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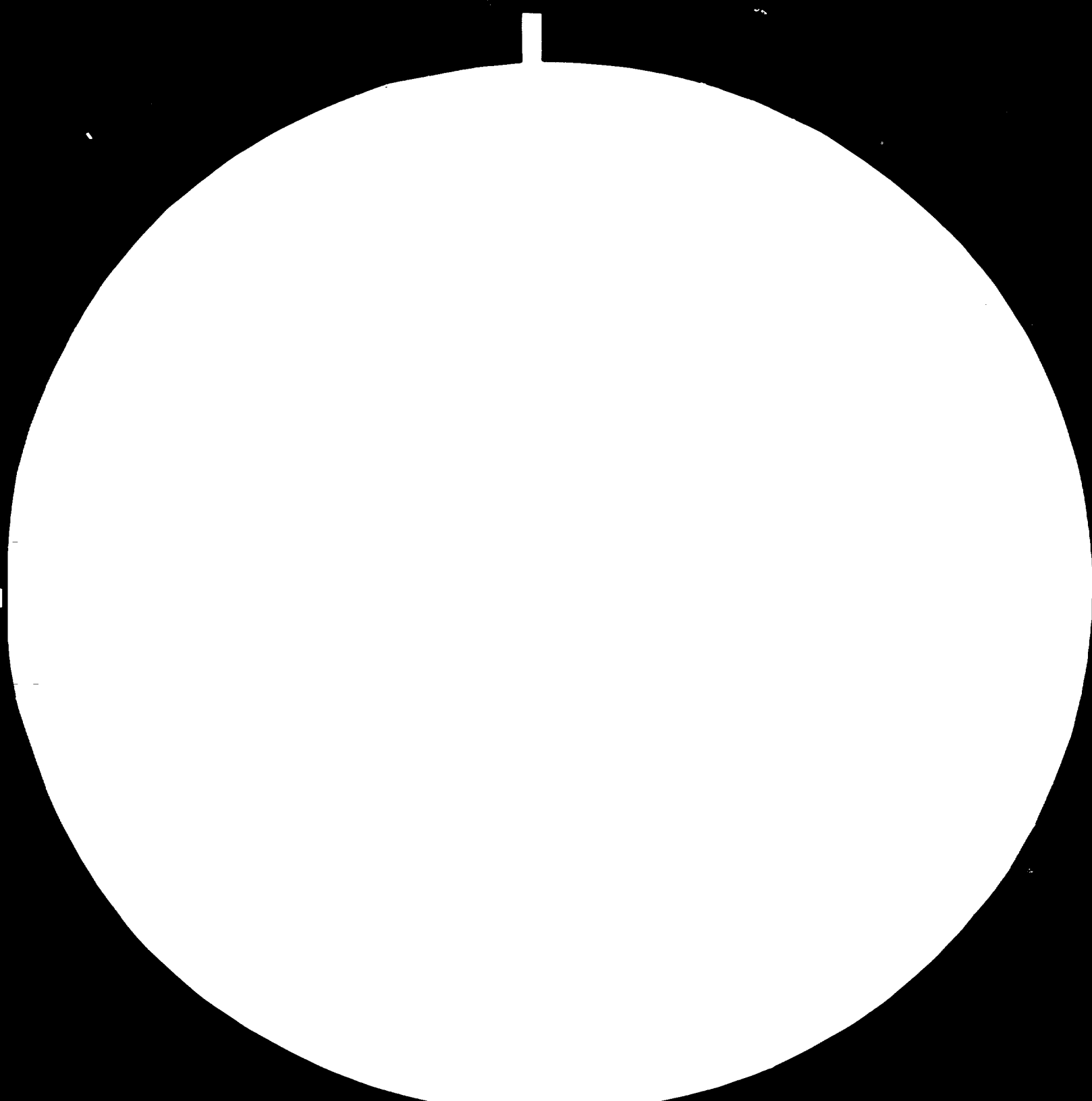

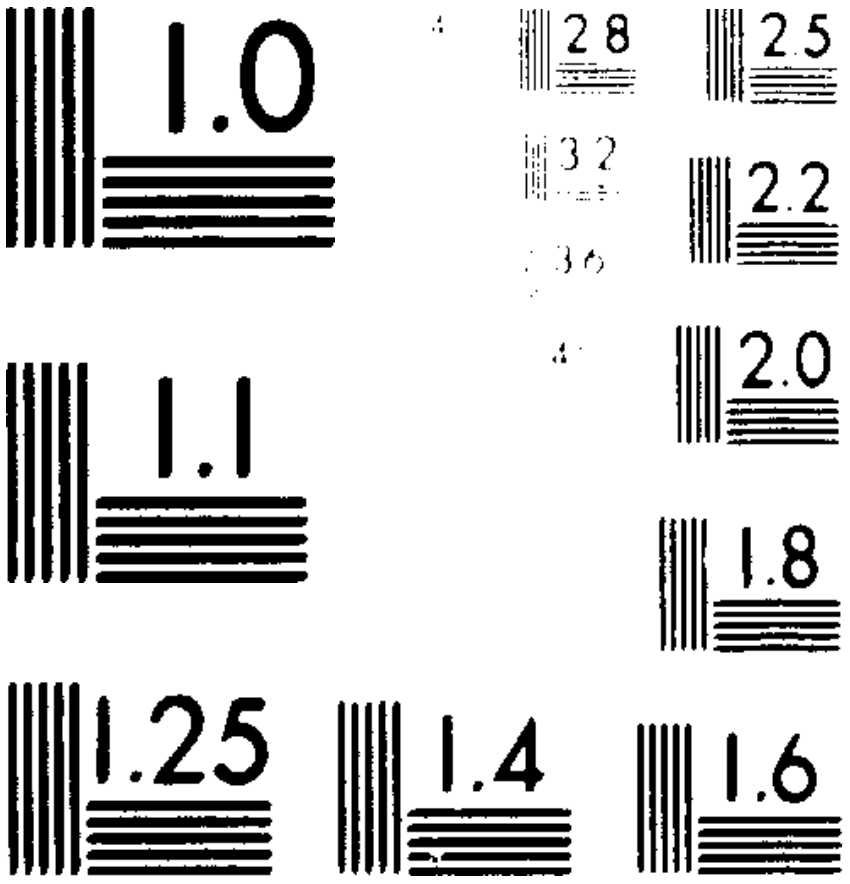

STRENGTHENING
OF
THE IRAQI ORGANIZATION FOR STANDARDS

Final Report on

MATERIALS TESTING

(TF/IRQ/77/003/11-03/G/31.3.A)

Prepared for the Government of Iraq

by

AJIT BHADURI

UNIDO Expert

Baghdad, JANUARY 1980

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RESTRICTED

1 January 1980

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" This report has not been cleared with UNIDO which does not, therefore, necessarily share the views expressed".

Baghdad, Iraq.

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ANNEXES

SUMMARY

1. About 125 testing equipment received for the Physical Testing Division of COSQC have been installed in the various laboratories and the technical staff have been trained to operate them, interpret test data and write the reports through intensive training courses.

2. Recommendations on the atmospheric conditions for testing have been made in the light of ISO Standards and prevailing local conditions.

3. The problem of acute limitation of space has been stressed and as an amelioration rearrangement of the laboratories has been recommended.

4. To achieve the objective of reliability in test results, the methodology to be followed by a multidisciplinary test house as well as by individual test laboratories has been discussed in detail.

5. An equipment cardex system has been designed for easy identification and location of the equipment in various laboratories.

6. The subject of Materials testing which also included paint and paper testing was elaborated in a series of lectures in a seminar and training course organized by the project.

7. The procedure to establish the criteria for approval of test laboratories in the National testing system has been explained.

1. INTRODUCTION

1.1 This report deals with the mission of the Expert during the period of six months from 26, July 1979 to 25 Jan. 1980 in the Physical Testing Division of the Central Organization for Standardization and Quality Control (COSQC). COSQC has been set up recently by merging the Iraqi Organization for Standards (IOS) with the Directorate of Research and Industrial Control (DRIC).

1.2 The Physical Testing Division comprises of the test laboratories devoted to the Physical testing of materials belonging to textile, rubber, plastics and leather, paper and paint disciplines. The laboratory premises and utilities were established and most of equipment and instruments ordered ealier were received before the Expert arrived in the field on 27, July, 1979.

1.3 The Job Description of the Expert is reproduced in Annex. I.

1.4 The COSQC authorities nominated Dr. Sameera Al-Khayat as the Chief Counterpart and five other counterparts to assist the Expert through out the period of his mission. The chief counterpart worked closely with the Expert on questions related to the Physical testing division in general including conduction of the training courses.

The other counterparts collaborated with the Expert in setting up and commissioning the various equipment in the individual laboratories and training of the technical staff in these laboratories.

1.4.1 A short resume' of all the counterpart staff are included in Annex.II.

2. OBJECTIVES AND WORK PROGRAMME

2.1 Objectives

As given in the Job Description, the main objectives of the present mission are:

2.1.1 To supervise the installation of the testing equipment for paints paper, and board, leather, plastics and rubber and textiles.

2.1.2 To train counterpart personnel on the testing of the above materials according to the national and international standards.

2.1.3 To assist in the organization and operation of the Materials Testing Division Laboratories.

2.2 Work Programme

At the commencement of the mission the Expert had meetings with Dr. Ahmed Geneidy, the Project Manager, the Head of the COSQC Standards Department and the counterparts to discuss the assistance of the Expert to the Physical Testing Division. Based on the Job Description and the needs of the Division, the following programme of work was drawn up by the Project Manager:

2.2.1 Supervision of the installation and operation of all testing equipment in the Physical Testing Division (Paints, Paper & Board, Plastics & Rubber, Leather and Textiles).

Training of the technical staff on their manipulation, interpretation of results and evaluation of products.

2.2.2 Study of the air-conditioning question in the light of ISO standards and prevailing local facilities. Recommendation as to the proper situation and effecting whatever changes in the sites of the laboratories if deemed necessary.

2.2.3 Arrangement of the equipment in each laboratory in order to facilitate movement and flow of work.

2.2.4 Developing methodologies for conducting work of the laboratories including the planning and establishment of lab. routines, testing and reporting procedures and forms.

2.2.5 Determination of the standard methods of testing to be followed and preparation of a testing manual for each laboratory. Recommendations as to the requirements for national standards on testing methods.

2.2.6 Determination of the optimum manpower (quantity & quality) necessary for the operation of each laboratory.

2.2.7 Assisting local staff in providing technical advice and service to industry.

2.2.8 Supervision of the local staff in the establishment of complete equipment files.

2.2.9 Advising on the design and location of the necessary stores (hazardous materials, chemicals, glassware, etc...) on the long and short terms.

2.2.10 Advising on the necessary safety facilities and precautions.

2.2.11 Conducting a training course on materials testing for the COSQC staff as well as chemists and analysts in the respective industries.

2.2.12 Recommendations as to the training of counterparts abroad.

2.2.13 Preparation of a list of publications on testing.

2.2.14 Conducting technical visits to the main plants in each of the five industrial sectors and inspection of their laboratories. Preparation of a report for each plant emphasizing:

a- the present status of testing facilities (manpower, equipment, building, methods, organization, etc..).

b- recommendations on how to complement and consolidate these testing facilities so as to be able to carry out all the necessary activities needed for proper quality control systems.

c- recommendation on ways and means to foster the mutual cooperation between JOSQC and the respective enterprises in the field of testing.

2.2.15 Conducting similar visits and studies of the main testing laboratories in Iraq.

2.2.16 Working out recommendations on the equipment to be procured:

a- urgently

b- in the stage of laboratory development.

taking into consideration:-

a- the results of the previous studies (items 14 & 15).

b- the main types of products manufactured locally.

c- the existing facilities

d- the equipment that has already been ordered.

2.2.17 Establishment of criteria for the approval (certification, accreditation, recognition) of testing laboratories in the five industrial sectors as the basis for a national testing system.

2.2.18 Study of setting up a packaging testing lab.

2.2.19 Study of the establishment of a research cell for environmental and corrosion - resistance testing of paints.

2.2.20 Elaboration of a final report on the expert's work, finding and recommendations.

However, it was realised when the mission progressed for four months that due to various constraints and the short period of the mission, the target set forth in the work programme is too ambitious to be acheived in full. Therefore though the objectives in the original job description were fully covered together with the major part of the programme, it was decided by the Project Manager that items 2.2.9, 2.2.10 and 2.2.12 should be left out. Since permission to study the industrial sector and the available laboratory facilities were not obtained, items 2.2.14 and 2.2.15 had to be dropped from the programme. Also due to the same reason, only a part of 2.2.16 could be attempted. Item 2.2.18, packaging testing facilities was also set aside as the counterpart of the Project Manager offered to take up this task.

3. ACTIVITIES AND FINDINGS

3.1 Supervision of Installation and Operation of Testing Equipment and Training of the Technical Staff.

3.1.1 All the equipment in the various laboratories were made operative and installed wherever space available permitted installation. Otherwise the equipment after operation and use were stored in the cupboards or on racks. There were 24 equipment which were received either in damaged states or with vital accessories or components missing. These equipment were not taken into consideration.

A list of such equipment is enclosed in Annex. III and necessary action regarding replacement/procurement should be taken by the authorities concerned.

3.1.2 The training of the technical staff was undertaken in a phased manner. In the first phase, the counterpart in each laboratory was trained in the operation of the testing equipment and in the interpretation of the results obtained. A standard procedure was followed in reporting on experiment with the results of tests. The counterparts were also trained to calculate standard deviation and coefficient of variation of test results by statistical methods.

The standard procedure followed in reporting is enclosed in Annex. IV.

3.1.3 Fair-copies of the first reporting of the experiments by the counterparts after corrections and suitable modifications were made in laboratory note-books with hard covers to serve as reference manuals to be followed in the laboratories concerned. Though it did not exactly fulfil the requirement of laboratory manuals, the time available did not permit to attempt anything better.

3.1.4 All the Methods of tests followed were according to the relevant ISO standards wherever such standards existed. Otherwise other international standards or well known national standards had been followed. Lists of the experiments carried out disciplinewise are enclosed in Annex. V.

3.1.5 The second phase of the training started with the training of individual technical staff in each laboratory by the trained counterparts who acted as instructors. This had helped the counterparts to understand the equipment better and achieve greater self-reliance. A close scrutiny of the day-to-day progress of this extensive training programme was maintained but it was felt that this training could have more quality with test specimens of required standard specifications and comparing the results reported by individual trainees. It is, therefore necessary to repeat the experiments under the above conditions and, of course, under proper guidance and supervision.

3.1.6 Lists of ISO specifications on the methods of testing on textiles, leather, rubber, plastics, paper and paints were issued to the counterparts in each of the laboratories for guidance and to become familiar with these standards formulated by the International Body. A lists of these standards were also handed over to the Project Manager.

3.2 Study of Air-Conditioning in the light of ISO Standards and Prevailing Local Conditions.

3.2.1 There are two seperate Air-Conditioning systems designed to provide controlled temperature and humidity conditions for the ground-floor rooms of the building where physical testing laboratories are situated. (Diagram 1).

3.2.2 One of the systems operates exclusively for the sample conditioning rooms for a very close control of temperature and humidity. It can maintain a standard condition of temperature and relative humidity at any temperature and relative humidity between 10 to 40°C and between 40% to 70% respectively. The temperature can be controlled within ± 0.5°C and relative humidity within ± 1%.

3.2.3 The A.C. system has been supplied by the Carrier Air-Conditioning and the control by the Satchwell Control System. There are two such units at present to maintain controlled atmosphere in the four Condition Rooms planned for this purpose.

One of the units is housed in Room 16 and serves conditioning to Rooms 15,17 and 18. The other one has been installed in Room 23A to provide conditioning to Room 25. The Humidifier of this unit is still to be installed.

3.2.4 The second system caters to the general air-conditioning needs for all the laboratories and offices at the ground floor of this wing of the building and has been housed in Rooms 3 & 4. The offices and laboratories served are Rooms 5,6,7,10, 11,13,20,21,22 & 23. This system can maintain temperature between 20 to 40°C with a ± 2°C variation and humidities between 45% to 75% with ± 2% variation.

3.2.5 No conditioning of the test samples are carried out at present and as required by the relevant ISO standards in the field of textiles, paper, leather, rubber and plastics. Samples are tested according to 'as taken' conditions. Therefore, there has been no demand on the services of the conditioning rooms up till now.

3.2.6 Conditioning room 15 is now used as a storage room for samples of plastics, leather and rubber materials before and after tests. Conditioning room 17 is utilised for textile materials for the same purpose. Conditioning room 18 is now serving as a storage room for about 14 big and small testing equipment for which no arrangement for installation could be made due to acute shortage of space.

3.2.7. The first floor of this wing of the building where the chemical laboratories are situated has no conditioning room and the general air-conditioning is provided by another unit similar to the one in Rooms 3 and 4.

3.2.8. Recommendation on the atmospheric condition for testing in the light of ISO Standards and the prevailing local conditions have been made after a day to day survey of the atmospheric conditions in the laboratories for some time. These details are included in Annex VI.

3.2.9 Reference to ISO recommended atmospharic conditions for testing of textiles, rubber, plastics, leather, paper and paint have also been included in the same Annexure.

3.3. Arrangement of the Equipment in the Laboratories.

3.3.1. The installation of the equipment in each laboratory has been discussed in details in Annex VII. The problem of acute shortage of space has been stressed.

3.3.2. In the light of the difficulties experienced in the proper installation of the testing equipment in each laboratory, the need for some rearrangement of the laboratories was keenly felt. This has been discussed in detail in Annex VIII, and necessary recommendations have been made. The necessity of commissioning the services of the specially constructed Conditioning Rooms has also been pointed out for the laboratories for which these are intended.

3.4 Methodologies for Conducting Work of the Laboratories Including Planning and Establishment of lab. Routines, Testing and Reporting Procedures and Forms.

3.4.1 Considering the importance of the topic so far as the COSQC laboratories are concerned, an intensive study has been made and elaborated in Annex. IX.

3.4.2 It has first taken into account what methodology should be followed in a multi-disciplinary test organization from the initial inquiry of the client and different stages of the progress of the test specimen from its receipt to final report, disposition of the specimen and retention of records. The methodology will help to increase the accuracy of test results and efficiency of reporting as well as enable verification of recorded data and evaluation of the personnel and equipment.

3.4.3 The methodology to be followed in individual laboratories has been next taken up. It discusses the quality and control of laboratory personnel, mode of selection of test methods, recording and reporting in laboratory systems and design and compilation of test documents.

3.4.4 The models of various forms which can be conveniently used by a laboratory organization were then illustrated.

3.5 Determination of Optimum Man-Power for Each Laboratory.

3.5.1 This has been discussed laboratory-wise in Annex. I. The main conclusion that could be drawn is that for a correct appraisal of the situation a time and motion study for each test should be undertaken by a competent body.

3.5.2 However, after the training of the laboratory personnel had been completed and the findings were recorded in the report, there had been sudden major alteration of staff structre in each laboratory by transfering 70% of the well trained counterparts as well as other laboratory personnel from the laboratories to the quality control office. The impact of this change could not be immediately assessed but the loss of such a large number of trained technical hands will certainly affect the performance of the laboratories so far as the use of the large number of equipment installed is concerned.

3.6 Preparation of Equipment Files.

3.6.1 A list of 125 new and old equipment has been prepared giving the details of the names of the equipment in alphabetical order, suppliers, methods of use and the specifications to be followed, descriptions of the apparatus and accessories, the supply order numbers etc. An individual file for each equipment has also been prepared containing the catalogue of the equipment together with other details.

3.6.2 A list of the damaged or defective equipment has also been prepared so that action can be taken to get these repaired or replaced by the suppliers (Annex. III).

3.6.3 For easy recognition and location of the equipment in the various laboratories of the Physical Testing Division, a guideline for the design of an Equipment Cordex System has been given to suit local conditions.

3.6.4 The details of the entire work are given an Annex. XI.

3.7 Seminar and/or Training Course on Materials Testing.

3.7.1 For the seminar and training course the following three lectures were specially prepared, and delivered to COSQC staff.

i) The Testing of Materials. (Two sessions)

ii) The Testing for Standardization and Quality Control of Paints.(Three sessions).

iii) Testing of paper and board.(Two sessions).

3.7.2 The copies of the lectures are attached separately.

3.7.3 The programme of the seminar and the training course is enclosed in Annex. XII.

3.8 List of Publications on Testing.

3.8.1 A selected Bibliography on testing of Textiles, Rubber, Plastics, Leather, Paper and Paints is given in Annex. XIII. This also lists selected references on Material Science and other related subjects.

3.8.2 The COSQC library has a good collection of various literature of interest to the physical testing laboratories. Further addition to the existing collection will enhance its utility to these laboratories.

3.9 Recommendations on the Procurement of Equipment.

3.9.1 The original plan was to visit various industries in the Public and Private sectors and examine their testing facilities for quality control and also to visit the main testing laboratories in Iraq to assess the gap in the demand and availability of testing facilities. This would have helped in arriving at an objective assessment and recommendations regarding procurement of additional equipment for the physical testing laboratories would have been more meaningful. Since the visits could not be arranged, recommendations have been made keeping in view the needs of a laboratory for the basic type of equipment which are to be frequently used.
This has been worked out in Annex. VII.

3.9.2 It will be noted that the textile laboratory does not need any equipment, the paint laboratory requires only one and the paper laboratory requires four additional equipment. Equipment for the plastic-rubber-leather group, some of which were already ordered, are listed in the Annexure.

3.10 Establishment of Criteria for Approval of Laboratories.

3.10.1 This subject has been discussed in detail in Annex XIV.

3.10.2 Calibration of test equipment, use of standard method for testing, the quality of laboratory personnel, the reliability, repeatability and reproducibility of test data are some of the important criteria which should be taken into a account to recognise a laboratory in the national testing system. ISO Draft Report on certification principles and practice includes the system for the recognition of the laboratories. Reference is also made to draft ISO Guide 24. A model proforma which can be conveniently used for this purpose has also been appended in Annex XIV B.

4. RECOMMENDATIONS

4.1 Testing and Inspection.

4.1.1 Although their functions overlap, it is desirable to distinguish between 'testing' as such, and 'inspection'. Testing refers to physical performance of operations (tests) to quantitatively measure or determine certain properties. Inspection on the other hand has to do with the observation of the processes and products of manufacture to ensure the presence of desired qualities. Inspection aims at the control of quality through the application of established criteria and involves the idea of rejection of substandard materials. In testing the aim is to determine the quality i.e. to discover facts regardless of the implication of results.

4.1.2 At present at COSQC the testing personnel are also engaged in the inspection of products which they test. This is an old practice inherited from the erstwhile D.R.I.C. organization. Apart from having no training to carry out inspection scientifically, the present system exposes the laboratory staff to an environment which may turn them biased and the implications of results are likely to affect their correct assessment ability.

4.1.3 It is, therefore, recommended that the laboratory staff should not be engaged in inspection and a separate cadre of inspectors should be created who should not be involved with testing.

4.1.4 In the Textile and the plastics, rubber & leather group of laboratories there are four and two inspectors respectively who do not have any laboratory duties, but they have been accommodated in the respective laboratories creating avodable overcrowding apart from the unlikely possibility of influencing test data. It is therefore recommended that the inspectors should be segregated from the laboratory personnel by providing them with alternative accommodation.

4.1.5 In the laboratories visitors form outside have free access. They come to deposit their samples for test or to inquire about the test results. This practice is detrimental to the interest of the Laboratory Work. It is recommended that visits of outsiders to the laboratory should be restricted and can only be permitted under very special circumstances.

4.2 Rearrangement of the Laboratories.

4.2.1 The paper laboratory which should have conditioning room, as conditioning of paper materials before testing is mandatory, does not have any such facilities at present whereas the paint Laboratory which normally does not require conditioning has been provided with such facilities.
It is therefore, recommended that the paper laboratory should be shifted to the rooms 21, 22, and 25, occupied by the paint laboratory which may be transformed to the rooms 42,43, and 44 in the first floor of the building just above the

existing paint laboratory, Food laboratory which is now in these rooms can move to the spacious room occupied by the paper laboratory (Room 68).

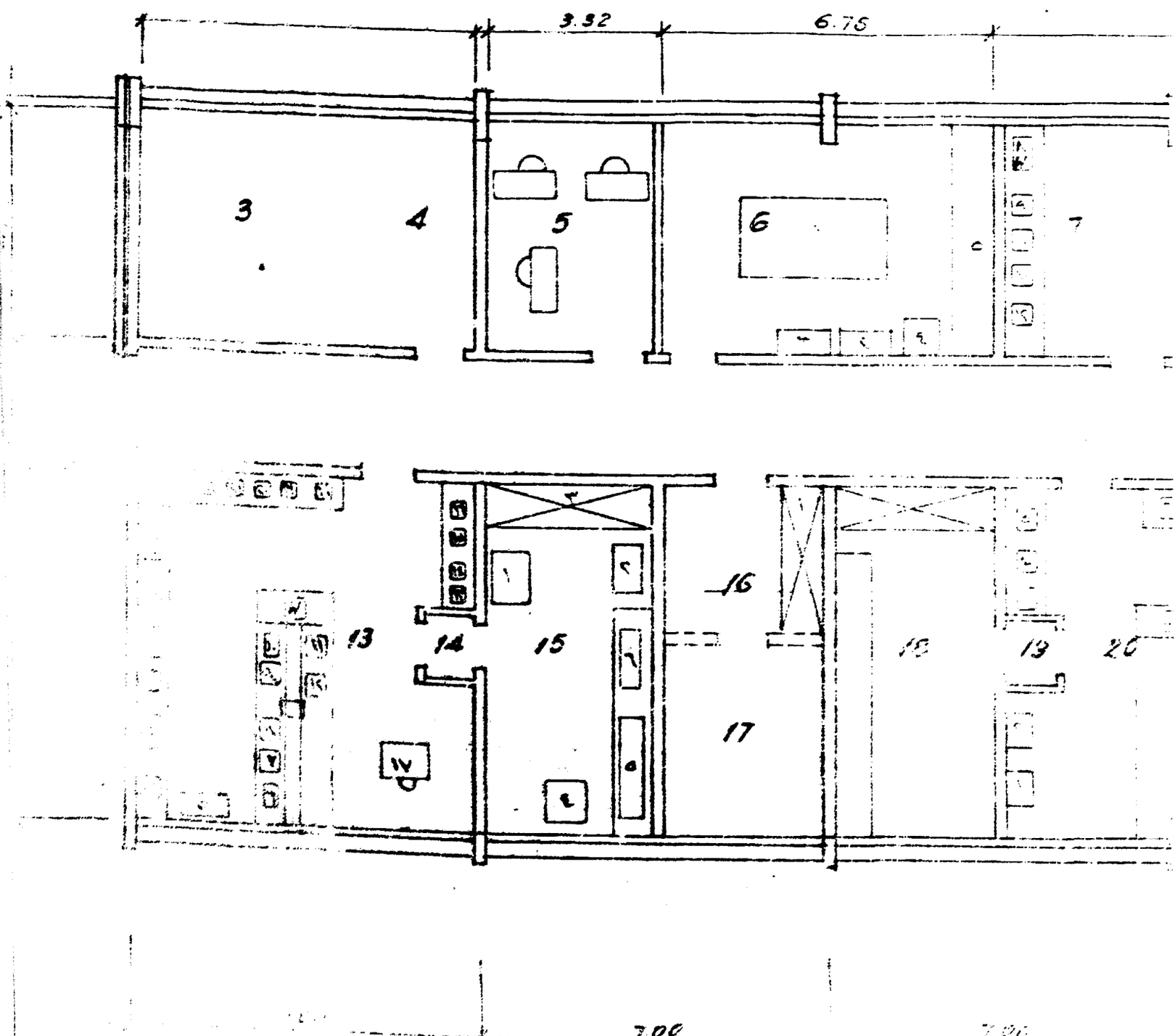
4.2.2 While installing the equipment in the various laboratories an acute limitation of space was experienced. It may be possible to ease the situation to a certain extent by providing additional accommodation by rationalizing the present system. Keeping this in view the following recommendations can be made:

4.2.3 Rooms 5 and 6 for the project Manager UNIDO for Strengthening of the Iraqi Organization for Standards may be released to the Laboratories and he should be provided with appropriate and adequate alternative accommodation elsewhere.

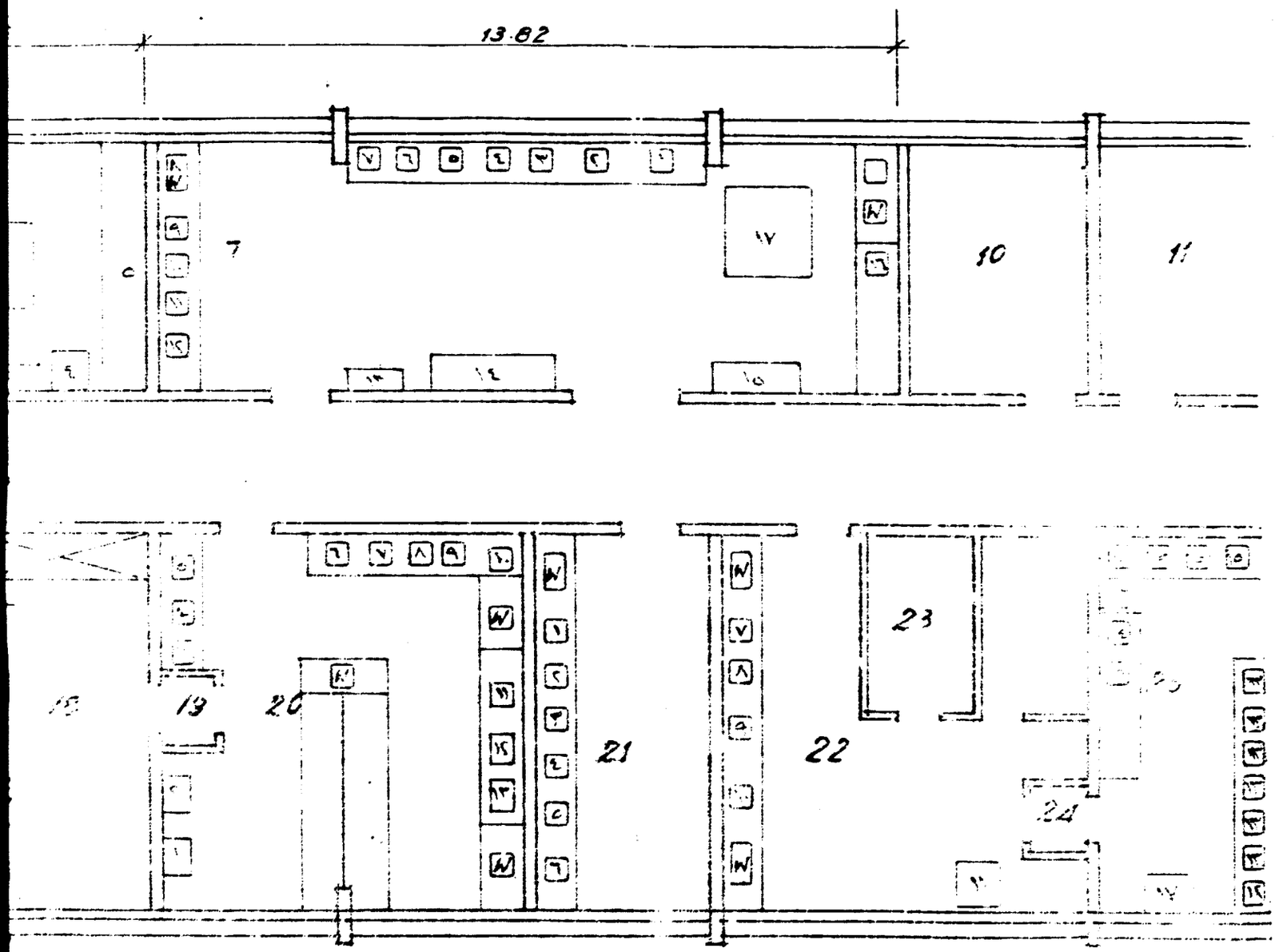
4.2.4 Room 6 may be added to the Textile Laboratory. Room 5 can be used by the senior staff members of the laboratories or preferably as a storage room for textile, rubber, plastic, leather, paper and paint samples by providing suitable racks till such time stores room for this purpose is constructed in the next phase of the building plan.

4.2.5 Room 7 housing the plastics, rubber leather and Weather-Ometer Laboratory should be partitioned to segregate the Weather-Ometer section from the rest of the Laboratory.

PHYSICAL TESTING DIVISION



SECTION 1



SECTION 2

4.2.6 Rooms 18 and 20 may be alloted to the plastics and rubber group for their proper growth.

4.2.7 The practice of chemical analysis in the physical laboratories should be discontinued for the protection of the sensitive test machines as well as to release the space for the installation of equipment.

4.3 Standard Atmospheric Conditions for Testing.

4.3.1 As the Standard atmospheric conditions for testing of materials are of prime importance and needed to be controlled to obtain comparable and reproducible results, the existing conditions of temperature-humidity of the laboratories were surveyed during October and November, 1979. Based on this survey and as per ISO standards of testing of Textiles, Rubber, Plastics, Leather and Paper, it is recommended that under the prevailing local conditions it will be appropriate to choose the Standard Atmospheric conditions of 27% with 65% relative humidity with proper tolerances for testing.

4.4 Conditioning rooms:

4.4.1 Though there are four conditioning rooms specially designed to have their independent air conditioning system to maintain any desired temperature and humidity, these rooms are rarely used for the purpose for which they are intended. It is recommended that the services of these rooms should be fully utilised for conditioning of test specimens before tests where such conditioning have been specified in the relevant standards.

4.4.2 Conditioning room 15 may be used for housing sensitive textile testing equipment, room 16 for conditioning of textile specimens, room 18 for plastic, rubber, leather group and room 25 for paper conditioning. It is also considered essential to install recorders to provide permanent record of humidities and temperatures prevailing throughout the conditioning and testing period in both conditioning rooms and test laboratories.

4.5 Equipment.

4.5.1 Balance room

4.5.1.1 There are several sensitive and expensive balances scattered in the physical testing laboratories. In order to properly maintain, use and above all, to avoid unnecessary duplication, all the balances of this division may be centrally located in a room free from dust and draft.

It is recommended that any of the 4 conditioning rooms may be used.

4.5.2 Repair and maintenance of equipment.

4.5.2.1 At present about 25% of the equipment are not in the proper working order due to mechanical or electrical faults. These faults are not of major nature in many cases, probably a simple repair may rectify the defect and bring the machine into commission. Some of the expensive equipment like Weather-Ometer requires continuous attention in maintenance. It is therefore recommended that a post of a qualified Instrumental Machanic should be created to attend to the repair, maintenance and servicing of the testing machines of the physical testing laboratories.

4.5.2.2. Spare Parts. Many useful test machines have been kept idle for want of minor and consumable spare parts which were not ordered with the equipment. It is recommended that a list of spare parts for such equipment should be prepared immediately and the spare parts procured from the suppliers of the equipment.

4.5.2.3 Cardex System. An equipment cardex system has been proposed for the 125 equipment of the Physical Testing Division for easy identification and location of the equipment. This has the advantage that repair, maintenance and obtaining spare parts of the equipment will be much quicker. To implement the

system, an identifying number is to be stuck to each machine and two sets of cards, one numerical and the other alphabetical, have to be prepared. Due to limited time, the system could not be worked but complete guideline has been indicated. It is recommended that the equipment cardex system should be implemented not only for the Physical Testing Division but also for the other laboratories of COSQC as well.

4.5.2.4 Calibration. For reliability of test results, periodic calibration and checking of the test machines are of extreme importance. It is recommended that a calibration cell in the Metrology division should be created for this purpose.

4.5.2.5. In all the laboratories most of the equipment procured will not be fully utilised unless elaborate material specifications setting up the requirements of qualities of products are formulated in the National Standards. It is therefore recommended that this should be considered by the appropriate authorities to utilise the services of the standard laboratories.

4.6 Laboratory Personnel

4.6.1 Training. Most of the laboratory personnel are graduates of chemistry, physics or chemical engineering. Most of them have no background of the technology with which they are involved. They, however, had the benifit of the on-the-job training

which is far from satisfactory. For this it is recommended that the counterparts who have been given a little insight into the principles and practices of testing into the field of their involvement during the short association of the expert with them, should have further training in the recognised test houses abroad.

4.6.2 Supervisory Staff. An incompetent and unqualified supervisor may completely ruin a test laboratory. The supervisor should be a person with adequate knowledge and working experience of the discipline of the particular laboratory and familiar with the methodology of a test laboratory. He should be able to train, guide and maintain very close staff supervision with a high degree of participation in the actual testing work and in the assessment of samples from the test results.
It is therefore recommended that the laboratory Supervisor should be carefully selected for a particular laboratory having the requisite qualifications, experience, and aptitude for the subject and other desirable qualities.

4.7 Laboratory Methodology. The present practice followed in the test laboratories has been objectively assessed and it is noted that there is much scope for improvement. In Annex IX, item 1.4, the methodology to be followed by a test laboratory has been discussed in great detail. It is recommended that the practices indicated may be adopted as far as practicable.

4.8 Research and Development in Testing

Research and Development in the field of testing and evaluation is an integral aspect which may go along very well with the functions of the Physical Testing Division. Beside offering testing facilities in several areas consistent with the growing demand of industry, the division should be able to conduct useful researchs in materials and processes and carry out extensive investigations in the development of test methods. In drawing up national standards it should be considered as the highest testing authority in developing methods of tests before they are finally embodied in national standards. It is recommended that with the instrumental and other facilities available, such R&D work should be initiated early. Some of the useful projects may be as follows:

4.8.1 Correlation studies of the durability of paint systems out-door and in the weather-meter (artificial accelerated ageing).

4.8.2 Studies on the service performance of the Road Marking Paints VS. their performance in the laboratory abrasion tester (Taber, Frank). This will permit incorporation of performance requirements in the Material Specification of Road Marking Paints which can be assessed in the laboratory.

4.8.3 Studies on the evaluation of the locally made carpets using Dynamic Loading Machine (WIRA) and in actual use in hotels, lobbies, office rooms or staircases.

ACKNOWLEDGEMENTS

The expert expresses his grateful thanks to the COSQC Authorities who extended all facilities in carrying out the work of his assignment.

The expert is indebted to Dr. Sameera Al-Khayat, his chief counterpart and at present Actg. Director General of the Standards Division of COSQC who rendered valuable assistance in planning the work, commissioning the test machines in the textile Laboratory and by constant cooperation. He is thankful to all his counterparts and especially to Mrs. Firdous Faik-Dawood, for their excellent collaboration and keen interest throughout this mission.

He records his deep sense of gratitude to Dr. Ahmad Geniedy, Project Manager for his constant guidance and warm support during the entire course of the work.

His special thanks are due to Miss salam B. Jirjis who carried out the onerous task of typing this report from the difficult handwritten manuscript of the expert.

Annex I

UNITED NATIONS

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

U N I D O

Request From the Government of Iraq

JOB DESCRIPTION

TF/IRQ/77/003/11-03/P/31.3.A

Post title	Expert in Material Testing
Duration	Six months
Date required	January 1979
Duty station	Baghdad

DUTIES

The expert will be member of a team of internationally recruited staff attached to the Iraqi Organization for Standards (IOS). Under the supervision of the Chief Technical Adviser and in close cooperation with IOS, the expert will be specifically expected to:

1. Supervise the installation of the testing equipment for paints, paper and board, leather, plastics and rubber and textiles.
2. Train counterpart personnel on the testing of the above materials according to national and international standards.
3. Assist in the organization and operation of the Materials Testing Division of IOS Laboratories.

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

QUALIFICATIONS

University degree or equivalent in engineering or science with extensive experience in material testing.

LANGUAGE

English, Arabic an asset.

BACKGROUND INFORMATION

During the past two decades, the national economy witnessed an impressive growth as a result of the implementation of ambitions development plands. In laying down and executing these plans, the importance of standardization as an efficient tool, for development was not overlooked. Thus, in 1963, the Law No. 15 was issued establishing the Iraqi Organization for Standards (IOS) as the only competent national authority in all matters pertaining to standardization and metrology.

In carrying out its functions, the IOS felt the persistent need to develop and consolidate its activities in the various relevant fields, namely: specifications, certification, testing, quality control and metrology. For this purpose a large-scale project ($ 8.000.000) was included in the current 5-year plan and in order to assist the Government in its execution, international expertise is requested.

The Project "Strengthening of the Iraq Organization for Standards" includes the setting up of standards laboratories for materials and goods testing as well as for legal and industrial metrology. The Materials Testing Division includes laboratories for testing paints, paper, plastics and rubber, leather and textiles. Laboratory premises and utilities have already been established, and testing instruments and equipment have been ordered.

Annex II

PARTICULARS OF THE COUNTERPARTS

The COSQC adminstration nominated six staff members to act as counterparts to the Expert. One of them was the chief counterpart. They were to be trained in the operation of the Physical Testing Labs dealing with Textiles, leather, Plastics & Rubber, Paper & Board and Paint. Their brief particulars are as follows :

1. Dr. Sameera Mahmood Hussain Al-Khyat - The Chief Counterpart:

   B.Sc. in Chemistry (1962) from the College of Science, Baghdad University ; Ph.D. in Fibre Science (Text.Chem.) (1968), Strathelyde University, Glasgow , U.K.

   Teaching experience of 12 Years in General and Textile Chemistry at High School and University levels. Was Head of the Quality Control Dept. of the Textile Woolen Company , Iraq for more than one year. Now Acting Director General of the Standards Division of COSQC.

2. Mr. Sabah Tahar Salah- Paint:

   B.Sc. in Chemistry (1972) from the College of Science, Sullaymania University .
   Worked as a Chemist in the Paint testing laboratory of DRIC from 1972 - 79 .

3. Mrs. Firdous Faiq-Dawood Plastics, Rubber and Leather:

   B.Sc. in Chemistry (1970) from the College of Science, Baghdad University ; Chemist , Quality Control Dept. at Vegetable oil Company (1970 - 71) ; Chemist, Plastics, Rubber, leather lab,DRIC (1972 - 79) .

4. Ms. Sharifa Yiha Ali-Plastics,Rubber and Leather:

   B.Sc. in Chemistry (1970) from the College of Science, Baghdad University , Chemist at DRIC (1971 - 79) .

5. Mrs. Ahlam Abdulla Kubba - Paper :

   B.Sc. in Chemical Engineering (1976),College of Engineering , Baghdad University ; Engineer in Paper & Detergent Lab,DRIC (1977-79) .

6. Mr. Esmail Kadoori Majid - Textile :

B.Sc. in Chemistry (1973) , College of Science , Baghdad University;
Military Service (1974 - 76) .
Inspector (Chemist) at Textile Laboratory , DRIC (1976 - 79) .

Annex III

LIST OF DAMAGED EQUIPMENT, EQUIPMENT WITH MISSING ACCESSORIES & ACCESSORIES IMMEDIATELY REQUIRED

A. Textile Laboratory

Sr.No. (1)	Name of Equip't (2)	Supplier (3)	Nature of Defects (4)
1	Auto-Sampler	Tex Test, SWITZERLAND.	Catalogue missing
2	Bursting Strength Tester.	James Heal Co.	Completely damaged when received.
3	Cutter for Circular Samples.	Karl Schroder KG	One of the cutter has broken base.
4	Carpet thickness tester.	Tex Test.	Catalogue missing.
5	Dynamic Loading Machine.	W.I.R.A.	The thickness measuring equip't Essidiel gauge is to be ordered.
6	Healographh Univer-Strength Tester	James Heal Co.	The electronic recorder does not work.

(1)	(2)	(3)	(4)
7	Impermeability Tester	Hans Baerag, Zurich	Catalogue missing.
8	Fibre length machine		Catalogue missing.
9	Micronaire-compact	Tex Test	Does not work.
10	Motor driven measuring Reel.	Tex Test	Damaged Clutch.
11	Tearing Tester System Elmendorf (4).	Tex Test	Three of the testers are not in working order due to various mechanical faults.

B. Leather, Rubber & Plastics Laboratory

1	Ball drop Apparatus.	CEAST-ITALY	Dart Support missing
2	Bally Tensometer	Bally Fabriken A.G.	Vital Spare Parts, e.g. Rubber Membrane immediately required.
3	Air Vacuum Oven, Model 5851	National Appliance Co. U.S.A.	The Vacuum Generator was not supplied.

(1)	(2)	(3)	(4)
4	Taber Abrasion Tester No. 506	MFG Co. Ltd. Japan.	Parts like wear wheels and weight holders immediately required.
5	Frank Abrasion Resistance Tester No. 11690.	Karl-Frank GmbH	Compressed air supply device defective.
6	Universal Testing Machine-ZWICK 1454 with Recorder Series 1100	Zwick GmbH Ulm, W. Germany.	The following spares are immediately required. 1.Tensile Specimen grips -2. 2.Compression grips. 3.Bending Test grips. 4.Extensometer -1 5.Load Cells-10 KN & 1KN 6.Allen Keys of Assorted sizes (8). 7.Rolls of chart paper for Recorder (10). 8.Adaptors for tensile and bend testing (2T + 1B)

(1)	(2)	(3)	(4)
			9. Compression device-4205 03 -- (1)
			10. Transverse Reinforcement for load cells.
			11. Compression Calibration Standards (1400. 14.402-2)
			12. Recording Pens & ink etc.
C.	Paper Laboratory:		
1	Bursting Tester	Adamel Lhomargy, France.	Received damaged with broken shaft.
D.	Paint Laboratory		
1	ICI Drying Time Recorder 602	Sheen Instru- ltd. U.K.	Standard Sand and Catalogue required- not Supplied with the equip't
2	ICI Paint film Spinner 1110	"	Panels were not supplied.

(1)	(2)	(3)	(4)
3	Oven IBW (25°-200°)	M.J.W., W. Germany.	Thermometer was received broken.
4	Pendulum Hardness Tester	Erichsen GmbH, W.Germany	No. glass test plate and Holder.
5	Roto Thinner & Gel Strength Tester	Sheen Instruments Ltd., U.K.	Special Cans for holding test samples have not been received.
6	Salt Spray Cabinet-1001	"	Glass cover & baffle plate were not supplied.

Annex IV.

FORM FOR REPORTING LABORATORY EXPERIMENTS

1. Experiment Number.
2. Description or Heading of the Experiment.
3. Date.
4. Specification followed.
5. Theory.
6. Apparatus.
7. Procedure.
8. Results.
9. Remarks or conclusion, if any.
10. Summary of the work done.

Unit. V.

LABORATORY EXPERIMENTS

I. Textile Laboratory.

Expt. 1 To determine the fiber diameter of wool by projection microscope.
Spec. ISO 137-1975.

Expt. 2 To determine the length of textile fiber by measuring individual fibres.
Spec. ISO 270-1975.

Expt. 3 To determine the dimensional change in woven fabrics subjected to laundering near the boiling point.
Spec. ISO R 675-1968.

Expt. 4 To measure the resistance of fabric to penetration by water by Hydrostatic load test.
Spec. ISO R 811-1968

Expt. 5 To determine fibre length of wool by using a comb sorter (barbe & hauteur)
Spec. ISO 920-1976.

Expt. 6 To determine the mean diameter of wool fibres by Air permeability method.
Spec. ISO 1136-1976.

Expt. 7 To determine the number of tufts and/or loops per unit length and per unit area of carpets.
Spec. ISO 1763-1973.

Expt. 8 To determine the thickness of pile above the carpets.
Spec. ISO 1766-1973.

Expt. 9 To determine the recovery from creasing of a horizontally folded specimen of textile fabrics by measuring the angle of recovery.
Spec. ISO 2313-1972.

Expt. 10 To determine the micronaire value of cotton fibres
Spec. ISO 2403-1972

Expt. 11 To determine the tuft withdrawal force of carpets
Spec. ISO 4919-1978.

Expt. 12 To determine the breaking strength and elongation of woven fabrics.
Spec. ISO 5081-1971.

Expt. 13 To determine the number of twist on a given length of thread and yarn of twine.
Spec. ISO 2061-1972.

Expt. 14 To determine the resistance of fabrics to abrasion (pill formation).
Spec. ASTM D1375 - 59T.

Expt. 15 To measure the length of yarn removed from woven cloth under known tension.
Spec. BS 2863-1975 & 2865-1975.

Expt. 16 To determine the irregularity of linear density of slivers rovings and yarns by electronic evenness tester.
Spec. ISO 2649-1974.

Expt. 17 To determine the stiffness of cloth.
Spec. BS 3356-1961.

Expt. 18 To determine the dimensional change in fabrics induced by free steam.
Spec. ISO 3005-1978.

Expt. 19 To determine the thickness loss of carpet under dynamic loading.
Spec. ISO 2094-1973.

Expt. 20 To determine the mass as well as the linear density (tex, Nm) of yarn.
Spec. ISO 2060-1972.

Expt. 21 To determine the fibre length of wool using a single fibre-length measuring-machine.
Spec. ISO 1822-1973.

II. Leather Laboratory.

Expt. 1 To measure the thickness of leather units.
Spec. ISO 2589-1972.

Expt. 2 To measure the apparent density of a leather sample.
Spec. ISO 2420-1972.

Expt. 3 To determine the Tensile Strength, and Elongation at Break of a leather sample.
Spec. ISO 3376-1976.

Expt. 4 To determine the tear strength of any type of leather.
Spec. ISO 3377-1975.

Expt. 5 To determine the tongue tear strength of leather method SATRA: PM 30.

Expt. 6 To measure the sole adhesion of shoes.

Expt. 7 To measure the resistance of leather to abrasion.

Expt. 8 To assess the resistance to cracking of grain of the leather and the determination of crack index.
Spec. ISO 3378-1976.

Expt. 9 To measure the percentage area extension and the percentage radial extension, at first crack of finish, at first crack of grain and at burst of the leather.
Spec. IUP/13.

Expt. 10 To determine the dynamic water-proofness of [illegible] and shoe sole leather.
Spec. IUP/11.

Expt. 11 To assess the flexing endurance as well as the surface finishes of light leathers.
Spec. IUP/20.

Expt. 12 To determine the degree of water proofness of boot or shoe upper leather under dynamic conditions simulating the conditions of wear.
Spec. IUP/10.

Expt. 13 To determine the distension and strength of grain of leather by Ball burst test.
Spec. ISO 3379-1976.

Expt. 14 To determine the pH of leather extract.
Spec. ISO 4045-1977.

III. Paper Laboratory.

Expt. 1 To determine the grammage of paper or board.
Spec. ISO 536-1976.

Expt. 2 To determine the thickness of single sheet of paper.
Spec. ISO R 534-1967.

Expt. 3 To determine the tearing resistance of paper.
Spec. ISO 1974-1974.

Expt. 4 To determine the roughness of paper and board by constant pressure air-flow method.
Spec. ISO 2494-1974

Expt. 5 To determine the water absorption of paper by Cobb method.
Spec. ISO 535-1976.

Expt. 6 To determine the water vapour transmission rate through paper by Dish method.
Spec. ISO 2528-1974.

Expt. 7 To determine the puncture resistance of board.
Spec. ISO 3036-1975.

Expt. 8 To determine the folding endurance of paper.
Spec. ISO 5626-1978.

Expt. 9 To determine the bursting strength of paper.
Spec. ISO 2758-1974.

Expt. 10 To determine the pH of water extract from paper.

IV. Paint Laboratory.

Expt. 1 To examine and prepare samples for testing of paints/varnishes.
Spec. ISO 1513-1973.

Expt. 2 To determine volatile and non-volatile matter in paints or varnishes.
Spec. ISO 1515-1973.

Expt. 3 To determine surface-drying time for paint by Ballotine method.
Spec. ISO 1517-1973.

Expt. 4 To determine the scratch resistance properties of a paint film.
Spec. ISO 1518-1973.

Expt. 5 To conduct Bend test (cylindrical mandrel) on paint film.
Spec. ISO 1519-1973.

Expt. 6 To conduct cupping test on a painted surface.
Spec. ISO 1520-1973.

Expt. 7 To determine the resistance to water of paints or varnishes.

Expt. 8 To conduct pendulum damping test on a painted surface
Spec. ISO 1522-1973.

Expt. 9 To determine the flash-point of paint vehicle by closed cup method.
Spec. ISO 1523-1973.

Expt. 10 To determine the fineness of grind of paint composition.
Spec. ISO 1524-1973.

Expt. 11 To conduct cross-cut test on paint film.
Spec. ISO 2409-1972.

Expt. 12 To determine the thickness of paint film.
Spec. ISO 2808-1974

Expt. 13 To determine the density of paints and varnishes.
Spec. ISO 2811-1974.

Expt. 14 To determine the specular gloss of non-metallic paint film at 20 degrees, 60 degrees of 85 degrees.
Spec. ISO 2813-1978.

Expt. 15 To determine the contrast ratio (Hiding power) of the paints of the same type of colour.
Spec. ISO 2814-1973.

Expt. 16 To determine the viscosity of paint at high rate of shear.
Spec. ISO 2884-1974.

Expt. 17 To conduct pull-off test for adhesion of paint.
Spec. ISO 4624-1978.

Annex VI

ATMOSPHERIC CONDITIONS FOR TESTING

1. Necessity For Standard Atmospheric Conditions for Tests .

1.1. The properties of materials and behaviour of equipment under test are influenced by atmospheric conditions , such as temperature, relative humidity and atmospheric pressure at the time of test. For comparision of test results oltained by different test laboratories, it becomes necessary to specify standard atmospheric conditions and conditioning procedures, under which the test should be carried out or at which the specimen should be conditioned before test.

1.2. The principal considerations that would justify the adoption of a set conditions may be enumerated as follows :

a) Temperature and humidity conditions specified should suit a majority of tests requiring standard atmospheric conditions.

b) Equipment required to maintain the standard conditions should be economical to instal and maintain .

c) The standard conditions should be within the comfort zones of workers.

1.3. Although the necessity for having an internationally agreed set of standard atmospheric conditions for test is realised, the wide divergence of the atmospheric conditions in the temperate and tropical or sub-tropical regions indicates that the same test conditions many not be suitable for all the zones , this aspect was examined in great detail by the several technical committees of ISO and IEC , and the co-ordinating committee on Atmospheric conditions for testing (ATCO) of ISO in collaboration with IEC , has recommended the following three sets of standard atmospheric conditions from which the individual countries could choose whatever is most suitable for them :

a) 20 °C with 65 % relative humidity (R.H.)
b) 23 °C with 50 % relative humidity (R.H.)
c) 27 °C with 65 % relative humidity (R.H.)

1.4. The atmosphere (C) above is intended for tropical and sub-tropical zones .

2. Conditions in Iraq .

2.1. Baghdad is in the tropical zone and though during the two winter months of December and January the atmospheric conditions tend to be closer to (a) or (b) , during the significant part of the year high temperature and low humidity conditions prevail. The day time temperature during Summer months (April to September)may be as high as 50 - 52 °C in the shade during mid-day with relative humidity less than 40%.

2.2. As the standard atmospheric conditions for testing of materials , products , equipment etc. are of prime importance and needed to be controlled to obtain comparable and reproducible results, the existing conditions of the standards laboratories of COSQC were surveyed every day during October and November , 1979. Though it had been the endeavour to keep the temperature close to 20°C by stringent air-conditioning , it was not possible to control the relative humidity as was revealed by the survey . It was observed that the relative humidity varied from laboratory to laboratory and day to day and the variations ranged from less than 40% to more than 70% .

2.3. The survey was carried out in about 20 laboratories including the conditioning rooms . It showed that the present air-conditioning system could maintain a temperature range of 22 °C to 25 °C in most of the working days in most of the laboratories but the relative humidities varied between 45% to 70% .

However, by analysing the variations it was noted that in the four conditioning rooms of Textile , Plastics , and Paints , and the Laboratories there were , in an average , more working days which had relative humidities maintained close to 60 - 65 % . The same was also true for the laboratories . (Ref . Diagram .2.) .

2.4. Based on this study though restricted to a limited period ,it will appear that due to prevailing local conditions it will be appropriate to choose the standard atmosheric conditions of 27 °C with 65 percent relative humidity with proper tolerances for testing laboratories in Iraq.

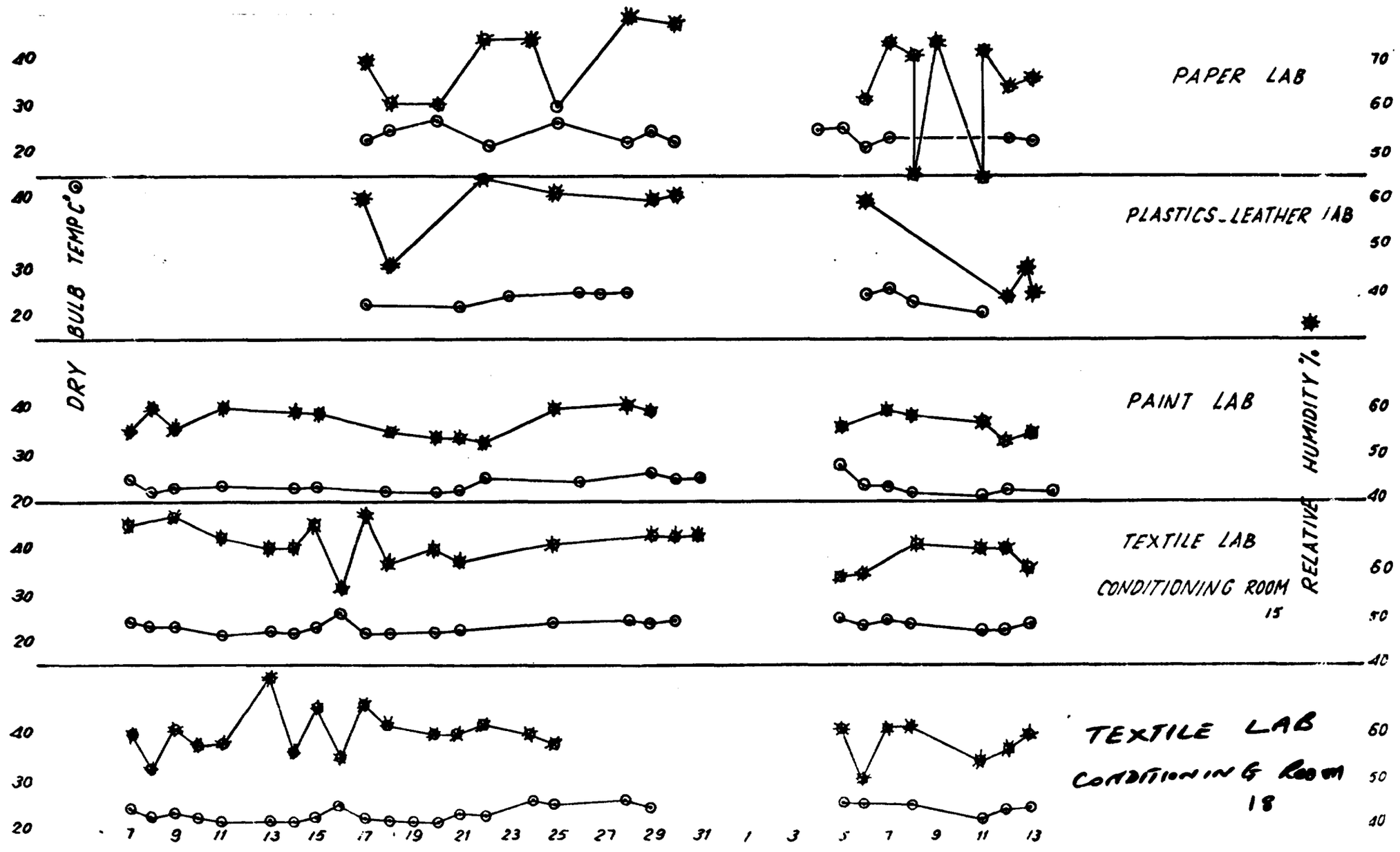


DIAGRAM 2. STUDY OF THE AIR-CONDITIONING IN THE PHYSICAL TESTING DIVISION FROM [illegible] 1928

2.5. In most industrial testing , it is seldom necessary to control the atmosperic pressure as is done in the case of temperature and humidity . Tests are usually carried out at the prevailing atmospheric pressure and therefore this criteria for the atmosphere has not been investigated .

3. Primary International Temperature

3.1. It may be pointed out that for many purposes the adoption of primary international temperature, namely , 20 °C would have great advantage on the grounds of international comparability , for example, measurements of basic standards of weights and measures , physical constants and precision measurements in terms of the basic standards as well as in such tests as calibration of tools , gauges etc. It is desirable that in such cases as well as in other cases where international comparability is of prime importance, the primary international temperature should be adopted both for actually carrying out the test at the prevailing atmospheric conditions .

4. Standard Conditions

4.1. On the basis of the above and actual study carried out it may be suggested as follows :

The Standard test atmosphere shall be :

Temperature	27 °C
Relative humidity	65 percent
Air pressure	1013 mbar (760 mm Hg)

This atmosphere should be used for conditioning a sample before test as well as for actually carrying out the test .

4.2. Tolerances on standard test atmosphere

There shall be two clases of tolerances , normal and close. The normal tolerance shall be ± 2 °C on the temperature and ± 5 percent on the relative humidity and the close tolerance shall be ± 1 °C on the temperature and ± 2 percent on the relative humidity at any point in the test or conditioning .

4.3. Range of Ambient Atmosheric Conditions for Testing

Wherever the parameters to be measured are not materially affected within a range of temperature and relative humidity it may not be necessary to carry out the measurements at the standard test atmosphere . In such cases the test may be carried out within the following range :

Temperature 15° to 40°C
Relative humidity 35 to 75 percent

5. Reference to ISO recommended conditions for Textiles , Rubber, Plastics , Leather and Paper and Paints .

5.1. Textles .

ISO 139 - 1973 - Standard atmospheres for conditioning and testing Textiles defines the characteristics and use of standard atmospheres for conditioning and for determining the Physical and mechanical properties of textiles and has two sets of conditions:standard temperate atmosphere for testing - temperature 20± 2°C and a relative humidity of 65± 2 % .

Standard tropical atmosphere for testing - temperature 27± 2% and relative humidity of 65 ± 2 %

Conditioning : It should be conditioned at the standard temperate atmoshere for testing in tropical or subtropical countries , the standard tropical atmosphere for testing may be used.

5.2. Rubber

ISO 471 - 1977 Standard temperatures , humidities and time for conditioning and testing of test pieces of Rubber stipulates that the standard temperature and humidity shall be chosen from the following :

23° ± 2°C and 50 ± 5 % relative humidity

27° ± 2°C and 65 ± 5 % relative humidity

If a closer tolerance is required the temperature should be within ± 1°C and relative humidity ± 2% .

Conditioning : The standard time for conditioning shall be a period of not less tan 16 h immediately before testing .

5.3. Plastics

ISO 291-1977 - Standard atmosphere for conditioning and testing of Platics specifies as follows :

Atmosphere 23/50 , temperature 23°C and relative humidity 50% - recommended atmosphere .

Atmosphere 27/ 65 temperature 27°C and relative humidity 65% - for tropical countries .

Conditioning : The period & conditioning shall be stated in the relevant specification for the materials .

5.4. Leather :

ISO 2419 - 1972 - Conditioning of test pieces for physical tests of Leather states 20 ± 2 °C and relative humidity of 65 ± 2% should be used for conditioning each piece for physical testing and for a period of 48 h .

In some countries where it is difficult to obtain the above conditions , the test piece may be conditioned in one of the alternative atmospheres defined in ISO / R 554 , Standard atmosphere for conditioning and/or testing - Standard reference atmosphere - specification i.e. 27 ± 2 °C and 65 ± 2% relative humidity or 23 ± 2 °C and 50 ± 2% relative humidity .

5.5. Paper and Board

ISO 187 - 1977 for conditioning of samples of paper and board specifies as follows:

Preferred atmoshere : temperature 23 ± 1°C and relative humidity 50 ± 2% .

For tropical countries : temperature 27 ± 1°C and relative humidity 65 ± 2% .

Unless otherwise stated in the relevant specification or test method , preferred atmosphere eg. 23 ± 1°C and 50 ±2% relative humidity.

5.6 . Paints.

The standard atmospheric conditions for testing have been specified in each individual ISO stamdard whereever necessary as 23 ± 2 °C and 50 ± 5% relative humidity , unless otherwise specified .

Annex. VII

INSTALLATION OF EQUIPMENT IN THE LABORATORIES

1. Textile Laboratory

1.1. Most of the activities of this laboratory are carried out in Room 13 and 15. Room 15 is a conditioning room and therefore it is of great advantage to the textile laboratory to conduct all tests for textiles according to ISO Standard Methods of Test for textiles where conditioning of samples prior to test is mandatory .

1.2. At present there are 18 Scientific Staff including 4 Inspectors in this laboratory . 43 equipment have been acquired some of which are old and were received from the erstwhile DRIC laboratory when this Directorate merged with IOS.

1.3. Either in terms of man-power or in terms of the number of equipment , the available area of about 70 m^2 is extremely inadequate for this laboratory . As a result , many of the equipment after operation and completion of the training of the Scientific Staff in their use had to be stored in the conditioning room 15.

1.4. The following equipment have been installed or just stored in the conditioning room (Reference - Diagram of the Physical Testing Division)

Working Benches : 5-7 .

1/ Healograph with Recorder .
2/ Bursting Tester.
3/ Projectina Microscope with accessories .
4/ Cotton Fineness Meter.
5/ Fineness Meter for Wool.
6/ Uster Evenness Tester.
7/ Shirley Comb Sorter.
8/ Abrasion Tester.
9/ Auto-Sampler (Electronic fibre length tester).
10/ Universal Tensile Tester (wall type).
11/ Mettler Balance .

Rack:

12/Pilling Tester
13/Yarn Inspection Winder.
14/Twist Tester.
15/ Shirley Crimp Tester.

1.5. The following equipment have been placed in the main laboratory (Room 13)
Working Benches:

1 - 4 WIRA Steaming Cylinder , WIRA Dynamic Loading Machine,Fibre Length Machine , Carpet Thickness Gauge , Shirley Stiffness Tester (2) , Shirley Crease Recovery Tester (2), Spray Tester.

5- Launder - O -Meter .
6-8 Labor Mixer , Mirconaire , Abrasion tester .

13-16 Elmendorf Tearing System (4) , Crockmeter (2) .
Motor Driven Measuring Reel .

1.6. The following equipment have been kept in Room 20:

Scourtester Oven , Yarn Winder, Fabric Permeability Tester.

2. Rubber , Plastics and Leather Laboratory:

2.1. The main activities of these group of laboratories are confined to Room 7. On the right-hand end of the room a Weather-O-Meter apparatus for conducting accelerated ageing tests on paints , plastics and textiles was installed from the beginning . This has reduced the available area of this laboratory by 25% and introduced other disturbing factors Viz ., overcrowding , noise etc.

2.2. In the present set up , the available space has been overutilized as there was no alternative but to install the equipment in this laboratory. Most of the new equipment received were for the physical testing of leather and the available bench tops have been used for their installation. The following leather testing equipment have been set up on benches 1 - 7 and 8-12 .

Working Benches:

1 - 7: Dial Micrometer , Bally Tensometer , Densimeter, Zwick Hardness Tester 3104 , Bally Penetrometer, Bally Stiffnessmeter, Bally Flexometer (SATRA) , Bally Mini-Flexometer, Sole Adhesion Tester,.

8 -12: ZWICK Punch for sample operation, Oven , Bally permemoter , Zwick Hardness Tester 7206 , Muffle furnace .

A vaccant area between table 7 and 8 has been utilised for the installation of the hydraulic press with heating arrangement for vulcanization of rubber.

The space (13 and 14) has been utilized for the installation of Zwick Universal Testing Machine together with its recording system.

2.3. Some more essential equipment are still to be procured for this laboratory and the problem of space has to be solved by providing additional accommodation to this laboratory .

2.3.1. These equipment are listed below:

1/ Kubelka Apparatus for Water Absorption.
2/ Steel Press Knife to cut leather samples for tensile strength with shape and dimension complying to ISO/3317-1977
3/ Steel Press Knife for cutting leather sample for water absorption by Kubelka method .
4/ Steel Press Knife to cut leather samples for Tearing Load testing .
5/ Impact Scuff Tester.
6/ Rub Resistance Tester .
7/ Viewing Box to assess visible damage in leather, complete with Scale etc. (IUP/22) .

2.4. Room 18 and 20 , it is understood, will be in future allotted to the Plastic and Rubber laboratory. It will ease the present situation to a considerable extent. More equipment are expected to be received in the near future which will make these two laboratories fully functional.

At present the two laboratories lack some important equipment. These are :

1/ Gas Permeability Tester.
2/ Rubber Fatigue /Flex testing machine.
3/ Pendulum Impact Tester.
4/ Melt Index Tester.
5/ Shearing Disc Viscometer.
6/ Brittleness Temperature Testing Machine .
7/ Plastometer .
8/ Deflection Temperature and Vicat Softening Temperature Testing Machine.

9. Accelerated Ageing Oven for Rubber, PVC.
10. Water Vapour Permeability Tester.
11. Equipment for Measuring the Electrical properties of insulating materials.
12. Drop Impact Resistance testing machine .
13. Gel Tester for polymers .
14. Flammability and Burning Rate Tester.
15. Incandescence Resistance Tester for rigid self extinguishing thermosetting plastics .
16. Extruder for blow film (laboratory size).

2.5. Room 18 and 20 should be able to accommodate all the equipment. Room 18 is a a conditioning room and is essential for these group of laboratories .

3. Paper Laboratory

3.1. Paper laboratory has been set up in Room 68 in the first floor of the building which is far away from the other physical group of laboratories . This is a spacious room (about 75 m^2) and can provide accommodation for many more equipment . Unfortunately there is no conditioning room in the first floor and conditioning of paper prior to testing is mandatory in all standards. Therefore, if the laboratory has to function in this room , provision of a conditioning chamber has to be made in this room or the laboratory has to shifted to the ground floor in the Physical Testing Division where there are four conditioning rooms .

3.2. The following equipment have been installed in this laboratory:
1/ Gurley-Cobb Paper Sizing Tester .
2/ Cobb Absorbency Tester.
3/ Smoothness and porosity Tester.
4/ Folding Endurance Tester.
5/ Water Vapour Permeability Tester .
6/ Universal Quadrant Scale 20 - 1000 g/m^2
7/ Paper Quadrant Scale 10 -250 g/m^2
8/ Tearing Strength Tester.
9/ Paper Cutters.
10/ Punch Tester.
11/ Precision Dial Micrometer.

3.3. A Bursting Strength Tester was received in a broken condition. Since this is a useful apparatus , early action should be initiated for its replacement by the Manufacturer (Adamel Lhomargy) .

3.4. The following additional equipment will be required by this laboratory :

1/ Crush Tester to determine Flat Crush Resistance of corrugated fibre board to ISO 3035-1973.

2/ Infrared Moisture Tester.

3/ Opacity and Brightness Tester to ISO 2469 , 2470 , and 2471 - 1977 .

4/ Stiffness Tester to ISO 2493 - 1973 .

4. Paint laboratory :

4.1. Paint laboratory occupies Rooms 21 , 22 and 25 of which the last one is the conditioning room. The plant for conditioning have not been fully assembled yet .

4.2. The laboratory supervisor sits in Room 22 ; Several equipment and an oven have been kept in this room.

4.3. Room 24 which was originally planned as a conditioining room, houses most of the newly acquired equipment. Being small and portable, these were stored in the various cupboards or on the bench tops .

4.4. Room 21 is the only place where the major burden of the testing e.g., cleaning painting and drying of panels , determination of volatile contents of thinners, extraction of pigment and other tests are carried out . It also serves as the sitting room of the seniormost Paint Chemist .

4.5. The following arrangement of placing the equipment in the three rooms has been made under the existing circumstances :

4.5.1. Room 21:

Mainly heavy equipment which are stationery in nature like Gallenkemp Centrifuge , MLW Oven , MLW Mechanical Stirrer and other Mechanical Stirrers , Refrigerator and Gallenkemp Oven .

4.5.2. Room 22 :

Equipment which deal with liquid systems , e.g., Rotto Thinners Flow Cups , Cavitation Disperser , Washability and Scrub Resistance Tester , Paint Conditioner , Salt Spray Cabinet .

4.5.3. Room 25 :

Gardner Multi - angle glossmeter, Scratch Hardness Tester , Applicator for Levelling and Vartical Flowing Tests , Impact Cupping Tester , Mandrel Bending Tester , Wet Film Thickness Gauge, Corrosion Testing Apparatus for Static Test , Flash Point Appartus , Mettler Balance , Two film Applicator , Pendulum Hardness Tester, Paint Film Spinner , Specular Glossmeter 20^{0}, 60^{0} and 85^{0} , 45^{0} minature Glossmeter , ICI Drying Time Recorder , Black and White Cryptometer, Scratch Tester , Bend Test Unit , Fineness of Grind Gauge , Cross hatch Cutter etc.,

4.6. There are in all about 54 testing equipment and except for a Humidity Cabinet no further equipment should be purchased in the near future .

Annex VIII.

REARRANGEMENT OF THE LABORATORIES

1. Paint and Paper Laboratories

1.1. From the discussions of the installation of equipment in the laboratories in Annex. VII it will be evident , that some sort of rearrangement of the Physical Testing Laboratories is necessary to make the best use of whatever little space is available for proper installation of the valuable testing equipment and their effective utilisation as well as getting the services from the conditioning rooms built at a huge cost.

1.2. It is, therefore , recommended that the paper laboratory for which a conditioning chamber has to be provided should be transferred, to the groundfloor wing of the physical laboratories having four conditioning rooms . For this laboratory Rooms 21,22 and 25 will be eminently suitable for the present needs and also for future expansion. Room 25 is especially designed to have its own conditioning arrangement.

1.3. Paint laboratory which is housed in these rooms do not require conditioning of samples but requires the services of a fume chamber. The space provided is also extremely inadequate for this labpratory. It is therefore suggested that the Paint Laboratory may be shifted to Rooms 42,43 , 44 in the first floor just above Room 21-25 but having larger accommodation . Since fume chambers are provided in these rooms it will be an additional advantage for this laboratory .

1.4. It may be examined if the food laboratory which is occupying these rooms can move to Room 68 from where the paper laboratory is proposed to be shifted.

2. Textile Laboratory.

2.1. Rooms 6 & 5 are now occupied by the project Manager , UNIDO for strengthening of Iraqi Organization for Standards and his secretary. These rooms should now be released to the testing laboratories and the Project Manager and the secretary should be provided with alternative and appropriate accommodation elsewhere .

2.2. Room 6 which is about 30 m^2 may be added to the textile laboratory which will resolve the present impasse to a great extent.Room 5 can be used by the senior staff members of the laboratories or preferably as a storage room fpr textile, plastic, rubber , leather and paper samples by providing suitable racks till such time any alternative arrangement can be made .

3. Plastics , Rubber and Leather Laboratory.

3.1. Room 7 may be partitioned to separate the weather-O-meter section from the leather laboratory . This will minimize many of the problems discussed in para 2 , Annex VII .

3.2. Rooms 18 and 20 should be alloted to Plastics and Rubber Laboratory for its proper expansion. New equipment for the leather section of the laboratory can also be accommodated in these rooms .

4. Conditioning rooms

4. 1. All the conditioning rooms should be commissioned and properly utilised . Room 15 should be used for housing sensitive testing equipment for textiles like Uster and the like , Room 16 for conditioning of textile samples, Room 18 for conditioning of plastics, rubber and leather samples and Room 25 for paper samples and sensitive equipment for paper laboratory , if paper laboratory is eventually transferred to this section .

Annex. IX

METHODOLOGIES FOR CONDUCTING WORK OF THE LABS, REPORTING PROCEDURES AND FORMS

1. Introduction

1.1. At present testing is carried out mainly in the two separate divisions of COSQC viz.,

A. Chemical division comprising of food, Pharmaceuticals, cosmetics, Detergent and Instrumental Analysis laboratories, and

B. Physical division comprising of Paint, Paper, Plastics, Rubber, Leather and Textile testing laboratories.

1.2. There is considerable interplay between the two divisions as the complete information of many materials are to be obtained by testing in both these division. Even in its present set up the physical division is multidisciplinary in nature and with the increasing frequency of inter-laboratory tests with the increasing volume of work in the coming years, the control procedurel for the efficient and orderly operation of a multi-disciplinary test laboratory will be necessary. This will be more so with the setting up of Electrical, mechanical, metallurgical, NDT and Metrology laboratories in COSQC in the near future. As all the testing activities are to be co-ordinated under a single set up as an independent testing agency under COSQC, a methodology has to be evolved by which the test specimens are to be processed, the records of such processing

and how these records interact with other systems (such as laboratory quality control and accounting) which will make up the total operation procedure of the laboratory.

1.2.1. Keeping the above facts in view a procedure for efficient control of this organization is outlined below. Practices and methodologies for control within the individual laboratories under this organization will be discussed afterwards.

2. Methodology of work for a Multidisciplinary Test Organization

2.1. The system to be discussed takes into account the processing of the work from the initial inquiry of the client to the final report, disposition of test specimens and retention of records. It is assumed that tests will not be conducted free and a certain fee commensurate with the nature of tests will be levied. It may be pointed out in passing that the measure of success of a test organization is reflected in the quantum of revenue earned by testing.

2.2. Initiation of work by the Estimating Department

2.2.1. There should be an Estimating Department in the organization which will deal with all queries of the test requests including the test fees for the specimens if applicable in such cases. This section will assign a proposal number to all written inquiries and requests for quotations and these should be entered into a quotation log. An estimate form listing the prospective clients' name, address, samples to be tested, applicable documents, proposal number and date of inquiry should

be completed. An estimate of cost is to be prepared using standard fees wherever possible and formal quatation is to be issued to the client. In this connection a schedule of testing fees should be prepared in a realistic way taking into consideration the actual cost incurred in testing a material.

2.3. Receipt of samples and work distribetion

2.3.1. A central sample receiving and distribution section should handle all incoming samples. A Work Order Number Slip is to be attached to each sample individually and consignment wise as the case may be. A Work Authorization Form listing the following details is next to be prepared:

i) Client's name and address
ii) Proposal Number
iii) Complete sample description
iv) Lists of tests and specifications to be followed wherever possible
v) Work order number
vi) Manner of disposal after test

The sample Receiving and Work Distribution Section should then initiate a history sheet or chronicle in which all the operations actually performed on the specimen are to be recorded by the persons who perform the operations. All records of transfer of possession of sample and information regarding completion of operation detailed in the Work instructions are also to be included. The receiving section will then distribute the specimen with all the documents to the appropriate testing laboratory/division which will undertake the test. Finally the receiving section should record the receipt and distribution of test samples, should record order

and work instructions and distibute copies of the records to the relevant departments for monitoring the progress and status of the work.

2.4. Testing operation

2.4.1. After receiving the sample and work instructions, the divisional head of the laboratory responsible for testing, will assign the job to a person qualified to undertake the test. The work instructions should be reviewed, all the necessary specifications and relevant literature are to be examined. The divisional head will record the assignment in the history sheet. The required tests are to be carried out under his supervision. Where some of the tests are to be carried out in other laboratories (inter-laboratory tests) the divisional head will issue necessary inter-divisional orders recording such orders in the history-sheet. The history-sheet will thus provide the exact history of the sample in the laboratory if required for revieWing in future. The form of the sheet may be made in any convenient way to suit the needs of the laboratory and should be designed to contain all necessary information which can be readily used, stored and retrieved.

2.5. Test reports

2.5.1. After the completion of the tests, the person who carried out the work will return the tested sample and all associated papers recording the transfer of possession in the history-sheet. The divisional head or his designate after proper examination and assessment of data and records will prepare a report of the test results (vide 3.8.). The sample is to be disposed of according to the instructions on

the work order and the disposal is to be recorded in the history sheet.

2.5. Accounts section

2.6.1. The records of the project are to be sent to the accounts section which will prepare the bill for the client to pay the cost, wherever applicable. But as a general rule fees for testing should be collected in advance before the materials are sent to the laboratories (vide 2.2).

2.7. Records section

2.7.1. The accounts section will then send all the documents to the Record keeping section where they are to be filed for future reference.

This section will retain all the files for jobs completed. The period of retention will vary depending upon the nature of the sample and the importance of the findings.

2.8. Advantages of the methodology

2.8.1. By following a rigid method as out-lined above, it is possible to increase the accuracy of test results and also the efficiency of reporting in a multi-disciplinary testing organazation having considerable inter-play amongst its laboratories. It also enables verification of recorded data in case of suspect results or an evaluation of the efficiency of the personnel and equipment.

3. Methodology for Individual Laboratories

3.1. The end result of any test, whether for an outside client or for use within the organisation operating the laboratory, should be a test document which presents accurately and clearly the results obtained by the laboratory. The aim will not be achieved unless a high standard of laboratory practice is set and maintained which will depend largely on the thoroughness of direction and supervision of the work of the assistant staff.

3.2. Staff

3.2.1. New staff members should be trained thoroughly in testing procedures to assure that their test results are in close agreement with those obtained by experienced staff members.

3.2.2. For tests which include a significant subjective element, very close staff supervision is essential together with a high degree of participation of senior staff in the actual testing work and in the assessment of the sample from the test results.

3.3. Supervisor and assistants

3.3.1. The supervisor must have sufficent technical knowledge and practical experience to enable him to foresee, to recognise and to cope with any technical problem likely to arise in the course of the work in the laboratory. He must also be able to control the work of his staff.

3.3.2. So far as the physical testing laboratories are concerned, it should be controlled by a person whose basic training has been in engineering, physics, chemistry or metallurgy.

3.3.3. Assistant members of the staff should have qualifications and experience appropriate for the work on which they are employed.

3.4. Control of staff

3.4.1. In small laboratories the officer-in-charge or the supervisor exercises personal control over the work of each testing personnel.

3.4.2. In larger laboratories he must decide who can work under direction and who under supervision. There must be clearly defined lines of responsibility with each person aware of the extent and limitations of his own responsibility.

3.5. Selection of test methods

3.5.1. Usually test methods prescribed by the International Organization for Standardization (ISO) or International Electrotechnical Commission (IEC) should be followed as far as practicable. If no test method is specified and there is no generally recognised test method, it is the responsibility of the officer-in-charge of the laboratoriy to select an appropriate test method. He should be able to choose as far as possible test methods and reporting procedure which are objective.

3.5.2. If the material specification preseribes a test method, it should be followed in all respects. A copy of the up-to-date specilication and test method, with all ammendments, should be maintained in the laboratory and should be accessible to the persons conducting the test.

3.5.3. In all laboratories, it could be advantageous to prepare a **Test Method Manual** and provide each staff-member with a copy.

3.5.4. A library of reference text books and journals relating to its range of work if added to a laboratory will improve its efficiency manifold. Without this facility it is difficult for the laboratory staff to keep themselves abreast of the new developements in testing.

3.6. Records System

3.6.1. Each laboratory should have a record system to suit its specific requirements. Although record system vary from laboratory to laboratory, certain basic principles are adhered to in all laboratory systems.

3.6.2. The first essential is to record a full identification of every sample received at the laboratory for test or calibration, and to ensure by allocation of a sample number or other device that mixing up does not occur at any point as to the identity of the material to which laboratory records refer.

3.6.3 A full record system should be made of the client's instructions, the test procederes and the test results. A record system is not adequate **unless** it contains sufficient information to permit satisfactory repeat performance of a test.

3.6.4. Each staff member should have a workbook or a supply of headed worksheets or work cards. The use of duplicate paged workbooks is preferable as the top copy can be removed and can accompany other documents while the carbon copy remains in the

staff member's workbook. When a sample is passed on to a staff member for testing he should be clearly informed of the identification of the sample and the work to be performed.

3.6.5. The staffmember performing the test should record in his workbook, worksheet or workcard the data identifying the article, the tests to be performed and all other instructions he has received. If appropriate he should record the condition of the article as received and any work he does on the article to prepare it for testing. As he performs each test he should record all readings directly into his workbook together with all calculations and comments . The fundmental aim should be accurate recording. In some laboratories, staff members are allowed to write original test readings and calculations on odd sheets of paper initially so that their workbooks will be clean. This practice cannot be approved as it increases the possibility of recording an error and prevents retention of original record of each observation.

3.6.6. Copies of all test documents and all documents pertaining to them, such as workbooks etc. must be retained at least for five years. It is an advantage to have a record system which enables the operation of tracing reported test results back to the original observations to be performed quickly and easily.

3.7. Checking calculations and results

3.7.1. Incorrect calculations and inaccurate transfer of data from workbook to final test document are among the major causes of errors in test documents. Errors of this nature are eliminated if all calculations and transfers of data are checked by a second person who signs or initials the relevant documents to show that checking has been done.

Workbooks, worksheets and workcards should be so designed as to have a place for the signature or initial of the checking officer. Then any possible failure to check data will almost certainly be noticed before the final test document is issued to the client.

3.8. Reporting of Test Results

3.8.1. A clear and informative presentation of test results is very important and so particular attention to the design and compilation of test documents is necessary.

3.8.2. As a general rule, test documents should contain the following information :

a. Name of the laboratory
b. Address
c. Date
d. Serial number of test document
e. A heading which summerises the nature of the test and the sample
f. Description and identification of samples
g. Material specification and test methods followed
h. The test results
i. Compliance or otherwise of the sample with the material specification
j. Any other information which may assist in the appreciations of the significance of test results, but no expression of opinion
k. Signature of an approved signatory

Test documents should be free from corrections and erasures . If the signatory considers that it is not possible or necessary to replace test document containing corrections , he should indicate his approval of the alteratious by initialling at such places .

3.8.3. In order to prevent the misuse of the test report from commerical exploitation a note may be added at the end of the report stating that " This Certificate or report may not be published for commerical purposes except in full unless permission of an approved al btract has been obtained from COSQC . Test certificate is valid only for the particular sample tested " .

3.9. Standard forms

3.9.1. In the following pages models of the forms which can be conveniently used for identification of samples received for tests , their distribution to the laboratories concerned for tests . history-sheet (Chromicle of movement) of the samples under test including inter. Laboratory tests and also for effective control of Laboratory work , a general purpose Test Certificate form for out-side clients , a form for reporting test results of a material under certification Marks Scheme and a form for reporting test results of a material involving inter-laboratory tests under certification Marks Scheme have been included .

3.9.2. These forms may be adopted for the COSQC laboratories making modifications whereever necessary to suit the local conditions .

Details of the forms :

Form 1 : The sample identification card
Form 2 : Proforma for sample distribution to Laboratories
Form 3 : History-sheet for samples under test
Form 4 : General purpose test certificate
Form 5 : Test Report of a particular material under Certification Marking Scheme .
Form 6 : Test Report of a particular material involving inter-Laboratory tests under Certification Marking Scheme .

Form 1

The Sample Identification Card

This card should be attached to the sample as soon as received by the sample receiving and distribution section (Sample Room) before sending to the Laboratories for testing .

The size and the form of the card should be as follows :

Size : 90 mm x 100 mm x 0.25 mm

Form :

Ministry of Planning
Central Organization for Standardization
& Quality Control , Baghdad , Iraq

Sample No. Date

Description

Received from :

Form 2

The Proforma for Sample Distribution

Ministry of Planning
Central Organisation for Standardization & Quality Control
Baghdad, Iraq

(for use by Sample Room and Testing Section)

Sample No. Proposal No.
* Mode of receipt Date
Description
Identification marks or seals, if any
Received from

Under reference No. Date
Acknowledgement date
Work Order No.
For disposal by

Signature:
Supervisor, Sample Room

Instructions

Head of the laboratories
Laboratory-in-charge

---

* Whether received by Rail, Air, deposited in the office or collected from the manufacturer.

Form 3

The Proforma for the history - sheet or chronicle for tracing the status of a test sample to control the work of the Laboratory .

Central Organization for Standardization and Quality Control

Laboratory Card (Part I)

Sample No. Proposal No. Work order No. and date

Brief description of samples

Received from ----------

Under reference No. dated

Instructions by the Head of the Laboratory Laboratory :

Handed over for testing to Mr.

Instruction regarding tests including interlab test, if any

Date by which tests to be completed

Tests completed on

Reasons for delay , if any

Draft T.C. put up by on

Draft T.C. approved by on

Sample disposed of

Laboratory - in- Charge

Head of Laboratories

Date when fair copies of T.C. were sent book to Laboratory

T.C. issued

Supervisor - Testing (Office)

File sent to Accounts Section on

File sent to Record Section on

To : destroyed on

To b: preserved permanently

Laboratory Card (Part 1I)

Inter-laboratory test

(This card is to be detached and sent with sample to the laboratory concerned)

Sample /Part sample sent to ..... laboratory on
Instructions regarding test
Date by which test to be completed
Test completed on
Reasons for delay, if any
Sample returned with draft T.C. to .....
on..... by.....
Draft T.C. approved by

Laboratory Card (Part III)

(To be retained by laboratory-in-charge or Head of the laboratory for progressing)

Proposal No. Sample of
Sample No.
Sample handed over to Mr..... on.....
Instructions for inter-laboratory tests, if any
Date by which test is to be completed including interlacoratory tests, if any
when draft T.C. actually submitted
Reasons for delay, if any
Steps taken to avoid such delays
Draft T.C. prepared by ..... on.....
Approved on

Form 4

General Purpose Test Certificate

INSIGNIA OF THE OFFICE

Republic of Iraq
Ministry of Planning
CENTRAL ORGANIZATION FOR STANDARDIZATION AND QUALITY CONTROL
Baghdad , Iraq

TEST CERTIFICATE

NO. Dated

Issued to
with reference to letter No. Dated
Work Order No. Dated

Sample received on .....

Remarks

Signature of the Divisional Head or Designated Authority

N.B. This certificate may not be published for commercial purpose or used for any legal action unless prior permission has been obtained from COSQC. Test certificate applies only to the samples tested .

Form 5

Test Report of a Particular Material
Under Certification Marking Scheme

Central Organization for Standardization and
Quality Control

Baghdad
Iraq
Dated _____

TEST REPORT

AS per Is :5411 (Part 1)-1974

No. _____

Particulars of sample submitted

a) Nature of Sample — Plastic Emulsion Paint Part 1 For Interior use

b) Code No.
c) Date of Receipt
d) Quantity

Packing and Marking

a) Packing
b) Trade name
c) Batch No.
d) Volume of the material (declared)
e) Month and year of manufacture
f) COSQC Seal

Test Results

Tests	Specified Requirements	Results
i) Drying time , Max		
a)Surface dry	15 minutes	
b)Hard dry	4 hours	
ii) Consistency	Smooth and uniform and suitable for application by appropriate method .	
iii) Finish	Smooth or matt or egg-shell gloss	

iv)	Colors	Close match to colour specified by the purchaser
v)	Fastness to light	To pass the test (tested on white unglazed at paper).

vi)	Resistance to alkali	To pass the test
vii)	Resistance to wet abrasion .	To pass the test
viii)	Temperature stability	To pass the test
ix)	Keeping properties	Not less than a year

Remarks

Tests Carried out by

Director

Form 6

Test Report of a Particular Material
Invowing Interlaboratory Tests Under
Certification Marking
Scheme

CENTRAL ORGANIZATION FOR STANDARDIZATION
AND QUALITY CONTROL

Baghdad
IRAQ
Dated _____

TEST REPORT

As per IS : 1596 - 1972

No.....

Particulars of Sample Submitted

a) Nature of Sample Polyethylene Insulated Cables
b) Code No.
c) Date of Receipt
d) Quantity
e) COSQC seal
f) Any other information

Test RESULTS

TESTS	Specified Requirments	Results
Packing and Marking (cl. 10)	The cable should be either wound on reels or coiled, and peaked and labelled. The Label should have the following information: a) Trade name , if any : b) Name of the manufactures: c) Nominal dimension of the Conductor of the Cable: d) Colour of the cores: e) Length of the Cable: f) COSQC Certification Mark:	

2. General Construction of Cable (Cl. 9)		
3.i) Colour Scheme for Cores (Cl 6.4)	Red , Black , Blue, White or Light Grey	
ii) Standard Colours of Sheath (Cl.7.2)	Black, Grey or White	
4. Conductor (Cl. 4.5)		
a) Dimension No. and diameter of Wires Comprising Conductors.		
b) Resistance	Ohms /Km at 20 °C , Max	
c) Tensile Test on Conductor	For $\frac{3}{4}$H 1100 to 1500 Kg/cm^2	
	For H 1500 Kg/cm^2, Min	
d) Wrapping Test on Conductor		
e) Annealing Test (Cl. 11.3)		
5. Overall Dimensions of Cable (Cl. 8.1)		
6. Thickness of		
a) Insulation	i) Avg:	mm , Min
	ii) Min:	mm-(5% of mm + 0.10mm), Min
b) Sheath (Cl 7.3, 7.4)	i) Avg:	mm , Min
	ii) Min:	mm - (5% of mm+ 0.25mm), Min
7. Physical tests on insulation and sheath (Cl. 11.7)		
a) Composition of insulation (Cl 6.1) .	Melt flow index : 3 , Max	

b) Tensile Strength and elongation at break for sheath (Cl 11.7.1)

i) Sheath

a) Tensile Strength — 85 Kg/cm^2, Min
b) Elongation at break — 175% , Min
c) Ageing test (Cl 11.7.2)

i) On insulation — Loss in weight , 3% , Max
ii) On sheath — Loss in weight , 3% , Max

d) Hot Deformation Test (Cl 11.7.3).

i) On insulation — Vicat softening Point: 85°C , Min

ii) On sheath

e) Heat Test (Cl 11.7.4)

f) Colour fastness to daylight exposure (Cl 11.7.5) — The fastness ratings : 4 , Min

8. Fire Resisting Properties (cl 11.7.6)
a) Period of burning after removed from Flame: 60 second, Max
b) Length of Cable decomposed: 200 mm, Max

9. High Voltage Test (Cl 11.4) — To withstand 1.5 KV for 45 minutes

10. Insulation Resistance (Cl 11.5) — 5000 megohms/Km at normal room temp.

11. Manufacturer's Identification (Cl 12.1).

REMARKS

Tests carried out by

Director

Annex X

MANPOWER REQUIREMENTS

1. For the proper assessment of the requirement of scientific man-power in a testing laboratory it is necessary to know the number and nature of samples received in the labotary , the specifications to which these are tested and making a " time and motion" study for the complete test of each different sample . It should also take into consideration the time required for Report Writing, studies of literature and specifications to plan the actual testing . It must be appreciated that the time available to the Expert was too short for this exercise . It is therefore recommended that such studies should be undertaken for the correct appraisal of the position.

2. A few years ago a study team appointed by the Government of India assessed the scientific man-power requirements of the National Test House in India having 118 laboratories in the same campus and branch laboratories in all the important metropolitan cities in India. It caters to all the disciplines of technology in testing viz., chemical, mechanical , civil , electronics, electrical including High Voltage , non-destructive testing etc. The study team assessed that a properly trained and experienced technical personnel should be able to report 200 samples per year . This yard - stick is not, however, applicable to samples requiring type tests , service trials or any special test because of obvious differences in the mode of testing from routine samples . However . 200 samples per person per year should not be applicable to the local conditions without proper study. The findings in each laboratory are as follows:

2.1. Textile Laboratory

2.1.1. There are at present 18 technical staff in this laboratory , 4 of whom are on inspection jobs everyday , one checks the reports and analyses and two are report writers . Therefore , in the overall analyses, there are only 11 scientific staff available for testing work.

2.1.2 The number of samples received from January to November this year was 12,599, But the tests are mostly qualitative and an in-depth study is necessary to assess the staff requirement .

2.1.3. The technical staff are graduates in chemistry , physics, chemical engineering or textile technology. Beside the textile technologist and the laboratory supervisor , none has previous training in this field . It is hoped that the extensive laboratory training courses conducted have benefited them.

2.2 Plastics Rubber and Leather Laboratory

2.2.1. There are 7 scientific staff in the laboratory who are also periodically deputed for inspection. The break-up of the number of samples received during 1978 - 79 is as follows :

Plastics	-	338
Rubber	-	120
Leather	-	462
TOTAL :		920

2.2.2. The number of samples handled averaged about 130 per person per year which is considered low if one takes into account the nature of simple qualitative tests carried out in most cases.

2.2.3. There are three chemists having 5 - 9 years of previous working experience in this field . The rest of them are chemical engineers and a physicist who are very new to this subject and are having on-the-job training. All of them were trained to handle the new equipment and interpret the test results .

3.3 Paper Laboratory:

2.3.1. Due to historical reasons testing of paper and detergents , though unrelated subjects , are carried out by the same group of scientific staff.

2.3.2. There are 6 scientific staff in this laboratory , 2 of them are chemists and the rest chemical engineers . None of them is a paper technologist .

2.3.3. About 600 samples of various qualities of paper and paper-boards were received for test last year. Here again the assessment of correct staff requirement should be based on the time content of testing which are basically very simple .

2.4. Paint Laboratory:

2.4.1. There are three chemists and three chemical engineers of whom only one of the chemists has previous experience of 7 years in this field . The others are comparatively new including the supervisor chemist who holds a Ph.D. degree but has no previous background of this highly specialised technology .

2.4.2. Under the circumstances , a three day course on paint testing was organized for the benefit of the scientific staff . But the subject being vast having a direct bearing on the process of paint manufacture, only the fringe of the topic could be touched . It is necessary to have prolonged training courses in the subject so that it can be fully assimilated by the staff.

2.4.3. About 930 samples of paints and related materials were received for test last year . Paint testing being highly subjective , the number of scientific staff is to be considered carefully and against the specifications to which these paints are tested . It is , however, necessary to have an experienced paint technologist as a supervisor for this laboratory who should be able to guide , direct and continue the training of the scientific staff under him which under present circumstances are sadly lacking .

Annex. XI

ESTABLISHMENT OF COMPLETE EQUIPMENT FILES

1. Equipment list for about 125 new an' old equipment in the Physical Testing Division has been prepared . The details of the names of the equipment in alphabetical order, suppliers with code or catalogue numbers , Methods of use and the specifications to be followed , description of the apparatus including accessories , the supply orders with dates and prices have been completed. Individual files for each equipment have also been prepared , containg the catalogue of the equipment, its method of use and all available information.

1.1. There are a number of defective and damaged equipment or equipment with missing vital accessories . A list of such equipment has been prepared so that these could be replaced , repaired or procured from the suppliers as early as possible .

1.2. Some of the equipment require additional accessories to make them fully operative . A list of accessories for such equipment is also given for early procurement action. (Annex.III) .

1 3. Since the details of the equipment are more or less completed , guidelines for the design of an equipment cardex system are given as follows keeping in view the following :

1.3.1. Easy recognition of equipment of the Physical Testing Division (PTD) Comprising of Paint , Textile , Leather , Rubber , Plastics and P er Testing Laboratories .

1.3.2. Easy identification of equipment .

1.3.3. Knowledge of Material Testing Stock

1.3.4. Obtaining information relative to the equipment.

2. How the system works

2.1. Labelling .

2.1.1. Each piece of equipment is to be given a PTE (Physical Testing Equipment) Number .

2.1.2. This number is to be stuck to the piece of equipment and/or to the container in which the equipment is stored . This identifies the equipment as belonging to the physical testing laboratories . It also will indicate where to find information about the piece of equipment .

2.2. Identification.

2.2.1. The name of the equipment, the PTE number (and COSQC Number if all the equipment in the Organization are put under a similar cardex system) and the accessories that go with it could be found on the card corresponding to the particular number e.g.,

PTE 157
PENDULUM HARDNESS TESTER

Accessories to the piece of equipment will carry the following nembers :

PTE 157.1, PTE 157.2. etc.

The whole card will therefore read as follows :

PTE 157

PENDULUM HARDNESS TESTER
PTE 157.1. TEST PLATE
PTE 157.2. KONIG PENDULUM
PTE 157.3. PERSOZ PENDULUM

2.2.2. To obtain additional information about the equipment, the appropriate card filed alphabetically must be consulted. The card will carry the following information :

PENDULUM HARDNESS TESTER
SUPPLIER : ERICHSEN
MODEL : 299
Purchase order No. 75479 , SLE/23/77 1977 - 08 - 20
PTE No. 157
LOCATION : PAINT LABORATORY

Where they exist , the serial no., type and/or Model No. are also stated .

There are, therefore , two sets of Index Cards , one set is filed in numerical order and the other in alphabetical order .

Provision is made in the system for additional equipment which may be acquired at a later date. Numbering of new equipment can be done after careful consulation of the equipment list and attached sheet .

N.B. On the equipment list the numbers 1 to 6 fall under the letter 'A' , It does not necessarily follow , however , that small numbers (i.e. numerically) correspond to the first part of the alphabet and larger ones (numerically) to the latter part.For example , when the free numbers under 'A' are used up, a number at the end of the list e.g.245 may then fall under 'A' . This may be illustrated under 'W ' where all numbers including the 'free ' numbers are exhausted . If any machine with ' W ' is added to the laboratories it will be assigned a number 246 and so on .

NOTE :

1. All additional equipment will carry one of the numbers left free under the appropriate letter of the alphabet .

2. The last number given is 234 to the Yarn Inspection Winder (under letter'Y').

3. When all the free numbers under any particular letter of the alphabet are used up a number after 245 should be given .Illustration has been given under ' W ' .

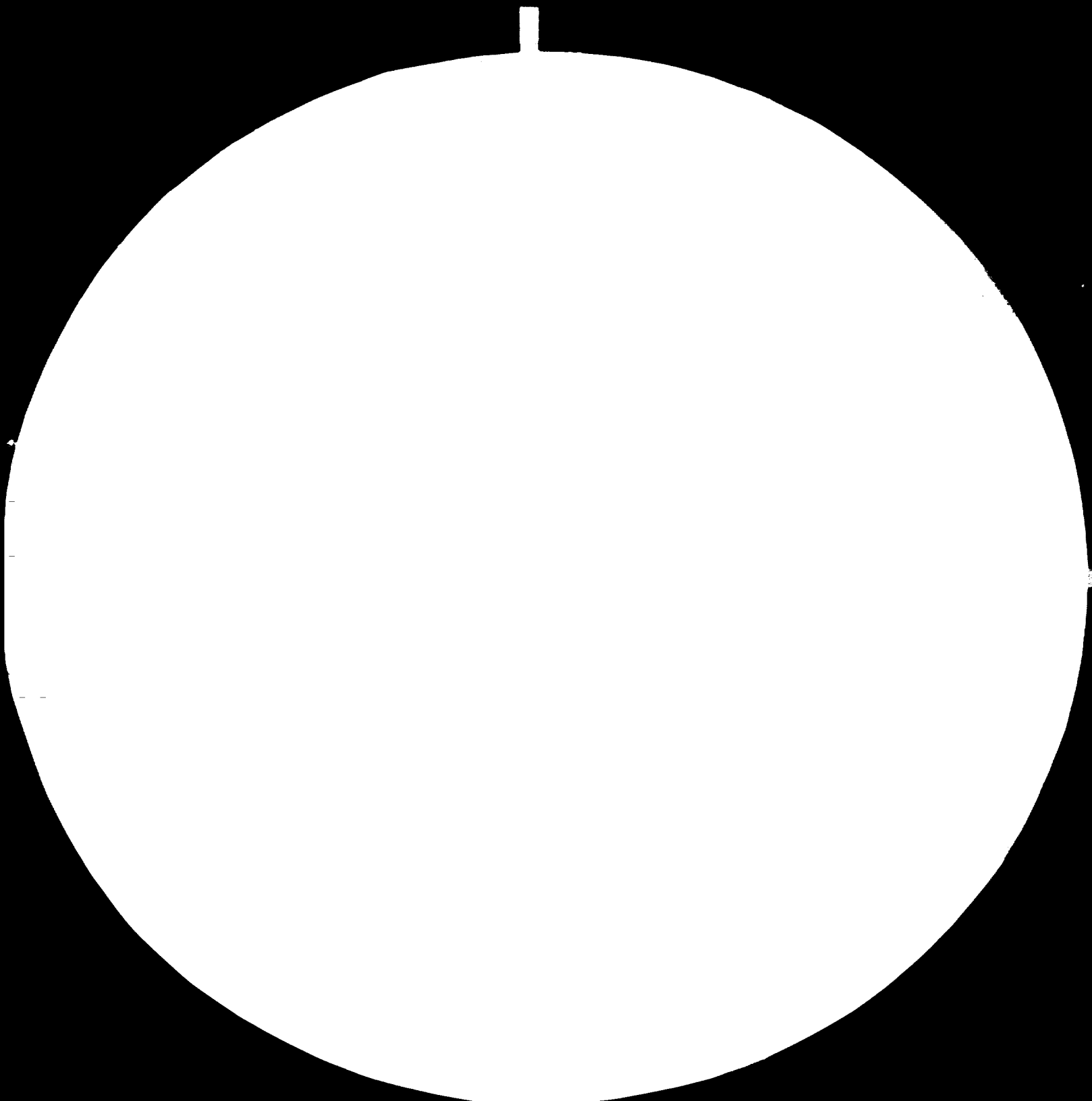
4. Special care must be taken to avoid giving any two pieces of equipment the same PTE number. This will involve careful consulation of the equipment list when new equipment arrives .

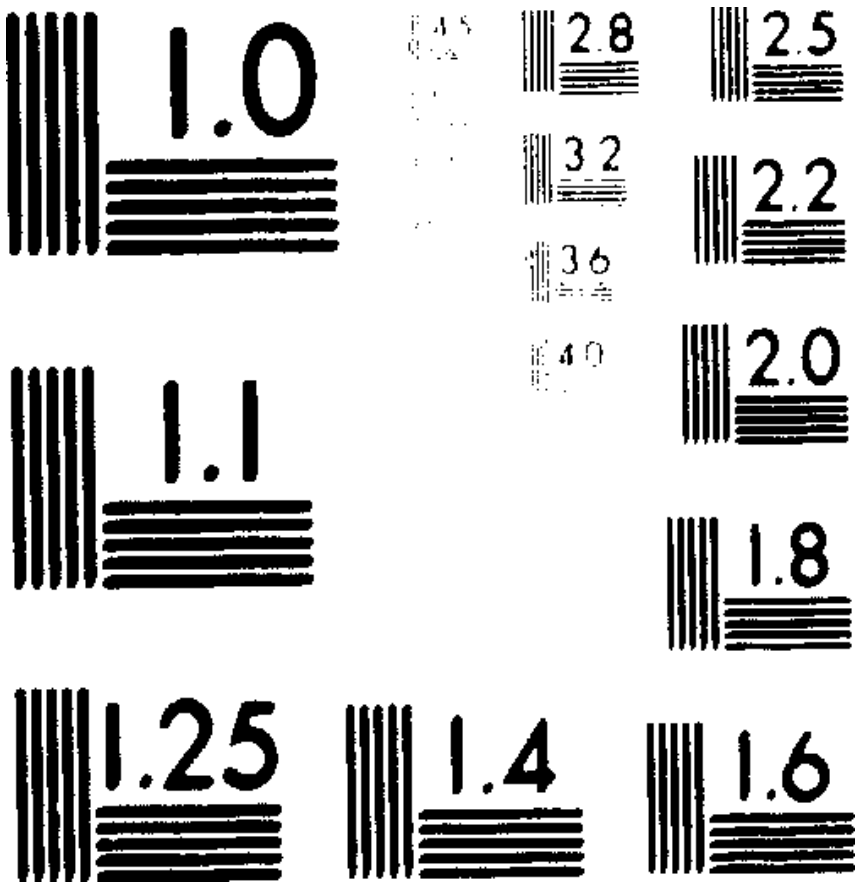
5. A complete list of apparatus and equipment of the laboraties has been prepared giving details of name of the equipment, supplier , catalogue /model number , use , description , accessories, purphase order number etc. and should be consulated while making the cards for the system. Examples of lists under alphabates A , B and C are enclosed .

EQUIPMENT LIST OF

PHYSICAL TESTING DIVISION

C-581





(A)

EQUIPMENT DESCRIPTION

1. Applicator for Levelling and Vertical flowing tests.

2. Applicator - two film.

3. Abrasion tester (Shimadazo)

4. Automatic Muller.

5. Abrasion tester (Taber)

6. Abrasion tester (Frank)

7-10. Free

(B)

EQUIPMENT DESCRIPTION

11. Balance - Rough

12. Balance - Mettler - P1200

13. Balance - Mettler

14. Bend test units

15. Black and white cryptometer.

16. Ball drop apparatus .

17. Bursting strength tester .

18. Bendsten smoothness and porosity tester.

19. Balance - Mettler .

20. Free

(C)

EQUIPMENT DESCRIPTION

21. Calculator

22. Centrifuge

23. Cavitation Dispenser

24. Corrosion Testing Apparatus for Static test

25. Cone and Plate Viscometer

26. Cross - Hatch Cutter

27. Carpet thickness tester

28. Crockmeter (2)

29. Cutter for circular samples (2)

30. Cotton Finess meter with motor

31. Cobb Absorption tester

32. Compressor - Dryer

33 to 40 . Free

Annex XII

PROGRAMME
OF THE
SEMINAR ON TESTING

Tuesday 18 December 1979

9.00 - 10 . 00	COSQC Laboratories : Their Evolution, Objectives and Functions. By Dr. A. Geneidy
11.00 - 12.00	Quality Control in Testing Laboratories By Dr. A. Geneidy

Wednesday 19 December 1979

9.00 - 10 . 00	Organization of Testing Laboratories By Dr. A. Bhaduri
11.00 - 12 . 00	Testing for Quality Evaluation By V. Libersky

Thursday 20 December 1979

9.00 - 10.00	Testing of Materials By Dr. A. Bhaduri
11.00 - 12.00	Instrumental Methods of Chemical Analysis By Dr. J. Fenerty .

Annex XIII

SELECTED BIBLIOGRAPHY ON TESTING

A. TEXTILES

A.1 Text Books

1. Grover, E.B. and Hamby, D.S.,
Handbook of Textile Testing & Quality Control (1960).
Wiley Interscience, N.Y.

2. Mark, H.F., Atlas, S.M. and Cernia, E.,
Man-Made Fibers, Vol I, II, & III,
Wiley Interscience, N.Y.

3. Hall, A.J.,
The Standard Handbook of Textiles, 8th edn. (1976).
Newnes - Butterworths, U.K.

4. British Standards Handbook No. 11
Methods of Tests for Textiles (1974).

5. Booth, J.E.,
Principles of Textile Testing (1968).

6. W.I.R.A. Handbook. Leeds, U.K.

7. Wool Research, W.I.R.A., Leeds, U.K.

A.2 Journals

1. Textile Research Journal, U.K.

2. Journal of Textile Institute, Manchester, U.K.

3. The Journal of Testing & Evaluation Published by A.S.T.M.

B. RUBBER, PLASTICS & LEATHER

B.1 Text Books

1. Schmitz, J. U.,
Testing of polymers (1967),
Wiley Interscience, N.Y.

2. Ward, I.M.,
Mechanical Properties of Solid polymers (1972).
Wiley Interscience, N.Y.

3. Ogorkiewicz, R.M.,
Engineering Properties of Thermoplastics.
Wiley Interscience.

4. Shields, J.,
Adhesive Handbook, 2nd. edn. (1976)
Newnes-Butterworth, U.K.

5. **Nelson , W.E.,**
Nylon Plastics Technology (1976)
Newnes-Butterworth, U.K.

6. Turner, S.,
Mechanical of Plastics.
Newnes-Butterworth, U.K.

7. Blow, C.M. (Editor),
Rubber Technology and Manufacture (1971).
(Published by the Institution of Rubber Industry)
Newnes-Butterworth, U.K.

8. Ives, G.C., Mead, J.A. and Riley, M.M.,
Handbook of plastics Test Methods (1971).
ILIFFE, London.

9. All India Rubber Industries Association,
Testing in Rubber Industry (1975).
A.I.R.I., Bombay.

10. Annual Book of ASTM Standards (1975), ASTM, Philadelphia:
Part 34 Plastic Pipe
Part 35 Plastics - General Test Methods, nomenclature.
Part 37 Rubber - Test Methods.

11. ASTM, Rubber and Related Products: New
Methods for Testing and Analysing (1974).

12. Brown, R.P. and Scott, J.R.,
Developments in Rubber Testing.
in: Progress in Rubber Technology Vol 36 (1972)
Institution of Rubber Industry, London.

13. Lever, A.E. and Rhys, J.A.,
The Properties and Testing Plastics Materials (1968)
Butterworth, London.

14. National Physical Laboratory,
Composites-Standards, testing and design.
Conference Proceedings (1974).
IPC Science and Technology Press, Guildford, Surrey.

15. Turner, S.,
Mechanical Testing of Plastics (1973)
Butterworth. London.

16. Vincent. P.I.,
Impact tests and Service performance of Thermoplastics
(1977).
Plastic Institute, London.

17. RAPRA Guide to Rubber and Plastics test equipment,
RAPRA, Shawbury, Shrewsbury (1973).

18. RAPRA Developments in testing (1973).

19. Shoe and Allied Traders Research Association (SATRA), International Conference Proceedings No.1,
Artificial Leathers, Their Manufacture, Properties and uses, Vol 1 & II (1973).
Kettering, Northants.

C. PAPER

C.1 Text Books

1. Casey, J.P.,
Paper and Pulp (1960)
John Wiley, N.Y.

2. Cairns, J.A., Oswin, C.R. and Paine, J.A.,
Packaging for Climatic Protection (1974).
Newnes-Butterworth, U.K.

3. Montrosor, J.M., Mostyn. H.P. and Paine, F.A.,
Packaging Evaluation: The testing of filled Transport packages.,
Newnes-Butterworth, U.K.

4. The Dictionary of Paper, 3rd., edn.,
American Paper and Pulp Association, N.Y.

5. Britt, K.W. (editor),
Handbook of Paper and Pulp Technology
Reinhold Publishing Corp., N.Y.

C.2 Test Methods

Official and Standardised Methods of Tests of:

1. Technical Association of the Pulp and Paper Industry, Atlanta, Ga, U.S.A. (TAPPI).

2. British Paper and Board Makers' Association, Technical Section, London EC4A (BPBMA).

3. Canadian Pulp and Paper Association, Technical Section, Montreal (CPPA-TS).

4. International Organization for Standardization, Geneva, Switzerland, (ISO: TC6 and 122).

D. PAINTS

D.1 Text Books

1. Payne, H.F.,
Organic Coating Technology,
Vol 1 Oils, Resins, Varnishes & Polymers (1954).
Vol II Pigments and Pigmented Coating for Architectural and Industrial Applications (1961).
John Wiley, N.Y.

2. Martens, C.R.,
Emulsion and Water Soluble Paints and Coatings (1964).
Reinhold Publishing corp., N.Y.

3. Gardner, H.A.,
Principles of Surface Coating Technology (1965).
John Wiley, N.Y.

4. Turner, G.P.A.,
Introduction to Paint Chemistry (1961)
Barnes & Noble, N.Y.

5. Paint, Varnish, Laquoer and Related Materials;
Methods of Inspection, Sampling and testing.
Federal Standard Test Methods, Govt. Printing press,
Washington, D.C.

6. Uhlig, H.H.,
Corrosion and Corrosion Control, 2nd. edn. (1971).
John Wiley, N.Y.

7. Shreir, L.L. (Editor).
Corrosion, Vol 1 and II (1976)
Newnes - Butterworth, U.K.

8. Sward, G.S. (Editor).
Paint Testing Manual (1972).
American Society for Testing and Materials.

9. Geynes, N.I.,
Formulations of Organic Coatings (1967).
D. Van Nostrand Co. Inc., Princeton, N.J.

10. Martens, C.R.,
The Technology of Paints, Varnish and Laquers (1968).
Reinhold Publishing Corp., N.Y.

D.2 Journals

1. Journal of Paint Technology (JPTYA).

2. Journal of oil and color chemists Association (JOCCA).

3. Journal of Applied Polymer Science (JAPNA).

4. Journal of Polymer Science (JPTYA).

5. Corrosion.

E. MATERIAL SCIENCE:

E.1 Text Books

1. Borstow, W.,
Science of Materials (1979).
John Wiley, N.Y.

2. Herman, H.,
Experimental Methods of Materials Research (1971).
(Advances in Materials Research).
John Wiley, N.Y.

3. Rolls, K., Courtney, T. and Wulff, J.,
Introduction to Materials Science and Engineering (1976)
John Wiley, N.Y.

4. Brown, R.G.,
Materials Management system - A Modular Library (1977).
John Wiley, N.Y.

5. Wuff, J.,
The Structre and Properties of Materials,
Wiley Interscience, N.Y.

6. Mantell, Charles L.
Engineering Materials Handbook.
Megraw Hills, N.Y.

7. Holman, J.P.,
Experimental Methods for Engineers, 2nd. edn. (1971).
Megraw Hills, N.Y.

F. MISCELLANEOUS

F.1 Text Books

1. Binford, C.M., Fleming, C and Prust, Z.A.,
Loss Control in OSHA Era (1975).
Megraw Hills, N.Y.

2. [illegible], N.,
Industrial Safety Handbook, 2nd edn. (1977).
Mcgraw Hills, N.Y.

3. Everett, K, and Hughes, D.,
A Guide to Laboratory Deisgn (1975)
Newnes-Butterworth, U.K.

4. Cooke, A. J. D.,
A Guide to Laboratory Law (1976)
Newnes-Butterworth, U.K.

5. Walshaw, A.S.,
SI Calculations in Engineering Science (1977).
Newsen-Butterworth, U.K.

6. Ferguson. W.R.,
Practical Laboratory Planning (1973).
Applied Sceuce Publishers, London.

7. Coleman, H.S.,
Laboratory Design, National Research Council
Report on Design, Construction and Equipment of Laboratories (1951)
Reinhold Publishing Corp., N.Y.

8. Gillemot L.Y.,
Material Testing Laboratories.
UNESCO (1970).

Annex. XIV

ESTABLISHMENT OF CRITERIA FOR THE RECOGNITION OF TESTING LABORATORIES AS THE BASIS FOR NATIONAL TESTING SYSTEM

1. A list of the manufacturers in the five industrial sectors Viz. Paint, Textile, Paper, Leather, Rubber and Plastics together with the range of their products is enclosed in Annex. XIV-A. However, none of the industries could be visited and therefore it was not possible to assess the standards of their testing facilities and no recommendation can be given. However, it is imperative that some of the main plants in each of these industries should be inspected to evaluate the present status of testing and quality control system followed by these important industries. It will help to strength the existing testing facilities wherever necessary. In this context it is also necessary to inspect other testing laboratories in the country to examine the facilities they have in terms of space, equipment, manpower and working methodology and explore the possibility of estabilishing a system by which these laboratories could be recognised by COSQC and a close working relationship between COSQC and these laboratories could be fostered.

2. Laboratory Classification and Functions.

2.1 After the requirements of tests and the testing facilities available in the country have been known, it will be necessary to consider the question of equipment, their accuracy and the

the personnel. These will very much depend on the type of laboratories to undertake the functions which may be broadly classified as follows:

(a) Laboratories for calibration of primary and secondary standards.

(b) Laboratories for sophisticated and very precise testing.

(c) Laboratories for industrial type of testing, less precise than (b).

(d) Laboratories for testing in quality control system at the shop-floor level.

2.2 While the facilities available at the COSQC laboratories will fall under categories (a) and (b), we have almost no information regarding (c) and (d) which will be required for making an assessment of the laboratories for recognition by COSQC.

3. Reliability of Test Results.

3.1 It will be appropriate to point out at this stage that reliability of the test data is the most important factor to be taken into consideration while assessing a laboratory, for this purpose it will be necessary to undertake a nation-wide calibration service for calibrating the various equipment which are used for testing at the various levels of laboratories enumerated above. In fact the parameter of reliability of the test data is very much dependent on the calibration of the machines to give the same results in different Laboratories.

This reliability also brings us to the question of repeatability and reproducibility of the test data of the analysis of a material in different laboratories. The method of testing is perhaps the most important criteria to get reliable data. Usually when a test is taken up, the method to be employed in the standard specification comes to play, as in the specification, procedures, details of equipment to be used and their accuracy are specified until different laboratories follow the specified procedure in the evaluation of a product, a comparision of test data will not be possible.

3.2 Laboratory personnel and their role in the testing can never be minimized. In any work where human activity is involved the variation effected is quite considerable and to mitigate this problem, training of personnel in the methodology of work in the laboratory is perhaps one of the most important points to be considered. The reliability of test data is directly connected with the working reliability of the personnel in the laboratory and a frequent check on their performance and individual variations in reporting results is an important function in any laboratory. It has been often experienced even if a standard procedure is followed, the methodology of working by a personnel makes difference if proper training and competence is not exereised by the individual in executing the work. Here comes not only the general training but also a specialised training in the standard activity of reporting test data by the laboratory concerned.

3.3 The evaluation of training in the laboratory as to its level of competence in a particular field is required to be done since the classification is necessary to determine the level of testing that is available. In order to do this, inspection of the laboratory by experts in the field may perhaps give an objective assessment and we may classify it at proper level.

3.4 For the purpose of recognition of laboratories in the individual field of testing, the procedure of a coordination and the review of the test data is very much necessary for achieving the uniformity in the test report from the laboratories having the same activity. As has already been discussed calibration in one of the important means to achieve this. .
In addition to this it is required to organise round robin test which will positively help to identify the quantum of variation which actually happens in following certain test methods and for the purpose of interpreting the results, it will give us a much more objective assessment of the test data. So the inter laboratory test evaluation is one of the most important matter which have to be co-ordinated and implemented by the coordination of laboratories.

3.5 To achieve the objective of the reliability of the test data the co-operation of different laboratories throughout the country is very much essential. Even in the international field such co-operation is needed to attest the reliability of particular test data. In the international trade which is

growing day by day such reliance of test data is very much necessary as it will not only increase the prestige of the product of a countries in the foreign market but will also reduce the problems in the trade both for the exporting and importing countries. In our day to day transaction inside the country such reliance has to be brought up only when the laboratory is independent and free from any subjective assessment. Rather if the laboratories come under a particular discipline of recognising each other in individual field, this will not only push up the individual transaction without much of the trade problems but it will also assure quality to the consumer.

4. CEN Criteria on Laboratory Recognition.

4.1 ISO Draft Report on certification principles and practice include the system for the recognition of the laboratories to be used for the certification marks scheme as being considered by the certification body of CEN (Comite European de Coordination des Normes). It has dealt with the qualification which need to be examined in recognising a laboratory and its methodology

5. Suggested Procedure for Recognition of Laboratories.

5.1 From what has been discussed above it will be evident that there is a primary need at the national level to institute a mechanism for an effective coordination of the activities of the laboratories in identifying the areas in which testing facilities are available for recognition purpose. For this tesk, an infra-structure has to be built up, to bring out proper type of proforma for the collection of data, not only regarding the equipment available but their accuracy and personnel also, for the scruting to testify if the facilities of the laboratories are proper to be able to undertake the type of testing, it may be necessary to constitute a committee of experts in the different fields, who will visit the concerned laboratories and recommend their competency in taking up such testing work.
These committees will periodically review the working of the laboratories to find out if the level of their competency is sustained, and the recognition is continued. Such an exercise will not only assure the reliability of the test results of the laboratories but will also bring confidence in their work.

5.2 A copy of the proforma which can be used for such purpose is inclosed in Annex. XIV-B.

Annex. XIV-A

LIST OF MANUFACTURERS AND THEIR PRODUCTS

1. PAINT

Sr.No.	Sector	Name of the Manufacturer	Products
(1)	(2)	(3)	(4)
1	Private	Technical Paint Product Co.	Enamel, Emulsion, Aluminium Red Oxide and Red Lead Paints according to IOS-970, 843, 1026, 877 and 871 respectively
2	"	International Paint Co.	"
3	"	Torginol Paint Co.	"
4	"	Akwar Paint Co.	"
5	"	Rafigan Paint Co.	"
6	"	Armstrong Paint Co.	"
7	"	Rainbow Paint Co.	"
8	"	Orient Paint Co.	"
9	"	National Paint Co.	"

(1)	(2)	(3)	(4)
10	Private	Harere Paint Co.	Enamel, Emulsion, Aluminium Red Oxide and Red Lead Paints according to IOS-970, 843, 1026, 877 and 871 respectively
11	"	Manal Paint Co.	"
12	"	Casco Paint Co.	"
13	"	Al-Rashed Paint Co.	Automotive Paint IOS 1130. Paint Renover IOS 1339.
14	"	Al-Noor Paint Co.	"
15	"	Al-Salam Paint Co.	"
16	"	Al-Samarie Paint Co.	"
17	"	Reem Paint Co.	Cement Powder Paint IOS 949.
18	"	Al-Sadek Paint Co.	"

(1)	(2)	(3)	(4)
19	Private	Sun Paint Co.	Cement Powder Paint IOS 949.
20	"	Al-Karaf Paint Co.	"
2. TEXTILE			
1	Public	Iraqi State Company for Textiles (Baghdad)	Various cotton clothes and yarns, Medical clothes (Medical Cotton, Bandages, Lint, Medical towels).
2	"	Mosul State Co. for Textiles (Mosul)	Various Cotton clothes, Cotton yarn.
3	"	State Company for Woolen Textile	Wool and mixed blankets, Clothes, yarns, socks, lannels and Military head covers.
4	"	National State for Textile Co. (Baghdad)	

(1)	(2)	(3)	(4)
		a. Jute Factory	Bags, Canvas, Sot-- lee threads, Nets etc.
		b. Carpet Factory	Designed, Plain, Manual Prayer and Wall carpets.
		c. Polypropylene Factory	Polypropylene Bags
		d. Plant Fibre Factory	Plant Fibre.
5	Public	Fine Textile State Company in Hilla.	Bleached rayon clo-- the and also prin-ted and dyed kinds, Polyester cloth, Filament yarns.
6	"	Rayon State Co. (Babel) District)	Rayon, Crepe, Cotton and woolen fibres. Sulphuric and Hydro-- cloric acids, Caus-- tic Soda, Sodium hypochlorite, sulph-ite and sulphate chlorine (Liquid). Carbon di-sulphide

(1)	(2)(2)	(3)	(4)
7	Public	State Company for Cotton Textile in Kut	Cotton Cloth and yarns, socks.
8	"	State Sewing Co.(Baghdad)	Commercial Products: Cloth for men, Women, boys & work dresses, Military products: Defence forces uniforms, Tents of various kinds and sizes.
9	"	State Company for Hand Woven Carpet in Arbil	Woolen Hand made Carpet.
10	Private	Numan Company for Socks	Socks.
11	"	Iraqi Knitting Co.	Men's Wear
12	"	Al-Rif Al-Arabi Factory for Knitting	Socks, Men's under wear.
13	"	Baghdad Terelyne Factory	Terylene Fabric.
14	"	Technical Dyeing and printing factory.	Dyed fabrics, women veil.

(1)	(2)	(3)	(4)
15	Private	Superitex Factory	Terelyne Fabrics.
16	"	Asmar Factory	Fabrics for curtains and furniture.
17	"	Fauzi Factory for Weaving.	Acetate and viscous rayons fabrics.
18	"	Al-Haramain Factory	Wall Carpets.
19	"	Altaji Woven Factory	Towels.
20	"	Alfa Company	Shirts, Pyjamas.
21	"	Al-Hasani Factory	Handkerchief.
22	"	Al-Baldawi Factory	Ties.
23	"	Iraqi Company	Cotton threads for sewing.
24	"	Technical Tailoring Co.	Shirts and Pyjamas
25	"	Khansaa Sewing Co.	Men's Suits.
26	"	Ahmaka Al-Thabi Factory	Dresses for Women.

(1)	(2)	(3)	(4)
27	Private	Al- Watany Factory	Shoe Laces.
28	"	Al-Shark Factory.	Bed Linen.

3. PAPER.

1	Public	Basrah paper Factory State Company for paper Industries - Basrah.	Writing paper, printing paper, kraft paper, Liner paper, Duplex board, Asphalt board and Common board.
2	Private	Paper requirement Industrial Factory.	Tissue Paper to IOS 1555. Toilet Paper to IOS 934. Napkin paper
3	"	Paper Industry Establishment	Paper Plate to Fed. UUP-670D.
4	"	Hilal Factory for Paper cups.	Paper cup to Fed Spen.
5	"	Ink, Carbon, Stencil, Printing Paper Industrial Establishment.	Carbon Paper, Stencil Paper

(1)	(2)	(3)	(4)
6	Private	Babylon Establishment for Abrasive Paper and Cloth.	Abrasive Paper
7	"	Abdul Hamid Company for Carton Industries.	Cartons.
8	"	Private Carton Co.	Wrapping box.
9	"	Mansur Factory for Sensitive Paper	Sensitive Paper for Printing
4.		LEATHER, RUBBER & PLASTICS.	
1	Public	General Enterprise for Leather Manufacturing	
		a. Leather Shoe Factory	Different types of Shoes Egyption Spen 330 & Special Factory spens.
		b. Rubber & Plastics Shoes Koffa.	Rubber Shoes to Egy. sp. 844 Platic Shoes & slippers, Micro-cellular Rubber Slippers to IOS 361.

(1)	(2)	(3)	(4)
		c. Bags Factory.	Travelling bags, School bags, Belts and Sacs.
		d. Leather Tanning Factory.	Upper leather to Egy. sp. 274 & Special Factory Spen. Lining Leather Egy. Sp. 447 Sole Leather Egy. Sp. & Special Factory Spen.
2	Public	General Enterprise for Rubber Manufacturing	
		a. Tyre and tube factory for cars, Diwania.	Products have not been tested.
		b. Tyre and Tube Fac tory for bicycle, Koffa.	
3	"	General Enterprise for plastics & Asbestos.	PVC high press. (10Kg/cm^2) PVC Low press. (6kg/cm^2) PVC Sewage Pipes. Punch Plastic Pipes Polyethylene H.D. Pipes.

(1)	(2)	(3)	(4)
4	Mixed	The National Chemical Industries Co.	Synthetic Sponge - to Kuwaitian Sp. 25. PVC Pellets, PVC tubes polystyrene sheets and Boards: Plastic disposable cups to Fed. Sp. L-C-770a. Polystyrene boards for Refrigerators (no spen) Coated Knitted fabrics for upholstered furniture - PVC type (BS 2601), polyurethane type (no spen.) Coated Knitted fabrics for bags (no spen.)
5	"	Decorative Laminated Plastics sheet Co.	D.L.P. sheet to IOS 1777.
6	"	Plastic flat sacks production Co.	Platic flat sacks to general requirements to relevant Fed.Spen. Polyethylene films for Agriculture to IOS 1174.

(1)	(2)	(3)	(4)
7	Mixed	Technical Plastic goods Co.	Television, Radio, Cassete bodies (no spen.). Plastic Crates to BS 5124, plastic joints (no spen.)
8	Private	The National Flooring Industries Co.	Unbacked flexible PVC flooring to BS. 3261.
9	"	Baldawi Bilasco factory,	Melamine Plastic Tableware to IOS 241.
10	"	Al-Thika Co.	Plastic tableware except Melamine plastic rulers for school use to BS. 4093.
11	"	Agriculture Plastic Production factory.	Polyethylene films for Agricultural use to IOS 1174 Flat Plastics sacks.
12	"	Iraqi Rubber Industries Co.	Rubber solid block for Automobiles BS. 106. Microcellular rubber slippers IOS 361.

(1)	(2)	(3)	(4)
13	Private	Al-Nasrain Plastic Shoes Co.	PVC Shoes (no psen.) microcellular rubber slippers - IOS 361.
14	"	Modern Rubber Industries Co.	Plastic toys - IOS 1150. PVC pipes for cold water - to Egy. spen. 982.
15	"	Iraqi Insulation Material Industries Co.	Expanded polysyrene for thermal insulation - IOS 1768.
16	"	Al-Wathiq Platic factory.	Rigid polyurethene chairs and tables (no spen.)
17	"	Al-Rafidian Rubber production factory	Latex Rubber Gloves to BS. 1651, Latex Rubber Balloons
18	"	Chemical Plastic production Co.	Tooth brush to IOS 1101.
19	"	Plastic Thermo-flask	Thermoflask to Egy. Sp. 381.

(1)	(2)	(3)	(4)
20	Private	Al-Salih Buttons factory.	Plastic buttons to B.S. 3866
21	"	Al-Dijlah glass fibre reinforced.	Showers and Bath-tubs to BS. 1188 corrugated g.f.r. plastic sheets to BS. 3953.
22	"	Arabic leather Co.	Goat and sheep skin to Egy. Sp. 274. Lining leather, Paint leather, Cow hides.
23	"	Al-Nahrin Leather gloves manufacturing factory.	Leather gloves for workmen, Leather gloves for welding to Fed. Spec. KK-G-486a
24	"	Vacuum Technique factory.	Plastic helmets to BS. 2095 and 4033.

Annex. XIV- B

PROFORMA FOR INSPECTION OF LABORATORIES

REPORT ON PRELIMINARY LABORATORY INSPECTION

1. General Information

   a) Name of the laboratory.

   b) Address.

   c) Date of inspection.

   d) Situation of the laboratory.

   e) Telephone number.

   f) Management staff.

   g) Persons contacted.

2. Lay-out of the Laboratory

2.1 Availability of space.

2.2 Arrangement of the equipment.

3. Checking the List of Equipment.

(For this purpose the list of equipment supplied in the proforma submitted by the laboratory may be used).

Name of Equipment make, cataloque No.	Whether in Working order or not	Latest Calibration Certificate.	Remarks

4. Testing Experience.

4.1 Specification against which testing is normally done.

4.2 Organisations for whom testing is done.

4.3 Specimen copies of test certificates.

5. Personnel.

5.1 Number of persons engaged in testing.

5.2 Academic quelifications and experience of persons engaged in testing.

6. Any other Information.

r° to be checked conclusion, Recommendation and Points for Action.

Inspected By:

Date: _____ Signature:

RECOMMENDATIONS:

APPROVAL: