OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.

DISCLAIMER

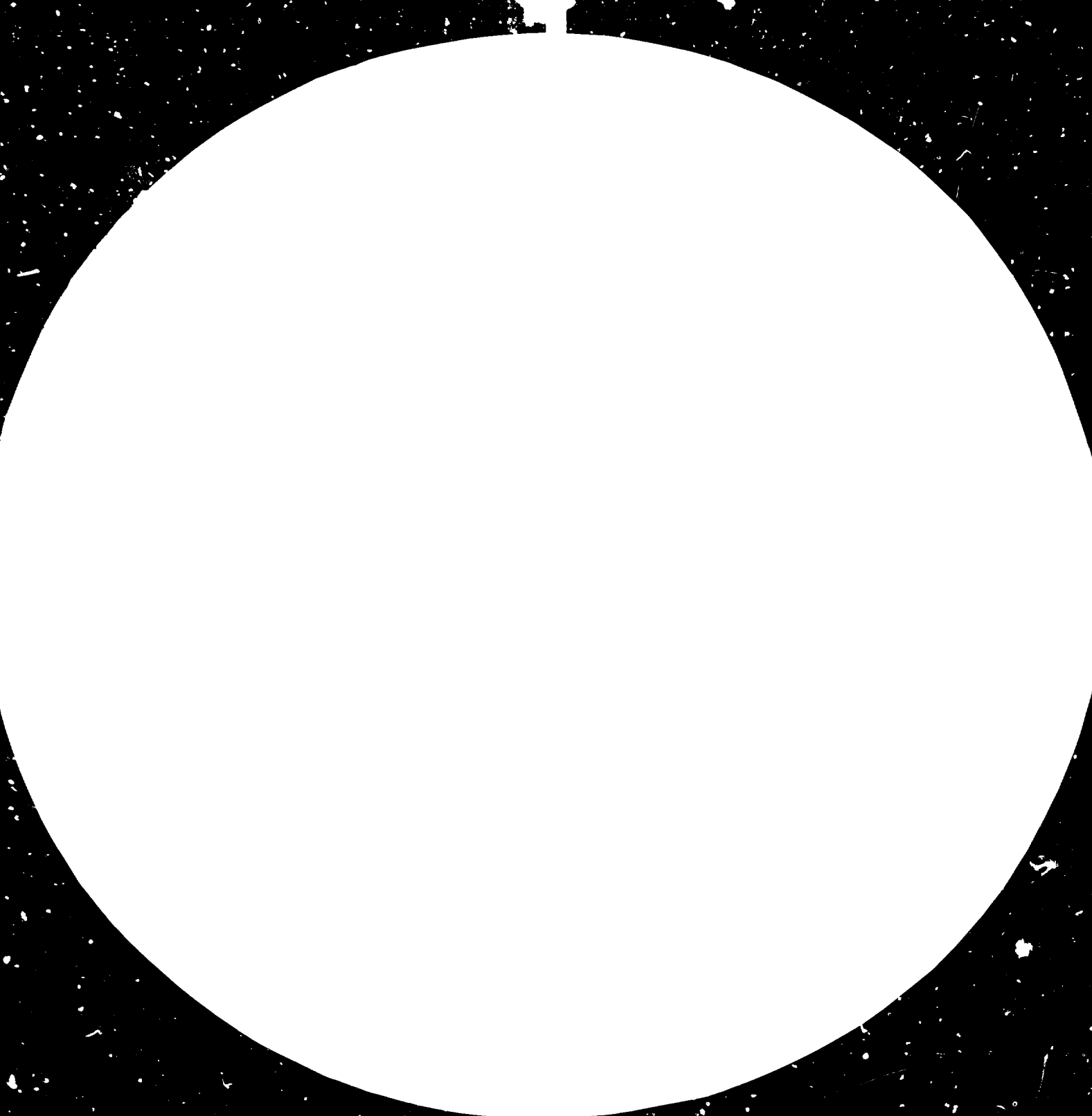
FAIR USE POLICY

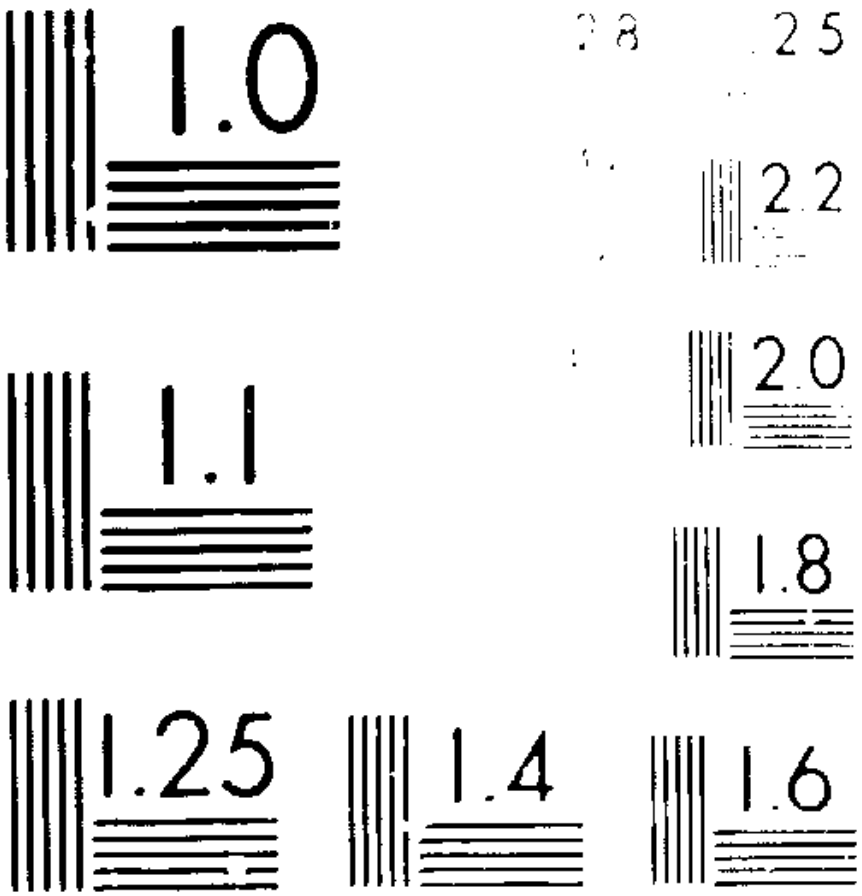
CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org




1.0
2.8
2.5
2.2
1.1
2.0
1.8
1.25
1.4
1.6

RESTRICTED

12420

DP/ID/SER.A/414
28 January 1983
English

Turkey.

SURVEY OF PACKAGING INDUSTRIES FOR ASSESSMENT OF MAIN REQUIREMENTS FOR EXPORT PACKAGE DEVELOPMENT

SI/TUR/82/802

TURKEY

Technical report*

Prepared for the Government of Turkey
by the United Nations Industrial Development Organization,
acting as executing agency for the United Nations Development Programme

Based on the work of John Salisbury,
expert in packaging technology

United Nations Industrial Development Organization
Vienna

* This document has been reproduced without formal editing.

V.83 50903

CONTENTS

I. INTRODUCTION

The concept of a Turkish Packaging Centre has been actively followed up since 1977 and a special building constructed at the Turkish Standards Institute. The building was completed and the laboratory started functioning at the beginning of 1982.

UNDP assistance has been given during 1981/82 under the project TUR/75/056 during which consultancy help was given, particularly in transit pack testing and material testing. Some fellowship training has been carried out with special reference to organization and planning, material testing and equipment selection.

Consideration was then given to the second phase of the project and this report is largely concerned with the assistance given by the consultant during a two month mission in preparing the draft Project Document.

II. SUMMARY

A. Project Document

A Project Document for phase II of the project was drafted for the approval of TSE and the UNIDO/SIDFA, Ankara (Annex 2).

B. Equipment

1. Equipment already in TSE Packaging Centre is listed (Annex 8 of report).

2. Equipment recommended for purchase through the project is listed and cost estimated (page 33, draft Project Document), total value US$ 169,000. This equipment is detailed in "Observations A.".

3. Equipment needed, but for which no finance is available at present is listed and described. Estimated cost US$ 100,000 (Appendix 5 of draft Project Document).

4. Possible equipment suppliers are listed (Annex 3 of report).

C. Training

1. The importance of training technical staff from industry is stressed as a means of promoting the Centre's activities (Observations B.).

2. The various training possibilities (B.Sc., M.Sc., fellowships, on-the-job, seminars, short courses, correspondence courses, etc.) are discussed and those relevant to the project highlighted (Observations B.).

3. Special attention is drawn to the need to prepare formalised, visually aided courses based on the work of the various consultants in phases I and II.

It is proposed by the SIDFA, Ankara), that the training component in the phase II project be formally linked to the very similar activity in the Jamaican Standards Institute (draft Project Document, Special Considerations and report "Observations B.4.(e)).

D. General

The tinplate quality variation problem in Turkey needs to be tackled vigorously by TSE.

III. CONDUCT OF THE MISSION

The consultant arrived in Ankara on 12 October 1982.

Visits were made to a number of companies in the Istanbul area and a seminar on package material testing given to representatives from industry invited by the Istanbul Chamber of Commerce.

Attention was focussed on the preparation of the Project Document for the second phase of the project, with special reference to equipment, training and consultancies.

A second series of visits was made to the industry in the Izmir area during which direct technical assistance was given and information gained about the problems being faced by the packaging industry in Turkey. A visit to the port was included and that occasion used to examine the characteristics of good and bad transit packaging.

The report and Project Document (draft) completed, the consultant left for Vienna.

IV. OBSERVATIONS

A. Equipment Considerations for the Turkish Packaging Centre

The first exercise was to determine what equipment was available in the Centre and what was available in the TSE. A list of existing equipment is given in Annex 8.

Consideration was then given to the kind and extent of consultancy help and fellowship training that would be required. Details of the decisions taken are recorded in the draft Project Document in Annex 2. Once these decisions had been taken, it was possible to estimate the approximate amount of money that could be made available through the project for the purchase of equipment and this evolved as US$ 169,000.

The consultant and his counterpart then examined the information available on possible pieces of test equipment, rejecting those that are either not considered suitable for the packaging centre, or are already available in the TSE. The equipment remaining was then listed and approximately costed. It was found that this list indicated an approximate cost in excess of US$ 250,000, hence it became necessary to establish priorities.

Three priorities were established through detailed discussions:

1. Essential)
2. Highly desirable) These first two groups being based on the immediate activities of the Packaging Centre.
3. Required eventually - This group based on future activities.

The priority 1. and 2. groups were then adjusted in content so that the estimated cost matches the available finances and the cost effectiveness of each piece of equipment was taken into account at this stage.

Equipment in Priorities 1. and 2.

No.	Equipment Specification	Source	Estimated Cost US$
1	Tear Tester. Elmendorf type.	1. H.E. Messmer (U.K.)	1,800
	Pendulum 0 to 8000 mN	2. T.M.I.	
	0 to 16000 mN	"	
	Sample cutting guillotine		
	For determining the tear propagation resistance of paper and plastics.		

No.	Equipment Specification	Source	Estimated Cost US$
2	Tensile Tester. For determining the tensile resistance of paper and board and bond strength measurements. Bench top model. Digital read-out preferred. Capacity up to 50kg. Variable speed. 220v. 50Hz.	1. H.E. Messmer (U.K.) Model 220D 2. T.M.I. (U.S.A.) 84-1-2 p 253 Schopper type 3. Toyo Seiki (Japan)	5,778
3	Compression Tester. Suitable for corrugated boxes of normal size. Test space at least 1,300mm x 1,300mm x 1,800mm. Maximum load 15KN. Direct reg. load/deformation. 220v. 50Hz. Upper platen floating or self-aligning. Overloading safety devices. Spare graph sheets. Operation, maintenance and installation manual in English (2).	1. Macklow Smith (U.K.) 2. T.M.I. (U.S.A.) 3. LAB/Ameresco (U.S.A.)	18,700
4	Heat Sealer. Controlled pressure, dwell time and temperature for laboratory investigations. Single heated bar. Teflon covered (spares). 220v. 50Hz.	1. Packaging Industries Inc.	4,000
5	Storage Rooms or very large Cabinets. For sample storage, shelf life of retail packs. Approximately 2m x 2m x 2m minimum. Conditioned 38°C and 90 per cent RH±2 per cent. Unit construction preferred for later extension. Prefabricated. 220v. 50Hz. Perforated shelves.	1. Baid and Tatlock (U.K.) 2. Rigaku Kogyo Co. Ltd. (Japan)	30,000

No.	Equipment Specification	Source	Estimated Cost US$
6	Vibration Table. For testing transit packs and palletized loads. Frequency 1 to 4Hz (1 to 30Hz better). Amplitude sufficient to obtain 1g. for each frequency normally 25mm). Area 1,300mm x 1,300mm. Movement vertical and circular. Drive mechanical. Capacity 100kg. Unsynchronized motion option if possible. High fences. Remote speed control. Interval timer. Tachometer. 220v., 380v. Three phase. 50Hz.	1. Ameresco (U.S.A.) 2,000V. 2. LAB Corp. (U.S.A.) 2,000V. 3. T.M.I. 90-1 4. L and W (Sweden)	15,000
7	Friction Tester. Static. Tilting table type. For measuring the friction and slip characteristics of paper, coatings, plastics, etc. Blocks to meet ISO and ASTM standards (4). 220v. 50Hz.	1. T.M.I. (U.S.A.) 98-25 p 273 2. H.E. Messmer (U.K.) TNO Model 3. TNO (Holland) 4. Custom Scientific Inst.	1,000
8	Drop Table. Electromagnetic. For testing transit packs, e.g. corrugated boxes. Capacity 50kg. Orientation device. Door aperture min. 500mm x 500mm. 220v. 50Hz.	1. LAB/Ameresco (U.S.A.) Bull 569/978 2. T.M.I. Cat. p 56 3. Schroder Cat. 62 4. Frank (FRG)	2,500
9	Strapping Equipment. Steel and Plastic. For hand strapping corrugated boxes prior to laboratory testing.	1. Showa Boeki (Japan)	300 300
10	Stapling Equipment. For hand stapling corrugated boxes in the laboratory prior to testing.		150

No.	Equipment Specification	Source	Estimated Cost US$
11	Thermohygrographs. Recording (1) and non-recording (1). For measuring the temperature and RH in the various laboratories. Spare charts (100) seven day type.	1. T.M.I. (Bendix type) (Serdex)	735 270
12	Vacuum Packing Equipment. Laboratory model for preparing test samples. Gas flushing devices. Vacuum pump gauge. Heat sealing device. 220v. 50Hz.	1. Multivac Export (FRG) 2. Paul Kiefel Gmb. (FRG) 3. Komet Maschinen Fabrik	5,000
13	Diaphragms for Mullen Burst Tester. Six of each for paper and board.	1. T.M.I. 2. H.E. Messmer	100
14	Calibration Foils for Mullen Burst. Pack of twelve in the low, medium and high ranges.	1. H.E. Messmer 2. T.M.I.	100
15	Set of Cutting Knives. Suitable for paper sample cutting (e.g. Stanley). Six with three dozen blades.	1. T.M.I. 2. H.E. Messmer	20
16	Beam for the Frank Compression Tester. To extend the range of the existing equipment. 0 to 2.5KN.	1. Karl Frank (FRG) Cat. 18938	500
17	Calibration Spring. For laboratory platen crush tester (Hinde and Dauch type). 2.5/5.0KN range.	1. T.M.I.	400
18	Sample Cutting Press. Punch and Die type preferred. For cutting test pieces from paper, board and plastics. For tensile tests 15mm x 250mm. For ring crush test on paper. Twin guillotine type acceptable.	1. H.E. Messmer 2. T.M.I. (JDC type 22-4) 3. Toyo Seiki (Japan) 142 p 87	2,000

No.	Equipment Specification	Source	Estimated Cost US$
19	Magnifying Glasses. Folding. For print examination (3).	1. T.M.I.	20
20	Closure Torque Tester. For measuring the opening and closing torque of bottle and jar caps.	1. UGB (U.K.) 2. Owens Illinois (U.S.A.)	1,500
21	Shrink Gun. For use in pallet and retail pack shrink wrapping in the laboratory. Hand held. Low capacity acceptable as time not important. 220v. 50Hz.		500
22	Stretch Wrapper. Hand held, clutch operated with thin plastic film. Can be used for pallet loads.		300
23	Guillotine. Bench type. Suitable for paper and laminates. Size approximately 0.6m x 0.6m. Hand operated.	1. T.M.I. 22-13-1 p 51 Jaques cutter	650
24	Pick Resistance Waxes. Dennison. For measuring the pick resistance of board.	1. H.E. Messmer (U.K.)	150
25	Micro Recorders (2).	1. Tandy Corp. (U.S.A.)	250
26	Micro tapes. For use with above recorder.		40
27	Playback Equipment. For use with the above tapes. Secretarial.		300
28	Gas Permeability Tester. Automatic. Oxygen equipment similar to the OXtran 100. Two or three material testing points and two retail pack testing capsules.		14,500

No.	Equipment Specification	Source	Estimated Cost US$
29	Slide Projector with Tape Capacity. For audio visual presentations. Built-in screen and able to project on to screen. Spare bulbs (three). For use in preparation and projection of tape/slide courses. Twelve carousels (100 slides). Remote control with extension of at least 3m. 220v. 50Hz.	1. Bell and Howell (PM850) 2. Rank Aldis (Caramate) 3300	1,200
30	Screen for Slide Projector. For use with 35mm slides. Beaded. Minimum size 1.75m x 1.75m stand.		100
31	Headphones (2). For use with slide projector no. 29.		50
32	Kit for preparing 35mm slides. B and W. For the rapid preparation of 35mm slides in the laboratory. Chemical. Self-loading cassettes. 35mm B and W film suitable for 1,000 slides.	1. Kodak Ltd.	100
33	Camera. SLR. Automatic exposure. 1.8mm lens.	1. Pentax (Japan)	200
34	Flash Unit. For the above camera - automatic exposure control.		80
35	Slide Copying Device for use with the camera. Bellows type preferred.	1. Pentax Ltd.	150
36	Packaging Course. Canadian Institute of Packaging. Slide/text.	1. World Packaging Federation	2,000
37	Slide/Text Courses by PIRA (U.K.). Various instruments and packaging technology subjects.		

No.	Equipment Specification	Source	Estimated Cost US$
38	PIRA Abstracts. Back-copies 1972 to 1982. As microfiche. Booklets actually preferred but microfiche much cheaper.	1. PIRA (U.K.)	100
39	Hooks. For drop tests. For the drop testing of odd shaped and heavy objects with a sling, mechanically operated. Capacity up to 500 kg.	1. T.M.I. 25-3-2	600
40	Carton Board Creaser. PIRA type. For the measurement of the creasability of carton board. Hand operated.	1. PIRA	3,034
41	Stiffness Tester. Crease and board type. Electronic. 220v. 50Hz.	1. PIRA 2. H.E. Messmer	4,250
42	Glass Container Side Wall Analyser 220v. 50Hz. For measuring the thickness of the side wall continuously.	1. ACRI (U.S.A.)	10,000
43	Push Pull Gauges. Chantillion type. Ranges 0 - 0.5 kg and 0 - 2.5 kg.	1. T.M.I. 34-18-3	700
44	Density Column. For measuring the density of plastics. Six column type preferred.	1. Davenport (U.K.)	3,000
45	Magnifying Glasses (2) with Built-in Light. Used for print examination.		
46	Seam Scope. Projector for can side seam projection. With sample saw. 220v. 50Hz.	1. Lubeco Machinen Gmb.	2,000

No.	Equipment Specification	Source	Estimated Cost US$
47	Glass Bottle Profile Projector To project a profile of the neck of a glass container to permit accurate measurement. 220v. 50 Hz.		12,000
48	Rub Tester. For the laboratory evaluation of the rub resistance of paper and board printed samples. Sutherland type. 220v. 50Hz.	1. T.M.I. 2. H.E. Messmer	1,500
49	Plybond Adhesion Tester. For measuring the plybond strength for board. An attachment to fit the Mullen Burst Tester.	1. T.M.I. (U.S.A.)	200
50	Impact Tester. For measuring the impact resistance of plastic films in the laboratory. Falling Dart type.	1. Davenport (U.K.) 2. Messmer (22 EM) 3. Custom Scientific Inst.	3,200

Details of the equipment that could not be included in the Project Document, because of finance limitations, are given in Annex 9. It is strongly recommended that consideration be given to methods of raising additional funds to purchase at least some of the equipment described, since it is all necessary for a fully equipped packaging laboratory.

B. Aspects of Training in Packaging Technology

1. Why should the Packaging Centre be involved in training?

Aims and Objectives

Before one can decide who is to be trained and by what methods, it is best to be clear as to why training is a necessary activity for the Packaging Centre of the Turkish Standards Institute. There are a number of objectives:

(a) To improve the competence of the Packaging Centre staff in the effective use of the test equipment and in the application of the results to the development of standards and to the development of the Turkish industry.

(b) To bring the Centre staff into close and frequent contact with technical personnel in industry so that they may better understand the problems being experienced by industry and thus be in a position to propose realistic solutions.

(c) To enable technical personnel in industry to better understand the nature of the tests and development work that can be carried out in the Packaging Centre. This will enable them to recognize those situations in which the Centre's services can be of help in improving the technological level of their part of the industry. In this way, they will be able to frame their requests to the Institute in a precise manner.

(d) To improve the understanding of packaging technology amongst technical and non-technical personnel in Turkey so that local and export products can be prepared for the market in the best possible way and foreign buyers' specifications met with confidence.

(e) To improve communication on technical matters between suppliers, converters, packaging users and transit personnel in Turkey and abroad. To facilitate the wider use of specifications, standards and quality control as applied to packaging materials and containers.

(f) To ease the inevitable changeover to modern automated methods of handling and transit.

2. Who is to be trained?

It is important to establish who is to be trained and in this case, there appears to be four groups important to the Centre. These are:

(a) The Centre's own staff; those existing today and those who will join in the future.

(b) The technical staff engaged in industry, e.g. technical managers, production managers, quality control personnel, works engineers, laboratory staff, food scientists etc. A background education in science or engineering subjects to university degree level is assumed.

(c) Non-technical staff in industry and commerce whose activities call for a good general knowledge of packaging, e.g. marketing and sales personnel, buyers, designers, works managers and export promotion organization personnel. Science to a school leaving standard is to be assumed.

(d) Students at universities and colleges of technology who will benefit from a knowledge of packaging technology when they enter industry or commerce, e.g. students of engineering (mechanical or chemical), food scientists, marketing, buying, physics, quality control, distribution, works management, industrial design, etc.

These groups have different needs and the training needs developed should take these into account. The first two groups should be of the greatest concern to the Centre for the next two years. The training of the third group could be regarded as a promotional activity and thought should be given to the possibility that this kind of activity may be better handled by a packaging association rather than a technical laboratory.

The following observations will concentrate, therefore, on the training of technical staff in the Packaging Centre and those in the packaging industry.

3. Some of the problems in training personnel from Turkish industry

(a) The Packaging Centre is relatively unknown to Turkish industry and has yet to establish itself as an authoritative source of packaging technology.

(b) Location. The Packaging Centre is located in Ankara, but the industry is concentrated in Istanbul, Izmir and Bursa, some 500km away. Travel and hotel costs are high and funds strictly limited.

(c) Release from industry for training purposes is not fully accepted as necessary by the bulk of Turkish industry.

(d) For some years it will be difficult to get experienced and able lecturers in packaging subjects. The Institute staff who will be the specialist course leaders in the future are still engaged in the learning process.

(e) Presentations should be in the Turkish language as much as possible.

The training systems introduced must be suitable for overcoming these problems if the Centre's programme is to make any real impact.

4. Possible training methods and their relevance to the training programme of the Turkish Packaging Centre

A list of the possible training methods relevant to the Packaging Centre would be as follows:

(a) Full-time education in packaging technology up to first degree (B.Sc.) level. Three to four years training.

(b) Full-time education at post-graduate level (M.Sc. or Ph.D.). Two to four years training.

(c) Fellowship training abroad. One to six months.

(d) On-the-job training. A Turkish counterpart working together with a visiting consultant. One to six months.

(e) Seminars, workshops, round tables and short training courses led by visiting consultants or Turkish specialists. One to fourteen days.

(f) Technical articles.

(g) Correspondence courses.

Each possibility will be considered in turn and its rele to the situation in Turkey examined.

(a) Full-time education in packaging technology

The University of Michigan (U.S.A.), Rutgers University and Watford College (U.K.), all offer full-time degree courses in packaging technology, usually lasting three to four years. The industry within a country has to be very highly developed and on a huge scale for there to be attractive career possibilities to candidates considering this type of education. In few developing countries is this the case. A full-time education in packaging technology would undoubtedly be the best preparation for a senior position in the Packaging Centre. Later it may well be worth considering the sponsorship or partial sponsorship of a student to prepare in this way, but for some years, this is likely to be a very risky venture because of the danger of losing the trained person to industry soon after his or her return. Such training cannot be supported through a U.N. project.

(b) Full-time education at the post-graduate level

This is a much more realistic possibility that would appeal to an engineering or science graduate considering a second degree at the M.Sc. level.

Such M.Sc. courses are offered by the University of Michigan (U.S.A.) and Rutgers University (U.S.A.). These courses include a good deal of formal instruction in packaging technology and therefore are an excellent preparation for the kind of activities that will be carried out by the Packaging Centre over the coming years. The Ph.D. level of qualification is probably not a worthwhile investment for the Packaging Centre since it will be too highly specialized to find reasonable application.

Such training cannot be given under this U.N. project, but can be given serious consideration as a possible action by the Standards Institute or appropriate Government Department.

(c) Fellowship Training

This is the normal method used in U.N. projects for widening the knowledge and perspectives of national counterpart staff. The period is normally one to six months with three months being considered as a good balance between fare costs and training costs.

As packaging technology is new to Turkey, it is most likely that suitable training will be found abroad. Possibilities are:

(i) A period in a packaging institute;

(ii) A period in a major company abroad;

(iii) Attendance at a formal education establishment for those parts of the on-going syllabus that are appropriate to the needs of the fellow.

Since previous fellowships have enabled senior members of the Packaging Centre staff to visit packaging institutions in Denmark, Sweden, Finland, Germany, Bulgaria, England and the U.S.A., it can be said that the need to be aware of the activities of similar institutions abroad, has been met by the first phase of the project.

The fellowship training needs for the second phase of the project have been identified as follows:

31.01 - Transit Packaging Testing 3mm

Head of the Transit Packaging Laboratory. Training in a packaging institute is a real possibility, e.g. PIRA (U.K.), India, Hamburg (Germany), TNO (Holland), but it is strongly recommended that consideration be given to three months spent at the Packaging School of the Michigan State University taking those parts of the degree course syllabus that are relevant to package testing (details have been sent for). This training has been found satisfactory on previous occasions; it is good basic academic training in transit test technology plus ample opportunity to work with similar equipment to that being installed in the Packaging Centre, i.e. inclined plane tester, drop, vibration and compression test equipment.

31.02 - Testing of Food Packages 3mm

Head of the Food Testing Laboratory. This fellowship could also be carried out in a packaging institute such as PIRA (U.K.), Munich (Germany), TNO (Holland) or The Campden Food Research Institute (U.K.), but it is strongly recommended that consideration be given to seeking access to the Customer Service Laboratories of a major food company abroad, e.g.:

(i) The Metal Box Customer Service Laboratories, Wantage, U.K.;
(ii) General Foods Ltd, U.S.A.;
(iii) Unilever Ltd, Port Sunlight, U.K.;
(iv) Reynolds Metal Inc., U.S.A.

31.03 - Packaging Material Testing 3mm

Head of the Packaging Material Section. The Head of the Packaging Material Testing Section has had good experience in three packaging institutes and more academic training in this subject is recommended, such as can be obtained at Watford College, Watford (U.K.), Michigan State University and Rutgers University (U.S.A.). Suitable parts of the on-going B.Sc. courses should be selected from the literature requested.

31.04 - General Packaging Technology 2mm

Head of the Packaging Centre. This is envisaged as an overall technical training for the Head of the Packaging Centre. An ideal course for this purpose is the intensive summer school run in June/July of each year by the Michigan State University. These are six weeks courses that compress the normal three months syllabus range of topics and therefore cover a wide range in the time utilized.

This is possible because most of the people attending have already had some basic training in packaging and one of the attractions is that most of the participants are from American industry. therefore the lectures and other activities are of a pragmatic nature and the discussions give a good insight into the kind of problems faced by people in industry. Attending such well-organized courses will illustrate how the Packaging Centre should run their training courses in the future.

It is suggested that, in addition to the intensive six weeks course, the opportunity is taken on the return or outward journey to study standardization activities in packaging in:

(i) American National Standards Institute, 1430 Broadway, New York, 10018, U.S.A.;

(ii) Gaynes Engineering Testing Laboratory Inc., 1642 W. Fulton Street, Chicago, Illinois, 6061, U.S.A.;

(iii) The British Standards Institute, Advice to Exporters Division, U.K.;

(iv) The Timber Research and Development Association (TRADA), Hughenden Valley, High Wycombe, Bucks, U.K.;

(v) The Hungarian Institute of Handling and Packaging, P.O. Box 89, Rigo Utea 3, Budapest, Hungary.

(d) <u>On-the-Job Training</u>

This is an essential part of any training programme, where experienced consultants work side by side with their Turkish counterparts, using the actual equipment in the Ankara Packaging Centre and giving advice to Turkish companies with their specific problems. The nature of the consultancies requested by the Centre is given in the Project Document, Assignment of International Staff, UNDP, and they focus in the second phase of the project on transit packaging, food packaging and training. The use of international consultants is a tried and proven technique of many years' standing, but there are difficulties that year by year become more acute. These are:

(i) Language difficulties. It is unlikely that any visiting consultant can speak Turkish, therefore communication has to be in another language, usually English. There is a real need to record the essential points of what each consultant has to say in the Turkish language, preferably in a form that is ready for use as a training medium for other Packaging Centre members and technical personnel in industry.

(ii) Costs of consultancies. The fare, DSA and salary costs are very high and in the future, such sums of money will be more and more difficult to raise. Ways must be developed to increase the cost effectiveness of the consultancy visits.

(iii) Loss of the trained national staff member. Train often on a one to one basis and if the counterpart is lost shortly after the training is given, as is often the case, the Institute suffers a very serious set-back in its ability to operate that section of its laboratory. Although the counterpart's knowledge and abilities receive a boost during the consultant's visit, it is true to say that he or she does not normally reach a level in the limited time available that enables them to train other members of the national staff in the Centre or personnel from industry. Too much of what the consultant has to convey is lost shortly after he leaves.

It is suggested that if the training consultancy is linked with the other consultancies, some of the training courses to be created could embody the principle points that those consultants have to make. These would be courses strongly supported by visual aid material (slides, charts, etc.), with written and taped commentaries in Turkish that can be used on many future occasions by the national counterpart staff. The visit of the training consultant could be made so as to overlap the visits of the transit testing consultant and the food packaging and analytical consultant to facilitate this combining of information and visual aid material.

The creation of the training courses would be the responsibility of the training specialist but each expert would be expected to contribute to the content and to supply the specialized visual aid material referred to above. This co-operation should be written into the job description for each expert.

(e) Seminars, Workshops, Round Tables, Short Training Sessions

These can be led by the visiting consultants and by the Packaging Centre staff and by specialists from Turkish industry. It is to be stressed that a key activity for the Packaging Centre is the training of technical personnel from industry in packaging technology. This is because these are the people who are going

to initiate and run testing programmes in their companies, concerned with quality assurance, specifications, raw material assessment and problem investigation. They are the people who will best understand how the services and expertise offered by the Packaging Centre can be related to the problems of Turkish industry but they do need to be very familiar with the nature of the test equipment and the techniques available in the Centre. This is done by repeatedly running seminars, workshops and short training courses in a variety of topics. It will be the task of the training consultant to identify, specify and prepare the courses; some typical subjects are listed in Annex 6. The visiting consultants will present some seminars but the aim of technical assistance is to create the means and skill by which the national staff may continue the work. Materials and techniques of presentation must be prepared for presentation to groups in the industrial centres of Izmir, Bursa and Istanbul and what is envisaged is tape/slide presentations, followed by discussion sessions led by either members of the Packaging Centre staff, or by a specialist in the subject from Turkish industry. Some material is already available, e.g. the 35mm slide-based course of the Canadian Packaging Institute which is distributed by the World Packaging Federation, and which covers a wide variety of packaging topics. PIRA (U.K.) offer a number of slide training systems which explain the use of their own pieces of test equipment. The purchase of these ready-made training materials through the project has been recommended.

The technique of using a slide/tape programme to explain the use and applications of the equipment could be extended by the Centre until it covers all the instruments and many of the test techniques that it has to offer. The text should develop the ways in which the results from the test equipment can be used to improve the quality of materials and containers in use in industry and in marketing.

Short slide/tape courses are very effective for groups and with the right projector can be used for individual study too. The purchase of this type of 35mm projector, which has its own built-in screen and headphone facility is strongly recommended. Such equipment makes the courses available to individuals from industry for private study and, of course, for the training of new members of the Centre's staff. Video cassettes are, of course, excellent for this type of training and as a first step into this modern technique, the slide/tape courses can be transferred to this medium.

If the training component of the project is linked with the training component of the Jamaican Standards Institute project (a two year project) and possibly that of the Portuguese Packaging Centre, then the potential for making a large number of such training courses will have been created. Use of the video cassette improves the transfer of courses from one location to another, but it can be done using slide/tape presentations too.

At some later date, there will be a need for regular training in the Istanbul, Bursa and Izmir regions and the existence of formalized training material will much facilitate such a development. Once established in packaging, the TSE may well find it attractive to use the techniques and equipment for training in other activities in these regions.

The Jamaican project is to be initiated at the Jamaican Standards Institute early in 1983. The aims of this project are very similar to those of the second phase of the Turkish project, that is, the further development of the existing Packaging Centre and the development of modern training methods in packaging technology. The training material produced during the Jamaican project will be in English and in many cases will be similar in content to that required by the Turkish Packaging Centre. Obviously modification is necessary and the translation of the commentary into Turkish is a much easier task than the creation of a new course. Some new material will be necessary, as not all the equipment is the same in each Centre.

The idea of combining the two training components deserves serious consideration.

(f) Technical articles published in Turkish in local journals

Such articles are of some help. They are time-consuming to prepare but there is ample material available (especially through ITC), to begin this activity. Their "Export Packaging Notes" would be an excellent place to begin.

Since the primary aim over the next year or so, is to inform technical personnel in industry of the growing range of facilities in the Packaging Centre, attention could be focussed on a monthly article in the TSE bulletin, each article describing a specific piece of equipment that is now functioning in the Centre, the techniques for using that equipment and how the results can be applied in industry. A standard format should be used so that once, say twenty, have appeared, they can be reproduced with only slight revision in the form of a small booklet that will give a good overall review of exactly what the packaging laboratories have to offer. The likely cost for each test should be indicated.

(g) Correspondence Courses

Normally correspondence courses are not viewed favourably as a means of fellowship training, but it is suggested that packaging technology is a special case because:

(i) other forms of on-going training in this subject are not available to technical personnel in the industrial concerns so widely dispersed throughout Turkey;

(ii) the Head of the Packaging Centre needs a broad, overall view of the subject which should include the basics of insurance, laws and regulations, marketing, machinery, economics and the environmental aspects of packaging as well as the technical aspects.

It is suggested that one course be started (cost only US$ 170) which will be pursued for one to two years by the Head of the Packaging Centre, but involving other members of staff who are specializing in any given part of the syllabus. The course recommended has been run by the British Institute of Packaging for many years and some 2,000 students have completed it successfully, both in the U.K. and abroad. Details are shown in Annex 4.

There is another reason for suggesting this activity. Once the course has been satisfactorily completed by the Centre staff, it is suggested that serious consideration be given to introducing it as a means of regular training in this subject in Turkey. In the U.K. there is a monthly "get-together" for all the people in a given area who are taking the course. All participants could be reading the same part of the syllabus making it possible to exchange information and views on that subject. Discussion can be led by a specialist from industry and the overall organization could be carried out by a staff member of the Packaging Centre, holding consecutive meetings in Izmir, Bursa, Istanbul and Ankara. The occasion could be used to hold other "one shot" training activities such as seminars, round tables, talks, films, etc., and the sessions could be open to interested technical people who may not be taking the correspondence course but wish to benefit from the discussions and presentations. An important advantage to this additional approach to training is that it brings the Packaging Centre staff members into regular contact with technical staff in industry in the principal industrial areas. Such personal contacts are an essential feature to building up the effectiveness of the Centre. The Centre staff are quite likely to have other activities in the area that can be linked to these regular monthly sessions.

If the course becomes a regular feature, consideration can be given to making the course material available in Turkish, so widening the scope of the course. Eventually the aim could be the introduction of a qualifying examination to recognize those skilled in packaging technology. This is some distance into the future, but the approach described above can lay the cornerstone for such a situation.

V. RECOMMENDATIONS

1. That the project described in the draft Project Document (Annex 2) be implemented as soon as possible.

2. That consideration be given to creating further funds for the purchase of equipment for the Centre (Observation A and Annex 9).

3. That training be regarded an essential activity for integrating the Centre with the packaging industry (Observation B).

4. That the staff of the Centre concentrate on becoming competent in the use of the existing and new equipment, clearly defining the test methods to be used. These methods to become Turkish standards.

5. That the test methods be applied extensively to current Turkish materials and containers to establish the "normal" values on which development work is based.

6. That the above test methods be incorporated into audio visual training courses designed for the technical personnel in industry (Observation B).

7. That the Head of the Food Packaging Laboratory be recruited as soon as possible.

8. That three laboratory technicians be recruited as soon as possible; there is a lot of routine testing to be done.

9. That structural and graphic design are not considered viable activities for the Centre staff for at least the next two years.

10. That it be realized that speed is of immense importance to the industry and that the technique of giving preliminary reports by telephone be adopted as soon as it is feasible. The formal written report to follow at a later date.

11. That when service laboratories are eventually opened in Istanbul and Izmir, technical personnel from the converting and user industries be encouraged to play a more active role in planning and supervision of the testing work (Annex 5).

12. That the problem of quality variation in locally produced tinplate be vigorously pursued by the Turkish Standards Institute. The credibility of the role of standards in improving quality could be damaged if this long standing situation is not improved.

ANNEX 1

LIST OF CONTACTS

1.	UNDP P.K. 407 Ankara Turkey - Tel. 26 54 85 to 89	Mr. S.K. Malik, Resident Representative Mr. G.L. Narisimhan, SIDFA Mrs. G. Turkmen
2.	Turkish Standards Institute Necatibey C addesi 112 Bakanliklar Ankara Turkey	Mr. Ali Armagan, Secretary-General Mr. Naci Dikmen, President Mrs. Gulden Tarhan, Director of the Packaging Laboratory Mr. Hasan Salih Acar, Head, Material Testing Mr. Recep Deveci, Engineer
3.	Tamek Gida San A.S. Eski Yalova Bursa Turkey Food Processors	Mr. Fikret Erbil Onem
4.	Auer. Gumussuyu Cad. 28 Topkai Istanbul Turkey Cookers and Space Heaters	Necdet Sunay, General Manager
5.	Eczacibasi Seramik Fabrikalari P.O. Box 6 Kartal Istanbul Turkey	Mr. Sadi Burat, Plant Manager
6.	Olmuk Co. Corrugated Board	Mr. Ali Yildirim, Technical Director
7.	Turyag Household Products	Ms. Gulcan Tuceturk, Head, Quality Control Mr. Okan Esin, Packaging Engineer Ms. Suna Gunday
8.	Pinar Milk and Dairy Products	Ms. A. Arsan
9.	Kaplamin Foam plastic filled board.	Mr. M. Fikret Ozveren, Factory Manager
10.	The Istanbul Chamber of Commerce	

ANNEX 2

UNITED NATIONS DEVELOPMENT PROGRAMME IN TURKEY

UNITED NATIONS DEVELOPMENT PROGRAMME

Project of the Government of
TURKEY

DRAFT PROJECT DOCUMENT

TITLE : Assistance to TSE in the Establishment of a Packaging Centre (Second Phase)

NUMBER : DP/TUR/81/013/A/01.37

DURATION : Three Years

PRIMARY FUNCTION : Establishment of the Packaging Centre

SECONDARY FUNCTION : Institutional-Building

SECTOR (Govt.Class.) : I n d u s t r y

UNDP CLASS.and CODE

SUB-SECTOR (Govt.Class.) :

0510
Industrial Development Support Services

GOVERNMENT IMPLEMENTING AGENCY: Turkish Standards Institute (TSE)

EXECUTING AGENCY : United Nations Industrial Development Organization (UNIDO)

ESTIMATED STARTING DATE : March 1983

GOVERNMENT INPUTS : TL 37,584,000 (in kind)

UNDP INPUTS: US $ 231,650

GOVERNMENT COST-SHARING : US $ 100,000

Signed : _____ Date : _____
on behalf of the Government

_____ Date : _____
on behalf of the Executing Agency

_____ Date : _____
on behalf of the United Nations Development Programme

PART I - LEGAL CONTEXT

This Project Document shall be the instrument referred to as such in Article 1, paragraph 1 of the Assistance Agreement between the Government of Turkey and the United Nations Development Programme signed by the parties on 21 October 1965.

The Government implementing agency shall, for the purposes of the Standard Basic Agreement, refer to the Government Co-operating Agency described in that agreement.

PART II.A - DEVELOPMENT OBJECTIVES

Assisting the industry in its packaging problems through a well-established Centre and undertaking research and development work to overcome these problems, thus contributing to the overall improvement of the quality and standards of packaging for the home and export markets.

PART II.B - IMMEDIATE OBJECTIVES

1. To improve the range of test equipment available.

2. To improve the knowledge and effectiveness of the national staff in applying the packaging technology to the problems of Turkish industry. Emphasis is to be on transit packaging and on the testing of food products.

3. To establish training material and techniques that can be used and further developed by national staff for training technical personnel from industry.

PART II.C - SPECIAL CONSIDERATIONS

The training material and techniques to be developed will have considerable value to similar packaging laboratories being assisted through UN projects. This could be viewed as a TCDC operation.

It has been suggested that the training component could be linked with the training activities at the Jamaican Standards Institute so as to obtain maximum benefit from the material to be produced that is common to both.

PART II.D - BACKGROUND AND JUSTIFICATION

The basic need for a packaging laboratory, or packaging centre, in Turkey was first raised in 1968 and reviewed in depth in the following reports:

1975 - A. Soltan, Survey Mission on Packaging;

1977 - K. Luxenhofer, Establishment of a Packaging Centre at TSE, Ankara.

The concept was considered and approved by the Turkish State Planning Organization in 1977 and work begun on preparing a suitable building at the Turkish Standards Institute.

Assistance was given through UNDP under project DP/TUR/75/056 - Assistance to the TSE in the Establishment of a Packaging Centre.

By 1982 the following position had been reached:

1. The laboratory buildings, servicing, furnishing, etc. had been completed at a cost in the order of TLS 15 million.

2. A director, two engineers and a chemist are now working at the laboratory.

3. Test equipment has been supplied by the Turkish Government and by the UN to a value in the order of US$ 100,000, but more is required before the range can be considered adequate.

4. Work is under way on transit pack testing, material testing and standards preparation.

5. Overseas training of national staff took place in 1977 and 1981 in the form of seven man-months of fellowships, focussing on material testing, organization and management and equipment studies. Further training of laboratory staff is required especially in transit pack testing, food packaging technology, retail pack testing and in training techniques.

6. Ten man-months of consultancy help has been provided in 1981 and 1982 focussing on planning, transit pack testing and material testing. More technical assistance is required to establish the food packaging laboratory, to build up the training capacity of the Packaging Centre and to further develop the testing capabilities of the Centre.

7. An important aspect of the Turkish development programme relates to the improvement of exports in quantity and quality. Transit and retail packaging quality is regarded as a vital component of this drive.

PART II.E - OUTPUTS

The overall performance of the Packaging Centre will be improved but of maximum importance are:

1. A completed transit package laboratory with vibration, compression, inclined plane and drop test equipment installed, operating and understood. The staff further trained in transit pack testing technology by fellowship training and consultancy help, with special reference to the new equipment for vibration, compression and drop testing.

2. A food packaging testing laboratory suitable for carrying out shelf life testing on packaged retail goods. Staff skilled in the planning, storage and performance analysis of a wide range of packaged foods.

3. Visual aid assisted training courses covering the principal operation and applications for most of the equipment in use in the laboratory. The local counterpart staff trained in the preparation of visual aided training courses such that they can apply the techniques learned to the remaining test methods and to packaging technology subjects.

4. A fully functioning package material testing laboratory with new equipment (detailed later) installed, operating and understood.

5. Reports

(a) A technical report from the transit pack testing consultant describing results achieved and outlining a development programme for the section for the following two years.

(b) A technical report from the food packaging consultant describing the results achieved, techniques taught and outlining a development programme for the following two years concerning products and packaging methods relevant to Turkish exports and local packaging that should receive special attention.

(c) A technical report from the training consultant describing the results achieved and outlining a programme of suitable subjects as suitable training activities with guidelines on their construction.

PART II.F - ACTIVITIES

No.	Activity	Location	Proposed Starting Date	Duration Months
1	Recruitment of new staff	Ankara	March 1983	6
2	Production of equipment at the TSE	Ankara	March 1983	6
3	Requisition, installation and commissioning of equipment by TSE	Ankara	March 1983	18
4	Requisitioning, installation and commissioning of the first group of equipment. UNIDO.		March 1983	18
5	Fellowship in transit testing leaves	U.S A./ Europe	January 1985	3
6	Food and analytical expert arrives	Ankara	February 1984	4
7	Requisitioning, installation and commissioning second group of equipment. UNIDO.		January 1984	12
8	Furnishing of library at the Centre	Ankara	January 1984	12
9	Food packaging fellow leaves	U.S.A./ Europe	September 1983	3
10	Material testing fellow leaves	U.S.A./ Europe	January 1984	3
11	Training expert arrives	Ankara	May 1984	3

No.	Activity	Location	Proposed Starting Date	Duration Months
12	Requisitioning, installation and commissioning travelling crane by TSE	Ankara	March 1983	12
13	Director of Packaging Centre leaves for fellowship	U.S.A./ Europe	June 1985	2
14	Transit pack expert arrives	Ankara	September 1985	3
15	Training expert arrives	Ankara	September 1985	3

PART II.G - INPUTS

1. Government Inputs

(a) Financial Obligations

TSE to secure funds for the employment of adequate personnel for the Packaging Centre and the purchase of locally made equipment.

(b) Assignment of National Staff

- Technical Adviser;
- Director of Packaging Centre (National Project Co-ordinator);
- Head of Transport Packaging Laboratory (Counterpart to the Transport Packaging Expert);
- Head of Material Testing Laboratory;
- Head of Food Testing Laboratory (Counterpart to the Food and Analytical Testing Expert);
- Physicist or Engineer;
- Mechanical Technician;
- Chemical Technicians (2);
- Documentation person;
- Secretary;
- Worker.

(c) Training Provisions

To be determined according to needs later.

(d) Government-Provided Lands, Buildings and Equipment

The buildings for the Packaging Centre have been constructed. Supplies and equipment are as follows:

Equipment	Approximate Delivery Date	Cost (TL '000)
Drop Hammer Device	1984	100
Water Spray Tester	1984	50
Forklift	1984	2,000

Equipment	Approximate Delivery Date	Cost (TL '000)
Glassware and other laboratory equipment	1984	2,500
Chemicals	1984	500
Books and periodicals	1984	50
Furnishing of library and training rooms	1984	500
Travelling crane	1985	4,000

Other laboratory expenses will be for electricity, water and fuel.

(e) Government Participation in Cost-Sharing with UNDP

Government agrees to contribute to the international cost of the project; an amount of US$ 100,000 to be paid in instalments as stipulated in the cost-sharing budget.

2. UNDP Inputs

(a) Assignment of International Staff

	Location	Starting Date	Duration Months
11-01 Expert in Food Packaging and Analytical Testing	Ankara	February 1984	4
11-02 Expert in Training in Packaging Technology	Ankara	May 1984	6
11-03 Expert in Transit Pack Development and Testing	Ankara	September 1985	3
11-04 Expert to be decided		1984	1

(b) Training Provision

31.01 Testing of Transit Packaging	U.S.A./ Europe	September 1984	3
31.02 Testing of Food Packaging	Europe/ U.S.A.	September 1983	3
31.03 Testing of Packaging Materials	Europe/ U.S.A.	January 1984	3
31.04 General Packaging Technology	U.S.A./ Europe	June 1985	2
31.05 To be decided		1984	1

A special objective for expert 11-02 "Training in Packaging Technology", is the preparation of training courses to be used by the Packaging Centre for training personnel from industry and future Centre staff, as elaborated in the job description in Appendix 3 and in the list of illustrative course titles given in Appendix 6 of this document.

(c) UNDP-Provided Supplies and Equipment

Details of the equipment specifications, possible sources of supply and approximate costs are given in the report of UNIDO Consultant J. Salisbury, December 1982.

No.	Equipment	Approximate Delivery Date	Approximate Cost (US$)
1	Tear Tester. Elmendorf type. Pendulums.	1983	1,800
2	Tensile Tester. Bench top.	1983	5,778
3	Compression Tester. Corrugated boxes.	1983	18,700
4	Heat Sealer. Laboratory. Heated bar type.	1983	4,000
5	Storage rooms or very large cabinets. Conditioned 38°C, 90 per cent RH.	1983	30,000
6	Vibration Table. 1.25m x 1.25m, 1,000kg.	1983	15,000
7	Friction Tester. Static. Tilting table type.	1983	1,000
8	Drop Table. Electromagnetic. Capacity 50kg.	1983	2,500
9	Strapping Equipment. Steel and plastic.	1983	600
10	Stapling Equipment.	1983	150
11	Thermohygrographs. Recording and non-recording.	1983	1,000
12	Vacuum Packaging Apparatus.	1983	5,000
13	Diaphragms for Mullen Burst Tester.	1983	100
14	Calibration Foil for Mullen Burst Tester.	1983	100
15	Set of Sample Cutting Knives	1983	20

No.	Equipment	Approximate Delivery Date	Approximate Cost (US$)
16	Beam for Frank Compression Tester. 0 to 2.5KN.	1983	500
17	Calibration Spring for Laboratory Crush.	1983	400
18	Magnifying Glasses. Folding; for print.	1983	20
19	Sample Cutting Presses. Punch and die type.	1983	2,000
20	Closure Torque Tester.	1983	1,500
21	Shrink Gun. Electric, hot air type.	1983	500
22	Stretch Wrapper. Hand-held device.	1983	300
23	Guillotine. Bench type.	1983	650
24	Pick resistance waxes. Dennison.	1983	150
25	Micro-recorders (2).	1983	250
26	Micro-tapes (12).	1983	40
27	Playback Equipment for micro-tapes. Secretarial.	1983	300
28	Gas Permeability Tester. Automatic. Oxygen.	1983	14,500
29	Slide Projector with Tape Capacity.	1983	1,200
30	Screen for Slide Projector.	1983	100
31	Headphones (2) for use with Slide Projector.	1983	50
32	Kit for preparing 35mm slides. Black and white.	1983	100
33	Camera. SLR automatic exposure type.	1983	200
34	Flash Unit for above Camera.	1983	80
35	Slide Copying Equipment. Bellows type.	1983	150
36	Packaging Course. Canadian Inst. Packaging. Slide/text.	1983	2,000
37	Text/Slide Courses. Test instruments and packaging technology.	1983	2,000
38	Packaging Abstracts. PIRA. 1972 to 1982.	1983	100

No.	Equipment	Approximate Delivery Date	Approximate Cost (US$)
39	Hooks. Drop tests.	1983	600
40	Creaser. Carton board. PIRA type.	1984	3,034
41	Stiffness Tester. Board and crease type.	1984	4,250
42	Glass Container Sidewall Distribution Analyser	1984	1,000
43	Push-pull Gauges. Chantillion type.	1984	700
44	Density Column. For plastics.	1984	3,000
45	Magnifying Glasses (2) with Light.	1984	10
46	Seamscope Projector. For can seam examination with sample saw.	1984	2,000
47	Glass Bottle Profile Projector.	1984	12,000
48	Rub Tester. Print. Sutherland type.	1984	1,500
49	Plybond Adhesion Tester. Mullen attachment.	1984	335
50	Impact Tester. Falling dart type.	1984	3,000
			144,267
	Estimated cost - freight, insurance, etc.		24,733
		Total Cost US$	169,000

Note: This list does not represent the total requirements for a fully fledged Packaging Centre, but those considered essential and representing the best value for the money in the present project. A list of additional equipment likely to be required at some future date is given in Appendix 5.

PART II-H - WORK PLAN

A detailed work plan for the implementation of the project will be prepared by the National Co-ordinator for the Project and attached to the Project Document as Annex 2 and will be considered as part of that document.

A bar chart showing the relationship between the activities is given overleaf.

WORK PLAN

Nº	ACTIVITY	1983 J F M A M J J A S O N D	1984 J F M A M J J A S O N D	1985 J F M A M J J A S O N D	1986 J F M
1	Staff recruitment.	———			
2	Equipment. TSE Workshop.	———			
3	Requisition, install equipment. TSE.	———	———		
4	Requisition, install equipment. UNIDO.	———	———		
5	Fellowhip. Transit testing.		———		
6	Expert. Food Packaging.		———		
7	Requisition, install equipment, UNIDO.		———	———	
8	Furnishing Library.		———		
9	Fellowship. Food Packaging.	———			
10	Fellowship. Material Testing.		———		
11	Expert in Training.		———		
12	Crane. TSE.	———			
13	Fellowship. General.			———	
14	Expert. Transit Development, Testing.				———
15	Expert in Training.				———

Part II-I : Preparation of the Framework for Effective Participation of National and International Staff in the Project.

The activities necessary to produce the indicated outputs and achieve the Project's immediate objective will be carried out jointly by the national and international staff assigned to it. The respective roles of the national and international staff will be determined by their leaders, by mutual discussion and agreement, at the beginning of the Project, and set out in a framework for effective participation of national and international staff in the Project. The framework, which will be attached to the Project Document as an annex, will be reviewed from time to time. The respective roles of the national and international staff shall be in accordance with the established concept and specific purposes of technical co-operation.

Part II-J : Development Supoort Communication

Guideline committees representing industry should be formed and hold regular meetings at the Centre; every six months is suggested.

Part II-K : Institutional Framework

Turkish Standards Institution (TSE), established by Law No. 132 in 1960 as an autonomous Public Institution, is the only national agency authorized to prepare the National Standards as deemed necessary and to stimulate the implementation of them. In order for the Government to declare a standard mandatory, it has to be a Turkish Standard.

At TSE there are four laboratories,namely : 1) Chemical Laboratory, 2) Civil and Mechanical Laboratory, 3) Electrical Laboratory, 4) Packaging Laboratory (not completed). These laboratories should:

a) do the necessary research work required during preparation of standards,
b) conduct tests required for the government inspections of standards; tests relevant to implementation of conformity to the TS Standards presently over 200 firms have been granted the license to use the TSE mark; and tests for standards prepared as requested by various organizations according to private Codes of Practice.
c) Act as an "Arbitrator Laboratory" in instances where different results are provided by separate laboratories.

It is to be noted that UN projects are under consideration concerning quality control and export promotion. The packaging facets to be related to this projec

Part II-L : Prior Obligations and Prerequisites

- Proper staffing of the Packaging Centre with qualified personnel.

- Necessary budgetary resources

Part II-M : Future UNDP Assistance

None foreseen at the moment.

PART III - SCHEDULES OF MONITORING, EVALUATION AND REPORTS

Part III-A : Tripartite Monitoring Reviews, Technical Reviews

The Project will be subject to periodic review in accordance with the policies and procedures established by UNDP for monitoring project and programme implementation.

Part III-B : Evaluation

The Project will be subject to evaluation in accordance with the policies and procedures established for this purpose by UNDP. The organization, terms of reference and timing of the evaluation will be decided by consultation between the Government, UNDP and the Executing Agency concerned.

Part III-C : Progress and Terminal Reports

Six-monthly Progress Reports will be prepared by the National Project Coordinator, utilizing the UNDP standard forms.

A Terminal Report will also be prepared by the Project's management, subject to clearance by the Executing Agency, six months prior to the termination date of the Project.

UNIDO

PROJECT BUDGET/REVISION

3 COUNTRY	4. PROJECT NUMBER AND AMEND.	5. SPECIFIC ACTIVITY
TURKEY	DP/TUR/81/013/A/01	

10. PROJECT TITLE: Assistance to TSE in the Establishment of a Packaging Centre. Second Phase.

10. PROJECT PERSONNEL EXPERTS / Post title	16. TOTAL m/m	16. TOTAL $	17. 1983 m/m	17. 1983 $	18. 1984 m/m	18. 1984 $	19. 1985 m/m	19. 1985 $	20. 1986 m/m	20. 1986 $
11-01 Food Packaging and Analytical	4	26,600			4	26,600				
02 Training in Packaging Technology	6	39,900			3	19,950	3	19,950		
03 Transit Pack Development & Test	3	19,950					3	19,950		
04 To be decided	1	6,650			1	6,650				
05										
06										
07										
08										
09										
10										
11										
12										
13										
14										
11-99 SUBTOTAL:	14	93,100			8	53,200	6	39,900		

21. REMARKS

UNIDO

PROJECT BUDGET/REVISION

2. PAD NUMBER

4. PROJECT NUMBER DP/TUR/81/013/A	16. TOTAL m/m	16. TOTAL $	17. 1983 m/m	17. 1983 $	18. 1984 m/m	18. 1984 $	19. 1985 m/m	19. 1985 $	20. 1986 m/m	20. 1986 $
12.01 OPAS Experts										
13.00 Support Personnel										
14.00 Volunteers										
15.00 Experts Travel		600				400		200		
16.00 Othe: Personnel Costs		1,000								1,000
17.01 Locally hired Experts										
17.02 Locally hired Experts										
19.00 Total Personnel Component	14	94,700			8	53,600	6	40,100		1,000
20. SUBCONTRACTS										
29.00 Total Subcontracts Component	14									
30. TRAINING										
31.00 Fellowships	12	44,000	3	9,800	7	25,800	2	8,400		
32.00 Study Tours, UNDP G. Training/Meetings										
33.00 In-service Training		3,000		500		1,000		1,000		500
34.00 Group Training (non-UNDP)		2,000		500		1,000		500		
35.00 Meetings/Consultations (non-UNDP)										
39.00 Total Training Component	12	49,000	3	10,800	7	27,800	2	9,900		500
40. EQUIPMENT		179,450		120,000		59,450				
49.00 Total Equipment Component										
50. MISCELLANEOUS										
51.00 Operations - Maintenance		1,500		500		500		500		
52.00 Reports		2,000		250		250		500		1,000
53.00 Sundries		5,000		1,000		2,000		1,000		1,000
55.00 Hospitality (non-UNDP)										
59.00 Total Miscellaneous Component		8,500		1,750		2,750		2,000		2,000
99. GRAND TOTAL:		331,650		132,550		143,600		52,000		3,500

COUNTRY : TURKEY
PROJECT TITLE : Assistance to TSE in the Establishment of a Packaging Centre, Second Phase.
PROJECT NUMBER : DP/TUR/81/013/A/01/37

COST SHARING CONTRIBUTION

(in US Dollars)

To be decided by UNDP Ankara at the relevant time.

COUNTRY : TURKEY

PROJECT TITLE: Assistance to TSE in the Establishment of a Packaging Centre, Second Phase.

PROJECT N° : DP/TUR/81/013/A/01

PROJECT BUDJET COVERING TURKISH GOVERNMENT CONTRIBUTION IN KIND

(In local currency, in '000TL)

10. PROJECT PERSONNEL	TOTAL		1983		1984		1985	
	m/m	'000TL	m/m	'000TL	m/m	'000TL	m/m	'000TL
Technical Adviser	36	2,397	12	714	12	765	12	918
Director of Packaging Centre	36	2,123	12	629	12	680	12	816
Head of Transport Packaging	36	1,581	12	459	12	510	12	612
Head of Material Packaging	36	1,581	12	459	12	510	12	612
Head of Food Packaging Lab.	36	1,581	12	459	12	510	12	612
Mechanical Engineer	36	1,581	12	459	12	510	12	612
Mechanical Technician	36	1,581	12	459	12	510	12	612
Documentation person	36	1,037	12	289	12	340	12	408
Secretary	36	1,037	12	289	12	340	12	408
Chemical Technician	36	1,037	12	289	12	340	12	408
Worker	36	891	12	255	12	289	12	347
19. Component Total	396	16,427	132	4,760	132	5,304	132	6,365

COUNTRY TURKEY

PROJECT TITLE : Assistance to the TSE in the Establishment of a Packaging Centre, Second Phase.

PROJECT N° : DP/TUR/81/013/A/01/37

PROJECT BUDJET COVERING TURKISH GOVERNMENT CONTRIBUTION IN KIND

(In local currency, in '000 TL)

	TOTAL '000TL	1983 '000TL	1984 '000TL	1985 '000TL
40. EQUIPMENT				
41. Expendable Equipment	500	500	-	-
42. Non-Expendable Equipment	8,750	4,750	-	4,000
43. Premises (Buildings and Lab)				
43.01 Admin. Expenses(Elect,water,fuel)	9,905	2,650	3,285	3,970
43.02 Furnishing Library	1,500	-	1,500	-
49. Component Total	20,655	7,900	4,785	7,970
59. Miscellaneous	500	200	200	100
99. GRAND TOTAL	37,582	12,860	10,289	14,435

APPENDIX 1

Fellowship Costs

It was pointed out in the appraisal meeting that the Proforma costs do not reflect the likely cost of the fellowships envisaged. These fellowships are described in the expert's report (J. Salisbury) and on that basis an attempt has been made to estimate possible expenditure.

Fellowship			Location	Estimated costs US $		
31.01	1984	3mm	USA	Travel	2000	
				DSA	6600	
				Fees	3000	
						11,600
31.02	1983	3mm	UK	Travel	1200	
				DSA	6600	
				Fees	2000	
						9,800
31.03	1984	3mm	UK	Travel	1200	
				DSA	6600	
				Fees	2000	
						9,800
31.04	1985	2mm	USA	Travel	2000	
				DSA	4400	
				Fees	2000	
						8,400
31.05	1984	1mm	Europe/ USA	Travel	1200	
				DSA	2200	
				Fees	1000	
						4,400
				Total		44,000

APPENDIX 2

24 November 1982

PROJECT IN TURKEY

DRAFT JOB DESCRIPTION

DP/TUR/81/013/11-01/31.7.E

Post Title: Expert in Food Packaging and Analytical Testing

Duration: 4 months

Date required:

Duty Station: Ankara

Purpose of the Project: The Turkish Government has set up a packaging laboratory with the aim of assisting the industry to improve the standard of packaging and develop a quality assurance programme. The project is concerned with the further equipping of this laboratory and training laboratory and industry personnel in the application of packaging technology.

Duties: The expert will work with a local counterpart team on the application of laboratory test techniques to the problems associated with the packaging of food in a wide variety of containers. The emphasis will be on the packaging of food in plastic containers, plastic films and laminates.
More specifically, the expert will be expected to teach counterpart staff the techniques associated with:

1. Preparation of packaged foods for shelf life testing, the planning of such tests and the methods of periodically sampling the product for evaluation.
2. The methods of evaluation used in examining the performance of the package in terms of the quality of the food, or the environment within the pack. Such techniques will include: gas chromatography, head space analysis, and similar methods of analytical procedure.
3. Techniques for determining the compatability of packaging and product, for measuring the migration of toxic and other undesirable components from the pack material into the food product.

4. The expert will prepare a programme of studies designed to improve the national staff's abilities in food packaging technology for the following two year period.

5. Make available for reproduction, material suitable for incorporation into visual aid assisted training courses, (slides, charts, diagrams, etc) on the subject of food packaging investigation.

6. The expert will be expected to prepare a report setting out the findings of the mission and giving recommendations to the Government for further action which might be taken.

Qualifications: The expert will probably have a university degree in food science or a science subject and have at least five years practical experience in the study of the performance of packaged foods in the laboratory, with special reference to plastic containers, films and laminates.

Language: English

Background Information: The Packaging Centre began operating in 1982 and has the usual material testing and transit testing equipment. The equipment for storage trials will have been purchased and installed and facilities for chemical analysis, e.g. gas chromatography, is available in the Standards Institute and may be used by the packaging laboratory staff under the direction of the consultant.

APPENDIX 3 24 November 1982

PROJECT IN TURKEY

DRAFT JOB DESCRIPTION

DP/TUR/81/013/11-02/31.7.E

Post Title: Expert in Training in Packaging Technology

Duration: 6 Months

Date Required:

Duty Station: Ankara, Turkey, with travel within the country.

Purpose of the Project: The Turkish Government has set up a packaging laboratory with the aim of assisting the industry to improve the standard of packaging and develop a quality assurance programme. The project is concerned with the further equipping of this laboratory and training laboratory and industrial personnel in the application of packaging technology.

Duties: The expert will design and initiate a training programme for the Packaging Centre suitable for training local staff and technical personnel from industry (engineering and science graduate level) in the principles, operation and applications of the test equipment in use in the various sections of the packaging laboratory and in the general principles of packaging technology. What is required is an overall training programme with model training courses from each discipline that will enable the Centre staff to continue this work in the future.

More specifically the expert will be expected to:

1. Assist local counterpart personnel in adapting existing visually aided courses in packaging technology and in the use of certain test equipment. These are at present in English but will be presented in Turkish.
2. With the co-operation of the visiting consultants in transit packaging and food packaging evaluation, prepare courses based on the principal points made by those consultants to their counterparts. This activity should cover the use and applications of the principal pieces of test equipment in use in the various laboratories.

3. To co-operate with the Head of the laboratory in developing specific courses required for the Institute's training activities. The expert will be expected to run training courses during the period to demonstrate presentation techniques.

The expert will be expected to prepare a final report setting out the findings of the mission and giving recommendations as to the training programme that should be pursued by the Packaging Centre.

Background Information:

The Turkish Packaging Centre has been operating since the beginning of 1982. The normal range of test equipment has been installed for materials, retail pack and transit testing. Consultancy help has been given in transit pack and material testing and local staff have been trained abroad on local fellowships.

Training activities have, so far, been limited to seminars led by visiting consultants, but, in future, this function is to be carried out by counterpart staff and specialists from Turkish industry and the assistance to be given is in the planning and initiation of this activity.

APPENDIX 4 23 November 1982

PROJECT IN TURKEY

DRAFT JOB DESCRIPTION
DP/TUR/81/013/11-03/31.7.E

Post Title: Expert in Transit Package Testing and Development

Duration: 3 Months

Date required:

Duty Station: Ankara, with travel within the country.

Purpose of Project: The Government has set up a packaging laboratory with a view to assisting the industry to improve the standard of packaging and develop a quality assurance programme. The project is concerned with the further equipping of this laboratory and training laboratory and industrial personnel in the application of packaging technology.

Duties: The expert will work with a team of counterpart personnel on the evaluation of transit packages and the development of transit packages for specific products. More especially, the expert will be expected to:

1. Examine the test methods already in use in the laboratory for simulated travel tests, the techniques used for evaluating test results and their applications to actual performance predictions, elaborating and increasing as necessary.
2. Advise on the development of specifications and standards for transit packs for selected products, with special emphasis on cost reduction techniques.
3. Further develop the survey of transport packaging systems at present in use in Turkey for specific products, analyse their cost effectiveness and suggest modifications and a work programme designed to bring about improvements.
4. Conduct technical discussion sessions on transport methods, transit package performance evaluation, materials and transit packages in common use.

5. Co-operate with the training expert in preparing visually aided courses in transit packaging for use in training other laboratory staff and technical personnel from Turkish industry. These courses will cover the principles, methods of use and applications for the principal pieces of transit test equipment in the Institute.

The expert will be expected to prepare a final report setting out the findings of the mission and make recommendations to the Government on further action that might be taken.

Qualifications: University degree in Science or Engineering, with a good knowledge of transport packaging materials and systems; extensive experience in the field of testing, performance evaluation, standardization and development of transport packaging systems.

Language: English

Background Information: The packaging laboratory has been operating since the beginning of 1982 and the usual transit test equipment for vibration, impact, drop and compression simulation will have been installed before 1984. A transit package expert worked with the laboratory for two months in 1982 focussing on inclined plane impact, drop and long-term compression testing in particular, and transit package design and testing in general. The equipment for short-term compression and vibration testing were not available at that time and will therefore be the special subjects for the next consultancy visit.

APPENDIX 5

ADDITIONAL EQUIPMENT LIKELY TO BE REQUIRED IN THE FUTURE - PRIORITY 1

No.	Equipment	Possible Suppliers	Est. Cost US$
51	Dynamic Friction Tester. For measuring the slip characteristics of paper and film when in motion. TNO model preferred. 220v 50Hz.	1. TNO (Holland) 2. Messmer (UK) 3. Davenport (UK)	2,000
52	Stereo Binocular Microscope. Low power eyepiece X10 and X20.		1,500
53	Paper Smoothness, Softness and Porosity Tester. For measuring these properties on paper and board. Gurley type instrument is the most usual but consideration should be given at the time of purchase to alternative equipment which are: i. the Bendsten ii . the Parker Printsurf iii. the Sheffield (USA). It is a question of matching the equipment already in use in Turkey.	1. Messmer 2. TMI 58-20 3. Toyo Seiki p159, 90	1,000 to 5,000
54	Printability Tester. For measuring the printability of paper and board. Equipment measures absorption, smoothness and pick for printing papers. IGT type preferred.	1. IGT (Holland) 2. Messmer UK	37,000
55	Paper Extension Tester. For measuring the degree of expansion of paper under different humidity conditions. 4 column.	1. TMI 78-3 p231 2. Messmer	4,350 3,276
56	Oil Absorption Time Tester. ORT. For measuring the speed at which oil (for ink) penetrates into the surface of the paper. Simple, not needed if IGT is bought. Useful for factory use.	1. Messmer	600
57	Reflectometer. For measuring the gloss, whiteness and opacity of printing papers. Price varies enormously with the type chosen. Need to establish what type at present in use in Turkey and buying same to facilitate co-operative exercises. 220v 50Hz.	1. TMI 2. Toyo Seiki 3. Messmer Schroder (FRG)	1,000 to 15,000
58	Hazeometer. For measuring the clarity of plastic films. Two types, one for the straight loss in transmitted light, the other measures the scattered light as well. 220v 50Hz.	1. Toyo Seiki	6,500
59	Pressure Tester for Aerosol Cans. For pressure resistance of aerosol cans. Will be essential for standards preparation. The possibility that the glass pressure tester can be used should be examined.		3,000
60	Curl Device. For measuring the curl of paper samples.	1. TMI p234 78-8	200

No.	Equipment	Possible Suppliers	Est. Cost US$
61	Tachometer. For measuring the belt or roller speed on packaging equipment. Five-speed type.	1. TMI p246	400
62	Stop Watches and Clocks. For sixty minutes. Start and re-set button. Spring operated.	1. Fischer Scientific 2. Gallenkamp, UK	50
63	Desk Top Computer. For storing and retrieving data relevant to material test results and useful information references.		2,500
64	Portable, Electric Typewriter. Turkish keyboard. For laboratory staff, reports, forms, etc.		400
65	Slide Mounting Equipment. 35mm. For preparing slides for training purposes in the laboratory.		200
66	Copying Stand for the 35mm Camera. Twin lamp. For copying documents, charts, diagrams, etc. for making 35mm slides. 220v 50Hz.		150
67	G Meter. Amplifier. Accelerometers. Oscilloscope and Impact-o-meters with the drop table to measure the recorded deceleration. Range 10G, 20G, 60G, 100G, 120G and 300G. High impedance cathode preamplifier matching accelerometer to the oscilloscope. Type 511, 5000 (Tektronixs for example), Peak G meter. Power supply for cathode with attached meters of peak G values. Low pass filter for crystal accelerometer. This equipment is for use when more sophisticated approach is being used in drop testing and particularly when cushioning properties are being examined.	1. Tektronixs (USA)	15,000
68	Corrugated Box Sample Making Table. For making samples of corrugated [illegible]es in the laboratory for test purposes. Probably the best approach is to copy the one in the corrugated box factory in Izmit.		
69	Overhead Sewing Machine for sacks.		1,200

APPENDIX 6

TYPICAL SUBJECTS FOR TRAINING COURSES IN PACKAGING LABORATORY TESTING TECHNIQUES

The principles, method of use and applications for each piece of equipment in the Packaging Centre should eventually be described.

1. The laboratory testing of paper and board materials (except corrugated).

2. The laboratory testing of paper and board containers (except corrugated).

3. The laboratory testing of glass containers.

4. The laboratory testing of plastic films and laminates.

5. The laboratory testing of semi-rigid and rigid plastic containers.

6. The laboratory testing of corrugated board materials.

7. The transit testing of corrugated board containers.

8. The palletization and unitization of transit packs, the advantages and how they are tested.

9. Shrink and stretch wrapping, why and how it is done and tested.

10. Printing techniques. The principles of gravure, litho, flexo and letterpress.

11. Shelf life testing of filled retail containers, especially packaged foods.

ANNEX 3

LIST OF SUPPLIERS' NAMES AND ADDRESSES

AB Coldator	Low temperature cabinets and air-conditioning.
Adamel Lhomargy 15 HAV. Jean-Jaures BP 238 F-94201 Ivry-sur-Seine France Telex 204342. Tel. 6701180	
Ameresco Inc. 101 Park St. Montclair New Jersey 07042 USA Tel. (201) 7465300. Tlx. 138614	Sales Organization for LAB Wide range of transit pack test equipment.
American Glass Research Institute (AGRI) P.O. Box 149, Butler Penn. 16001 USA Tel. (412) 287 4779 Tlx. 86-6269	Wide range of test equipment for glass containers.
Auriema BP 46 F 94170 Le Perreux, France Tel. 680124 Tlx. 871 0280	Durometer.
Baird & Tatlock (Export Sales) P.O. Box 1 Romford RM1 1HA UK Tlx. 24225	Humidity cabinets and storage rooms. Glassware. General laboratory equipment.
Bruel & Kjaer	Accelerometers.
Bell and Howell AV Ltd. Alperton House Bridgewater Rd. Wembley Middlesex HA0 1EG UK.	Tape/slide projectors.
British Cellophane Bath Rd. Bridgewater Somerset TA6 4RA UK. Tel. 0278 424321 Tlx. 46266	

Van der Korput Nederland BV Postbus 119 Baarn Netherlands	Wide range of test equipment. Possibly now part of Messmer UK.
Casella, C.F. & Co. Ltd. Regent House Britannia Walk London N1 7ND UK	Psychrometer.
CETI. (French Packaging Institute) 11-13 Avenue Georges Politzer F 78190 Trappes France Tel. 051 1009	Drawings for transit test equipment.
Continental Can Co. Can Division 1350 West 76 St. Chicago. Ill. 60620 USA	Special micrometers used for the measurement of can dimensions.
Creusot-Loire Inst. France	Wide range of test equipment.
Custom Scientific Instruments (CSI) 13 Wing Drive Whippany New Jersey 07981 USA Tel. 201 538 8500	Wide range of test equipment.
Davenport (Daventest) Ltd. Tewin Rd Welwyn Garden City Hertfordshire UK	Friction tester, falling dart tester and others.
De Boy Packaging Machinery Domain Ind. New Richmond Wisconsin 54017 USA	Heat seal equipment.
Electrosonic Ltd. 815 Woolwich Rd. London SE78LT UK	Tape/slide projectors.
Fisher Scientific Co. Hottingestrasse 14 8032 Zurich Switzerland	Wide range of general laboratory equipment. Humidity cabinets.

Gallenkamp P.O. Box 290 Technico House Christopher St. London EC2P 2ER	General laboratory equipment.
Gerrard Industries 96-104 Birmght High St. London SE1 UK	Strapping equipment.
Hartmann & Braun AG Postfach 900507 D-6000 Frankfurt 90	Stroboscope and recorders.
Impact-o-Graph Div. Chatsworth Data Corporation 20710 Lassen St. Chatsworth. Calif. 91311 USA	Accelerometers, trip recorders, shock recorders.
Instron Ltd. Coronation Rd. High Wycombe Bucks. UK Tel. 33333 Tlx. 83222	Tensile and compression testers, universal testers.
Karl Frank Gmb Postfach 1320 0-6940 Weinheim FRG. Tel. 0621 896081	Full range of test equipment.
Karl Kolb Buckslag Steingrund 3 Postfach 102040 D 6072 Oreich FRG Tel. 06103 61076. Tlx. 0417981	General test equipment.
Karl Schroder AG Prüfmaschinen-Messgeräte Postfach 1768 D 6940 Weinheim FRG	Wide range of test equipment.
Katoh & Co. Mitsui Building Muromachi Nihonbashi Chuo ku, Tokyo, Japan Tel. 03 270 3611 Tlx. 0222 4775 KATOHTJ	Accelerometers.
Keifel Paul D8228 Freilassing Industrias 17-19 Postfach 537 FRG	Vacuum packing equipment.
LAB Division Mechanical Technology Inc. 968 Albany-Shaker Rd. Latham NY 12110 USA	Equipment for transit testing.

Komet Maschinen Fabrik
Ernst Deimold 7000
Stuttgart
Kornhergstr 27-29
FRG

Vacuum packing equipment.

Lansmount Corp.
Box 1390
Monterey
Ca. 93940
USA

Vibration table, compression and other transit test equipment.

Lenk. DR GmbH
CH 8274
Tager Wilen
Oberdorfstr. 15
Switzerland

Vibration table.

Lorentzen and Wettre
Viderogatan 2
Kista Box 4
S 16393 Stockholm
Sweden
Tel. 08 541970 Tlx. 19024

Wide range of test equipment.

Lubeco Maschinen Anlagen GmbH
Libech
FRG

Can seamscope and sample saw.

Lyssy Dr. G.H.
Rotfluhstr. 87
CH 8702 Zollikon
Zurich
Switzerland
Tel. 01 65 4550 Tlx. 56104

Gas and water vapour permeability tester.

Macklow Smith Ltd.
Watchmoor Rd.
Off Moorlands Rd.
Camberley
Surrey GU 15 3 AH
UK Tel. 0076 24459

Box compression testers.

Marubishi Scientific Instr.
Japan

Messmer H.E. Ltd.
144c Offord Rd
London N 1
UK Tel 01 607 2416 Tlx. 27453

Wide range of test equipment.

Metal Box Engineering Div.
Heron Lodge
London Rd
Worcester
Worcs UK

Can testing equipment.

Mettler Instruments CH 8606 Greifensee Switzerland Tel. 01 9412241 Tlx. 54592	Precision balances.
Mo-Con USA	Gas permeability equipment.
Mitutoyo Manufacturing Co. Ltd. 33-7 Shiba 5 Chrome Minato Ku Toyo Japan	Test equipment in general.
MTS Systems Corp. Box 24012 Minneapolis Minnesota 55424 USA Tel. 612 937 4000 Tlx. 29 0521 MTS System ENPE	Range of test equipment for transit testing.
Multilight Ltd. 13 Bone Lane Newbury Berkshire RG145 TE UK Tel. (0635) 30504 Tlx. 847534	Colour matching light boxes.
Multivac Export AG Baaresstrasse 112 CH 6300 Zurich Switzerland Tel.	Vacuum packing equipment.
Neotec 6110 Executive Boulevard Rockville Maryland 20852 USA	Colour measurement meters.
Niho Rigaku Kogyo Co. Ltd. 59-8-301 1 Chrome Akabane Kitaku Tokyo Japan	Climatically controlled cabinets.
Otto Brugger Feinmechanik	Gas permeability tester.
Owens Illinois USA	Closure torque tester.
Packaging Industries Airport Rd. Hyannis P.O. Box 5 Mass. 02601 USA	Heat seal equipment (Sentinel).

Perkin Elmer Ltd.
P.O. Lane
Beaconsfield
Bucks MP91QA
UK

or
Main Ave.
MS 12
Norwark
CT 06856 USA

Gas chromatograph.

PIRA Packaging Div.
Randalls Rd.
Leatherhead
Surrey KT 22 7 RU
UK Tel. 53 76161

Stiffness tester, crease stiffness tester.
Information of all kinds.

Pathfinder H.E.S. Ltd.
Solvent Rd.
Havant
Hants PO9 1JF
UK

Air conditioning equipment.

Riga Ku Kogyo Co. Ltd.
59-8-301 1 Chrome
Akabane
Kitaku Y
Tokyo
Japan Tel. 902 7541 2538

Climatically controlled storage rooms.

Sanko Denshi Kenkyusho
3-71 Furuichiba 2 Chrome
Saiwai Ku
Kawasaki City
Kanagawa 211
Japan
Tel. 044 541 3535

Moisture meters, coating thickness meters.
Pin hole detectors.

Sanso Co.
NO 31-6 I Chrome
Hamamaisu Cho
Minato Ku 105
Tokyo
Japan

Tape adhesion tester.

Sapratin
420 Rue D'Setienne D'orves
F 92700 Colobres
France Tlx. 610400

Climatically controllled cabinets.

Satorius Werke
Weender Landstrasse 94 108
D 3400 Göttingen
FRG

Precision balances.

Scott Tester Inc.
Providence
Rhode Island
N.Y. USA

Showa Boeki
27 18 1 Chrome
Edobori Nishi Ku
Osaka
Japan Tel. 06 441 3333

Packaging machinery.

Siemens Postfach 211080 D 7500 Karlsruhe FRG	X-Y recorder.
Signode Corp. Dept. 446 PMC 2600 N. Western Ave. Chicago, Illinois 60647 USA	Strapping equipment.
Sheffield Inc. USA	Smoothness, porosity of paper, other test equipment.
Stanley Strapping Systems 1300 Corbin Ave. New Britain Conn. 06050 USA	Strapping equipment.
Taber Instrument Corp. 111 Grounry St. North Tanawanda N.Y. USA	Paper and board stiffness testers.
Technidyne 1862 Production Drive Louisville Kentucky 40299 USA	Reflectometers.
Tektronix Inc. P.O. Box 500 Beaverton Oregon 97005 USA	G meters, accelerometers, oscilloscopes, etc.
Testing Machines Inc. 400 Bayview Ave. Amityville N.Y. 11701 USA Tel. 516842 5400 Tlx. 96-1302	Wide range of test equipment.
Thwing Albert Instruments Inc. 10960 Cotton Rd. Philadelphia PA 19154 USA	Wide range of test equipment.
TNO Shoemakerstrasse Delft Netherlands.	Printability tester, friction testers.

Toyo Seiki 15-5 Chrome Takinogawa Kita Ku Tokyo Japan	Wide range of test equipment.
Wallace H.W. and Co. St. James Rd. Croydon Surrey CR92HR UK Tlx. 946300	Range of test equipment.
United Glass Co. UK	Closure torque tester.
Weiss, Karl Giessen K.G. D 6301 Reiskirchen Greizerstrasse 21-29	Salt spray cabinet.

COURSE FEE

The Course Fee for students in the United Kingdom and Eire is £90. This covers the supply of lesson material, marking of worksheets and tutorial guidance, and a free copy of past Examination Papers and the textbook 'Fundamentals of Packaging', which is required reading for the Course.

Provision is made for payment of the enrolment fee by instalments (by Standing Order only) in which case an initial payment of £20 will be followed by eight monthly payments of £10 each, making a total outlay of £100. The deposit payment is non-returnable in the event of a student withdrawing after enrolment.

Subject to certain conditions, the fee for U. K. students may be eligible for Industry Training Board grant, and company training officers are advised to establish the position at the outset.

The fee for overseas students, to cover additional postage charges, is £100 payable in one sum on enrolment.

THE INSTITUTE EXAMINATION

A correspondence course student who wishes to register for the Institute of Packaging Membership Qualifying Examination will first be required to take up membership of The Institute. Applications for student membership who are under 25 years of age will normally require a minimum of four G.C.E. successes at Ordinary Level, including English and Mathematics, or near equivalents. Students over 25 will be expected to provide alternative acceptable evidence of experience in packaging.

THE INSTITUTE OF PACKAGING

CORRESPONDENCE COURSE IN PACKAGING TECHNOLOGY

ANNEX 4

November 1981

Fountain House, 1A Elm Park, Stanmore, Middlesex, HA7 4BZ (01-954 6277)

CORRESPONDENCE COURSE IN PACKAGING TECHNOLOGY

This, the first correspondence course in packaging technology available to English-speaking students throughout the world was produced by THE INSTITUTE OF PACKAGING and launched in 1972. Since then, well over a thousand students in the United Kingdom and many overseas countries have enrolled with THE NATIONAL EXTENSION COLLEGE at Cambridge, which collaborates with The Institute in administering the course.

COURSE CONTENT

The Course comprises twenty-six lessons, based on the Institute's education syllabus designed specifically, but not exclusively, for students intending to take The Institute of Packaging Membership Qualifying Examination. Other and more mature packaging executives and technologists could find the Course a valuable medium for the extension or update of knowledge. The lessons cover:

1 Introduction
2 Product Assessment
3 Journey Hazards
4 Marketing Factors
5 Adhesion & Adhesives
6 Shipping Containers
7 Retail Containers
8 Cushioning
9 Barrier Materials
10 Specifications & Quality Control
11 Testing
12 Machinery & Production
13 Economics
14 Wood, Paper & Board Products
15 Glass
16 Metal
17 Plastics
18 Other Packaging Media
19 Packaging and the Law
20 Rationalisation and Standards
21 Packaging of Food and Drink
22 Packaging of Cosmetics & Pharmaceuticals
23 Packaging of Chemicals
24 Packaging of Engineering Equipment
25 Development of Packaging
26 Packaging and the Environment

Additional revision worksheets are incorporated at intervals throughout the Course, and provision is also made for a mid-point examination to assist the student in measuring progress.

LEVEL OF THE COURSE

Students wishing to enrol for the Course are not required to qualify for that purpose, but need to recognise from the outset the importance of an adequate level of knowledge, particularly in English, Mathematics and one or more of the science subjects pertinent to the study of packaging technology.

STUDY PROGRAMME

Students may commence work on the Course at any time, but prospective students are reminded that The Institute of Packaging Membership Qualifying Examination is held only once a year, in May. Once enroled students are free to determine their own rate of progress thus, whilst completion within a year is quite feasible, studies can extend over a much longer period if so desired.

COURSE TUTORS

Course tutors, all of whom are knowledgeable and experienced members of the packaging profession, are appointed and allocated by The Institute of Packaging.

LOCAL COUNSELLORS

In addition to normal tutorial provisions, arrangements also exist for the appointment of Local Counsellors to provide on the spot help and encouragement. Where so required, Counsellors can be provided with monthly reports under confidential cover.

ENROLMENT

Enrolment, which should be made on the prescribed form obtainable from The Institute of Packaging, is effected with the NATIONAL EXTENSION COLLEGE at 18 Brooklands Avenue, Cambridge, CB2 2HN.

ANNEX 5

A New Approach to the Problems of Introducing a Package and Material Testing Service into the Industrial Areas of Izmir, Bursa and Istanbul.

At some time in the future, service laboratories for the TSE may be introduced into the industrial areas of Izmir, Bursa and Istanbul. It may be that the services offered include packaging. If so, there will be the problem of training new staff for these laboratories which is difficult and expensive. There are also certain problems in operating a service from a central laboratory in Ankara that have not been aired in the other parts of the report, problems that involve the industry's attitudes in most countries to central government and semi-government technical services.

The consultant has had over twelve years' experience specifically in the problems of introducing packaging technology into industry in developing countries from such central laboratories and after the 1982 mission to Jordan, wrote the following notes about this topic. They seem to be very relevant to the future problems in Turkey, especially those concerned with giving technical assistance to industry, therefore they are reproduced here.

C.9. The Introduction of Packaging Technology into Jordanian Industry

Once it is accepted that improved packaging can be helpful both to domestic growth and, in particular, to the growth of export of manufactured goods, the question to be decided is how can packaging technology be used as a tool to bring about such improvements. How can it help industry to get more efficient usage out of existing and new machinery; how can the performance of containers be improved and how can the growing legislation in many importing countries that is concerned with packaging be adequately met so as not to become a barrier to trade with them. It is to be emphasized that the aim is to help industry bring about improvements rather than to use scientific testing to set standards that may be unreasonably high for the present level of development of local industry. The aim is to bring Jordanian products to a level at which they can compete with the products of other countries when offered for sale in Jordan or in target markets.

i. The Conventional Approach to Introducing Packaging Technology

Packaging technology is based on the ability to measure the physical properties and in some cases, the chemical properties, of the materials and containers being used so that differences between satisfactory levels and unsatisfactory levels can be clearly identified and the magnitude of that difference established. It is then possible to monitor the effect of improvements tried during the process of bringing up the performance to acceptable levels. Reference to the lists of test equipment given in Annex 3 and Annex 4 will give an overall view of the range of properties involved.

It is quite impossible for the majority of companies in Jordan to acquire the necessary test equipment and to acquire the kind of expertise necessary in the operation of the test equipment and in the interpretation of the results. The cost is too high and the cost benefits in the immediate future are not high enough because of the small markets involved in most cases. As with most developing countries the process of introducing packaging technology into local industry has to start with a centrally located laboratory.

A fully fledged packaging centre such as is to be found in many industrialized countries would offer the following range of activities:

a. Scientific testing facilities;
b. Information;
c. Promotion;
d. Training;
e. Research and development.

a. Scientific Testing Facilities

In terms of scientific testing facilities, Jordan has already established a laboratory in the Royal Scientific Society and other laboratories related to packaging are : the paper and packaging laboratory, the plastics laboratory, the metallurgical laboratory, the microbiological section, the laboratory for chemical analysis and the laboratories associated with testing physical properties.

At some time or other investigations into packaging problems require the help of many of the above specialities. The paper and packaging laboratory already has quite a wide range of test equipment available to it. A list is given in Annex 3. Discussions were held on three occasions with members of the staff of this laboratory and the related ones and a list of additional equipment that would extend the range of activities of this laboratory is given in Annex 4. The main contribution of any laboratory of this type is to be able to accurately measure physical properties with a view to:

1) Establishing differences between materials that have been found in practice to be satisfactory and those that have been found in practice to be unsatisfactory so that attention can be focussed on the properties involved.

2) Being able to measure the properties under controlled conditions provides the tool for monitoring the effects being produced by changes on the manufacturing equipment or monitoring the improvements that are being achieved under say transit conditions or under storage conditions.

3) Establishing buying specifications that describe what is necessary for a company to achieve satisfactory performance from its raw materials, or in the establishment of product specifications. To be able to do this means working out the necessary quality control tests and their introduction accomplished.

There are several hundred tests that can be done; the vital factor for success is to be able to select the few that are worth doing on a given occasion.

4) The identification of materials being used in similar packs can be a very helpful service to the industry.

b. Information

When the packaging laboratory staff and the technical staff from industry want to carry out a special investigation into a packaging topic they must have access to information on that topic, be it problems of machine performance, the possible benefits or hazards of using a given material for a certain application, the type of equipment used for test purposes, the type of machinery and processes used in manufacturing activities. Such information can be very expensive and must be well documented if it is to be retrieved rapidly and successfully when needed. It is usual to centralize such information and the facilities for this already exist in the RSS which would appear the logical point for focussing the development of any improved facilities concerning information on packaging technology.

c. Promotion

Although this can be done by a central packaging laboratory, it is much better done by an entirely separate association which is normally

made up by those companies who manufacture materials and containers and those companies who are very large users of packaging materials and containers, e.g. the food industry, the pharmaceutical industry and the household products industry. It is generally very much in their interests to promote the availability of better packaging within the country and to increase the awareness of the important role that packaging plays in the development of sales especially in the export led industries.

d. Training

If the instrumentation and expertise for scientific testing is centred in one particular point, in the early development of a country's industry for economic reasons, then that laboratory must be involved in a training programme for the technical staff of the local manufacturing and user industries. This is necessary if the technical staff are going to appreciate the facilities available and understand how they can benefit from the services that the laboratory is offering. The usual way is by seminars from one day to a week or more. They may be general in future or they may be focussing on a specific part of one industry. It is a feature of this training that the specialists from within the industry itself are concerned in the preparation and presentation of these training courses. It should also be noted that training courses in packaging technology are better run at the pace of one or two hours per day than intensive courses lasting all day. Those hours can either be in the morning, overlapping the normal starting hours of the local industry, or be held in the evenings when participants do not need permission to be absent from their place of work. There are also well-established correspondence courses, one of which is run by the British Institute of Packaging and has students from all over the world. It is quite possible to base a training course on this correspondence course with the people taking the training meeting periodically for a kind of tutorial rather than formal tuition at which they can exchange ideas and sources of information and discuss their learning problems with experienced people.

e. Research and Development

There is a tendency for all newly qualified science graduates to focus on the research aspects of the work rather than to provide a testing service that is concerned more with the application of well-established knowledge to the problems of local industry. This is a very natural phenomenon but it is not a very helpful one when a country is struggling in the early stages of industrialization. The amount of information available to anyone working in packaging technology is overwhelming and the possibility of a small laboratory with very limited resources making any worthwhile contribution to the packaging scene in terms of basic research is extremely unlikely.

There are, however, very many difficulties in adapting established technology to local conditions and in just understanding which parts of that mass of information are relevant and helpful to resolving a problem at any given time. It is therefore urged that the very term 'research' be eliminated and the whole emphasis be placed on development for at least the foreseeable future.

In the conventional approach, the technological centre would be carrying out the necessary technical work to back up investigations in industry or for the development of suitable standards.

Since the funds available to technological institutes are strictly limited, the number of people who can work in any packaging technical centre is always strictly limited. It can often be no more than two graduates and three or four laboratory assistants in a developing country environment. In a small country the employment of four or five graduates in such a section would be regarded as a very large investment indeed, and this can be said to be true for even medium sized developing countries. It is not reasonable to draw comparisons with the packaging institutions in highly industrialized countries where there may be hundreds of people gainfully employed.

It is very important for the development of Jordanian products that they can compete in the future against the far better presented imports. But the restriction of those imports should really only be made when the local product is a fair match for them, or the local product is going to rapidly achieve a reasonable standard.

It would seem reasonable that the functional properties of the products offered for sale should be satisfactory. Cartons of detergent powder should not deposit their contents on the shelves, tins of tomato paste must contain the product every time, plastic bottles should not leak their contents etc. etc. It is essential that the existing belief that the local product is no good is changed. It takes years to achieve this but many countries have done it. The packaging manufacturing companies have a lot of problems to contend with. Often they are struggling with unsuitable equipment because the size of the market does not justify high capital investment or the future is too uncertain to wait for what is regarded in other environments as a reasonable time for a return on that investment. The survey results contained in Annex 2 leave one in no doubt that improvements are very necessary and a good packaging laboratory can help achieve this. The main question is how best can the limited resources be used to bring this about. Will the conventional approach of a very small staff in a packaging laboratory really make an impact on the present situation. To answer that question it is possible to draw on the experience of a number of new laboratories in developing countries and look at the problems they have had to face.

4. The Limitations of the Conventional Approach to Introducing Packaging Technology

a. Some of the problems that limit the effectiveness of a centralized package testing laboratory are as follows:

There will have to be a strict limit on the number of staff members in the laboratory, yet the range of knowledge required and the skills required are very wide. The technology of the various industries is quite different, i.e. in cans, glass, plastics, paper and board and the complex laminates and co-extruded film that are becoming very common. Specialization is difficult and although the laboratory staff can become skilled in the use of their test equipment, it is very difficult for them to actually give the results any meaning. Results from laboratory test equipment have little meaning until they have been applied repeatedly to what happens in practice on a given machine or in a given user situation. It is only by the constant comparisons between satisfactory and unsatisfactory materials and containers that the optimum level can be established and the laboratory staff can never have the time or the opportunity to spend time in the industry itself close to the centre of a given problem to really grasp the relationship between the test results obtained and the performance of the material or container in practice.

It is equally true that technical staff from within industry, technical managers, production managers, works engineers, production engineers, etc. with responsibilities for the packaging side of the companies' activities have little opportunity to become familiar with the nature of the tests that can be done in a packaging laboratory and to recognize on those occasions when they have problems, which tests could provide evidence on which they could base remedial action. Another reason for this is that packaging is somewhat different to other technical subjects in that a figure can often not describe what happened during the tests and the person interpreting the results very often has to see the test being carried out making comparisons between satisfactory and unsatisfactory materials if he, or she, is to get a lead as to what might be the cause of the problem from a manufacturing or user point of view. For instance it is quite difficult to describe rub resistance results or to describe the behaviour of a bond when it is ruptured on the tensile test equipment, which is often more valuable than the actual value of the figure recorded. The behaviour of a corrugated case while it is being transit-tested can sometimes give more information than the values that are reported. This is certainly true when it comes to shelf life testing where a judgement must be made as to the state of the product at any given time, and whether that state is satisfactory or unsatisfactory. These kinds of decisions can really only be made by the product manufacturer because they are

concerned with the target market and all that that implies. In other words, for really effective benefits from testing activities, the person who is most involved in seeking information on what changes he is to make in materials or processes has to be present during the testing process, at least until his comprehension of the meaning of the results of the test is so well developed that figures can give him a clear indication of what actually happened during the testing process. Under the present system samples are sent to the central laboratory and, after what is so often a considerable length of time, a written report is sent by that laboratory to him. This may well work quite satisfactorily with microbiological testing, chemical analysis or strengths of building materials etc. but it has strictly limited effects in packaging.

b. Speed

When the manufacturer or user is faced with a problem he often has to take some sort of action within hours and therefore if the results of scientific testing are to be one of the factors that has to be taken into account, those results have to be available in a matter of hours. Centralized laboratories by their very nature are often unable to produce results within days, often within weeks. Part of the reason for this is that if a written report is to be supplied, it must be checked and cross-checked to ensure that no inaccuracies have been made and that the results have been presented in a way which is clear yet indicates the limitations of the conclusions that may have been reached. Samples are often inadequate in number and are often not even representative, but this is a fact of life that technical staff in industry have to live with but people used to the laboratory environment find this very difficult to accept. It is this lack of rapid feedback that is the greatest reason why industries in developing countries tend not to use testing laboratories (centralized ones, that is) when struggling with their technological problems. Some means of changing this "normal" situation has to be sought.

c. Cost

Scientific testing is not cheap, no matter how you do it, but the thing that upsets industry most is that they have no real idea what they are paying for. They send in a series of samples and they get the results - and a bill which quite often they find high. Naturally their enthusiasm for sending in large numbers of samples is considerably reduced and yet so often large numbers of samples have to be examined if progress is to be made with a given problem. Unfortunately, quite a high proportion of the cost in testing in a centralized institution is to do with the overheads concerned with the process of report preparation. The time spent by a skilled graduate in preparing his report, submitting it to his superiors (when the necessary retypings have been

carried out of course), and adjusting that report to bring it into line with the suggestions and criticisms of the more senior members of the organization means that not only is time elapsing but the cost involved is climbing steadily too. Another factor in costing is the extent of testing that may be necessary. When a technologist is supervising the testing and he has a thorough knowledge of the problem, he can quickly abort a testing programme which is obviously not following the kind of pattern that was expected. He can change direction, he can act upon an observation that has given him a lead to a course of investigation that had not previously been thought about. When testing is carried out in a laboratory without any benefits of that background information, such things are not possible; it is necessary to go through the whole pre-arranged testing programme following up a large number of variables and each testing programme must be carried out very carefully - quick "siting shots" are only possible when you are thoroughly involved with the problem. The company involved may not feel that the costs are justified, especially as they often cannot know in advance what that expense is going to be.

d. Confidentiality

When a manufacturing or a user company has problems with the performance of a material or a container, they rarely want this to become common knowledge throughout the industry and to be available to their competitors and customers. They need to move quickly to overcome the problem to see that no damage is done to their reputation (at least this is what we want to happen). The reassurance so often given by central testing laboratories that all work that they do is confidential is not accepted by the majority of industry personnel. It is not accepted for the very good reason that one of the benefits of a centralized laboratory is that the specialized knowledge and skills available have been acquired by studying the problems that exist in other parts of the industry and the human beings involved in that process do pass on information about what they have seen, even though they may well do it unintentionally. Many manufacturers feel that when they are investigating a known weakness the concrete evidence that they are acquiring about that weakness should be strictly confidential to them and also since they are spending money investigating the problem, the benefits that accrue from the work should be available only to them, which is not an unreasonable attitude.

e. Utilization of Capital Invested

The instrumentation is a good packaging laboratory and can cost in excess of US$ 200,000. The number of workers within that laboratory will always be fairly small and this can only lead to gross under-utilization of this high capital investment. Some means of getting much more return from this investment has to be tried. Much of the test equipment in laboratories is hardly used on a weekly basis.

These then are the problems and the reasons why any new laboratory specializing in packaging technology will find it very difficult to make an effective impact on the problems in industry. It is therefore important to consider very seriously any alternative means that may help.

iii. An Extension to the Conventional Mode of Operation of a Packaging Laboratory

It is important to stress that the ideas put forward in this next section in no way alter the work of the permanent staff of the laboratory. The proposals are aimed at increasing the effective size of the staff without the intolerable costs that would normally be involved. All of the activities described in the first section are retained.

It is suggested that a lot of the problems described in section ii can be considerably reduced and the impact of the laboratory greatly increased if technical staff from the various industries are trained in the use and potential applications of the test instruments available in the packaging laboratory and from then on are allowed access to the laboratory with a view to supervising their own test programmes. Effectively the staff using the facilities could be raised from a maximum of two or three graduates to a potential of 20 to 30 graduate as the technological base of the local industry improves with time. Such a move brings with it administrative problems but it is suggested that these are no greater (and probably less) than the administrative problems being faced every day by even the smallest of the local manufacturing companies and therefore should not be regarded as a reason why the technical staff from industry should not be allowed into the laboratory. Let us look therefore at the benefits that may be expected if such an approach was adopted.

a. Since only technical personnel from industry who have been through a prepared training course in the laboratory are involved, we have an immediate improvement. The technical personnel from industry are now very familiar with the ways in which the test equipment is utilized and in what applications the test can be helpful. They are therefore better able to recognize situations in their own working environment where scientific testing can contribute. They know how to phrase requests, even if they do not take advantage of the possibility of being present and supervising the actual tests.

b. What is visualized is that the technical man from industry when faced with a situation where testing of physical properties can be helpful will phone through to the laboratory and effectively book operating time on the equipment he is likely to need. That time should be reserved for him and a laboratory assistant assigned to him to operate the equipment as he requires it. In this way, results can be available in

hours if the equipment happened to be free at that particular time and since no formal reporting procedure is now necessary, the time can be reduced to probably a third of that originally required. The technical member can return to his problem hopefully armed with information on which to make a decision as to a possible course of action. In time, as his knowledge of the testing conditions and the relationship between these and the results becomes much clearer to him he will tend to send in samples for testing rather than coming himself.

c. Since under this system, it is no longer necessary to explain anything about the background to the tests, confidentiality has been assured. The only results are those the industrial member brought away with him, no copies are left and the company can be confident that they have kept control over their affairs. The relatively minor loss of confidentiality in that the tests are being carried out in an open laboratory is rarely a problem, but if it was then perhaps special arrangements could be made to overcome this on the odd occasion that it mattered. It might be argued that this lack of information left in the laboratory records is a disadvantage, and this is true. However, the fact that these are not available does not in any way limit the scope and depth of the work which the permanent members of staff are carrying out in the course of their normal work. It is fully expected that if this method of operating is successful, then the number of companies prepared to send in samples for testing because they have found the technological approach useful will increase with time and the full-time members of the laboratory will have ample results available to them.

d. It is envisaged in the section dealing with financial considerations that technical members from industry will pay a fee for the number of hours they are in the laboratory irrespective of the nature of the work they are carrying out. It is envisaged that they will sign in and sign out and at the end of the month the number of hours in which they have availed themselves of the facilities will be added up and a charge made to the company accordingly. Adjustments can be made at any time if equipment needed is not available, or if the laboratory technicians are not available as arranged. A company now knows the cost of any testing programme undertaken and could well allocate a certain number of hours per month to their technical staff to use as required without further re-course to permission.

e. There is another problem that this system overcomes. A central laboratory tends to lose staff periodically to industry and when it does the effectiveness of the laboratory is very seriously affected. With this proposed method of operation, the laboratory keeps functioning quite well and the pressure on the replacement staff member is much less of course. When industry technical staff are frequently visiting the laboratory the chances for the permanent staff to learn more about how industry operates and more about its problems is greater than when they have to rely on special visits. With the routine testing work for raw material assessment, quality control and trouble shooting investigations being done by personnel from industry, the permanent laboratory staff have more time to devote to the longer term work that the industry is often reluctant to undertake.

f. Training

The methods adopted for training the personnel from industry in the basic theory, method of use and the applications of each piece of test equipment in the laboratory will be critical to the success of this approach. Conventional methods may have to be used but the consultant is convinced that this can best be done by video training films which can be made available to those who need them at any time and for very low cost. Work is in hand on the preparation of such films and it is hoped that they will be available in 1983 when an Arabic form could be considered.

iv. Financial Considerations

A central packaging laboratory is normally supported financially in three ways; by Government grant, by subscriptions from industry and by fees earned for testing services and investigational projects. More and more Governments are expecting laboratories of this type to contribute to their costs and if the staff is limited to two or three graduates as it so often is, the earning power of the laboratory is severely restricted. In the proposed method the potential earning capacity is raised manyfold without reducing the earning capacity of the permanent staff. It is envisaged that those companies wishing to avail themselves of the opportunity to use the equipment pay a monthly fee plus an hourly fee for actual time spent in the laboratory.

ANNEX 6

TYPICAL SUBJECTS FOR TRAINING COURSES IN PACKAGING LABORATORY TESTING TECHNIQUES

The principles, method of use and applications for each piece of equipment in the Packaging Centre should eventually be described.

1. The laboratory testing of paper and board materials (except corrugated).

2. The laboratory testing of paper and board containers (except corrugated).

3. The laboratory testing of glass containers.

4. The laboratory testing of plastic films and laminates.

5. The laboratory testing of semi-rigid and rigid plastic containers.

6. The laboratory testing of corrugated board materials.

7. The transit testing of corrugated board containers.

8. The palletization and unitization of transit packs, the advantages and how they are tested.

9. Shrink and stretch wrapping, why and how it is done and tested.

10. Printing techniques. The principles of gravure, litho, flexo and letterpress.

11. Shelf life testing of filled retail containers, especially packaged foods.

ANNEX 7

Suggested Reading Concerned with all Aspects of Training Courses for Adults.

1. Dickenson, Gary. Teaching Adults - A Handbook for Instructors. Toronto New Press 1973. Written for part-time instructors to cover all aspects.

2. McLagan, Patricia. Helping Others to Learn - Designing Programmes for Adults. Reading, Mass., Adison Wesley Publishing Co. 1978.

3. Rufvold, Margaret. A Guide to Educational Media. Fourth Edition, Chicago, American Library Association, 1977. Describes catalogues, indexes, lists, etc.

4. Taggart, Dorothy, T.A. A Guide to Sources in Educational Media and Technology. Mutchuen, New Jersey, The Scarecrow Press Inc. 1975. An aid to librarians but very useful to part-time trainers.

5. Pfeiffer, J.W. and Jones, J.E., Eds. A Handbook of Structured Experiences for Human Relations Training. Vol. 1 to 5, La Jolla, California. University Associates.

6. Kraig, Robert. Training and Development Handbook. A Guide to Human Resource Development. Second edition, New York, Magraw Hill 1977. Basic reference book.

7. Davis, Larry. Planning, Conducting, Evaluating Workshops. Austin, Texas. Learning concepts, 1977. Many practical tips on designing workshops.

ANNEX 8

TEST EQUIPMENT ALREADY INSTALLED IN THE TURKISH PACKAGING CENTRE

Equipment	Supplier
1. Puncture Tester. Beach type.	TMI, USA.
2. Concura Fluting Medium Tester.	Karl Frank, FRG.
3. Platen Press for edge, flat and ring crush. Model 18938	Karl Frank, FRG.
4. Mullen Burst Tester. 0 to 230 PSI (0 to 16 bar) Model EC03 0 to 700 PSI (0-50 bar)	Lhomargy, France.
5. Stiffness Tester. Taber Model 150B. Sample Cutter.	Taber Corp, USA.
6. Ovens. Laboratory bench. Model FN500 0 to 250°C Model EN400 0 to 125°C	
7. Impact Tester. AGRI. For glass containers.	American Glass Research Inc.
8. Pressure Tester. Incremental type. AGRI. For glass.	American Glass Research Inc.
9. Polariser. Strain Gauge. Model 110, standard discs. Series 5.	British Glass Industries Research Association.
10. Pycnometer Air Comparison. Beckmann 930.	Beckmann.
11. Gas Permeability Cell. Packaging Institute, Munich.	Otto Bruger, Munich, FRG.
12. Balances: 1. Sartorius 2474 0-160gm Analytical. 2. Sartorius 2351 0-7000gm. Top Pan X0.1gm. 3. Mettler H542 Analytical 0 to 160gm X0.1	
13. Cobb Test Equipment.	Made locally.
14. Calipers, large, 17" capacity, internal/external.	
15. Thickness Gauge. Motorized Model 16867.	Karl Frank, FRG.
16. Thickness Gauges, portable type A 100 (2).	Karl Frank, FRG.
17. Moisture Meter. Wood, automatic. Model 378 T. Protimeter. Timbermaster.	Protimeter Ltd., Meter House.
18. Water Vapour Transmission Rate Equipment. Dish type.	
19. Heat Sealer. Sentinel Model JT/C 12 AS impulse only.	Packaging Industries Inc., USA.
20. Moisture Vapour Transmission Cell Model CS 141 067. Grace/Cryovac type.	Custom Scientific Institute.

Equipment	Supplier
21. Falling Ball Viscometer.	
22. Climatically Controlled Cabinet, cyclic.	Fisons, Loughborough, UK.
23. Compression Tester. Small platen (rather old). 0 to 1,000kg.	Tinius Olsen Testing Mach.
24. Salt Spray Cabinet. Model S 1000	Karl Weiss, FRG.
25. Cold Storage Chamber. Model K660 S 1000	Karl Weiss, FRG.
26. Inclined Plane Impact Tester. To ASTM test method.	Made locally.
27. Drop tester. Two doors, approximately 1m x 0.6m. Sacks.	Made locally.
28. Platform Scales "NAN", capacity 500kg. 0.8m x 0.5m.	

ANNEX 9

ADDITIONAL EQUIPMENT LIKELY TO BE REQUIRED IN THE FUTURE - PRIORITY 3

No.	Equipment	Possible Suppliers	Est. Cost US$
51	Dynamic Friction Tester. For measuring the slip characteristics of paper and film when in motion. TNO model preferred. 220v 50Hz.	1. TNO (Holland) 2. Messmer (UK) 3. Davenport (UK)	2,000
52	Stereo Binocular Microscope. Low power eyepiece X10 and X20.		1,500
53	Paper Smoothness, Softness and Porosity Tester. For measuring these properties on paper and board. Gurley type instrument is the most usual but consideration should be given at the time of purchase to alternative equipment which are: i. the Bendsten ii . the Parker Printsurf iii. the Sheffield (USA). It is a question of matching the equipment already in use in Turkey.	1. Messmer 2. TMI 59-20 3. Toyo Seiki p159, 90	1,000 to 5,000
54	Printability Tester. For measuring the printability of paper and board. Equipment measures absorption, smoothness and pick for printing papers. IGT type preferred.	1. IGT (Holland) 2. Messmer UK	37,000
55	Paper Extension Tester. For measuring the degree of expansion of paper under different humidity conditions. 4 column.	1. TMI 78-3 p231 2. Messmer	4,350 3,276
56	Oil Absorption Time Tester. ORT. For measuring the speed at which oil (for ink) penetrates into the surface of the paper. Simple, not needed if IGT is bought. Useful for factory use.	1. Messmer	600
57	Reflectometer. For measuring the gloss, whiteness and opacity of printing papers. Price varies enormously with the type chosen. Need to establish what type at present in use in Turkey and buying same to facilitate co-operative exercises. 220v 50Hz.	1. TMI 2. Toyo Seiki 3. Messmer Schroder (FRG)	1,000 to 15,000
58	Hazeometer. For measuring the clarity of plastic films. Two types, one for the straight loss in transmitted light, the other measures the scattered light as well. 220v 50Hz.	1. Toyo Seiki	6,500
59.	Pressure Tester for Aerosol Cans. For pressure resistance of aerosol cans. Will be essential for standards preparation. The possibility that the glass pressure tester can be used should be examined.		8,000
60	Curl Device. For measuring the curl of paper samples.	1. TMI p234 78-8	200

No.	Equipment	Possible Suppliers	Est. Cost US$
61	Tachometer. For measuring the belt or roller speed on packaging equipment. Five-speed type.	1. TMI p246	400
62	Stop Watches and Clocks. For sixty minutes. Start and re-set button. Spring operated.	1. Fischer Scientific 2. Gallenkamp, UK	50
63	Desk Top Computer. For storing and retrieving data relevant to material test results and useful information references.		2,500
64	Portable, Electric Typewriter. Turkish keyboard. For laboratory staff, reports, forms, etc.		400
65	Slide Mounting Equipment. 35mm. For preparing slides for training purposes in the laboratory.		200
66	Copying Stand for the 35mm Camera. Twin lamp. For copying documents, charts, diagrams, etc. for making 35mm slides. 220v 50Hz.		150
67	G Meter. Amplifier. Accelerometers. Oscilloscope and Impact-o-meters with the drop table to measure the recorded deceleration. Range 10G, 20G, 60G, 100G, 120G and 300G. High impedance cathode preamplifier matching accelerometer to the oscilloscope. Type 511, 5000 (Tektronixs for example), Peak G meter. Power supply for cathode with attached meters of peak G values. Low pass filter for crystal accelerometer. This equipment is for use when more sophisticated approach is being used in drop testing and particularly when cushioning properties are being examined.	1. Tektronixs (USA)	15,000
68	Corrugated Box Sample Making Table. For making samples of corrugated boxes in the laboratory for test purposes. Probably the best approach is to copy the one in the corrugated box factory in Izmit.		
69	Overhead Sewing Machine for sacks.		1,200

ANNEX 10

UNITED NATIONS

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

UNIDO 2 July 1982

Request from the Government of the Republic of Turkey

for Special Industrial Services

JOB DESCRIPTION

SI/TUR/82/802/11-51/31.7.E

Post title	Consultant in Export Packaging
Duration	Two months
Date required	As soon as possible
Duty station	Ankara, with travel within the country
Purpose of project	To assess the actual main requirements of the packaging industries in the country to meet their responsibilities within the export programmes, and specify the institutional support which should be granted to the Turkish Standards Institute within the framework of the same programmes.

Duties

The consultant will be assigned to the Packaging Centre of the Turkish Standards Institute and will work in close co-operation with the national counterpart, the head of the same Centre. More specifically, the consultant will be expected to:

1. Become acquainted with the technical capabilities of the Packaging Centre in terms of premises, personnel and equipment, and with plans for development through the on-going project and further UNDP/UNIDO technical assistance;

2. Visit important export centres and/or firms to assess the main national demands for export packages and discuss problems related to the quantities and qualitities available;

3. Visit important export package manufacturing firms and producers/importers of related materials, to assess the capability of the national packaging industries to meet the demand for export packages in terms of quality and quantity, and work out a proposal for development action for submission to the Government;

..../..

4. Work out a programme of regular activities for the Turkish Standards Institute, for technological assistance to the national export package manufacturer and user industries, and specify the additional equipment, expertise and training which would be required to carry out this programme.

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

Qualifications — Expert in Export Packaging; wide experience in carrying out packaging surveys in developing countries and of planning operational structures and research means for technological support of export packaging industries development.

Language — English

Background Information — The Turkish Standards Institute (TSE) grants the mark of quality to high quality commodities, based on appropriate testing which is carried out in specialised laboratories.

However, the quality of many products is declining and may be completely damaged due to climatic and mechanical problems encountered during transport, storage and distribution. These considerations, together with the awareness of the fundamental protective function of packaging, have induced the TSE to include packages and packaging materials testing in the development plans.

In this connection, consultant missions were fielded by OECD in 1965 and 1966, and by UNIDO in 1970 and 1975. A UNIDO technical assistance project was organised and is now approaching completion. A second phase, small-scale project, supported by Government cost-sharing, has been included in the 1982-1986 Country Programme and is currently being considered.

In the meantime, the Government has placed particular emphasis on the development of exports and, consequently, the urgent development of export packaging industries has suddenly assumed increased importance. It became imperative that the Turkish Standards Institute specify precisely their main requirements for the development and definition of a co-ordinated programme. UNIDOs assistance has, therefore, been requested for this purpose.

CANDIDATES REQUESTED BY 27 AUGUST 1982