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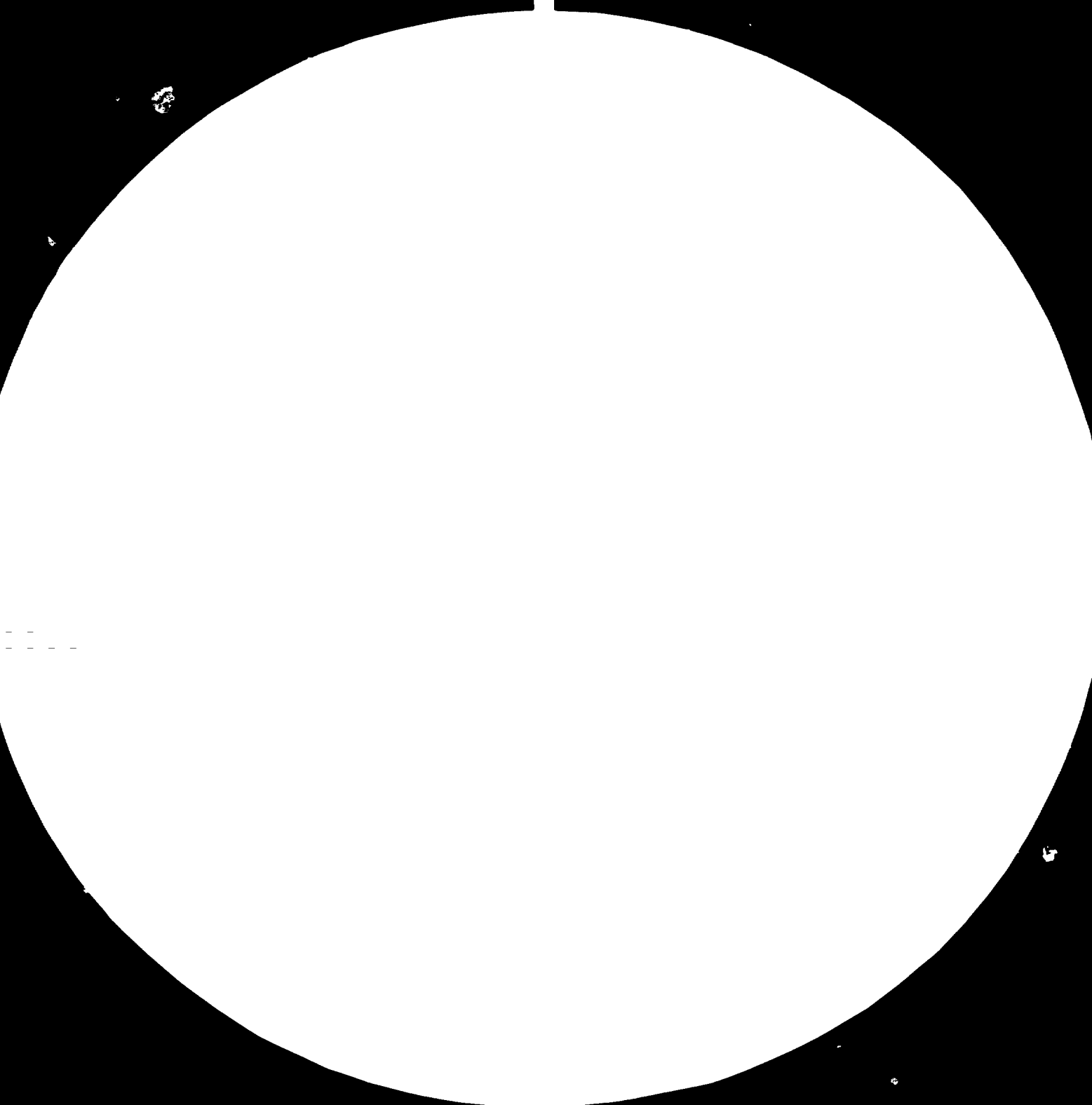

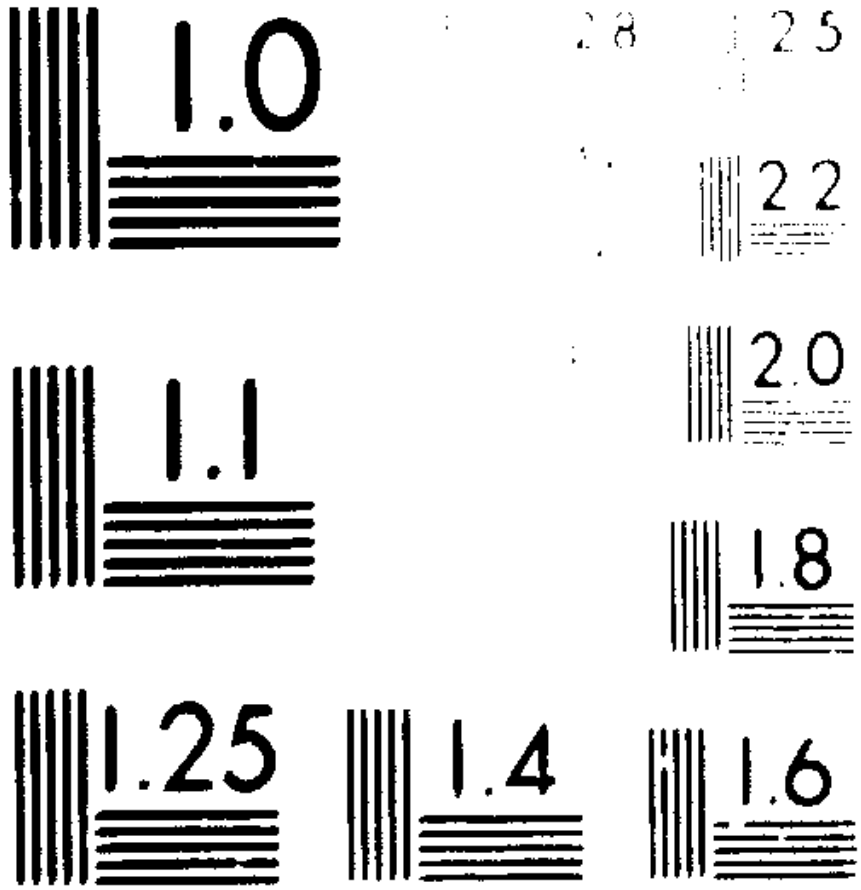
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STRENGTHENING

OF

THE IRAQI ORGANIZATION FOR STANDARDS

FINAL REPORT ON THE EXTENDED

MISSION ON

QUALITY TECHNOLOGY AND MANAGEMENT

(TF/IRQ/77/003/11-04/ 31.3A)

" This report has not yet been cleared by UNIDO which therefore does not necessarily agree with the views expressed ".

PREPARED FOR THE GOVERNMENT OF IRAQ

BY

SH SUNDARA RAJU

UNIDO EXPERT

BAGHDAD, DECEMBER 1982

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UNIDO EXPERT

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CONTENTS

SUMMARY

Quality control in Food is a major activity of the year in the extension of intensive quality implementation and improvement programme to specialised sectors of industry envisaged by the Central Organisation for Standardisation and Quality Control (COSQC).

Dairy products, bread and biscuits, chocolates and beverages are the items covered. Model quality systems manuals and check-lists were prepared for yogurt, beverages and bread. An interesting and useful study was concluded to improve the quality and weight of bread as per IOS.

Reliability evaluations were carried out on electric lamps (60W), colour televisions and freezers; case studies (first of their kind) were prepared, to serve as reference for future programmes.

Keeping in view the statutory provisions that exist in respect of quality control and standardisation and the dominant role that the socialist sector is playing in the economy of the country, certain recommendations have been given to strengthen the national quality control activities within the framework of COSQC and the various State Organizations for Industry. Specific guidelines for standardising the respective quality functions are also given.

Augmenting the supply of trained quality specialists and managers is an urgent step recommended to promote and implement quality and achieve rapid economic growth in the country. Implementing a national quality apprenticeship scheme for fresh engineers, technologists, and graduates from the

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physical sciences and establishing a professional training and education centre for the development of specialists and the factory personnel are the other recommendations. The need is also brought out to launch an vigorous O. improvement programme to save several millions of dinars specially in the capital intensive socialist and the mixed sector factories by way of prevention of defectives, wastages, sub-standards and the other c. losses.

1. INTRODUCTION

1.1 This is the concluding Report of the third year of the mission on quality technology and management in Iraq.

1.2 In pursuance of its need, the Government of Iraq sought from UNIDO international expertise to develop quality control through its Project "Strengthening of the Iraqi Organization for Standards" (TF/IRQ/77/003/11-04/31.3A). The mission was launched when the Expert reported at his duty station, Baghdad on 14 December 1979. In the first year, intensive implementation of quality technology and management was taken up in a few factories producing textile products and domestic appliances. A nine-month in-depth training was also concluded for twenty engineers belonging to the Central Organization for Standardisation and Quality Control (COSQC). Technical visits were undertaken to survey the status of quality control in industry and promote quality control applications for quality and cost improvements. As the work progressed and the scientific methods of quality control gradually gained momentum from the management, the term of the Expert was renewed for a second year

to extend the scope of quality control to more factories and pursue on-the-job training and development of the engineers in quality technology and management. In the second year, intensive quality improvement and quality systems work was extended to electrical fans, heaters and dairy products. At the same time there was vigorous follow-up in the textil quality promoted in the first year. Specialised in-plant and inter-plant courses were conducted for the textile industry. Intensive training was imparted to the fourteen counterpart engineers. The scientific base of quality in the seven representative plants in the country was strengthened. The technical staff was increasingly exposed to the techniques and procedures of quality control. Quality Manual was designed for one of the products, gas cookers. As a result, the need was persistently felt for quality control to extend to specialised sectors such as food, electricals etc. There was growing awareness in the country to improve quality and lower the costs of production. An appreciation developed in the management to have the engineers trained in the basics of reliability engineering and the techniques of design and analysis of experiments, with specific reference to Orthogonal Array (OA) for process, product and productivity improvements. This led to the renewal of the term of the Expert for the third year, through 7 December 1982.

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1.3 The present report broadly confines to the activities, findings and recommendations of this third year mission. For the two-year ended with 7 December 1981, the Expert had submitted a detailed Report (TF/IRQ/77/003/11-04/31.3A, February 1982). An extract (Section III 16-20P) of the Recommendations from the earlier report is given in Annex 1, for ready reference.

1.4 Annex 2 gives the programme of work concluded in the year now under Report.

2. ACTIVITIES AND FINDINGS

2.1 Quality Control in the Specialised Sectors

2.1.1 In the first two-years, the thrust of the activities was in the

1. demonstration of applications of QC techniques and the management principles in the factories for quality improvement and quality assurance of products as per applicable standards

and

2. training of the counterpart and the factory engineers in a few representative plants to strengthen and develop their technical abilities and skills in the total quality control and assurance tasks.

2.1.2 At the end of the second year when the programme and priorities were under consideration the question came up about the need for COSCO engineers to develop specialist skills and knowledge in quality control

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as applicable to various sectors such as food, textiles, chemicals, mechanical and engineering and electrical products. It was recognised that the COSQC, besides its responsibilities for formulation of national standards and specifications has also a significant role to play in the verification of conformance of products with the applicable standards and wherever required, in providing technical and other assistance to factories in the improvement of quality and reliability of the product and the reduction of costs of manufacture. Viewed against this background, it was a commendable forethought that the COSQC had given consideration to have some of its engineers acquire specialist skills and knowledge in specific industry sectors for undertaking quality and productivity improvements as well as the lowering of costs, in manufacture. In the work programme of the year (Annex 2), certain emphasis was given to quality control in food and electrical sector products. Intensive work was taken up in yogurt, butter, bread and biscuits and non-alcoholic beverages, [illegible] uality evaluation of yogurt in the market was also completed.

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2.1.3 The quality control in the food products brought to focuss many interesting facts:

1. In the yogurt, several defects including bacteriological non-conformances were reported, although at the time of despatch from the factory, the yogurt had reportedly conformed to the specifications.

2. In the biscuits, the need was under-lined to formulate specifications for second quality biscuits which was being sold at discount, to the consumers.

3. In the bread, the need was stressed for total quality control including weight and freshness (elasticity) control.

4. In the beverages, the need was pointed out for control of contaminants (dust, dirt, foreign matter and other visible impurities).

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2.1.3.1 The need for total quality control of food items was stressed in the factories visited. It was recommended that the managements must pay special attention to :

1. Hygiene control
2. Field quality control including packaging, storage, handling and preservation
3. Documentation and reporting of quality
4. Batch control to permit traceability of the materials and process conditions and
5. Process quality control with particular reference to washing of the equipments.

2.1.3.2 Except in the dairy, the organisation structure including the trained manpower for carrying out effective QC in food, was generally weak.

2.1.3.3 In the bread plant, optimum levels for yeast improver, salt and water were determined by a series of experiments, in order to produce bread of the required weight and quality.

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2.1.3.4. Reliability studies were concluded on the raw milk in a dairy plant.

2.1.4 In electric iron, it was pointed out that process quality must be more effectively controlled, specially from the standpoint of the conformance of the finished irons to the stipulated safety and the other requirements.

2.2. Reliability Evaluations

2.2.1 Reliability studies were concluded on electric lamps, freezers and colour televisions. The studies brought to light the necessity for more effective:

i) incoming quality control of components and materials (compressors in freezers)

ii) quality control in manufacture (lamps) and

iii) design quality control in the televisions.

2.3 Situation Analysis

2.3.1 As mentioned earlier, the activities of the year centred upon:

1. demonstration of the kind of techniques and approach for implementing total quality control and assurance in industry

2. implementation of special methods for quality, controductivity and cost improvements in manufacture

3. creating a core of engineers trained in quality and reliability and

4. arousing the interest of managements in the implementation of scientific quality technology and management tools and methods.

2.3.2 Judged from the applications (Annex 3 gives the technical publications) and the progress seen, it can be reasonably stated that a significant impact has been made on the representative plants in the applications of quality techniques and the interest of the managements has been substantially aroused in extending the scope of quality control work in the factories.

2.3.3 There are however, several questions that arise when the pace of implementation has to be accelerated to cover more industries-large medium and small- in Iraq in a reasonable time say 4 to 5 years from now. Apart from the consideration of accelerating the momentum, the basic question has also to be considered as to how best the positive attitude of the representative managements could be sustained in the immediate future, and continuity is maintained in the quality improvement and implementation tasks.

2.3.4 There are a little over nine thousand factories in Iraq out of which about four hundred are in the socialist and mixed sectors. The private secector plants are mostly small engaged in the production of the rather "easy-to-process" products. In terms of the basic inputs of quality technology such as gauges, instruments, trained manpower, standards and quality techniques, such plants have to go a long way. In the socialist, mixed and the organised medium and large private plants, there are quality control facilities but they are not fully utilised to achieve effective quality control and assurance of the processes and products. Inspection and test in these plants is by itself regarded as quality control activitiy.

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The depth and the breadth of quality activity is not yet comprehended. With the result such vital areas as supplier quality control and control of post-manufacturing areas such as packaging, storage, handling, transhipment and preservation, are not given the extent of considerations they deserve.

2.3.5 Against such a background, the question arises: How best rapid and effective implementation of quality control be secured in the country ?

2.3.6 No doubt there are several issues to be considered. Unlike in situations in which the role that quality can play is determined by such criteria as profit or cost improvement or the other market forces that shape the attitudes of managements, there is in Iraq the statutory Law No. 54 that makes obligatory for the managements in the country to produce products of standard quality economically and thus protect the consumers against sub-standards and losses. The Law is no doubt a powerful stimulant. But by itself, it cannot achieve much unless the managements formulate concrete plans of action with a view to implementing quality control effectively and expeditiously in their organisations.

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2.3.7 The COSQC as a premier organisation has a vital role to play in this connection. Apart from its statutory role as a monitor, it has to serve as an effective co-ordinator, promoter, trainer, consultant, disseminator and leader in respect of quality control, quality assurance, inspection and test activities, in the country. Such a role imparts new and varied dimensions to its activities.

2.3.8 Whether it is COSQC or a large number of managements concerned with quality control in the country, the most urgent question that needs consideration is the availability of trained manpower to undertake the various tasks of quality technology and management. The question of training is under active consideration of the COSQC management for sometime. At present, besides the training being arranged abroad for its chemists and engineers in the specific fields of inspection and test, a group of twelve to fifteen engineers have received intensive training in various aspects of quality technology and management under the guidance of the Expert. To this, if the number of trained personnel available in the other organisations is added, the total stock in the country is of the order of twenty to twenty-five who can be regarded as quality professionals with 3-5 years experience in the field.

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Judged from the needs of the country and the time-frame of 3-5 years within which about nine-thousand factories have to be covered by the effective implementation of quality control, the number now available is too small to make any significant contribution to quality or national economy by way of efficient utilisation of the resources and improvement of productivity.

2.4 Training Strategy in the 1980s

2.4.1 National Plan of Training

In response to the desire of the COSQC management, the Expert had prepared a National plan of training the personnel in Iraq in June 1981. It is believed that the approach envisaged and the plan of action presented in that report are still valid for implementation, for ready reference the report copy is given in Annex 4. The point, that needs emphasis is that a quality professional as in medicine would take 3-5 years, to mature under guided association of senior specialists with over 5-8 years experience. The training and development has to be on applied problems. This naturally calls for intensive practical work backed by intermittent doses of theoretical instructions.

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Such an approach of sand-wiched theory and practice unfortunately takes considerable time, and quick results cannot be reasonably expected. Therefore any delay in the implementation of the training plans would only result in the postponement of realisation of practical benefits.

2.4.2 Apprentice - Scheme

2.4.2.1 Certain plans have been proposed for increasing the supply of quality specialists in Annex 4. These plans mostly refer to the training of professional engineers and technologists. Considering the specialised needs of the COSQC and those of the industry, a scheme is presently proposed to augment the supply of tra ned manpower in quality technology and management.

2.4.2.2 The scheme in essence, consists of recruiting as apprentices, fresh bright engineers, technologists and graduates from physical sciences as soon as they finish their graduation and imparting applied training at professional level to them at the Training Centre of COSQC. The duration of apprenticeship might vary upto eighteen months to two years. After the successful completion of the apprenticeship, the persons will be offered regular appointments in the COSQC or by the factories to undertake various quality tasks and responsibilities.

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2.4.2.3 This kind of apprenticeship has been successfully implemented in some countries including India. (In India, under the colombo plan scheme a post-graduate training centre was established in 1964 for augmenting the supply of quality specialists to industry. The centre is turning out about 20 persons every fifteen months. Two more centres have since been established to train persons employed in industry on a part-time basis.)

2.4.2.4 The apprenticeship training is intended not for imparting the university-type of education but for applied project studies and theoretical orientation to meet the specific requirements of quality professionals. A training centre at the COSIC is preferred as the Organisation generates rich practical data and has close contact with industry and institutions; practical training can be effectively organised.

2.4.2.5 The exact topics, sequencing, method of instructions and the other organisational inputs and facilities including budgetory implications have to be worked out in detail to implement the scheme.

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2.4.2.2 The quality Systems Division at the COSQC might be entrusted with the responsibility for technical work and co-ordination.

2.4.3 Development of Quality Specialists in Industry

2.4.3.1 The need is also urgent and real to impart accelerated training in quality at professional level, to selected persons from industry. Such an objective can be more easily realised in the socialist, mixed and the organised private sector plants. The approach consists of securing from the managements concerned, nominations of engineers/technologists from the factory to undergo training in quality control. The duration and the kind of trainingto such personnel would obviously differ from that proposed for the fresh graduates as apprentices. The availability of the nominees to undergo full time training, all the six days in a week, is doubtful. The theoretical and practical training has to be sand-wiched and made more specific to suit the products and technology needs.
Specialisation in product types such as textiles, electricals etc. is nother grouping that needs consideration. Taking all these factors into consideration, a continuous training and education scheme needs to be worked out and implemented in the COSQC.

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2.4.4 Short Term Courses

Apart from the development of specialists, there is need to conduct a number of short-term, specialised lecture-courses and training in quality control and allied subjects. A detailed list of such courses is attached to Annex 4.

2.5 Quality Control in the Socialist and Mixed Sectors

2.5.1 Judged from their importance to the economy, and the output, employment and income they generate, the socialist and the mixed sectors occupy a significant role in the quality control setting in the country. There are about four-hundred factories engaged in the production of various consumer goods and services. The State Organizations for textile and food industries have already taken significant steps to strengthen the quality control activities in their factories. It is heartening that they are exploring possibilities to set up quality Directorates within their administrative framework with certain quality functions entrusted to them. Such a step would no doubt supplement and strengthen the quality control efforts of COSQC. The functions that the Quality Directorates of the State Organizations might carry out include:

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1. Formulation of economic Quality Standards for various products consistent with the IOS requirements.

2. Doc mentation of the these as Company Quality standrads.

3. Design and preparation of Quality Manuals (The manulas give guidelines to implement the Quality Standards).

4. Analysis and appraisals of Quality Status of products in factories. (This it does by specifying standard formats for reporting quality parameters, losses etc. on a regular basis by each factory).

5. Special studies for quality improvement and development and cost reductions.

6. Training of personnel in quality.

7. Promotion of quality in the factories.

8. Audit of quality.

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9. Preparation of quality aids, gadgets and posters for training and promotion.

10. Preparation of quality Incentives and reward schemes wherever required.

11. Consultative assistance on trouble shooting/defect prevention

12. Applied research and development specially with respect to process and product development using QA techniques and Industrial Experimentation.

13. Publication of case studies.

14. Preparation of bi-monthly quality control Newsletter for circulation among the factories.

15. Co-ordination with the COSQC in the national QC activities.

16. Preparation of supplier material quality manuals.

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17. Survey and appraisal of the supply sources both inside the country and outside.

18. Appraisal of the top management of the inter-factory performance and the latest trends in the quality field in the world.

19. Organization of conferences, seminars, workshops etc.

20. Participation in the international conferences/ Meetings relating to quality and reliability.

21. Consultancy services to the small and medium private plants in the country which are supplying materials to the State Organization.

2.6 Need for re-structuring the responsibilities in the COSQC.

2.6.1 In a special study undertaken in the Food Quality Control Division, it was reported (see Annex 5) that the effectiveness of quality activity and productivity of the Laboratory can be stepped up

significantly provided, among others,

1. The role and the functions of the inspection (it was suggested that this might be more appropriately called "Appraisal Division") are up-graded in tune with the needs of the national quality control activities of the COSQC and

2. The quality testing and evaluation in the Laboratory is planned and conducted on modified lines (broadly to confine to priority and specialised products and areas and critical and major characteristics).

2.6.2 The man-power and the test resources at the COSQC have to be put to maximum productive use which would naturally result in the more effective implementation of quality in the country.

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2.6.3 To man the proposed restructured functions, specific training needs to be organised for the Inspection Personnel.

2.6.4 As for the Laboratories, re-scheduling of inspections and tests has to done keeping in view the planned load and the priorities designed in the quality monitoring programmes.

2.6.5 The quality Systems Division needs strengthening in its manpower. Planning, progress and appraisal of quality activities in the COSQC is an important area which can be entrusted among others, to the Systems Division.

3. Recommendations

1. Re-structure the quality functions and activities in the COSQC

Serial No.	Function	Department/Division to carry out the function
1.1	Set-up a quality planning, Progress and Appraisal Unit to :	A highly competent but small 2-3 men team could form the Unit. It could work directly under the President; alternatively it could function as a wing of the DG(QC). In any case, the Unit has to have close relation with the Q. Systems Div. for formulation of the plans and their review. The Unit has to have sufficient flexibility and access to various departments/ Divisions. Reporting has to be objective and independent.
1.1.1	Undertake periodic survey of the factories to assess the status of QC in them	
1.1.2	Prepare priority lists (on certain criteria safety, reliability, health-care and high cost manufacture and socialist/private managements - good, satisfactory or poor Q. management) of factories and products for Q. surveillance and sampling and testing at the COSQC.	
1.3	Review the progress of implementation of the planned load on quarterly basis.	
1.4	Evaluate and revise the priorities and plans from time to time	

1.2	Design and participate in the Q. evaluation and studies in the market to assess the status of field quality of products.	Inspection(Appraisal) Division, Q. Systems Division and the Laboratories.
1.3		
1.3	Prepare quality checklists and systems as per IOS, for various products (example; yogurt and beverages)	Q. Systems Division in co-operation with the Laboratories and Inspection Division
1.4	Provide consultative guidance on design and execution of defect prevention and Q. improvement studies in factories	
1.5	Design Q. Systems for specific products	Q. Systems
1.6	Set-up data-evaluation procedures and assist the Laboratories in the maintenance of Log Books on Test Results in Standard Forms (Eventually as the COSQC grows, serious consideration has to be given to the setting up of computerised Q. and r liability Data Bank).	Q. Systems

1.7	Assist the factories and the Inspection Division in the implementation of Q. Assurance programme to meet IOS requirments (The Guidelines for Implementing QA Programme Requirements must be circulated to the factories and the follow-up steps organised as appropriate)	Q. Systems
1.8	Quality audit in factories	Q. Systems
1.9	Conduct Q. training for industry (see Annex 5)	Training Division and Q. Systems Div.
1.10	Conduct management seminars, meetings, workshops	Training and Q. Systems Division.
1.11	In-house consultant for the standardisation Directorate, the Laboratories and the Inspection Division (An urgent task is to review the sampling systems in the IOS standards and revise the procedures to the extent necessary both for the COSAQ and the factory inspection and tests)	Q. Systems

1.12	Prepare visual aids, course materials and manuals.	Q. Systems
1.13	Publish case studies, technical articles on Q. improvement and implementation	- do -
1.14	Bring out Quarterly journal on Q. technology	- do -
1.15	Promote QC (Study tours, seminars and conferences, posters, lectures and technical visits to factories)	- do -
1.16	Technical liaison and co-ordination with the national and international organizations engaged in Q. control work	- do -
1.17	Close technical co-ordination with the Q. Directorates of the State Organizations	- do -

1.18	Rapid Inspection and test methods-applied research and development	Systems Division
1.19	Identification and witnessing of inspection and tests at site in the factories	Inspection Div.
1.20	Design and follow-up of implementation of Q. forms and records at the factory to meet the IOS requirements.	Inspection Div.
1.21	Consultative asistance to factories for effective Q. control as per IOS	- do -
1.22	Inspect and test, and report as well as certify at the factory, wherever required, the Q. of product as per IOS.	- do -
1.23	Train the factory inspectors and test personnel as per IOS requirements	Inspection Div. and the Laboratories

2. There is need to develop more quality engineers in individual specialisations such as textiles, food, chemicals etc. and attach them for consultancy, training and quality implementation work with the respective Laboratories/Inspection Divisions.

3. The recommendations contained in the Report of the Expert submitted in February 1982 (see Annex 4) require consideration and implementation.

ACKNOWLEDGEMENT

The Expert got inspired in his mission by the positive attitude and continuous support given by Dr. Hannush Mehdi, President, Mr. Abdul Fatah, Director General (Quality Control), Mr. Abdul Razzak Hilal, Director General (Standardisation and Metrology) and Mr. Mahmud Menzi Director (Admin) in the COSQC, and he expresses grateful thanks to all of them for their kind assistance and support.

It is the good fortune of the Expert that despite exceptional circumstances that prevailed in the country, he had a band of highly devoted and motivated counterparts who took keen interest in various programmes and bent their energies to assist in the mission. Indeed many thanks are due to each of them and to Mr. Salman Taher Salman who led the team competently, a word of special thanks is due.

Dr. Adnan Soghaier, Resident Representative, Mr. Salim Kassum Deputy Resident Representative and Mr. K. Padmanabhan Assistant Resident Representative at the UNDP gave liberal facilities and secretarial assistance in the mission. The Expert owes his gratitude and thanks to them for help.

Extract of the Recommendations
from the report TF/IRC/77/003/11-04/31.3A
February 1982.

III. RECOMMENDATIONS

3.1 By its pivotal role, COSQC has to spearhead the national drive for:

1. arousing the consciousness of the managements in industry for effective implementation of Q. control and achieving economy in manufacture by promoting adoption of scientific methods of Q. control
2. ensuring effective implementation of the statutory provisions specially with regard to Q. control methods in raising the level of Q. and producing the products as per applicable standards
3. assisting and guiding the managements in the proper implementation of Total Quality Control (TQC)
4. extending training facilities
5. providing inspection and test assistance and guidance in Q. evaluations
6. providing liaison and co-ordination in the Quality and Standardization matters for securing a strong and competitive base for Q. and economy in the manufacture and the merchandising of the products, for the benefit of the consumers.

3.2. The following steps might serve as a guide for the management of COSQC in working towards the above objectives:

1. Draw-up a specific and time-bound plan to implement TQC so as to cover all the industries engaged in manufacture in a reasonable time.

2. Set-up study - groups to appraise objectively the actual difficulties and problems encountered by the managements in the plant-wide implementation of QC.
3. Prepare product-wise Q. Manuals
4. Extend specialist assistance and guidance to factories in Q. improvement, Q. assurance and Q. systems design and implementations
5. Organise Q. education and training for personnel from industries.
6. Promote application of scientific tools and techniques of Q. including assistance in metrology, SQC and Q. Cost improvement techniques.
7. Organise in-country and international study tours to raise the Q. and secure rapid advancement of Q. programmes.
8. Organise annual national Q. and Reliability conferences, seminars, meetings and Workshops
9. Set-up industry-wise (product wise) permanent Q. committees to co-ordinate Q. implementation and improvement - activities in the country.
10. Establish regional centres for consultancy, promotion, training and Inspection and Test activities in Mosul and Basrah.
11. Establish a national society for Quality Control in Iraq.
12. Establish a high Quality Journal on Q. Technology and Applications (there are already enough rich in - country case studies and theoretical exercises to cover six to seven volumes of a Journal over the next one (two years.)
13. Publish case studies to promote applications

14. Establish good library and publication of reference literature in Q. and Reliability.

15. Establish in co-operation with the Institute of Technology and the Baghdad University post-graduate degree, diploma and certificate courses on Q. and Reliability.

16. Introduce mass Q. education and training programmes in the TV and the Radio.

17. Institute national awards for the best Quality producing firms and the publication of outstanding papers / articles on QC.

18. Undertake specific applied research and development aimed at Q. improvement and development inspection and test of the product and Q. assurance, for maximum economy convenience and pr acticability in the small industry as well as the organised sectors of the industry and

19. Undertake, at source, Q. evaluation and certification specially of su h mate ials as are procured and distributed for production to various small and other factories

3.3.1 <u>Need for Reviewing the Q. Responsibility Structure in COSQC</u>

The COSQC might also restructure the Q. functions and the responsibilities of some of its Divisions so as to achieve more effectiveness and economy in its operations.

3.3.2. In addition to its present functions, the INSPECTION DIVISION (This might be more appropriately named as Q. APPRAISAL DIVISION.) might,

1. witness at the factory the checking, testing and assessing the conformance of the Q. of the product asper applicable standards.
2. evaluate the status of Q.systems and pro-

cedures and approve them as per specified guidelines.

3. verify and certify the Q. records and reports at the factory as per procedures given

4. report in standard formats to the managements of the factory and the COSQC non-conformances whenever and wherever noticed during inspections and tests at the factory.

5. prepare periodic and monthly reports on the Q. deficiencies in the prod ucts and processes at the factory

6. assist the Q. systems Division at the COSQC in the review and revisions of acceptance sampling and inspection check-lists and Q. improvement programmes and

7. suggest improvements, amendments or any other line of action in order to strengthen the field Q. activities of COSQC.

3.3.3 Among others, the Q. systems Division might draw up plans for Q. improvements in industry and provide design / planning assistance with respect to,

1. sampling and testing of products so as to comply with the statutory requirements
2. evaluation systems and procedures
3. preparation of Q. Manuals
4. design of training aids and gadgets and
5. training personnel in industries.

3.3.4 The test Laboratories might also contribute to the improvement of productivity and economy in work by organising their work,

1. to test and evaluate "major and critical" characteristics in products more frequently than the 'minor' characteristics in products
2. to assign to Inspection (Appraisal) Division qualitative tests such as appearance, finish

surface defects etc and tests / checks for which facilities at COSQC are not readily available

3. to carry out more of instrumental and specialised inspections / tests for which there are no facilities or skills available in the factories

4. carry out more frequently market Q. evaluation specially for reliability, shelf-life and similar characteristics which deteriorate over time and

5. participate in the Q. improvement (development) work with the specialized skills they possess.

Annex 2

Programme of Work

(8 Dec. 1981 to 7 Dec. 1982)

1. Technical visits to the Dairy Plant for intensive Q. implementation and systems design for yogurt and follow-up of the programmes in milk and the other dairy products.

2. Technical visits for the bread production plant for Q. improvement and systems studies.

3. Technical visits to the non-alcoholic beverages for Q. systems studies.

4. Technical visits and follow-up for TQC in Biscuits.

5. Promotional visits and studies in the sugar plant and cement plant.

6. Follow-up the QC programmes in the woollen mills and kerosine heaters.

7. Technical visits for QC studies in the electric motors

8. Training courses and workshops

8.1 conduct six-weeks workshop for the COSQC engineers on consumer Q. evaluation (market surveys).
8.2 conduct one-week lecture course on Design of Experiments followed by four week practical training in the data evaluations and field experiements.

8.3 conduct one-week lecture course on reliability.

8.4 deliver 3-day lectures on QC in Textiles for Teachers from Textile Training Institutes.

9. Visits to the Specialised Engineering Institute, the University of Baghdad and the Institute of Technology, the Arab Institute for Training and Research in Statistics, for studying collaboration possibilities for QC education and training.

10. Prepare technical reports and case-study materials on Q. improvements and Q. system.

11. Guide the counterparts in the preparation of technical reports and case studies for publication.

12. Preparation of half-yearly and final reports of the mission.

Annex 3

TECHNICAL PUBLICATIONS

A TECHNICAL REPORTS

1 Report on Q. Assurance of Gas Cookers (24 p)

2 Q. Improvements in the 17th July Woollen Mill (27p)

3 An Experiment on improving whiteness of cloth (12p)

4 Viscose yarn Q. Control (7p)

5 Q. Control of Indola Table Fans (51p)

6 Q. Control in the State Enterprise for Dairy Products (41p)

7 Q. Improvement in Preparatory and spinning (7p)

8 An Experiment in Dye-stuff at the State Enterprise for fine Textiles (6p)

9 A special study in 20^s yarn Q. improvement in the State Iraqi Textile Co. (7p)

10 A study on Carpet Quality (7p)

11 Q C in the State Canning Co. (5p)

12 Q C in Brewery (4p)

13 Q C in the National Food Industries (Report No.2) (6p)

14 Q C in the National Food Industries (Report No.1) (6p)

15 Pilot Study Report on Kerosine heaters (7p)

16 A study on the control of speed of Table fans (18p)

17 Report on Q. Assurance of Biscuits (15p - manuscript)

18 Q. Control in Cement (12p- manuscript)

19 Q. Control in the Hisan Sugar Factory (16p- manuscript)

20 A Methodological Study of micro- biological Standards for foods (7p)

21 Q. Control in the COSQC (33p)

22 Q. Improvement o f Samo uns (36p)

23 Consumer Q. evaluation (22p)

24 Q C Report: 7-up factory (3p)

25 Q C Report at the Iraqi Co. for Ice-cream and Dairy products (5p)

26 Report o n the QC Surve y at the Sadik fact ory (Yogurt) (4p)

27 Report on t he visit to the Light Industries Company (4p)

28 Q. Control o f Electric Irons

29 Q. contr ol of Bricks

30 An Experiment on Q. Improveme nt of mosaic ti les.

31 Report on the visit to the State Woollen mill in Arbil (8p-manuscript)

32

B. Q.SYSTEMS MANUALS/CHECK-LISTS

32 Q. Assurance Manual (for Light Engineering Indus tries 67p)

33 Q. Assurance Manual for Yogurt (30p)

34 Q.f aystems for kerosine Heaters (9p)

35 Q. Check-lis t for Samoun-Bread (10p manuscript)

36 Q. Check-lis t for Soft Drinks (6p manuscript)

37 Q.check-lists for butter, cheese and cream.

C CASE STUDIES

38 Q.Co ntrol Case Studie s in certain Iraqi Ind ustr ies (A collection of twelve case studies from various indus tries is presented in the publication 93p)

39 Case studies in Reliability (A collection of four studies is presented in the publication 51p)

4D MANUALS/GUIDELINES FOR COSQC

40 Guidelines for Implementing Q. Assurance programme requirements in Industry(86p)

41 Guidelines for Assessment of Q. programmes in Industry (115p)

42 DRAFT Glossary of terms in Q. Management (192 terms)

E TRAINING MANUALS

43 Q. Technology (453p)

44 Q. Management (255p)

45 A Basic Course in Reliability (46p manuscript)

46 Orthogonal Designs and their Applications for Q. Improvements, and economy in Manufacture

47 Q. Control in Textiles (59p)

48 Q. Control in Engineering Industry (case problems (28p)

49 Practical Q. Control in Woollen Textiles (35p Arabic)

50 Q. Control Tables (51 Tables compiled in one volume to facilitate reference by the practitioners)

F GENERAL AND PROMOTIONAL

51 A National plan for Training in Q. Control in the Republic of Iraq (45p) 1981 June

52 Q C Development: Draft frame of Five Year Plan in the Republic of IRAQ- June 1981(12p)

53 Application of the Scientific Methods in Textile Industry in Iraq-July 1982 (5p)

54 Application of the Scientific Method in Industry in Iraq (5p) - August 1982.

A NATIONAL PLAN
FOR
TRAINING IN QUALITY CONTROL
IN
THE REPUBLIC OF IRAQ

A WORKING PAPER

by

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UNIDO EXPERT

BAGHDAD, JUNE 1981

(i)

C O N T E N T S

(ii)

A NATIONAL PLAN FOR TRAINING IN Q. CONTROL

1. INTRODUCTION

1.1 The core objective of Q. control is defect prevention. Defects in products commonly arise due to defective material, manufacture, workmanship, storage, handling and packaging, and sometimes due to bad design, unsuitable environment, lack of preservation and wrong usage of the product., Creating a rugged design, efficient manufacture and satisfactory service during the entire designed life are the essential components of total Q. control and assurance of the product which would satisfy the needs of customers. Such a total Q. control and assurance of the product would also make the product highly economical. Rejects repairs, downgrades, wastes and wasteful checking in sorting out good from the bad items after manufacture and hardship to users in keeping the sub-standard products in service, are the avoidable losses. Making the product right the first time is a proven to approach Q. control in order to ensure both Q. and economy.

1.2 How is this achieved? The question though simple is not easy to answer. For, Q. as a total objective of an enterprise involves a broad specturum of activities both within and outside the organisation engaged in the design and manufacture of the product. Historically Inspection and Test which largely concerned with the segragation of good items from the manufactured articles was in iteself regarded as Q. control, but as time passed by, such an approach proved uneconomical and in-effective to achieve total Q. control in the products. Several activities were covered in total Q control programme starting with the creation and the set up of the right specifications and standards for the product through Research and Development (R&D) design and production

engineering, process technology, manufacture, inspection and test, packaging, stores and after sale services. Such a programme called for a radical:

a) restructuring of the traditional inspection activities
b) reorganisation of the work-schedules and responsibilities of the various departments in the manufacturing organisation and
c) re-orientation, education and training of the personnel both inside the Inspection and Test Department and outside it in order to achieve efficient co-ordination and implementation of total Q. control in the factory. Depending on the nature of the product, size of the factory, complexity of manufacture and level of skill of personnel, the needs of Q. education and training also varied.

2. Q. TRAINING IN IRAQ

2.1 Resume of Background

2.1.1 In Iraq, the needs of Q. training and education have to be assessed against the following background factors:

1. The Republic of Iraq enacted the Law No. 54 in June 1979 which among others a) established a Central and Organisation for Standardization and Q. control (COSQC) for the overall co-ordination and functioning as a statutory body at the national level in all standardization and Q. control matters, in the country.
2. As the back-bone for rapid economic growth, the Republic has established a number of key industries in the socialist sector-food processing, textiles, building materials, metallurgical and mechanical engineering and chemical industries. This sector is playing a dominant role in the economy of the country in terms of its contribution to the national product,

employment and supply of essential consumer goods. The sector has also held in the country the largest stock of skilled managerial and technical manpower engaged in the technical and manufacturing activities.

3. With the growing demand for technical and specialised manpower from industry there has been increasing shortage of such personnel in the country with the result, essential functions such as design, technology and Q. control have lagged behind and not caught up to the extent necessary in most of the industries.

4. Historically manufacture in industry is based mostly on licensing arrangements with outside countries with imported machinery, materials and documentation. In due course, for compelling economic and other reasons the need would certainly arise for largescale application of scientific methods of Q. control for indigenous development of science and technology both for product design and development and reduction of costs.

5. In most of the products imported material accounts for atleast fifty to sixty percent of the product cost. Savings in scrap, wastes and degraded products in manufacture would considerably benefit in conserving the expensive and imported material. This would also help to lower the product cost and the selling price. Q. control is one of the proven tools for achieving this objective. Education and training of personnel in the economic control of Q and prevention of Q. losses becomes one of the priority steps requiring implementation in the country.

6. There is at present import of many consumer goods including electrical appliances, processed foods, textiles and many other products, in the market. The domestic manufacture has to meet certain minimum standards comparable to the international supplies

in order to sustain the consumers preference. Failure to keep up comparable standards of durability, performance and appearance etc and also consistency of Q. would also result in the stock-pile of unsaleable products manufactured at home. This would raise serious questions concerning the efficient working of the industry and its effect on employment, pricing consumption and the other economic indicators.

7. There are a large number of small plants which are engaged in production activity in the private sector. Bread, bricks hosiery products and plastic items are a few typical items of manufacture in this sector. Q. control of these items manufactured is an important aspect requiring special attention in this sector.

2.2 Need for specific schemes

For the above reasons, it is necessary that a national Q. training scheme is drawn up and implemented as a priority. Such a scheme might take into account

1. the short-term needs of industry to implement crash programmes of Q. improvement and
2. the long-term requirement of designing and implementing in-plant Q. systems in order that the products produced from the industry are of assured Q. as per applicable standards.

3. TRAINING SCHEMES

3.1 Scope

3.1.1 There are over seven thousand five hundred factories in the country. About five hundred of these are in the socialist and the mixed sector. As this sector accounts for the largest share of technical and managerial man-power the areas of Q. education and training have to be dealt with spparately for this sector.

3.1.2 In a separate document (1) a structure has been proposed for developing Q. control at the national level. For the socialist and the mixed sector, a three -tier Q. organisation has been suggested. The three tiers are:

1. Q. Department in the factory - Primary Unit
2. Q. (co-ordination) Division at the stat Establishment- secondary Unit
3. Q. Directorate at the state organisation - for each industry - tertiary Unit

3.1.3 At the national level, COSQC by its statutory role, will be the apex co-ordinating organisation.

3.1.4 Consistent with the national objectives of Q. control the functions of each Unit referred to above have to be clearly descibed keeping in view the short and the long term tasks, namely

1) Q. improvement
2) Q. systems design and implementation.
3) Q. documentation
4) Q. maintenance and
5) Q. development

3.1.5 As for the private sector as already proposed in the Draft Five Year plan frame (1) COSQC has to play a key role in imparting the Q. education and training and extending a number of other Q. services in order to raise the Q. level and secure effective implementation of the statutory requirements. in the plants.

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(1) QC Development: Draft Frame of Five Year Plan in the Republic of Iraq-June 1981 (COSQC)

3.2 Q. Education and Training for the Socialist and Mixed sector factories

3.2.1 Development of Q. Specialists trainers

Top priority has to be accorded to the Q. training of the personnel in the socialist and the mixed sector. Keeping the goals of such training clearly in view, the obvious strategy would be to plan for creating a multiplier effect so that in a reasonably short time, say 3 to 5 years the stock of technical and managerial personnel is covered by the various Q. education, training and orientation programmes. The multiplier -effect cannot be effectively achieved if initially select groups of the practicing managers/ engineers is not given intensive specialised theoretical and practical training in Q. control. It is these specialist personnel who have to spearhead the Q. improvement, Q. maintenonce and Q. development in industry. Such a training has to be highly applied in nature and not of an academic type. It has to be purposive, task-oriented and on-the-job as much as possible. such training has to equip the persons with the practical expertise and skill so that the persons trained in turn will become trainers, competent Q. trouble shooters, Q. systems designers, and promoters of Q. improvement and development.

3.2.1.1 In-depth practical training

The Q. of in-depth training and education required of the personnel who have to impart multiplier effect to the Q. movement in the country, is in many respects, comparable to the education and training required to produce competent medical practitioners. In a large measure, both the professionals, the Q. specialist and the medical practioner, have to deal with identical types of problems and objectives-diagnosis, improvement and control in their

respective fields. Both the professionals require considerable training and practice. This is a time-consuming process. A Q. specialist will usually take 3-5 years to become a competent Q. professional able to handle 70 or 80% of the Q. tasks in industry.

3.2 Short term plan

As a short-term plan it is proposed that about one hundred persons be trained and developed as Q. special ists at the vate of 30-35 per year over the next three years to man the various Q. functions envisaged in the three-tier Q. organisation in the socialist / mixed sector enterprises.

3.2.3.1 Training model

The model of specialised training including the areas, the depth and the practical work are described in Appendix I. (If is worth noting that the details of the programme have been successfully implemented in COSQC during 1979 - 80 and as a result there is now a contigent group of engineers trained in Q. control which can serve as a proven model for similar training now proposed for the managers, engineers in the socialist - mixed sector plants.)

3.2.3.2 It is necessary that the managers and engineers trained in the specialised Q. course take up actual problems in their respective factories under guided supervision for periods ranging from two to three years, The problems might relate to Q. improvement, Q. systems design and implementation and Q. development, The trained persons would also conduct in-plant Q. training of various types and duration, to operators, inspectors, technicians and production personnel. In this way the base for Q. would become broad and strong, and the multiplier-effect is rapidly created to produce the impact on a scale expected on Q, productivity and cost, in industry.

3.2.4 Management Programmes

3.2.4.1 Attitude of higher management both in industry and the Government is of paramount importance that determines the success of Q. programmes in the country. The role of Q. control in industry has to be appreciated by the Administrators and the top executives in:

a) raising the Q. level of products
b) increasing the productivity and turnover
c) reducing the costs of manufacture
d) improving the technology of manufacture and
e) developing the product Q. Orientation programmes have to be specially designed and conducted for top management, Live case studies and the applications of Q. tools and techniques have to be presented in such programmes. Aspects requiring attention by higher management in respect of Q. management and Q. administration have to be specially highlighted. Specific follow-up programmes have to be chalked out.

3.2.4.2 In appendix II - vide para 2.6 - the duration and topics for the appreciation programmes are given.

3.2.5 Need for a centre for continuing education and training in Q. and Reliability for the socialist and Mixed sector factories

3.2.5.1 It might be recalled that Q. involves a broad spectrum of functions starting from the R & D through design, technology, manufacture, inspection & test, stores, purchase, packaging and after-sale services. In terms of the overall social objectives, Q. control within the manufacturing domain is only a part of the activity on the part of the management. In fact, the proof of satisfactory Q. and Reliability (Q&R) only begins after the product leaves the factory and is sold to the consumer. The need to integrate Q&R both before,

during and after manufacture is a continuing process requiring knowledgeable involvement, participation and specialised, orientation and expertise of several co-ordinators. Such needs have to be tuned to meet with the other social objectives of the public sector enterprises.

3.2.5.2 It is therefore necessary to establish a continuing Centre of Education and Training in Q. & Reliability. Such a centre can formulate and implement short and long term Q&R training programmes for management, engineering and the other operating personnel in the socialist sector organisation. They can also organise a number of tailor-made industry-based training programmes, workshops, seminars and symposia. The centre might also develop training manuals, aids, gadgets and other application materials.

3.3 Need for Strengthening Q. training activities in COSQC

3.3.1 COSQC has a key role to play in

1. promoting the application and development of Q. & R
2. raising the Q. level
3. securing and assuring implementation of Q. standardss
4. assisting economic manufacture
5. assuring the consumers that the products they use are of standard Q.

3.3.2 The above objectives cannot be effectively achieved without comprehensive Q. training and education. The need for such training is real specially for engineers and technical personnel within COSQC and in industry which it has to supervise for Q. control and standards implementation.

3.3.3 Q. Specialist Development & other training

3.3.3.1 In an earlier report (see Appendix III for relevant extract), a number of long term Q. functions that COSQC has to carry out has been listed. Q. training of short and long term nature for COSQC personnel is essential to equip them with the necessary expertise. besides repeat implementation of the course on Q. Technology and management for one/ two more batches of engineers as was done in 1979-80 (see Appendix I). The other short term programmes might include the following:

3.3.4 The Q. training programmes offered by COSQC have to be enlarged considerably and repeated more frequently than now. A list of typical courses that COSQC might arrange is given in appendix II .

4. CO-ORDINATION

4.1 Even as it is Q. control courses are being organised by the National Centre for Consultancy and Management Development (NCCMD), Specialised Engineering Institute (SEI) and the chemical Engineers society in co-operation with the COSQC. The course are however far less frequent than the needs of the country. To step up the output of trained manpower and to meet the specialised needs of the socialist sector, a separate continuing Q. training and education centre is proposed in this note. Also COSQC by its vital role has to step up Q. training significantly, There is therefore, a need to ensure that the training efforts and programmes are well integrated and scheduled in order to avoid overlapping and lack of sufficient participation from industry.

4.2 COSQC has basic responsibility as a central co-ordinating and statutory agency. A possible approach by it for co-ordination is to channelise:

A	Top management Executive management programmes	through NCCMD
B	Programmes for engineers, technicians etc. in the Mechanical Industry	through SEI & state organisations for Engineering Industry and Design & Construction
C	Programmes for food textiles, chemicals	through the respective state organisation Q. Directorates
D	Programmes for packaged commodities	through the Ministry of Trade, commerce and supplies
E	Programmes for Imported materials and goods	through the Ministry of trade & commerce
F	Programmes for health care	through the Ministry of Health
G	Programmes for Defense stores Q. control	through the Ministry of Defense
H	Programmes for Q&R, Development	through the various national Research & Test centres and Ministries concerned with Science & Technology

4.3 The schedule of courses of short and long term nature must be drawn up well ahead of time and the responsibility structure specified for organising, conducting and follow-up of the programmes.

4.4 Need for an apex policy and Programmes advisory committee

4.4.1 Implementation of a national Q. training plan and programmes will receive serious set-backs if the managements concerned do not accord due recognition to the need and importance of Q. training and arrange for nominating the right kind of personnel in adequate numbers to the various programmes. The difficulty might be partly remedied, at least in the socialist and the mixed sectors by entrusting the responsibility of monitoring the programmes to a high level committee that might be constituted by the Government with COSQC as the central organisation to provide the secretariat for the committee. The committee might be composed of:

1. Representatives at policy-making level from the Ministries of planning, Industry, Trade & commerce and Education (members from other Ministries to be co-opted as and when required.)
2. Presidents of various state organisations
3. Heads of NCCMD, SEI
4. Three Representatives from the private manufacturing sector (by rotation each to serve one year on the committee)
5. Two presidents from the professional societies - chemical engineering etc
6. The president of COSQC will be the ex-officio chairman of the committee and the DG (QC) at COSQC its secretary and convenor

4.4.2 The committee will meet at least twice a year to:

1. consider and approve the annual Q. training programmes
2. review the progress and advise the participating organisations in various courses on follow-up programmes
3. recommend priorities for the training courses
4. evaluate the progress made in implementations and recommend such actions and steps as necessary to improve the effectiveness of training and achieve the anticipated benefits.

5. TYPES OF TRAINING

5.1 Specialised course in Q. Technology and Management

This is a long term programme of one year. It aims at imparting specialisation in Q. Technology & Management. The persons trained will serve as the back-bone of the Q. movement in the country, They will be the trainers, future Q. Managers, promoters, guides and service specialists for other engineers, managers and supervisors. The participants will be graduate engineers preferably with some experience in industry. The instruction and field training has to be intensive under specialist guidance. Appendix I gives the details of the programme. The engineers trained will man the Q. specialists/ Managers positions in the COSQC, socialist/mixed factories, and in the Establishment and State organisation headquarters.

5.2 In-plant Courses

5.2.1 Basic training in QC.

The aim of the programme is to :

1) Promote simple yet powerful QC techniques by the supervisors in manufacturing
2) Secure largescale participation in implementing total Q. control in the factory and
3) improve Q and prevent defects in products

Supervisors in manufacturing will undergo the programme. Project studies by them under guided supervision is an essential part of such training, Appendix IV gives a typical course conducted successfully in 1980 in one of the factores.

5.2.2 OTHER IN-PLANT COURSES

There are a number of in-plant courses. These are specifically designed to suit the needs of the personnel. Some of these are:

1. Operative training
   - 10 to 12 hours, 3 days
2. Inspectors training
   - 20-25 hours, 5-6 days QC tools, Acceptance sampling and graphical and other aids for Data evaluation are some of the topics.
3. Training to design and production engineering personnel
   - 20-25 hours, 5 to o days Q. engineering, Reliability engineering, orthogonol Designs are some of the specialised topics to be covered.

4. Training for purchase, stores, finance & commercial Divisions
   - 20-25 hours, 5 to 6 days. Supplier Q. evaluation and assurance, Q costs, Q. planning, Q. rating and field Q. evaluation & control and Q. Reporting are some of the topics to be covered.

5.3 Training to Executives/Managers

The aim of the programme is to:

1. impart appreciation in the application of Q. tools and techniques for Q. improvement and Q. maintenance
2. Orient in the restructuring of the in-plant Q. control to the extent necessary on scientific lines and
3. Train in the management of Q.

The instruction is largely by the case-study method and seminars as well as discussions sessions. The duration is 20-30 hours spread over a week.

5.4 Course in Q. Systems and Q. Planning

This is an important programme of 40 hours, spread over ten working days. The lecture course is followed by 5-6 weeks intensive practical training in the factories.

The participants are expected to undertake live studies under guidance from the specialists. Q. and Design engineers are the participants.

5.5 Course in Design and Analysis of Industrial Experiments with special reference to Orthogonal Array (OA) Techniques.

5.5.1 This is an extremely important programme. It has the following objectives:

1 To improve technology
2 To improve Q. & Reliability
3 To reduce cost
4. To increase productivity
5 To improve efficiency and validity of applied research & development and design activities.

5.5.2 Design, production and Q. engineers and technologists are the participants. The programme is of two types:

Short term : 40 hours
Long term : 120 "

Both the programmes have in-plant practical and application sessions ranging from six to twelve weeks. There would be refresher courses as a follow-up. Guided supervision is an part to promote right applications and development of technical obilities in the participants.

5.5.3 In view of its importance, it is even necessary to formulate plans to introduce the subject as specialisation for the final year of the graduate engineers courses and the other academic courses at the Masters level and at the post-graduate courses in the technological Institutes and Universities.

5.6 Course in Q. costs

This is a five-day, or 25 hours, programme aimed at Q. engineers, managers, cost accountants and finance executives, design and production engineers and R&D personnel.

5.7 Course in Reliability Engineering

This is a programme of two weeks, 40 hours, followed by 8-10 weeks application phase meant for engineers and managers drawn from Q., design, production engineering, technical sorvices and R&D specialists.

5.8 Other courses

A number of short-term courses of specialised nature such as

1. application of statistical methods in Q. control
2. data evaluation techniques
3. computor applications in process control and improvement
4. operational research in optimisation problems
5. Quality and Reliability assurance and
6. Statistical Q. control, are designed and conducted to specific groups of personnel drawn from Industry.

(see appendix V)

5.9 Q. Education and Training in Universities and Professional Institutes of higher learning

5.9.1 In many parts of the world, Q&R is offered as a field of specialisation at the post-graduate courses and in some universities, at the final graduate (masters degree level leading to the award of post-graduate Diploma or Masters

Degree in Q & Reliability.) Applied project work is an essential part of such programmes. It is suggested that a high-level committee/working Group be set up to formulate a scheme of such programmes in order that the Republic of Iraq becomes self-reliant in the supply of competent Q., Reliability, and R&D specialists and design engineers in the years to come. In this way the pace of progress of applied seience and technology can also be accelerated in the country to achieve rapid economic growth.

5.9.2 Courses for teacher training

As a short-term objective, it is desirable that the faculty engaged in teaching and training at the professional courses in university and institutes, be given training in Q, Reliability and Industrial Experimentation techniques. Summer schools specially organised for them would be an effective means for the purpose.

6. RESOURCE INPUTS

6.1 The essential inputs are:

1. Specialists to implement the specialist development programme (see paras 3.2 and 3.3.3) in order that the country achieves self-reliance in having well developed Q. engineers and managers over the next five years.

2. Training aids and gadgets including the setting up of Q. Demonstration centres in which live training material and Q. workshop training material is available
3. Audio-visual aides (see appendix VI for a typical list)
4. Well developed library facilities
5. Documentation and reproduction facilities
6. Documentary films (These have to be specially developed from within the country.)
7. Training manuals, case-study and other indigenously developed case material and
8. Promotion and publication facilities.

6.2 Depending on the time schedules, priorities and the location of training centre(s), the details of each resource input have to be worked out keeping in view the budgetory availabilities.

7. OUTPUTS

7.1 Indicative output of trained personnel in various types of programmes is given in Table 7.1 for each year for a term of five years:

(see next page)

SL No.	Type of Training Course	Number to be trained Year ending 1	2	3	4	5	TOTAL
	For Engineers/Technologists						
	One-year (whole-time) Specialist Development	20	20	20	20	40	120
	*Two-year (part-time) Specialist Development	-	20	20	20	20	80
	Basic and Application oriented courses (10-12 weeks)	60	60	80	80	100	380
	Short-term courses (one-week)	60	60	100	100	120	440
	For Managers						
	Appreciation programmies/ orientations (3 to 5 days)	60	80	100	130	150	590
	In-plant						
	Supervisors/inspectors/ operators	40	80	120	160	200	600
	Teacher Trg.	20	30	30	40	40	160
	Others (Seminars, symposia) etc.	50	100	100	100	150	500
	TOTAL	310	450	570	650	820	2800

* This is for employed engineers who avail of part-time training at three days a week after working-hours in factories.

7.2 At the end of five years, 2800 (say 3000) persons would have been covered by one type of Q. training or another During the second-phase of extended plans of training the pace of training would be much more accelerated than in the phase presently envisaged. The reasons for the modest outputs are obvious:

1. availability of specialists to impart training,
2. availability of personnel from industry to be spared for training
3. Time to impart appreciation to top management about the need for Q. training
4. practical facilities
5. training materials etc.

3.7 Apart from the numbers trained as indicated, the contribution should be sizeable in respect of the following aspects from the work of the trained Q. personnel:

1. Significant improvement in Q., and productivity in industry.
2. prevention of defects and economic losses arising out of repairs, wastes, rejects, downgrades etc by at least 50% from the present 15% estimated loss of the turnover in industry.
3. Effective conformance of Q. and implementation of national Q. standards as per statutory requirements (Low No 54 of June 1979)
4. Significant advancement in the Science and Technology in industry
5. Strong foundation for intensifying and enlarging Q. & Reliability movement in the country
6. Protection of interests of consumers against defective and sub-standard products.

7. More rapid economic growth by way of conserving expensive material and more efficient utilisation of machinery and man-power resources in the country and and increase of production.

Appendix I

SPECIALISED TRAINING PROGRAMME

IN

QUALITY TECHNOLOGY AND MANAGEMENT

PARTICIPANTS : Not more than 25 specialists with aptitude for consulting, training, trouble shooting and having General Management skills who have responsibilities for staff Q. functions

OBJECTIVES :
1. To develop skills in the applications of basic tools of Quality Technology and Management.
2. To impart competence in the assessment of broad requirements of Quality in a plant which would be prerequisites for certification and plant-wide standardization programmes.
3. To develop promotional abilities to impart appreciation to engineers, technicians, and management personnel.

DURATION :
1. Lecture Sessions : about 100 each of 2½ hrs.
2. In-plant practice: 24 weeks (Sandwich)
3. Follow up work : on-the-job field studies.

Lecture Course Phase I: Basic Topics

Each Lecture 1¼ hours

STATISTICAL CONCEPTS

	Subject	No. of Lectures
1	Uses and Abuses of statistics	1
2	Description of Statistical terms	1
3	Presentation of Data	2
4	Rationale of Sampling	2
5	Unity in Diversity-Normal patterns of variations	1
6	Measurement and variability Frequency Distributions	1
7	Computation of Mean & Standard Deviation	1
8	Area under Normal Curve	1
9	Practicals	2
10	Basic concepts of Probability	1
11	Use of Probability Normal & Binomial papers	2
12	Statistical Logic	1
13	Basic Ideas on Correlation	1

PHASE II : IN-PLANT TRAINING

1 Intensive applications and in-plant studies on live problems under the guidance of the Expert

2 Group Discussions and Review sessions

3 Reporting

4 Seminars by participants

PHASE III : Lecture course

B QUALITY TECHNOLOGY - BASIC TOOLS AND TECHNIQUES

Quality Technology	1
Measurement Quality Control Techniques	2
Defects & Defectives-control Techniques	2
Analysis of Lack of Control Situations	2
Specifications and process capability Analysis	2
Acceptance Sampling	6
Special Graphical Aids for Analysis and Q. Improvements	2
Correlated Q. Characteristics	2
Shop Q . Planning	2
Q. Reporting	2
Q. Improvements	2
Work Sampling	2
CASE HISTORIES	8

PHASE IV : In-Plant Practicals

Practical training in factories on live problems under the guidance of the Expert.

PHASE V LECTURE COURSE
on
Advanced Topics on QC

Economics of Measurement	2
Fits and Tolerances	2
Cusum Charts	2
Non-Parametric Methods	2
Tests of Significance-Basic Concepts and General Considerations	2
Comparison between two processes and methods	2
Analysis of Variations	4
Sampling and Testing Errors	2
Designs and Analysis for process and product improvements and developments	6
Multi-Variate Quality Studies	2
Basic Tools of Reliability Evaluations	2

PHASE VI In-plant Applications

Intensive application and on-the-Job training of participants in factories and seminars or data evaluators under the guidance of the Expert.

PHASE VII

Q. Management

Quality Policy and Objectives	2
Quality Organisation	1
Quality Systems and Procedures	2
Quality Planning	2
Product and Process Ratings	2
Quality Manuals	1
Quality Costs	2
Supplier Quality Assurance	2
Quality Information and Reporting System	2
Quality Assurance systems Requirements	2
Quality Standards and Certifications	1
Quality Evaluations	2
Statistical Control of Quality	2
Quality Motivations	1
Quality and Incentives	1

Quality Control and Research and Development	1
Quality Education and Training	1
Quality in Small Plants	1

PHASE VIII

Participants to undertake the following under the guidance of the Expert

1. On the Job practice
   - Assess Q. systems
   - Undertake Q. Improvement Studies
   - Design Q. Manuals
2. Give Lectures
3. Case Study presentations
4. Discussion of case problems - food, textiles engineering, small Industries electricals, electronics, paper and ceramic industries
5. Technical Report Writing
6. How to Introduce Q. Systems & QC in factories.

QUALITY EDUCATION AND TRAINING

1. Need for Comprehensive Training & Education

Quality and Reliability assurance have acquired considerable importance in recent years to meet the challenges of modern industry. Defense and military applications and increasing complexities of technology have put forth growing demands on quality and reliability techniques, and with it, education and training needs have also grown. Responsibility for quality control and quality development has largely multiplied and broad-based, to cover almost every function in an organisation. Specialists in the Quality and reliability departments have to acquire skills and knowledge of greater magnitude than their predecessors in the traditional Inspection Department. The needs of education and training have become more diverse and compelling than before.

2. TRAINING AREAS

2.1 Inspection & Tests

With the advent of modern test devices and instruments, the need for qualified test personnel has become a necessary requirement . Several types of training programmes in NDT, Metrology, and inspection techniques are organised for Inspection and Test personnel.

2.2 For production personnel, basic courses are conducted for supervisors and engineers in quality control techniques. The aim is to promote applications by them in simple trouble-shooting exercises and control of quality during production. Short orientation courses

are conducted for operators to enable them produce better quality and carry out self-checks on quality, wherever possible.

.3 A list of courses, the topics covered and duration of each course is given in exhibit 1. The courses are by no means exhaustive. They are only indicative of the range of courses and the levels which it would be worth while to cover, by various types of programmes.

Training as part of professional education

The task of educating and training the personnel already employed in Industry is by itself formiddable. While on the one hand such programmes must be continued, the need is also real for instituting instructional programmes as a part of academic courses in engineering, technical and other professional courses. In many parts of the world, such programmes have proved successful and useful in promoting quality and reliability, on a massive scale in industry, scientific and technical institutions, and research establishments.

Exhibit .1

LIST OF TYPICAL QUALITY & RELIABILITY COURSES

1. In-plant courses:

1.1 AIM i) To promote applications of simple qc tools and techniques

ii) To enlist knowledgeable co-operation and involvement in introducing and strengthening QC operation

1.2 Participants

i) Production supervisors
ii) Inspection & Test personnel
iii) Technical supervisors from other functional Departments-Design, Production, Engg, Purchhase, Market, Maintenance, R&D.

1.3 Topics & Duration 40 Hours

Quality technology specification and standards; losses in Quality and quality costs; Process control systems-tools and techniques; Material Quality-Evaluations and control techniques; Product evaluation & Rating; Acceptance sampling; control charts; Quality Reporting
Quality Investigation and improvements - Tools and Techniques.

1.4 In-plant practicals- 8 weeks

Each participant will undertake specific studies on live problems in the plant under the supervision of specialist faculty.

1.5 Fellow- up & Review 10 Hours.

Seminars and Discussion of project study Reports by the participarts.

2. Specialised Courses for Various function Groups.

2.1 Aim: Applications by participants

2.2 For Inspection & Test personnel

Instruction topics	practicals
(24 Hrs)	(4 wks)

Sampling systems
Acceptance sampling plans
Q - evaluations
Q - Audits
Q - Reporting
Product Q - Rating
Graphical Aids for Data Analysis
Measurement Control- Accuracy & precision
Process Capability Evaluations
Calibration system

2.3 For Process control personnel

Topics-Instructional Sessions	Practical
(20 Hrs)	(4 wks)

Sampling Methods
Control Chants
Correlation & Regression
Tests of significance
Analysis of Variance

2.4 R&D, Design and Production Engineers

24 Hrs	8 wks
THEORY	PRACTICAL

Sampling
Tests of Significance
Analysis of Variance
Data Evaluation Techniques
Design & Analysis of Industrial Experiments
Orthogonal Designs
On setting quality standards
Fits and Tolerances.

2.5 Advanced Courses

QC, R&D, Design & Production Engineers

Each Course: Theory: 30 Hrs Practical: 4 Wks.

A. Reliability Evaluation & Assurance
B. Quality Assurance
C. Evolutionary operations
D. Quality Engineering.
E. Optimisation Problems.

2.6 Appreciation Courses

Participants: Top and Sr. Executives in plant
Duration: 10-12 Hours.
Topics: Q- policy, objectives, planning,
Q- Costs, systems & procedures,
Q- Manuals, evaluation, SQC,
Q- Improvement, Reporting,
Q- Audits, Motivations,
Education & Training.

3. General Courses:

3.1 The aim of such courses, is to impart appreciation and applications. Participants are engineers/ technicians drawn from various manufacturing plants.

Duration: 60 Hours theory plus 8-10 weeks practicals on live problems under specialist supervison

Topics: Each course series will be a package by itself.

A. Course for control of packaged Commodities:

Sampling, control charts, specifications and process capabilities,
Q - Evaluation, Q Audits,
Economic levels of machine/
process settings, Q- reporting.

B. Basic QC courses:

Sampling distributions, control charts, correlation & regrestion, acceptance sampling, Graphical data analysis techniques.

C. Control of Q - Costs (30 Hrs Theory - 4 Wks practice)

Q - Cost evaluations, pareto - analysis, Ishikawa Diagram Machine/process control and reporting.

3.2 Q- Management courses

3.3 Other courses:

Industry wise courses and courses leading to specialisation in Quality control and Reliability at the Masters Degree and post graduate levels for engineers technologists and scientists, are conducted by Technical Universities, professional Institutes and Universities, in many countries.

EXTRACT FROM THE PERIODIC REPORT 8 JUNE 1960 TO 7 DEC 196[illegible] ON THE PROPOSED STRUCTURE OF FUNCTIONS OF THE Q. SYSTEMS DIVISION IN THE COSQC

Appendix III

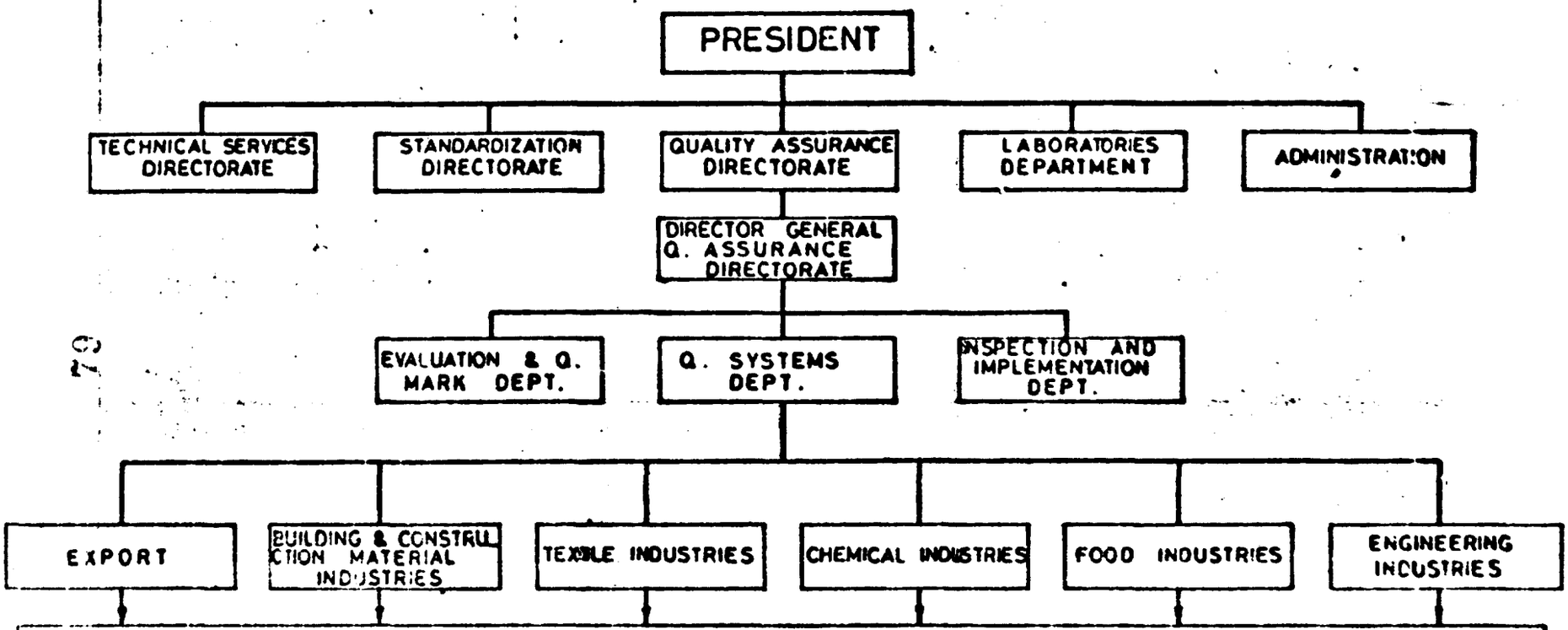
CENTRAL ORGANISATION
FOR
STANDARDIZATION AND QUALITY CONTROL
PROPOSED STRUCTURE OF FUNCTIONS
OF
THE Q. SYSTEMS DIVISION

Notes:

1. The name of the Department is shown in the structure as "QUALITY ASSURANCE".
2. Industry and product-wise regrouping of Labs, evaluation, inspection and implementation personnel is now reportedly under consideration by the Administration. When the regrouping is effected, A and B functions as shown in the structure, namely consultative assistance and evaluation of QC systems, will have to be entrusted to the product-wise evaluation, inspection and implementation Groups. The systems Division will then only co-ordinate and provide assistance and guidance as and when required by the respective staff specialists.
3. Arising out of the proposed structure of functions of the Q. systems Division, the nature of work and to some extent the level of responsibility of the Inspection and Implementation staff would also change.
4. The nature and number of specialists/engineers in the systems Division will be worked out after the general regrouping now in progress, is effected.
5. Details of activities under each function A to H are given in the attached lists.

CENTRAL ORGANIZATION FOR STANDARDIZATION AND QUALITY CONTROL "COSQC"

PROPOSED STRUCTURE OF FUNCTIONS OF THE Q. SYSTEMS DIVISION



QUALITY SYSTEMS DIVISION/DEPT. FUNCTIONS:

A. CONSULATIVE ASSISTANCE TO INDUSTRY.
B. EVALUATION & CERTIFICATION OF Q. SYSTEM IN INDUSTRY.
C. EDUCATION AND TRAINING IN INDUSTRY
D. PROMOTION AND PUBLICATION.
E. APPLIED RESEARCH AND DEVELOPMENT OF QUALITY SYSTEMS TOOLS & PROCEDURES.
F DESIGN AND TECHNICAL CO-ORDINATION OF LIABILITY SYSTEM IN COSQC.
G. SMALL PLANT QUALITY CONTROL.
H CO-ORDINATION WITH OTHER AGENCIES IN QUALITY CONTROL AND COSQC "DEPTS" WITH PARTICULAR

QUALITY SYSTEMS DEPARTMENT

PROPOSED ACTIVITIES UNDER EACH FUNCTION A TO H

A. CONSULTATIVE ASSISTANCE TO INDUSTRY

1. Review and Appraisal of Quality systems
2. Design of quality systems and procedures
3. Quality Audit
4. Quality Rating
5. Inspection and Test Results Evaluation
6. Quality Improvement studies
7. Quality Manuals Preparation
8. Quality Equipment Planning
9. Organising for Quality
10. Implementation of IOS Standards
11. Review and Recommendation of Revision in Standards
12. Quality Planning
13. Export Quality Assessment
14. Material Quality and Supplier Quality Assessments.

B. EVALUATION AND CERTIFICATION OF QUALITY SYSTEMS

1. Design of Quality Records to Comply with Statutory Provisions
2. Witnessing of Inspection and Tests at Site
3. Supervising Implementation of Guidelines for Assessment of Quality Systems
4. Reporting
5. Certification
6. Follow-up

C. EDUCATION AND TRAINING IN QUALITY

1. Preparation of Training plans and Calendars
2. Organising Industry wise and In-plant Training Programme
3. Preparation of Training Manuals
4. [illegible]
5. Design and Preparation of Training aids - Slides, Charts, Diagrams, Product Models etc.
6. Evaluation and follow-up
7. In-plant Project Study Supervision and Follow-up

Training Areas

i) Implemention Requirements of Law No. 54 June 1979
ii) Quality Systems and Procedures
iii) Quality Management and Administration
iv) Quality Costs
v) Quality Planning
vi) Quality Standards
vii) Q. Evaluations
viii) Q. Improvement
ix) Q. Reports
x) Statistical Q. Control
xi) Reliability
xii) Supplier Q. Assurance
xiii) Design and Analyses of Experiments

D. PROMOTION AND PUBLICATION

1. Preparation of Industry-wise briefs on QC
2. Case Study and Application Booklets
3. Seminars and Workshops
4. Talks and lectures
5. Educational Posters

6. News Letters-Abstract service
7. Conferences
8. Organising Study-Tours (In-Country)
9. Promoting QC-Circles in Industry
10. Journal on Quality
11. Organising Essay Competitions
12. Instituting National Awards and Prizes for Best Quality

E. APPLIED RESEARCH AND DEVELOPMENT

1. Sampling and Test Evaluation procedures
2. Quality Improvement and Development studies
3. Q. equipment and test planning and development for small plants

F. DESIGN AND TECHNICAL CO-ORDINATION OF LIABILITY SYSTEMS IN COSQC

1. Assessment of Reliability of Sampling and Testing in COSQC
2. Reliability Studies for Shelf Life, Storage, Merchandising and Usage Conditions
3. Evaluation of Accuracy and Precision of Instrumental Methods of Analyses and Analytical Tests and Calibration Systems
4. Review and Revision of COSQC Test Standards and Evaluations as Per 3 Above
5. Technical Specification of Liability Systems

C. SMALL PLANT QC

1. Preparation of Q. Systems and Plans for Implementation of Law No. 54/1979
2. Organising Q. Training and Workshops
3. Assisting in Planning and Implementation of Q. Organisation.

H. COORDINATION WITH OTHER AGENCIES AND DIVISIONS

1. Assist In Test Evaluation-Set up Procedures and Techniques
2. Review Sampling and Inspection Systems
3. Product Grading
4. Participate in Planning Inspection of Factories
5. Prepare Q. Systems Manual for COSQC.

Appendix IV

TRAINING COURSE
IN
PRACTICAL QUALITY CONTROL
IN
TEXTILES

1. AIM: (i) Yarn quality control as per applicable standards.
(ii) Defect control in cloth.
(iii) Waste improvement and control.

2. PARTICIPANTS: Supervisors from finishing weaving, spinning, preparatory, QC, Inspection and tests with at least 2 yrs mill experience from all five woollen mills.

3, SCOPE: Polyester-Wool cloth.

4. DURATION: 4 October to 9 October 1980
15 Hours lectures and discussions

Lecture I : 8:30 AM to 9:45 AM
Break 9:45 to 10:00 AM

Lecture II : 10:00 to 11:30 AM
& Discussions

5. Lecture course & case study Sessions

TOPICS

1) Yarn quality evaluation
- Discussion of results 17 July Mill.

2) Count Control/Neb Control
- How to detect Frame/Machine differences?
- How to locate defective spindles?
- How to look for back material variations in preparatory?

- How to work out control limits for yarn count and neps?
- How to evaluate yarn quality against required standards?
- How to detect long term variations?
- How much to sample?

3) Procedures of count/nep control at preparatory
   - Carding
   - Mixing
   - Drawing
   - Roving

   Discussion of case studies from 17 July Mill

5) Process control procedures at dyeing of tops
   - Discussion of case from 17 July Mill

6) Raw tops quality evaluation and control
   - Discussion of case studies from 17 July Mill

7) Moisture and Humidity control
   - Effect on count variations-experience of 17 July Mill

8) QC at winding

9) Comparative quality evaluation of imported yarns.

   Defect Evaluation Procedures at Finishing
   - Planning for defect control at weaving and finishing
   - Reports on defects
   - Discussion of case studies from 17 July Mill
   - How to evaluate standards for defect levels.

Follow Up:

Specific studies will be taken up by the participants on yarn and cloth quality improvements.

Appendix V

A SPECIAL COURSE ON Q. IMPROVEMENT & CONTROL TECHNIQUES IN Textiles

1. Objective: To impart technical training in the practice and implementation of Q.improvement Q. control Q. evaluation and Q. assurance in the textile industry

2. Participants: Persons having supervisory responsibilities in the production Q. control and testing design, purchase and marketing Division, with at least two years experience. Knowledge of English is preferable.

3. Topics:

   1. Purchase material quality control
   2. Techniques for evaluation and control of short term andlong term variation in preperatory and spinning for yarn count, evenness and nep control.
   3. Systems for sampling for detection and control of machnie and material differences.
   4. Techniques for formulation of process Q. standards.
   5. Process capability evaluations
   6. Pareto Analysis for Q. evaluation and

improvement in weaving and finishing
7. Defect control techniques in fabric
8. Snap survey methods
9. Q. reports
10. Q. planning
11. Q. assurance and audits
12. Optimization of Q. costs in dyeing and Q improvement Techniques - factorial experiment and orthogonal array (OA) Designs

4. Duration:

I.	Lecture Sessions & Practical Work	One week
II.	In-plant project studies under Expert Guidance	Five Weeks
III.	Follow-up Seminars & Reports	One Week

5. Timings:

Lecture Sessions

Lecture	I	8:30 AM	to	9:45 AM
Break		9:45	to	10:00
Lecture	II	10:00	to	11:30 AM

Practical Exercises & Discussions on Case problems
11:30 to 1:00 pm

6. Method of Instruction:
1. Lectures will be through live practical cases
2. The participants are required to work out

practical exercises under the guidance of the Expert. It is useful if the participants have with them pocket calculators during the course.

3. To make the discussion-sessions instructive and useful, it is desirable if the participants bring with them live data from their QC Records. Application of specific data evaluation and control techniques will be illustrated by the Expert.
4. Each participant is expected to undertake a specific Q. improvement project study during the practical work phase. The Expert will provide specific guidance.

5. The results of in-plant project studies will be presented by each participant in seminars during the review phase. Implementation guidance and specific comments will be provided by the Expert.

Appendix VI

LIST OF QC TRAINING

AIDS AND GADGETS

1. Quincunx Model
2. QC Demonstration panel
3. Box of beads and paddle
4. QC charts
5. Sampling Inspection gadgets
6. Cusum chart Simulator
7. Normal curve templates
8. LP Analogue
9. Design of Experiments cubes
10. Statistical kit No. 1
11. Normal and Binomial probability papers
12. Weibull Distribution papers
13. Models of p,c and $\bar{X}$ - R charts

Popular Films

1. The story of a campaign
2. Right first Time
3. According to Specification
4. Quality and Reliability
5. Reliability - An introduction

EXTRACT FROM THE REPORT ON QC STUDIES IN THE COSQC-January 1982

Annex 5

SUMMARY

1. This report presents the results of quality control studies undertaken in the COSQC. The studies aim at,

   1. Strengthening the QC in the Laboratories
   2. Improving the productivity of inspection and test in the COSQC and
   3. Promoting more effective implementation of Q. systems in the factories.

2. The studies were confined to dairy products (milk, yogurt, ice cream), soft drinks, biscuits and chocolates, macaroni, chewing gum, sweets and candy.

3. Eight-two reports on QC for the priod February to November 1981 were analysed using the Network Analysis and Pareto techniques. Flow charts were prepared covering the full cycle from registration of samples to despatch of final QC reports. Seven factories were surveyed in the socialist (one), mixed (two) and the private (four) sectors to appraise the status of QC in them. The outcome from the studies within COSQC and the surveys was together evaluated to formulate the following observations and recommendations.

At COSQC

1. The average time taken per report is 20 days; half (10 days) of this is taken by the Laboratories in inspection and tests on the factory samples. One to two days is for typing; two to three days in the flow of report from the Lab to the QC Directorate and despatch,

2. Micro-biological tests account for fifty percent of the Lab time. In this and the rest of the time, organoleptic, analytical and contaminant tests are spread over including draft report preparations in the Laboratory.

3. Analysis of sampling and the quantum of tests carried out at present has shown that mere evidence of zero defects in the checks on samples does not necessarily guarantee that the bulk of the product of which the sample(s) tested in the COSQC, in part is also free of defects. However evidence of non-conformance as judged from

the sample(s) tested, would demonstrably underline prospects od defectives in the un-checked bulk of production un the factory.

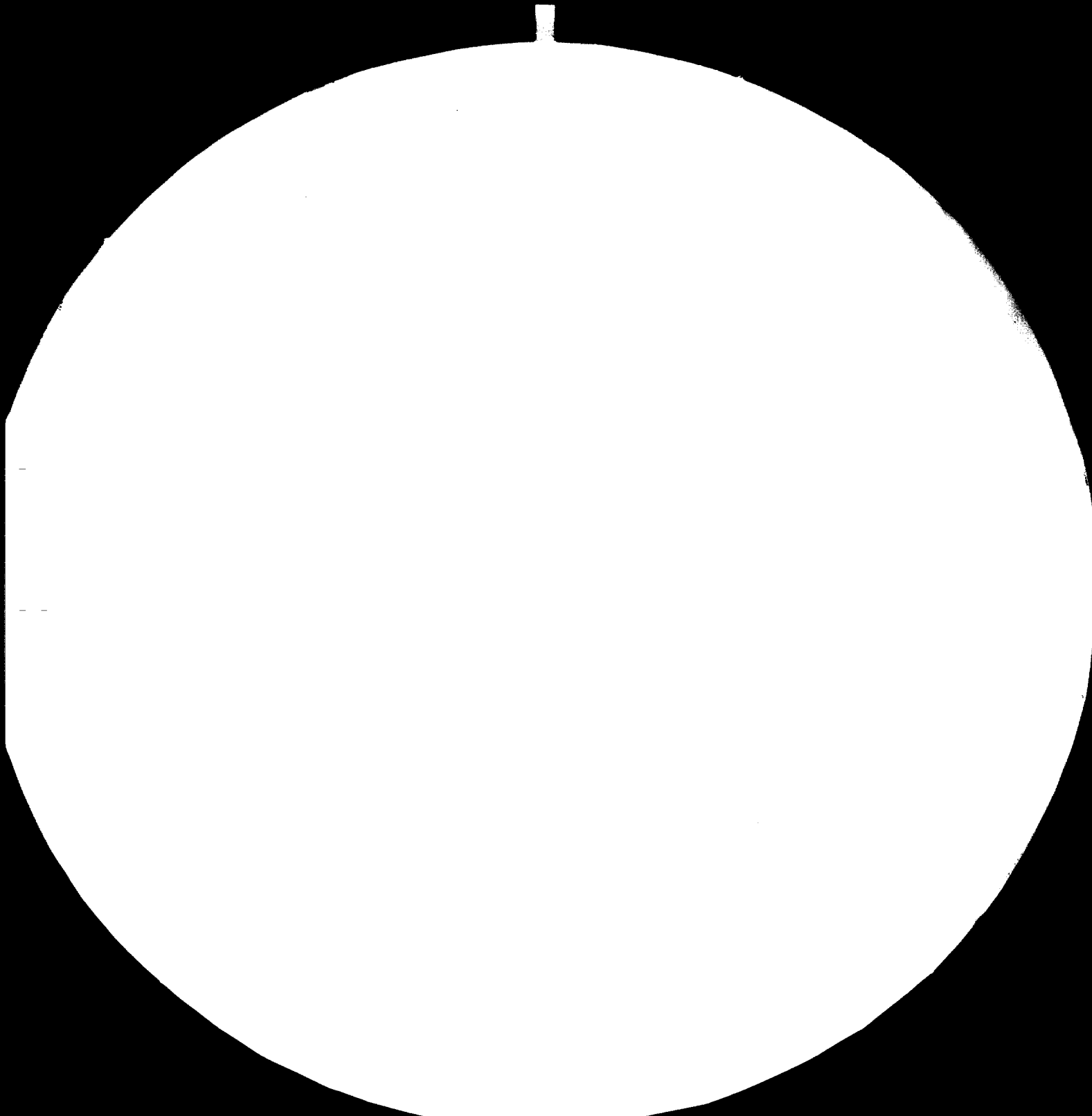
4. In view of the somewhat longtime - 20 days- taken to despatch a QC Report from COSQC, the practical utility of the report is reckoned, and specially application, of correctives on products from the factories does not bear realistic correspondance, so as to protect consumers against sub-standards. The need is therefore felt to

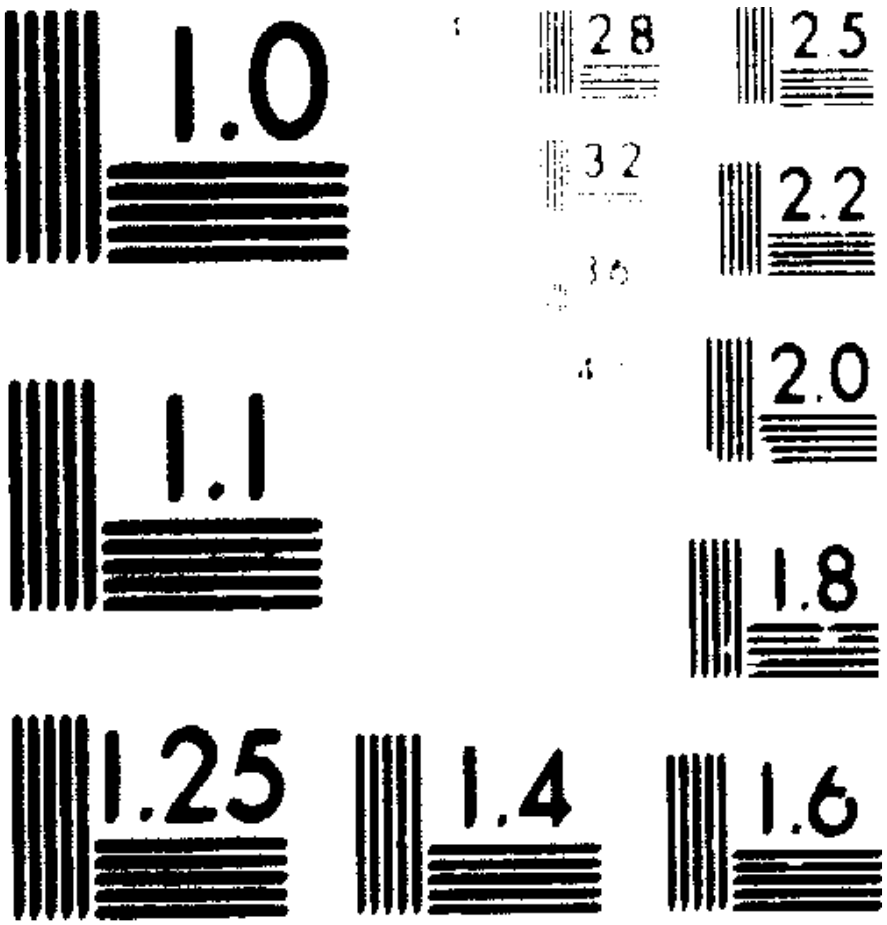
1 compress the time-log and

2 design measures to secure more effective guarantees on conformance of Q. closer at site.

5. To compress the time-log, the study has brought out the following:

1 confine inspection and test only to "major" characteristics (micro-biological)





2 delegate 'minor' checks to Inspection. Organoleptic and other qualitative tests to be done at site by the Inspector as per prescribed procedures.

3 authorize the inspector to witness the inspection and tests-both analytical and organoleptic- at site in the factory.

4 adopt rapid method(s) for long time consuming checks. (example: 1 solid content analyser through computer only 2.3 mins against 2.3 hours 2. coliform, total count bacteria 3 hours against 4-5 days etc).

5 standarise and print test records/reports formats - avoid typing delays.

6 As shown by the tests, even when there are no defects in the sample(s), if the report must be sent to the factory, delegate report sending to the Head of the Laboratory. 'Exceptions are when there are defects in the samples, the report needs attention and authorization by the Higher Management in the COSQC.

../..

7 Arrange with the factories to carry out inspection and t st as per IOS requirements.

8 Establish correspondence in the test procedures as between the COSQC Lab and the factory QC Department.

Measure to assure Q. at the factory as per IOS requirements

9 Assist the factory to set-up inspection and test programme at the factory corresponding to the equivalent inspection and test programme in the Lab in COSQC.

10 Train the factory chemist in the COSQC Lab. (This should be on-the-job training).

11 Design record form to be maintained at the factory specially for final product assurance as per IOS requirements and in conformity with the verification objectives by COSQC.

12 Arrange with the factory management to nominate a QC person at a senior level, to be the authorized representative of the factory for co-ordinating the QC activities as per IOS requirements and to provide liaison with the COSQC representatives.

../..

13 Assist the factory to document the specif cation, Q. systems and procedures, methods of inspection and test, and also to maintain the Q. records so as to serve scrutiny and verification by the COSQC, as and when necessary.

6. In the three socialist and mixed factories producing dairy products and soft drinks, there are good facilities for inspection and test of products they produce, trained manpower and Q. records. In the four private factories, two producing yogurt have good facilities for inspection and test, trained manpower and Q. records and in the remaining two there are facilities, but at present under-utilised for QC. All the seven have potentials to carry out Q. control in the way that is expected of them as per COSQC lab. checks. Q. assurance on 'minor' and 'major' checks at site should pose no serious difficulty in them.

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7 BENEFITS FROM IMPLEMENTATION

7.1 Laboratory productivity can be stepped up by 60 to 70% from the present level, by compressing the time-lag from 20 to 6-7 days per report.

7.2 Q. implementation and assurance is rendered more effective in factories.

7.3 More reliable Q. control is possible by organising for assurance of Q. closer at site.

7.4 Statutory obligation by the COSQC is achieved more effectively.

Annex 6

LIST OF COUNTERPARTS

Sl.	Name	Education/ Specialisation	Experience	Remarks
1	2	3	4	5
1	Salman Taher Salman	M.Tech(Chem. Engr.)	16	Counterpart from the inception of the mission
2	Miss.Selwa Wazir	B.Tech. (Chem.Engr.)	11	-Do-
3	Nejim Al-Jaboori	M.Tech.(Tex. Mech.Engr.)	13	-Do-
4	Mrs.Sahera Hoosa	B.Tech. (Chem.Engr.)	6	Counterpart since Jan 1981
5	Mrs.Shada Zaid	-Do-	6	-Do-
6	Ghaffor Sheriff	B.Tech. (Chem.Engr .)	12	Counterpart since Jan 1981.
7	Mahrous R. Kafi	B.Tech. (Chem.Engr.)	15	Counterpart since Oct. 1982.