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16213

19 December 1986
English

TEXTILE TESTING AND STANDARDIZATION (Phase II)

(DP/NIR/78/001)

TERMINAL REPORT

Prepared for the Government of Nigeria by the United Nations Industrial Development Organization, executing agency for the United Nations Development Programme

Based on the work of

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EXPLANATORY NOTES

In the report the following abbreviations can be found:

(i)	Air Conditioner	-	A.C.
(ii)	American Association of Textile Chemists and Colorists	-	AATCC
(iii)	American Society for Quality Control	-	ASQC
(iv)	American Society for Testing & Materials	-	ASTM
(v)	British Standards	-	BS
(vi)	European Organization for Quality Control	-	EOQC
(vii)	Federal Institute of Industrial Research Oshodi - or Institute	-	FIIRO
(viii)	German Standards (Deutsche Industrie Normen)		DIN
(ix)	Hungarian Standards (Magyar Szabvány)	-	MSZ
(x)	International Academy for Quality	-	IAQ
(xi)	International Standard Organization	-	ISO
(xii)	Naira	-	N
(xiii)	Textile Research Institute Budapest	-	TKI

The rest of the abbreviations are in correlation with those used by the United Nations Industrial Development Organization.

The exchange rate of the N during the period of the project:

1 US.$ = 3,2N

A B S T R A C T

TEXTILE TESTING AND QUALITY CONTROL (PHASE II)

DP/NIR/78/001

The purpose of the project is to render technical assistance to the Nigerian Government in textile testing, quality control and standardization. Promotion of development in the textile industry based on local resources, adapting imported technologies and modifying existing ones in order to achieve optimal results in quality and price. These included the equipping of the Federal Institute of Industrial Research Oshodi with different textile testing apparatuses and the training of the staff, referring to the utilization of these units, as well as maintenance, respectively. Duration of the field-mission extended from 27 November till 20 December, 1986.

The objectives of the project were the followings:-

- selection of the necessary laboratory testing equipment
- assist in placing the equipment in order
- instal the equipment and supervise its initial operation
- correct damage or initiate replacement when necessary
- train the personnel in the operation and maintenance
- assist in the preparation of national standards
- advise for further assistance

The objectives of the present phase of the project were as follows:

- review and assess the existing situation with regard to quality control and testing activities in textile industry;
- review the level of application of existing laboratory facilities in quality control activities, advise and assist in on-the-job training in the techniques of measurements, methods of verification and maintenance of existing laboratory instruments and equipment;

- develop and discuss measures for strengthening and developing existing facilities in quality control and testing;
- advise on the eventual need for further assistance..

All these targets were fully met.

INTRODUCTION

A. Project Background

Although the world textile industry is generally in state of serious depression and has been suffering for several years, there has tended to be a growth pattern in both spinning and weaving of short staple fibre throughout Africa. In the area of the textile industry Nigeria is one of the leading countries in Africa and the rate of growth is above the average African level. The increase of installed short staple spinning capacities between 1969-1979 represents a staggering 188.8%, the highest in Africa. The growth of the installed looms between the same period is 83.1%, the second largest in Africa.

The textile industry in the country consists of approximately 120 mills, 35 of which are integrated mills while the remaining have varying capacities and types of operation. In 1979 there were about 691 thousand spindles and 13,215 looms, well over 1,000 knitting machines of various types and a lot of modern dyeing and finishing plants installed and operating throughout the country. This industry is the biggest employer of industrial labour force.

According to the latest sources about 0.47% of the whole population, actually 448,679 workers are engaged by the manufecturing industry. The textile industry alone is responsible for 80,697; which is about 18% of the total manufacturing labour force. (Federal Office of Statistics: Economic and Social Statistics Bulletin, 1985 and Federal Office of Statistics: Annual Abstract of Statistics 1985 Edition)

To make perceptible the relative largeness of the textile industry, the next branch of the industry, which is second on the basis of the number of workers engaged, is the food industry, employing about 43,600 workers only (9.8% of the total manufacturing labour force).

Within the textile industry, cotton and synthetic industry play a prominent role, while the development of the wool and carpet industry is expected in the near future.

In 1971 the Government of Nigeria expressed its desire for UNIDO assistance to provide the FIIRO with the necessary basic equipment for textile testing and quality control and to train personnel in the utilization of the equipment. Taking into consideration the limited number of equipment involved in the project the project's obejctive was achieved. There was a need, however, to introduce a wider range of equipment and to train the personnel in the use and repair of this equipment.

At present, there is not a single institution in the textile and clothing industry in the country which is equipped to meet the needs either of the Government or of the industry in testing and quality control. The FIIRO, which already has some of the basic equipment and trained personnel, is the most suitable institution to be developed and strengthened to meet these needs in association with the Nigerian Standards Organization.

The FIIRO, which is under the Federal Ministry of Science and Technology was established in 1955, to assist the industrialization of the country through research on the industrial use of local raw materials and through the development of local technologies. The Institute also renders technical assistance to the existing industry, either Government or privately owned, by the provision of laboratory facilities for analyses of their products and seeking solutions to their technical and production

problems. Further on the Institute's activity extends to the solution of economic and statistical problems raised by the factories, firms, etc. The Textile Unit of FIIRO has been an integral part of the Institute since its establishment. The unit engages in research and quality control. Also offers technical assistance to government agencies. The staff of the unit has served on technical committees of the NSO for the establishment of standards for textiles and allied products. Most of the experimental work for the establishment of these standards was done in the unit. The NSO has continually made use of the facilities in the unit by sending samples for quality control evaluation for the issuance of the Certification Mark to Industries. The unit offers training courses for students and Quality Control Personnel.

Under the Third National Development Plan the FIIRO has been allocated the sum of N1.32 million for the expansion and improvement of the laboratory facilities. More than 50% of this amount has been utilized for the building programme. An annual allocation of some N100,000 is to cover all equipment requirements of the Institute, which includes all laboratory and pilot plant equipment. There were, therefore, no funds available to enable the textile testing and quality control laboratory to become fully operational.

The textile industry in the country currently aims at increasing its share of the domestic market which is partly satisfied from imports. The project helps to achieve this aim by providing research, technical assistance and specialists capable of improving the quality of the local textile production.

B. Official Arrangements

The assistance for the present project was requested by FIIRO through the Nigerian Government in 1978. The project document was approved on 5 March, 1980 by the Government, 28 March, 1980 by UNIDO and on 3 April, 1980 by the UNDP.

The project became operational on 23 April, 1981 when the international expert arrived to Nigeria to make his suggestion on the equipment involved and on the fellowship training. This mission lasted for a month. The expert personally supervised and assisted in the development of the project during his next three assignments. Onward 18 March, 1982 there was a one- month-mission, from 5 August, 1982 the expert was on the field for 4 months while from 1 November, 1984 another 6-week-assignment took place. During these assignments the expert supervised the unpacking of the equipment, installed these equipment, carried out the necessary actions to repair the damages, trained the staff, revised the fellowship training, made suggestions on the further improvement of the facilities and the project itself.

The present part of the project became operational on 27 November, 1986 with the arrival of the expert for a one-month assignment to Nigeria to fulfil the objectives of the project.

During the 1982 and the present mission UNIDO attached an Electrical Expert to the project for a duration of one month each to assist in the electrical installation of the equipment.

C. Contribution

The contribution to be covered by the UNDP has come up to US. $266.557. The detailed budget is attached in the Annexes (No. 4). According to the original project document UNDP contribution was to be US $218,150.00. This project budget has been revised several times, mainly because of the increased proforma costs, the additional cost of the replacement of the water cooled air conditioning unit by an air cooled one and because of the experts' return missions.

The contribution of the Nigerian Government totals N53,500.00 in kind and has not changed in the meantime.

1 OBJECTIVES

Development Objectives

Promotion of development in the textile industry based on local resources, adapting imported technologies and modifying existing technologies in order to achieve optimal results in quality and price.

Immediate Objectives

To assist the Government through FIIRO in

(i) establishing an adequate laboratory for testing and quality control of textile materials, products and related materials by expanding the present laboratory facilities at FIIRO.

(ii) strengthening and developing the capabilities of FIIRO's staff to provide the necessary services to Government and Private Sector.

(iii) developing the capability to render greater assistance in the preparation of national standards and to render assistance in the certification process.

The objectives have not been revised.

The immediate objectives have been fully met. In the course of the mission the equipment involved were installed, the staff of the FIIRO has been trained further on guidance and directives were given to elaborate the referring local standards.

11. MAIN DUTIES OF THE JOB DESCRIPTION

Main duties according to the job description were as follows:

- to review and assess the existing situation with regard to quality control and testing activities in textile industry;
- to review the level of application of existing laboratory facilities in quality control activities, advise and assist in on-the-job training in the techniques of measurements, methods of verification and maintenance of existing laboratory instruments and equipment;
- to develop and discuss measures for strenghtening and developing existing facilities in quality control and testing;
- to advise on the eventual need for further assistance.

A copy of the job description is attached to the Annexes (No. 1)

111. ACTIVITIES

A. Elaborating a Work Plan

A detailed Work Plan has been prepared by the international experts. This has been thoroughly discussed with the Nigerian counterpart and the UNIDO representative at the UNDP office and finally both parties have approved it.

The Work Plan is attached to the Annexes (No. 5).

B. Reviewing advance of the project

Equipment received by FIIRO

In the period of 1984 - 1986 three equipment were shipped to FIIRO. These equipment are as follows:

- compact micronaire
- aspiration psychrometer
- air condenser of the air conditioner

This means that FIIRO has received all the hardware which was included in this project.

Books received by FIIRO

Books suggested to be acquired in the international expert's report of 7 December, 1984 have not yet been supplied to FIIRO.

Installation of the Air Conditioner

Installation Engineer of the producer of the A. C unit was on the spot in 1983 and installed the unit equipped with a cooling system operating on water. On the international expert's request an air cooled condenser has arrived but has not yet been installed. UNIDO Headquarters have invited the producer to install the condenser several times but have failed to receive any reply. Because of the lack of water of sufficient quantity the A.C unit has never been switched on and cannot be operated until the condenser is changed. This operation, however, requires the presence of the installation Engineer of the producer/supplier.

C. Checking the equipment

Condition of the equipment was checked. In the following only those failures are listed which were mentioned neither in the 1982 nor 1984 Terminal Report.

General Observation

Some of the symptoms and observations can be generalized. These are as follows:

1. The stabilizer of the laboratory building was set for a value of 240-245 V. This was done because the building houses lot of laboratories and in some of them there are certain equipment which requires 240 V for operation. The equipment of the textile lab, however, require a main supply of 220 V only. As a consequence some of the equipment in the textile lab have developed a fault in their own stabilizer system (for example Zwick Tensile Strength Tester, Fibre Bundle Tensile Tester etc).
2. The wire network inside many equipment have deteriorated up to a certain amount or completely got ruined because of foreign effect from the environment (for example Zwick Tensile Strength Tester, Laboratory Dyeing Apparat, Laboratory Washing Scourotester etc)
3. Surface finish of many equipment have been damaged because of the climatic conditions and have developed rustspots which caused functional problems as well (for instance Laboratory Washing Scourotester, Automatic Yarn Tensile Strength Tester etc)
4. Because of the climatic conditions and the local environment a more frequent maintenance as generally needed is necessary which was not performed. Furthermore, there are difficulties to obtain the necessary spare parts and service materials.
5. Among the equipment there are a lot with complicated electronics which failures could be observed after rectifying the basic faults only. For example, the moving crosshead of the Zwick

Tensile Strength Tester was unidirectional. This was caused by faults which had developed in the stabilizer and power supply of the equipment which were repaired. After this it was to be established that the recorder could not record the force and the motor which is to move the diagram paper had been stuck. After these reparation we could realise that while performing a test after rupture the crosshead failed to stop or move back to its original position.

Same procedure was necessary when repairing the Bursting Strength Tester (Heal) and the Fibre Bundle Tensile Strength Tester (METEFEM-Metrimpex).

Condition of equipment delivered after 1984

All the cases, except one, were opened in the absence of the international expert. The case which houses the air condenser of the Air Conditioner has not been touched providing an opportunity for the installation Engineer of the producer to check the content himself and by this not losing the warranty. This case is still intact, the international experts have not opened it either.

The Compact Micronaire was in mint condition, no damage could be observed.

The Aspiration Psychrometer was in good condition. In one of the thermometers, however, the continuity of the mercury was broken several times.

Condition of equipment delivered in or before 1984

Some of these equipment were out of order because of the lack of

spare parts, most of them needed maintenance work to be carried out, one of them was so unreliable that it has to be changed, while two others should be changed at least partly.

The Yarn Evenness Tester (YET) supplied by TKI was delivered during the first phase of the project, actually in 1976. This equipment was produced actually in 1973, and is now 13 years old. Because of the climatic conditions here in Nigeria and the characteristics of the electrical parts built inside the equipment the Tester is no longer serviceable. Tests according to the referring standards cannot be performed on this aged unit.

The wire network of the Laboratory Washing Scourotester (supplied by TKI) inside the equipment was completely damaged by foreign effects from the environment, the main switch and the pressure switch to control the water level furthermore, the switch for the heater got ruined. The electronic part of the equipment is no longer serviceable, it should be changed for a new one.

The wire network of the Laboratory Dyeing Apparat (supplied by TKI) was severely damaged by foreign effects from the environment. The equipment has rusted. The electronic part of the equipment should be changed for a new one.

Several failures could be observed at the Drying Equipment with Predying oven and Balance supplied by GISM. The built in balance was not functionable any more and the light indicator was not operational.

There were several problems with the Statometer supplied by Schroder. The unit was non functioning because of several failures. The zero levelling potentiometer was no longer turnable, it was stuck because of

the rusting. The equipment was stored switched in position, the batteries rusted together, and several rustspots could be found inside and on the surface of the unit. As it was pointed out in the expert's report of 23 November, 1982, this unit had not been produced to be used in the climatic conditions existing here.

The loading device of the Mechanical Treader for Carpet supplied by TKI got stuck, the unit was non functioning.

The Fibre-Bundle Tensile Strength Tester, produced by METEFEM was non functioning. The steel wire which transmitted the force had been broken, the stabilizers providing the power supply for the electronics were faulty, the driving mechanism to move the diagram paper in the recorder furthermore, the photo element were faulty as well.

Bursting Steength Tester supplied by Heal was non functioning. The motor which moves the hydraulics did not start. Loose cable connections could be observed.

The following failures were to be found on the Tensile Strength Tester produced by Zwick. Moving crosshead was unidirectional, moving only downwards, recorder faulty, functioning in one mode only and the zero setting could not be performed. Through further measurements it could be established that the required power supply was missing for the electronics, one of the plugs of the recorder was faulty, cables were damaged and the potentiometer to set the zeropoint was faulty.

The digital display of the Momcolor supplied by Metrimpex was faulty, has to be changed for a new one.

The balls to indicate the variation in tensile strength of yarns in the Automatic Yarn Tensile Strength Tester supplied by Metrimpex got rust and partly lost. New balls are needed.

The ventilation blades in the Selector supplied by Metrimpex touched the covering house, the axle was loose.

One special shaped weight was missing for the Skein Gauge supplied by Wira as it was indicated in the international expert's report of 7 December, 1984.

The Carpet Thickness Gauge supplied by Schroder and the Carpet Static Loading Tester supplied by Wira are not compatible as it was described in the international expert's report of 23 November, 1982. Because of the difference in the diameters of the pressure feet the two equipment, which are intended to be used together, cannot be operated.

D. Installation and Reparation

The following can be established in general

- Installation and reparation were executed up to the equipment were free from any defect or up to the lack of spare part made it impossible to complete.
- The number of equipment to be repaired was limited by the time element and by the great variety and quantity of the failures.
- The preparation was hindered or was more difficult to execute because of the Manuals shipped with the equipment did not include circuits diagrames or the supplied diagrames differed from the real construction of the shipped unit. (for example, Bursting strength tester, Fibre bundle tensile strength tester).

All the mechanical failures, misalignments and many electrical failures have been repaired.

A list was prepared in which the necessary parts for the repair and completion of the installation are indicated and attached to the Annexes (No. 6).

Beside that, one complete equipment (Yarn Evennes Tester) and the electronic parts of two other (Laboratory washing scourotester, Laboratory dyeing apparat) are not serviceable any more.

The newly arrived equipment were fully installed and some others re-installed.

There are now 2 more laboratories available to increase the area for the textile lab. These premises need, however, painting. Therefore, it was not advisable to reinstall all the equipment which will be placed in the new premises, this work should be carried out later, after the painting and the necessary reconstruction work are completed.

E. Resetting of the Stabilizer

The stabilizer of the laboratory building was reset to supply mains of 225-230 V. This was a result of a compromise to use the same stabilizer for equipment operating on 220 V and 240 V as well.

The Director of Research of FIIRO has issued a paper which was stuck on the stabilizer according to which it cannot be adjusted to any other value.

F. Training

Training was provided to the staff referring to the equipment shipped in or after 1984. The staff became familiar with the referring standards.

They were taught the handling and maintenance of the equipment. They carried out tests themselves.

G. Furnishing of the new premises

The area of the textile lab. has been increased by two more rooms, namely the labs No 2 and 6. The area of lab No. 4 has not yet been handed over to the textile lab. and it is suggested to do that as soon as possible.

Having the whole groundfloor in the laboratory building the following arrangements can be suggested.

Yarn and fibre testing equipment to be placed into Lab. No 1

Fabric testing equipment to be placed into Lab. No 5

Equipment for chemical tests to be placed into Lab. No 2

Wet processing equipment to be placed into Lab. No. 4

Balances and A.C to be placed into Lab. No 3

Heat generating equipment to be placed into Lab. No. 6

It has to be taken into consideration that beside the painting of the premises certain reconstruction work are necessary in Lab. No 6 for placing the Flammability tester and Xenotest.

H. Workshop

A one-week-workshop on Textile Testing and Quality Control and the official launching of the equipment would be organised in the course of 1987. This requires the final installation of all equipment to be placed into the new acquired premises, the repair of all equipment which could not been repaired because of the time element and the lack of spare parts, the installation of the air conditioner and the painting and necessary reconstruction of the laboratories.

The objectives of this workshop are the following:

- to disseminate expertise to industry people
- to introduce FIIRO's new capabilities on the field of quality control and research.

This requires the presence of the international experts, namely that of the project manager and the electrical expert. They should return to the field after the problems, which are in the sphere of authority of FIIRO, are solved to install and to repair the outstanding equipment and to attend the workshop meeting.

I. Parts, equipment accessories and books to be acquired

The project has to be extended to have an additional budget for parts, equipment, accessories to be acquired necessary for the operation of the equipment and for carrying out research activity. Furthermore, some more books are needed.

In the list of spare parts are mentioned those which are either necessary to complete the installation or for the expected maintenance to run the equipment according to the international standards. This list is attached to the Annexes (No. 6).

It was already mentioned that one of the equipment has to be completely changed (Yarn Evenness Tester FY 26) while the electronics parts of two others (Laboratory Washing Scourotester and Laboratory Dyeing Apparat) have to be changed.

Some accessories are needed and should be acquired, like

- For the evaluation of the specimen-after tested by the Random Tumble Pilling Tester (Type PT-4, supplied by Atlas Electric Devices Co.) a series of standard rating photographs are needed. Three sets of fine photographic pilling test standards, each set corresponding to size of pills produced, are available from ASTM HQs (1916 Race St., Philadelphia, PA 19103).
- For the evaluation of board type Yarn Evenness Tester (Seriplan) a series of standard rating photographs are needed.
- The Schiefer type Abrasion Tester (Rubtester) was delivered with one abradant only. The following items should be acquired additionally enabling the full utilization of the abrasion tester:

  spring steel blade abradant

  cross-cut tungsten tool steel blade abradant

  wearing brush

  carpet clamping device

  mounting aid (hold-down press) for clamping carpets and felts

Photographs of these items were published in ASTM D 1175, as well as in AATCC Technical Manual volume 57, 1981/82 edition on page 361 and 362. Care has to be taken that the listed accessories should match and fit the present abrasion tester, therefore, the order should be placed at the producer of the mentioned equipment.

Some more boeks are to be acquired the list of which can be found in the Annexes (No. 7).

J. Visiting the Federal Ministry of Science and Technology

The Director of FIIRO made arrangements that the international experts working in FIIRO would make a visit at the Ministry of Science and Technology.

The visit took place on 8 December, 1986. The international experts were escorted by the Director of FIIRO and the head of the Textile Division. They were received by Professor Emmanuel U Emovon, Federal Minister of Science and Technology and by Miss J S Atta, Permanent Secretary.

There was a discussion on the present UNIDO projects in FIIRO and at the end of this reception the Minister expressed his thanks to UNIDO for the assistance so far and to the international experts for the work well done.

IV. ACHIEVEMENT OF THE IMMEDIATE OBJECTIVES

The immediate objectives were fully met. FIIRO is in possession of a well equipped laboratory on the area of testing textiles. The staff can carry out the necessary tests according to international standards and they can evaluate the results and classify textile materials accordingly. FIIRO's staff too has accumulated the knowledge to elaborate national standards as well.

Handbooks have been compiled, titled "Handbook of Textile Testing and Quality Control" further more" Testing and Analytical Services for the Textile and Allied Industries" with a view to intimating the textile and allied industries of the highly improved facilities available for their use and for training purposes, respectively.

The official launching of the equipment should take place in the course of 1987. A one week workshop on Textile Testing and Quality Control is to follow the official launching. Participation will be extended to the local industry and to ECOWAS countries for the sake of local and international utilization of the facilities. This workshop should be organized after the painting and reconstruction work of the laboratory building has been completed, the unit to supply the standard atmosphere for testing is in operation further more all the equipment are installed and repaired both in mechanical and electrical point of view. FIIRO has expressed its desire to extend the international expert's assignment by an other 2.5 months and to take the advantage of the electrical engineer' presence for the same period of time to finish the installation of the equipment, to assist in the final preparation, further more to present papers and participate at the workshop.

Further expansion of the project, i.e. to set up a pilot plant, to improve the quality orientation of FIIRO and to develop FIIRO to a regional training centre status, respectively should increase the utilization; not only to achieve the objectives but to surpass them to a great extent.

V. FINDINGS

Taking into consideration all the achievements FIIRO has made on the area of industrial research and service in general or on the same for the textile industry alone, it is an ideal organization for UNIDO assistance so far and in the future, respectively. The utilization of this project up to now is far ahead of the local standards.

FITRO has made all the efforts to provide a far better infrastructure for the project than it exists in Nigeria in general. The Institute was able to provide a constant water supply and has acquired three new generators to compensate the unreliable power supply in the region.

The staff of the Textile Department has improved and now it seems that the permanency of the staff has been achieved. The head of the Textile Department, Dr I Aladeselu was an efficient partner of the experts, he assisted a lot and made all facilities available to achieve success. The Director of the Institute, Dr O A Koleoso has rendered an effective support to the activity of the expert by all means and his assistance has a great effect on the achievements.

It is evident that the project has made an effect on the local industry and the expansion of the project will further increase the utilization.

VI. CONCLUSIONS AND RECOMMENDATIONS

A. Conclusions

The objectives of the project were as follows:

- selection of the necessary laboratory testing equipment
- assist in placing the equipment in order
- install the equipment and supervise its initial operation
- correct damage or initiate the replacement
- train the personnel in the operation and maintenance
- assist in the preparation of national standards
- advise for further assistance.

These targets were fully met and achieved, some additional parts are necessary for the installation and repair.

B. Recommendation

1. To expand the project by adding some extra funds for spare parts, equipment, accessories and books

The full utilization of the project has been hindered so far by the lack of some necessary parts which has made impossible the final installation and repair. There are some additional accessories and books needed as well. All these were discussed in detail in Chapter III Section I.

The acquisition of the referred items influences a lot the full utilization of the project.

2. To set up a Pilot Plant

The Institute already possesses pilot plants for food processing. further more for the ceramics which are in operation. A pilot plant set up simulating the processes in a typical textile industry should complement the laboratory techniques and should assist to render more assistance to the industry and to carry out more effective research activity. A draft plan for the pilot plant is attached to the Annexes (Annex No. 8).

3. To improve the quality orientation of FIIRO

In the course of this project FIIRO has been equipped with equipment enabling the Institute to carry out tests, do research work on the field of material testing, evaluate the test results and assess the quality of the textile products.

There is a suggestion included in this report referring to the Phase III of the present project to equip FIIRO with a Pilot Plant. This provides FIIRO the necessary hardware for research on the processing field as well and the facility to render effective assistance to the Nigerian textile and allied industries to solve their processing problems.

If this training will not be executed as a substitution the course on Total Quality Control to be organized by the Asian Productivity Organization (4-14 Akasaka, 8-chome, Minato-ku, Tokyo, Japan 107) can be recommended.

There are other courses organized by the International Centre for Quality and Management Sciences and Dr O A Koleoso, Director of FIIRO should be enrolled into one, dealing with Quality Systems, Installation, Auditing and Improvement.

There is a special importance, that the Director of FIIRO would be familiar how to audit and improve the quality system and the whole organization to make it work more efficiently, hence economically.

- Local training of the staff.

A seminar should be organized under the auspicesof UNIDO on quality control, statistical quality control and quality management. The international expert should organize this seminar but some internationally accepted personalities, whose special field corresponds with the listed topics should also be involved, like Mr Richard A Freund. (Mr R A Freund is the president of Quality Planning Service, and a consultant at the Rochester Institute of Technology, past president of ASQC, member of IAQ, can be reached on 155 Yarkerdale Drive, New York 14615, USA).

Another 1 week seminars should deal with the topic of Metrology and standardization to improve the activity on that area.

4. Further parts, equipment and books to be acquired

In Chapter III, Section I the list of accessories can be found the acquisition of which should greatly improve the utilization of the project.

5. Further assistance to develop FIIRO to be the training centre of the region

It is always favourable to select and to develop a local institution to be the training centre for a given area. The local institution has the advantage over the foreign ones; knowing better the local circumstances and need, how to train and what to teach.

In this report there is a suggestion to give further financial assistance to FIIRO to set up a pilot plant. If this suggestion is accepted with some additional assistance FIIRO can easily be developed to be the training centre for textile testing and quality control not only for Nigeria but for the region as well.

The other advantage to select FIIRO as a regional training centre is that by this time, as a result of previous UNIDO projects, it should possess most of the hardware and its staff will have most of the knowledge which are necessary for an effective training centre. This means that the cost to achieve this aim is far less significant than in the case of other institution which has not benefitted from previous UN assistance.

The creation of the suggested training centre should highly increase the utilization of the present project as well.

6. Reconstruction and painting of the laboratory, (activity needed by FIIRO)

To put the project operational as soon as possible the laboratory building and especially the new premises allocated to the textile department should be painted. Some reconstruction work is necessary in Lab No. 6 for the sake of the Flammability tester and Xenotest.

7. Finding the local alternative of different materials needed to perform and to standardize tests (Action needed by FIIRO)

Beside the specimen there are certain materials needed to execute tests. Abrasive paper of given quality is needed for the abrasion test, special abrasive resistant adhesive is needed for the accelerotor and pilling tests, thread of a prescribed quality is needed to execute the flammability test etc. These materials can be obtained from foreign producers but because of the high consumption it is strongly recommended to find the local version of the needed materials.

Parallel comparative tests should be carried out at FIIRO and the correlation of the results should be calculated which were obtained using the original materials and their local substitute. On the basis of these comparative tests local standards can be elaborated taking into consideration the local resources.

8. Organization of a workshop and the international experts' return mission to FIIRO (Activity needed by UNIDO and FIIRO)

It was mentioned in Chapter III, Section H that a workshop on Textile Testing and Quality Control and the official launching of the equipment would be organized in the course of 1987. By that time the A.C. unit has to be operational, furthermore, all equipment installed and repaired. This requires in addition the completion of the reconstruction and painting of the laboratory building.

FIIRO wishes therefore to suggest a return mission for the international experts for 2.5 months each. This would enable the experts to complete the installation, repair the failures and to participate and present paper furthermore to assist in the organization of the workshop

LIST OF ANNEXES

Annex No.1

UNITED NATIONS

3/6/86

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

UNIDO

PROJECT IN NIGERIA

JOB DESCRIPTION
DP/NIR/78/001/11-03/31.3.E

Post title	Expert in Quality Control and Testing (textile industry)
Duration	1 month.
Date required	As soon as possible
Duty station	Lagos
Purpose of project	Promotion of development in the textile industry based on local resources, adapting imported technologies and modifying existing technologies in order to achieve optimal results in quality and price.

Duties

The expert will be attached to the Federal Institute of Industrial Research (FIIP) in Lagos, and, in co-operation with the Institute's staff, will specifically be expected to:

1. Review and assess the existing situation with regard to quality control and testing activities in textile industry;

2. Review the level of application of existing laboratory facilities in quality control activities, advise and assist in on-the-job training in the techniques of measurements, methods of verification and maintenance of existing laboratory instruments and equipment;

3. Develop and discuss measures for strengthening and developing existing facilities in quality control and testing;

4. Advise on the eventual need for further assistance.

The expert will also be expected to prepare a final report, settin out the findings of his missions and his recommendations to ghe Government on further action that might be taken.

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

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

Qualifications	University degree in engineering or applied physical sciences or equivalent experience in the assembly, installation, calibration, operation, maintenance and repair of scientific testing instruments, particularly those used for quality control and testing in textile testing.
Language	English

Background information

The textile industry in Nigeria consists of about 120 mills, about 35 of which are integrated mills (cotton and other fibres), the remaining have varying capacities and types of operation. This industry is one of the biggest employers of the country's labour force. In 1972 the textile industry accounted for 22.1 per cent of the total manufacturing labour force and was the second largest contributor to manufacturing value added. Within the textile industry, cotton and synthetic industry play a prominent role, the jute and silk industry being less important. A development of the wool and carpet industry can be expected.

At the request of the Government of Nigeria, a project was developed (NIR/75/023) designed to provide the Federal Institute of Industrial Research (FIIR) with basic equipment required for textile testing and quality control and the training of staff in the working, repair and maintenance, and use of the equipment. The project's objectives have been achieved. There is need, however, for the introduction of a wider range of equipment and the training of staff in the use and repair of this equipment.

At present, there is not a single institution in the textile and clothing industry in Nigeria equipped to meet the needs either of the Government or of industry in textile testing and quality control. The FIIR which already has some of the basic equipment and trained staff, is the most suitable institution to be developed and strengthened to meet these needs in association with the Nigerial Standards Organization. Under the Third National Development Plan (1975 - 1980) the GIIR has been allocated the sum of ₦ 1.32 million for the expansion and improvement of its laboratory facilities. Of this amount about ₦ 700,000.00 have been utilised for the building programme. The new laboratory buildings which will also house the textile testing and quality control laboratory are being completed. An annual allocation of some ₦ 100.000.00 is to cover all equipment requirements of the Institute, which includes all laboratory and pilot plant equipment. Hence there are no funds available to enable the textile testing and quality control laboratory to become fully operational.

Nigeria's textile industry currently aims at increasing its share of the Domestic Market which is partly satisfied from imports. The present project will help to achieve this aim by research, technical allistance and by producing specialists capable of improving the quality of local textile production.

UNITED NATIONS

3/6/86

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

UNIDO

PROJECT IN NIGERIA

JOB DESCRIPTION

DP/NIR/78/001/11-02/31.3.K

Post title Expert (Electrical Engineer)

Duration 1 month

Date required As soon as possible

Duty station Lagos

Purpose of project Promotion of development in the textile industry based on local resources, adapting imported technologies and modifying existing technologies in order to achieve optimal results in quality and price.

Duties The expert will be attached to the Federal Institute of Industrial Research (FIIP) in Lagos, and, in cooperation with the Institute's staff, will specifically be expected to:

1. Review and evaluate the existing laboratory testing equipment ordered in previous years.
2. Assist in installation of the equipment and supervise its initial operations.
3. Organize and participate in on-the-job training of the staff in the operation and maintenance of the installed equipment.
4. Advise and assist in preparing technical instructions on the use of laboratory equipment.

The expert will also be expected to prepare a final report, setting out the findings of his missions and his recommendations to ghe Government on further action that might be taken.

2
..../..

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

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

V.81-33106

Qualifications

University degree in engineering or applied physical sciences or equivalent experience in the assembly, installation, calibration, operation, maintenance and repair of scientific testing, electrical instruments, particularly those used for textile testing.

Language

English.

Background information

The textile industry in Nigeria consists of about 120 mills, about 35 of which are integrated mills (cotton and other fibres), the remaining have verying capacities and types of operation. This industry is one of the biggest employers of the country's labour force. In 1972 the textile industry accounted for 22.1 per cent of the total manufacturing labour force and was the second largest contributor to manufacturing value added. Within the textile industry, cotton and synthetic industry play a prominent role, the jute and silk industry being less important. A development of the wool and carpet industry can be expected.

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At present, there is not a single institution in the textile and clothing industry in Nigeria equipped to meet the needs either of the Government or of industry in textile testing and quality control. The FIIR which already has some of the basic equipment and trained staff, is the most suitable institution to be developed and strengthened to meet these needs in association with the Nigerian Standards Plan (1975-1980) the FIIR has been allocated the sum of N 1.32 million for the expansion and improvement of its laboratory facilities. Of this amount about N 700,000.00 have been utilized for the building programme. The new laboratory buildings which will also house the textile testing and quality control laboratory are being completed. An annual allocation of some N 100.000.00 is to cover all equipment requirements of the Institute, which includes all laboratory and pilot plant equipment. Hence there are no funds available to enable the textile testing and quality control alboratory to become fully operational.

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ANNEX NO 2

INTERNATIONAL STAFF

At this phase of the project the international staff consisted of two members. Their names, nationalities, expertise and duration of service on the field are as follows:

Dr G .S Aschner, Hungarian

Expert on textile testing, quality control and standardization

From 27 November till 20 December 1986

Mr A Solymos, Hungarian

Electrical Engineer

From 27 November till 20 December 1986.

ANNEX NO 3

Senior Counterpart Staff

In Table No. 1/3 the names, qualifications and position of the senior counterpart staff are given. The service they provided except 2 of them extended the whole duration of the international experts' presence in Nigeria. Mr Odutola was in the UK for a course, while Mr Balogun was on sick leave.

N A M E	QUALIFICATIONS	DESIGNATION
Dr Ibitoye Aladeselu	BSc. (Hons) Chemistry; MSc. (Fibre Science) Ph.D (Polymer Sci. & Techn.) C. Text, A.T.I.C. Chem, M.R.S.C.	Chief Research Officer
Dr Eric E Ikpeama	C. Text, A.T.I, M.Phil Ph.D (Colour Chemistry)	Senior Research Officer
Mr Olusola . M Odutola	BSc, (Hons) Fibre Science C. Text, A.T.I.	Senior Research Officer
Mr Audashiru D Balogun	OND (Textile Techn) HND (Textile Techn)	Principal Technical Officer
Mrs E O Orekoya	OND (Textile Techn) HND (Textile Techn)	Higher Technical Officer
Mr Bisi O Olawoyin	OND (Textile Techn) City & Guilds Advanced Dyeing of Textiles	Higher Technical Officer
Mr A Aderibigbe	West African School Cert.	Lab. Assistant
Mr S O Sadare	City And Guilds London Inter. (Electronics)	Technical Officer.
Mr A Waidi	Govt. Trade Test Grade I (Electronics)	Foreman Electronics

- Annex No. 4

Project budget

RUN-DATE 1988-11-04
UNIDO - UMAP07/B

DETAIL REPORT ON PROJECTS AS AT 1988-10-31
BY PROGRAM ELEMENT AND COUNTRY

PROJECT NUMBER: DP/NIR/78/001 PAGE 837

PROJECT TITLE TEXTILE TESTING AND QUALITY CONTROL (PHASE II)

PROJECT REVISION K
PROJECT STATUS O - ONGOING
PGM-ELEMENT CODE J12107
FIRST ISSUED 80-05-09 LAST UPDATED 88-01-10

BUDGET LINE	DESCRIPT	TOTAL ALLOTMENT M/M (1)	TOTAL ALLOTMENT DOLLARS (2)	CURR YR PHASING M/M (3)	CURR YR PHASING DOLLARS (4)	PRIOR YEAR EXP M/M (5)	PRIOR YEAR EXP DOLLARS (6)	CURR YR DISB M/M (7)	CURR YR DISB DOLLARS (8)	BAL CURR YR OBL M/M (9)	BAL CURR YR OBL DOLLARS (10)	COMMITTED FUTURE YEARS (11)	BALANCE CURR YR (12) (4-8-10)	UNCOMMITTED BALANCE (13) (2-6-8-10-11)	YTO IMPL VERSUS PHASING (14)
11-01		7.4	48,158	0.0	0	7.4	47003	0.0	0	0.0	0	0	0	0	
11-02		2.0	15,055	1.0	8,250	1.0	6805	0.0	0	0.0	0	0	0	845-	
11-03		1.0	8,250	1.0	8,250	0.0	0	0.0	0	0.0	4920	0	8,250	8,250	
11-99	INTEXPERT	10.4	69,463	2.0	16,500	8.4	53808	0.0	0	0.0	4920	0	11,580	10,738	
15-00		0.0	224	0.0	0	0.0	0	0.0	0	0.0	0	0	0	224	
15-01		0.0	0	0.0	0	0.0	224	0.0	0	0.0	0	0	0	224-	
15-99	TRAVEL	0.0	224	0.0	0	0.0	224	0.0	0	0.0	0	0	0	0	
19-01		0.0	0	0.0	0	0.0	844-	0.0	0	0.0	0	0	0	844	
19-99	SUR PY OB	0.0	0	0.0	0	0.0	844-	0.0	0	0.0	0	0	0	844	
19-99	PERSONNEL	10.4	69,687	2.0	16,500	8.4	53188	0.0	0	0.0	4920	0	11,580	10,570	20 %8
32-00		0.0	17,117	0.0	0	0.0	17117	0.0	0	0.0	0	0	0	17,117	
32-01		0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0	0	17,117-	
32-99	STUDYTOUR	0.0	17,117	0.0	0	0.0	17117	0.0	0	0.0	0	0	0	0	
39-99	TRAINING	0.0	17,117	0.0	0	0.0	17117	0.0	0	0.0	0	0	0	0	
41-00		0.0	1,591	0.0	0	0.0	0	0.0	0	0.0	0	0	0	0	
41-10		0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0	0	1,591	
41-11		0.0	0	0.0	0	0.0	1591	0.0	88	0.0	0	0	88-	88-	
41-99	EXPENDABL	0.0	1,591	0.0	0	0.0	1591	0.0	88	0.0	0	0	88-	1,591-	
42-00		0.0	178,732	0.0	0	0.0	0	0.0	0	0.0	0	0	0	178,732	
42-01		0.0	0	0.0	0	0.0	178702	0.0	0	0.0	0	0	0	178,702-	
42-99	NONEXPEND	0.0	178,732	0.0	0	0.0	178702	0.0	0	0.0	0	0	0	1,080-	
49-99	EQUIPMENT	0.0	177,323	0.0	0	0.0	178383	0.0	88	0.0	0	0	88-	1,148-	
51-00		0.000	2,430	0.000	500	0.000	0	0.000	0	0.000	0	0	500	2,430	
51-40		0.000	0	0.000	0	0.000	287	0.000	0	0.000	0	0	0	287-	
51-41		0.000	0	0.000	0	0.000	320	0.000	0	0.000	0	0	0	320-	
51-43							400							400-	
51-99	SUNDRIES	0.0	2,430	0.0	500	0.0	1012	0.0	88	0.0	0	0	408	1,323	19 %8

RUN-DATE 1988-11-04
UNIDO - UMAP02/B

DETAIL REPORT ON PROJECTS AS AT 1988-10-31
BY PROGRAM ELEMENT AND COUNTRY

PROJECT NUMBER: DP/NIR/78/001

PROJECT TITLE TEXTILE TESTING AND QUALITY CONTROL (PHASE II)

PROJECT REVISION K
PROJECT STATUS 0 - ONGOING
PGM-ELEMENT CODE J12:02
FIRST ISSUED 80-05-09 LAST UPDATED 88-01-10

BUDGET LINE DESCRIPT	TOTAL ALLOTMENT		CURR YR PHASING		PRIOR YEAR EXP		CURR YR DISB		BAL CURR YR OBL		COMMITTED FUTURE YEARS	BALANCE CURR YR	UNCOMMITTED BALANCE	YTD IMPL VERSUS PHASING
	M/M (1)	DOLLARS (2)	M/M (3)	DOLLARS (4)	M/M (5)	DOLLARS (6)	M/M (7)	DOLLARS (8)	M/M (9)	DOLLARS (10)	(11)	(12) (4-6-10)	(13) (2-6-8-10-11)	(14)
53-01	0 0	0	0 0	0	0 0	1000	0 0	0	0 0	0	0	0	1,000-	
53-02	0 0	0	0 0	0	0 0	44	0 0	0	0 0	0	0	0	44-	
53-99	0.0	0	0.0	0	0.0	1044	0.0	0	0.0	0	0	0	1,044-	
59-99 MISC COST	0.0	2,430	0.0	500	0.0	2068	0.0	98	0.0	0	0	406	270	19 %
99-99 PROJ TOT	10.4	268,557	2.0	17,000	8 4	250744	0.0	183	0.0	4920	0	11,897	10,710	38 %

ANNEX NO 5

W O R K I N G P L A N

for Dr G S Aschner and Mr A Solymos

referring to UNIDO Project DP/NIR/78/001

27 November 1986 - 19 December 1986

1. Review and assess the condition of equipment. Establish defects and all those facts which decrease fully or partly the utilization of them.

2. Repair equipment using spare parts available. If additional spares are needed list the required ones and those which are necessary for running and maintenance (expansion of present project).

3. Suggestion on the final placement of the equipment taking into consideration the new premises allocated for the laboratory. Plan reconstruction of the building if necessary, laboratory furniture etc *

4. Install all those equipment which have arrived recently furthermore reinstall at least one part of the equipment to be placed in the new premises (mainly equipment for the chemical laboratory) *

5. Train the staff on the handling and maintenance of equipment. Additional training of the newly arrived equipment and establish the problem area on using the old ones. Suggestions for additional training of the staff on the spot and abroad.*

6. Suggestion on the arrangement and organization of a one-week-workshop and on the official launching of the equipment to disseminate expertise to industry people. *

7. Suggestion on the expansion of the present project. *

   7.1 Acquisition of new hardware and parts furthermore additional training.

   7.2 Set up a Pilot Plant

   7.3 Improve quality orientation and expertise of FIIRO's staff on the following areas

      7.31 Quality Control

      7.32 Quality Management

      7.33 Metrology and Standardization

   7.4 Develop FIIRO to be the training centre of the region

Points marked with asterisks cannot be completed or fully elaborated because of the time element.

Annex No. 6

Parts to be acquired for installation and repair

Statometer produced by Schroder (Karl Schroder KG., Postfach 1768, D-6940 Weinheim/Bergstr. GFR)

Type: 1407, No. 1982

1 pc Preh lin. Potmeter, Type 6500-000, 100 kohm, 0.25 W

Lager Nr. EL 17/024

Bursting Strength Tester produced by Heal (James H Heal & Co. Ltd., Halifax, England)

Serial No. 111-208

1 pc Micro Gauge Pressure Transducer, Type P 102

1 pc Measuring Head Amplifier (complete) with Meter Range switches and Reset switch (HEL 105, HEL 106 printed circuit board, complete). These should be calibrated to the Pressure Transducer to be delivered

1 pc Service Manual with circuit diagram for the

measuring amplifier

digital display

power supply of the unit mentioned above

Note: these circuit diagrams were not delivered together with the equipment

Fibre Bundle Tensile Strength Tester produced by Metefem, supplied by Metrimpex (Budapest, Hungary)

Type: FM 20, Serial No was not given

1 pc Panel fitted with 2 pc of Photoelement (photo resistor)

type: B_pY 11

1 pc Drawing Cable, pos No. 43

2 pcs Microswitch, pos No. MK-3, MK-4 Type: Pn2-2

Laboratory Dyeing Tester produced by TKI, supplied by Metrimpex (Budapest, Hungary)

Type: FE-08/C, No. 76001

1 pc Instrument Rack with complete electronic parts and cables, incl. timer clock, temperature control, but exl. driving motor

Attention: this rack should be controlled by the international experts on the spot before delivery

Laboratory Washing Scourotester produced by TKI, supplied by Metrimpex Budapest, Hungary)

Type: FE-09, No. 76001

1 pc Instrument Rack with complete electronic parts and cables incl. timer clock, temperature control and program switch but exl. driving motor.

Attention: this rack should be controlled by the international experts on the spot before delivery

Momcolor D produced by MOM (Budapest, Hungary)

No. 213611

1 pc Digital Display type TA 310, s/N 628621, producer TEKELEC TA

Because the equipment is "dead" after the display is fitted some additional faults may be discovered the repair of which may require additional parts

1 pc Service Manual (complete)

Automatic Yarn Tensile Strength Tester produced by Metefem, supplied by Metrimpex (Budapest, Hungary)

Type: FY-17, no serial No. given

500 pcs Metal Balls with a diameter of 2 mms for signaling the distribution.

Tensile Strength Tester produced by Zwick (Zwick GmbH & Co., Postfach 4350, D-7900 Ulm, GFR)

1 pc Twenty Turn Potentiometer, Order No. EA 10-53/10 k

1 pc Cable for recorder, cable length 5.7 m, Order No. EA 20-27/5

1 pc Cable, cable length 5.0 m Order No. EA 20-27/3

1 pc Cable, cable length 4.5 m Order No. EA 20-27/5

Annex No. 7

List of books to be acquired

Feigenbaum A: Total Quality Control 3rd Edition
McGraw Hill Book Co. 1984

Crosby P.: Quality without Tears
McGraw Hill Book Co. 1984

Crosby P.: Quality is Free
McGraw Hill Book Co. 1980

European Organization of Quality Control: EOQC Glossary of Terms used in the Management of Quality Control
5th edition. English language
EOQC Secretariat, P O Box 2613
CH-3001 Berne, Switzerland

American Society for Quality Control: Glossary and Tables for Statistical Quality Control
ASQC, 230 West Wells. Milwaukee,
WI 53203

Annex No. 8

TO SET UP A PILOT PLANT AT FIIRO

Because of the time element a proper project document could not been elaborated. Neither was the international expert aware of the fact that in this report a detailed suggestion on the expansion of the project should be included. The producer and price of the machines to be selected, therefore, can not be given. This draft is intended to be a document only on which future activity can be based.

I N T R O D U C T I O N

There has been a rapid increase in textile production in the recent years. It has even continued when the rest of the world suffered from stagflation.

FIIRO has received assistance from UNIDO on the area of textile testing, quality control and standardization. As a result of these projects FIIRO possess a well equipped laboratory and the staff is able to utilize these equipment. A pilot plant set up simulating the processes in a typical textile industry should complement the laboratory techniques and should assist to render more assistance to the industry and to carry out more effective research activity especially in the area of using and processing local raw materials.

The suggested project should include the following:

1. Selection of the necessary machinery for the pilot plant
2. The acquisition of the machinery
3. Providing the proper housing for the pilot plant
4. Installation and reparation of the machinery, training of the staff, respectively.

This draft is intended to deal with the first point only. The following, however, should be mentioned:

- Accommodation of the pilot plant should be provided through FIIRO by the Government
- The project should include 3 or 4 experts including spinning, weaving, knitting and finishing specialists and an electrical engineer.
- Training of the staff should consist of their teaching on the field by international experts furthermore of fellowship training of the staff abroad.
- The project should include the machinery processing cotton, synthetic fibres and their mixtures only

MACHINERY FOR THE PILOT PLANT

Small scale operation machinery should be selected, which can be grouped according to the following:

- spinning and preparatory machines
- weaving and preparatory machines
- knitting machines and machinery making up knitted goods
- dyeing and finishing machines

Spinning and preparatory machines

Opening and cleaning: bale plucker and doffer

Carding machine

Drawing and doubling: conventional draw frames

Combing

Rowing machine

Spinning: ring spinning, open end spinning machines

Weaving and preparatory machines

Cone winding machine

Warping

Slashing

Drawing in

Pirn winding

Weaving machines: conventional automatic loom, shuttleless loom (Sulzer), air jet loom

Knitting machines and machinery making up knitted goods

Single knitting machine

Warp fabric knitting machine

Cutting device

Sewing machine

Pressure (type Hoffman)

Dyeing and finishing machines

Singeing machine

Desizing machine

Scouring machine (Kiering machine) for fabric

Saturators (sodium hypochlorite + caustic soda/hydrogen peroxide)

J box

Vapoloc-steamer

Washers

Drying machine

Mercerising machine

Dyeing machines: jigger, HT apparatus, jet

Padding mangle

In addition to the listed machinery some auxiliary equipment are needed, like

Effluent treatment plant

Boiler, etc.