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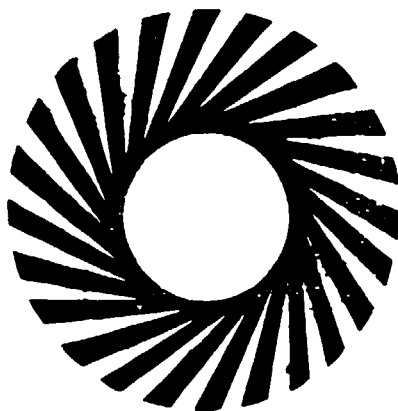
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RESEARCH AND DEVELOPMENT: A TOOL FOR ECONOMIC DEVELOPMENT

INDUSTRIAL RESEARCH AND CONSULTANCY UNIT

TERMINAL REPORT

PROJECT TITLE : Strengthening the SSI Unit in the Ministry
of Trade and Industry

SUBJECT : Quality Training, Advisory and Assessment
Services to Small Scale Industries

DATE OF ISSUE : 31 December 1991

MALAWI BUREAU OF STANDARDS

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BLANTYRE

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3. Mr. V. Nyathi - Stationery and Chalk; and
4. Mr. D.M.D. Chokazinga - Soaps

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0. EXECUTIVE SUMMARY

1. GENERAL

The Malawi Bureau of Standards (hereinafter referred to as "the contractor") was contracted by the United Nations Industrial Development Organisation (henceforth referred to as "the client") to provide Quality Training Advisory and Assessment Services to Small-Scale Industries under Project No. MLW/88/034.

The objective of the programme was to assess the quality level of the products being manufactured by selected Small-Scale Industries (SSI's) against national and/or international standards in order to:

1. Provide information to Project No. MLW/88/034 for further use in designing assistance schemes to SSI's; and
2. Assure Government and quasi-Government buying departments/institutions of the quality of products emanating from the selected SSI'S with a view to encouraging them to buy their products under the Government Preferential Purchase Programme (GPPP).

The contractor and the client met on 3rd May, 1991 and identified the product types and the respective SSI units to be covered under the programme. It is on the basis of work done on these product groups at the respective SSI units that the overall observations and recommendations that follow below are made.

2. MAIN OBSERVATIONS

In the course of executing the programme the contractor made the following main observations; that:

1. Almost all personnel at all levels in the SSI units have very little or no knowledge of quality and its control;
2. There are very few or no quality control operations at almost all the units;

3. The quality of the products from the units could be improved further if technical and financial investment into the sector were made; and
4. Despite the constraints under which the units operate, with the exception of Abasika Brushware, all the units are capable of producing goods that comply with national standards.

3. MAIN RECOMMENDATIONS

3.1 Recommendations to Malawi Government

1. Government should encourage its buying departments including Central Government Stores and other quasi-government institutions to buy the products manufactured by the units covered in this programme even by introducing quota systems, except, for the moment, from Abasika Brushware.
2. In the event of a tender being awarded to a small scale unit or a group of SSI units to supply any of their products, Government should request that the Malawi Bureau of Standards certifies, at the cost of the unit, the quality of products being supplied.
3. The Government should identify means of developing the technical and financial capabilities of SSI's in general including those covered by this programme.
4. Government should strengthen the capability of the Malawi Bureau of Standards to provide nationally, training in standardization and quality management on an on-going basis with emphasis on SSI units.
5. Government should further develop the national infrastructure for standardization and quality control. In particular, the Malawi Bureau of Standards should have satellite testing laboratories in the central and northern regions of Malawi in order to efficiently provide standardization and quality control assistance to SSI's in all parts of the country.
6. Government should identify means of extending this programme on Quality Training Assessment and Advisory Services to other SSI units.

7. The units covered by this programme should be assisted in procuring quality control testing equipment as recommended by the Contractor where appropriate.

3.2 Recommendations to UNDP/UNIDO

1. In designing any assistance to SSI units under Project MLW/88/034 or any follow-up projects, attention should be paid to the identification of appropriate technologies urgently required by the units;
2. Consideration should be made in developing and further strengthening quality testing technologies both at company and national level. At the company level, funding mechanisms as those used in developing Liwonde Tannery Limited could be ideal; and
3. UNDP/UNIDO should assist in the development of in-country capabilities in training in standardization and quality management.

MALAWI BUREAU OF STANDARDS

INDUSTRIAL RESEARCH AND CONSULTANCY UNIT

PROJECT : Strengthening of the SSI Unit in the Ministry of Trade and Industry DP/MLW/88/034

SUBJECT : Quality Training, Advisory and Assessment Services to Small-Scale Industries

TERMINAL REPORT

SECTION 1

BACKGROUND, SCOPE AND CONSULTATIONS

- 1.1 The Malawi Bureau of Standards was contracted by UNIDO to provide Quality Training, Advisory and Assessment Services to selected Small-Scale Industries in Malawi. The contract was signed under the UNDP/UNIDO Project Strengthening of the SSI Unit in the Ministry of Trade and Industry. This report is issued in terms of paragraph 4 (b) of the contract no. 91/011.
- 1.2 This final report covers work done during the entire six months as outlined in the contract. The activities as outlined below have been fully covered:
 - 1. Discussions between MBS, MTI, UNIDO Project CTA, GOM purchasing organisations for identification of the products and SSI producers.
 - 2. Industrial visits and sampling
 - 3. Training and Advisory services
 - 4. Appraisal of product quality (after training and advisory services).
 - 5. General observations and sectoral recommendations.
- 1.3 The consultative discussions between MBS, MTI, UNIDO etc (item 1 of 1.2 above) were held over two meetings. The results of the meetings were agreement that:-

1. The programme should cover selected industries involved in the manufacture of the following product groups:

1. Textile garments and uniforms;
2. Shoes, furniture and brushware;
3. Stationery and chalk; and
4. Soaps.

2. The industries to be included in the programme be:-

| <u>Product type</u> | <u>Company</u> |
|-----------------------------------|--|
| 1. Textile garments and uniforms | <ol style="list-style-type: none"> 1. Fit-O-Fit Tailors 2. Jubeck Uniform Centre 3. Ndekhani Garments 4. Logasons Knitting Works |
| 2. Shoes, furniture and brushware | <ol style="list-style-type: none"> 1. Gep Shoe Company 2. Phazi Shoe Company 3. Famba Furniture 4. Peter's Furniture 5. Abasika Brushware |
| 3. Stationery and chalk | <ol style="list-style-type: none"> 1. Centuary Printers 2. BP & P - Paper Converters Division 3. Education Materials Supply Company 4. Blantyre Chalk Makers |

4. Soaps
 1. Changu Soap Manufacturers
 2. Upile Products
 3. Madzimayera Soap Factory
 4. Pachanya Soap Factory

3. The workplans proposed by the Bureau were approved in line with the contract.

SECTION 2

INITIAL INDUSTRIAL INSPECTIONS AND SAMPLING

2.0 Introduction

During the consultancy, initial industrial inspections were conducted at each unit for each product group by designated officers of the Contractor.

The general objectives of the initial industrial inspections were to obtain a general impression of the operations of the selected units in relation to quality control, identify training needs and obtain samples of their products to conduct initial testing with a view to characterising their quality.

2.1 Textile Garments and Uniforms

It was observed in this component of the programme with the exception of Logasons Knitting Works who specialise in knitted products, that all the units manufacture a wide range of garments and uniforms according to market requirements or the requirements of specific customers where relevant. It was found out also that Jubeck Uniform Centre were not operational.

At all the units, it was generally observed that nothing or very little was done regarding the quality control of the products. On-site inspection of the products however showed acceptable products quality in terms of stitch uniformity,

straightness of seams, stitch sizes, seam free from pucker, colour matching and scum puckering.

It was learnt during the initial inspections that the manufacturers have problems with locally manufactured fabrics in terms of both quality and price.

In all cases samples were obtained for initial quality testing at the contractor's laboratories for the following quality parameters: tensile strength (fabrics), stability of dimensions (shrinkage) stability of colour (fastness), stability of surface, seam slippage, tear strength (wovens), bursting strength, abrasion resistance, sizing, rubbing resistance and labelling.

Based on the results of both the initial factory inspections and product testing, training and advisory services were designed and executed as reported in section 3 of this report.

2.2 Shoes, Furniture and Brushware

In this component of the programme, it was established that Gep Shoe Company were not operational and that situation prevailed throughout. Consequently, in as far as shoes are concerned only Phazi Shoe Company was assessed. It was observed that Phazi Shoe Company manufacturers fashion shoes specialising in ladies shoes using imported shoe uppers while lasting is done locally. The shoes were visually assessed and found to be acceptable in terms of workmanship.

Samples were obtained for laboratory testing for the following quality parameters: adhesion strength (sole to upper and heel to sole), flexing resistance, tensile strength, tear strength, elongation at break, resistance to ageing and heat and water absorption.

At the furniture factories namely Famba Furniture and Peter's Furniture, it was observed that both units manufacture a wide range of office and household furniture to an acceptable quality in terms of workmanship. However, areas for quality improvement were noted and included choice and conditioning of raw timber and customer information covering such issues as product performance, care and maintenance.

Samples of assembled products or units of products were obtained for laboratory testing for the following quality parameters: workmanship (finishing), fabric-colour fastness to washing and light, cracks, joint strength and glue strength.

At Abasika Brushware, it was generally observed that the products were of poor quality mainly because of the poor quality of raw materials. On-the-spot advisory services were given especially in the choice of raw materials and product specifications.

Samples of the products were obtained for testing for the following quality parameters: moisture content of wood, density of wood, dimensions of stocks and tufts, tuft strength and total mass of tufts.

Based on both the observations made during the inspections and the laboratory test results, relevant training and advisory services were designed.

2.3 Stationery and chalk

Only Blantyre Print and Packaging - Paper Converters Division was covered in the programme on stationery since Centuary Printers do not make envelopes; the product of interest for the programme. During the initial factory inspection, emphasis was placed on production procedures and assessment of quality control procedures. Inspection of documentation showed that their suppliers of paper do not give full product specifications. Samples of both raw paper and finished products were obtained for laboratory tests for the following quality parameters: tensile strength, tear strength, grammage, bursting strength, thickness, abrasion, opacity, smoothness, brightness, colour, surface strength and dimensions.

In this component of the programme, initial factory inspections were also conducted at Blantyre Chalk Makers and Educational Materials Supply Company who manufacture chalk. During the initial inspections focus was made on raw materials handling, preparation and mixing, moulding of chalk, in-process inspection, sampling and testing and finished product sampling and testing.

Although the products (chalk) visually appeared to be of acceptable quality samples were obtained for laboratory testing.

Based on the results of both the initial inspection and laboratory test results, training and advisory services were designed.

2.4 Soaps

Initial factory inspections were also conducted to all soap manufacturing units where it was observed that tallow was the main raw material used in the manufacture of the laundry soaps.

Samples of soap were obtained for laboratory testing for relevant quality parameters. Based on the observations made during the inspections and the test results obtained, training and advisory services were designed by the contractor.

SECTION 3

TRAINING AND ADVISORY SERVICES

3.0 Introduction

Training and advisory services were provided to all units in all the four products fields of the programme. Areas for training were established as described in section 2 of this report. In most cases, training focussed on quality control awareness and/or techniques while advisory services dwelt on what the units needed to do to achieve desired product quality levels where they fell short.

3.1 Textile Garments and Uniforms

During the initial factory inspection, training needs were identified in quality control and the following areas relevant in garment and uniforms manufacture:-

1. Seaming and choice of sewing threads and needles;
2. Stitching;
3. Machine tensioning

4. Designing and cutting; and
5. Finishing of garments.

3.1.1 Process quality control - training

Process quality control training was given to redress the above problem areas and summaries of main points are given below for each problem area.

i) Seaming and choice of sewing threads and needles

The sewing thread used should suit the fabric, smaller thread for finer fabrics and bigger needles for coarser fabrics. Use of polyester or polyester/cotton thread was recommended due to its durability and high tensile strength. The type of thread selected should be suitable to avoid seam puckering or fabric distortion which may show immediately after sewing or may develop during usage of the garment.

ii) Stitching

Units were advised that the size of stitches and their spacing should suit the garment. For example shirts should have smaller stitches than overalls.

iii) Machine tensioning

The sewing should be done at the correct tension since use of higher tension than required causes stretching of threads resulting in seam puckering.

iv) Designing and cutting

These were emphasised to be the most critical stages of garment manufacturing. The use of suitably trained and highly skilled personnel for these functions was considered paramount. The garment or uniform design should satisfy the customer and be skillfully done.

v) Finishing of garments

Correct finishing was also considered important. This is ensured by cutting loose threads, pressing of seams and final inspection of the garment for uniformity in stitching, slippage of stitches and colour matching.

3.1.2 Quality control in garment manufacture - training

i) Objective

Personnel in all the units were informed of the objectives of quality control in garment manufacture as being to maintain and improve garment quality thereby reduce production of seconds and provide better value which will in turn enhance customer satisfaction.

ii) Techniques

In the absence of testing equipment at the shop-floor units were taught on visual quality inspection techniques for the critical points during manufacture as follows:-

a) Raw materials quality control

The raw fabrics should be visually checked for typical yarn defects such as neps, loose filling, and consistency in dyeing. The units should also clearly specify their fabric quality requirements to their suppliers or buy only the fabrics that meet their set fabric requirements.

b) In-process quality control

During processing the manufactures were encouraged to visually assess their products for quality indicators especially those listed above which give particular problems.

c) Finished product quality control

The units were taught on how to undertake visual quality control of finished products as stated in 3.1.1 (v) above.

3.2 Shoes, Furniture and Brushware

Arising from observations made during the initial factory inspections and the results of tests done on initial samples; training in the following areas were considered necessary:-

1. Shoes (Phazi Shoe Company)

Quality control training was the utmost requirement.

2. Furniture (Famba and Peter's Furniture)

The problem areas identified which required training and advisory services were:-

1. Choice of timber and related raw materials;
2. In-process quality control; and
3. Finishing of furniture products.

3. Brushware (Abasika Brushware)

1. Choice of raw materials;
2. In-process quality control; and
3. Finishing of brushware products.

3.2.2 Process quality control - training

1. Shoes

The process of shoe making at Phazi Shoe Company was deemed acceptable with requisite process controls in place. The only exception is poor choice of raw materials which results in the shoes failing in one quality aspect; flexing resistance (Annex 1).

2. Furniture

i) Choice of timber and related raw materials

Units were advised to ensure that the right timber is used for all furniture products as required by the customers. The timber should be at the right moisture content (12-18% m/m) before use and free from typical defects such as splits, waness, knots bowing and fungal growth.

Other materials such as adhesives, nails and upholstery fabrics should be of the right strength. Nails should also be of the right length and diameter.

ii) In-process quality control

Units were advised to undertake in-process quality control tests that do not require elaborate and expensive equipment. There are tests for:-

- Dimensional requirements
- Stability and rigidity; and
- Resistance to staining

iii) Finishing of furniture

Units were advised to ensure that their furniture products were finished properly to render them smooth, machine chip free and properly abraded.

3. Brushware

i) Choice of raw materials

The unit was advised to procure raw materials of the right quality as follows:

1. Wood raw materials

The wooden raw materials i.e. stocks should be made from timber with straight grains, free from defects such as splits and knots to render them strong and improve the performance of the brooms and brushes.

The wood should be at the right moisture content (15% m/m).

2. Tufts (bristles)

Tufts or bristles should consist of animal hair, synthetic or natural fibres and filaments.

2. In-process quality control

The unit was advised to undertake in-process quality control so as to ensure that:-

1. Wooden parts of the products are neatly machined to a smooth finish;

2. Hole dimensions are such as to accommodate tufts securely;
 3. Stocks of brushes and brooms with stapled tufts should form one solid piece;
 4. Each tuft is formed from a bundle in which hairs, fibres or filaments are essentially parallel to each other and stapled or drawn and folded at the staple or wire into two branches of equal length;
 5. Hairs, fibres or filaments in the products are of uniform size, free from loose fibres and other damages and firmly secured in the tuft holes;
 6. Handles are free from brittle heart, decay and have slope of grain in excess of 1 in 20;
 7. Sawn ends are finished square to within 3° to the longitudinal axis while moulded ends shall have a smooth finish; and
 8. The products are packed in containers in such a manner as to protect tufts against deformation and any other damage.
3. Finishing of brushware products

The unit was advised to finish their products to render them as defect free as possible.

3.2.2 Quality control in shoes, furniture and brushware - training

1. Objectives

The units were given similar objectives for quality control in this component of the programme as those given in the component on textile garments and uniforms.

2. Techniques

The units were advised of the techniques for quality control as being:-

- Raw material quality control;

- In-process quality control; and
- Finished product quality control.

The specific details for achieving the required quality levels are as given in the respective sections 3.2.1 above.

3.3 Stationery and chalk

During the initial factory inspections training and advisory needs were also identified for this component of the programme. The units were consequently advised on how to redress the specific problems observed as presented below for each product type and trained on aspects of quality control in a manufacturing industry:-

1. Stationery (Envelopes)

The process for manufacturing envelopes at Blantyre Paper Converters was deemed acceptable with requisite process quality controls in place. The only quality problems seen were:

- i) Lack of exactness in specimen dimensions during preparation; and
- ii) Gum performance with respect to:
 - i) Curling of paper upon application;
 - ii) Moisture picking of gums (hygroscopicity);
 - iii) Adhesive strength of gum; and
 - iv) pH, solid content and viscosity of gum.
- iii) Uncontrolled conditions for factory-floor paper testing.

2. Chalk

Both chalk manufacturing units use similar processes and hence produce chalk of comparable quality. The quality problems identified were:-

- i) Raw material storage and handling; and
- ii) The presence of grit/sand in the chalk.

3.3.1 Process quality control - training

1. Stationery

i) Lack of exactness of specimen dimensions

The unit was advised on how to redress this quality problem to ensure that envelopes are made exactly to the standard specifications.

ii) Gum performance

Due to the numerous problems arising from the gum, the unit was advised to establish clear gum specifications and ensure that only the gum complying with the specifications was procured. The gum should be pre-tested to certify compliance before use.

iii) Uncontrolled conditions for factory - floor paper testing

The unit was advised to procure a small humidity chamber and also to send samples to the Malawi Bureau of Standards for testing.

2. Chalk

i) Raw material storage and handling

The unit was advised on how to improve storage and handling of raw materials by use of appropriate storage rooms.

ii) Presence of grit/sand in the chalk

The unit was advised on how to overcome this problem by use of sieves of appropriate mesh sizes to sieve the raw material (calcium sulphate) before use.

3.2.2 Quality control - training

In both product types namely stationery and chalk, training in quality control focussed on the concepts of quality control and the techniques. The objectives and techniques of quality control were also outlined in similar terms as described in 3.1.2 above.

3.4 Soaps

During the initial factory inspections to units in this component of the programme and arising from laboratory test results the following problems areas were identified as requiring training and advisory services:-

1. Raw material handling;
2. In-process quality control; and
3. By-product and waste material handling.

3.4.1 Process quality control - training

Process quality control training was given to redress the above problem areas as summarised here below:-

i) Raw material handling

Although on testing the quality of tallow, the essential raw material was found to be of acceptable quality, the units were advised to periodically check the quality of their tallow, to monitor the saponification number on which the amount of caustic to be added depends. The strength of the caustic should also be checked periodically to ensure more or less complete saponification.

ii) In-process quality control

In some cases, the products, on initial testing had the following short-falls:

- a) high unsaponified matter;
- b) high foreign matter content and
- c) high total fatty matter

Consequently, the units were generally advised on how to overcome these shortfalls as follows:

a) High unsaponified matter

In addition to using caustic of the right strength, the temperature-time conditions during the saponification process should be optimised.

b) High foreign matter content

The units were advised to identify sources of foreign matter and devise means of removing or limiting their undesirable effect on the products. Most of the foreign matter could be eliminated if use of wind-controlled rooms was made for the critical processing stages.

c) High total fatty matter

On analysis the soap has much higher total fatty matter than the minimum specified in the Malawi Standard MBS 250:1991 - Specification for Laundry Soap. Units were advised to use extenders or fillers to reduce the level and maximise yields while complying with the Malawi Standard.

iii) By-products and waste handling

It was observed in most of the units inspected that 'lye' was being drained to waste. It was not possible during the project to advise precisely how to limit this except to indicate the possible causes as being the use of uncontrolled time-temperature conditions and the non-homogeneity in mixing.

3.4.2 Quality control in soap manufacture - training

The units were trained on the essential elements of quality control in soap making indicating the objectives of quality control and the techniques in some detail. A summary is given hereunder:

1. Objectives

The objective of quality control in soap making was stated to be simply meeting the customers needs in terms of safety, performance and price.

2. Techniques

The techniques are similar to those stated for the other programme components namely:

- i) Raw materials quality control by checking the quality of the fats used, caustic soda concentration, salt, water, etc;

- ii) In-process quality control as described in 3.4.1 (ii) above; and
- iii) Finished product quality control by periodically testing the finished products for indicative quality parameters such as free caustic alkali, unsaponified matter and total fatty matter using the Malawi Bureau of Standards.

SECTION 4

APPRAISAL OF PRODUCTS QUALITY

4.0 Introduction

After execution of the training and advisory services outlined in section 3, the units were inspected again to assess the impact of the training and advisory services offered. Summarised below are the observations made for each of the product groups.

4.1 Textile Garments and Uniforms

On inspection, it was observed that all units in this component of the programme had successfully implemented the training and advisory services offered. Consequently, testing of samples obtained from the units afterwards showed compliance of the garments with the standard requirements for:

- i) Stitch uniformity
- ii) Straightness of seams
- iii) Stitch size and uniformity;
- iv) Seam free from pucker and seam strength;
- v) Workmanship and labelling;
- vi) Stability of dimensions; and
- vii) Size matching and tension.

Compliance was also observed on stability of dye to washing, perspiration and light indicating improvement in choice of raw fabrics.

The knitted products from Logason Knitting Works were compared with similar imported products and they compared favourably in terms of colour matching, seam strength, shrinkage and colour fastness.

The single and major problem that prevailed was that some of the locally manufactured fabrics show inconsistencies in dyeing resulting in sporadic poor performances in colour fastness.

4.2 Shoes, Furniture and Brushware

On appraisal, after implementation of the training and advisory services, most of the units in this sector had also successfully implemented the training and advisory services offered. The exceptions were Phazi Shoe Company and Abasika Brushware.

Testing of products sampled for the second time at Famba and Peter's Furniture showed significant quality improvements in relation to:

- i) Choice of timber and related raw materials (annex 2);
- ii) Dimensional requirements; and
- iii) Stability and rigidity of products.

There was significant improvement in varnishing quality of products at Peter's Furniture resulting in improvement in resistance to staining.

At Phazi Shoe Company, the shortfalls that persisted were the need for qualified personnel capable of assessing quality during production and failure in flexing resistance of the shoes (Annex 1).

At Abasika Brushware, there were no improvements in the workmanship and other quality parameters as clearly shown in annex 3.

4.3 Stationery and Chalk

The units in this sector also successfully implemented the training and advisory services that did not require excessive capital investment.

The envelopes manufactured by Blantyre Print and Packaging - Paper Converters Division are of acceptable quality complying with the basic requirements of the Government Printer.

The chalk manufactured by Blantyre Chalk Makers and Educational Materials Supply Company also comply with standard requirements and compare favourably with imported chalk as clearly shown in annex 4. Although the chalk is not dust free, it writes well and has no grit.

4.4 Soaps

The units in this component of the programme have also implemented the training and advisory services offered by the contractor. This has resulted in the production of laundry soaps that comply with the requirements of MBS 250:1991 - Laundry Soaps : Specification as clearly indicated in annex 5.

SECTION 5

GENERAL OBSERVATIONS AND SECTORAL RECOMMENDATIONS

5.0 Introduction

In the course of undertaking the project the contractor made some specific observations at the various units which are of particular interest. The sections below outline the observations and the respective recommendations.

5.1 Textile Garments and Uniforms

5.1.1 Observations

1. It was generally observed that the units in this sector have problems with sourcing raw fabrics for manufacturing garments. Locally manufactured fabrics have particular problems of quality especially in relation to colour fastness and dimensional stability. It was also learnt that locally manufactured fabrics are considered expensive by the garment and uniform manufacturers.
2. It was observed (or noted) that for certain periods, Malawian small-scale garment manufactures face stiff competition from established Malawian and non-Malawian large-to-medium scale garment manufacturers due to the latter's access to imported fabrics.
3. The units do not always adhere to garment informative labelling requirements and there are apparent problems with garment sizing.

5.1.2 Recommendations

1. The local fabric supplier, David Whitehead and Sons Limited, and the garment manufacturers should agree on the quality of the fabrics supplied on the basis of a defect count system. To facilitate this the Malawi Bureau of Standards should adopt the British Standard BS 6395:1983 on Numerical Designation of Fabric Faults. This system will provide a more accurate picture of fabric quality.
2. Both Malawian small-scale and the established large-to-medium scale garment manufacturers should be given equal access to competitive sources of raw fabrics for the manufacture of garments.
3. All units should adopt acceptable garment labelling and sizing standards. The Malawi Bureau of Standards should therefore establish standards on garments labelling and sizing.

5.2 **Shoes, Furniture and Brushware**

There were no specific observations requiring specific recommendations in this component of the programme.

5.3 **Stationery and Chalk**

There were also no specific observations made in this component of the programme.

5.4 **Soaps**

No specific observations requiring specific recommendations were made in this programme component.

ANNEX 1

REPRESENTATIVE RESULTS OF SWAGS CONDUCTED ON 10/14/84
IN 1984

| No. | Parameter | Results | Remarks/Conditions |
|-----|--|-------------|--------------------|
| 1 | Apparent strength of gravel core | None | |
| | No. of units tested (no. of units in the sample) = 100 (100) | 100% | |
| 2 | Die head pressure | 1000 psi | 1000 psi |
| | Flowing channel | 100% | 100% |
| 3 | Gravel strength | 700-800 psi | 700-800 psi |
| 4 | Soil strength | 425-5 | 425-5 psi |
| 5 | Gravel core strength | 100% | 100% |
| | Soil strength for testing with new die head for 1000 psi at 1000 | 100% | 100% |
| 6 | Water content of gravel | 100% | 100% |

ANNEX 2

LABORATORY RESULTS ON TIMBER AND UPHOLSTERY FABRICS

| No. | Parameter | Result | Specification |
|-----|----------------------------|---------------------------|--|
| 1 | Moisture content | 11.32% | 15% (max) |
| 2 | Colour fastness of fabrics | Grade 5 on the Grey Scale | Not less than grade 4 on the Grey scale when exposed to rapid fade lamp for 20 hours |

ANNEX 3

LABORATORY TEST RESULTS ON BRUSHWARE SAMPLES FROM ABASIKA
BRUSHWARE

| | Parameter | Result | Specification |
|---|-------------------|--|---|
| 1 | Moisture content | 11.68 | 15% (max) |
| 2 | Tufts strength | 587 N | Not specified |
| 3 | Workmanship | Rough surface | Smooth with no machine chips |
| 4 | Visual inspection | - Unvarnished handles - Tufts of different length | - Varnished handles - Tufts should be of the same length |
| 5 | Tufts fixation | Easily pulled by hands | Should never be pulled by hands |

ANNEX 4

**LABORATORY TEST RESULTS: COMPARISON ON LOCALLY MANUFACTURED
CHALK WITH IMPORTED CHALK BOUGHT ON THE OPEN MARKET**

A: Blantyre Chalk Makers

| PARAMETER | LOCAL | IMPORTED | SPEC. |
|---|---------------------------------|------------------------------|----------------------------------|
| Dimensions: Base (mm) | 11.0 | 11.6 | 11.0 + 1 |
| Tip | 9.61 | 9.1 | 9.5 + 1 |
| Length | 81.8 | 82.7 | 80 + 3 |
| Transverse Breaking Strength | 100% supported >900 g mass load | 100% supported >900 g | At least 80% should support 900g |
| Moisture content, %m/m | 14.5 | 15.7 | 14% |
| Freedom from heavy metals | Acceptable levels | Acceptable levels | Acceptable levels |
| Calcium sulphate, %m/m | 81.4 | 78.3 | 90% |
| Writing qualities and freedom from grit | Satisfactory | Writes well no grit detected | Should write well no grit |

ANNEX 4 CONT'D

B: Education Materials Supply Company

| Parameter | Local | Imported | Spec. |
|---|----------------------------------|----------------------------------|----------------------------|
| Dimension (mm) | | | |
| Base | 12.0 | 11.6 | 11.0 + 1 |
| Tip | 9.1 | 9.1 | 9.5 + 1 |
| Length | 80.9 | 82.7 | 80 + 1 |
| Transverse breaking strength | 100% supported more than 900 g | 100% supported more than 900 g | 80% should support 900 g |
| Moisture content, %m/m | 5.4 | 15.4 | 14 |
| Freedom from heavy metals | Acceptable levels | Acceptable levels | Acceptable levels |
| Calcium sulphate, %m/m | 90 | 78.3 | 90 |
| Writing qualities and freedom from grit | Satisfactory No grit detected | Satisfactory No grit detected | Should write well. No grit |

ANNEX 5

LABORATORY TEST RESULTS ON SOAP SAMPLES FROM SOAP MANUFACTURERS

| Unit | Parameter | Total Fatty matter % m/m | Unsaponified matter % m/m | Alcohol insoluble matter % m/m | Free alkali acid % m/m | Foreign matter % m/m | Toxic metals % m/m | Rosin acids % m/m | Phenolic substances % m/m |
|-------------|--|-----------------------------|------------------------------|-----------------------------------|---------------------------|-------------------------|-----------------------|----------------------|------------------------------|
| Madzimayela | | 79,60 | 0,9 | 0,3 | 0,15 | nil | nil | 0,2 | nil |
| Upile | | 73,00 | 1,6 | 0,2 | 0,09 | nil | nil | 0,14 | nil |
| Pachanya | | 67,00 | 1,5 | 0,4 | 0,10 | nil | nil | 0,10 | nil |
| Changu | | 68,00 | 0,9 | 0,03 | 0,15 | nil | nil | 0,25 | nil |
| | MBS 250:1991 Laundry soap Specifications | 50,0 min | 2,0 max | 20,0 max | 0,4 max | nil | nil | 15,0 max | - |

ANNEX 6

TRAINING PROGRAMME FOR MR H KARONGA OF MADZIMAYERA SOAP INDUSTRIES AT THE BUREAU

| DATE | SECTION/DIVISION | ACTIVITY | RESPONSIBLE OFFICER |
|------------|------------------------|---|--------------------------------|
| 29-7-1991 | Industrial Consultancy | Basic soap manufacturing processes - a theoretical approach | General Manager |
| 30-7-1991 | Standards | Specification for laundry soaps, scope and basic definitions | E B Kamangira/ D R D Mbango |
| 31-7-1991 | Laboratories | Raw Material and finished products handling in soap industry | D M D Chokazinga |
| 1,2-8-1991 | Laboratories | Q C operations in soap industries with special attention to laundry soaps | E G Chinangwa/ C Segula |

NB: To achieve maximum benefit from the project, the Managing Director of Madzimayera Soap Industries attached Mr Karonga to the Malawi Bureau of Standards. Mr Karonga was exposed to the different activities related to the soap industry as shown above.

INDUSTRIAL RESEARCH AND CONSULTANCY UNIT

OF

THE MALAWI BUREAU OF STANDARDS

Standards provide rationalization and sound basis for production processes. The Malawi Bureau of Standards produces and publishes National Standards through over 30 technical committees. These standards provide valuable technical information on products and processes to entrepreneurs.

Implementation of these standards contribute directly to industrial development. To ensure effective implementation and optimum utilization of the technical information contained in standards, industrial research and consultancy services were established at the Bureau.

The Industrial Research and Consultancy Unit (IRACU) was therefore established to provide such services. The unit specifically provides services in the following areas:

- development of new products
- development of the quality of products to set specifications and national standards (for both local and export markets)
- establish a sound Factory Quality Management System
- training of factory management and operators in quality management systems.

For further information, contact the General Manager.