding and spinning processes and many calculations were made since this is the crucial point of the mill's potential productivity.

It is essential that the maximum amount of production be put through the carding process. The spinning process has a slight excess in capacity to the carding.

q) Cop winding.

These machines are in need of maintenance. The capacity is adequate on a two-shift basis. Improvement can be made in some instances by reduction of speed.

r) Cotton twisting.

This department should be the least troublesome in the mill. However, it is a bottle-neck process and attention to the working method must be given.

The efficiency can be definitely improved. Because this is a simple process, very little supervisory attention has been given to it and sometimes the poorest workers have been placed on this machine.

s) Warping.

These machines also require maintenance. The machine only runs one shift and has ample capacity.

t) Weaving.

The blanket looms are old but satisfactory for the work required. Maintenance could be improved. The most important productivity items are that additional shuttles are required, the supply of weft is not well organised, and the warps are poor.

u) Nappage. (Mending).

A completely new method of inspection is being planned in the Nappage Department. We concur with this new method. The mending of single warp yarn will be eliminated. This will reduce the number of workers. The quality of the fabric will not be reduced.

v) Finishing.

The scouring, suction, dyeing, hydro-extracting, thermo-fixation, raising, tentering are all running reasonably well. There is excess capacity at each process. These machines are generally maintained at break-down only and they are in reasonably good condition with the exception of the raising machine which requires constant attention and maintenance of the wire clothing.

w) Making-up.

The making-up department is almost all handwork. In the area of sewing we recommend that an additional sewing machine be purchased so that corner making, which is presently done by hand,

can be done by machine. The result will be an improvement in quality and lower costs.

x) Carpet making.

The productivity is very low due to only one shuttle being used and the use of poor quality cotton binder yarn. Most of the loom stops resulted from yarn breaks in the cotton yarn.

We recommend that the highest quality yarn available be purchased. This would increase the productivity and lower the cost of the manufacture of carpets.

y) Woollen cloth making.

The Lenz looms and some finishing equipment are idle. There are future possibilities for this equipment via the purchase of yarns. However, we do not recommend any action be taken for the next 18 months until the company has been able to digest all of the recommendations and changes which can be made.

Acrylic type dress and drapery fabrics can easily be produced on these looms.

z) Work-shop.

The work-shop is equal in importance to any other section of the mill. It is essential that Debre Berhan Wool Factory have a good work-shop. Two new expensive machines estimated at E.£ 40.000 to E.£. 45.000 each are required. These are a lathe and a milling machine.

Two additional well qualified men are required in the work-shop for maintenance and machine making.

aa) Supervisory Training.

Operator and supervisory training is required throughout the entire mill. However, supervisory training has a priority and must precede any system of training of the workers. The supervisory personnel seem to have good mechanical and technical background, but they lack the training and tradition of supervision. They are not fully aware of their duties and responsibilities.

bb) Organisation Structure.

The changes which are proposed relate to :

- the separation of the Material Preparation Mill from the Spinning Mill,
- the transferring of the Napping (mending) Section from the Finishing Department to the Weaving Department,
- the transferring of the Raw Material Stores Section from the Administration to the Manufacturing.

5. Standards Department.

It has been strongly recommended that a Standards Department be established in the mill. In the chapter entitled "Standards Department" an outline of the functions of this department is given. These cover the establishment of standards in :

processing,
raw material,
waste,
maintenance,
labour unit cost,
productivity.

Details of the work involved in the Standards Department are included in a form which can be utilized as a work programme for installation for the Standards Department.

6. Marketing Division.

a) General Background.

Debre Berhan Wool Factory markets the following products all of which are sold in Ethiopia :

- Blankets - raised wool type manufactured from long fibre waste material,
- Carpeting - woven - pile yarn manufactured from long fibre ,
- Handicraft yarns - from local woollen selected fibres.

Until a year ago the products were not selling well. Today all of the blanket inventory has been sold and the blanket market is firm, absorbing all of the present production of Debre Berhan.

There is still a large inventory of carpeting in various widths and piece lengths. The carpeting market, however, is in reality in the embryo stage.

The handicraft yarn market is very strong. The production limitation is related only to the raw material supply which is very small.

The company markets its own carpets through its own sales organisation.

The marketing of blankets is done through a distribution company called Ethiopian Distribution Company "EDISCO".

b) Organisation Structure.

It is recommended that Debre Berhan Wool Factory market their own blankets via the Company Sales Division. It is our opinion that it is better to own a market than to own a mill, and if you do own a mill then it is essential that you control your own market.

c) Blankets.

The market being strong absorbs all of the present production. Due to the bright colours and designs in the latest range of blankets, Debre Berhan Wool Factory has moved from a position in which it trailed behind its competitors to one where it has become the leader.

Although Edisco were not selling blankets too well up to a year ago, because of a wage incentive which was inspired by the Debre Berhan Wool Factory management, the branch managers of Edisco have managed to sell all of the inventory of the previously unwanted goods.

Edisco have 19 distribution depots of which Addis Ababa sells more than 65%, Asmara more than 12%, Dire Dawa more than 5% and Nazareth almost 4%.

The range of the blankets has been reduced by eliminating some of the non profitable articles.

There are 4 other companies producing blankets. Only one of these produces a similar type of blanket to Debre Berhan. This company, Lazaridis, is producing about the same number as Debre Berhan Wool Factory at the moment. The quality of the Lazaridis blankets is somewhat inferior.

All of the other blankets are made of cotton waste in various forms. Debre Berhan Wool Factory are the most expensive blankets on the market and the best.

From all indications, Debre Berhan Wool Factory could sell all of the 300,000 blankets which could possibly be produced out of the present capacity.

The imports of blankets have declined mainly because of the sharp increase in import tariffs in 1971-72.

The consumption of blankets is over 1,100,000 per annum.

There is a constant increase in the Gross National Product and in the population. The consequence of this is that there is an estimated increase in textile consumption of 4% per year. It is our opinion that it will be higher than this figure and consequently there appears to be a very good continued potential growth in the Debre Berhan Wool Factory type of blankets. Moreover, since this is a higher quality blanket, than the cotton blanket, its potential for growth is greater than the other types.

d) Recommendations.

i) We repeat that we recommend that Debre Berhan Wool Factory market their own blankets.

ii) We recommend a minimum of two designs and a maximum of 4 to be introduced per annum.

iii) A system of market reporting should be instituted so that management is kept informed of all sales activity and market conditions. This is essential when marketing your own blankets. Presentation of the products could be improved. It does not seem to be a problem at the present time but is an area where sales can be maintained when the market conditions become more competitive.

iv) Long range planning. When the mill has reached its maximum capacity of around 300.000 blankets a year and the company is operating at a healthy profit, expansion should be considered in the form of additional carding and spinning in order to balance the weaving capacity.

For very long range planning we recommend that a needle punch machine be considered. This will produce a more fluffy but warmer blanket. It will be necessary to make extensive tests before purchasing such equipment.

e) Carpets.

There are two types of carpets made. One has a 4 mm. pile, the other is 6 mm., which is then cut.

The present selling policy is to manufacture on speculation.

The type of carpeting produced is primarily for the contract sector. It has very little appeal for the domestic market.

The pricing policy is based on 25. E.g. per sq.m. for the 4 mm. loop pile and 35. E.g. per sq.m. for the 6 mm. cut pile. This price remains regardless of how the roll of carpeting is cut. The result has been a large inventory of cut pieces which are very difficult to market. In the year ending August '74 production was almost twice the quantity of sales.

7. Management/Cost Accounting.

a) Organisation.

Only a minor change relating to the raw material store is recommended. This should be placed under the Factory Management.

b) Effectiveness of Management.

The improvements which have taken place during the last year clearly manifest the ability and effectiveness of the current management. The present team of the General Manager and Factory Manager is unusually well balanced, competent and progressive.

c) Management Reports.

The General Manager receives a number of very useful reports relating to :

- sales
- production
- raw material
- cash on hand
- personnel
- transport
- overdue accounts.

d) Recommended changes to Management Reports.

Sales Reports - Additional comparisons.

Overdue account report - Broken down by age of delinquency.

Cost Distribution Report - This report should be greatly condensed.

Product cost Report - Recommend that this report be replaced by a new standard cost report.

e) Recommended new Management Reports.

i) Raw material graphs.

The raw material report in graph form be drawn up. As per the illustration in this report.

ii) Waste report.

A waste report be instituted as per the form illustrated in this report.

iii) Production Reconciliation report.

A reconciliation report similar to the one illustrated in this report be put into operation.

iv) Budget controls.

Budget controls do not at present exist because there is no standard costing which has been set up. When standard costing come into being it is essential that budgets be established.

f) Administration Reports and Records.

i) There are numerous reports in the mills and between the mills and administration. Nearly all of these adequately serve their purpose. In general the reports and records are good. The most important are as follows :

payroll
 production
 input to process
 waste
 finished goods
 inventory record of supplies
 finished goods record of inventory
 raw material inventory
 consignment delivery notes
 credit invoices and cash invoices
 personnel

(The personnel reports and records are singled out for commendation. Some of them are excellent).

ii) Recommendations.

- Payroll - salaries and production report.

It is recommended that all production and payroll reports be established on a two week basis instead of monthly and semi-monthly. All staff employees also should be paid every two weeks.

- Supply records.

Perpetual inventories are maintained of each item in stock. However, minimum quantities are not marked on the record. It is recommended that a person be assigned the task of examining each type of supply item, review the historical volume and estimate the required minimum.

Such a programme would require the attention of one man for a period of approximately six months.

g) Financial Analysis.

i) A reputable accounting firm audits the books. Consequently, the records are in proper order.

The company has consistently lost money on an annual basis since its conception. However, during the year July 1st 1967 - June 30th 1968, the company did reach either a break-even point or a modest profit for a few months.

ii) Working capital.

The company clearly lacks working capital. Main capital requirements are raw material, dyestuffs and replacement parts for the equipment.

iii) Overdraft interest rate.

The overdraft has been reduced from about E.£. 2,000,000 down to less than E.£.1,000,000.- during the past 14 months. Nevertheless, at 9,5% interest, this is a very onerous financial burden for the company to bear.

iv) Inventory levels.

The inventory level of finished goods in carpets is too high. Inventory level of blankets is phenomenally low.

v) Primary raw material.

Primary raw material is too low. The actual inventory of raw material is not sufficient for the type of operation in which Debre Berhan Wool Factory is involved. This type of production requires a blend of many types of waste raw material. In order to achieve the proper blend the raw material must be carefully selected. It is very easy to have an adequate supply of one type and an insufficient supply of a balancing type. We recommend that a minimum of five months supply is maintained. At present, the volume is approximately three months.

vi) Dyestuffs.

The market demand for coloured goods requires that the mill has many dyestuff colours on hand.

We recommend that a full year's usage be retained in stock at all times.

vii) Replacment parts.

The replacement parts in the plant on the operating machinery is much too low. Items which are in daily use and replacements such as bobbins, shuttles, spools are much too low. This leads to inefficiency, waste of time in trying to obtain the parts from the stores and costly running conditions.

h) Purchasing.

The method and control of purchasing is quite good. The follow-up on raw material on order and in transit is excellent.

Recommendation - There are two clerical staff members maintaining the records relating to purchasing, one for domestic purchases, one for foreign purchases. The total work could be done by one person.

1j) Break-even point and profit potential calculations.

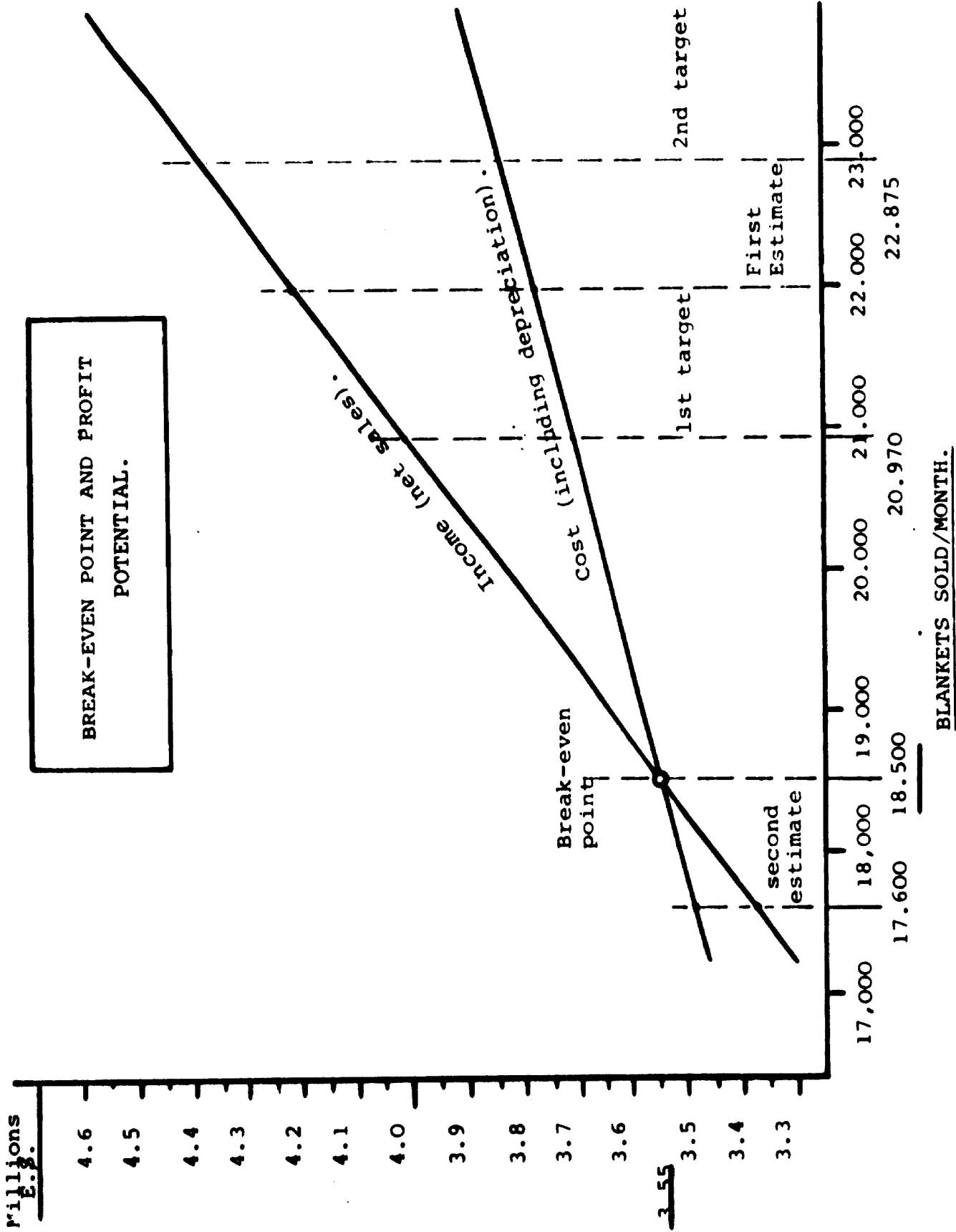
A series of calculations were made to determine if the company could be profitable or reach a break-even point. The result of these calculations showed that the current volume at the current selling prices would produce a profit picture.

Furthermore, a break-even point could be reached at approximately 18,500 blankets of quality 1805 per month.

The capacity of the mill at its first target would be 20970.

Attached is a graph illustrating the break-even point and potential profit.

BREAK-EVEN POINT AND PROFIT POTENTIAL.



h) Analysis of cost System.

Prior to the fall of 1973 there was no proper cost system established whatsoever. Since that period a historical cost system has been installed which is most commendable. The system however is very detailed. It is recommended that this system be replaced by a more simple standard cost system which is outlined in the chapter on Standard Cost System.

lm) Relationship of costs to prices.

It is recommended that the Standard Cost System, as illustrated in the chapter on Standard Cost System, be used to establish product costs.

n) Analysis of premium payment system.

The present set up, where some of the workers are receiving higher wages than others on the same work is, inherited.

The new system has replaced a very loose and unorganised method.

We do not recommend any quick moves regarding the change of incentives or the alteration of the pay rates. We recommend that a very simple approach be taken to the wage incentive system. We suggest that approximately 65% of the production target which is expected from the employee be used as a base pay. Over the base pay an incentive wage would then be applied. New employees would come under the 65% base pay system. Old employees would initially remain at their present actual base pay.

8. Standard Cost System.

a) Present Cost System.

The present cost system is very detailed and based on historical data. This system, however, is a vast improvement over the records which existed a year ago.

b) Recommendation.

A Standard Cost System is recommended which would be based on the standard data which is being established by the Standards Department.

c) Production Standards.

Production standards are based on the bottle-neck process of carding. The calculations of the other processes are placed in balance with the carding.

d) Labour Standards.

This figure has been established and is used for costing purposes. The labour complement can definitely be reduced via training and improved management controls.

e) Waste Standards.

Temporary waste standards have been established.

f) Construction Sheets, Cloth, Blankets, and Carpets.

These vital calculations have now been made on 1805 and on 4 mm. carpets. The company personnel are now able to calculate the remaining styles.

g) Cost Centres.

Only five cost centres will be calculated on the cost distribution sheet.

Material Preparation Mill
Spinning Mill
Weaving Mill
Finishing Plant
Carpet Mill.

h) Cost Calculation Sheets.

A complete set of calculations has been compiled for one quality. The Financial Manager assisted in the compilation of this data and can complete the work for additional styles.

i) Product Cost Calculations.

The product cost formats for spinning, weaving, finishing, blanket making and carpet manufacturing have been drawn up.

k) Cost Distribution Sheets.

Recommendations have been made for a reduction in the amount of work required to compile this report. It will be greatly condensed.

III. DETAILED ANALYSIS OF THE MANUFACTURING DIVISION.

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III. DETAILED ANALYSIS OF THE MANUFACTURING DIVISION.

A thorough analysis of the entire manufacturing division was made. In the following sections each process is analysed. In some instances detailed production calculations are included in order to clarify particular points and to identify the areas to which attention should be given. Recommendations accompany each process.

Reference is made to the important items in each section where they apply, such as "Utilisation of Equipment, "Balance of Production".

Consequently, the following remarks relating to general topics are sometimes elaborated upon in the separate sections on each process.

1. Uniformity of Equipment.

As with most textile mills, there are many processes where there are only one or two machines, and consequently, uniformity of equipment is not a particular problem.

a) Weaving.

This area has the greatest number of machines. There is a reasonable uniformity of equipment. In this department there are three types of looms suitable for blanket weaving, and only one type which was purchased specifically for apparel cloth. The distribution of looms is reasonably good.

<u>Loom Type.</u>	<u>Width.</u>	<u>Number.</u>
Schönherr - dobby 4x4	200 cm	29
Snoeck - dobby 4x4	200 cm	6
Lainière de Sclessin - jacquard 4x4	250 cm	6
Lenz - dobby 4x1	180 cm	6
Lenz - dobby 4x1	180 cm auto	4

The present equipment is suitable for the type of goods being produced.

b) The cop-winding equipment was selected to service the looms and consequently there are two different types of cop-winders. This is quite proper and they are suitable for the purpose.

c) Carding and Spinning.

There is a lack of uniformity in the carding and spinning equipment. Furthermore, there is an imbalance between the carding and spinning processes. The three cards are each different from the other and the three spinning frames are different. One side of one frame is in balance with one of the cards. The remainder of the cards and spinning do not balance properly. However, the machines cannot be made more uniform without a significant investment in modifications and such action is not recommended. Modifications to the cards are recommended but this is only on a basis of re-conditioning and overhaul.

d) Other processes.

With the exception of minor alterations which are itemised in the sections on each process, no recommendations are made for expenditures which would result in more uniform equipment.

2. Maintenance.

The quality of maintenance is not uniform throughout the mills. In general it is poor. Furthermore, there is no preventive maintenance programme in operation in any department. Much of the major maintenance is left up to the work-shop personnel. All major replacement and repair jobs are done by the work-shop personnel. There is a definite lack of proper equipment in the work-shop which adversely effects the quality of the

maintenance being done. The chapter in this report on work-shop provides a more elaborate review of this problem.

There is no preventive maintenance programme for the work-shop to check any machinery. There are no written instructions. The electrical shop does the checking of the electrical installations and the oiling of motors on their own. They have no checking schedule.

The production departments have no order books to order the services of the mechanical shop.

There are differences in the mill between the various departments :

a) The carding spinning sector.

The major effort in the mill should be put into this department - particularly to the cards.

According to the spare-parts store records, very little was done during the last 3-4 years.

Waiting until a breakdown occurred and then making a repair has become too much a way of life in the department.

The spare-part catalogues and the drawings of the cards were always kept in the Factory Office.

The General Foreman cannot read the drawings and catalogues because they are in French. (Machinery made in Belgium and in France).

b) Weaving.

Maintenance of the warping machine was neglected.

The looms were taken care of by the floor management. The Weaving General Foreman follows the conditions of the looms and writes up lists of spares and accessories to be ordered.

The maintenance in the weaving is at present not so critical because the department has extra capacity compared to the spinning.

There are presently always spare looms available. If a machine breaks down, the operator is transferred to another machine and no man-time or production is lost.

One loom represents only 2,4% of the capacity in weaving but, because there is spare capacity, a breakdown of 1 loom does not mean a loss in production of 2.4%.

In the carding a break-down stops one third of the production. In this case, all the kilos are lost because there is no spare capacity and the department is working on three shifts.

c) Finishing.

There is no maintenance programme in the department.

d) Other Equipment.

Maintenance of other equipment varies. Cop-winding and other preparatory equipment is not well-maintained. In almost every area, the maintenance is done when the machine breaks-down and is never maintained on a routine basis to prevent break-down.

e) Preventive Maintenance Programme.

Such a programme is strongly advocated.

3) Utilisation of Equipment.

Incomplete utilisation of equipment is brought about in two ways :

- a) equipment which is idle due to lack of orders or not necessary for the current products,
- b) imbalance of machinery.

Idle equipment : there is idle equipment in various parts of the mills.

<u>Type of Equipment.</u>	<u>Remarks.</u>
Raw wool scouring range.	<p>This equipment as a full range is not suitable to the current or foreseeable future production of the mill. However, the Hopper is planned to be used to provide an improved feed to the Blending Process. We endorse this plan.</p> <p>The dryer section is being used to dry the raw material which is being dyed. As an even higher percentage of material is planned for dyeing in the future, this drying capacity becomes more and more important. Certainly, to purchase a dryer for this purpose, when the scouring range exists, is not wise. The fact that there is a portion of the machine which is idle does not warrant dismantling it. It is very unlikely that such a machine could be sold in Ethiopia, and it certainly has no interesting market value outside the country.</p>
Lenz looms.	<p>These looms were purchased for the manufacture of cloth. We recommend in the marketing section that in a period of 1-1/2 to 2 years that development of acrylic-type cloths be considered. Until the management has had</p>

time to absorb and adjust to the numerous changes which should be made during the next two years, there should be no attempt made to utilise these looms. We do not recommend they be sold unless a very good price was received and the corresponding finishing equipment was sold as well. They do not restrict the flow through the mill and the space they occupy is not required immediately.

It is conceivable that a new company could be formed for the purpose of producing apparel and other cloths and these looms could form the nucleus of such an organisation.

Finishing Equipment.

Inspection perch.
 Rope scouring machine.
 Milling machine.
 Tentering frame.
 2-Blade shearing machine.
 Rotary Press.
 Montfort semi-decatizing machine.
 Rolling stand.

These machines were purchased primarily for cloth finishing. There is no current demand for these machines in the country and the external resale value is very low. There is no advantage in dismantling this equipment. The space is not needed and there may be future opportunities when such equipment could be used.

Much of the idle equipment is almost completely written-off. Its value is relatively low, and in most cases nil. We recognise that it is a wise fiscal policy to try to utilise all the equipment wherever possible. However, only if such utilisation is profitable. For the next twelve months, the management of the Debré Berhan Wool Factory will be fully occupied with other problems of much greater importance than the idle equipment. Consequently, for this period of time we recommend that management ignore the annoying existence of idle machinery.

4. Balance of Production.

This important factor is directly related to the Imbalance of Equipment. Maintaining a proper balance of production throughout a textile mill is a constant struggle. The numerous changes which can take place all tend to upset the balance of production even in the most scientifically planned mills. The present balance of production is three shifts in carding and spinning, and two shifts in cop-winding and weaving. Clearly, the looms could absorb the production of another card and spinning frame, which is our recommendation for the first stage of expansion. Most of the finishing equipment has excess capacity which can also easily absorb the production of another card. However, there is a potential bottle-neck in washing equipment. Further expansion in washing will demand additional equipment. At the moment there is no necessity to contemplate such additional equipment.

The balance of production and utilisation of equipment is calculated at almost each process in this report and shown in detail in the individual process section.

We do not recommend the purchase of additional processing equipment at the present time. We do recommend that an additional sewing machine be purchased to supplement the present machines.

5. Obsolescence.

None of the equipment which is being utilised can be considered as obsolete under the present production programme. A machine is obsolete only when it fails to perform satisfactorily, does not give the required quality, or becomes so costly to operate that it can be replaced with a less costly machine. None of the equipment utilised falls under this category.

The idle equipment is obsolete only because there is no demand for its usage. The machines are quite suitable for certain products.

The only machine that could be considered for scrap is the washer section of the scouring range. We see no advantage in spending money on such an exercise when neither the scrap has any real value nor the floor space required for any other purpose.

6. Spare-Parts & Supplies.

The number of spare-parts on hand are in general insufficient. It is recommended that the mill purchases the following items as soon as possible :

- 120 shuttles, cost approx. E.£. 2,400.-
- Spinning frame bobbins for frames 1,2 A and 2 B. At least 50% are damaged. Optimum size packages cannot be made and as a result the efficiency in spinning and cop-making is reduced.

Total number of bobbins required :

344 in frames,

2,000 night shift reserve (spinning 3 shifts, cops 2 shifts)

344 empties for doff.

2,688

+ 50% extra = 4,000

Half of this quantity - 2,000 - needs renewing during the next two years at an estimated cost of E.£. 8,000.-

Recorders for cards, at an estimated cost of E.£.1,000.-

All 3 cards should have counters that record the machine stopped time and the running time.

The incentive scheme for the carding department can be based on the counter readings.

Pick counters for Schönherr at an estimated cost of E.£. 4,000.-

20 counters are broken and there are no spares available. Second hand counters can be used.

Condenser bobbins for the cards.

Card clothing belts, chains, bearings are required for all three cards. Estimated cost for overhauling all three cards = approx. E.£. 100.000.--

It is recommended that the minimum stock level for spare parts be one year's requirements.

Action to be taken.

- a. For all items check the consumption per year,
- b. This figure will represent the "order point",
- c. Write the order points in the cards,
- d. Have the store keeper report all order points reached.

Spare-parts Store.

The spare-parts store is in good order and the records are well kept.

7. Production Programme.

Any production programme is effected by the market demand, the type of goods produced, the delivery promises and the variety of products. In the Debre Berhan Wool Factory a very desirable yet difficult situation exists. All of the blankets are produced on speculation. Consequently, there is no requirement to co-ordinate the production with the sales. The production programme becomes one which the marketing feel can be sold. Specific production orders are not sent to the mill. The production plan is reviewed periodically by the General Manager and the Factory Manager and production continues as capacity permits. The exceptions are specific orders for the military.

Furthermore, it is not possible, even in the production planning to decide in advance upon the colours. The volume of each colour is decided upon by the colours available in the raw stock. Consequently, this normally important and difficult work is eliminated in Debre Berhan Wool Factory.

The general overall plan is decided upon periodically as mentioned above. The detailed planning is done on a day to day basis according to what is available in the raw stock and the yarn store. This planning can be vastly improved by having a larger raw stock from which to select material. At present the Factory Manager is obliged to spend a considerable part of each day occupied in this task. The job could be reduced to a couple of hours once per week with an adequate supply of raw stock.

It is necessary for the planning to be done by the factory management of the mill on a daily or weekly basis. We recommend however, that the Assistant Factory Manager be trained in this task. This work requires a considerable degree of experience and this can only be transmitted over a period of time.

8. Raw Material.

a) Primary raw material.

Frequent references are made to raw material in this report. The reason is that the raw material in the Debré Berhan Wool Factory type of blanket mill is of much more relative importance than most mills. The variety of the raw material is almost infinite. The combination of raw materials varies even under the best of supply materials. Maintaining as constant a blend of materials as possible becomes very important. Running conditions throughout the mill are affected by the blend. There is nothing which can affect a mill so adversely as improper blending. Consequently, we strongly advocate a larger stock of raw material in order to maintain as consistent a blend as possible.

The present source of raw material, the United Kingdom, is, to our knowledge, the best. However, it should be recognised that the labour unrest in shipping and transport in the UK can create great difficulties for Debre Berhan Wool Factory if all the raw material is being supplied from that source. We therefore, recommend that Belgian sources be developed and that approximately 15% of the supply be purchased from that country, even if the price is somewhat higher.

b) Dyestuffs and Chemicals.

The stock of dyestuffs is intolerably low. It is impossible to operate efficiently with so little dyestuff. Most of the dyestuffs and chemicals are imported from Europe.

It is recommended that a year's supply of imported materials and 4 month's supply of local materials be kept in stock.

Following is an estimate of the dyestuffs and chemicals required.

DYESTUFFS AND CHEMICALS TO BE STORED IN THE MILL.

Dyestuffs or Chemicals	Source	Consumption per year/kg	Price E.£. per kg.	Price per year E.£.	Value of storage kept in mill. E.£.
Direct dyestuffs	Import	3,000	8.00	24,000	24,000
Union dyestuffs	Import	500	10.50	5,250	5,250
Cathionic Dyes	Import	2,000	25.00	50,000	50,000
Acetic Acid	Import	3,000	3.00	6,000	6,000
Levelling Agent	Import	2,000	3.00	6,000	6,000
Common Salt	Local	30,000	0.20	6,000	2,000
Soda Ash	Import	3,000	0.50	1,500	1,500
Ammonium Sulphate.	Local	1,000	0.40	400	400
Teepol/Detergent	Import	3,000	2.00	6,000	6,000
Total		47,500		105,150	101,150

9. Raw Material Storage.

a). Present floor space utilisation.

The floor space is poorly utilised. 50% of the floor space in the area originally built as a raw material store, is occupied as follows :

1. Spare parts store occupies bays 1 and 2 (see attached floor plan).
2. Old spare parts occupy bays 8 and 9.
3. Chemicals occupy bay 10.
4. Bays 11, 12 and half of 13 are occupied by old waste.

b) Recommended action to be taken.

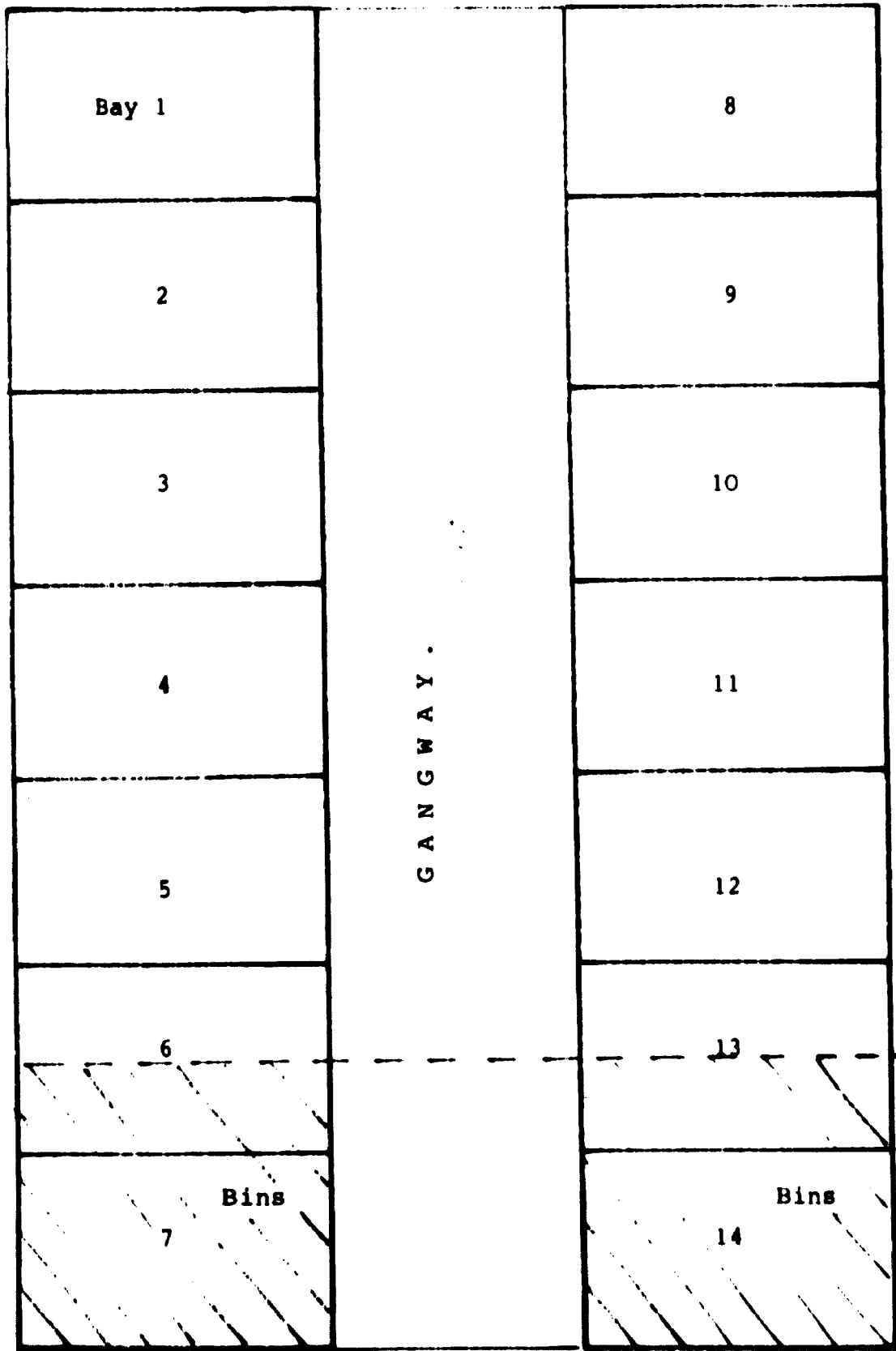
- Move out old spare parts store,
- Move out spare part store,
- Move out chemical store,
- Gradually sell or move the old waste off the premises.

New locations for the above stores were discussed with the management.

Management have a feasible plan to employ the shower rooms and other facilities which have never been utilised for the spare parts and supply stores.

The raw material storage capacity per bay is ca. 40.000 kg. The actual storage capacity can be calculated as 50% of the total since new material cannot be stored until the old lot is used. Consequently, the additional new storage capacity (0.5 x 7.5 bays x 40.000 kg = 150.000 kg) which is sufficient for the increased raw material quantity recommended.

Loading Door.



10. Pulling.a) Present Production.

The pulling production of August was analysed in detail. There are two pulling machines :

- Autefa (two cylinders) which is used to pull imported material,

- Duesberg/Bosson (one cylinder) which is used to pull own yarn waste only (mainly weaving returns).

Material pulled.	Imports.	Own waste	% of total input.
Carpet thread	5,408		14.00
Tricot	9,219		23.90
Blanket ends	13,137		34.10
Weaving returns		9,003	23.40
Blanket cutting		1,622	4.20
Nappage returns		161	0.40
Total	27,764	10,786	100.00
Grand Total	38,550		
Percentage	72%	23%	100%

Kilograms produced in August 1974	38,550
Machine hours	
- worked	336.4
- idle	117.7
- total	<u>454.1</u>

b) Productivity.

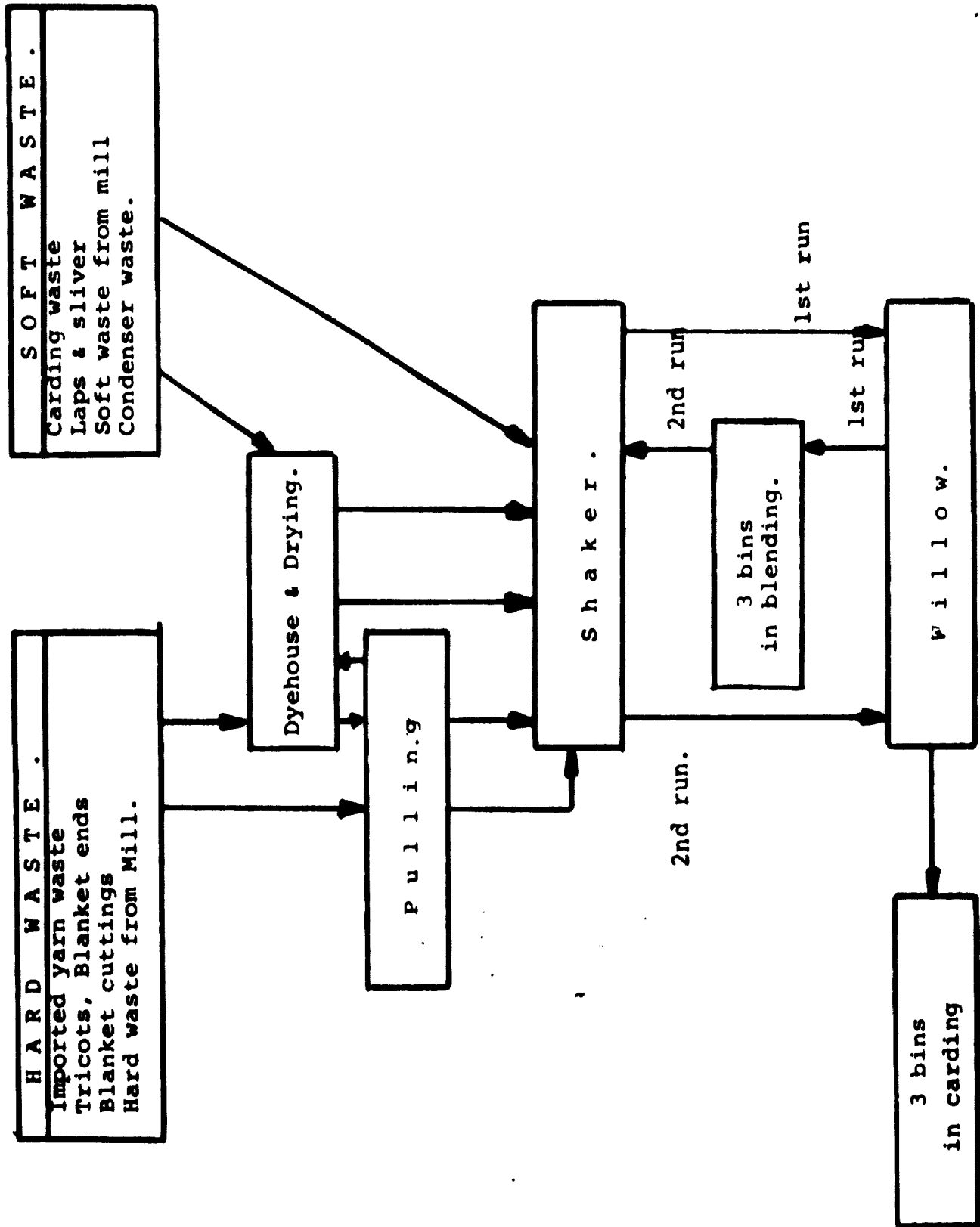
Kilograms pulled per machine hour worked 114.6

The operators are transferred to the cards when the pulling machine is idle, where they perform the card stripping operation. This is a good arrangement.

c) Recommendation.

60% to 80% of the raw material needs pulling. The pulling operation is a key point in the production flow. The machine is relatively simple to maintain. The cylinders, however, must be kept in good condition since a badly maintained pulling machine will damage fibres and cut them to shorter lengths. It is recommended that this machine be stopped and maintained on a routine basis of once every two months.

11. Process Flow: Material Preparation Mill



- i. The raw material is packed in bags after pulling.
- ii. The bags are transported to the shaker and the blend fed into the shaker manually.
- iii. The first run is :
 - manually to shaker,
 - through shaker to willow (oil and water emulsion given here),
 - to bins in the blending.
- iv. The second run is :
 - manually from bin to shaker,
 - through shaker to willow,
 - to bins behind the carding.
- v. The blend size is 2,500 kg (determined by the size of the bins).

The blend size is satisfactory.

12. Blending.a) Present Production.

The blending production of 1st to 28th of August 1974, was analysed in detail. The materials blended were as follows :

Material		kg.	%
X-bred sorted	import	9,075	12.9
Carpet thread pulled	"	6,795	9.6
Sliver laps, sorted	"	11,565	16.4
Condenser waste	"	3,460	4.9
Weaving returns	own	7,931	11.3
Tricot pulled	import	11,903	16.9
Blanket ends	"	12,155	17.4
Spinning returns	own	2,021	2.9
Undercard waste	"	3,128	4.4
Blanket cuttings	"	1,439	2.0
Viscose sorted	import	966	1.3
Total		70,438	100.0

New stock to blends		79.4%
Own waste		20.6%

Machine hours worked	499.4	90%
Machine hours idle	57.8	10%
Total machines hours	557.2	100%

Productivity: 141.0 kg per machine hour worked.

b) Planned New Process Flow.

The factory management has two plans to which we agree which will improve the process and obtain :

- 1) a better carding efficiency,
- 2) an improved blend production.

i. Additional blend reserve bins behind the cards.

The carding operation is the bottle-neck of the entire manufacturing process. Operations before and after carding have extra capacity. The carding therefore has to be run as effectively as possible.

At present, there is no buffer stock between blending and carding. There are six bins behind the cards and these bins can only hold the running blends.

In case of any disturbance in the pre-carding processes, the lack of spare blends causes idle time in the carding.

Management plans to construct an additional four bins with pneumatic feeding as a reserve for the blends to carding. Adequate space near the blender is available.

ii. Install hopper feeder.

The hopper feeder from the scouring range to be attached to the shaker. In addition, by improving the present ducts, the second feeding from the bins could be made pneumatic. The result will be better material handling and improved blending production.

c) Capacity.

The capacity of the blending unit is 350 to 400 kg/hour. As the material goes through the machine twice, the resultant output of the machine is only 175 to 200 kg per hour. 1 to 1.5 hours daily must be deducted for beating the undercard waste.

Actual capacity in 3 shifts :

$$22.5 \times 175/200 \text{ kg} = 3,938 - 4,500 \text{ kg.}$$

=====

A safe figure for production planning is 4,000 kg per day. The blending is able to feed the 3 cards even in improved carding conditions.

13. Carding.a) Machinery.

Card No.	M A K E .	No. of condenser bobbins.	Cakes per bobbin	Yarn Nm.	Speed Nm/min.
1	Duesberg & Bosson	8	12	1.5	20
2	Alexander & Antoine	8	14	1.5	18
3	Alexander & Antoine	16	10	2.8	15
		16	5	1.5	20

Cards 1 and 2 were originally bought for coarse counts and are suitable for the purpose.

Card No. 3 is built for finer count produce but most of the time is used to produce slubbing for Nm. 1,5. In this purpose two ends are run on one cake and the actual output is 80 ends only. In the present circumstances this is the best solution, but the card is really not suitable for this work.

The cards are badly maintained. The following items need complete overhauling :

- card clothing to be changed,
- feed lattices need changing,
- belts need replacing,
- peraltas to be put back in operation. Repairing has become "a way of life " in the carding department. According to the spare part records, very little replacement parts were used during the last 3-4 years.

A long list of replacement parts is needed. The value is estimated at E.£.100,000 during a two year period.

b) Present production.

The carding production from 1st to 12th of August 1974 was analysed in detail.

The machine hours were utilised as follows :

- machine hours worked	576	70.6 %
- machine hours idle	240	29.4 %
- total machine hours	816	100.0 %

Main reasons for idle time were :

Reasons .	Hours %	Sub-totals	%
1. Blend shortage	62.7	94.8	40
2. Condensor bobbins full	29.6		
3. No tubes	2.5		
4. Stripping	5.5	81.8	34
5. Cleaning	40.4		
6. Pack under card waste	5.8		
7. Blend change	13.1		
8. Grinding	16.0		
9. Clean breast cylinder	1.0		
10. Maintenance	8.0	63.0	26
11. Machine blocked	1.0		
12. Trouble in transfer roll	2.0		
13. Broken belts	6.5		
14. Adjustment	5.3		
15. Feed lattice broken	2.5		
16. Adjust stripper	2.0		
17. Change bearer roll bearing	5.5		
18. Repair	24.0		
19. No power	6.2		
Grand Total	29.4	239.6	100

Divided into three main groups, the reasons for idle time can be expressed as follows :

- organisational	94.8 hrs	40%
- cleaning & maintenance	81.8 hrs	34%
- mechanical	63.0 hrs	26%
<hr/>		
Total	239.6 hrs	100%

Carding is the bottle-neck operation and the organisational idle time must be reduced to a minimum. This can be improved by :

- better raw material control - having sufficient raw material in storage.
- ordering early enough to guarantee an even flow,
- building spare bins to form a buffer stock as described,
- having additional condenser bobbins made. The supply of condenser bobbins at present is quite inadequate. If the spinning frames have a break-down the cards will be stopped in less than one hour.

Calculation of number of condenser bobbins required.

100% output ca. 80 kg per card/hour,
 8 condenser bobbins per doff = 48 kg,
 Rate of doffing=1.7 doffs per hour.

4 hours reserve of condenser bobbins required :

$4 \times 1.7 \times 8 = 55$ bobbins per machine as buffer stock.

8 in the card,
 10 in the spinning frame,

73 per card.

=====

c) Present efficiency and productivity.

The actual carding production was not previously known since the process does not include weighing the slubbing produced and the cards have no recorders.

The carding production always is higher than the spinning production because of recycling of material from the spinning frames to the hopper feeder.

This recycling consists mainly of the following :

- condenser waste from condenser bobbins. The bobbins are doffed before they are completely empty,
- suction pipe waste. This is waste that is collected to the suction pipe from broken down ends,
- floor waste and under card rolls.

Weighings were made in the spinning mill to determine the quantity of recycled waste. The weighing results showed that there was approximately 7% waste on the condenser bobbin and that the weight of suction and floor waste was approximately 13%.

Analysis of production 1st to 12th August '74.

- 12 blends fed into carding all Nm.1.5	30,409
- recycling condenser waste 7%	2,128
- recycling suction floorwaste 13%	3,953
<hr/>	
Estimated carding production:	36,490

d) Expected carding production.

Calculations were made to establish the new standard for production. During a discussion with management, the following standard production targets for carding were established.

- 1.- the ultimate or second target efficiency of 71%,
- 2.- immediate or first target was set 10% below this figure
at :
$$0.90 \times 71 = 63,9\%$$

The first target will be achieved with better control and raw material flow.

The second target - 71% overall efficiency - will be reached after the reconditioning of the cards. The calculations for the second target standards are shown on the following table.

The target production for the first stage will be :
21,343 kg/week in 3 shifts.

e) Recommendations.

Complete re-conditioning and overhaul of the cards. A detailed list has been started by the Factory Manager. The cost is estimated at E. \$.100,000 over a two year period.

Debre Berhan Wool factory.		CARDING EFFICIENCY CALCULATION.								Werner International	
Card No.	Make.	No. of cond. bobbins	Cakes per bobbin	No. of outputs.	Speed mm/min.	Slubbing g/m.	100% kg per mach.hr.	100% output : 1st-12th Aug.			
								Tot. Hrs.	Hrs.wkd.		
1	2	3	4	5	6	7	8	9	10		
1	Duesberg Bosson	8	12	96	20	0.70	80.6	21,923	16,120		
2	Alexander & Antoine	8	14	112	18	0.70	84.7	23,038	19,159		
3	Alexander & Antoine	16	10	160	15	0.38	67.2	13,278	10,127		
		16	5	80	20	0.70		63,239	45,406		
				448							

The efficiency can now be calculated as follows :

- over all efficiency $36,490 \div 63,239 \times 100 = 57.7\%$
- running efficiency $36,490 \div 45,406 \times 100 = 80.4\%$

Column.

- 1.- Card No.
- 2.- Make of Card.
- 3.- No. of condenser bobbins.
- 4.- Cakes per bobbin
- 5.- (3) x (4)
- 6.- Speed of machine
- 7.- Weight of slubbing
- 8.- 100% output kg per mach. hour.
- 9.- 100% output of total hrs. 1st to 12th August.
- 10.- 100% output of hrs. Worked 1st to 12th August.

Card	Hrs 1st to 12th Aug.	
	Wkd.	Total
1	200	272
2	226.2	272
3	150.7	272
Total	576.9	816

DEBRE BERHAN WOOL FACTORY		EXPECTED CARDING OUTPUT (Nm.1.5)										WERNER INTERNATIONAL		
Card No.	Make	100% output per m. hr.kg.	Total hours per week	Lost mach.hrs. per week.			Total hrs.	Mach. hours wkd.	100% Prod. mach. hrs.wd kg	Running eff. 85%	100% output of 144 hrs.	Over all eff. %		
				strip 7%	Maint. 2%	Blend change 1.4%							Break down 4%	Wait blend 2%
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	D & B	80.6	144	10	3	2	6	3	24	120	9,672	8,221	11,606	
2	A & A	84.7	144	10	3	2	6	3	24	120	10164	8,639	12,197	
3	A & A	67.2	144	10	3	2	6	3	24	120	8,064	6,854	9,677	
Total		232.5	432	30	9	6	18	9	72	360	27900	23,714	33,480	71

COLUMN.

- 1.- Card number
- 2.- Card Make D & B - Duesberg Bosson, A & A Alexander & Antoine.
- 3.- 100% output per machine hour, kg.
- 4.- Total hours per week 3 x 48 = 144.
- 5.- Stripping (fettling) cards 5 hrs every 72 hrs 7%.
- 6.- Maintenance 3 hrs per week. Most of the maintenance will be done when the card is stopped for stripping.
- 7.- Blend change twice per week, one hour per change.
- 8.- Break downs reduced from the present 7.7% to 4%, due to better spare parts service.
- 9.- Waiting blends will be eliminated, allow.2% since interference cannot be always totally avoided.
- 10.- (5) + + (9)
- 11.- (4) - (10)
- 12.- (3) x (11)
- 13.- 0.85 x (12) Time allowed for breaks, small stops and cleaning.
- 14.- (3) x (4)
15. Sum of (13) ÷ Sum of (14) x 100 %

14. Spinning.a) Machinery for blanket weft Nm. 1.5

Machine No.	1	2A	2B
No. of spindles	2 x 60	112	112
No. of spindles in use	96 or 120	112	80
Ring diameter	150 mm.	130 mm.	130 mm.
Bobbin length	455 mm.	455 mm.	455 mm.
Weight of package	0.5 kg.	0.42 kg.	0.42 kg.
Spinning m/min.	18-20	18-20	18-20
Slubbing count	1.4-1.45	1.4-1.45	1.4-1.45
Spinning count	1.5	1.5	1.5
Draft	3.5-7%.	3.5-7%.	3.5-7%.

Notes : Card 1 has 96 output units, the spinning frame 120 spindles.

Card 2 has 112 output units, the spinning frame 2A 112 spindles.

This unit is in balance.

Card 3 only produces from 80 output units when processing, Nm. 1.5.

The frame has 112 spindles.

b) Present Production.

The Spinning Production from 1st to 12 th Aug. was analysed in detail.

Machine hours worked	590.1	72%
Machine hours idle	225.7	28%
Total machine hours	815.8	100%

The main reasons for idle time :

Reason.	Hrs.	%	Subtotals.	%
1. No tubes	5.5	18.7	152.5	68
2. No condenser bobbins	19.1			
3. Card idle	123.1			
4. Waiting blend	4.8			
5. Card stripping	10.2	3.2	26.4	12
6. Blend change	15.7			
7. Cleaning	0.5			
8. Tin drum broken	37.6	5.7	46.8	20
9. Electrical fault	0.8			
10. Oiling	0.5			
11. No power	5.9			
12. Adjust tension roller	1.0			
13. Adjust shaft	1.1			
GRAND TOTAL :	225.7	27.6	225.7	100

Main groups :

- organisational 68%
- stripping & blend changes 12%
- mechanical faults 20%

The main reasons for idle time are :

- imbalance between carding and spinning,
- lack of proper material flow,
- lack of condenser bobbins.

SPINNING PRODUCTION COMPARISON.

(1st to 12th August - Only Nm. 1.5 yarn was spun during this period).

Frame No.	No. of Spind.		Yarn count Nm.	kg. per bobbin	Kg. per conds. bobbin effective	Kg. per cake effective	Speed m./min.	100% out-put kg p. sp.hr.	100% out-put kg p. machine.	100% output :		Actual output 1-12th. August.
	Actual	Effective								Total hours	worked hours	
1	2	3	4	5	6	7	8	9	10	11	12	13
1	120	96 or 120	1.5	0.50	5.1	0.425	18	0.724	86.9	23,984	18,258	10,128
2A	112	112	1.5	0.42	4.0	0.295	18	0.724	81.1	22,384	18,240	10,791
2B	112	80	1.5	0.42	4.0	0.285	18	0.724	57.9	15,980	8,992	6,077
Total :										62,348	45,490	26,946

Columns.

1. Frame No.
2. No. of actual spindles
3. Spindles in effective use
4. Yarn Nm.
5. Kg per spinning bobbin
6. Weight of condenser bobbin less recycling waste.
7. (6) ÷ number of cakes per bobbin.
8. Speed m./min
9. (8) ÷ (4) x 60 ÷ 1,000
10. (9) x (3)
11. Total machine hours per frame 1st to 12 th Aug. x (10)
12. Machine hours worked per frame 1st to 12 th Aug. x (10)
13. Actual output of spinning 1st to 12th August.

The overall efficiency can now be calculated

$$26,946 \div 62,348 \times 100 = 43.2 \%$$

Running efficiency :

$$26,946 \div 45,490 \times 100 = 59.2 \%$$

c) End break testing.

It is virtually impossible to make a thorough analysis of the spinning operation without making an analysis of the end breaks.

A form was designed (see following form) to record end breaks in the spinning.

The end break testing is of primary importance when calculating the :

- expected output of a spinning frame,
- the labour hours required to operate the frame at a certain efficiency.

The following operations on a frame are constant and can be calculated mathematically :

- doffing,
- creeling,
- cleaning,
- patrolling.

The cycle times and frequencies for these operations are fixed for a certain type of yarn.

The variable work content comes from the end breaks - the more the operation is under control the higher the efficiency and the lower the waste, which affects the re-cycling in the carding process and thus the carding production.

DEBRE BERHAN WOOL FACTORY ETHIOPIA		END BREAKS SPINNING =====		WERNER INTERNATIONAL SEPTEMBER '74	
Sheet No. _____		Date : _____		Tester : _____	
Type of Break	Mach. :	Mach. :	Mach. :	Mach. :	
	Yarn :	Yarn :	Yarn :	Yarn :	
	Blend :	Blend :	Blend :	Blend :	
	Color :	Color :	Color :	Color :	
	No. of sp. :	No. of sp. :	No. of sp. :	No. of sp. :	
	Started :	Started :	Started :	Started :	
	Finished :	Finished :	Finished :	Finished :	
Back 1. Roller to condenser bobbin.					
Front 2. Roller to Suction Pipe					
3. With Lapping					
Breaks 1					
2					
3					
Total					
Time elapsed					
B/1000 sp.hrs					
<u>REMARKS:</u>					

RESULTS OF THE END BREAK TESTS.

(Tests taken 10 to 19 september)

Test No.	Yarn Nm.	NUMBER OF END BREAKS IN TEST.						Time elapsed hours	No. of spin-	End breaks per 1000 spindle hours	
		Back roll to conds. bobbin	%	Front roll. to suction pipe	%	With lapping	%				Total.
1	2	3	4	5	6	7	8	9	10	11	12
1	1.5	7	88	1	12	-	-	8	0.20	24	1,670
2	1.5	25	68	6	16	6	16	37	0.32	60	1,946
3.	1.5	8	32	10	40	7	28	25	0.133	60	3,125
4	1.5	29	37	39	50	10	13	78	0.50	40	3,900
5	1.5	28	37	29	38	19	25	76	0.50	40	3,800
6	1.5	22	35	26	42	14	23	62	0.50	40	3,100
7	1.5	37	33	48	43	27	24	112	0.50	40	5,600
8	1.5	39	40	36	37	22	23	97	0.50	40	4,850
9	1.5	24	42	23	40	10	18	57	0.50	40	2,850
10	1.5	25	38	24	36	17	26	66	0.50	40	3,300
Total		244	39	242	39	132	22	618	172 sq.hrs.		3,593

Columns. 1. Test No.
2. Yarn Nm.
3. Breaks in condenser bobbin

4. (3) ← (8)x100
5. Break to suction
6. (5) ← (9) x 100
7. Break with lapping
8. (7) ← (9) x 100
9. (3) + (5) + (7)
10. Test Time
11. Spindles observed
12. Breaks/1000 spindle hours.

Analysis of end breaks.

39% of the end breaks in the spinning are directly caused by the cards. (These are the breaks in column 3).

The end break rate is too high and should be reduced at least by 35%. The main factors giving this improvement will be :

- replacing the card clothing to improve quality of slubbing,
- putting the peraltas back into operation (spares have been ordered to complete the job).
- better raw material mix. In the past lack of certain type of raw material resulted in poor blends.

For the present conditions, 4,000 end breaks per 1,000 spindle hours was used in the work load calculations.

d) Time studies.

The spinning and carding processes are closely dependent on each other, since the carding process is the "bottle-neck" in the mill. We decided to provide the management of Debre Berhan Wool Factory with more details, so that improvement in this process would be made. Consequently, we conducted some brief time-studies in order to determine the unit times for various tasks in the spinning.

The work methods also were checked. Machines 1, 2A and 2B were in operation during these studies.

Results of the time-studies.

	BMS.
- End break back roller to condenser bobbin	0.35
- End break to suction pipe	0.14
- End break with lapping	0.30

Weighted average 0.26 BMS.

0.30 BMS allowed in calculations.

- Creeling : Frame 1 2.00 BMS for 8 bobbins
 1.20 BMS the 2 extras.

Note : Card No. 1 is supplying spinning frame No. 1. The card produces 8 condenser bobbins but the frame needs 10. Consequently, either 20% of the spindles remain stopped or the frame has to be stopped twice for creeling.

Frame 2A 3.00 BMS
 Frame 2B 2.33 BMS

- Doffing : Frame 1, Frame 2A, : 3.00 BMS
 Frame 2B, : 2.40 BMS

- Cleaning : 2 BMS per machine hour.

c) Proposed production.

From the measured observations and checks the expected production per machine hour was calculated :

EFFICIENCY AND PRODUCTION.

	Machine No.		
	<u>1</u>	<u>2A</u>	<u>2B</u>
Stopped time/hr-creel	5.44	7.62	3.38
-doff	4.35	5.16	4.13
-end breaks	1.21	1.20	1.20
Total :	11.00	13.98	8.71
% Efficiency	81.6	76.7	85.5
GMS/Spindle hour at 100%	724	724	724
GMS/Spindle four at 81.6%	591	555	619
Expected production/machine hour-kg	71	62.2	49.5

d) Carding/Spinning Balance.

Comparison of the balance between carding and spinning.

Card No.	Expected Prod. per hr at 71%	Corresponding spinning frame No.	Expected eff. %	Output kg per made hr.
1	57.2	1	81.6	71.0
2	60.1	2A	76.7	62.2
3	47.7	2B	85.5	49.5

- i. The efficiencies of the spinning frames 1st to 12th August 1974 were :

Frame	Over all Eff. %	Running eff. %
1	42.2	55.5
2A	48.2	59.2
2B	37.7	67.0

- ii. Card 3/Frame 2B actual imbalance is actually bigger than these figures show since only 80 of the 112 spindles are calculated to be producing.
- iii. The spinning frames in all cases will have excess capacity compared to carding but they both must be run in three shifts.
- iv. Work methods in creeling and mending end breaks are satisfactory. Doffing takes too long because the operators :
- have to carry empty bobbins from the cops making,
 - do not always carry them in advance and prepare the doff. Sometimes the machine is waiting idle while they get the bobbins,

- do not have equipment to take away full bobbins.
Time is lost when the full bobbins are carried
to the cop - making by operators.

e) Recommendations.

- Purchase additional spinning bobbins. Many of the present bobbins in use are worn and sit too low on the spindle. The lift of the machine is thus shortened and the efficiency of both the spinning and cop-winding is reduced.

- Purchase or make additional condenser bobbins. The lack of condenser bobbins causes idle time.

- Replacement of worn and damaged parts such as drums at an estimated cost of E.£.35,000.-

- Material handling equipment (truck) for full bobbins. Time is lost when the full bobbins are carried to the cops making by the operators.

15. Cop- winding.

a) There are the following machines :

i. OVEMAG horizontal cop winder for the Snoeck looms.

- 10 spindles (3 out of order),
- 2 operators,
- cop weight 152 gr.
- time to produce a cop : 1.65 min.,
- the operators use tail ends to avoid idle spindle time between supply packages.

ii. Two D. DELERUE & Cie vertical cop winders for the Schönherr and Jacquard looms.

- one machine 15 spindles, (2 out of order),
- one machine 10 spindles (1 out of order),
- production time per cops : 0.91 min. change over stoppage 0.09 min., total time per cops.
- cop weight 110 gr.
- there are yarn feeders who creel in the feed yarns for the cop makers.

b) Present production.

The cop- winding production of one week was studied in detail. Timing and stoppage tests were taken and compared to the performance of the cops in the looms.

The cop-winding production 26th to 31st August 1974.

Date	P R O D U C T I O N I N K I L O S .						Efficiency %.	
	Small cops Delerue.			Big cops Ovemag.			Small	Big.
	S h i f t		TOTAL	S h i f t		TOTAL		
A	B	A		B				
26.8	870.2	1,001.5	1,871.7	108.3	177.7	286.0	80.6	45.9
27.8	1,288.3	1,286.8	2,575.1	191.4	203.3	394.7	110.8	63.3
28.8	1,033.7	1,003.4	2,037.1	217.8	202.0	419.8	87.7	67.4
29.8	1,126.2	1,015.8	2,142.0	238.5	226.7	465.2	92.2	74.7
30.8	897.8	917.0	1,814.8	217.3	247.8	465.1	78.1	74.7
31.8	813.6	736.2	1,549.8	230.6	179.1	408.9	66.7	65.6
			11,990.5			2439.7	86.0	65.3

The Department is now working in two shifts and producing sufficient yarn.

i. Small cops

- 22 spindles, 16 hrs, 960 min., 100% production
110 gr/min., 105.6 kg/day per spindle.
- = 2,323.2 kg/day.

ii. Big cops

- 7 spindles, 16 hrs, 960 min., 100% production
92.7 gr/min., 89.0 kg/day per spindle,
- = 623 kg/day.

iii. Total : $0.86 \times 2,323.2 \text{ kg} = 1,998 \text{ kg}$

$0.65 \times 623.0 \text{ kg} = 405 \text{ kg}$

Total per day = 2,403 kg

per week = 14,418 kg

Notes : When the carding production reaches the first target standard of improvement the cop-winding will become very tight on a 2-shift operation.

When the second target standard is reached the department will have to work approx. 118 hours per week.

c) Proposed Machine Speeds.

Speeds of the vertical cop-winding machines.

The vertical machines operate at a high speed - up to 230 m per minute for yarn Nm. 1.5

Most of the blends seemed to be able to take this speed. Certain "poorer" blends run very badly at this speed. There were 5-6 end breaks per cop.

In these cases the operators could not keep even 3 spindles producing and tried to keep down the spindle speed by holding the start lever.

A preliminary testing programme showed :

- i. with high breakage rate the knots are not made satisfactorily in cop-making,
- ii. these types of blends also cause loom stops and the biggest single cause of loss of weaving efficiency,
- iii. bad cops can stop a loom 10 times during one hour. If the weaver has to strip back yarn every time the efficiency loss can be as high as 16%,
- iv. tests were taken on the Snoeck looms too and showed that big cops perform much better in the weaving. Weft breaks are greatly reduced. The winding speed for the Snoeck cops is approx. 25% lower than for the small cops.

d) Recommendation.

- i. obtain a pulley to reduce the speed of the 10 sp. winder by 25%.
- ii. test "poorer" blends at both speeds, by taking end breaks

in cop-winding.

iii. Weave these cops in the same loom and take a loom stop test.

iv. If a considerable improvement in the weaving is achieved, start running "poorer" blends at lower speed. The reduction in speed would mean an increase in efficiency. It is possible that the same production can be achieved without going onto three shifts.

16. Cotton Twisting.

a) Machinery.

Pfenningsberger 2 x 96 spindles = 192.

- bobbin length 300 mm.
- ring diameter 70 mm.
- bobbin weight 80 gr.
- yarn speed 12.3 m/min.
- yarn count Ne.2/21 = Nm. 17.8

Approx. 5% of the production is lost because there are idle spindles due to various mechanical faults.

There are two operators on the machine.

The creeling and mending and breaks methods are satisfactory.

Rings have to be oiled manually with a rag.

b) Present Production.-

- The mill has received single Ne 21 cotton yarn on one kilo cones.
- N.B. The mill receives Ne 16, 18 and 21 and these are used for the same purpose.
- Yarn twisted to Ne. 2/21 to be used for blanket warps is, after twisting, wound onto 3 kilo cones.
- Part of the Ne. 2/21 is used for carpet cotton warp. It is twisted over the large cops then cabled to 6/21. The process for carpet yarn is twist 2-ply, wind on cones, twist 6-ply.
- The operators are not on incentive and there are no produced weights recorded on the production sheets.
- From the yarn store records it was established that the production was 140 kg per day 3 shifts.

c) Proposed Production.

	Mins.	
	Per shift.	Per hour.
<u>Machine stopped time.</u>		
- oiling rings	10,00	1.25
- doffing cycle mins.		
80 x 17.8 : 12.3 = 115.8		
- <u>doffing time 4 mins./doff</u>		<u>2.07</u>
Total stopped time/hour		3.32
Running time 94.5%		56.68

Allow 5% efficiency loss for creeling, endbreaks and idle spindles.

Expected efficiency 89%.

Expected output :

$$\frac{12.3 \times 60 \times 192 \times 0.89}{17.8 \times 1000} = 7.1 \text{ kg/mach. hr.}$$

$$= 170 \text{ kg/day/3 shifts.}$$

The weight of cotton yarn per blanket is approx. 155 gr.

The production rate of 170 kg per day is equivalent to approx. 1,000 blankets per day.

This represents the first stage standard production target and at that stage there would not be any capacity left for the carpet manufacturing.

There are several possibilities to overcome this problem.

- i. Try to buy part of the cotton yarn twisted,
- ii. Do Sunday work for the time being - one day is 16.6% additional output.
- iii. Convert spinning frame 3B to a twisting frame.
- iv. Buy an additional twister for 2-ply cotton.

d) Recommendations.

To increase the efficiency, the following action is needed :

- i. Place operators on incentives.
- ii. Repair idle spindles.
- iii. Have a doffing trolley made for the machine - see drawing I.
- iv. Train the operators to doff properly.
- v. Shorten ring oiling time
 - both operators should work simultaneously from different ends of the machine on the same side.

e) Doffing method.

- i. Prepare empty bobbins for the side to be doffed in advance.
- ii. Before starting the doff have the trolley ready at the side of the machine.

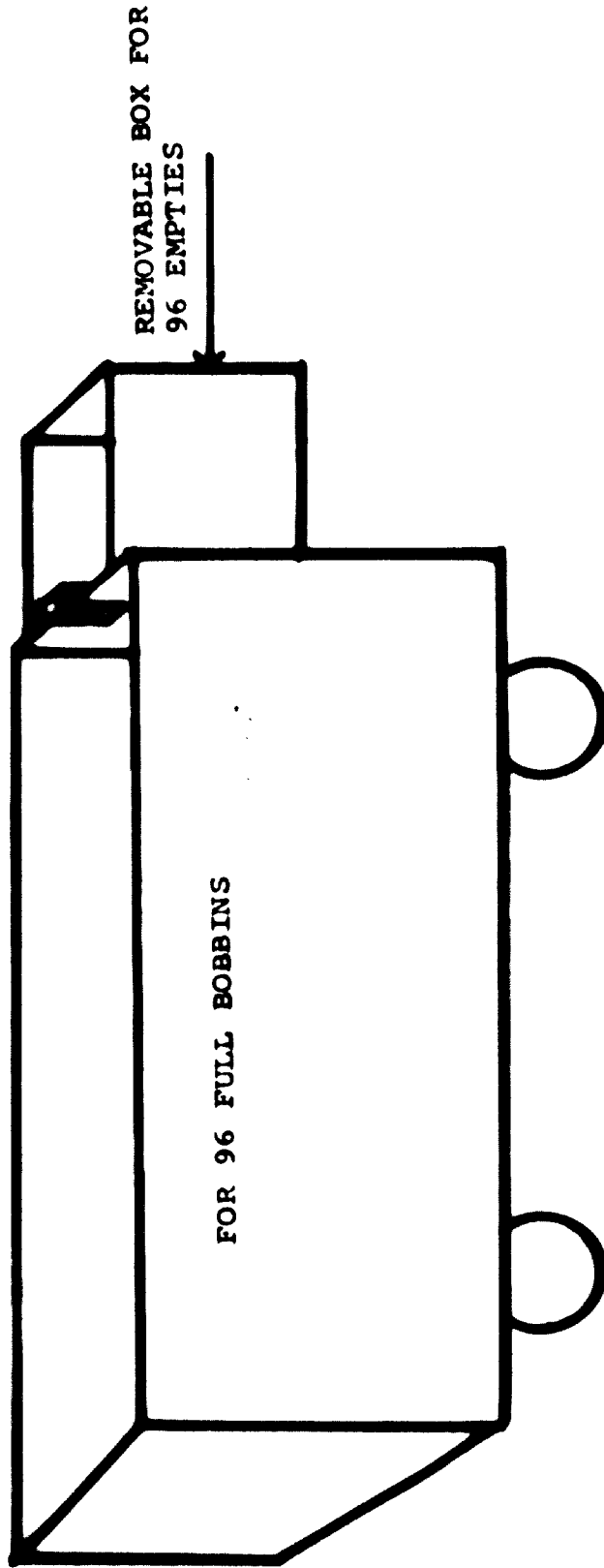
iii. Stop the machine and wind down.

iv. Work as a team of two.

- one goes first and pulls up the full bobbins from the machine (two in one hand) and places them in the doffing box,
- the other operator follows pushing the trolley with her knee so that the trolley stays between the operators,
- the second operator takes empty bobbins from the compartment on the trolley and pushes them firmly into place.
- start machine,
- repair broken ends,
- transport away full doffing trolley,
- prepare trolley for next doff.

DRAWING I

DOFFING TROLLEY



17. Warping: Blankets.

a) Machinery.

There is one S.A.C.F.E.M. sectional warping machine, year 1964.

- drum width 235 cm.
- present warping speed 140 m./min.
- machine moving on rails,
- single creel opens manually,
- electric stop motions,
- creep package 3 kg,
- No. of cones in creel 155 x 7 sections = total 1080 ends.

There are several mechanical faults in the machine.

The machine is suitable for this type of warping, but the creel is too lightly built. Present 3 kg creel packages are too heavy for the machine design.

- i. In several locations there are 1 or 2 brake discs and some locations have 3 discs. The tension becomes uneven.
- ii. Several creel pegs are badly centered, they are not in line with the guide eye. This can cause pulling of yarn and additional end breaks.
- iii. There is no start-stop button in the creel. Thus two operators are needed to run the machine : one at the stop button in the machine end and the other watching the creel and shouting stop signals.
- iv. The stop motions are defective. This machine, however, is not a bottle-neck and after the adjustment of the creel pegs the reconditioning becomes secondary in priority to the yarn manufacturing.

b) Time & Method studies.

Operator work methods and unit times are acceptable, taking the mechanical condition into consideration.

The danger point in the work method is that the broken end runs out to the drum and the operator is not pulling the warp back to obtain the broken end. The practice is proven by the many cones on the floor behind the looms. This has been pointed out and there is now a plan to tackle this defect using a quality bonus. We concur with this approach.

The results of the time studies.

1. Preparatory work per section	1.80 BMS
- measure,	
- adjust carriage,	
- tighten screw of carriage,	
- tie in the lease band,	
- cut and knot,	
- start drum.	
ii. Creel.	0.40 BMS
- remove old cone	
- creel in new cone	
- tie a knot,	
- start drum.	
iii. Repair end breaks, without pulling	0.25 BMS
iv. Repair end break, pull back	0.80 BMS
v. Preparation work for warp	5.00 BMS

c) Production calculation.

	BMS
i. Preparatory work for warp	5.00
ii. Preparatory work per section $7 \times 1.80 =$	12.60
iii. Creeling	
- warping continuously from the same creel bank	
- one cone running :	
$3,000 \text{ gr} \times 17.8 = 52,500 \text{ m.}$	
equals to 7,500 warp meters	
equals to 4.17 warps	
- 25% of the cones need creeling during one warp	
- stopped time per warp $40 \times 0.4 =$	16.00
iv. End breaks	
- per section 3 short $\times 0.25 = 0.75$	
7 long $\times 0.80 = 5.60$	
Total :	6.35
- per warp 7×6.35	44.45
v. Actual running time	
- $7 \times 1,800 \text{ m.} + 140 \text{ m./min}$	90.00
Total time per warp	168.05
+ add 5% miscellaneous and 15% rest allowances	33.61
TOTAL BMS :	201.66
	~ 3.4 hrs
	=====
vi. Beaming speed 50 m./min., 1,800 m.	~ 0.6 hrs
- beaming preparatory and finish up	~ 0.3 hrs
TOTAL TIME WARPING & BEAMING	4.3 hrs
vii. Expected production 11 warps per week 48 hrs =	
19,800 m. = 8,250 blankets.	
viii. The warping will only be 60-65% occupied on one shift.	

18. Weaving : Blankets.

a) Machinery.

There are the following looms in blanket production :

No. of looms	Make	Picks min.	Type of loom.	Reed width/cm.
29	Schönherr	98	4x4	2.00
6	Snoeck	90	4x4	2.00
6	Jacquard	75	4x4	2.60
41				

The Snoeck looms are suitable for blanket production. The loom has a shuttle and cops large enough for this type of work.

The Schönherr looms are satisfactory for the purpose. Shuttle and cops size are on the small side but with one loom per weaver the job load and quality can be maintained.

- i. The looms are old, they were bought second hand but they run with very little mechanical down time.
- ii. There are relatively few spare-parts that must be imported from Europe.
Most of the repair work can be done in the mill.
- iii. Both Schönherr and Snoeck are amongst the best known in heavy non-auto looms, generally well and ruggedly built.
- iv. The looms are weaving blankets where the raising covers minor faults and irregularities which might be caused by the loom.
- v. It is quite normal to run this type of equipment with "break down maintenance only".
This means to keep the machines going and repair what breaks down rather than do preventive maintenance. Reconditioning and preventive maintenance in this instance

would be too expensive.

- vi. The looms can easily be run for another 5 years, possibly stripping a few looms for spares and running the remaining looms in three shifts.
- vii. These looms are almost fully depreciated.
- viii. New machinery is expensive and must be run at optimum efficiency and with good labour utilisation. This needs effective management controls and competent floor management. It is more advantageous to first establish controls and train floor management before considering new machinery.

b) Present weaving Production.

The weaving evaluation of B-shift, 16th to 20th of September was studied in detail (Schönherr looms).

Day	Picks produced.	L o o m H o u r s			Idle %	Running eff. %.
		Wkd.	Idle	Total		
16.9	738,667	190	10	200	5.0	66.1
17.9	637,424	174	18	192	9.4	62.3
18.9	657,482	175.5	8.5	184	4.6	63.7
19.9	619,844	163.5	12.5	176	7.1	64.5
20.9	678,693	179	13	192	6.8	64.5
Total	3332,100	882	62	944	6.6	64.8

Hrs worked (loom hr = man hr)	882	93.4%
Hrs idle	62	6.6%
Total	944	100.0%
Running efficiency achieved		64.8%
Over all efficiency achieved		60.6%

Separate study of idle time :

	Hrs.	%
Mechanical fault	35.0	38.6
Repairs in work shop	20.5	22.7
Warp thread cut	31.0	34.3
Put in new warp	4.0	4.4
Total :	90.5	100.0

Mechanical down time was approx. 4%.
=====

c) Proposed weaving production.-

1. Loom stop testing.

An analysis of the loom stops was made. The results were converted to stops per 10 M.picks for the work load calculation.

Type of Break.	Breaks per 10 M.picks	%
Warp	6.83	23.2
Weft	21.30	71.3
Mechanical	1.61	5.5
Total :	29.74	100.0

Note : High number of weft breaks (see cop winding).

ii. Time studies.

Time studies were taken, the following BM values were established. They compare well with established international standards.

	<u>BMS.</u>
Prepare shuttle	0.22
Repair and break, behind	0.90
Change shuttle	0.10
Strip backs	0.60
Take off piece, 2 operators	4.00

Work method acceptable except shuttle changing.

There are normally three colors in the loom. The weavers only have one spare shuttle and when preparing the shuttle they do not always know which color runs out first. Very often they have the wrong color in the shuttle and instead of only a shuttle change (0.10 BMS) they also have a preparation (0.22 BMS).

0.22 BMS is lost per occasion, 46 shuttle changes per hour equals to $46 \times 0.22 = 10.12$ mins. per hour = 17% loss in efficiency if weaver misses all changes.

Need of new shuttles.

- one extra per color, 2 new shuttles per loom,
- + 50% extra = 120 new shuttles.

iii. Weft Supply.

During the studies, it was observed that the weavers too often run out of weft. Upon investigation it was found that the weft was in the yarn store but the supply had simply not been delivered. In most cases the weavers went to the yarn store to pick up their own weft.

This was discussed with the Factory Management and they have a plan of action to correct this matter.

d) Recommendations.

- Purchase additional shuttles. See section c.ii above.

- Organise the work so that a man is responsible for the control of the supply of weft from yarn store to looms and is paid on incentive of loom output.

19. Napping : Blankets.

a) Present work method.

- i. Piece transported to the door of the napping room.
- ii. Operators measure the length of the piece on the floor.
- iii. Piece put behind menders table.
- iv. Mender pulls the piece over the table, first pull.
 - 1) Scissor work, cutting
 - trim selvages,
 - pull out jerk-ins,
 - pull out slough offs,
 - pull out thick slubs,
 - remove bad knots,
 - remove double weft,
 - cut weft loops.
 - 2) Needle work, mending.
 - mend-in missing warp ends.
- v. Mender turns the piece and pulls it over the table for the second time.
 - burf other side of cloth,
 - mend-in ends which were missed in the first inspection.

iv. Average production is 3 pieces per 8 hours.

b) New Work Method.

The Factory Management has a plan to change the process in this department. We agree with this plan.

The plan was discussed with the Management and quality tests were successfully made to eliminate the mending in of single warp ends.

In the new method :

- i. Roll the pieces over an inspection perch which has a trumeter and scale attached. The length and the weight of the piece will then be recorded.
- ii. Load pieces over a table approx. 2-3 meters wide and 4-5 meters long.
- iii. 4 operators (2 per side) work to burl and trim the piece.

This method will produce a great saving in labour.

20. Finishing : Blankets.

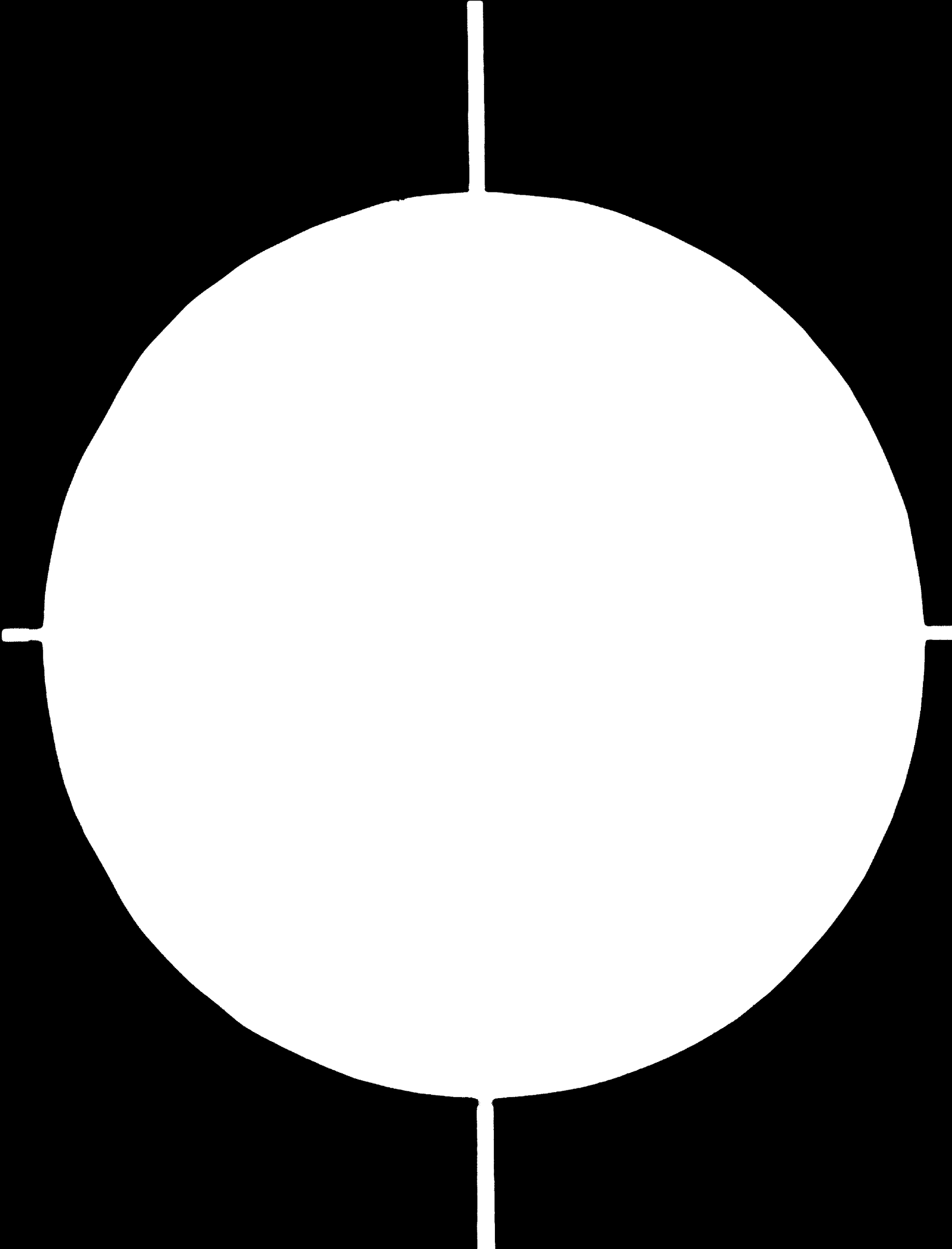
a) Process flow and machine utilisation.

Product.	Scour	Dye	Hydro	Suction	Dry	Tenter	Thermo	Raise
Raw Mater.		x	x		x			
Carpet Yarn	x		x		x			
Fam. Blanket	x			x			x	x
Norm. Blanket						x		x

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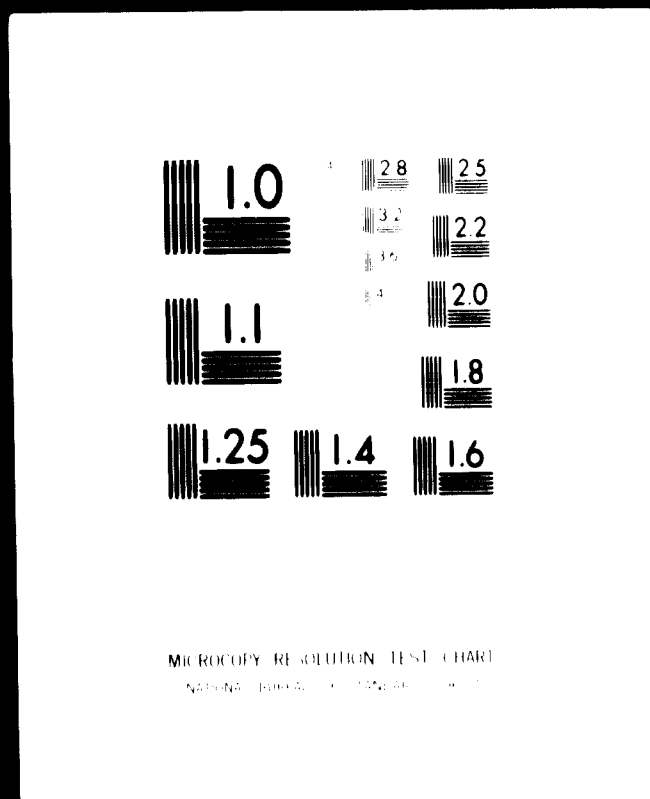


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Machine hour required.

<u>Raw material</u>	dye & hydro	250 kg/4 hrs
	dry	1,000 kg/8 hrs
<u>Carpet Yarn</u>	scour	35 kg/1.5 hrs
	hydro	35 kg/0.5 hrs
	dry	35 kg/0.5 hrs
<u>Fam. Blanket</u>	scour	1 pc/1.5 hrs
	extract	1 pc/0.25 hrs
	thermo	1 pc/1.2 hrs
	raise	1 pc/0.5 hrs
<u>Norm. Blanket</u>	raise	1 pc/0.5 hrs
	tenter	1 pc/0.3 hrs

Man hours required.

<u>Raw material</u>	250 kg	6 man hours	
<u>Carpet yarn</u>	35 kg	2.5 man hours	
<u>Fam. Blanket</u>	1 pc scour	1.5	" "
	extract	0.5	" "
	thermo	2.4	" "
	raising	1.0	" "
		5.4	" "
<u>Norm. Blanket</u>	1 pc raise	1.0	" "
	tenter	0.6	" "
		1.6	" "

Add 5% miscellaneous, 15% R.A. & 10% handling time.

b) Scouring.

There is one rope scouring machine used for scouring family blankets and carpet yarn.

Family blanket, one piece per batch.

- scour with soap	15 mins.
- 2nd scouring add soap	15 mins.
- rinse with cold water until clear	30 mins.
- handling, fill and take out sew piece	30 mins.
	<hr/>
Total cycle :	90 mins.
	1.5 hrs.
	=====

Capacity in two shifts = 10.7 pieces. The Jacquard capacity is 10.6 pieces in the same period.

Carpet yarn,

Hanks tied to form a rope are scoured in the rope scouring machine.

The scouring capacity is sufficient for the present production.

c) Suction.

- speed 7.5 m./min. - capacity sufficient,
- family blankets are put through this machine to reduce the water content because the hydro extractor is too small for the purpose.

d) Dyeing.

- There is one open vat for loose material dyeing.
- Batch size 250 kg.

Standard procedure for dyeing.

- i. Load in material
- ii. Fill vat with water, steam to boil
- iii. First scouring 20 mins.
- iv. Empty vat and rinse
- v. Fill vat with water, steam to boil
- vi. Add dyestuff and chemicals,
- vii. Boil 1.5 hours
- viii. Empty vat
- ix. Fill with water and steam
- x. Scour second time, short scouring only
- xi. Rinse
- xii. Empty vat
- xiii. Unload material.

Cycle time 4 hrs

Capacity in two shifts 1,000 kg is sufficient.

Note : The second scouring is required for quality reasons.

- i. The blankets are not scoured
- ii. Dyestuffs are used which are not guaranteed for color fastness,
- iii. There have been complaints in the past about color bleeding.

e) Hydro extracting.

Capacity: 1,000 kg in 8 hrs. The operator can extract the old batch when the new one is in the machine.

f) Thermofix.

- There is a thermo-fix machine that originally was bought to set synthetic mixtures.

- The machine is now used to dry family blankets because the tentering machine does not have the width.

The machine is not suitable for this work. Speed is low (2.8 m./min.), the cloth needs three runs and the heating system uses light oil.

At the moment, however, it is the only machine that can dry the family blankets.

Capacity.

- drying 2.8 m./min., three runs, speed 0.93 m./min.
= approx. 50 m./hour (i.e. 7.7 pieces/shift. The weaving capacity is 5.3 pieces/shift).
- The dry run after raising can go at high speed.

g) Raising.

There are two machines :

- heavy raising machine Mariocrosta,
- speed 14.8 m./min.
- both sides of the piece are raised in the same pass.
- total time per piece 30 mins
- maximum production per 8 hrs is 15 pieces.

The second machine Tessiltechnica was not in operation during the study - major overhauling was being made. The machine is of a lighter construction than the first one and it is estimated that the maximum production would be 10 pieces per day.

Capacity.

The capacity of this section is sufficient.

h) Tentering.

The tentering machine is used only to straighten out the normal blankets and stretch them to the correct width.

The speed is 4 m./min., 240 m./hr. approx. 1,800 m./8 hrs, i.e. 865 blankets/8hrs.

Capacity.

The capacity of this machine is sufficient.

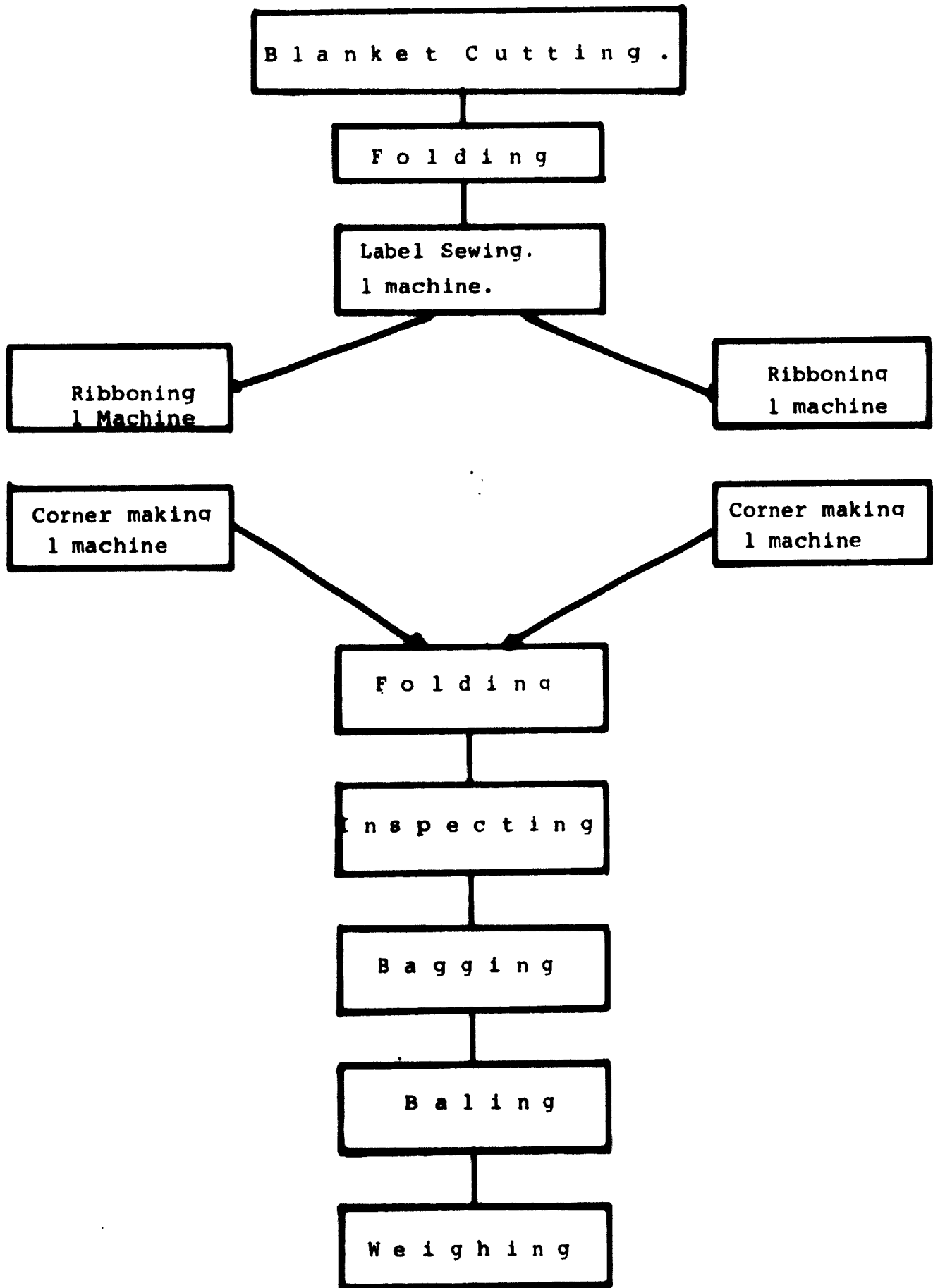
21. Making-up : Blankets.

a) Present Situation.

The present flow is perfectly logical. There is one major process which can be greatly improved and which management have plans to correct. The corners of the blankets are finished manually. This can be done by a sewing machine.

b) Planned process-flow.

We subscribe to the use of sewing machines for the finishing of the corners of blankets. This change will result in a reduction in labour. The process flow would be as follows :



Process Flow.

1. Cut blankets with blade
2. Fold
3. Sew label in the corner
4. Sew ribbon around the blanket
(family blanket and children's blanket) or at top and bottom (normal blanket)
Cut with scissors eq. 2 cm over the edge
Push blanket over to corner making
5. Turn in corners and stitch twice
6. Fold blanket 8-fold and hand over to inspection
7. With scissors trim the yarn ends sticking out and inspect the making-up
8. Put blankets in plastic bag and lay on desk
9. Lay 25 blankets on the bale cloth, push into the press
10. Press the bale
11. Sew bale
12. Fasten straps
13. Wheel bale over to the scale

22. Carpet Manufacturing.

a) Machinery.

One only tapis à verge type MV,
Make : M. Van de Wiele,
Width : 4 meters,
Speed : 42 picks per minute.

b) Present Production.

The carpet weaving production of August was studied in detail.

Item.	Shift A.	Shift B.	Total.
Hrs wkd.	190.5	170	360.5
Hrs idle	71.5	38.0	55.5
Total Hrs	208.0	208.0	416.0
m2 produced	1,316	1,124	2,440
m2/hr. wkd	6.91	6.61	6.8
Top daily prod	68 m2	74 m2	

Calculating from the loom speed of 42 PPM and the 500 picks per meter, the 100% output is 5.04 m. = 20.2 m2 per hour. Over all efficiencies achieved

Shift A 34.2%
 Shift B 37.7%

c) Carpet Construction.

	Count Nm.	Yarns per m.	Kg / m ² .	
			4 mm pile	6 mm pile
Wool warp	0.90	290	0.994	1.100
Jute warp	1.80	870	0.495	0.495
Cotton warp	6.00	600	0.155	0.155
Jute weft	1.80	500	0.288	0.288
Total			1.932	2.038

d) Loom stop tests and time studies.

4 loom stop tests were taken each covering 2 meters of woven carpet i.e. 1,000 picks.

Results of loom stop tests (total 4,000 picks).

Type of stoppage	T e s t N o. :				Total to 4	%
	1	2	3	4		
Warp breaks						
- jute	4	3	3	1	11	11
- wool	3	5	7	7	22	22
- cotton	11	12	6	8	37	37
Subtotal	18	20	16	16	70	70
Weft breaks	2	3	6	3	14	14
Strip backs	3	3	2	4	12	12
Mechanical	1	1	1	1	4	4
Grand total	24	27	25	24	100	100

Cotton breaks are the biggest single reason.

Results of time studies.

	<u>BMS</u>
i. Prepare and change shuttle	1.10
ii. Repair cotton break, warp	2.00
iii. Repair jute break, warp	1.00
iv. Repair wool break, warp	0.50
v. Strip back (remove one wire)	1.50
vi. Weft break (weaver catches)	0.50

Stopped time per 10,000 picks and efficiency.

	UT.	Freq. 10,000 Pix.	Total time
i. Repair warp breaks			
- wool	0.50	88	44.00
- jute	1.00	44	44.00
cotton	2.00	148	396.00
ii. Repair weft breaks	0.50	56	28.00
iii. Strip breaks	1.80	48	86.40
iv. Mechanical	0.20	16	8.00
v. Change shuttle			
- reed width 4.00 m			
- cops 375 gr. picks per cops 164			
vi. Total stopped time per 10 M.Picks			571.30
vii. Time to produce 10,000 picks			238,10
viii. Total cycle time			809.40
ix. Expected efficiency (7) : (8) x 100 = 29.4%			*****

These studies clearly show that low efficiencies 32.2 and 37.7% in August are caused by two major factors : cotton yarn breaks and shuttle changing.

Cotton yarn.

The cotton warp causes nearly 50% of the machine stopped time.

The price of cotton yarn per one sq.meter of carpet is Eth. \$ 0.726. The total sq.meter cost is :13.12.E.\$.
The cotton is only 5.5% of the total cost.

Cheap cotton yarns are totally unsuited for carpet production as they greatly reduce the machine efficiency.

Even doubling the cotton yarn price would only add E.\$.0.726 to the total cost but could produce greatly increased square meters production per hour, which would lower the labour cost.

Shuttle change.

The loom was operating with only one shuttle. The changing of shuttle is a lengthy process :

- stop loom
- take out shuttle
- open shuttle lid
- take out waste yarn and foam cloth
- place foam cloth on shuttle
- place new bobbin on cloth
- operate press at the side at the machine to press bobbin into location.
- lead yarn through shuttle eye
- put shuttle into box
- start loom.

The whole procedure takes 1.10 mins. When two shuttles are used the preparatory work becomes inside time (machine running) and the stopped time is only 0.15 mins.

e) Projected productivity.

Reduction in stopped time,

- cotton breaks to 25% of the present,
from 296 mins to 74 mins.

- shuttle change 0.15 BMS instead of 1.10 BMS.
from 64.9 mins to 8.85 mins.

	BMS
New stopped time/10 m. picks	293.25
time to produce 10 m. picks	238.10
<hr/>	
CYCLE TIME	531.35
Expected efficiency	44.8%

Improvement in productivity 52.4%

f) Recommendations.

- Purchase top quality cotton yarn.
- Use two shuttles.

23. Woollen Cloth Making.

a) Machinery.

There is machinery available which can produce woollen type. Acrylic cloth, as proposed in the marketing section of the report, can be manufactured on this equipment.

- i. The sectional warping machine is only needed on one shift for the blankets, and is suitable for this type of work.

The mechanical defects in the machine which were previously mentioned under blanket production must be repaired. Quality requirements are higher for warps on woollen cloth than on blankets and a defective warper causes excess mending and seconds cloth.

- ii. Pirn winder Hacoba with 2 spindles. Different types of pirns are available :

- for automatic change,
- for manual change,
- cones for cops.

iii. 10 Lenz looms of which :

- 4 automatic 4 x 1 boxes
- 6 non-automatic 4 x 1 boxes
- 140 PPM
- suitable for cloth width 140-150 cm.,
- all looms with dobby.

There is an adequate supply of drop wires, shuttles, beams and cloth rolls.

The following accessories are missing. They have been used for the blanket looms :

- shafts,
- heddles,
- reeds.

iv. Inspection perch with lights available to inspect cloth from roll.

v. The present mending tables are suitable for burling and mending of the cloth.

vi. Finishing machinery available :

- rope, scouring machine,
- milling,
- tentering frame,
- 2-blade shearing machine,
- rotary press,
- Monforts decatizing machine,
- rolling stand.

b) Expected production.

Woollen cloth 10 picks per cm.

Loom speed 140 PPM

Over all efficiency 75%.

$$\frac{140 \times 60}{1000} \times 0.75 = 6.3 \text{ m./hr} = 50.4 \text{ m./8 hrs}$$

10 looms in 2 shifts 6,000 m./week
~~9,000 m./week~~

24. Work-shop.

The mill needs a good work-shop for the following reasons :

- remote location, delivery time for spare-parts is long and many of the parts have to be made,
- remote location, no possibilities to have mechanical work done in town,
- some of the textile machine makers have gone out of business and parts are not available. These have to be made.

a) The following machines need replacing.

i. Lathe P.420, Le Progrès Industriel, Belgium,

Bought second hand, over 40 years old.

Condition very poor :

- guide bed worn out
- drive spindle out of center
- all travelling guides and carriage are worn out
- no spares available
- needs constant repairing
- can probably be used for some rough work

ii. Milling machine, Parkson, England

Made 1930.

The machine is incomplete,

- no arbors and cutters,
- no spares available,
- maker gone out of business,
- cannot be used.

The specifications for the new machinery recommended :

UNIVERSAL LATHE.

- distance between centers 3 m.
- height of center 20-25 cm.
- automatic gear box
- removal gap, size of gap must be specified.

UNIVERSAL MILLING MACHINE.

- clamping table size : width 300-400 mm.,
length 1400-1500 mm.
- built in driving mechanism for rotary table with power feed, including universal dividing head, vertical milling head, etc...

The price of these machines is approx. Eth.\$ 40,000.- to 45,000.- each.

b) Personnel.

The mill requires very capable mechanics. The chief of the work-shop is the only man reputed to be well qualified. It is essential that the mill have two additional well qualified mechanics. The valuable new work-shop equipment recommended should only be used by good mechanics. The major overhauling of the cards and spinning frames should be done by good mechanics. As each year passes the need for well qualified mechanics increases.

We strongly recommend that two well qualified mechanics be hired to replace the less capable men in this department.

25. Supervisory Training.

a) Present capacities.

The training of the floor management is the top priority in the mill training programme.

Most of the supervisors have good mechanical and technical background but they lack the training and tradition of supervision. They are not fully aware of their duties and responsibilities.

They have a problem in identifying themselves.

They do not feel as part of the management. Neither are they accepted as fellow workers by the operators. They are acting as middlemen who pass on the orders from top management but do not initiate orders and indeed do not like to issue orders.

b) Recommendations.

- i. Establish their levels of authority,
 - ii. Grade them and establish the characteristics of each grade,
Grade A, General Foremen,
Grade B, Foremen,
Grade C, Assistant Foremen,
Grade D, Shift Leaders.
 - iii. Write a job specification for all supervisory staff.
- It is proposed that the following procedure be followed :

- The Assistant Factory Manager will be made responsible for writing up the programme,
 - He first will discuss with the Factory Manager and write up the specifications for each job as to what the management expects each Supervisor to do.
 - He then will interview each Supervisor separately telling them the purpose of the exercise which is to establish the status of the Supervisors and to prepare their proper job specifications.
 - He will not show the Supervisor the job description made together with the Factory Manager but will try to get the Supervisor's own idea of what he is supposed to do.
 - After interviewing all Supervisors, he will summarise the information and present it to the Factory Manager.
 - They will then combine the information and prepare all job descriptions.
 - The job description will then be reviewed by the General Manager.
- iv. The job description must include the maintaining of the production and quality standards.
- v. The Assistant Factory Manager, under the direction of the Factory Manager should hold a meeting of the Supervisors at which he explains the concept of industrial engineering methods and the function of the technical controls.
- vi. The Factory Manager should explain the concept of budgetary controls.

c) Illustration of levels of authority.

i. Authorities.

The functions a supervisor may be expected to perform without consulting his superior are these :

- maintaining equipment,
- assigning work,
- requisitioning routine supplies,
- imposing limited disciplinary actions for violation of company rules (excl. warning and suspension notes, discharges),
- temporarily transferring employees within his own jurisdiction where no promotions or demotions are involved,
- inspecting and passing on the quality of work done in his own unit,
- granting time off to employees with responsibility to check the clocking out. Short absence of up to one day,
- disposing of routine grievances,
- minor changes in established production or work methods,
- taking emergency actions in the absence of a superior

ii. Authorities which require reporting to superior prior to taking action

The reason for such reports are usually that the action will have some effect on the work or the working force in other departments or on the company's planning.

The following list shows these functions :

- requisitioning of additional labour,
- regulating working hours in the event of excess or shortage of work,

- signing and handing out warning and suspension notes in agreement with superior,
- requisitioning or ordering special tools or equipment.

iii. Responsibility for recommendations.

Floor management should make recommendations on the following:

- Promoting, demoting and transferring personnel,
- Discharges,
- Applicants for employment,
- Major changes in production methods or machinery,
- Changes in company policies.

d) Illustration of Job Descriptions.

Job Description.

Position : Weaving Supervisor.
Responsible to : Production Manager
Responsible for : Weaving shed staff.

Responsibilities :

1. Supervise loom fixers and weavers,
2. Ensure that optimum efficiency is maintained and costs are kept to a minimum. Maintain productivity standards.
3. Issue priority when different jobs are to be done at the same time,
4. Ensure that looms are well maintained,
5. Issue the loom cards, check that they are properly filled in (spot checks to be made),
6. Order spare-parts well in advance. Keep stock.
7. Handle defective loom reports.
8. Maintain high standard of quality.
9. Check with weaving preparation foreman that warps are coming through.
10. Check with the weft man that weft is available.
11. Keep the place clean and tidy.
12. Report any warps that are going to be delayed in weaving.
13. Training operators on the job.
14. Dealing with operators that are persistently below department standards,
15. Discipline in the department.
16. Responsible for security within the department.
17. Authority to grant special short term leave of absence.
18. Dealing with employee problems : queries, complaints, requests for transfers.

19. Responsible for maintaining work identification through the department.
20. Participation in selection of personnel required.
21. Signs in agreement with superior warning and suspension notes with copies to personnel department and trades union.
22. Responsible for any other duties as delegated by superior.

Job Description.

Position : Weftman Chargehand
Responsible to : Production Manager
Responsible for : Pirn winders
Weft yarn man
Pirn stripper.

Responsibilities :

1. Keep all looms supplied with correct weft.
2. See that weft is wound in advance for the night shift during the 8 hour working day,
3. Oversee the pirn winders, yarn man and the pirn stripper,
4. Get weft order slips from the warp man.
5. Order weft according to the instructions.
6. Organise the work for the weft winders to ensure maximum efficiency.
7. See that the packages are large enough.
8. Give work to the weft winders so that yarns cannot be mixed.
9. Keep weaker yarns on slower spindles.
10. Report to production manager if expected production cannot be achieved.
11. Discipline in the department.
12. See that place is kept clean and tidy.
13. Responsible for any other duties as delegated by supervisor.

26. Organisation Structure.

a) Present Organisation.

The present organisation is shown on the following chart

b) Proposed organisation.

The proposed organisation changes have been discussed with management. The changes relate to the Preparatory Department. At present, the Spinning General Foreman is required to supervise over 180 persons many of whom are on hand-work, such as, sorting, and who require considerable attention. It is proposed to separate the Preparation from the Carding and Spinning.

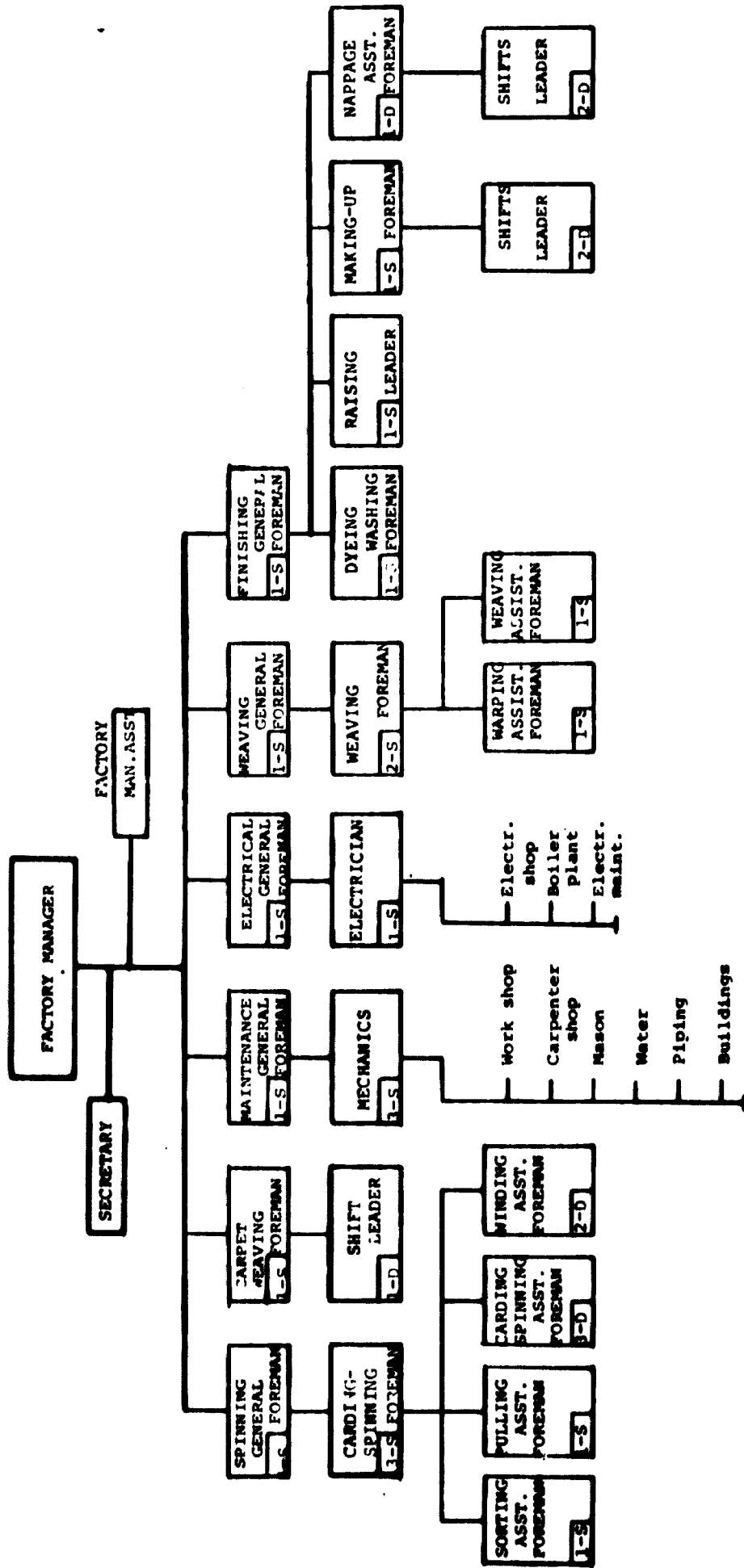
The Raw Material Store can at that time be placed under the jurisdiction of the Head of the Preparation Department.

The Nappage Department is recommended to be moved from the Finishing General Foreman to the Weaving General Foreman. This organisational structure change does not conform to classic guide-lines, wherein the party who is responsible for manufacturing the goods should not be responsible for inspection. In this instance, however, the problem of reporting defectively woven goods warrants the necessity of placing the inspection under the Weaving General Foreman so that the reporting need not be attributable to specific inspectors.

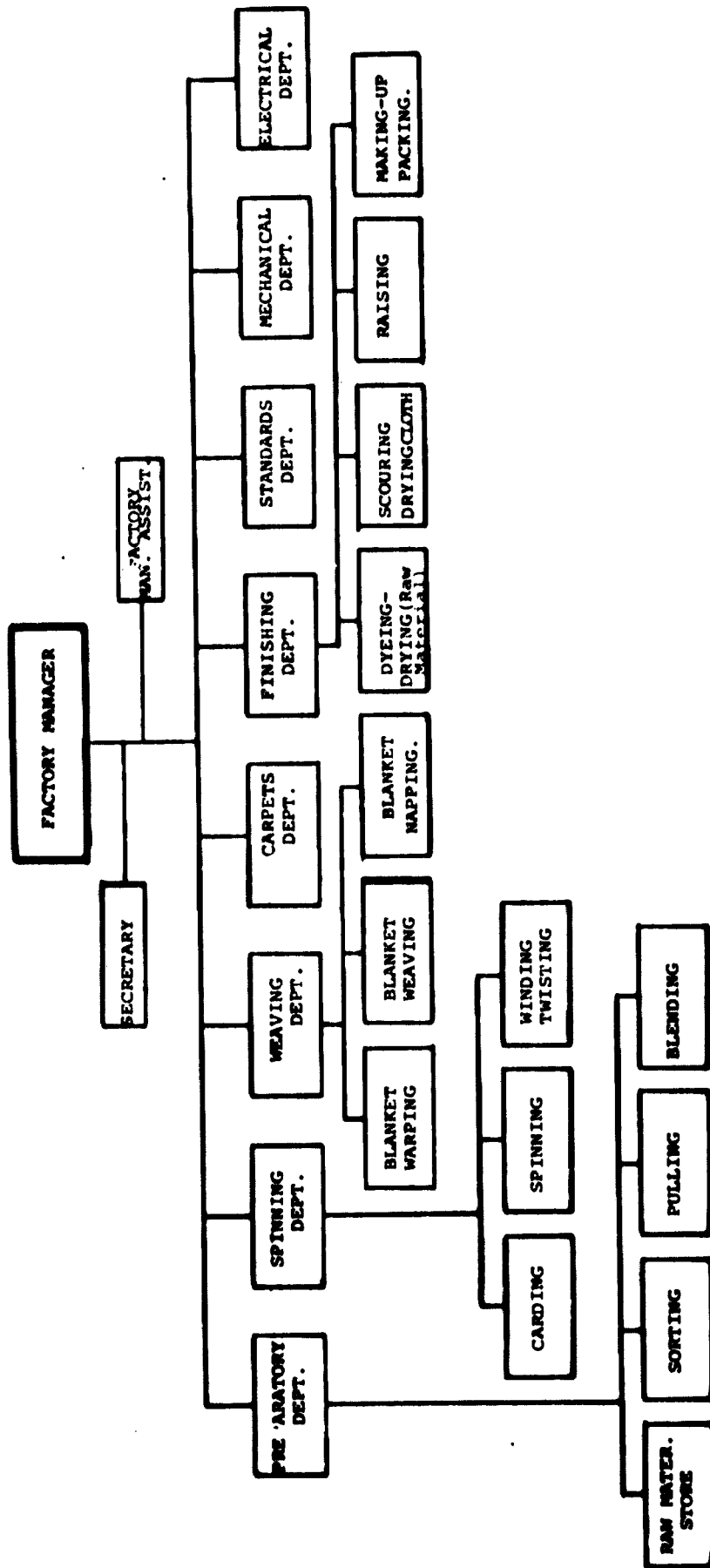
The Standards Department must now be included in the organisation structure.

Following is the chart illustrating the structure of the proposed organisation.

ORGANOGRAM OF THE
PRESENT ORGANISATION.



ORGANOGRAM OF THE
PROPOSED ORGANISATION.



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**WERNER INTERNATIONAL
MANAGEMENTS CONSULTANTS**

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DEBRE BERHAN WOOL FACTORY S.C.
IN ETHIOPIA**

VOLUME II - CHAPTERS IV AND V

**PREPARED BY:
WERNER INTERNATIONAL DEVELOPMENT
CORPORATION
ADDIS ABABA**

WERNER INTERNATIONAL
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IV. STANDARDS DEPARTMENT.

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IV. STANDARDS DEPARTMENT.

A great amount of time was spent in giving the Assistant Factory Manager instructions and explanations regarding the operations of the mill. All of the calculations which were made in the manufacturing analysis were done with the Assistant Factory Manager in attendance. The purpose was to provide him with as much working knowledge and experience as was possible to give during the analysis period. He was enthusiastic and responded admirably.

We decided that, among the many areas where improvements could be made, the one which would provide the greatest benefit to Debre Berhan Wool Factory was the installation of a Standards Department. Consequently, a large proportion of our time was spent in getting such a project underway and providing illustrations to the Management as to how a Standards Department functions.

Following is an outline of the functions of the Standards Department in the form which can be employed as a work programme.

1. Function.

The function of the standards department is to advise management of the operating condition of the mill vis-à-vis established standards. Consequently, management are better able to exert control over the operations and to implement improvements.

2. Establishment of standards.

- The Standards Department develops proposed standards via tests and observations.
- During this development stage the Standards Department personnel work closely with the mill supervision.
- The proposed standards and test data are reviewed by management and ultimately standards are established.

3. Routine testing and reporting.

The Standards Department conducts numerous tests and compile reports on a scheduled basis. The reports are submitted to management.

4. Areas which are standardised.

The Standards Department can ultimately be developed to cover many controllable items in manufacturing :

processing,
raw material,
waste,
quality,
maintenance,
labour unit cost,
productivity

We have strongly recommended that Debré Berhan Wool Factory establish a Standards Department and management have already proceeded to do so.

The Assistant Factory Manager has been given instruction on the functions and operations of a Standards Department. He has participated in the analysis of the manufacturing division and is familiar to some degree with the setting up of a Standards Department. Initially it will be his task to organise the Standards Department and to get it functioning.

We recommend that after the department has established processing and waste standards and routine testing, that he be sent to the United Kingdom to be trained in work study. He will then be in a position to train one of the men in the Standards Department to conduct this important work.

5. Staffing.

The department should initially employ a Standards Officer and a tester.

Following is a job description for the Standards Officer.

JOB SPECIFICATIONS.

Standards Officer in charge of the Department and responsible to the Factory Manager.

Duties : i. Responsible for carrying out the standard labour hour and standard labour cost control.

Responsibilities :

- every pay-roll obtain the wages paid and hours worked from the pay-roll officer,
 - obtain the production figures from departmental production sheets,
 - calculate the cost per unit,
 - distribute the information,
 - in case of any irregularities find out the possible reasons and report them in connection with the control data.
- ii. Responsible for carrying out the departmental efficiency and idle time control.
- every period get the departmental production statistics and calculate the percent of idle time and record the reasons.
 - get the regular hours worked and the overtime worked from the labour officer,
 - calculate departmental efficiency,
 - distribute the information,
 - in case of any irregularities find out the possible reasons and report them in connection with the control data.

iii. Responsible for carrying out departmental processing control programme and overseeing that the tester performs his duties properly.

- keep graphs and charts to control the frequencies of the testing programme;
- make sure tests are carried out and the results calculated and recorded,
- in carrying out the processing control programme be in close co-operation with the supervisory staff to ensure the optimum flow of information through various stages of manufacturing,
- make quarterly summaries showing the development of processing conditions in the various departments.

iv. Responsible for checking operators work-loads and renewing production standards as required.

(This work is to commence after the Standards Officer has been given basic work study training).

- when observations and processing tests indicate that there has been a change in the process, the Standards Officer will :
 - a. report the condition to the Factory Manager,
 - b. take necessary frequency and time studies,
 - c. prepare calculations,
 - d. present the results to the Factory Manager.

v. Follow up the performance and premium earnings of the operators.

- every pay-roll period check the performances and premiums earned by the operators,
- in case of continuous below-standard performances, study the reasons and give recommendations to the Factory Manager,
- check if the below-standard operators are using right methods,

iv. Own initiative.

- make recommendations to Factory Manager as how to improve conditions in the various departments.

6. Efficiency Control.

a. Terminology.

The following terminology is used:

i. theoretical production, calculated directly from speed

Example : Schönherr loom.

$$60 \times 98 = 5,880 \text{ Pix per hour.}$$

ii. overall efficiency.

$$\frac{\text{actual production}}{\text{theoretical prod.}} \times 100$$

Example : Schönherr production

33,500 picks per shift.

overall efficiency

$$\frac{33,500}{8 \times 5,880} \times 100 = 71.2\% \\ \text{=====}$$

iii. total machine hours,

The hours the machine was available for production :
normally always 8 hours per shift.

iv. Machine hours "idle".

The hours the machine was stopped for the following reasons :

- mechanical break down,
- change-over
- lack of material
- lack of bobbins (spools, etc...)
- no. of operators,
- power failure
- etc...

v. Machine hours worked.

Total machine hours (iii) less machine hours "idle".

vi. Running efficiency.

$$\frac{\text{Actual Production}}{\text{theoretical prod. per hr.} \times \text{machine hrs worked.}}$$

b) Calculations.

In each process section of the text of this report there are illustrations, where applicable, of the efficiency calculations.

The Standards Department should calculate every quality for each process in the same manner as has been illustrated. Summary reports for each period should be drawn up and submitted to management. The standards must be established via approval by management.

7. Processing controls.

The purpose of the processing controls is to guarantee optimum running conditions by carrying out a routine testing programme in the mill.

In carrying out these duties the Standards Department should work very closely with the Foremen and Mechanics and lend them all possible assistance in keeping the quality of the product and process under control.

The initial Processing Controls should include :

- percentage of waste in blending
- percentage of re-cycled waste in carding,
- end-break testing in spinning,
- end-break testing in cop-winding,
- idle spindle test in spinning,
- loom stops in weaving-blankets,
- loom stops in carpet weaving.

Each of these tests has been illustrated in the text of this report. These tests should be initially established on a weekly basis.

8. Waste Report.

The Standards Department should issue a Waste Report every period. The records should be reviewed with management every six months and new standards established. Following is an illustration of the Waste Report.

Debre Berhan Wool Factory		WASTE REPORT - SPINNING MILL.			WERNER INTERNATIONAL	
PERIOD :						
Blend Input weight + 1.5% oil -						
PROCESS	TYPE WASTE	RETURNABLE OR NON-RETURN	WEIGHT	PRODUCTION	% Waste on blend input.	
					Actual	Standard
Shaker	Under mach.	non-return				1.0
	Suction	non-return				1.0
	Fly	non-return	estimated			0.5
Card	Under card	non-return				1.0
		returnable				9.0
	Stripping & Peralta	non-return				2.0
Spinning	Fly	non-return	estimated			0.5
	Condenser	re-circulated to card proc.				20.0
	Suction waste	immediately				
	Floor waste					
Cop making	Fly yarn	non-return	estimated			0.5
		returnable	included with cops yarn			
	Lot run out	returnable				3.2
	Yarn	returnable				2.7
Sub-total		returnable				14.9
		non-return				6.5
		re-circulated				21.4
						20.0
TOTAL :						41.4

DEBRE BERHAN WOOL FACTORY		WASTE REPORT - WEAVING & FINISHING				WERNER INTERNATIONAL		
PERIOD :								
Input weight to weaving -								
Process	Type Waste	Returnable or non- return.	Weight	Production	% Waste			
					On input to weaving		On blend input to spin.	
					Actual	Stand.	Actual	Stand.
Weaving	Yarn	return.				9.7		8.6
	Sweeps	non-ret.				1.13		1.0
Raising	Suction	non-ret.				8.3		7.4
Last touch	Blanket cutting	Return.				3.36		3.0
- Sub-total Returnable						13.06		11.6
Non-return.						9.43		8.4
- Grand total Returnable								20.0
Spinning Non-								26.5
and returnable								14.9
weaving								41.4
Composition of blends.				Weight.		% Blend.		
New Raw Material								
Returned Waste								
Oil - 1.5%								
% Yield on blend input :								
% Yield on new raw material :								
<u>REMARKS.</u>								

9. Standard Labour Hours and Labour Cost.

A complete record of the standard number of persons required to produce the standard production must be drawn up by the Standards Department.

The following forms should be used for this purpose. The Standards Department must calculate the labour requirement and obtain approval from management before the standards are established.

Debre Berhan Wool Factory	<u>STANDARD LABOUR HOURS.</u>	Werner International
------------------------------	-------------------------------	-------------------------

Department :

CODE	JOB CLASSIFICATION.	OPERATOR HOURS PER DAY.				Hrs per Departm. Hour.	
		Day only.	S h i f t s				TOTAL
			I	II	III		
	Direct :						
GRAND TOTAL							

REMARKS.

10. The Labour Cost per Unit of Production.

From the labour complement the labour cost per department must be calculated. Since the labour complement is based on the standard of production established for each department, the standard cost per unit of production can readily be determined. These calculations must be given to the Costing Department for the establishment of the Standard Costing.

The actual labour cost vis-à-vis the actual production must be calculated each period in order to determine the actual labour cost per unit of production. This figure must be compared to the standard, these comparisons must be reported to management each period.

Following is an illustration of a comparison report.

11. Liaison with Costing Department.

The Standards Department must inform the Costing Department of every change in standards so that accurate costings can be calculated. This applies to the following :

- Production & Efficiency Standards,
- Waste percentage Standards,
- Labour Cost Standards

12. Production targets for the Mill.

a) Base for the Standard Production Target.

The carding production is the bottle-neck that determines the spinning and blanket production.

The overall efficiency of the carding 1st to 12 Aug. was 57.7% (August was selected, because it was the best in 1974). Based on Werner calculations, the standard was set to 71% overall efficiency to be achieved after the reconditioning of cards. In the meeting on Sept. 16 it was decided that the first target would be 10% below this figure, and after reconditioning is completed it would go to 71%.

CARDING STANDARD PRODUCTION - BLANKET YARNS.

Card No.	100% output kg per m/c hr	71% output kg per m/c hr	90% of the 71% output kg/m/c hr	Product. kg per 144 kg hr work
1	80.6	57.2	51.5	7,416
2	84.7	60.1	54.1	7,790
3	67.2	47.7	42.9	6,178
TOTAL	232.5	165.0	148.5	21,384

The first target represents 63.9% overall efficiency which is 10.7% improvement on the 1st to 12th August 1974.

b) Production Balance for the first standard production Target.

Basis :

- carding capacity of 21,384 kg/week
- recycling spinning-carding 20%
- new material required from blending
 $0.80 \times 21,384 \text{ kg} = 17,107 \text{ kg}$
- waste before carding output

shaker : under mach.	1.0%
: suction	1.0%
: fly	0.5%
card : under card	10.0%
: stripping & Peralta	2.0%
: fly	0.5%
TOTAL :	
	15.0%

Blending : input 20,126 kg per week (15% waste)

Bland as follows

- 26.5% returned waste
- 1.5% oil
- 72.0% new stock

New stock needed $0.72 \times 20,126 = 14,491 \text{ kg/week}$.

Pulling : 70% of the raw material going into blends is pulled.

Input to pulling $0.70 \times 14,491 = 10,144 \text{ kg/week}$

Carding : carding capacity 21,384 kg/week.
 =====

Spinning: recycling 20% production

$0.80 \times 21,384 = 17,107 \text{ kg/week}$

less 6.4% waste 1,288 kg Prod. 15,835 kg/week

yarn for cops making.

Cop -making & weaving waste :

Waste from cop -making	2.7%
Weaving (yarn 8.6%, sweeps 1.0%)	10.83% (of input weaving).
Yarn from cop -making	15,392 kg
Yarn used for blankets	13,636 kg
Waste	1,656.12 kg.

Yarn weight per blanket : $\frac{1086 \times 179 \times 52}{15 \times 25} = 2.696 \text{ kg}$

No. of blankets per week : $\frac{13,636}{2.696} = 5,058$
 =====
843 per day.

Weaving requirements : Picks per blanket 2,390

M.Pix per week required $5,058 \times 2.390 = 12,089$

Weaving capacity : Schönherr $29 \times 96 \times 5,880 = 16,370$ M.Pix

Snoeck $6 \times 96 \times 5,400 = 3,110$ "

Jacquard $6 \times 96 \times 4,500 = 2,592$ "

Total : 22,072 M.Pix

The weaving has to run at 54.8% overall efficiency if all looms are used.

22 Schönherr in operation $22 \times 96 \times 5,880 = 12,419$ M.Pix

Snoeck $6 \times 96 \times 5,400 = 3,110$ M.Pix

Jacquard $6 \times 96 \times 4,500 = 2,592$ M.Pix

Total : $34 \sim 68$ weavers = 18,121 M.Pix

With 22 Schönherr looms, overall efficiency required is 66.7%.

Cops winding : production divided in proportion to loom picks.

big cops Snoeck - 3,110 Pix - 17.2%

small cops Sch. & Jac. 15,011 Pix - 82.8%

Yarn to cops winding 15,835 kg - 2,724 kg big cops

- 13,111 kg small cops

Small cops 2,186 kg per day/2 shifts 94% eff. on 22 spdls.

Big cops 454 kg per day/2 shifts 73% eff. on 7 spdls.

Twisting (cotton 2 ply) yarn Ne. 2/21 = Nm 2/35

speed 12.3 m./min.

Production at 89% eff. $\frac{12.3 \times 60 \times g. \times 0.89}{\text{min.} \times 17.8 \text{ m.}} = 37 \text{ gr/sp/hr.}$

= 7.1 kg/mach.hr.

=====

Expected production per week 1,022 kg

=====

Warping : Expected production 11 warps/48 hrs

Required production 7 warps/48 hrs

with full cones the department is 64% occupied.

Man hours per product/finishing.

	Unit	Basic	Total hours
Raw material	250 kg	6.00	7.80
Carpet yarn	35 kg	2.50	3.25
Fam. blanket	1 pc	5.40	7.00
Norm. blanket	1 pc	1.60	2.10

Example :

Actual prod. raising 1 dyeing week XY.	Production	Man hours required
Raw material	5,000 kg	20 x 7.8 = 156
Carpet yarn	200 kg	5.7 x 3.25 = 18.5
Fam. Blanket	30 pcs	30 x 7 = 210
Norm. Blanket	150 pcs	150 x 2.1 = 315
Total std. man hours		699.5

The Department has 20 operators.

Actual man hours 20 x 48 = 960 man hours

Dept. efficiency $699.5/960 \times 100 = 72.8\%$

=====

V. DETAILED ANALYSIS OF THE MARKETING DIVISION.

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V. DETAILED ANALYSIS OF THE MARKETING DIVISION.

1. General Background.

Debré Berhan Wool Factory markets the following products all of which are sold in Ethiopia :

blankets - raised wool type manufactured from
long fibre waste material
carpeting- woven, the pile yarn manufactured from long
fibre
handicraft yarn - spun from local wool and selected
waste fibre.

Over 93% of the production is blankets. Handicraft yarn is spun very infrequently. The remainder of the production goes into carpeting.

At the present moment, all of the blanket production is being sold.

The present carpet production is also being sold since the company has a large contract with the new AID Bank Building.

Until a year ago the products were not selling well. The blankets were unsuited to the markets. However, since the present Management has been appointed, the blankets have been re-designed. The new bright colours had considerable impact on the market; and the demand for blankets generally, and home produced ones in particular, has risen and is continuing to rise. The consequence is that the Debre Berhan Wool Factory is selling all of the production and could sell more.

There is virtually no inventory of blankets. There is a large inventory of carpeting in various widths and piece lengths.

The blanket market at the moment is firm.

The carpeting market is in reality in the embryo stage.

The Handicraft Yarn Market is very strong. The production limitation is related only to the raw material supply which is very small.

2. Organisation Structure.

a) Present.

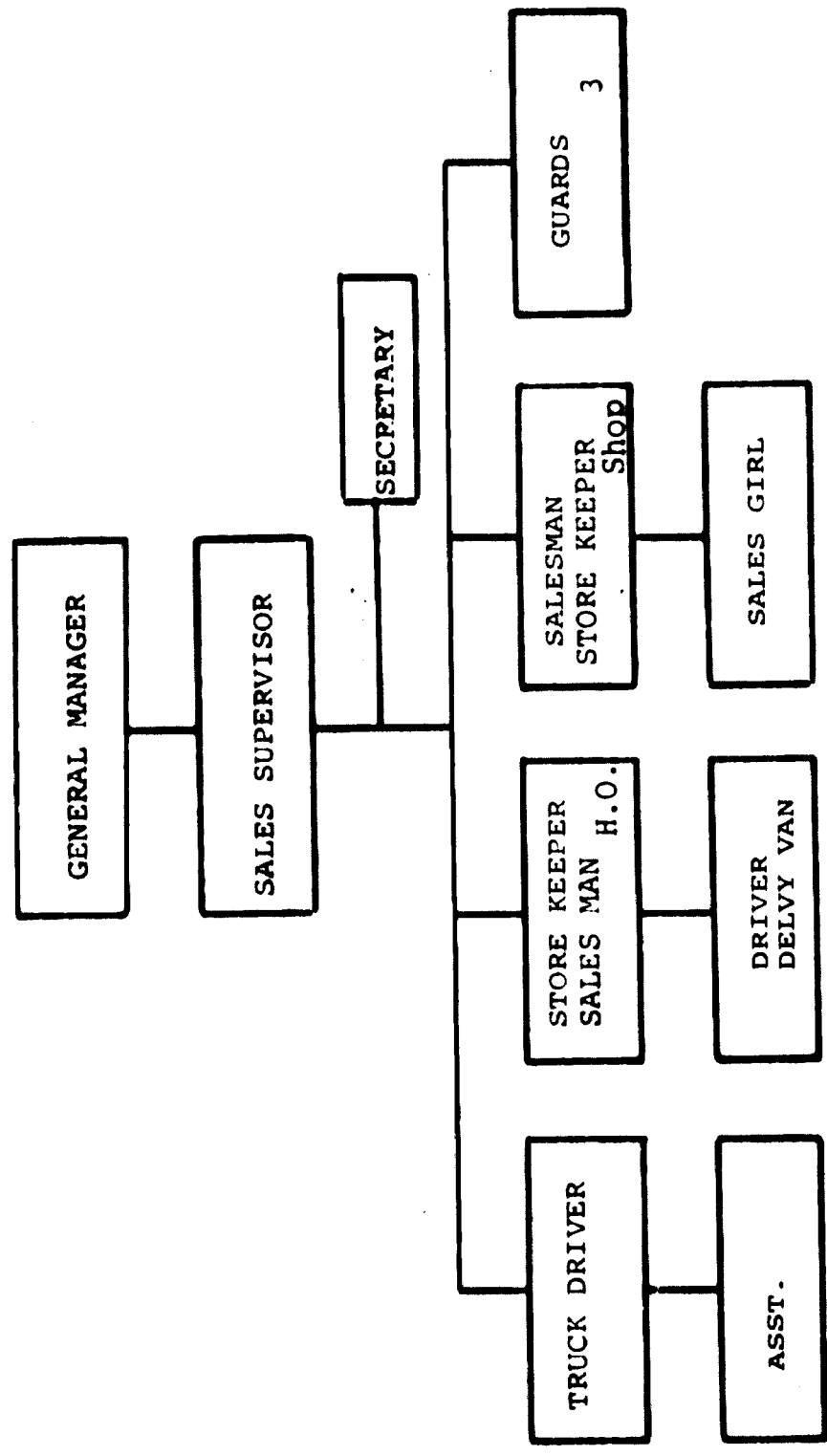
The marketing of blankets is carried out by the Ethiopian Distribution Company "EDISCO".

The Head Office Sales Department sells directly about 10% of blanket sales and all of the carpet and handicraft yarns. The sales are made either through the Retail Sales Shop or the Head Office Show Room.

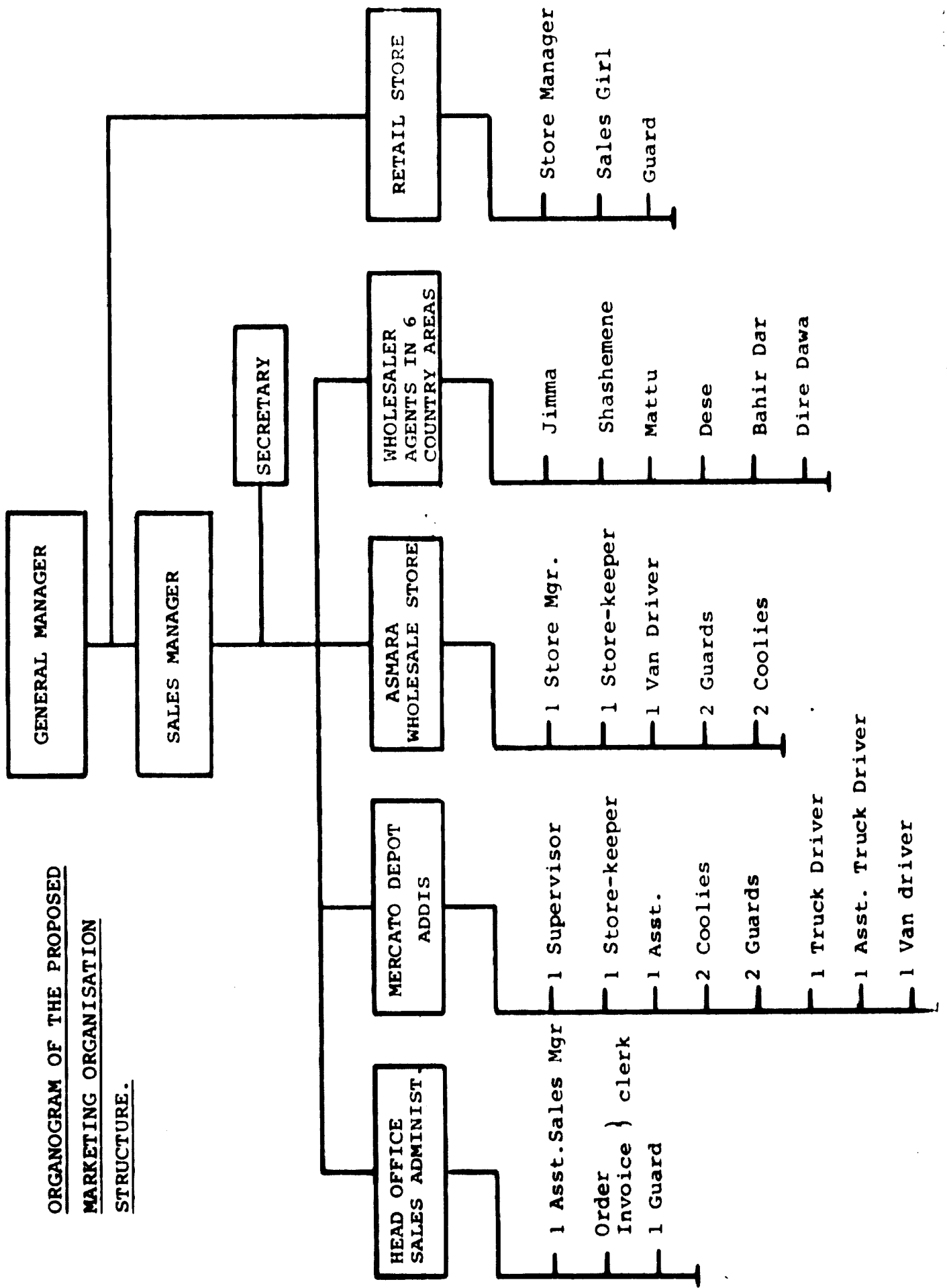
b) Proposed.

It is recommended that Debre Berhan Wool Factory market all their products via the Company Sales Division. This move would necessitate an enlarged marketing staff and additional marketing locations.

ORGANOGRAM OF THE PRESENT MARKETING ORGANISATION STRUCTURE.



ORGANOGRAM OF THE PROPOSED
MARKETING ORGANISATION
STRUCTURE.



3. Blankets.

a) Present Situation

- i. Sales : the market situation is such that all blanket production could be sold easily and whenever more blankets could be produced, the market is able to absorb them.
- ii. Design : the bright colours and designs incorporated in the latest range of blankets are acceptable in the market and Debre Berhan Wool Factory has moved from a position in which it trailed behind its competitors to one where it has become the leader.
- iii. Distribution : apart from blankets sold through either the Head Office Sales Show-room or Retail Store, the sole distributing agents for blankets are EDISCO (Ethiopian Distribution Company). In the year July 1973- June 30, 1974, Edisco distributed blankets to the value of Eth. \$ 3,365,238.- or 90% of the blankets sold.
- iv. Edisco : Edisco works is a distribution agent earning commission on sales generated. An annual contract, starting date July 1, '74 has been agreed and signed by which Edisco earns 5% on the first Eth.\$ 2x10⁶ blanket sales and 4% thereafter. The contract terms are to be re-negotiated for the next year and any cancellation has to be notified in writing by either party at least one month before the expiry date of the contract. Edisco has a total of 19 distribution points through the country, including the central depot in Addis Ababa. Each depot has a branch manager who has the opportunity to earn personal bonuses under an incentive scheme proposed by Debre Berhan Wool Factory and contributed to jointly by Debre Berhan and Edisco.

Edisco are responsible for :

- 19 distribution depots,
- actual distribution,
- splitting deliveries between branches,
- collecting orders and moneys due,
- bad debts,
- feeding back market information to Debré Berhan,
- issuing stock lists/sales per branch per 10 days,
- payment to Debre Berhan of sales value, less commission, distribution transport and handling charges, within the first few days following each 10 days period,

Debre Berhan Wool Factory is responsible for :

- transport and handling costs,
- investigating market reports originated by Edisco.

v. Sales volume :

During the 12 months ending June 30, 1974 a total of 312,000 blankets were sold though the production during this period totalled only 192,555. The difference of 119,445 between sales and production represented the very large stocks of blankets held at the start of the period and which were disposed of during the year. As many of these blankets were old stock, because their design and colour had no consumer appeal, the fact that they were sold with little or no price reduction indicates an upturn in demand.

vi. Sales per Distribution Means:

July 1, 1973 - Une 30, 1974.

Debre Berhan Head Office Sales,

- including Retail Store :	10%
Edisco :	90%
	<u>100%</u>

Edisco sales per branch : 12 months period.

	<u>Units</u>	<u>Percentage of sales</u>
Addis Ababa	171,084	65.2
Asmara	32,236	12.3
Bahir Dar	2,679	1.0
Dessie	2,291	.9
Dilla	3,200	1.2
Jinma	4,658	1.8
Agarow	3,775	1.4
Mattu	2,104	.8
Dire Dawa	13,786	5.2
Gimbi	3,828	1.5
Shashamene	3,079	1.2
Gondor	3,625	1.4
Nazareth	10,050	3.8
Mehal Meda	825	.3
Yirga Cheffe	2,250	.9
Nogelle Borena	550	.2
Awasa	325	.1
Debré Berhan	930	.4
Kulubi	1,304	.5
Total :	262,579	100

Edisco believe they could sell 500,000 blankets per annum.

The actual sales made per area do not reflect the potential sales in each area. Edisco have disposed of all the blankets available to them in the most easily accessible markets where they would sell.

vii. Selling Range and Prices.

12 months ago the range of blankets exceeded 40 in number. Some of these were non-profit making. The policy of the new management has been to eliminate the non-profitable lines and thereby rationalise the production. The advantages of this move are obvious but the danger is that Debré Berhan may no longer offer a comprehensive range of blankets.

Debré Berhan Selling Range.	Ethiopian Dollars (October 1974)			
	Range number. (March 1974)	Wholesale* price (Edisco)	Retail * price (Head Office)	Comment
1805 B	4.-	5.-		
900	8.-	10.-		Discontinued
901	8.-	10.-		"
1200 (airforce)	12.-	-		"
1200 (army)	14.-	-		
CC	15.-			Discontinued
1801/N	17.-	18.50		Not continuous production.
1500/New	16.25	-		Discontinued
1802	17.-	18.50		"
1802 RR	-	19.-		"
1804	17.-	18.50		In range.
1800	18.50			Discontinued
1805/N	17.-	18.50		
1900 RR	17.50	19.-		
1800 RR		19.-		Discontinued
1804 RR		19.-		
1801 RR	17.50	20.-		
500 Baby		18.-		
1801 F	24.-	26.-		
1804 F	24.-	26.-		In Range
1900 F	24.-	26.-		
500 N	45.-	50.-		
500 F	60.-	70.-		
Z/F	27.-	30.-		
Z/RR	19.-	21.-		
1805 child	9.-	11.-		
Z/N	18.-	20.		

* Add 2% turn-over tax.

Best seller : 1805

Code : RR : Ribbon all round blanket.

F : Family size

N : Normal bed (ribbon on 2 ends only).

Dealers who buy from Edisco (sub-wholesalers and retailers) have no price-list to work to. They earn whatever margin they can and this ranges from about Eth. \$ 0,25 to Eth. \$ 2.- for the normal blanket type.

Debre Berhan Wool Factory and Edisco have an agreement whereby Debré Berhan retail sales prices are according to the differentials listed above by blanket type.

Trimming ribbon used : woven viscose narrow fabric folded over edge of blankets, edges doubled under and sewn with double, straight line, plain stitch.

Presentation :

All blankets are baled in the mill with 25 blankets per bale. The only difference in presentation between high and low qualities is that the high qualities are initially individually wrapped in plastic whilst the low qualities are not plastic wrapped.

All blankets carry the Debré Berhan trade mark sewn to the blanket.

viii. Competition : Blankets.

Production in Ethiopia showing capacities per company per annum.

	1969/70	1970/71	1971/72	1972/73	1973/74	Proj. 1976
Cotonificie Brattolo (1)	23,000	25,000	27,000	29,000	30,000	150,000
Cotton Company of Ethiopia (2)	190,000	156,000	106,000	80,000	80,000	100,000
Indo Ethiopian (3)	170,000	175,000	189,000	278,000	300,000	300,000
Lazaridis (4)	300,000	300,000	332,000	332,000	332,000	480,000
Debré Berhan (5)	170,000	169,000	195,000	187,000	300,000	450,000
TOTAL :	853,000	825,000	849,000	906,000	1042000	1480000

Total capacity available 1973/74 : 1,160,000 Normal Blankets

- 1) Brattolo, based in Asmara produces low quality blankets from Cotton waste materials. Reported to be increasing capacity to 150,000 blankets per annum.
- 2) Cotton Company of Ethiopia, is a Japanese owned company presently producing below capacity (80,000 represents only 40% of capacity utilisation) and uses only acrylic waste materials.
- 3) Indo-Ethiopian has a capacity of 300,000 blankets per annum and uses only cotton waste materials.
- 4) Lazaridis, Debré Berhan's principal competitor, has a capacity currently of 330,000. Of this total 260,000 are woven from the same waste materials as Debré Berhan and 70,000 from cotton waste. Lazaridis is also reported to be increasing his capacity by 150,000 which will bring his capacity to 480,000 per annum.

5) Debre Berhan can reach a production total of 300,000 from installed capacity.

Investment in machinery to increase the production of carding and spinning would enable loom capacity to be fully utilised and a production of 450,000 blankets p.a. to be achieved.

ix. Imports.

Imported blankets have declined remarkably over the last 4 years.

Year	Total Number	Total Value	Av. Value/Blanket E.¢
1970	154,093	254,110	1.65
1971	146,924	273,077	1.86
1972	99,404	226,576	2.28
1973	62,025	185,749	2.99

In the period 1970-1973 imports have declined by 60%.

100% wool blankets : represented 1.3% of imports in 1970 and 3% in 1973. The average price in 1970 was Eth.¢. 15.75 and Eth.¢ 19,56 in 1973.

100% cotton blankets : represented 95% of imports in 1970 and 89% in 1973. The average price in 1970 was Eth.¢. 1.23 and Eth. ¢ 1.73 in 1973.

Wool/Cotton mixtures : represented 1% of imports in 1970 and 9% in 1973. The average price in 1970 was Eth. ¢ 13.33 and Eth. ¢. 22.27 in 1972.

The dramatic decline in imports was brought about by the sharp increase in import tariffs in 1971/1972 (Eth. ¢. 5.- per kgm of blanket), in order to protect the home producing industry in addition to 15% transaction tax, 1% municipality tax and excise tax of Eth. ¢ 2.- per kgm.

x. Apparent Consumption : Blankets per annum.

	1970	1971	1972	1973	1976 (Est.)
<u>Production</u>	825,000	849,000	906,000	1,042,000	1,480,000
<u>Imports</u>	154,093	146,924	99,404	62,025	50,000
<u>Exports</u>	-	-	-	-	-
<u>Apparent Consumption</u>	979,093	995,924	1005,404	1,104,025	1,530,000

Consumption of blankets has increased consistently since 1970. The estimated apparent consumption of 1.5×10^6 in 1976 is, perhaps, optimistic according to demand and is based on the production expected to be available and the imports. A more accurate estimate of consumption in 1976 is thought to be : 1.35×10^6 blankets.

xi. Reasons for increase in Consumption and future expansion.

- Change in climate : cooler and wetter weather
- Change in political climate : distributors are not importing as many blankets because of uncertainty over duties.
- Gross National Product is increasing.

Year	Gross National Product x 10 ⁹ E.₡	Annual change.
1969	3.78	
1970	4.14	+ 9.5%
1971	4.39	+ 6%
1972	4.402	+ 7%
1973	4.646	+ 5.5%

When inflation is taken into account, rate of increase of Gross National Product in real terms was 1% average.

However, as a blanket is an essential piece of clothing and furnishing in the mountainous regions - and a prestige items also - the purchase of a new blanket rates high on the shopping list of most people.

xii. Competitors' Prices.

Lazaridis : Cotton waste blankets : non-woven made of coarse count yarns, screen printed and over-stitched edges : Eth. § 7,25-7,75 per normal sized blanket.

Woollen waste blankets : 1.6 x 2.2 metres is the closest competitor to Debre Berhan's best seller - 1805/N. Woven designs with all round, warp-knit trim and zig-zag sewing. Eth.§. 17,25 - 18.-, i.e. Eth.§. 0,45 - Eth.§.1.- cheaper than Debre Berhan's 1805. Softer finish through extra raising, lower picks than Debré Berhan but heavier warp.

Local cotton waste woven (not Lazaridis).

- : light weight, very poor quality, Eth.§.5,50 - E.§ 6.-
- : light weight, poor quality with blue woven border, Eth. §. 6,40 - Eth.§. 6,90

Japan cotton woven :

medium weight, all round border, good quality,
Eth. § 8.- to Eth. §. 8,40.

Imported Merino wool quality : from Italy,

similar to Debre Berhan's 500 type.

Imports retail at Eth. §. 65.- compared with
Eth. §. 60.- for Debré Berhan's 500 type.

Bed sheets : are sold in the market at Eth.§. 15.-

Coloured woven, striped, mattress covers, sold as cheap alternatives to bed-sheets, retail at Eth. §. 10.-

b) Recommendations.

- i. Our recommendations for the marketing of blankets are mainly concerned with the distribution and sales points. We repeat that we recommend that the Debré Berhan Wool Factory markets its own blankets.

The details of the proposed distribution are discussed elsewhere in this report.

- ii. Product development.

We support the recently innovated designs and new colours that have been developed. We recommend a minimum of 2 new designs and a maximum of 4 be introduced per annum in order to stimulate the market, keep the Debré Berhan Wool Factory ahead of its competitors, and to motivate the production departments.

- iii. Rationalisation.

We support the moves to rationalize the variety of constructions in the blanket range and the reasons for them, i.e. to eliminate non-profitable lines. We would, however, recommend that a comprehensive range covering sizes, types and designs, so that major market demands can be supplied as fully as possible.

- iv. We recommend that a system of continuous market reporting and marketing controls be instituted to keep management informed of all sales activities and market conditions.

- v. Presentation of products does not seem to be a problem at the present time. However, the marketing information service will advise of changes that may need to be made in order to increase the appeal of the products. For example: the trimming used on the blankets does not, for reasons of economy, appear on all 4 edges of many of the blankets. Additionally, the sewing does not always cause the trimming to lie flat.

Falling sales in more difficult times could be arrested if greater attention is paid to this sort of detail.

c) Forecasting and long range planning.

The market for blankets is buoyant and is expected to continue to grow.

According to a recent study of the textile sector of industry in Ethiopia, the real gross domestic product per capita growth was projected at 2.5% per annum up to 1982. The per capita increase in textile consumption during the same period would be 2.1%. When combined with the population increase, the projected growth in the consumption of textiles would be about 4% per annum.

As a basic necessity, textiles range second only to food. Furthermore, it is a fundamental status symbol. As such, it is our opinion that the growth of textiles will exceed the forecast made in the above mentioned report. However, even the forecast which was made is sufficient for Debre Berhan Wool Factory to plan for future growth and expansion. In addition, it is our opinion that the wool-type blankets will increase in popularity and capture a larger portion of the market.

Consequently, the planned increase in production through productivity improvements to a volume of 300,000 in the short term should be marketable by the Sales Department in the Home Market.

i. Long range planning - First stage.

We propose a capacity increase be considered after two years. This capacity to be additional carding and spinning in order to balance the weaving capacity which is available. Such an addition is estimated at approximately 50% which would bring the capacity to 450,000 blankets.

ii. Long range planning - Second stage.

The home market can take large quantities of cheap blankets as well as the more expensive (1805) and very expensive (500). All three will grow. When production and sales are approaching 450,000 blankets per annum, we recommend that the lower quality market be considered.

The consumer reputedly associates weight with value and warmth. Although this point is probably valid in today's market, there may be a large number of consumers who, in a few years, will recognise that bulk and fluffiness provides greater warmth. In anticipation of this change as well as planning for further growth, we recommend that a needle-punch blanket unit be considered. Such a unit has a very large capacity. The end product is quite different from the present blanket production. The raw material mix is different. It is possible that the hair from the local tanneries can be used as a raw material.

It would be essential to investigate this equipment and its products examined thoroughly. The marketing of such products would have to be well tested, prior to investment of capital.

4. Carpets.

a) Product types.

Two types of carpets are manufactured :

- . 4 mm loop pile, plain weave, uni-colour from dyed fibre - 4 metres width.
- . 6 mm cut pile, plain weave, uni-colour from dyed fibre 4 metres width.

Warp length : equivalent to 20-25 metres carpeting.

b) Present situation.

i. Selling policy.

The selling policy has been to manufacture carpeting speculatively and to retail it through the Head Office Sales Department and Retail Stores.

Some standard sized carpets are prepared speculatively and are held in stock in Addis Ababa and at Debre Berhan. The sizes of these carpets are 3 m. x 2 m., 3 m. x 3 m., and 3 m. x 4 m.

The remainder of the carpeting is cut to customers' requirements, sewn on the raw edges and delivered. When customers place orders for carpets that have to be cut to order, deposits are required to guarantee good faith.

No positive selling policy has been followed. Government Offices, i.e. the Contract Sector, have been advised to purchase carpet requirements from Debré Berhan through the Central Government Authorities but have not been specifically instructed to do so.

Debré Berhan has tendered for orders for Government Offices in competition with imported carpets but have not always been awarded the contract.

It should be noted that the only carpet production made against a definite order is the current order from the A.I.D. Bank (Agricultural & Industrial Development Bank) for 16,000 square metres of the 6 mm cut pile quality.

The Private Sector business has been built up during the last 12-18 months through "word of mouth" and through the reputation of the Retail Store

Contract Sector :

The Contract Sector has accounted for 75% of all Retail Sales in the last 24 months. 90% of contract sales have been in the 4 mm. loop pile market.

Preferred colours : beige - green - blue - olive.

Private Sector :

The Private Sector has accounted for only 25% of Retail Sales. There have been more individual sales than in the Contract Sector.

Most customers in the Private Sector prefer the 6 mm. cut pile type for quality reasons but buy the 4 mm. loop pile for price reasons.

Preferred colours : 4 mm type - red - yellow - orange -
olive,

6 mm type - red - blue.

11. Pricing Policy.

The current pricing policy is to offer the two carpet products at standard prices without regard to the size of carpet or carpeting purchased.

Prices per Square Metre :

4 mm. loop pile : Eth. ₤. 25.-

6 mm. cut pile : Eth. ₤. 35.-

The stock remnants are sold at the same standard prices per square metre. If discounts are demanded by customers for small pieces, a maximum of 10% is deductable from the standard price.

Credit is not given.

iii. Sales and Stocks 1973/1974.

Square metres.	4 mm type	6 mm type	Total
Closing stock 31.10.'73	2500.4	984.4	3484.8
Closing stock 31. 8.'74	4526.2	7824.6*	12350.8
Production Nov.'73 to Aug.'74 incl.			15718.8
Sales : 1.11.'73/31.8.'74			6852.8

* including 2217.4 square metres of A.I.D. Bank order.

Sales accounted for only 57% of production, and 43.5% if the current A.I.D. Bank order is excluded.

The differences between the Opening and Closing Stocks for this 10 months period show the following increases :

4 mm. type : 81%

6 mm. type : 470% (A.I.D. order excluded).

(as the 6 mm. quality is the type that sells less well, the problems of speculative production can be appreciated.

iv. Analysis of carpet, and carpeting - Stock

Situation, August 31, 1974.

4 mm. type - 20 'full-sized' rolls carpeting, i.e.
(all colours ± 20 m. x 4 m.
including - 447 odd sized pieces of average size 6.5 sq.m.
black). (N.B. 39 pieces are smaller than 2.0 sq.m.)

6 mm. type - 65 'full-sized' rolls carpeting, i.e.
(all colours) ± 20 m. x 4 m.
- 200 odd sized pieces of average size 13 sq.m.

The odd-sized pieces are primarily "off-cuts" remaining after :

- i) customers' orders have been cut from rolls,
- ii) standard sized carpets have been cut and sewn,
- iii) downgraded pieces with manufacturing faults.

The Company policy for disposing of remnants that was earlier agreed upon, but as yet not implemented, is for the Sales Department to sell remnants through garages and stores for car-mats, bed-side mats, etc...

v. Country-wide Carpet Production.

1. Debre Berhan is the sole industrial manufacturer of carpeting and carpets producing woven carpets.

Year	Debré Berhan Production * square metres.	
1970	4370	1092
1971	4680	1170
1972	+6000	1500
1973	6712	1678
1974 (1st 6 months)	7789	1947
1974 (July/August - AID order)	+4900	1225

* Source :
Central Sta-
tistical Of-
fice and Debre
Berhan records.

2. Hand knotted carpets are produced by 10 Institutions within the country, i.e. Rehabilitation centres, prisons, Government Training Schools, etc..., and by some cottage schools.

The hand knotted carpets are made with local hand spun or machine spun yarns from Debre Berhan and retail at prices from E.£.55.- to E.£. 110.- per square metre.

From price considerations, these hand-knotted carpets which are sold primarily to foreign residents and tourists, are not competing for the same market as Debre Berhan production.

vi. Carpet Imports.

Imports are the only other source for retail sales and are offered by 3 stores. The principal retail store, who is also the importer, is Karibian who stocks carpets from world-wide sources that include the United Kingdom, Belgium, China, India as well as the Middle-East.

Karibian's stocks include :

- 1) carpeting - uni-colour, plain weave
- 2) " uni-colour, patterned weave
- 3) " printed, plain ground,
- 4) " printed, patterned ground
- 5) carpets and carpeting - coloured, woven Jacquards and tufted
- 6) carpets/scatter rugs - hand knotted
- 7) carpets and scatter rugs - raschel knitted, long loop.

The majority of the carpeting selection was in tufted qualities.

Prices for imported articles (1-7), which are competing for the same market as Debre Berhan Production, varied from E.£. 42.- to E.£. 56-per square metre.

Carpet width : Karibian offers carpeting up to 4 metres wide. Carpeting and carpets are made-up to the required size at no extra charge.

Remnants : The policy regarding remnants and off-cuts is to dispose of these at 50% of the standard unit area price for that particular quality.

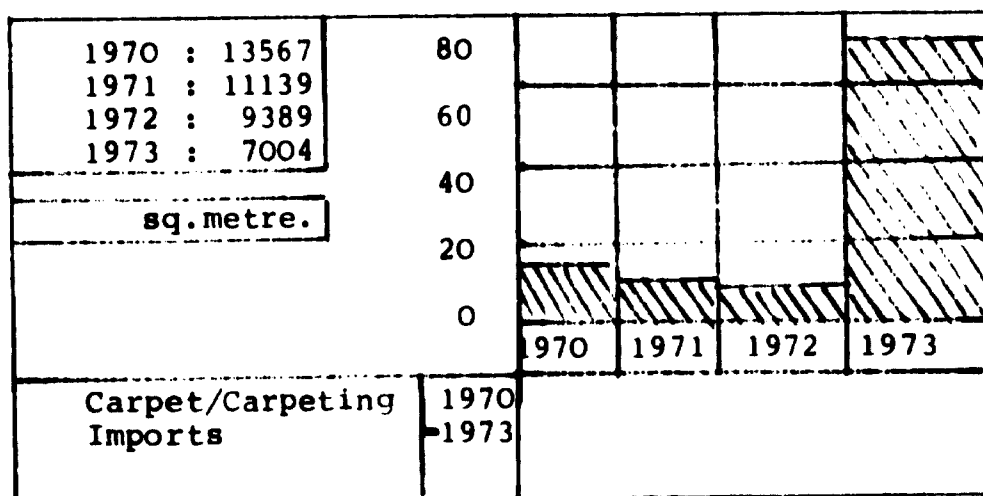
Credit : Karibian does not offer credit facilities to customers.

Volume of Imported carpets *

	1970	1971	1972	1973
Carpeting : sq. m.				
Knotted woollen	-	1260	17	18
Knotted cotton	98	1067	-	2992
Knotted other fibres	9619	2744	5958	60039
Woven woollen	-	1075	-	2737
Woven cotton	2591	2	-	92
Woven other fibres	1259	4991	3414	4063
Total :	13567	11139	9389	70011
Carpets : number	14405	25239	17337	24002
Rugs : number	2033	46	431	287

* Source : Customs House Annual Statistics.

The official statistics categorise carpets and carpeting as either knotted (hand/machine) and woven. No separate identification is made for tufted and knitted carpets and carpeting.

vii. Consumption.

Imports, and presumably Retail Sales, showed a small decline from 1970 to 1972 but a sudden increase in 1973. The 1973 imports of 70011 sq.metres represented a 640% increase over 1972.

During the same 4 year period imports of carpets fluctuated from year to year but in 1973, the total was 24,000 carpets. At an average size of 9 sq.metres, the amount of imported carpets totalled : 216,000 sq.metres.

Rugs (scatter rugs) have dropped consistently over the last years, so that the 1973 imported total represented only 14% of the volume for 1973. If the average sized rug is 2 sq.metres, then the area of imported rugs in 1973 = 576 sq.metres.

The total carpet/carpeting /rug imports in square metres

carpeting	: 70011
carpet	: 216000
<u>rugs</u>	<u>: 576</u>
Total	: 286587 square metres.
*****	*****

c. Recommendations.

Given the following basic criteria, we recommend that the company continue with the production and marketing of carpets and carpeting.

Basic Criteria.

- The market for carpet/carpeting /rugs is growing and will continue to do as the Gross National Product increases.
- the company has the production facilities for producing the dyed yarns, carpet weaving and finishing,
- the product cost has been calculated out exactly and shows that the production of carpeting can be profitable provided the problems of marketing can be overcome.
- the distributive means to wholesale and retail carpeting is established,
- the product is acceptable to the market.

Detail of Recommendations.

1. The manufacturing policy for carpets should be changed from a policy of speculative production to a policy which requires at least 50% of a warp length to be sold before any stage of manufacture is begun.

The purpose of this recommendation is to contain the possible stocks of unsold production to a reasonable volume.

We propose that customers, from both the contract and private sectors, should place orders with any one of the sales outlets and, when these orders totalled together for any one carpet type and colour amount to 50% of the production of one warp, manufacturing should proceed with the production of the whole warp length.

This activity will require careful planning, programming and forecasting by both the Sales and Production Departments to ensure that production proceeds with the maximum speed when a sufficient part of the warp has been sold.

ii. The Standard width of the carpeting should be reduced from 4 metres to 3 metres.

The standard carpet sizes are 3 m. x 2 m., 3 m. x 3 m., and 3 m. x 4 m. This move will restrict the numbers of stock remnants which are difficult to sell.

If customers order complete warps on a 4 metres width, there is no reason not to accept orders at that width.

The increase in product cost per square metre caused by manufacturing on a reduced width will not make a too significant difference to the selling price. Raw materials total 67% of the product cost, so that the new conversion cost cannot exceed $33\% \times \frac{4}{3} = 44\%$ i.e. an increase of 11% in the product cost per sq.m. This cost would be more than off-set by the reduction of remnants.

iii. Stocks of carpet remnants should be cleared as soon as possible. This policy should be adopted not only for the large stocks currently held but also for off-cuts as they occur in the future.

Present stocks. It is recommended that the present stocks be disposed through an aggressive selling policy directly to the end customer. The capital tied up in stocks should be converted into cash as soon as possible, even though the stock must be sold off at varying discounts. A target of 50% on the normal selling prices is

recommended. Although this will result in a "book" loss, the company will be strengthened through a much needed improved working capital position.

Future stocks. Through adopting the recommended manufacturing policy, the future stocks will be contained within smaller limits;

- a) because of the restriction on speculative production,
- b) if customers have to order, pay and await delivery, they will be tempted to buy stock items.

Small sized, odd pieces should, in the future, be sold below the normal price in order to effect a quick sale.

iv. Pricing. The same unit area price should not apply to all sizes of carpeting sold. If customers want a square of, say, 2.5 m. x 2.5 m., a 3 metre width x 2.5 metres length will be charged, i.e. the effective square metre price becomes for example, E. §. 30.- instead of E. §. 25.- That is, the price of 2.5 m. of 3 m. wide carpet = E. §. 187,50 and this is divided over 2.5 x 2.5 sq.metres.

If customers require carpets, say, 2.0 m. x 2.2 m. wide, where the remnant is a practical runner width of 1 m. or 0.8 m., your policy can be modified to allow for the improved sales chance for the off-cut.

v. Marketing.

We recommend that a positive direct selling policy be adopted in both the Contract and Private Sectors.

Contract Market : The policy should be to have a direct and regular contact with all agencies working in the contract market.

Private sector : Through the means of the Retail Store and, for the time being, through the Head Office Show Room to give

prominence to carpets. Eventually, during 1975, carpets can be offered also through the Mercato Depot and Asmara Wholesale Store.

Elsewhere in this report, we have recommended that the Retail Store be immediately re-vamped to stock a complete range of household textiles. This will include a limited range of imported carpets and carpeting to supplement the present range. At that time, we propose that you make a sales promotion/advertising campaign, be made that will have a two-fold value of raising interest not only in the Retail Store but also in Debre Berhan carpets.

vi. Carpet Production Capacity on a 2 shift activity at a width of 3 metres amounts to approximately 22,000 sq.metres per annum, at the present efficiency.

These production levels per shift are equivalent to the following percentages of 1973 imported levels :

	<u>Production sq.m.</u>	<u>% of 1973 imports.</u>
1 shift :	11,000	3.9
2 shift :	22,000	7.7
3 shift :	33,000	11.6

We do not believe that it will be difficult to sell the production, even from a full 3 shift operation, in view of the fact that this represents only a small fraction of the imported quantities.

All imported goods are more expensive than Debre Berhan's carpeting.

In order to achieve these sales, a publicised, direct selling operation has to be mounted in both the Contract and Private Sectors.

5. Handicraft Yarns.

a) Present Situation.

There is a growing demand for handicraft yarns for the production of hand knotted carpets and wall coverings. These products are manufactured in 10 different locations throughout the Country, e.g. prisons, training schools, re-habilitation centres, etc...

i. Size of Market.

We estimate that the market is currently worth 600-650 kgm of woollen yarn per day, i.e. 178 tons per annum. The market will continue to grow as the demand for these carpets, mainly from foreign residents and tourists, grows.

ii. Carpet prices.

The carpets retail at prices from E.£. 55.- per square metre to E.£. 110.- per square metre, according to the quality of the yarn used.

The cheaper quality of carpet is produced from hand-spun, un-washed, Ethiopian wool and hair yarns, whilst the more expensive quality is produced with mechanically spun, scoured, Ethiopian wool yarns. Carpet manufacturers are prepared to pay currently E.£.10;- per kgm. for the machine spun yarns rather than a lower price for the wool which they themselves hand spin and which contain large amounts of foreign matter.

iii. Yarn Requirements.

Carpet Manufacturers require 75% of white woollen yarns and the remaining 25% divided over 8 other colours. Debre Berhan cannot supply all the quantities of white yarns ordered

as the white wool is not available in sufficient quantities.

a) Recommendations.

We recommend Debre Berhan to continue to supply the carpet manufacturers subject to the following qualifications :

- the prices obtained for the yarns cover not only the production costs of the yarn itself but also the cost of weaving and finishing capacity made idle by diversion of the yarn from blanket production.
- that excessive orders for white woollen yarns, or colours are accepted, which would result in either falling short of the blanket and carpet requirements or letting the customer down.

6. Other Fabrics.

a) Idle capacity.

At the present time there is idle machine capacity on 10 looms which would make fabrics either for apparel or for curtains. There is complementary idle finishing equipment on which these cloths could be finished.

b) Recommendations.

i. Acrylic fabrics.

Our recommendation is that after 2 years time the introduction to the market of a small range of coarse weave, patterned cloths for skirts (women's wear) and curtains made from imported acrylic yarns be considered.

ii. Yarns.

We advise that acrylic yarns be purchased because the carding drawing and spinning capacity is not available to produce these yarns when woollen yarns for blanket and carpet production have priority demands on the equipment.

Acrylic yarns will be in greater demand in the future for both apparel and curtains because of their inherent easy-care properties.

iii. Timing.

The introduction of this range of cloths should not have priority in the re-organisation programme. We recommend it be placed on a low position in the list of priorities and to concentrate initially on re-organisation of the prime products, blankets, carpets.

Additional reasons for a delay in the introduction of this fabric range are :

- capital investment will be required to get the project off the ground.

This is estimated to be of the order of E.ḡ. 100,000 to cover :

- . investment in yarns
 - . initial ranges (development work)
 - . purchase of designs from European producers
 - . re- equipping looms from which you have "borrowed" parts
 - . operator training
 - . designer time
 - . promotion
- The Mill Technical people are at present fully occupied in producing the prime products and in achieving the increases in productivity that have been shown to be attainable. In order to produce this alternative fabric range, a newly trained team of personnel will be needed, as it would not be advisable to expect the existing team to perform well in all areas simultaneously.

iv. Selection of fabrics.

Our recommendations to produce curtain fabrics and women's skirt fabrics are based on :

- the loom speed of 125 p.p.m. is low. Low pick fabrics are required to obtain a good production rate. Skirt fabrics and curtains can be woven with coarse yarns in low pick constructions.
- the looms are suited to producing patterned and plain cloths which are in demand for both these end-uses.
- there is no competitive weaver in Ethiopia for this type of merchandise. When production is begun, all imported cloth will have to pay a higher total tariff than hitherto, i.e. with no local producer available, duties payable are E.ḡ. 0,60 per sq.m. (or 65% of value whichever is the higher), plus the same transaction tax (15%), municipality tax (1%) and excise tax (E.ḡ. 2.- per kgm).

- the market place has many stalls selling Dress Fabrics by piece length and our observations show that this was almost exclusively cloth that had been imported from Japan. Furthermore, this cloth was more than 99% knitted fabric (double jersey) in plains, prints and coloured knitted. Some woven cloth was available but had less than 1% share of the market. In Western Europe the demand for knitted fabrics is on the decline, so that the market share is declining 45% - 50%. We believe, therefore, that a range of skirt fabrics could be marketed with no difficulty.
- the market place was not offering the type of loose weave acrylic curtain/drapery fabrics that we propose. Curtains being offered were the conventional cotton plains and prints, velvets, etc. We believe there is a good opportunity for the introduction of the new acrylic curtain fabric to the Ethiopian Market.

v. Market prices for woven fabrics ranged from E.ፌ. 8.- to

E.ፌ. 12.- per linear metre on a width of 150 cm. The basis for the prices asked in the market were difficult to comprehend as the most simple fabric, which should have been the cheapest, was in fact the most expensive. These prices are not indicative of the true market price, but we believe these products can be marketed profitably.

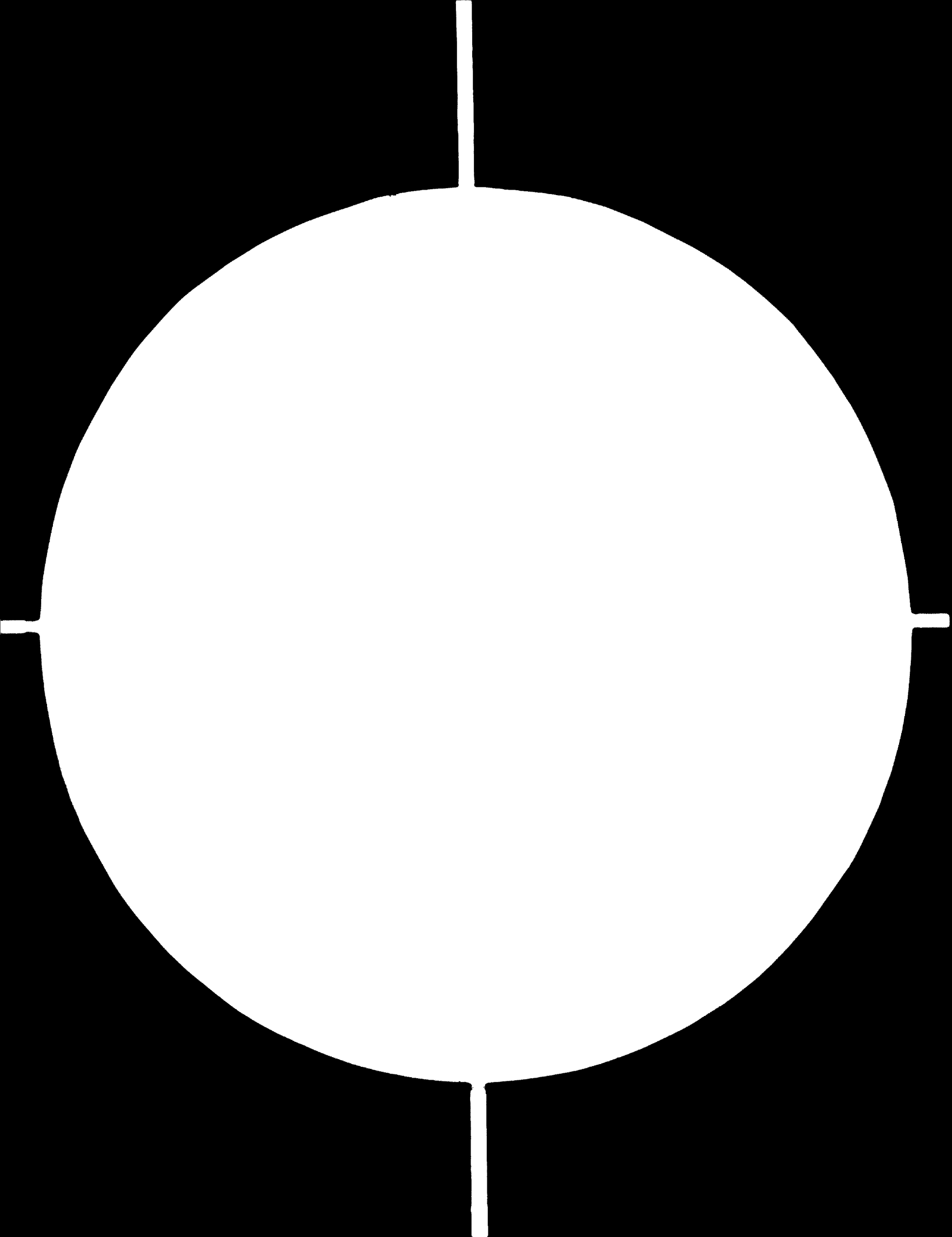
vi. Distribution.

We propose that these cloths are stocked at the Mercato Depot and Asmara Wholesale Store. Additionally, some stock and a full range of samples should be available in the Retail Store.

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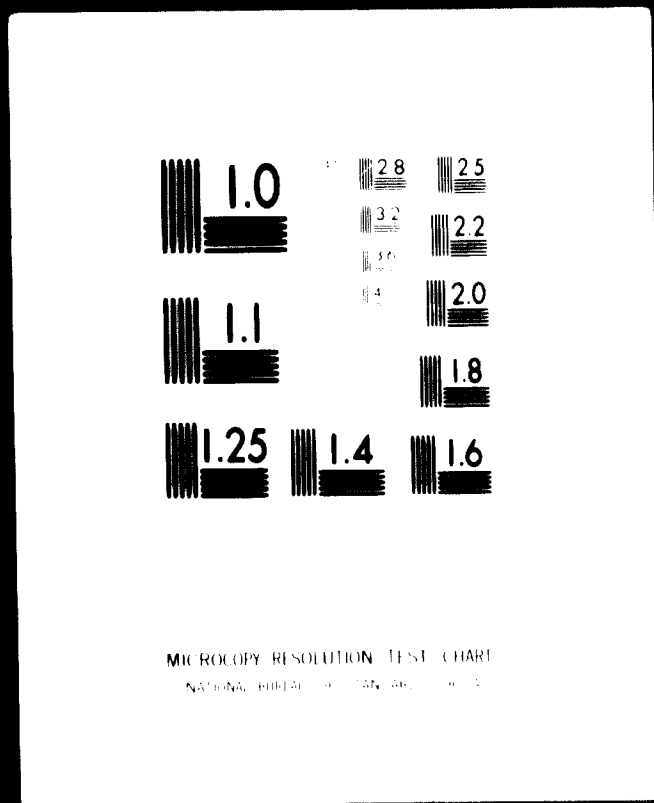


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7. Head Office Sales Department.

a) Current Activity.

The Head Office Sales Department is now operating as the Sales Office :

- orders and enquires received and replies given
- liaison with Edisco, current distributor of blankets
- liaison with Mill
- preparation of Sales Statistics : orders, value, deliveries
- controlling activities of Retail Shop
- Head Office Show Room Sales
- negotiate contract sales of blankets and carpets with Governmental Institutions
- solicits sales for carpets to be used in new buildings, contract with Architects measuring and fitting carpets, including delivery
- contacts for Sales of Handicraft Yarns
- investigation of market problems as reported by Edisco
- controlling movements of truck and lorry.

b) Recommended Activity.

i. Sales Administration.

The Head Office Sales Department should be re-styled as the Sales Administration activity of Debre Berhan Wool Factory concentrating on total marketing, i.e. sales development and distribution. We recommend that a smaller Show Room be retained to demonstrate products to visitors, as necessary, but that customers enquiring for retail sales should be referred to the Retail Shop in the City.

The activities carried out will be :

- receiving orders sales, enquiries from Mercato Depot, Retail Shop, Asmara Warehouse, Wholesale Dealers, etc. Preparing and issuing appropriate replies,
- preparing invoices for all sales effected,
- monitoring sales, deliveries statistics by volume and value per product type for each Depot or Dealer Preparation of monthly and annual records for management,
- direct management of Mercato Depot and Asmara Warehouse,
- investigating market requirements, problems and competition activities,
- anticipating changes in demand for all product types,
- aggressive selling of all products to ensure that production departments can operate to target capacities,
- liaison with Mill concerning revised production programmes, delivery schedules, customer problems,
- instruct Storeman in Mill to prepare shipments according to sales requirements, i.e. make up bales of blanket assortments as required and despatch to Addis Ababa according to Sales Department instructions.

(Note : Sales Department will prepare invoices to accompany each shipment received from Mill).

ii. Staffing.

Salary proposed E.ḡ. per month

Sales Manager	1	1100
Asst. Sales Manager	1	500
Clerk	1	200
Secretary	1	200
Guard	1	70
<u>TOTAL :</u>	<u>5</u>	<u>2070</u>

iii. Head Office Sales Dept.- Estimated Operating costs * per annum.

	<u>1st Year.</u>	<u>2nd Year.</u>
Labour - Salaries	24840	24840
Rent (1/2 present Accdn)	8000	8000
Stationery/Phone	5000	5500
Travel, etc. (see Personal Travel expenses "iv")	6540	5290
Visits to wholesale dealers	-	13000
Advertising/Sales Promotion	2500	3000
Transport (Mill to Addis) **	18000	18000
Insurance	3000	3000
Bad Debt provision (0.5% Turnover)	25 000	25 000
Depreciation	1000	1000
Miscellaneous	1120	1370
<u>Total :</u>	<u>95000</u>	<u>108000</u>

* Excluding Transaction Tax.

** Part to be charged to production for transportation of raw materials to Mill from Addis Ababa.

iv. Analysis of Personal Travel Expenses.

These expenses will be incurred principally by the Sales Manager in the first year, visiting the Mercato Depot and Asmara Stores. The frequency of visits will necessarily be greater in the first months than later, e.g. it is expected that he would visit ASMARA every 2 weeks for the first 3 months and monthly from then on.

<u>Travel Costs to Asmara 1st year</u>	=	15 return flights :	E. \$ 3000
		30 nights hotel +	
		taxis	2000
			<hr/>
		Total :	5000
<u>2nd year</u>	=	12 return flights :	2400
		24 nights hotel/tax's	1350
			<hr/>
		Total :	===== <u>3750</u> ====

Travel Costs to Mercato Depot.

Frequency 5 days per week x 52 weeks per year by Sales Manager or, in his absence, by the Assistant Sales Manager.
 = 260 visits at cost of, day \$ 4.- per visit = \$ 1040.
 =====

Travel Costs to Wholesale Dealers.

When the decision has been taken to phase in Wholesale Dealers in selected areas, during 1976, regular visits will be made to each area. For the first two months of each agent's activity, he will be visited every 2 weeks but once the business is running smoothly, these visits can be reduced to monthly.

Considering the time, which in any case would not be until the second half of 1976, when 6 agents were visited monthly for 1 night's stay per visit, the expenses would be at a level of :

72 visits : return fare/flight	E.š. 8,640
hotel/taxis	3,600
Miscellaneous	760
<hr/>	<hr/>
Total :	E.š. 13,000
	=====

Selling carpets/curtains in Addis Ababa.

5 day, 100 trips x š 5.- per trip	E.š. 500
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Summary of personal Travel Expenses

during 1st year : ASMARA	E.š. 5000
MERCATO	1040
CARPETS	500
<hr/>	<hr/>
Total :	E.š. 6540
	=====

Summary of Travel Expenses.

during 2nd year: ASMARA	3750
MERCATO	1,040
WHOLESALE DEALERS	13,000
CARPETS/CURTAINS etc.	500
<hr/>	<hr/>
Total :	E.š. 18290
	=====

v. Present Operating Costs per annum based on the first 6 months of 1974 *

Excluding Retail Shop (Salaries, Rent and Services):

Labour	E.ḡ.	17,600
Rent		11,000
Stationery/Phone		3,500
Advertising/Sales Promotion		1,250
Transport (Mill to Addis)		18,000
Insurance		2,150
Bad Debt provision		5,400
Depreciation		2,750
Handling charges		1,650
Miscellaneous		1,700
Edisco commission		165,000
<hr/>		
Total :	E.ḡ.	230,000

* Excluding transaction tax.

vi. Total estimated operating costs of Debre Berhan Sales Departments with own distribution.

		<u>1st year</u>	<u>2nd year</u>
Head Office Sales Dept. (iv)	E.ḡ.	95,000	108,000
Asmara Wholesale Store (iv)		33,000	33,000
Mercato Depot		59,000	59,000
<hr/>			
Total :	E.ḡ.	185,000	200,000
		=====	=====

vii. Estimated savings in operating costs to Company in first year of own Distribution.

difference in the calculated operating cost

<u>Edisco + present</u> <u>selling expenses.</u> as detailed above (v) E.₡. 230,000	<u>Own Distribution</u> <u>1st year.</u> as detailed above (vi) E.₡. 187,000 <u>Savings: E.₡. 43,000</u>
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Conclusion.

With the present volume of blanket production and the restricted outlets during the first year, i.e. Mercato, Asmara and the Retail Store only, it is calculated that a saving in Distribution/Administration costs of E.₡. 58,000 will materialise.

viii. Job Specification.

Title : Sales Manager

Responsible to : Company General Manager

Responsible for :

1. All sales and marketing activities of the Company with the exception of the retail store in H.S.I. Addis Ababa.
2. In order to meet these demands, the Sales Manager will be in control of : the Head Office Sales Administration;
the Mercato Depot,
the Asmara Wholesale Store.

(The functions of each of these sectors is detailed elsewhere in this report).
3. The Sales Manager will be responsible for the day to day running of each department, for the efficient operation and discipline within the departments and for budgetary control of these departments.
4. He will be especially responsible for ensuring that Target Sales in each area are achieved and will visit each area, as determined, on a regular basis.
5. He will ascertain, through discussions with wholesale agents and own personnel, and also through contacts with dealers in the market places and stores, changes in market trends concerning product styles, colours, prices, demands and activities of competitors. Monthly reports of market trends will be prepared and submitted to the General Manager for discussion.

6. Customer complaints will be investigated, resolved and reported back to the General Manager.
7. Liaison with Production Departments concerning :
 - ° Delivery Programme requirements
 - ° Customer complaints
 - ° Product Development/Market Sampling
 - ° Delays in delivery schedules.
8. Generation of carpet, curtain, handicraft yarns and apparel sales to enable carpet loom and 10 weaving looms to run at optimum efficiency. The policy of positive selling direct to the end user for carpets and, as required, for curtains will be the means by which this will be achieved.
9. Liaison, through the General Manager, with the Retail Shop to ensure adequate stocks of Debre Berhan Production is maintained. (The profitability of the Retail Store is the responsibility of the General Manager).

Where the imported household textiles are to be distributed through the Asmara or Mercato Depots or through other agents, the Sales Manager will be responsible for distribution, at agreed prices, through the depots.
10. Preparation of monthly and annual reports of sales and deliveries per product by value and volume according to each point of distribution and also globally.

Characteristics required of Sales Manager :

- : pleasing personality
- : personal drive
- : self motivation
- : ability to relate with people, customers, colleagues at all levels

- : leadership
- : confidence in the Company, its products and his own abilities.

8. Retail and Sales Shop, H.S.I. Addis Ababa.

a) Present Situation.

Purpose : The Sales Shop was set up 12 months ago by Debra Berhan as a retail outlet for its production of blankets and carpets. It has operated without any sales promotion and has not succeeded financially nor in terms of volume turnover.

In our view, the merchandise as presented has little appeal and the shop needs to be re-vamped or closed down.

b) Recommendation.

1. Complete range of household textiles.

We propose that the shop should be developed as a retail store offering a complete range of Household Textiles. The range of Debre Berhan products, blankets, carpets, curtain and apparel fabrics, would be supplemented with imported carpets and curtain fabrics outside Debre Berhan's scope and supplemented also by complementary household textiles such as bed-sheets, pillow-cases, towels, table linen, etc...

The complete range of household textile products will give character and personality to the Store that will attract the public to it and who will buy blankets when they come to buy sheets, for example, and vice-versa.

The quantities of imported goods should be strictly limited to the minimum required for an attractive product range and according to experience of turn-over per item. The Sales Shop will also handle the retail sales now handled by the Head Office.

ii. Status.

The Retail Shop should be established as a separate Sales Company with an apart Profit Centre. The shop should be a specific responsibility of the Company's General Manager. Merchandise should be purchased from Debre Berhan in the same manner as from other suppliers, so that the shop is responsible for its own profitability.

iii. Staffing.

The present staffing should be adequate for the increased volume turnover proposed, i.e.

		<u>Monthly Salary E.β.</u>
Shop Manager	1	200
Sales Girl	1	70
Van Driver	1	200
Guards	2	2 x 70
<hr/>		
Total :		E.β.610 =====

iv. Operational Costs.

The operational costs will remain as at present with the exceptions of the van driver and additional guard who are currently carried as Head Office charges.

Operational costs/annum :	E.β.
Labour	7320
Rents	5400
Services	600
* Van Expenses/Deprec.	3080
<hr/>	
Total :	E.β.16400 =====

* Where the van is used by the purchasing and other departments, part of these expenses and those of the driver should be re-allocated.

v. Start up costs.

Certain costs will be incurred in setting-up the shop as an Household Textiles Retail Store and also in making contact with overseas suppliers of merchandise.

Correspondence with Overseas Suppliers	: E.£.	400.-
Furnishings for shop		10,000.-
Provision		600.-
		<hr/>
Total :		E.£.11,000.-
		=====

- vi. The first priority for the shop is to sell off all the stocks of remnants and defective carpeting. Whilst this sale is proceeding, the initial contacts with potential suppliers can be made with a target date of January 1, 1975 as an opening date.

We recommend that the carpet remnants be sold at as good a price as possible but that Management should not be disappointed if only 50% on average of the current normal selling price (4 mm. quality at E.£. 25.- per sq.m. and 6 mm. quality at E.£. 35.- per sq.m.) are realised.

9. Details on proposed marketing organisation.

a) Market Depot (Mercato).

i. Purpose :

To act as the principal distribution and wholesaling depot for Debre Berhan. It is known that Edisco distributes 65% of all the blankets it handles from the depot in Addis Ababa and, as we do not propose having wholesalers or agents initially in the immediate adjacent towns, it is expected that the Market Depot will, when established, distribute approximately 70% of blanket sales of production volume of 300,000 blankets per annum.

ii. Status.

Department of Debre Berhan Sales Organisation.

iii. Responsibility :

Through the Sales Manager to the General Manager.

iv. Location :

Within the Addis Ababa Market Area :

Accommodation for unloading and loading lorries; bale storage area and racks for accommodation of blankets, carpets and curtain and apparel fabrics. Certain imported items of household textiles may also be stocked.

v. Timing :

The Depot has to be ready to take over the distribution of blankets as from July 1, 1975, when the current Edisco contract expires.

We recommend that the type of building required be studied and that the possibilities available in the area be investi-

gated within the next few weeks.

Contracts for the rental of the building should be signed by May 1975 latest for the tenancy to commence in June. During the month of June, the building has to be fitted out and the senior staff engaged, so that the business can be taken over promptly when the Edisco Contract expires.

During the last 2 weeks of June, dealers will be contacted to advise them of the planned change in distribution. (Edisco will have to be advised of the termination of their contract no later than May 31, 1975, i.e. 1 month's notice).

vi. <u>Start-up Costs.</u>	<u>E.£.</u>
Provision	1,500
Persuader	1,000
Furnishings/Racking/Counter/Desk, etc..	4,000
Additional van to help transport goods locally	15,000
Provision	1,500
<hr/>	<hr/>
Total :	E.£23,000.- =====

vii. <u>Staffing.</u>		<u>Income/month E.£.</u>
Depot Supervisor/Salesman	1	1 x 500
Storekeeper	1	1 x 250
Asst. Storekeeper	1	1 x 200
Coolies	2	2 x 60
Guards	2	2 x 80
Truck Driver	1	1 x 250
Van Driver	1	1 x 220
Truck Driver's Asst.	1	1 x 180
<hr/>	<hr/>	<hr/>
Total :	10	E.£1,880.- =====

viii. Operating Costs per Annum.

	<u>E.g.</u>
Labour	22,560
Rental of Building	18,000
Services	1,500
Truck Expenses/Depreciation	15,000
Provision	1,940
<hr/>	
Total :	E.g.59,000.- =====

Note : Distribution costs from depot to customers will be payable by customers.

ix. Transportation :

The total cost of the truck has been included in the operating costs of the Sales Department and will be allocated as a selling expense. However, this truck will be used for transportation of raw material to Debre Berhan in addition to the delivery of blankets from the mill to the Mercato Depot. A share of the truck expenses should be allocated to the Production Department.

It is envisaged that blankets will be delivered from the depot to dealers in the immediate locality. Whenever additional transport is required, a delivery charge will be made to the dealer and transport will probably be by Natraco.

x. Carpet fitter :

Service to consumer. To assist in the consolidation of orders in the carpeting and curtain sectors, the Selling Policy should be one that offers consumers in both the Contract and Private areas the service of measuring, making to measure and fitting.

Initially, when the business is in the embryo stage, this can be handled on a contract basis. As the business volume increases, the time to appoint a full time employee for this post can be determined.

This man would handle orders received via the Retail Store as well as by the Mercato Depot.

xi. Introductory Lines.

At the same time as the marketing operation from the Mercato Depot is begun, we recommend that the opportunity be taken to introduce 2 or 3 new blankets. This will give greater impact to the total new approach to distribution.

Elsewhere in this report, under Product Development, we have discussed the need to introduce 2 new designs in the blanket range in order to retain the position as market leaders. The start-up of the new Organisation is a special case when some new designs, styles and qualities should be introduced.

One possibility is that a somewhat lighter weight but a better raised quality be placed onto the market in an attempt to break the established myth that a warm blanket has necessarily a heavy weight. The same weaving construction could be used.

If interest is generated in this way, a sufficient impact will be made on the market to create a demand that will be helpful through the transition period from EDISCO to the company distribution system.

b) Asmara Store.**i. Purpose :**

To act as Wholesale Depot for the Asmara area serving dealers with:

- blankets,
- carpets,
- curtains/other fabrics
- other imported retail goods.

ii. Status :

Department of Debre Berhan Sales Organisation.

iii. Responsible:

Through Sales Manager to General Manager.

Sales Manager will make regular visits, at least 2 x monthly initially.

iv. Timing :

The store should be prepared to take over the market in Asmara when the Edisco contract expires on June 30, 1975.

During April 1975, or latest May 1975, the General Manager should complete his initial investigation of the market to determine :

- accommodation
- dealers
- personnel interviews
- sales promotion required.

During June 1975, the General Manager and the Sales Manager should visit Asmara :

- to sign contract for accommodation
- to introduce Sales Manager to dealers
- to appoint main personnel
- to furnish store.

viii. Transportation :

Of goods to Asmara (selling expense to Debre Berhan)
at contract price to be negotiated with Natraco :

Reported freight charge (Addis-Asmara) = E\$ 9.- per 100 kgm.
25 blankets weight 65 kgm, so that freight transport cost
of 39 blankets = \$ 9.-
(100 kgm) Per blanket freight = E.\$0,23.

ix. Target Sales :

It is recommended that an agreed volume of production be sold through the Asmara Store. This volume should be higher than the 1973 volume of 32,200 that Edisco has sold through his Asmara branch. A reasonable target volume would be 50,000 minimum per annum (20% of production).

Carpets and other items : positive selling.

x. Transportation Addis Ababa - Asmara and vice-versa.

The question of transportation to Asmara of blankets, carpets, cloth and some imported goods to be distributed through the Asmara Wholesale Store, and of imported raw materials from Assab to Addis Ababa, has to be fully investigated.

The two choices lie between :

1. using a transport company under contract: e.g. NATRACO,

or

2. operating company truck and trailer for this purpose (this would mean investment in a new truck and trailer).

The round trip Addis Ababa - Asmara - Addis Ababa (2300 km) would take 10 or 11 days according to the time of year including loading and unloading times.

The factors to be considered are :

NATRACO :-contract price
 -service offered
 -delivery times

OWN TRANSPORT :

- will one truck and trailer travelling 1 x 2 weeks have sufficient capacity for manufactured goods to be sold in Asmara ?
- will one truck and trailer travelling 1 x 2 weeks have sufficient capacity for raw materials to be transported Assab-Addis Ababa?(This is unlikely and alternative transport will have to be arranged for the major part of the incoming raw materials).
- cost/utilisation considerations.

Investment : truck and trailer E.₡. 60,000

Annual Costs :

<u>Labour</u> : Driver (E.₡ 450 per month)	5,400
Driver's mate E.₡.200 per Month	2,400
Living expenses (E.₡.13 per day, for driver and mate together)	4,500
Diesel Fuel (E.₡.0,50 per litre, 5 km/lit. 74,000 km/year)	7,400
Depreciation (truck - 5 years + interest)	13,200
Servicing (truck)	2,500
Provision	600
<hr/>	<hr/>
Total :	E.₡. 36,000.- =====

Conclusion.

Based principally on the factor of the relatively small share of imported raw materials that the company truck/trailer could transport to Addis Ababa and to the necessity for alternative arrangements to be made for the larger part of incoming raw materials, we would recommend that a satisfactory contract be negotiated with Natraco for the total transport of goods from Addis Ababa to Asmara and from Assab to Addis Ababa.

c) Wholesale Dealers in Country Areas.

We do not envisage that it will be necessary for Wholesale Dealers to be appointed in the country areas immediately that the distribution and wholesaling activity is taken over by Debre Berhan. The information available to us has shown that the present volume of sales could be maintained through the Mercato Depot, Asmara Store and Retail Shop.

It is confidently expected that those dealers who are unable to buy blankets in their particular localities will make their purchases when they come to Addis Ababa for other business purposes.

When the new distribution system is running smoothly during the second half of 1975 and the volume of production will have been stepped up with productivity improvements, the company will be in a position to appoint wholesale dealers in selected areas.

1. Areas.

We would recommend that the areas selected, in order of priority, be :

- Jimma
- Shashemene
- Mattu
- Dese
- Bahir Dar
- Dire Dawa

These 6 areas will give adequate coverage for those parts of the country where blankets are used.

iv. Selection of Wholesale Dealers.

The Wholesale Dealer selected for each area will be the one who :

- is centrally situated
- is prepared to deal only with Debre Berhan blankets
- has a reputation locally for fairness
- is known to and is known by all local dealers
- will buy blankets for his own account against cash or against bank guarantees. As a less desirable alternative, one who will sell blankets on commission but only if adequate bank guarantees are supplied
- will maintain adequate stocks of each blanket type to meet consumer demands i.e. who will re-order new stocks in anticipation of sales.

v. Servicing of Wholesale Dealers.

The Sales Manager will visit each area on a regular basis to ensure that each Area Dealer is being adequately served by the Mill Deliveries, that the Dealer's Orders are on target and to observe the local Market Conditions at first hand.

Initially, these regular visits should be 1 x per 2 weeks but, eventually, the frequency can be reduced to 1 x per month.

Head Office Sales Department will monitor all orders and deliveries made to each area per product type, so that the state of each Area Market can be studied continuously and delays in honouring orders can be followed up.

10. Product Development.

Continuous product development is the basis of a healthy company. It has the dual advantage :

- bringing new products into the market which will enable the company to retain its position as a leader in the various fields.

- will contribute to the ever-increasing efficiency of the production units who will be involved with working with new designs and materials and will not become bogged down with always producing the same items.

Product Development should be restricted to the introduction of one or two new designs per product group twice a year. To have more innovations is too expensive in terms of time of manpower and machines and also in yarns. Additionally, it will be too disruptive to the normal production-selling lines and could develop to a stage where dealers are holding back with buying as they expect many new designs at too frequent intervals.

At the same time, it should be reckoned that the competitors will not be standing still, if their product changes e.g. designs, colour, prices, presentation, blanket trimming, etc..., have an adverse effect on Debre Berhan sales, then the company will obviously have to respond.

The Sales Department should pick up information on the activities of competitors on a continuing basis and relay this to management.

For example, it could happen that demand for blankets shows a turn-down because of a poor harvest and the 1805 F is not

selling as well the Lazaridis quality, which is in any case slightly cheaper, the reason could be that Lazaridis has a more attractive trimming with a zig-zag sewing to hold it flat and, additionally, the trimming is on all 4 edges of the blanket. The trimming may then need to be modified and the blanket trimmed on all 4 sides in order to increase its appeal.

This will, of course, have to be played by ear. Response must be made to the dictates of the market.

Elsewhere, in this report, Introductory Lines, section 9, xi, we have recommended that some special new lines be developed to generate special interest in Debre Berhan blankets that will help the company through the transition stage when taking over the complete distribution operations. If an impact can be made on the market at this special time, dealers will seek out Debre Berhan in order to get supplies, so that the hard work of chasing dealers will be reduced.

As part of Product Development, we would recommend that new designs and styles be discussed with selected and respected dealers, in advance of going into production. In this way the company will initially benefit from their advice and recommendations and, secondly, their interest will be generated in advance of production and they will help to get new lines off the ground.

11. Exports.

There is prestige to be earned for a company that exports - but often very little money.

We do not recommend that the export market be entered at the present time for the following reasons :

- The Home Market is not being fully satisfied and it is in the company's interest to exploit this fully before moving into other markets,
- it is unlikely that the profit margins in the Export Markets will be as high as those in the Home Market
- to develop an Export Market requires that the sales personnel investigate the market and build up the business at great expense, or you work with an Agent or directly with a Wholesaler in the other Country. In any case, the selling expenses per unit sold are going to be higher,
- competition in that market will be stronger than at home,
- transportation, which in any case is problematical within the country, will be more difficult to distribute to the borders and beyond,
- the additional demands on management are burdens they should not be asked to carry at this time and no increase in management staff is justified for the relatively small export trade that would be found. Management's time can be fully and usefully utilised in increasing Mill Efficiency and Home Market Sales.

At the same time, we do not suggest that any or all enquiries for Export Sales should be ignored. Any enquiry received is an opportunity to build up a library for future reference.

The information should be recorded under the headings of :

Export Market
 Contact's name
 Market size
 Size of enquiry/frequency of orders/buying cycles
 Delivery times required
 Designs/colours
 Constructions
 Sizes
 Prices.

If an enquiry is found to be particularly interesting from a price and/or available stock point of view, the sales opportunity should be examined closely. However, there is always the chance an export order may demand a large slice of the capacity which, in honouring the export order, requires that the home trade be neglected. The following year large export orders may not be repeated and it may be difficult to become re-established in your home market. Alternatively, the export account may force the prices to be lowered to below cost and since there is no other market for the production, the order must be taken.

Method of Tackling an Export Market.

At some future date, the company could be in a position to tackle the export market in one of the neighbouring countries. We recommend the following procedure :

- select the particular market to be entered,
- the sales personnel should spend some time in that market to evaluate it.

Identify the following points :

- . demand, volume, price, quality, range.
- . local suppliers, names, capacity, performance, price, quality, delivery times.

- . importers, number, names, prices,
- . import regulations,
- . distribution channels,
- . wholesaling facilities required.

We would advise that large orders are never taken with one client as this :

- ties up too much capacity,
- orders running for long periods on contract prices can lose money if raw material prices increase,
- a commitment of a large proportion of the capacity to any one client could result in a drastic situation if cancellation occurred or extremely low prices were forced for future contracts.

We are firmly convinced that the export market must be developed by the company.

12. Marketing Division : Recommended Timetable for Action.

Year	Month	Detail.
1974	Oct.	Dispose of existing carpet stocks and institute new production policy.
	Nov.	
1975	Jan.	Preliminary studies for Mercato and Asmara Markets. Select buildings for Mercato Depot and Asmara Wholesale Store Advise Edisco officially that distribution contract will not be renewed. Appoint and train Mercato/Asmara staff. Furnish buildings. Introduce new blanket styles/designs. Commence own distribution.
	Feb.	
	Mar.	
	Apr.	
	May	
	June	
	July	
	Aug.	
	Sept.	
	Oct.	
	Nov.	
	Dec.	
1976	Jan.	Phased appointments of wholesale agents in 6 country areas.
	Feb.	
	Mar.	
	Apr.	
	May.	
	June	
	July	
	Aug.	
	Sept.	
	Oct.	
	Nov.	
	Dec.	

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(74/27)

**WERNER INTERNATIONAL
MANAGEMENTS CONSULTANTS**

**FINAL REPORT
ON CORPORATE ANALYSIS OF THE
DEBRE BERHAN WOOL FACTORY S.C.
IN ETHIOPIA**

VOLUME II - CHAPTERS VI TO XI AND APPENDICES

PREPARED BY

WERNER INTERNATIONAL MANAGEMENTS CONSULTANTS

ADDIS ABABA

1974

5

WERNER INTERNATIONAL
MANAGEMENT CONSULTANTS

Reference : Project No. IS/ETH/73/006.

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Vienna, Austria.

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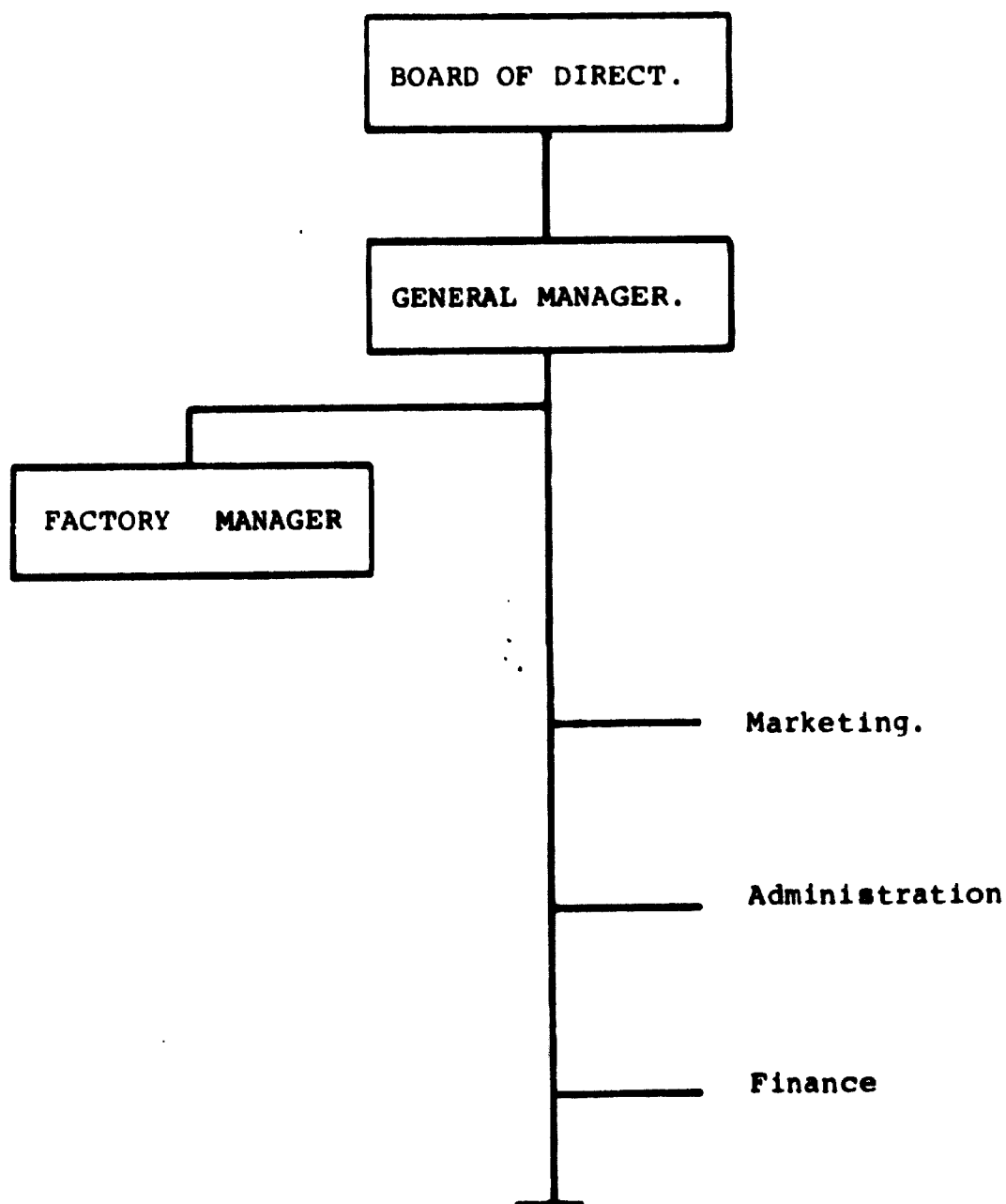
January 1975

VI. DETAILED ANALYSIS OF THE MANAGEMENT/COST ACCOUNTING.

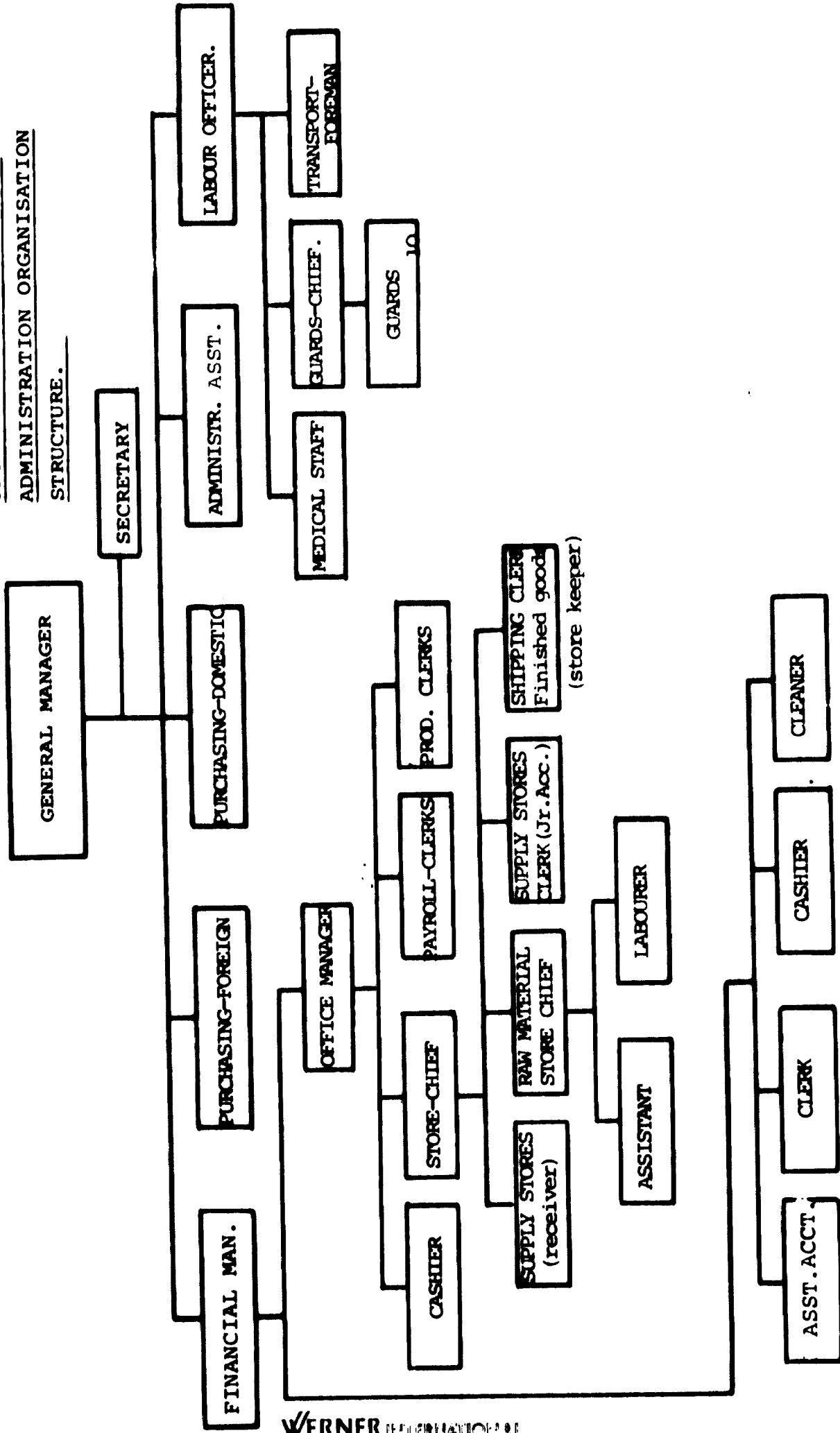
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VI. ADMINISTRATION/COST ACCOUNTING.**1. Organisation Structure.**

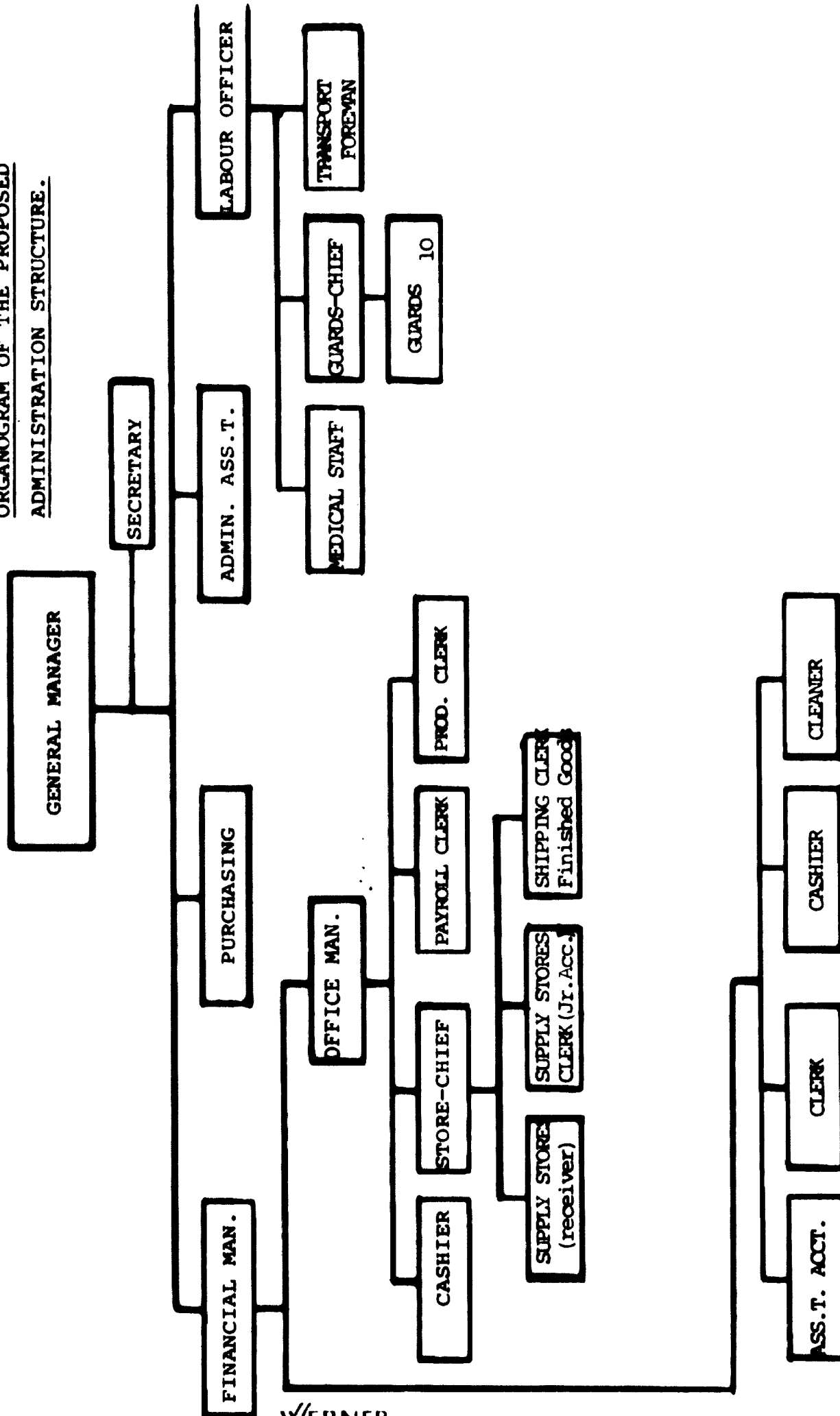
The present and proposed organisation structures are illustrated on the following organograms.

ORGANOGRAM OF THE TOP ECHELON ORGANISATION STRUCTURE.

ORGANOGRAM OF THE PRESENT
ADMINISTRATION ORGANISATION
STRUCTURE.



ORGANOGRAM OF THE PROPOSED
ADMINISTRATION STRUCTURE.



c) Reasons for recommended changes.

The only major change is to move the Raw Material Store Chief and his assistant and labourer in Debré Berhan Wool Factory from the stores section and place them under the direction of the Material Preparation Mill. This change has already been mentioned in the reorganisation proposal in the manufacturing section of this report. The raw material stores are part and parcel of the Material Preparation Mill and as such should come under the control of the head of this mill.

d) Remarks on organisation structure.

The organisation structure of the Mill Office and the Head Office is not according to prescribed classic organisation. However, it is quite properly organised to suit the specific circumstances of Debré Berhan Wool Factory. The company is not large and the general manager is directly involved in

- labour relations,
- marketing,
- raw material,
- all purchasing.

Consequently, to have all these departments reporting to him is, in this case, quite correct.

2. The effectiveness of management.

The following comments on management embody all divisions of the company.

We reiterate information given in the interim report that during the past 18 months there have been the following improvements :

- personnel changes, replacement with more competent personnel,
- increase in volume of sales,
- operating improvement from a drastic loss picture to a recent profit picture,
- the entire large quantity of blankets inventory sold,
- production increase,
- bank overdraft reduced.

Clearly, the management of the company has been exceedingly effective.

As regards the individuals, the following comments are made :

General Manager.

A competent intelligent individual with an understanding of finance and a flair for marketing.

Factory Manager.

A competent technical man who has unusual mechanical ability and a thorough understanding of the manufacturing processes and requirements.

The combination of these two gentlemen makes an unusually well balanced team.

Sales Supervisor.

This gentleman is relatively new to the company. He does not appear to be a dynamic marketing type which would be most desirable for Debré Berhan.

Due to the fact that the Managing Director plays the major part of determining the marketing strategy and does the direct dealing himself with "EDISCO", the Sales Supervisor may have felt somewhat restricted in his activities. However, he will now be given a specific task of selling carpets and if he does not succeed to sell a large volume of this inventory within one month, we recommend that a replacement be considered.

Financial Manager.

This gentleman is very new to the company and is replacing a man of particular competence. Fortunately, he appears to have the competence and understanding of his work. It is anticipated that he will do a commendable job.

Personnel Officer.

This individual appears to be extremely well qualified for his position. The organisation of his work is commendable.

Office Manager at Debre Berhan Wool Factory.

This gentleman also appears to be quite competent.

Assistant Factory Manager.

This gentleman although in a technical position is new to textiles. However, his background of mechanical engineering should suit him very well in his work. He appears to have both the ability and the desire and drive to become a capable and qualified factory manager. He requires additional training.

Altogether the management group of Debre Berhan Wool Factory form a good progressive team.

3. Management reports.

a) Present reports.

The general manager receives the following major reports.

1) Sales Reports.

This multi-page report is compiled monthly and shows the following information :

- Comparison of planned and actual sales in summary form,
- Comparison of sales during the month in quantity and value,
- Finished goods inventory - The inventory in Debré Berhan Wool Factory which is a physical inventory and the inventory at "EDISCO" which is a perpetual record.

- ii) "EDISCO" sales by region report - The region type of goods sold and the percentage of sales by region are shown,
- iii) "EDISCO" sales report on a 10-day period (3 times per month) basis. The volume and value of sales is shown.
- iv) Cost Distribution Report and Product Cost Report.
 - An extremely detailed multi-paged cost distribution report and product cost report is submitted. Further discussion of this report will be made in the section "Analysis of Cost System".
- v) Production Reports.
 - A production report is submitted weekly showing daily production, excise tax paid, total finished goods production for the week.
- vi) Raw Material Report.
 - A very comprehensive picture of the raw material on order and in transit is completed monthly. This is an excellent report.

vii) Cash on Hand.

- Daily cash position is shown to the General Manager each day. No formal report is summarized.

viii) Sales Plan.

- There is a sales plan which is made periodically. It is recommended that this plan be converted to a graph and additions to the graph be made monthly which would show the plan for the year comparative to the actual sales accumulated during the year.
Attached is an illustration of this graph.

ix) Personnel Report.

- A comprehensive personnel report is submitted monthly giving :
 - general information,
 - disciplinary action which has been taken,
 - a list of the medical expenses paid,
 - sick leave,
 - patients at the clinic in the factory.

- The total number of employees by department are summarized on this report.

x) Transport.

- The transport activities are chronologically noted.

xi) Overdue Account Report.

- This report is issued twice per month. Due to the fact that "EDISCO" handle virtually all of the sales of the blankets, the overdue account report, which comprises all other sales, is not large.

b) Recommended changes to Management Reports.i) Sales Report.

The sales reports are quite good. It is recommended that on the comparison of planned and actual sales summary that a cumulated year to date figure be added.

ii) Comparison of sales during the month by quantity and value.

It is recommended that cumulated year to date figure be added.

iii) Overdue Account Report.

It is recommended that this report be broken into three columns :

Up to 30 days 30 to 60 days 60 days and over.

iv) Cost Distribution Report.

This report should be greatly condensed (see Standard Cost Accounting Section)

v) Product Cost Report.

It is recommended that this report be replaced by a new standard Product Cost Report (see Standard Cost Accounting Section).

c. Recommended New Management Reports.

i) Raw Material Graphs.

It is recommended that a Raw Material Report in graph form be drawn up as per the illustration attached. This report would show the inventory in the plant and the amount received during each month. The average price of the material received would be shown. There would be one of these reports for each product line where necessary.

ii) Waste Report.

It is recommended that a Waste Report be instituted in the Standard Department of the mill and that a copy of this report be submitted to the :

- General Manager,
- Factory Manager,
- Assistant Factory Manager,
- Financial Manager,

- Spinning Department Supervisor (a section applicable to spinning),
- Weaving and Finishing Supervisors (a section applicable to weaving and finishing)

A design of this report is shown in the Standard Department chapter.

iii) Production.

A Production Reconciliation Report has been designed for management, and is recommended to be put into operation. This report should be submitted to the :

- General Manager,
- Factory Manager,
- Assistant Factory Manager,
- Financial Manager.

Attached is a draft of the suggested report.

The purpose of this report is to provide management with an overview of the balance of production. It purports to show the quantity of material entering the plant, the production at each stage, the waste made at each stage and the final production out of the plant. The combination of these figures should balance. Clearly, there will be a fluctuation from month to month. However, after a period of a few months the balance should start to show and if a balance does not show then the recorded figures are wrong or the waste recording is wrong or some calculation is not correct. It is an excellent report which simplifies the overall view and control of the production of the plant.

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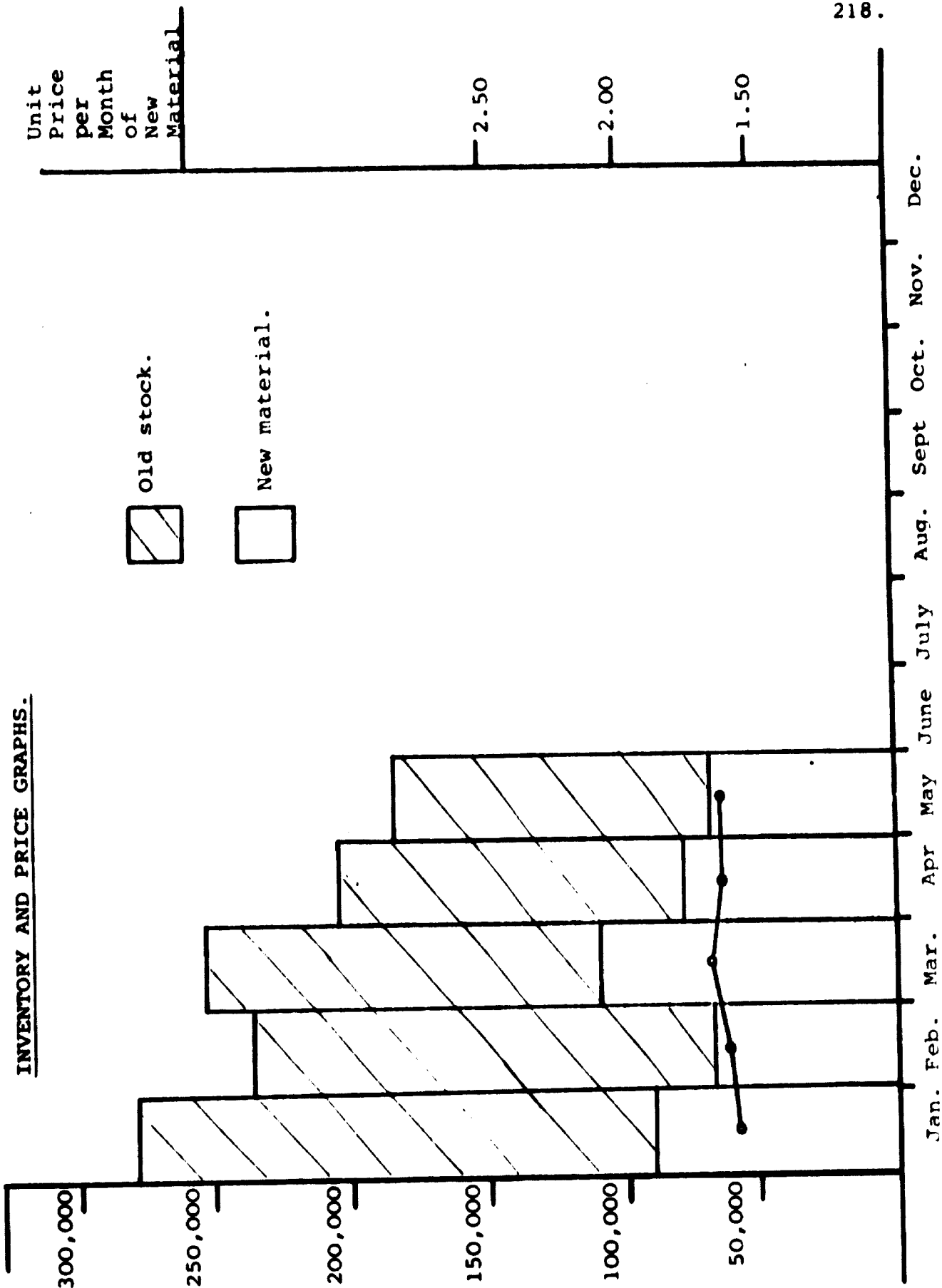
DEBRE BERHAN
WOOL FACTORY

RAW MATERIAL - 1200 TYPE.

RAW MATERIAL - 1800 TYPE.

KGS.

INVENTORY AND PRICE GRAPHS.



DEBRE BERHAN WOOL FACTORY	PRODUCTION RE-CONCILIATION REPORT.												WERNER INTERNATIONAL		
	Year :												Oct.	Nov.	Dec.
I T E M .	Jan	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.			
Input to blending & new raw material															
& reworked waste															
Spinning production															
Cops production															
Spinning mill waste															
Calculated yield (input to blend less spin. waste).															
Input to weaving															
Weaving production - picks converted to weight															
Nappage production - meters converted to weight															
Finished production & waste weave + finishing															
Calculated yield - finishing (input to weaving less & weaving + finishing waste)															
Sorting production															
Pulling production															
Dyeing production															

iv) Budget Controls.

Budget controls do not at present exist because there is no standard costing which has been set up. When standard costing comes into being it is essential that budgets be established for all expenses and the actual be compared with the standard monthly. A review and the establishment of budgetary controls for overhead expenses will be reviewed in the Standard Cost System chapter.

4. Administration - Reports & Records.

a) Present Reports.

They are numerous reports in the mills and between the mills and administration. Nearly all of these adequately serve their purpose. In general the reports and records are good. The most important are as follows :

i) Payroll Report.

The Payroll Report as presently constituted is quite adequate.

The Summary Report in particular is very useful.

ii) Production Reports.

The production reports from each department are quite adequate.

iii) Input to Process Reports.

These reports are also quite well designed and adequate for the purpose.

iv) Waste Records.

These records are good and will be put to beneficial use through the new Standards Department.

v) Finished Goods Report.

This report is adequate for the purpose.

vi) Inventory Records of Supplies.

An adequate system of recording of all items in inventory is in operation. The glaring weakness of the system is that although there is an item on the cards where minimum quantities can be marked there are no minimum quantities inserted. The result is that the store-keeper must use his own judgment on all items and report to the supervisors when he feels that the quantities are low.

vii) Finished Goods Record of Inventory.

The method of maintaining this record is satisfactory.

viii) Raw Material Inventory.

The method and records are satisfactory.

ix) Consignment Delivery Note.

This record is not an invoice, it refers to the delivery of blankets to Edisco.

It has been recommended that the number on the order-form requesting delivery be made, be written on the consignment delivery note so that a cross reference could be made against all orders issued by the head-office and the deliveries made. This is in operation now.

x) Credit Invoices and Cash Invoices.

The design of these forms is quite satisfactory and they adequately serve their purpose.

xi) Personnel Reports.

There are a number of Personnel Reports and Records. This groups of reports and records is singled out for commendation. They are excellent. The graphs show at a glance some important personnel data such as percent absenteeism.

b) Recommendations.i) Payroll, Salaries and Production Reports.

It is recommended that all production and payrolls be established on a two week basis instead of monthly and semi-monthly. All staff employees also to be paid every two weeks.

The basis reasons are that all production calculations can readily be made on a weekly or fortnightly basis. The comparisons each two weeks are simplified and there is no difference in the pay periods which anyone can distort into being discrimination. It has been expressed that some employees do not feel they are "part of the company" because they are paid semi-monthly and not monthly. Regular payment every two weeks is better for the community. In most companies the employees prefer to be paid weekly.

- ii) Supply Records - Perpetual inventories are maintained of each item in stock. The forms have been properly designed and contain the item "minimum quantity". This very important item is not utilised, the store-keeper is required to use his own judgment as to when he should advise management that additional supplies should be ordered.

To inscribe the correct inventory minimums will take considerable effort and decision making. However, the effort will pay many dividends.

It is recommended that a person be assigned the task of examining each type of supply item, review the historical volume and estimate the required minimum. On a regular routine basis these items would be reviewed by the General Manager, the Technical Manager, the Assistant Technical Manager and the minimum requirement established. Such a programme would require the attention of one man for a period of approximately six months.

iii) Personnel Hiring.

It is recommended that all employees be given a test for eyesight and a test for manual dexterity. Neither test need be elaborate. These tests will eliminate many employees from being improperly located on jobs which require good eyesight and dexterity such as spinners and weavers.

Placing of pins into holes and threading of needles are excellent tests. Such test boards can be built by the machine shop.

5. Financial Analysis.

The finances of the company were analysed. A reputable accounting firm has audited the books annually and consequently the records are in proper order. There is no change recommended in the presentation of the financial results of the company.

A review of the financial results reveals that approximately 4 years after the company came into existence that either a break-even or a modest profit was achieved for a few months. During the year July 1st 1967 to June 30th 1968 the company lost 37.851.- E.£. The previous year the loss was 255.124.- E.£.

Moreover, at this particular year the overdraft was 520.038. E.£. and the sales had reached almost 2 million Dollars. However, the inventory had risen to over 400.000.- E.£., which of course was not a healthy sign.

During the subsequent year, there were major personnel changes and the company went into decline.

Since the arrival of the new management in 1973, and the numerous personnel changes, the entire picture of the company has changed. Naturally, these changes have not come about within a very short period and have taken a number of months to manifest the improvement financially. The final report of 1974 is not yet completed. However there are some particularly encouraging figures which can be quoted. The total inventory has been reduced from 1.455.688.- to approximately 400.000.- E.£. The majority of these 400.000.- E.£. is carpets. Sales have ballooned to over 4 million E.£. from less than 2,5 Million in 1973. The overdraft has been reduced from over 2 million Dollars to less than 1 million Dollars.

a) Working Capital.

The major conclusion on the financial analysis is that the management has proven that they can operate this company successfully and it is now essential that they obtain sufficient working capital to capitalize upon their ability. The working capital is clearly insufficient as will be shown in various portions of this report. The main capital requirements are in raw material, - (waste purchase), and dyestuffs. Also spare parts and replacement parts for the equipment are absolutely essential for the efficient running of the mills.

b) Overdraft Interest Rate.

The interest rate is at 9,5% which at June 1974 meant a financial burden of approximately 90.000.- E.£. and at the present moment - at the end of September - is approximately 75.000.- E.£. Additional working capital could, of course, reduce the overdraft and thereby convert that interest into profit.

c) Inventory levels.

1) Finished goods.

The inventory level of finished goods at present is too high in carpets. Inventory level of blankets is phenomenally low.

A major point requiring management attention is the reduction of the very high inventory on carpets.

This subject has been discussed with management and management are planning to institute a campaign of very active selling to commercial outlets of carpets.

Such activity was not put into action before due to local circumstances and the uncertainty of the market.

We highly endorse this action and advise that the large inventory of carpets be sold at reduced prices. The company is at present producing on a long term contract and during this period all of the inventory of carpets should be liquidated. We estimate that the average price which will be obtained from the inventory will be about 50% of its current value. This will mean that the year ending June 1975 will have to absorb the loss of approximately 200.000.- E.£. in reduction in inventory price. However, this loss is one which will not affect the cash flow and will in fact greatly improve it. Furthermore, it will provide working capital which is sorely needed in this company.

ii) Primary Raw Material.

Inventory levels of the raw material are very low. The actual inventory of raw materials is not sufficient for the type of operation in which Debré Berhan Wool Factory is involved. The type of production requires a blend of many types of waste raw material. In order to achieve the proper blend, the raw material must be carefully selected. It is very easy to have an adequate supply of one type and an insufficient supply of a balancing type. Three months supply might appear to be adequate but in truth because of the wide variation of types and the uncertainty of shipments of goods, there is insufficient volume from which to readily draw a blend which is suitable for the production. The consequence of this is that a large portion of the time of the technical management of the mills is absorbed in selecting raw material which will provide an adequate or a workable blend throughout the plant. At the moment it is quite impossible to plan even two days in advance the blends which will be put into the

plants. With an additional two months supply on the floor, minimum, the blends entering the plant will be much more uniform, the operations of the plant will be more consistent, the quality will be more uniform, the operations of the processes will be greatly improved and management will be able to plan for one full week in advance and will be relieved of a time consuming task, Management will then be able to apply more time onto other urgent problems.

iii) Dyestuffs.

The management have learned that the market demands colored goods. Consequently the demand for dyestuffs has increased tremendously over the previous year.

The present supply of dyestuffs is absolutely insufficient. Due to the very long delivery time of dyestuffs in small quantities, it is essential that Debré Berhan buy dyestuffs for a minimum requirement of 6 months at a time and should maintain an inventory from six months to one year on hand. Dyestuffs are very expensive and this requires a considerable increase in working capital.

At present it is virtually impossible to plan ahead on the utilisation of dyestuffs. It has to be done on a day to day basis. This occupies an undue attention of management which could well be applied in other parts of the enterprise.

iv) Replacement parts.

The replacement parts in the plant on the operating machinery is much too low. Items which are in daily use and replacement such as bobbins, shuttles, spools, are much too low. This leads to inefficiency, waste of time in trying to obtain the parts from the stores and costly running conditions.

Following are some examples of the losses which are incurred due to the lack of proper supplies and inadequate supplies.

- Condensor bobbins.

There are insufficient condensor bobbins. From time to time cards must be stopped in order to wait for condensor bobbins to be run out on the spinning frame in order to re-start up the carding. This is a loss in efficiency and production on the cards. Ultimately, this loss is reflected onto the spinning. Some of these condensor bobbins are virtually irreparable and are in very bad condition. This causes additional waste which again adds to the cost of operation.

- Spinning bobbins.

Many of the bobbins are in very bad condition. With continual usage some of them slip too far down on the spindle and consequently sit too low on the spindle. This means that the lift of the spinning frame must be limited to accommodate the low sitting top of these bobbins. This means excessive doffing on the spinning frame, lower efficiency on the spinning, smaller package size which means in turn smaller supply package to the cops winding and overall increase in cost. In addition, it affects the quality in as much as there are additional knots unnecessarily put into the product.

- Weaving.

Shuttles. There are insufficient shuttles. The looms are hand-change-type looms. It is necessary for the weaver to prepare a shuttle to replace one which is run out.

When a loom is operating with three colours in the loom there are three shuttles with three different colours operating on the looms simultaneously. When each shuttle runs out there should be another shuttle prepared of the same colour to immediately replace the run-out shuttle. This is not the case since there are not sufficient shuttles. Very frequently there is only one additional shuttle with which a weaver can work. From time to time the weaver prepares a colour for replacement which is the wrong colour. The result is he must replace the cops into the shuttle which causes additional waste and additional consumption of time.

- Carpet Loom Shuttles.

The above remarks apply to the carpet loom. On this loom the lost time due to the lack of extra shuttles is even greater.

6. Purchasing.

The purchasing is separated into foreign purchasing and domestic purchasing. The foreign purchasing relates mainly to raw material and supply parts for the equipment. All purchases are approved by the General Manager.

a) Purchasing - Local.

Most purchases are done on a cash basis. The records are adequate for the operation. The A/P ledger is not large since not many items are purchased on credit.

b) Purchasing - Foreign.

Most purchases are done on a letter of credit basis.

i. Primary Raw Material.

The primary raw material for spinning comprises approximately 33% of the selling price.

The purchased yarns, dyestuffs and chemicals, other secondary raw materials used in blanket making-up comprise an additional 7%.

The present method of purchasing is as follows :

- the Factory Manager examines the inventory position and the requirements. He writes out requisitions for each type of raw materials.

- the General Manager receives the requisition and reviews the requirements with the Factory Manager.

- the General Manager, after giving consideration to the company financial position, places purchasing orders with the respective suppliers.

- the raw material position is controlled by a monthly report showing the delivery position of each purchase order and a perpetual inventory at the mill. The quantities received and the amount put into work are of course recorded.

The General Manager has also a good overview and control on the primary raw material.

The secondary raw material is also controlled by the General Manager but not in as detailed a manner as the primary.

Recommendations.

The method of primary raw material is adequate. It is recommended that the graphs referred to in the management reports be put into operation.

Sources.

Primary raw material supplied by UK for type of material used this is the best source.

Recommended, developing another source, e.g. Belgium for 10-15% of requirements as insurance against strikes in UK.

ii. Yarns.

At present, these are not specified and sometimes a different yarn number is received. It is recommended that yarns should be specified in more detail. Eg. blankets use both 16's and 21's.

iii. Dyestuffs.

These are supplied by Switzerland and East Block Countries. The purchasing of low cost dyestuffs from East Block sources should be pursued since this element of cost is very high. It can vary between 2 and 4% of the total cost. In this regard,

no substitutes should be purchased without prior review by both the Factory Manager and the General Manager since the fastness of the dyestuffs may have an adverse effect. The General Manager is in the position to evaluate both the effect on the market and the financial implications.

iv. Ribbon.

Is purchased from Japan.

Other sources should be examined, Italian sources may be lower cost. However, the combination of price and reliability of delivery may not be improved.

Recommend trials be made on warp knit fabric which is slit to the required width.

v. Recommendation.

There are two clerical staff members maintaining the records relating to purchasing, one for domestic, one for foreign purchases.

The total work can be done by one person.

7. Break-even point and Profit Potential Calculations.

As part of the corporate analysis it was essential to determine as early and as rapidly as possible if the company with its present price structure could be profitable or could reach a break-even point. Consequently a calculation was made based on certain assumptions and which embodied all costs.

The result of this calculation showed that the current volume, (i.e. August 1974), at the current selling prices would produce a profit picture. Furthermore a break-even point could be reached at approximately 18.500 blankets of quality 1805 per month.

The calculations were based on the following assumptions :

- i) the labour and social costs and salaries of the month of July 1974 were selected.
The reason for selecting these was because a new increase in wages had been applied prior to that month and in addition some back pay adjustments were also included. Consequently, the current and immediate future wages would not exceed this figure.
- ii) the production basis of July was selected to correspond to the wages of that month.
- iii) it was assumed that all production would be on quality 1805 and nothing on any other product.
The conversion of the carpet production and other

blanket production during the month of July to quality 1805 was estimated. This figure was taken as a conservative production of 22.000 blankets.

- iv) **Raw Material Costs.** The average cost of raw material was calculated on a basis of the landed cost of material at Debré Berhan during the previous three month. This figure amounted to E\$. 1.66
- v) the other raw material costs such as purchased yarn, ribbon, were taken at the most recent price quotation values.
- vi) **Dyestuffs.** Since dyestuffs are becoming a very important part of the cost, a very high estimate of the cost of raw material was made. This estimate was at the value of 12.000.- E\$. per month. This figure exceeds the estimate made later in the study.
- vii) the general and administration and manufacturing costs were taken on the basis of the first six months of 1967. Where the costs were related directly to production, these costs were increased by an increment of 25%.
- viii) bank charges were taken on the basis of one million Ethiopian Dollars overdraft at 9,5%. The actual overdraft as of September was approximately E\$. 800.000.-
- ix) the selling price was taken as 17 E\$ per blanket. This is the actual selling price and management is contemplating increasing this figure.

The calculation was purposely designed to determine whether or not the company had a positive or negative cash flow.

The depreciation was then deducted to determine if there was a profit or loss.

The calculation revealed that the company, strictly on an operating basis, should be making approximately 337.000.- E.₡. per annum.

Calculations were than made to attempt to determine the approximate break-even point. The following assumptions were made :

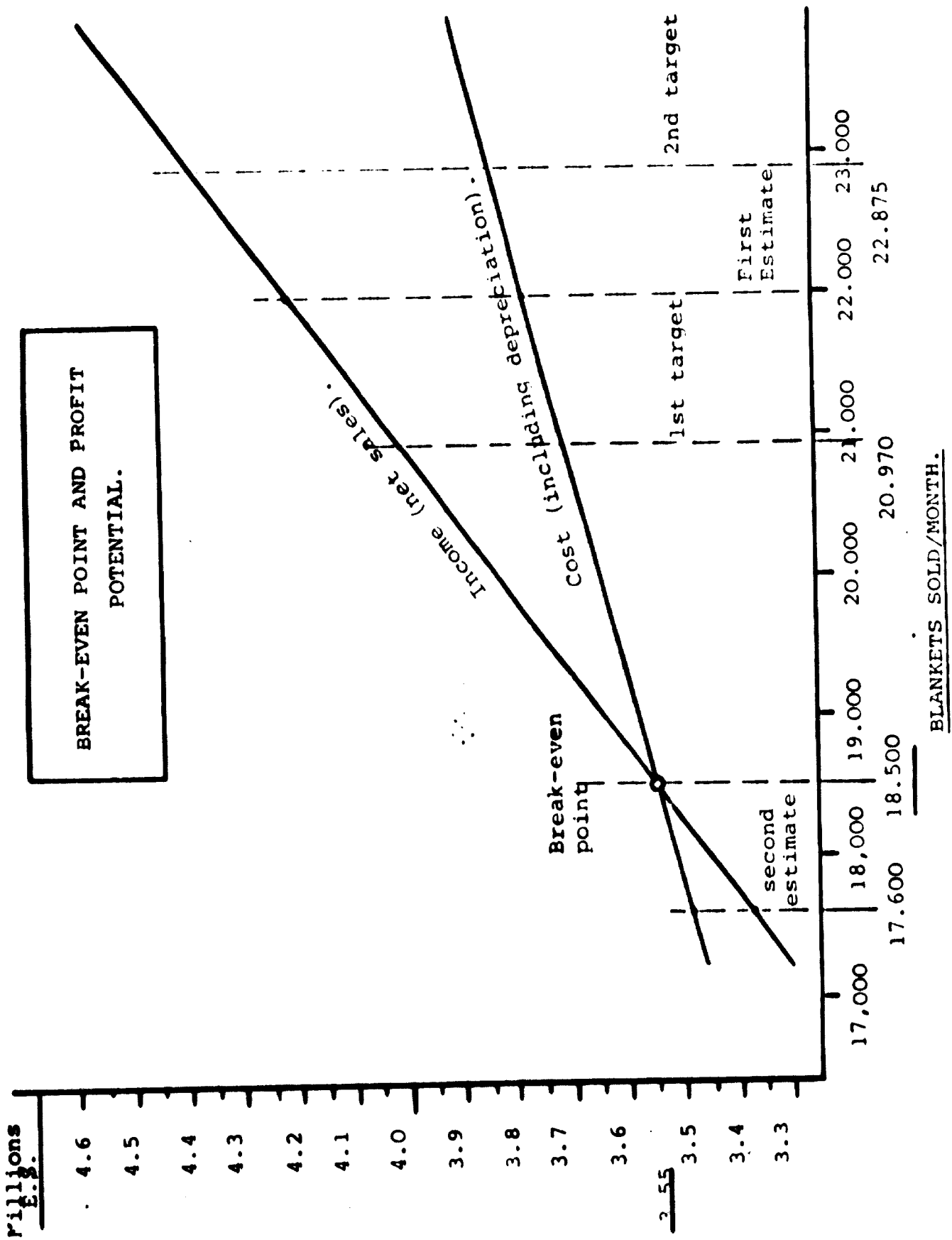
- i) the volume of sales and production was reduced by 20%. The corresponding costs were reduced on a purely assumed basis where necessary and on a calculated basis where applicable (for example : Excise tax).
- ii) the result of this calculation showed that a 20% drop in production to 17.600 blankets per month would mean an estimated loss per annum of approximately 122.000.- Ethiopian Dollars).
- iii) placing the two calculations on a graph it was determined that the break-even point would be at approximately 18.500 blankets.

All of the calculations relating to the estimated break-even point and profit potential calculations are included in appendix A of this report.

From these calculations it became manifestly clear that Debre Berhan could be an attractively profitable operation in the future provided the basic recommendations given in this report were carried out.

It is important to recognize that the company is producing a number of qualities of blankets and two qualities of carpet. The calculations referred to above proved that if only one quality, the major volume item 1805, was produced that the company would make a profit. Consequently, it is necessary for management to compare carefully the advantages of producing any type of quality other than the one major quality at the present time. The present market demand will absorb the full production of the plant on quality 1805. Consequently, if any other type of production is made it must be made on the basis of either equal return on investment, better return on investment, or other reasons.

Following is a copy of the break-even graph shown in appendix "A".



8. Analysis of Cost System.

- Cost Structure, Costing System and Controls.

Prior to the fall of 1973 there was no proper costing system established whatever. Since that period a historical cost system has been installed which is most commendable. The system however is very detailed.

- Recommended Standard Cost System.

It is recommended that this system be replaced by a more simple "Standard Cost System" (see chapter on Standard Cost System).

9. Relationship of Costs to Prices.

- Product Costing.

Product costing was developed for the first time on a historical basis along with the cost accounting system, which was developed during the past year. This system provided management with sufficient information to determine the degree of profitability in each product. It has been very helpful.

- Recommendation - Standard Product Costing.

It is recommended that the system be replaced by a more simple "Standard Cost System" (see chapter on Standard Cost System).

10. Analysis of Premium Payment System.

The present system is as follows :

- i) there are grades or levels of classification of jobs somewhat similar to "Job Evaluation". This arrangement is very good and should be maintained.
- ii) there are some workers who do not come under the wage incentive scheme but are paid on a straight daily basis. This is quite acceptable and should not be changed as these workers are indirect and do not affect the productivity of the mills.
- iii) within each grade there are 24 levels of payment. Workers achieve the different levels of payment for a variety of reasons : competence, seniority, etc...,
- iv) there is a base of production above which incentives are paid. The production base is in all cases relatively high.

It is obvious from observation of the premium system and the discussions regarding the background of this system that the company is facing an extremely complex and difficult question. Certainly the method at present being used whereby workers on the same job are getting different rates of pay is wrong. However, this is an inherited problem and cannot be eliminated overnight. In fact, the elimination of this problem may well take years.

Deciding the wage level of the different workers on the same category of job is very difficult. The wages scale within a category obviously has too many stages. Over the years this must be reduced and it is our understanding that the company management intends to do so. Fortunately the premium system as presently set up is not too difficult to alter from the acceptance standpoint of the workers. The percentage of premium payment vis-à-vis the percentage of additional production over the base is generally less than the percentage of production. For example, in weaving an increase of 10% production would provide an increase of only 6 to 8% increase in wages. Some premium payments are higher than the increase in production, but fortunately these incentives have not been achieved.

Consequently, the present system can probably be changed with the minimum of difficulty, for one which would benefit both the company and the employees.

We are not recommending any quick moves regarding the change of incentives or the alteration of the pay rates.

a) Recommendation.

We recommend that a very simple approach be taken to the wage incentive system. We suggest that approximately 65% of the production target, which is expected from the employee, be used as the base pay. Over the base pay an incentive wage would then be applied. For example, if we anticipate that an employee can earn at a full job load and standard production, two Ethiopian Dollars per day, then the base pay would be established at 1,30 E.Doll. Over the 65% production, the worker begins to earn a bonus. In truth it is a straight piece-work approach but with a base as the minimum. We suggest the following application of this system. When a new employee is hired he would be placed on a wage rate which is a learner rate for

approximately six weeks of one Ethiopian Dollar per day. After six weeks the learner would then be moved to 1,25 E.ḡ. for another six weeks. After this time the learner should be meeting the target of 65% which would in reality be 1,30 E.ḡ.

At this time the worker would then be transferred onto the bonus system, providing of course that the worker is sufficiently well trained to be able to earn on the wage system. If however, the worker is unable to attain the 65% then the worker is removed and a new one is started with. In this way you measure the performance with the operator when they are in the learning stage and you avoid adding operators in the plant who are incapable of performing the proper jobs.

As for the previous employees who are presently in the plant, the problem is greatly aggravated. We recommend that all wages of all employees be related to the target scale when the full or standard production is reached. This is illustrated as follows : if an employee who presently is earning 1,80E.ḡ. a day has a target of 2 E.ḡ. per day, then the base wage is related to the percentage of that final target or in this case 90%. This particular employee is then guaranteed 90% of the target wage. When he produces beyond the 90% then he automatically comes into an incentive scale. The wage calculation can be easily minimised by establishing the piece-work rate per unit of production and on the payroll simply multiply that rate by the actual production achieved. A standard base pay list per each employee would then be compared with the actual earnings for that particular period. If an employee earns more than the base rate there is no further calculation. If an employee earns less than the base rate of which they were formerly paid then the base rate is simply substituted for the earned amount.

Over the years what will happen is that wages will increase. In such an instance then the base pay can remain the same for those who are above the 65% but the rate of incentive would be increased. For example, presume that the wage rates would increase by 10% in 1976 then an employee whose base was 90% of the anticipated earnings of 2.00 E.g. in 1974, would maintain a base rate of 1.80 E.g.

The wage incentive would reach an anticipated earning of 2,20 E.g. Consequently, the 1.80 E.g. would no longer be 90% of the anticipated earning, it would be reduced to 80.2. As subsequent increases in wages took place the problem would eventually be eliminated.

Comparison of % Production to % increase in wages.				
Process.	Approximate Base Pay.	% increase over Base Production.	Incentive Amount paid.	% incentive increase in wages.
Sorting	1.85	10	0.160	8.7
Nappage	1.88	33	0.150	8.0
Card	1.85	10	0.890	48.
	1.97			45.
	1.66			54.
	2.12			42.
Cops wind.	1.92	10	0.260	13.6
Weaving	2.71	10	0.216	8.0
	3.91			5.5
Raising	2.71	10	0.180	6.6
Dyeing	2.91	12	0.250	7.8
Pulling	2.60	10	0.160	6.1
Carpet Weave	1.88	10	0.350	18.7
Tailers	1.94	10	0.150	7.8
Overedgers	1.94	10	0.200	10.3
Blanket Cutter	1.66	10	0.120 ap.	7.2
Folders	1.66	10	0.060	3.6

VII.

STANDARD COST SYSTEM.

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VII. STANDARD COST SYSTEM.**1. Concept of Costing.****a) Purpose of Costing.**

The basic concept which was emphasized was that, the purpose of costing is to provide management with sufficient information to control the operations of the company. The manner in which this is done is :

- i) to determine the expected production which can be obtained via proper management. This is established as Standard Production.
- ii) to determine the personnel which are required to produce this volume of material.
- iii) to determine the various costs which contribute to manufacturing and establish budgets which can be reached via good management.
- iv) to determine the various General and Administration Costs which are necessary to service the standard production.
- v) to determine the costs related to Selling and establish a budget for these considering the volume of goods which are planned to be produced and sold.
- vi) to determine the percentage of waste which is permitted at each process, and which can be controlled.

b) Conversion Costs.

From these figures calculations can be made which determine the cost per kilogram or cost per meter at each process. These costs are known as Conversion Costs. These figures can then be used to determine the cost of each product.

c) Product Cost.

The conversion cost per kilogram or per meter having been calculated per process, is then compiled into a summary for each product. The cost of raw material is determined and added to the conversion cost to determine the total standard cost per product.

d) Comparison of Actual to Standard Costs.

The actual costs must be compared to the standard costs periodically in order to advise management of the actual variance of actual costs to standard costs. This is done by simply multiplying the standard unit cost by the production achieved during a period and comparing this with the actual costs during the same period.

e) Benefits of Standard Cost System.

The benefits of a Standard Cost System are that management can obtain a projection of what the costs should be and then can examine the actual performance from an intelligently predetermined base. Discrepancies or variations from the standards can then be questioned and should be accounted for. Or possibly the standards should be changed in which case a new set of standard calculations should be made.

At all events, management has an excellent tool with which to work.

f) Responsibility of Costing Department.

It is vitally important that the Costing Department understand the extent and limitations of their responsibility. It is the responsibility of the Costing Department to provide the cost data to management. It is the responsibility of management to exert control. The Costing Department does not exert control. The Costing Department "keeps the score".

g) Simplified Approach.

In addition the concept of maintaining a simplified approach to costing has been promoted. The important thing is to provide management with information which is usable even if certain items are "grouped" or "estimated". Reams of details which are of no significant value should be avoided.

h) Tailor-made Costing.

The costing system should be tailor-made for the purpose for which it is used.

ij) Summation.

The above is a very simplified summation. It is the basic concept which has been repeated many times at Debré Berhan Wool Factory.

2) Standard Costing System Standards.

The commencement of establishing a Standards Department in the mills has provided management with standards which did not exist before. Upon these standards a Standard Cost System can be built.

a) Production Standards.

As has been described in the Manufacturing and Standards Department, standards of production for the Carding Process and Weaving Process have been calculated. The Carding Process is the "bottle-neck" process of the mills and consequently all projected sales and production must be built around this capacity.

b) Labour Standards.

The present labour complement is accepted as standard. This figure can be greatly reduced via training and improved management controls, but it does provide a standard with which management can work in the immediate future.

c) Waste Standards.

Waste Standards have been established on a temporary basis. A Waste Report has been designed (see Standards Department Chapter).

d) Construction Sheets, Cloth, Blankets and Carpets.

The manner in which the cloth was being constructed was unknown to the costing department, and was not written down in the manufacturing division. (As has already been explained, this is not intended as a reflection upon the incumbent management of the mills. This was an inherited situation which the present management had not sufficient time to rectify).

Construction Sheets for both blanket style 1805 and Carpet 4 mm pile have been drawn up, copies of which are included in this report. These construction sheets are essential for the determination of Standard Costs and Product Costs.

It is of course recommended that the construction of all products be calculated.

No cost system is correct the first time it is calculated. Furthermore, periodic revisions must be made.

e) Standard Cost System

The Standard Cost System should be recalculated every six months. This need not be done precisely at the end of the fiscal year. It should, however, be done as soon as possible following any annual increase in labour wages and when a revision is made of the following items:

- Waste Standards,
- Yield,
- Labour Complement,
- Production at bottle-neck process or planned production if below this figure,

DEBRE BERHAN WOOL FACTORY	BLANKET CONSTRUCTIONSHEET.	WERNERTEX Date :
Style No.	1805 Normal.	Data.
WEAVING.		
Weave Warp yarn Nr. Weft yarn Nr. Warp ends/cm - off loom Weft picks/cm - loom setting - on loom - off loom Reed Warp ends per dent - body - selvedge Width in reed - in cm Width off loom in cm. % contraction weft Total warp ends - body - selvedge Total ends in warp Warp length - in meter Warp contraction - on loom % - off loom % Weight of warp - Meter off loom Weight of weft - Meter off loom Total weight/meter	Dobby Design 2/16 Ne (cotton) 13.6NM 1.5 NM (wool blends) 6.35 9.- 9.33 10.82 4.- (40 Dents/10 cm). 1 - 2 1/2/1/2/1/2 3 - 2 of 2/16 - 1 of 6/21 179 (180.8 reed) 171 4.5 1,074 6 1,085 1,800 (30 pcs) 3.7 20.7 .0962 (1085 ⁽⁺²⁾) x 1.207/13.60 1.2950 (1.79 x 1.088/1.5) 1.3912	
FINISHING		
Raising - No. of passes Width of finished cloth % weft contraction % warp stretch Picks/cm after raising % waste in raising Resultant weight meter No. Meters/blanket Total picks/blanket Total weight/blanket (kg) Total warp weight/blanket 7% Total weft weight/blanket 93%	1.60 6.9 7.72 10.02 8.53 1.165 2.20 2,204 2.563 0.181 (.0896x.915x220) 2.382	

DEBRE BERHAN WOOL FACTORY	CARPET CONSTRUCTION SHEET.	WERNERTEX.
Style No.	4 mm. Pile.	Date :
WEAVING : Weave Warp yarn - base - binder - pile Warp end/meter - base - binder - pile % Warp contraction - base - binder - pile Weft yarn Weft picks/meter % Weft contraction Warp Weight - base kg/m2 - binder - pile Weft weight - kg/m2 Total weight - kg/m2		Carpet Jute 2/3.62 Nm. Cotton 6/21 Ne. (6/36Nm) Spun Blend 3/2.8 Nm. 870 500 290 3 15 2.20 Jute 2/3.62 Nm. 500 4.2 0.495 0.115 0.994 0.288 1.892

- Budgeted administration cost,
- Budgeted manufacturing cost,
- Raw material cost, average of the previous three months.

3) Recommended Application of Standard Cost System.

The following outline of the proposed Standard Cost System has been drawn up and presented to Debre Berhan Wool Factory and it is strongly recommended that it be put into operation. It is necessary that modifications be made to the system to suit circumstances as they arise. The period of installation will be a long one. Moreover, there will be additional forms which will have to be designed to serve the purpose of compilation and provide management with the data which is ultimately desired.

IT MUST BE STRESSED, THAT THE SYSTEM IS NOT DESIGNED TO BE EXACT IN ALL DETAIL. SOME MINOR ACCURACY HAS BEEN SACRIFICED FOR THE BENEFIT OF ACHIEVING A RAPID OVERVIEW AT LOW CLERICAL COST. THE SYSTEM IS HOWEVER, SUFFICIENTLY ACCURATE FOR PROPER DECISION-MAKING BY MANAGEMENT.

It must be further stressed that judgment must be applied when determining the cost calculation. For example : to do a great amount of clerical work to obtain an exact figure where only one or two cents are involved in the end product cost is not worth the effort. When a significant cost factor is under consideration, such as dyestuffs here the application of costing should be closely considered and be quite accurate.

a) Cost Centres.

In the Debre Berhan Wool Factory it is recommended that only the following cost centres be established :

- Material Preparation Mill,
- Spinning Mill,
- Weaving Mill,
- Finishing Plant,
- Carpet Mill.

i) Material Preparation Mill.

This cost centre should embrace the receipt of raw material to the transfer of material to the blenders. Included in this mill as far as costing is concerned would be the dyeing of raw stock. The actual supervision of dyeing must come under the Finishing Plant Supervisor but the cost elements are applied to the Material Preparation Mill. This is important since the cost of the blends including dyeing must be determined. The costing system should then show the raw material input cost, the conversion cost and the output cost of the material which will be used in blending.

ii) Spinning Mill.

The Spinning Mill comprises the costs from input to blending through to cop making.

The input cost of raw material to blending is an extremely important item. The blend is comprised of both new raw material which has passed through the material preparation department and returned waste.

The waste material should not be given any value.

Additional work is involved if values are applied to the wastes and it can be readily shown that there is no advantage whatsoever in giving the returnable waste any value.

All of the conversion costs and all of the original raw material costs should be channeled into the yield. In this manner all of the costs are ultimately applied to the end product. A conversion cost in spinning plus the raw material input cost will determine the yarn cost from the cops winding.

iii) Weaving Mill and Finishing Plant.

The Weaving Mill and the Finishing Plant is separated as far as control over cost centres are concerned. Budgets for manufacturing expenses should be established for each mill, and control by management exerted over these areas independently. Each cost item can be readily identified and consequently the General Foreman of each mill should be held responsible for the costs in his department. These costs are the conversion costs and of course the percentage of waste which is made.

The product cost however should be calculated for weaving through finishing. In the Debré Berhan Wool Factory there is no advantage whatever in determining the costs of the woven fabric inclusive of material and then separately calculating the cost of finishing inclusive of raw material.

The detailed illustration of the Product Cost of Blankets clearly shows the advantage of combining the material costs in both of these mills.

iv) Carpet Mill.

The conversion costs for carpet weaving and subsequent finishing are clearly defined on the payroll and by the distribution of overhead costs.

However, the preparation of the yarns for carpet weaving are made in the cop winding section. Therefore this section must be studied carefully to determine the amount of labour which is involved in this work and this labour cost should then be applied to the carpet weaving. This is a perfect example of how the concept of costing should be applied. The labour in the cop winding department are required to move from one job to another as the work demands. Consequently, in order to maintain an accurate record of the amount of labour time applied to each process and report this independently on the payroll becomes an onerous and complicated job which serves very little purpose. It is much better to study the operation for a short period of time and determine the amount of work which is necessary to produce one kilo of carpeting or one square meter of carpeting. When this figure is established it should simply be applied as a standard conversion cost figure in the preparation of yarns for carpet weaving.

When comparisons are made to the actual cost then a calculated percentage of the cost of cop winding section would be applied to the carpet mill and deducted from the spinning mill. If no carpet production was made during a period then the entire cost of the cop winding section would be applicable to the spinning mill.

b) Primary Raw Material Costing.

The raw material in Debré Berhan Wool Factory presents the most complex cost element in the operations. There is a wide variety of raw materials and the value of these materials not only varies between one another but also within the same type from shipment to shipment. Furthermore, when a shipment is received it is only after the goods have been completely sorted that the usage of the raw material can be determined. Consequently, it becomes exceedingly difficult to attempt to accurately identify the raw material cost of each individual lot of production which is put through the spinning. Furthermore there is very little advantage in determining the exact cost of each lot. The composition of each lot is presently recorded and this information is supplied to management. Consequently, the control over the blends of each lot are made on a daily and weekly basis. The calculation of the cost of each lot submitted on a later date does not serve as a management tool to any great degree. In the section on recommendation, this point is mentioned. The percentage of waste should also be clearly identified.

What is important to know is the average cost per lot over a period of time. The fact that one lot may cost as much as 10 or 20 cents more per kilo than another lot does not mean that there will be any change in the end product price for that particular lot. If the average lot cost is increasing than management must know this for the purpose of either purchasing less costly raw material or increasing the price of the finished product if possible.

The raw material price should be determined on the basis of the average purchase price of the raw stock received during the previous three months.

In addition, the product costing has been so designed that the raw material cost is completely separated from the conversion cost. This permits management to rapidly determine the effect of any increase in raw material costs on the cost of the end product. Consequently, it becomes easy to determine if a revision in selling price is warranted.

It has already been recommended that a larger quantity of raw stock be available for management to formulate their blends. With a larger volume of raw stock the blend will not only be more consistent in quality it will also be more consistent and uniform in price.

c) Standard Cost Calculation per Quality.

The Spinning Mill has in the past produced a variety of qualities many of which were very similar from the standpoint of the blends of raw stock. In the immediate future there may only be 4 or 5 qualities which are spun such as :

- 1800 group,
- 1200 group,
- Carpet yarn,
- Handicraft yarn.

It is recommended that when complete cost calculations be made for each quality that the assumption be made that the entire spinning mill is producing this one quality. In this manner an accurate standard cost for each quality can be determined. Attached is a calculation form for spinning yarn cost.

DEBRE BERHAN WOOL FACTORY	STANDARD YARN COST SHEET.		WERNER INTERNATIONAL
STYLE :		Yarn Count :	Date
RAW MATERIAL COSTS		Cost/kg.	
<p style="text-align: center;"> New Re-workable Oil TOTAL </p>			
CONVERSION COSTS.			
LABOUR	MFG. O/H	Other	
TOTAL COST/KG.			

d) Handicraft Yarn Cost.

When calculating the cost of handicraft yarn, it must be recognized that by selling yarn this yarn that the utilisation of equipment is placed out-of-balance. Every kilogram of yarn sold is a kilogram less that is not woven and finished. The machinery which is idle as a result of this sale must be charged to the yarn cost.

Further, the manufacturing overhead in spinning should theoretically be increased since there is no processing after spinning on which to apply this cost.

In Debre Berhan the situation is further aggravated because labour cannot readily be reduced even when there is less work. Consequently, the labour which is not utilised on blanket making because of the lack of yarn produced for handicraft yarn must also be applied to the cost of the handicraft yarn.

The most simple cost calculation which is also reasonably accurate is to add the conversion cost per kilogram in weaving and finishing of blankets to the cost of the handicraft yarn.

The true comparison of profit margin can then be determined.

4) Illustration of Standard Cost Calculation.

Following are a set of calculations which illustrate the manner in which the Standard Cost can be calculated for each mill and for each quality. The figures used in the calculation were based on :

- standard production

the newly established standard production of 2846 kg per day through the carding.

a) Standard production.

Referring to the manufacturing section of this report it has been determined that the bottle-neck point of the production is the carding. It has been determined that at some future date the standard of 3162 kg per day can be established. The production in August/September has been calculated at approximately 20% below this target. It has been agreed that a production of 2846 kg per day, which is 10% below the ultimate target, should be established as standard.

b) % to blanket weaving.

93% of the spinning production destined for blanket weaving of quality 1800.

c) Standard Labour Cost.

The standard labour cost per hour determined by using the actual production of August and the actual labour cost of August.

In future, the standard labour costs will be determined from information received from the newly created Standards Department in the manufacturing division. These figures which were used in this illustration were purposely selected as being reasonably representative of the actual present situation.

d) Primary Raw Material.

The raw material average price of 1,66 E.£. was determined by calculating the average price of the raw material received in Debre Berhan during the previous three months. It must be noted that the higher price material which is used for the 1200 range, i.e. the khaki type of material, was not included in this figure. Only the type of material which goes into the 1800 range was included.

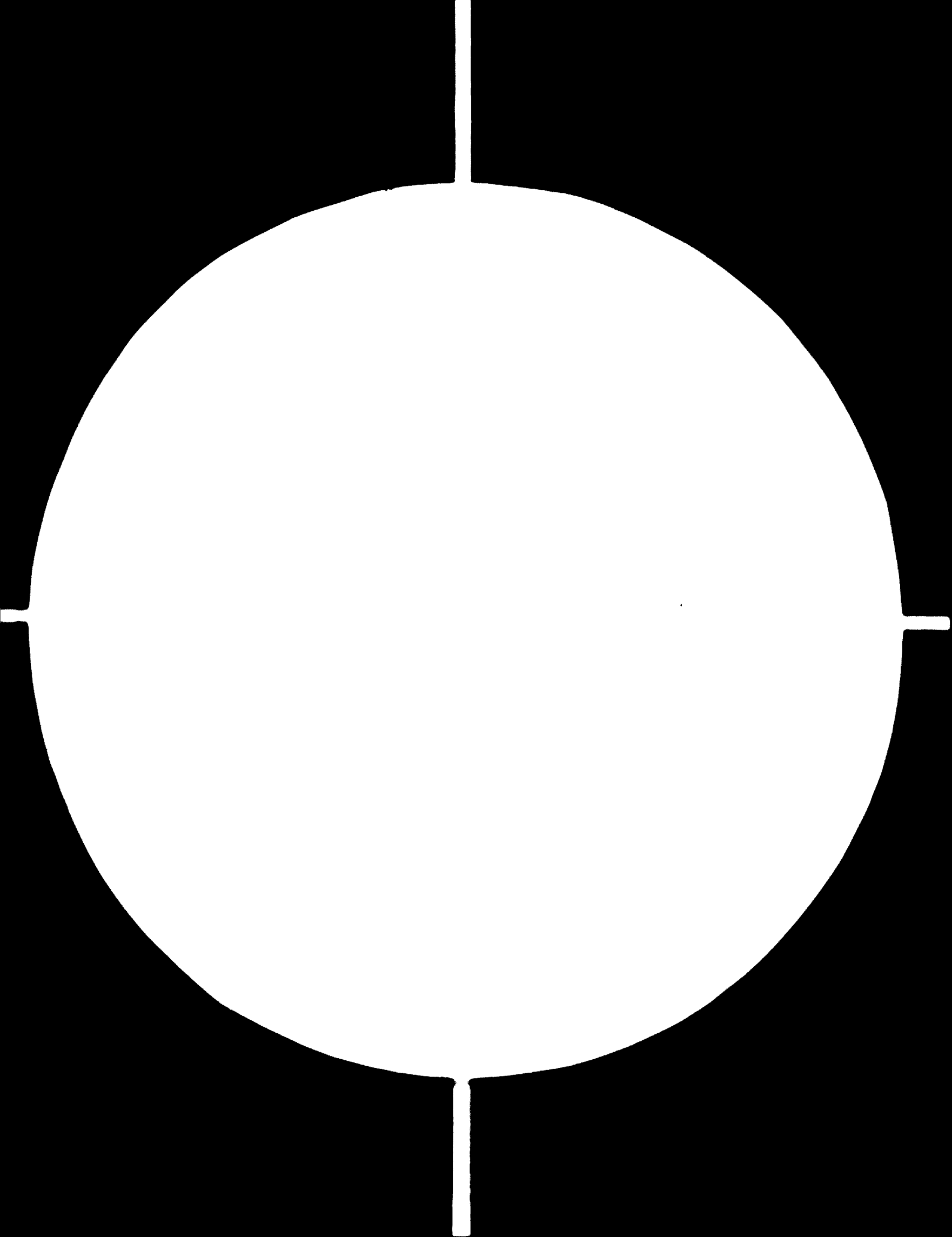
e) Allocation of Manufacturing Overhead Costs.

The allocation of manufacturing overhead was not done on a calculated basis. It was purely estimated for the purpose of illustrating the procedure of calculating the product cost. In future, all manufacturing budget items should be allocated on a pro-rata basis.

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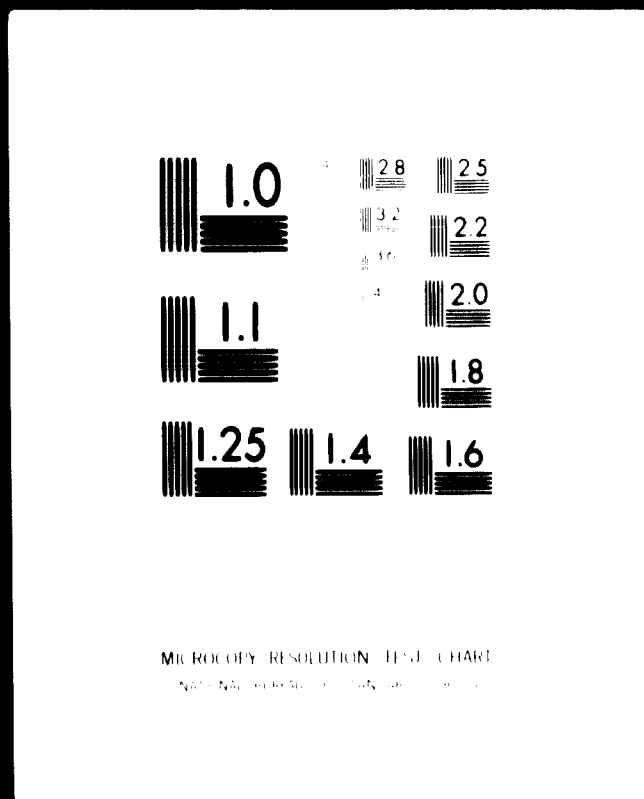


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STANDARD COST SYSTEMStyle - 1800

<u>Item</u>	<u>125 days</u>
Carding production at 71% efficiency (less 10% production)	88.950
Less 20% recycled	17.790
Net carding production (85% yield - same as input less 15%)	71.160
<u>Input to Blending</u>	
New raw material 72%	60.379
Reworked waste 26.5%	22.221
Oil 1.5%	1.259
Total input	83.859
Less 21.4% waste	17.946
<u>Cop Making Production</u>	65.913
Input less (21.4 + 8.6 + 1%) waste 31%	25.996
<u>Weave Mill Production</u>	57.863
Input less 41.4% waste	33.908
Yield of weft yarn	49.951
<u>Number of Blankets</u>	20.970
(Weft WT/blanket 2.382)	
No. of kg of warp required (Warp WT/blanket 0.181)	3.795
Total WT produced	53.746
93%	49.984
Pulling production 70% of new raw material	42.265
Dyeing production 33.3% of new raw material	20.126

Style - 1800Material Preparation MillCost/KgRaw Material Stores

Standard production 25 days - 60.379

Number of worker days/month - 108

Labour cost/month (August 74) - 235

Standard labour cost/kg - 0.0039

0.0039Sorting

Assume all new raw material is sorted

Number of worker days/month (August 74) - 1183

Labour cost/month (incl. premium etc.) (Aug. 74) - 2561

Standard labour cost/kg (Aug. 74: $\frac{2561}{60379}$) - 0.0453

0.0453

Standard supervisor cost/month - 171

Standard supervisor cost/kg ($\frac{171}{60379}$) - 0.00280.00280.0481Pulling

Assume 70% of all new raw material is pulled

Number of worker days/month (August 74) - 258

Labour cost/month (incl. premium etc.) (Aug. 74) - 647

Standard labour cost/kg $\frac{647}{42265}$ - 0.0153

0.0153

Standard supervisor cost/month - 163

Standard supervisor cost/kg - 0.0039

0.00390.0192

Style - 1800

<u>Dyeing and Drying</u>	<u>Cost/Kg</u>
Assume 33.3% of all sorted raw materials is dyed.	
Number of worker days/month (August 74) - 143 (50% of raising)	
Labour cost/month (August 74) - 403	
Standard labour cost/kg ($\frac{403}{20126}$) - 0.0200	0.0200
Dyestuff (Raw material):	
Assume 12.000 dyestuff cost/month based on 2 dyeing cycles/day which is 1000 kgs/day	
Dyestuff cost/kg ($\frac{12000}{25000}$) - 0.4800	<u>0.4800</u>
	<u>0.5000</u>
 <u>Allocation of Manufacturing Overhead for Material Preparation Mill</u>	
Assume budget to be the same as the average of the first six months 1974.	
Standard cost per kg ($\frac{\text{Total } 1911}{60275}$) - 0.0317	<u>0.0317</u>
 <u>Summary for Material Preparation Mill</u>	
	<u>Cost/Kg</u>
Raw material stores	0.0039
Sorting	0.0481
Pulling 700% of 0.0192	0.0134
Dyeing and Drying 33.3% of 0.5000	0.1666
Allocation of manufacturing O/H	<u>0.0317</u>
	0.2637
Raw material	<u>1.6600</u>
TOTAL COST/KG	<u>1.9237</u>

Style - 1800Spinning MillCost/Kg.

Number of worker days/month (August 74) - 2962

Labour cost/month (August 74) - 6757

Standard labour cost/kg - 0.1094 0.1094

Standard supervisor cost/month - 1329

Standard supervisor cost/kg ($\frac{1329}{65913}$) - 0.0202 0.0202Allocation of Manufacturing O/H

Assume budgets to be the same as the average of the first six months 1974.

Standard cost/kg ($\frac{6200}{65913}$) 0.09420.2238Raw Material

New raw material 72% at 1.9237 = 1.3850

Re-worked waste 26.5%

Oil 1 1/2% at 1.39/litre - 0.0209

1.4059

1.4059

TOTAL COST/KG (COPS)

1.6297

Style - 1800Weaving Mill and Finishing PlantWeaving MillCost/Kg

Assume 93% of spinning production is allocated to weaving.

Number of worker days/month (August 74) - 2377

Labour cost/month (August 74) - 6473

Standard labour cost/kg - 0.1194 0.1194

Standard supervisor cost/month - 1329

Standard supervisor cost/kg ($\frac{1329}{49984}$) - 0.0266 0.0266

0.1460

Finishing Plant

Number of worker days/month (August 74) - 1489

Nappage - 641

Raising 50% - 143

Last touch - 705

Labour cost/month (August 74) - 2947

Nappage - 1195

Raising 50% - 403

Last touch - 1349

Standard labour cost/kg ($\frac{2947}{49500}$) - 0.0595 0.0595

(Assume production weight for August was 49.500 kgs)

Standard supervisor cost/month - 1409

Raising - 639

Nappage - 770

Standard supervisor cost/kg ($\frac{1409}{49984}$) - 0.0282 0.0282

0.0877

Style - 1800Weaving Mill and Finishing PlantCost/KgAllocation of Manufacturing O/H

Assume budgets to be the same as the average of the first six months 1974.

Weaving Mill

Standard cost/kg ($\frac{6200}{49984}$)	0.1240
---	--------

Finishing Plant

Standard cost/kg ($\frac{6200}{49081}$)	<u>0.1240</u>
	<u>0.2480</u>

Raw MaterialsCost/Kg

Spun weft yarn/kg	1.6297	
% yield in weaving and finishing	77.51%	
Weft cost/kg	2.1894	
Warp/kg	6.50	
% yield - assume 95	95%	
Warp cost/kg	6.8420	
% weft	93%	
Weft cost/kg of cloth	2.0361	
% warp	7%	
Warp cost/kg of cloth	0.1533	
TOTAL COST/KG	2.1894	<u>2.1894</u>

Style - 1800Weaving and Finishing Plant

<u>Summary</u>	<u>Cost/Kg</u>
Weaving Mill - labour and supervisor	0.1465
- O/H	0.1268
Fin. Plant - labour and supervisor	0.0882
- O/H	0.1268
Raw Material	2.1894
	<hr/>
TOTAL COST/KG	<u>2.6777</u>

It is recommended that when a product cost calculation for cloth is made, that the weaving and finishing be included on the same sheet. Attached is a calculation form for blankets.

DEBRE BERHAN
WOOL FACTORY

PRODUCT COST SHEET.

WERNER 27
INTERNATIONAL

STYLE :

Size :

Date :

RAW MATERIAL COSTS

Cost/kg.

Weft (from spinning)
Yield
Weft cost/kg
Warp (from supplier)
Yield
Warp cost/kg
% Weft
% Warp

Total cost/kg.

CONVERSION COST.

Process	Labour	O/II	Other
Weaving			
Finishing			
Washing			

Total conversion cost/kg

Total cost/kg.

MAKING UP COSTS.

No. of kg/blanket
Raw Material + conv.Costs/Blanket

Added raw material costs
sewing thread
ribbon
labels
packaging
bagging

Total Mfg cost/blanket

ADDITIONAL :

Excise tax
H.O. Admin. 8%
Selling costs 2.75%

Total cost/blanket

% margin

Selling price

5. Notes on Costing System.

a) Sorting.

The labour cost per worker is so low that to make detailed cost analysis of the different raw stock varieties is to no particular advantage.

Average figure of productivity and cost per quantity should be accepted. This should be used as standard. August 1974 figures are adequate for this purpose. After six months - July to December - have been recorded, establish a new standard. Eventually, the sorting process should be studied and more accurate production and cost figures can be determined.

b) Pulling.

The present labour will be used if the standard production is put through the machine, therefore use labour cost of August 1974 with calculated standard production to determine standard labour cost.

c) Dyeing and Drying.

The present labour will be used if the standard production is put through the machine, therefore, use labour cost of August 1974 with calculated standard production to determine standard labour cost.

N.B. The full capacity of this equipment can be achieved at the same labour cost. At some future date this will occur and a new labour standard must be established. Full capacity is 6000 kg/wk., 1000 kg./day

These operations should be segregated on the payroll. If only labour were involved this proposed segregation would be unimportant. However, the dyestuff costs are very high and these must be placed at the proper point in the cost system.

The supervision of the processes remains the same but it is not necessary to split the supervision cost between these processes and the other finishing processes. The end cost result is the same and the breakdown between the processes is not significant.

d) Raw Material.

New Raw Material.

The cost of this item should be averaged every month over a period of three months purchases.

The standard cost on the costing sheets need not be revised each time there is a fluctuation (refer to the concept of costing). This vital information must be given to the General Manager so that the determination in the selling price can be made accurately and on time.

The present standard of E.£.1.66 per kg., is based on the average of the first six months of 1974.

e) Spinning Mill - Labour Cost.

- The labour cost of the entire spinning mill can be grouped together.

Spinning mill - Supervision Cost.

- is based on the standard production .
- Returned waste to blend.
- This is given no value. All the value of the blend is allotted to the new raw material only. This method eliminates considerable detailed calculations. There are no basic errors in this method since all cost of raw materials is based on yield.

f) Weaving mill.

- It is necessary to establish the standard cost both in kilograms and in picks. The production in picks will never be 100% accurate because of the variation in the yarns and picks/cm., but it is the most fair and simplest manner in which to pay labour and calculate production.
- The standard cost which is based on weight is essential for the final blanket cost calculation.
- For the purpose of control it is unnecessary to include the raw material cost in weaving. This cost factor can be added in at finishing.

g) Finishing Plant.

- Labour cost of dyeing is presently included . These labour costs should be separated in raising (see Dyeing and Drying).
- Combine all labour, nappage, through to Last touch, since all production must flow through these processes.

h) Washer and Stenter Drying.

- This cost item in theory should be identified separately. However include this cost with other finishing since the volume and thus the cost is not significant.

- It is important, however, to estimate this cost per blanket since this cost must be added to the product costing of family blankets. Since there is a low volume of family blankets, this cost becomes significant.

6) Recommended changes in Cost Distribution Reports.

When the standard cost system goes into effect, the following changes to the Cost Distribution Reports are recommended :

- a) - The actual cost distribution which is made monthly should contain only the five cost centres.
- b) - The labour cost of the workshop, electrical shop and the consumer stores can all be combined into one labour cost item which can be distributed among the cost centres directly.
- c) - The labour cost of medical and administration services can be combined and the labour cost distributed among the cost centres directly.
- d) - The yarn store labour cost should be applied to the weaving.
- e) - The finished good store should be applied to the finishing.
- f) - The idle facilities costs should be included in the administration cost.
- g) - The supply costs must be broken down into the major elements of dyestuffs, chemicals, purchased yarn and ribbon, and packaging material :- Hessian cloth and plastic bags.
- h) - The head office costs are presently split between selling expenses and G and A expenses. Some of these can be combined to save clerical labour as follows : stationary and supplies should be applied only to G and A. There is no particular advantage in separating the supplies for selling.

ij) - Rent and Utilities.

These should all be applied to G and A.

k) - Telephone & Telegraph.

These should all be placed under G & A. It is easy to identify where the costs are being applied when management examine the telephone invoices.

lm) - Legal and Auditing Charges should be combined under Professional Services.

n) - Advertising and Sales Promotion accounts should be put together.

op) - Some of the manufacturing overhead costs can be itemised but only the total is distributed on a pro-rata basis. For example :

- vehicle insurance,
- transportation expense,
- telephone and telegraph,
- property tax,
- miscellaneous.

q) - Salaries. The salaries of the Assistant Factory Manager, Chief of Stores and Administration Group can all be combined into one figure and distributed among the five cost centres.

r) - Factory Manager. It is recommended that this be included in the head office administration.

s) - Premium Overtime and Leave Pay. These should not be distributed independently. They should all be combined with the total labour pay. Management control over the overtime pay should be done semi-monthly directly from the payroll sheets not monthly from the cost distribution sheets.

t) - Electrical and Workshop Costs. A record of where each of these people work and at what time should be maintained. The costs of these departments should then be attributed to the individual cost centres according to the time which has been spent in each one.

v) - Other costs, such as vehicle insurance, medical costs, transportation expenses, tel. & tel., property tax, miscellaneous, should all be attributed on a pro-rata basis.

7. - Other recommended changes.

a) Cost of blend calculations.

It is recommended that the present system of calculating the cost of each blend be eliminated. The determination of the new raw material input cost should be done by taking the average of the cost of raw material received during the past three months. It is recommended that the determination of the percentage of waste input be calculated on each blend and summarized at the end of each month.

b) Application of cost of consumable stores.

It is recommended that the cost of supplies (consumable stores) should be applied to the cost centres when received. The present system is to charge the individual cost centres as supplies are consumed. Adequate management control can be achieved from the proposed method. Since all purchasing is approved by both the Technical Manager and the General Manager, the elimination of the consumption cost calculation will save clerical labour.

8. Work Programme.

It is now possible to design and to put into operation a Standard Cost System. The concept and format of a Standard Cost System has been provided. The initial work has been completed and it is only necessary for the Accounting Department to follow the guidelines which have been laid down for a costing system to be fully installed.

Following is a work programme that will assist in the implementation of the Standard Cost System.

- i. Recalculate standard production figures on the Net Carding Production/Day - 3.162 less 10 % = 2.846 kgs.
- ii. Recalculate standard costs throughout each mill using the labour costs per kilogram based on August production and wages.
- iii. Obtain from the "Standards Department" of the Manufacturing Division the "Labour Complement" and "Standard Labour Cost per Kg." When this data is available, recalculate the entire "Standard Cost" for each mill and the "Product Costs" - Nov. '74.
- iv. When new waste standards are established the "Standard Costs" and "Product Costs" must be re-calculated - Jan. '75
- v. Raw Material Value per product line to be established on the basis of raw material received during the last three months. At present, only two main product lines are planned for manufacture in blankets, and two in carpets.

<u>Type.</u>	<u>Composition.</u>
1200	60% Khaki waste 40% fine sliver } weft 100% fine sliver warp
1800	All other foreign purchased waste.
Carpets 6 mm.	
4 mm.	

Apply the calculation of the total average price to determine the unit raw material price - Nov. '74.

- vi. When the new method of raw material value commences, eliminate the calculation of raw material cost per blend lot. Nov. '74.
- vii. Implement the raw material "Inventory and Price Graphs by product line. - Nov. '74.
- viii. Monthly manufacturing cost report to be produced to new recommended form as soon as Standard Cost System is installed.
- ix. Review all cost items with the General Manager and the Factory Manager and establish standard budget figures.
- x. Obtain construction data on style 1200 and set-up the construction sheet in conjunction with the Standards Department.
- xi. Set-up cost system on style 1200 and carpets and style 500.

- xii. In December - enquire about the Production Reconciliation Report.
- xiii. Have Standards Department check carpet construction again on both 4 mm. and 6 mm. - Nov. '74.
- xiv. Have Standards Department check percentage waste on the 6 mm. cut pile carpet when new production begins.
- xv. Obtain from Ato Fanuel forecast of percentage of spinning production to carpets and to blankets.

VIII. SUMMARY OF RECOMMENDED CAPITAL INVESTMENT.

Primary Raw Material.

5 months minimum in stock.		
5 x 65.000 kg at E.ß. 1,66	=	E.ß. 540,000.-
4 months minimum in transit		
4 x 65.000 kg at E.ß. 1,00	=	E.ß. 260,000.-
		<hr/>
		E.ß. 800,000.-

Estimated capital in raw material
at present :

end of August in transit	E.ß. 250,000.-
in stock, 200,000 kg	E.ß. 330,000.-
	<hr/>
	E.ß. 580,000.-

New working capital required : E.ß. 220,000.-
=====

Dyestuffs and Chemicals.

See III, 8, b.1)	
Required in storage	E.ß. 101,150.-
Estimated in storage	E.ß. 16,000.-
	<hr/>
At present :	E.ß. 85,000.-

Spare-Parts.

See III, 6 Carding estimated	E.ß. 100,000.-
See III, 14 e) Spinning estimated	E.ß. 35,000.-
Remainder of mill (looms spare-parts are already ordered and not included)	est. E.ß. 15,000.-

Supplies.

See III, 6	Shuttles	Est. E. \$.	2,400.-	
See III, 6	Bobbins	Est. E. \$.	8,000.-	
	Spools	Est. E. \$.	1,000.-	E. \$.
				11,400.-

Counters.

See III, 6	Looms	Est.		E. \$.
				4,000.-

Recorders.

See III, 6	Cards	Est.		E. \$.
				1,000.-

Bins.

See III, 12 b) i	Blending	Est.		E. \$.
				2,000.-

Trucks, Tables, etc...

	Est.		E. \$.	4,000.-
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Sewing machine.

See III, 2) b.	Making-up	Est.		E. \$.
				12,000.-

Work-shop.

See III, 24	Lathe &			
	Milling Machine	Est.		E. \$.
				85,000.-

Marketing Sales Department.

Start-up costs.

See V 9 a, vi.	Addis-Ababa	E. \$.	23,000.-	
See V 9 b, v.	Asmara	E. \$.	21,000.-	
See V 8 b, v.	Retail Shop	E. \$.	11,000.-	
				E. \$.
				55,000.-

Estimated total :

E. \$629,400.-

Use: E. \$630,000.-

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IX. SUMMARY OF MAJOR CONSIDERATIONS.

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IX. SUMMARY OF MAJOR CONSIDERATIONS.

1. Aim of Corporate Analysis.

The aim of the corporate analysis was to provide the Debre Berhan Wool Factory with assistance which would improve the efficiency of its operations in each of the three major divisions, manufacturing, marketing and administration/financial.

2. Conclusion - Can be Moderately Profitable.

The company has been greatly improved via new management during the past eighteen months, to the point where it is breaking-even or marginally profitable. From our analysis we have concluded that the company can be moderately profitable and certainly worth the investment of additional capital.

3. Working Capital Required.

An input of approximately E.£. 630,000.- additional working capital is required.

The company management are unable to utilise their full capacity resources without additional working capital. This is required principally to purchase raw material and machinery supplies. The result will be a more efficient smooth-running plant.

4. Installation of a Standards Department.

The result will be improved management control over manufacturing operations and establishment of the basis for standard costing. We guided the initial installation work during our stay in Debre Berhan Wool Factory.

5. Sell own Blankets.

Organise and install a company marketing division to sell their own blankets to the market. At present the sales are handled by a distribution company.

6. Installation of a Standard Cost System.

The initial outline was set forth during our stay in Ethiopia.

7. Short Range Plan - 18 months.

Concentrate on blanket production and secondarily on carpets. Do not invest in any new production equipment or new products. Work toward the goal of achieving a solid and continuous profit for a period of time before making new basic changes.

8. Exports.

We do not recommend any investment be made during the next 18 months to develop exports. If requests are received at profitable price, they should be considered, but never to exceed 3% of productive capacity to one client and over 5% to exports without having your own export marketing organisation.

9. New Processing Machinery.

Do not invest in new processing machinery in the immediate future. The present equipment is satisfactorily for the production of yarns, blankets and carpeting provided it is improved with necessary spare-parts and properly maintained.

10. Idle Machinery.

Do not expend time, energy or money for 18 months in an effort to utilise the idle machinery, and only try to utilise this equipment after thoroughly evaluating the feasibility of the entry of a new product line.

11. Supervisory Training.

Investment in work study training abroad for the Assistant Factory Manager is strongly recommended. A supervisory training programme should be developed.

12. Carpet Manufacturing.

Manufacture carpeting mainly against orders. Do not manufacture on total speculation.

13. Retail and Sales Shop.

Expand the merchandise to include all household articles. Become a speciality shop in this line. Import a variety of products.

14. Inventory - Carpeting.

Reduce the current high inventory by selling at reduced prices where necessary. The balance sheet year ending June '75 will be adversely affected but much needed working capital will be acquired.

15. Marketing Strategy : Blankets.

The blanket market is strong and there are good indications that it will continue to grow. The marketing policy should be to capture as much of this market as possible when a good profit can be made. Carpeting and handicraft yarn should be produced only if the capacity required of the cards can give an equal or greater profit than the blankets.

The carpet market and the handicraft market will still be available to Debre Berhan Wool Factory in 18 months.

Profits should be maximised during the next 18 months.

It is important to capture as much of the blanket market as possible.

APPENDICES .

APPENDIX "A"
BREAK-EVEN + PROFIT
POTENTIAL CALCULATIONS

PRODUCTION - BASIS FOR CALCULATIONS

No. of blankets in July 20,692
 Sq. M. Carpets 1,732

Expected blankets per month 22,221

Assume that if only blankets had been made in July
 that 22,000 would have been made.

<u>COST OF M.F.G.</u>	<u>PER ANNUM-</u>
LABOUR - Based on July 74 wages-medical 26,432/MDS	317,184
SALARIES - 14,196 /MDS	170,352
PROD. SUPPLIES	59,076
MAINT + SUPPLIES	80,476
UTILITIES	97,164
STATIONARY	6,044
OUTSIDE MAINT + REPAIR	200
TRANSPORT	2,344
TEL +TEL	1,864
UTILITIES	97,164
TAXES	4,000
INSUR -BUILD +MACH	7,716
EMP. LIAB	2,024
VEHICLE	806
MISC	<u>1,058</u>
SUB TOTAL	847,472

SELLING EXPENSESPER ANNUM

SALES MANAGER		
SECRETARY		
TRUCK DRIVER		
ASSISTANT TRUCK DRIVER		
STORE KEEPER-SALESMAN		
TOTAL INCLUDING SOCIAL COSTS	1293	15,504
TRANSPORT		18,302
TEL + TEL		2,918
INSUR. EXP. VEHICLES		2,142
RENT + UTILITIES		15,478
HANDLING CHARGES, EDISCO		1,646
SALES PROM + ADVERT		1,232
DEP + TRUCKS		2,748
SUPPLIES		562
MISC		834
		<hr/>
		61,366

GENERAL ADMINISTRATION EXPENSESPER ANNUM

GENERAL MANAGER	
TECHNICAL MANAGER	
FINANCIAL MANAGER	
ADMINISTRATIVE ASSISTANT	
ASSISTANT ACCOUNT (Trial Bal-Posting to Genl. Ledger)	
SECTY-GM	
CLERK (Edisco + others)	
CASHIER	
PURCHASER - Foreign	
PURCHASER- Local	
DRIVER - Delvy Van	
GUARD - HD + Store	
GUARD - HO + Store	
GUARD - HO + Store	
CLEANER	
TOTAL INCLUDING SOCIAL COST	132,744
TRAVEL + TRANSPORT	6,912
INSURANCE VEHICLES	800
T + T + POSTAL	6,200
STATIONARY ETC	2,362
PROFESSIONAL SERVICE	11,402
RENT + UTILITIES	10,726
MISC	3,308
DEPM. VEHICLES	3,308
	<hr/>
	177,762

FINANCIAL BURDENS + TAXES

<u>EXCISE TAX .</u>	0.50/KG PRODUCED	<u>PER ANNUM</u>
AVERAGE WT / BLANKET	2.56 KG	
TAX/BLANKET	1.28	
+ 3% ON WASTE	1.32	
TAXES COST	29,040 / MONTH	<u>348,480</u>
<u>TRANSACTION TAX</u>		
NET SALES	4,220,964	
LESS EXCISE	<u>348,480</u>	
	3,872,484	
<u>LESS IMPORT</u>		
DUTY 0.20 KG	158,400	
792,000 KG		
<u>LESS TRANSACTION TAX</u>		
1.40 x 792,000 16%	<u>177,408</u>	
	3,536,676	<u>176,834</u>
<u>BAD DEBTS</u>		
CURRENTLY 0.01 %		<u>4,221</u>
<u>BANK CHARGES</u>		
1,000,000 9½ %		<u>95,000</u>
<u>REVENUE STAMPS</u>		
ASSUME		<u>5,000</u>
	TOTAL ANNUM	<u>629,535</u>

RAW MATERIAL COSTS-

		<u>PER ANNUM</u>
PRODUCTION - 22,000 BLANKETS		
YIELD IS	82.7 % = 2,563-0,085 = 2.478	
INPUT WT	= 3.00	
AVERAGE COST OF RAW MATERIAL	= 1.66 KG	
AVERAGE PER BLANKET	= 4.98	
BLEND COST	= 109,560 / MONTH	<u>1,314,720</u>
PURCHASE YARN		
COST/KG	6.50	
YARN PER BLANKET	= 085	
TOTAL WT PER MONTH	= 1870 KG	
YARN COST	= 12,155 / MONTH	<u>145,860</u>
RIBBON		
COST/M	= 0.15	
METERS/BLANKET	1.60 x 2 = 3.20	
COST BLANKET	= 0.48	
RIBBON COST	= 10,560 / MONTH	<u>126,720</u>
DYESTUFFS + CHEMICALS		
ESTIMATED AT	12,000 / MONTH	<u>144,000</u>
JUTE BAGGING		
INCLUDED IN SUPPLIES	TOTAL/ANNUM	<u>1,731,300</u>

SALES

		<u>PER ANNUM</u>
CONSIGNMENT PRIVE/BLANKET	- 17.00	
LESS 5% NET SELL. PRICE	- 16.15	
SALES / MONTH	- 355,300	- 4,263,600
LESS 1% ALLOW + RETURN + SECONDS	- 42,636	- 4,220,964
NET SALES		

DEPRECIATION

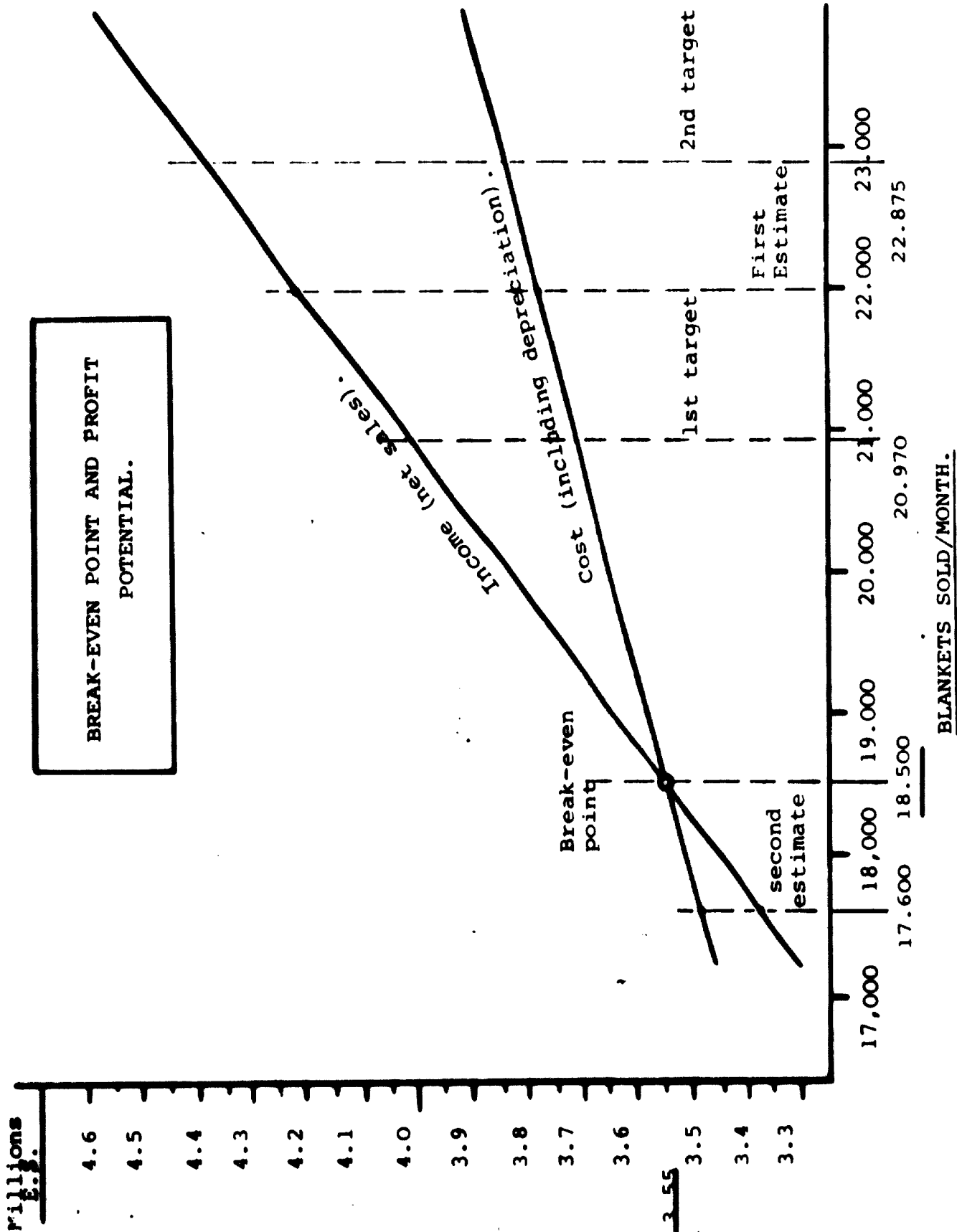
		<u>PER ANNUM</u>
BUILDINGS	83,522	
ELEC. INSTALL	24,364	
FURN + EQUIP	3,124	
VEHICLES - D.B.	4,122	
FIRE EXTING	822	
TOOLS	630	
MACHINERY	267,343	
UNUTILIZED MACH.	<u>52,350</u>	
	436,277	<u>436,277</u>

RECONCILIATION - SUMMARY

		<u>PER ANNUM</u>
NET SALES		4,220,964
RAW MATERIAL COSTS	1,731,300	
COST OF MANUFACTURING	847,472	
SELLING EXPENSES	61,366	
G + A EXPENSES	177,762	
FINANCIAL BURDENS + TAXES	<u>629,535</u>	
SUB TOTAL	3,447,435	<u>3,447,435</u>
EST. CASH FLOW		773,529
DEPRECIATION		<u>436,277</u>
EST. PROFIT BEFORE TAXES		337,252

BREAK-EVEN POINT ESTIMATE

	<u>PER ANNUM</u>
ASSUME VOLUME OF 20 % LESS	
22,000 LESS 20 % = 17,600	
COST OF M.F.G.	
LABOUR REDUCED BY 10% = 31,718	
COST ANNUM	815,754
SELL. EXP.	
ONLY REDUCTION IN TRANSPORT COST	
BY 20 % - 1,830	
COST PER ANNUM	59,536
G.A. EXPENSES	
VIRTUALLY SAME	177,762
EXCISE TAX	
LESS 20 % 69,500	279,000
TRANSACTION TAX	
LESS 20 % 35,000	142,000
BAD DEBTS	3,377
BANK CHARGES - NO CHANGE	95,000
REVENUE STAMPS - NO CHANGE	5,000
RAW MATERIAL COSTS	
LESS 20 % 346,000	1,485,000
DEPRECIATION	<u>436,277</u>
	<u>3,498,706</u> <u>3,498,706</u>
NET SALES	
LESS 20 % 844,193	<u>3,376,771</u>
EST LOSS	<u>121,935</u>



APPENDIX "B"SUMMARY OF RECOMMENDATIONS.

It is important to note that the recommendations are no reflection upon the present management. The present management has initiative and have made many improvements. It has only been the limitation of time, manpower and in some instances experience that has prevented them from achieving even better results.

<u>SUBJECT.</u>	<u>CHAPTER.</u>	<u>RECOMMENDATIONS.</u>
Carding	III 1. c.	- Reconditioning and overhaul.
Preventive Maintenance	2. e.	- Begin Preventive Maintenance Programme.
Idle Machinery	3.	- Ignore the Problem for the immediate future.
Balance of Production	4.	- Purchase one sewing machine.
Spare-Parts	6.	- Shuttles, - Spinning Bobbins, - Condenser Bobbins, - Recorders-Cards, - Counters-loom, - Card clothing & other parts.
Production Programme	7.	- Train Assistant Factory Manager.
Raw material	8.	- Increase inventory of primary raw material, dyestuffs and chemicals.
Raw Material Store	9. b.	- Move spare-parts store to new location.
Pulling	10. c.	- Preventive Maintenance every two months.
Blending	12.b.	- Additional bins behind cards, - Install hopper feeder, - Improve ducts.
Carding	13. c.	- Re-conditioning (see III, 1.c. above.

Spinning	III 14. c.	- New bobbins, - Condenser bobbins, - Replacement parts, - Truck for full bobbins,
	d.	- Alter work method in doffing
Cops winding	15. c.	- Lower speed for poor lots.
Twisting	16. d.	- Place operators on incentives, - Repair idle spindles, - Make doffing trolley, - Train operators, - Ring oiling.
Warping : Blankets	17. a.	- Creel adjustments : discs, pegs, pegs, stop-motions, - Install start-up button, - Full cones only - Incentive to eliminate run-out ends.
Weaving : Blankets	18. d.	- Purchase additional shuttles, - Make one man responsible over weft supply to be put on incen- tive.
Nappage (inspection)	19. b.	- New work method.
Making-up : Blankets	21. b.	- Additional sewing machine, - Planned Process Flow.
Carpet-making	22. f.	- Purchase top quality cotton yarn - Use two shuttles.
Work-shop	24. a.	- Purchase new lathe, - Purchase new milling machine.
	b.	- Hire two well qualified mechanics
Supervisory training	25. b.	- Establish levels of authority, - Write job descriptions. - Proposed new organisation.
Manufacturing organisation	26. b.	
Standards Dept.	IV. 4.	- Establishment of standards dept. - Assistant Factory Manager take work study course, - Standards department to carry out the programme as outlined in the Chapter IV.

Marketing organisation	V. 2. b.	- Proposed marketing organisation. - Market own blankets.
Blankets	3. b. ii	- New designs semi-annually.
	iv	- Institute continuous market reporting and controls.
	v	- Improve presentation.
Carpets	4. c. i	- Change policy of speculation to 50% firm orders before manufacturing.
	ii	- 3 m. standard width to replace 4
	iii	- Clear stocks at reduced prices.
	iv	- Pricing policy changes.
	v	- Positive direct selling policy.
Handicraft Yarn	5. a.	- Price to cover other costs.
Other fabrics	6. b. i	- Acrylic fabrics from purchased yarns.
	iii	- Specialised personnel.
	iv	- Dress & Drapery fabrics.
Head Office Sales Department	7. b.	- Details of start-up activity.
Retail and Sales Shop	8. b. i	- Complete range of household textiles,
	b. ii	- Reporting directly to General Manager.
	b. iii	- Staffing.
Product Development	10	- New designs and finishes.
Exports	11	- Do not develop for two years.
Timetable for action	12	- Institute.
Administration Organisation	VI. 1. c.	- Raw materials stores.
Management reports	3. b.	- Changes.
	c.	- New reports.
Frequency of reports and payroll	4. b. i	- Two week periods.

Supply Records	VI. 4. b. ii	- Insert minimum quantities.
Personnel Hiring	b. iii-	Eye and dexterity tests.
Working capital	5. a.	- Increase.
Inventory finished goods.	c. i.	- Reduce carpets.
Inventory Primary Raw Material	c. ii	- Increase.
Inventory Dyestuffs	c. iii-	Increase.
Inventory Replacement Parts and Supplies	c. iv	- Increase.
Primary Raw Material Inventory	6. b. i	- Institute Graphs.
Ribbon	6. b. iv	- Experiment with slit warp knit fabric.
Purchasing	6. b. vi	- Reduction of one clerk.
Standard Cost System	7.	- Install.
Standard Product Costing	8.	- Install.
Premium Payment System	9. a.	- 65% base.
Construction Sheets VII	2.d.	- Complete every style.
Standard Cost System	3.	- Method of application.
Standard Cost Calculation per quality	3. c.	- Should be made.
Cost Distribution Reports	6.	- Changes.
Cost of Blend Calculations	7. a.	- Eliminate.
Application of Cost of Consumer Stores	7. b.	- Apply when purchased goods received.

APPENDIX "C".CONSULTANTS' TIME SPENT IN ETHIOPIA.-

According to contract, the contractor's personnel were to spend the following length of time in the project area

<u>Name.</u>	<u>Field of Activity.</u>	<u>Duration of time in the Project Area (weeks)</u>
J. Hearn	Management/Cost	
(Team leader)	Accounting	3
K. Stuart-Smith	Marketing	3
A. Rynanen	Manufacturing	3
		9
	Total :	9

After a preliminary review of the project on the scene in Addis-Ababa, the team leader realised that the time allotted to marketing was more than necessary and that Debra Berhan Wool Factory would benefit more by additional attention to the Manufacturing Division. By agreement with the management of Debre Berhan Wool Factory and the UNDP resident representative, Dr. A. Zichy, the time applied to marketing was shortened and the time applied to manufacturing was lengthened.

The time applied in manufacturing was more than the time reduced in marketing. This additional time applied was in the best interest of Debre Berhan Wool Factory. The outline of the Standards Department was drawn up and implementation of the department was begun. This work was in addition to the terms of reference in the contract.

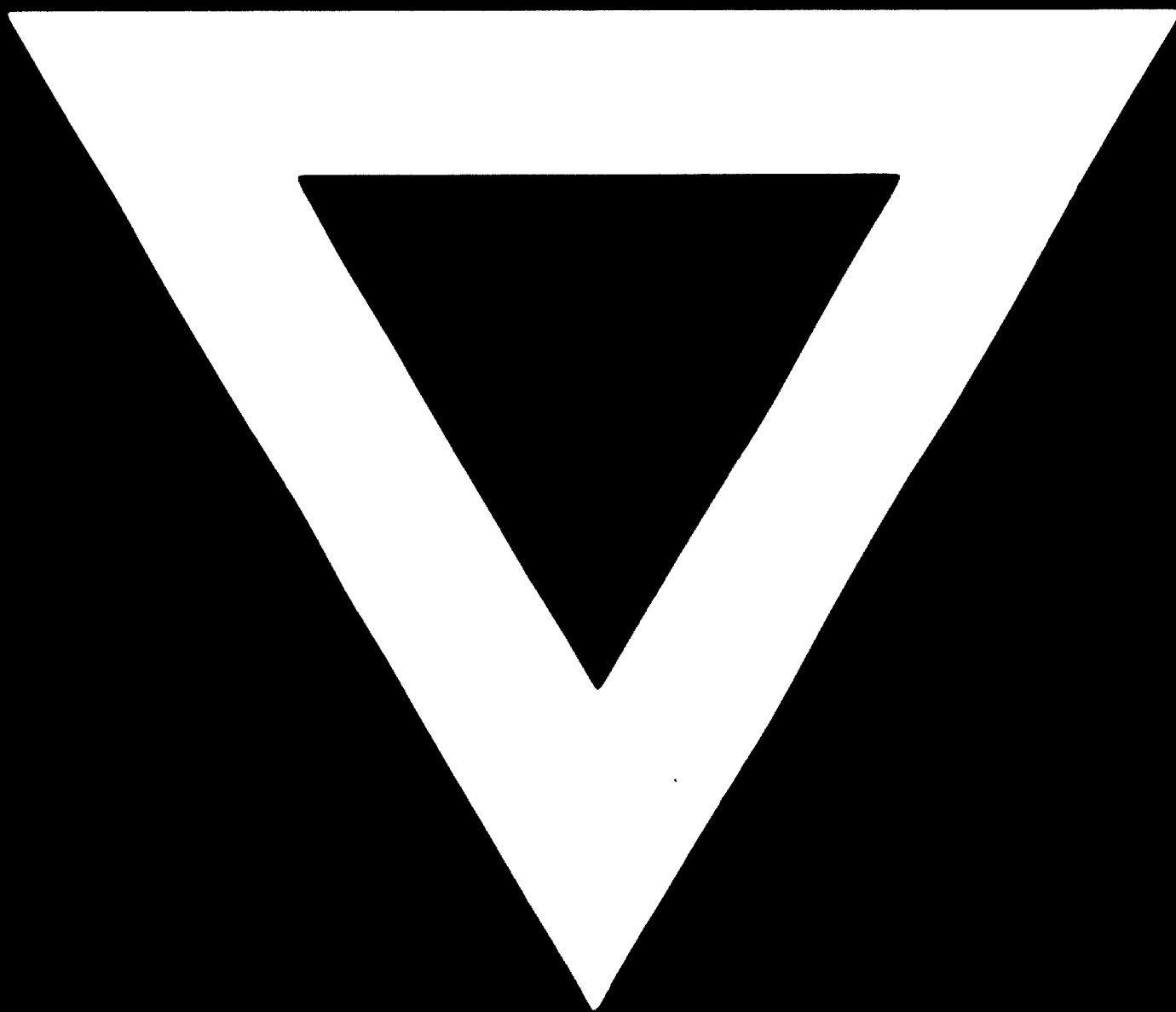
In the Administration/Cost Accounting field, the team leader stayed one additional week over contract in order to begin the implementation of the recommended Standard Cost System, this implementation work being in addition to the terms of reference of the contract.

Following is a table showing the length of time each consultant spent in Ethiopia :

<u>Name.</u>	<u>Area of Specialisation</u>	<u>Arrival in Addis-Ababa</u>	<u>Left Addis- Ababa.</u>	<u>Duration of time in the project area (weeks).</u>
J. Hearn	Administration/ Cost Accounting	Sept. 8	Oct. 5	4
A. Ryyanen	Manufacturing	Sept. 7	Oct. 12	5
K. Stuart- Smith	Marketing	Sept. 24	Oct. 4	1-3/5
			Total :	10-3/5

A total of 23 man days were spent in Debre Berhan Wool Factory, the remainder in Addis-Ababa.

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