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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

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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 formalized, 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 1952.

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.
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
3. Required eventually

These first two groups being based on the immediate activities of the Packaging Centre.

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.

<table>
<thead>
<tr>
<th>No.</th>
<th>Equipment Specification</th>
<th>Source</th>
<th>Estimated Cost US$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tear Tester, Elmendorf type.</td>
<td>H.E. Messmer (U.K.)</td>
<td>1,300</td>
</tr>
<tr>
<td></td>
<td>Pendumulum 0 to 8000 mN</td>
<td>T.M.I.</td>
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<td></td>
<td>0 to 16000 mN</td>
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<td></td>
<td>Sample cutting guillotine</td>
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<td></td>
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<td></td>
<td>For determining the tear propagation resistance of paper and plastics.</td>
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<td>No.</td>
<td>Equipment Specification</td>
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<td>Estimated Cost US$</td>
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<td></td>
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<td>2. T.M.I. (U.S.A.)</td>
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<td></td>
<td></td>
<td>3. Toyo Seiki (Japan)</td>
<td></td>
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<tr>
<td>3</td>
<td>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).</td>
<td>1. Macklow Smith (U.K.)</td>
<td>18,700</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. T.M.I. (U.S.A.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. LBM/Ameresco (U.S.A.)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Heat Sealer. Controlled pressure, dwell time and temperature for laboratory investigations. Single heated bar. Teflon covered (spares). 220v. 50Hz.</td>
<td>1. Packaging Industries Inc.</td>
<td>4,000</td>
</tr>
<tr>
<td>5</td>
<td>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 to 2 per cent. Unit construction preferred for later extension. Prefabricated. 220v. 50Hz. Perforated shelves.</td>
<td>1. Baid and Tatlock (U.K.)</td>
<td>30,000</td>
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<td></td>
<td></td>
<td>2. Rigaku Kogyo Co. Ltd. (Japan)</td>
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<td>No.</td>
<td>Equipment Specification</td>
<td>Source</td>
<td>Estimated Cost USD</td>
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<tr>
<td>6</td>
<td>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.</td>
<td>1. Ameresco (U.S.A.) 2. LA3 Corp. (U.S.A.) 3. T.M.I. 90-1 4. Lani W (Sweden)</td>
<td>15,000</td>
</tr>
<tr>
<td>8</td>
<td>Drop Table. Electromagnetic. For testing transit packs, e.g. corrugated boxes. Capacity 50kg. Orientation device. Door aperture min. 500mm x 500mm. 220v. 50Hz.</td>
<td>1. LAB/Ameresco (U.S.A.) Bull 2. T.M.I. Cat. p 56 3. Schroder Cat. 62 4. Frank (FRG)</td>
<td>2,500</td>
</tr>
<tr>
<td>9</td>
<td>Strapping Equipment. Steel and Plastic. For hand strapping corrugated boxes prior to laboratory testing.</td>
<td>1. Showa Boeki (Japan) 2. Schroder Cat. 62 3. Frank (FRG)</td>
<td>300</td>
</tr>
<tr>
<td>10</td>
<td>Stapling Equipment. For hand stapling corrugated boxes in the laboratory prior to testing.</td>
<td></td>
<td>150</td>
</tr>
<tr>
<td>No.</td>
<td>Equipment Specification</td>
<td>Source</td>
<td>Estimated Cost US$</td>
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<tr>
<td>11</td>
<td>Thermohygrographs. 1. T.M.I. (Bendix type) (Serdex) 2. Thermohygrographs recording (1) and non-recording (1). For measuring the temperature and RH in the various laboratories. Spare charts (100) seven day type.</td>
<td></td>
<td>735 270</td>
</tr>
<tr>
<td>13</td>
<td>Diaphragms for Mullen Burst Tester. 1. T.M.I. Six of each for paper and board. 2. H.E. Messmer</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>14</td>
<td>Calibration Foils for Mullen Burst. 1. H.E. Messmer Pack of twelve in the low, medium and high ranges. 2. T.M.I.</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>15</td>
<td>Set of Cutting Knives. 1. T.M.I. Suitable for paper sample cutting (e.g. Stanley). Six with three dozen blades. 2. H.E. Messmer</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>16</td>
<td>Beam for the Frank Compression Tester. 1. Karl Frank (FRG) Cat. 18938 To extend the range of the existing equipment. 0 to 2.5KN.</td>
<td></td>
<td>500</td>
</tr>
<tr>
<td>17</td>
<td>Calibration Spring. 1. T.M.I. For laboratory platen crush tester (Hinde and Dauch type). 2.5/5.0KN range.</td>
<td></td>
<td>400</td>
</tr>
<tr>
<td>18</td>
<td>Sample Cutting Press. 1. H.E. Messmer Punch and Die type preferred. For cutting test pieces from paper, board and plastics. For tensile tests 15mm x 250mm. For ring crush test on paper. Twin guillotine type acceptable. 2. T.M.I. (JDC type 22-4) 3. Toyo Seiki (Japan) 142 p 87</td>
<td></td>
<td>2,000</td>
</tr>
<tr>
<td>No.</td>
<td>Equipment Specification</td>
<td>Source</td>
<td>Estimated Cost US$</td>
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</tr>
<tr>
<td>19</td>
<td>Magnifying Glasses. Folding. For print examination (i).</td>
<td>1. T.M.I.</td>
<td>20</td>
</tr>
<tr>
<td>20</td>
<td>Closure Torque Tester. For measuring the opening and closing torque of bottle and jar caps.</td>
<td>1. UKB (U.K.) 2. Owens Illinois (U.S.A.)</td>
<td>1,500</td>
</tr>
<tr>
<td>21</td>
<td>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.</td>
<td></td>
<td>500</td>
</tr>
<tr>
<td>22</td>
<td>Stretch Wrapper. Hand held, clutch operated with thin plastic film. Can be used for pallet loads.</td>
<td></td>
<td>300</td>
</tr>
<tr>
<td>23</td>
<td>Guillotine. Bench type. Suitable for paper and laminates. Size approximately 0.6m x 0.6m. Hand operated.</td>
<td>1. T.M.I. 22-13-1 Jaques cutter</td>
<td>650</td>
</tr>
<tr>
<td>24</td>
<td>Pick Resistance Waxes. Dennison. For measuring the pick resistance of board.</td>
<td>1. H.E. Messmer (U.K.)</td>
<td>150</td>
</tr>
<tr>
<td>25</td>
<td>Micro Recorders (2).</td>
<td>1. Tandy Corp. (U.S.A.)</td>
<td>250</td>
</tr>
<tr>
<td>26</td>
<td>Micro tapes. For use with above recorder.</td>
<td></td>
<td>40</td>
</tr>
<tr>
<td>27</td>
<td>Playback Equipment. For use with the above tapes. Secretarial.</td>
<td></td>
<td>300</td>
</tr>
<tr>
<td>28</td>
<td>Gas Permeability Tester. Automatic. Oxygen equipment similar to the OXtran 100. Two or three material testing points and two retail pack testing capsules.</td>
<td></td>
<td>14,500</td>
</tr>
<tr>
<td>No.</td>
<td>Equipment Specification</td>
<td>Source</td>
<td>Estimated Cost US$</td>
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</tr>
<tr>
<td>29</td>
<td>Slide Projector with Tape Capacity. For audio visual presentations.</td>
<td>1. Bell and Howell (PM850)</td>
<td>1,200</td>
</tr>
<tr>
<td></td>
<td>Built-in screen and able to project on to screen. Spare bulbs (three).</td>
<td>2. Rank Aldis (Caramate) 3300</td>
<td></td>
</tr>
<tr>
<td></td>
<td>For use in preparation and projection of tape/slide courses.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Twelve carousels (100 slides). Remote control with extension of at least 3m. 220v. 50Hz.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Screen for Slide Projector. For use with 35mm slides. Beaded. Minimum size 1.75m x 1.75m stand.</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>31</td>
<td>Headphones (2). For use with slide projector no. 29.</td>
<td></td>
<td>50</td>
</tr>
<tr>
<td>32</td>
<td>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.</td>
<td>1. Kodak Ltd.</td>
<td>100</td>
</tr>
<tr>
<td>33</td>
<td>Camera. SLR. Automatic exposure. 1.8mm lens.</td>
<td>1. Pentax (Japan)</td>
<td>200</td>
</tr>
<tr>
<td>34</td>
<td>Flash Unit. For the above camera - automatic exposure control.</td>
<td></td>
<td>80</td>
</tr>
<tr>
<td>35</td>
<td>Slide Copying Device for use with the camera. Bellows type preferred.</td>
<td>1. Pentax Ltd.</td>
<td>150</td>
</tr>
<tr>
<td>36</td>
<td>Packaging Course. Canadian Institute of Packaging.</td>
<td>1. World Packaging Federation</td>
<td>2,000</td>
</tr>
<tr>
<td></td>
<td>Slide/text.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>Slide/Text Courses by PIRA (U.K.). Various instruments and packaging technology subjects.</td>
<td></td>
<td></td>
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<tr>
<td>No.</td>
<td>Equipment Specification</td>
<td>Source</td>
<td>Estimated Cost</td>
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</tr>
<tr>
<td>39</td>
<td>Hooks. For drop tests. For the drop testing of odd shaped and heavy objects with a sling, mechanically operated. Capacity up to 500 kg.</td>
<td>1. T.M.I. 25-3-2</td>
<td>600</td>
</tr>
<tr>
<td>40</td>
<td>Carton Board Creaser. PIRA type. For the measurement of the creasability of carton board. Hand operated.</td>
<td>1. PIRA</td>
<td>3,034</td>
</tr>
<tr>
<td>41</td>
<td>Stiffness Tester. Crease and board type. Electronic. 220v. 50Hz.</td>
<td>1. PIRA</td>
<td>4,250</td>
</tr>
<tr>
<td>42</td>
<td>Glass Container Side Wall Analyser For measuring the thickness of the side wall continuously.</td>
<td>1. ACRI (U.S.A.)</td>
<td>10,000</td>
</tr>
<tr>
<td>43</td>
<td>Push Pull Gauges. Chantillion type. Ranges 0 - 0.5 kg and 0 - 2.5 kg.</td>
<td>1. T.M.I. 34-18-3</td>
<td>700</td>
</tr>
<tr>
<td>44</td>
<td>Density Column. For measuring the density of plastics. Six column type preferred.</td>
<td>1. Davenport (U.K.)</td>
<td>3,000</td>
</tr>
<tr>
<td>45</td>
<td>Magnifying Glasses (2) with Built-in Light. Used for print examination.</td>
<td>1. Lubeco Machinen Gmb.</td>
<td>2,000</td>
</tr>
<tr>
<td>46</td>
<td>Seam Scope. Projector for can side seam projection. With sample saw. 220v. 50Hz.</td>
<td>1. Lubeco Machinen Gmb.</td>
<td>2,000</td>
</tr>
<tr>
<td>No.</td>
<td>Equipment Specification</td>
<td>Source</td>
<td>Estimated Cost U$</td>
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</tr>
<tr>
<td>47</td>
<td>Glass Bottle Profile Projector</td>
<td>1. T.M.I.</td>
<td>12,000</td>
</tr>
<tr>
<td></td>
<td>To project a profile of the neck of a glass container to permit accurate measurement. 220v. 50 Hz.</td>
<td>2. H.E. Messmer</td>
<td></td>
</tr>
<tr>
<td>48</td>
<td>Rub Tester.</td>
<td>1. T.M.I.</td>
<td>1,500</td>
</tr>
<tr>
<td></td>
<td>For the laboratory evaluation of the rub resistance of paper and board printed samples. Sutherland type. 220v. 50Hz.</td>
<td>2. H.E. Messmer</td>
<td></td>
</tr>
<tr>
<td>49</td>
<td>Plybond Adhesion Tester.</td>
<td>1. T.M.I. (U.S.A.)</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td>For measuring the plybond strength for board. An attachment to fit the Mullen Burst Tester.</td>
<td>2. H.E. Messmer</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>Impact Tester.</td>
<td>1. Davenport (U.K.)</td>
<td>3,200</td>
</tr>
<tr>
<td></td>
<td>For measuring the impact resistance of plastic films in the laboratory. Falling Dart type.</td>
<td>2. Messmer (22 EM)</td>
<td></td>
</tr>
</tbody>
</table>

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 relevance 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

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

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

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

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.;


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

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

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

(d) On-the-Job Training

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 setback 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 consultations, 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 3).

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.
LIST OF CONTACTS

1. UNDP
   P.K. 407
   Ankara
   Turkey - Tel. 26 54 35 to 89

2. Turkish Standards Institute
   Necatibey Caddesi
   112 Bakanliklar
   Ankara
   Turkey

3. Tamek Gida San A.S.
   Eski Yalova
   Bursa
   Turkey
   Food Processors

4. Auer. Gumussuyu Cad. 28
   Topkapi
   Istanbul
   Turkey
   Cookers and Space Heaters

5. Eczacibasi Seramik Fabrikalari
   P.O. Box 6
   Kartal
   Istanbul
   Turkey

6. Olmuk Co.
   Corrugated Board

7. Turyag
   Household Products

8. Pinar
   Milk and Dairy Products

9. Kaplamin
   Foam plastic filled board.

10. The Istanbul Chamber of Commerce

Mr. S.K. Malik,
    Resident Representative
Mr. G.L. Narisimhan, SIDFA
Mrs. G. Turkmen

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

Mr. Sadi Burat, Plant Manager

Mr. Ali Yildirim, Technical Director

Ms. Gulcan Tuceturk, Head,
    Quality Control
Mr. Okan Esin, Packaging Engineer
Ms. Suna Gunday

Ms. A. Arsan

Mr. M. Pikret Ozveren, Factory
    Manager
TITLE: Assistance to TSE in the Establishment of a Packaging Centre (Second Phase)

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

DURATION: Three Years

PRIMARY FUNCTION: Establishment of the Packaging Centre

SECONDARY FUNCTION: Institutional-Building

SECTOR (Govt. Class.): Industry

SUB-SECTOR (Govt. Class.): 

GOVERNMENT IMPLEMENTING AGENCY: Turkish Standards Institute (TSE)

EXECUTING AGENCY: United Nations Industrial Development Organization (UNIDO)

ESTIMATED STARTING DATE: March 1983

GOVERNMENT INPUTS: TL 37,594,000 (in kind)

UNDP INPUTS: US $ 231,650

GOVERNMENT COST-SHARING: US $ 100,000

Signed: ________________________________

on behalf of the Government

Date: ________________________________

on behalf of the Executing Agency

Date: ________________________________

on behalf of the United Nations Development Programme

Date: ________________________________
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;


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 TL 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.
1. 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.P - ACTIVITIES

<table>
<thead>
<tr>
<th>No.</th>
<th>Activity</th>
<th>Location</th>
<th>Proposed Starting Date</th>
<th>Duration Months</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Recruitment of new staff</td>
<td>Ankara</td>
<td>March 1983</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>Production of equipment at the TSE</td>
<td>Ankara</td>
<td>March 1983</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>Requisition, installation and commissioning of equipment by TSE</td>
<td>Ankara</td>
<td>March 1983</td>
<td>18</td>
</tr>
<tr>
<td>4</td>
<td>Requisitioning, installation and commissioning of the first group of equipment. UNIDO.</td>
<td>Ankara</td>
<td>March 1983</td>
<td>18</td>
</tr>
<tr>
<td>5</td>
<td>Fellowship in transit testing leaves</td>
<td>U.S.A./Europe</td>
<td>January 1985</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>Food and analytical expert arrives</td>
<td>Ankara</td>
<td>February 1984</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>Requisitioning, installation and commissioning second group of equipment. UNIDO.</td>
<td>Ankara</td>
<td>January 1984</td>
<td>12</td>
</tr>
<tr>
<td>8</td>
<td>Furnishing of library at the Centre</td>
<td>Ankara</td>
<td>January 1984</td>
<td>12</td>
</tr>
<tr>
<td>9</td>
<td>Food packaging fellow leaves</td>
<td>U.S.A./Europe</td>
<td>September 1983</td>
<td>3</td>
</tr>
<tr>
<td>10</td>
<td>Material testing fellow leaves</td>
<td>U.S.A./Europe</td>
<td>January 1984</td>
<td>3</td>
</tr>
<tr>
<td>11</td>
<td>Training expert arrives</td>
<td>Ankara</td>
<td>May 1984</td>
<td>3</td>
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<tr>
<td>No.</td>
<td>Activity</td>
<td>Location</td>
<td>Starting Date</td>
<td>Months</td>
</tr>
<tr>
<td>-----</td>
<td>--------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>12</td>
<td>Requisitioning, installation and commissioning travelling crane by TSE</td>
<td>Ankara</td>
<td>March 1983</td>
<td>12</td>
</tr>
<tr>
<td>13</td>
<td>Director of Packaging Centre leaves for fellowship</td>
<td>U.S.A./Europe</td>
<td>June 1985</td>
<td>2</td>
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<tr>
<td>14</td>
<td>Transit pack expert arrives</td>
<td>Ankara</td>
<td>September 1985</td>
<td>3</td>
</tr>
<tr>
<td>15</td>
<td>Training expert arrives</td>
<td>Ankara</td>
<td>September 1985</td>
<td>3</td>
</tr>
</tbody>
</table>

**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:

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Approximate Delivery Date</th>
<th>Cost (TL '000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drop Hammer Device</td>
<td>1984</td>
<td>100</td>
</tr>
<tr>
<td>Water Spray Tester</td>
<td>1984</td>
<td>50</td>
</tr>
<tr>
<td>Forklift</td>
<td>1984</td>
<td>2,000</td>
</tr>
<tr>
<td>Equipment</td>
<td>Approximate Delivery Date</td>
<td>Cost (TL '000)</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>---------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Glassware and other laboratory equipment</td>
<td>1984</td>
<td>2,500</td>
</tr>
<tr>
<td>Chemicals</td>
<td>1984</td>
<td>500</td>
</tr>
<tr>
<td>Books and periodicals</td>
<td>1984</td>
<td>50</td>
</tr>
<tr>
<td>Furnishing of library and training rooms</td>
<td>1984</td>
<td>500</td>
</tr>
<tr>
<td>Travelling crane</td>
<td>1985</td>
<td>4,000</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>ID</th>
<th>Location</th>
<th>Starting Date</th>
<th>Duration Months</th>
</tr>
</thead>
<tbody>
<tr>
<td>11-01</td>
<td>Expert in Food Packaging and</td>
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<td></td>
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<tr>
<td></td>
<td>Analytical Testing</td>
<td>Ankara</td>
<td>February 1984</td>
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<td>11-02</td>
<td>Expert in Training in Packaging</td>
<td>Ankara</td>
<td>May 1984</td>
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<tr>
<td></td>
<td>Technology</td>
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<tr>
<td>11-03</td>
<td>Expert in Transit Pack</td>
<td>Ankara</td>
<td>September 1985</td>
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<tr>
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<td>Development and Testing</td>
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<tr>
<td>11-04</td>
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(b) Training Provision

<table>
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<td>11.01</td>
<td>Testing of Transit Packaging</td>
<td>September 1984</td>
<td>3</td>
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<td></td>
<td>U.S.A./Europe</td>
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<td>Europe/U.S.A.</td>
<td>September 1983</td>
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<td>11.03</td>
<td>Testing of Packaging Materials</td>
<td>Europe/U.S.A.</td>
<td>January 1984</td>
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<td>11.04</td>
<td>General Packaging Technology</td>
<td>U.S.A./Europe</td>
<td>June 1985</td>
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<tr>
<td>11.05</td>
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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.

<table>
<thead>
<tr>
<th>No.</th>
<th>Equipment</th>
<th>Approximate Delivery Date</th>
<th>Approximate Cost (US$)</th>
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<tbody>
<tr>
<td>1</td>
<td>Tear Tester. Elmendorf type. Pendulums.</td>
<td>1983</td>
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<td>2</td>
<td>Tensile Tester. Bench top.</td>
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<td>Compression Tester. Corrugated boxes.</td>
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<td>4</td>
<td>Heat Sealer. Laboratory. Heated bar type.</td>
<td>1983</td>
<td>4,000</td>
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<td>5</td>
<td>Storage rooms or very large cabinets. Conditioned 38°C, 90 per cent RH.</td>
<td>1983</td>
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<td>6</td>
<td>Vibration Table. 1.25m x 1.25m, 1,000kg.</td>
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<td>7</td>
<td>Friction Tester. Static. Tilting table type.</td>
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<td>8</td>
<td>Drop Table. Electromagnetic. Capacity 50kg.</td>
<td>1983</td>
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<td>9</td>
<td>Strapping Equipment. Steel and plastic.</td>
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<td>Stapling Equipment.</td>
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<td>Thermohygrographs. Recording and non-recording.</td>
<td>1983</td>
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<td>12</td>
<td>Vacuum Packaging Apparatus.</td>
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<td>13</td>
<td>Diaphragms for Mullen Burst Tester.</td>
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<td>14</td>
<td>Calibration Foil for Mullen Burst Tester.</td>
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<td>Set of Sample Cutting Knives</td>
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<tr>
<td>No.</td>
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<td>Approximate Cost (US$)</td>
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<td>-----</td>
<td>---------------------------------------------------------------------------</td>
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<td>------------------------</td>
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<tr>
<td>16</td>
<td>Beam for Frank Compression Tester. 0 to 2.5KN.</td>
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<tr>
<td>17</td>
<td>Calibration Spring for Laboratory Crush.</td>
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<td>18</td>
<td>Magnifying Glasses. Poling; for print.</td>
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<td>19</td>
<td>Sample Cutting Presses. Punch and die type.</td>
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<td>Closure Torque Tester.</td>
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<td>Shrink Gun. Electric, hot air type.</td>
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<td>22</td>
<td>Stretch Wrapper. Hand-held device.</td>
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<tr>
<td>23</td>
<td>Guillotine. Bench type.</td>
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<td>24</td>
<td>Pick resistance waxes. Dennison.</td>
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<td>25</td>
<td>Micro-recorders (2).</td>
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<td>26</td>
<td>Micro-tapes (12).</td>
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<td>27</td>
<td>Playback Equipment for micro-tapes. Secretarial.</td>
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<tr>
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<td>Slide Projector with Tape Capacity.</td>
<td>1983</td>
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<td>Screen for Slide Projector.</td>
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<td>Headphones (2) for use with Slide Projector.</td>
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<tr>
<td>32</td>
<td>Kit for preparing 35mm slides. Black and white.</td>
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<td>33</td>
<td>Camera. SLR automatic exposure type.</td>
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<td>34</td>
<td>Flash Unit for above Camera.</td>
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<td>Slide Copying Equipment. Bellows type.</td>
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<td>36</td>
<td>Packaging Course. Canadian Inst. Packaging. Slide/text.</td>
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<td>37</td>
<td>Text/Slide Courses. Test instruments and packaging technology.</td>
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<td>38</td>
<td>Packaging Abstracts. PIRA. 1972 to 1982.</td>
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<td>No.</td>
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<td>Approximate Cost (US$)</td>
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<td>-----</td>
<td>----------------------------------------------------------------------------</td>
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<td>39</td>
<td>Hooks. Drop tests.</td>
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<td>40</td>
<td>Greaser. Carton board. PIRA type.</td>
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<tr>
<td>41</td>
<td>Stiffness Tester. Board and crease type.</td>
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<td>Glass Container Sidewall Distribution Analyser</td>
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<td>1,000</td>
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<tr>
<td>43</td>
<td>Push-pull Gauges. Chantillion type.</td>
<td>1984</td>
<td>700</td>
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<tr>
<td>44</td>
<td>Density Column. For plastics.</td>
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<tr>
<td>45</td>
<td>Magnifying Glasses (2) with Light.</td>
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<td>46</td>
<td>Seamscope Projector. For can seam examination with sample saw.</td>
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<td>47</td>
<td>Glass Bottle Profile Projector.</td>
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<td>12,000</td>
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<td>48</td>
<td>Rub Tester. Print. Sutherland type.</td>
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<td>49</td>
<td>Plybond Adhesion Tester. Mullen attachment.</td>
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</tr>
<tr>
<td>50</td>
<td>Impact Tester. Falling dart type.</td>
<td>1984</td>
<td>3,000</td>
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</table>

Estimated cost - freight, insurance, etc. 144,267
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.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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<td>2</td>
<td>Equipment, TSE Workshop.</td>
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<tr>
<td>3</td>
<td>Requisition, install equipment, TSE.</td>
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<tr>
<td>4</td>
<td>Requisition, install equipment, UNIDO.</td>
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<td>5</td>
<td>Fellowship, Transit testing.</td>
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<td>6</td>
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<tr>
<td>7</td>
<td>Requisition, install equipment, UNIDO.</td>
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<tr>
<td>8</td>
<td>Furnishing Library.</td>
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<td>9</td>
<td>Fellowship, Food Packaging.</td>
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<td>10</td>
<td>Fellowship, Material Testing.</td>
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<td>12</td>
<td>Crane, TSE.</td>
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<tr>
<td>15</td>
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<td></td>
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</tbody>
</table>
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 Support 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:

- do the necessary research work required during preparation of standards,
- conduct tests required for the government inspections of standards; these 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.
- 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 project.

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

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>PROJECT NUMBER AND AMENDS</th>
<th>SPECIFIC ACTIVITY</th>
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<tr>
<td>TURKEY</td>
<td>DP/TUR/81/013/A/01</td>
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#### PROJECT TITLE

"Assistance to TEB in the Establishment of a Packaging Centre. Second Phase."

### PROJECT PERSONNEL

<table>
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<tr>
<th>EXPERTS/Post title</th>
<th>16. TOTAL m/m</th>
<th>17. 1983 m/m</th>
<th>18. 1984 m/m</th>
<th>19. 1985 m/m</th>
<th>20. 1986 m/m</th>
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<td>Food Packaging and Analytical</td>
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<tr>
<td>Training in Packaging Technology</td>
<td>6 39,900</td>
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<tr>
<td>Transit Pack Development &amp; Test</td>
<td>3 19,950</td>
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<tr>
<td>To be decided</td>
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**SUBTOTAL:** 14 93,100

**REMINDERS:**

1. Remarks
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<tr>
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<td>m/m</td>
<td>$</td>
<td>m/m</td>
<td>$</td>
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<td>13.00 Support Personnel</td>
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<td>14.00 Volunteers</td>
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<td>30. TRAINING</td>
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<td>31.00 Fellowships</td>
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<td>35.00 Meetings/Consultations (non UNDP)</td>
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<td>2,000</td>
</tr>
<tr>
<td>99. GRAND TOTAL:</td>
<td>331,650</td>
<td>132,550</td>
<td>143,600</td>
<td>52,000</td>
<td>3,500</td>
</tr>
</tbody>
</table>
COUNTRY : TURKEY
PROJECT TITLE : Assistance to TSE in the Establishment of a Packaging Centre, Second Phase.
PROJECT NUMBER : LA/TUR/81/013/A/67/37

COST SHARING CONTRIBUTION

(in US Dollars)

To be decided by UEDF Ankara at the relevant time.
COUNTY: TURKEY
PROJECT TITLE: Assistance to TSK in the Establishment of a Packaging Centre, Second Phase.
PROJECT №: DP/TUR/81/013/A/01

PROJECT BUDGET COVERING TURKISH GOVERNMENT CONTRIBUTION IN KIND
(In local currency, in '000TL)

<table>
<thead>
<tr>
<th>10. PROJECT PERSONNEL</th>
<th>1983</th>
<th>1984</th>
<th>1985</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>m/m</td>
<td>'000TL</td>
<td>m/m</td>
</tr>
<tr>
<td>Technical Adviser</td>
<td>36</td>
<td>2,397</td>
<td>12</td>
</tr>
<tr>
<td>Director of Packaging Centre</td>
<td>36</td>
<td>2,123</td>
<td>12</td>
</tr>
<tr>
<td>Head of Transport Packaging</td>
<td>36</td>
<td>1,581</td>
<td>12</td>
</tr>
<tr>
<td>Head of Material Packaging</td>
<td>36</td>
<td>1,581</td>
<td>12</td>
</tr>
<tr>
<td>Head of Food Packaging Lab.</td>
<td>36</td>
<td>1,581</td>
<td>12</td>
</tr>
<tr>
<td>Mechanical Engineer</td>
<td>36</td>
<td>1,581</td>
<td>12</td>
</tr>
<tr>
<td>Mechanical Technician</td>
<td>36</td>
<td>1,581</td>
<td>12</td>
</tr>
<tr>
<td>Documentation person</td>
<td>36</td>
<td>1,037</td>
<td>12</td>
</tr>
<tr>
<td>Secretary</td>
<td>36</td>
<td>1,037</td>
<td>12</td>
</tr>
<tr>
<td>Chemical Technician</td>
<td>36</td>
<td>1,037</td>
<td>12</td>
</tr>
<tr>
<td>Worker</td>
<td>36</td>
<td>891</td>
<td>12</td>
</tr>
<tr>
<td>19. Component Total</td>
<td>396</td>
<td>16,427</td>
<td>132</td>
</tr>
</tbody>
</table>
COUNTRY: TURKEY

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

PROJECT No.: DP/TUR/81/013/A/01/37

PROJECT BUDGET COVERING TURKISH GOVERNMENT CONTRIBUTION IN KIND

(In local currency, in '000 TL)

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

<table>
<thead>
<tr>
<th>Fellowship</th>
<th>Location</th>
<th>Estimated costs (US $)</th>
</tr>
</thead>
<tbody>
<tr>
<td>31.01 1984</td>
<td>USA</td>
<td>Travel 2000</td>
</tr>
<tr>
<td>31.02 1983</td>
<td>UK</td>
<td>Travel 1200</td>
</tr>
<tr>
<td>31.03 1984</td>
<td>UK</td>
<td>Travel 1200</td>
</tr>
<tr>
<td>31.04 1985</td>
<td>USA</td>
<td>Travel 2000</td>
</tr>
<tr>
<td>31.05 1984</td>
<td>Europe/USA</td>
<td>Travel 1200</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DSA 6600</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fees 3000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DSA 6600</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fees 2000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DSA 4400</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fees 2000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DSA 2200</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fees 1000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11,600</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9,300</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9,300</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8,400</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4,400</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total 42,000</strong></td>
</tr>
</tbody>
</table>
DRAFT JOB DESCRIPTION

Post Title: Expert in Food Packaging and Analytical Testing

Duration: 3 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 procedures.
3. Techniques for determining the compatibility 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.

5. 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.
Draft Job Description

DE/TUR/51/013/11-02/3/7.2

Project in Turkey

Expert in Training in Packaging Technology
6 Months
Ankara, Turkey, with travel within the country.

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.

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.
To 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.

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

PROJECT IN TURKEY

23 November 1982

DRAFT JOB DESCRIPTION

DP/TUR/31/013/11-03/31.7.8

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

<table>
<thead>
<tr>
<th>No.</th>
<th>Equipment</th>
<th>Possible Suppliers</th>
<th>Est. Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>51</td>
<td>Dynamic Friction Tester. For measuring the slip characteristics of paper and film when in motion. TNO model preferred. 220v 50Hz.</td>
<td>1. TNO (Holland) 2. Messmer (UK) 3. Davenport (UK)</td>
<td>2,000</td>
</tr>
<tr>
<td>52</td>
<td>Stereo Binocular Microscope. Low power eyepiece X10 and X20.</td>
<td></td>
<td>1,500</td>
</tr>
<tr>
<td>53</td>
<td>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.</td>
<td>1. Messmer 2. TMI 5E-20 3. Toyo Seiki p159, 90</td>
<td>1,000 to 5,000</td>
</tr>
<tr>
<td>54</td>
<td>Printability Tester. For measuring the printability of paper and board. Equipment measures absorption, smoothness and pick for printing papers. IGT type preferred.</td>
<td>1. IGT (Holland)</td>
<td>37,000</td>
</tr>
<tr>
<td>55</td>
<td>Paper Extension Tester. For measuring the degree of expansion of paper under different humidity conditions.</td>
<td>1. TMI 7E-3 p231 2. Messmer</td>
<td>4,350 3,276</td>
</tr>
<tr>
<td>56</td>
<td>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.</td>
<td>1. Messmer</td>
<td>600</td>
</tr>
<tr>
<td>57</td>
<td>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.</td>
<td>1. TMI 2. Toyo Seiki 3. Messmer Schroder (FRG)</td>
<td>1,000 to 15,000</td>
</tr>
<tr>
<td>58</td>
<td>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.</td>
<td>1. Toyo Seiki</td>
<td>6,500</td>
</tr>
<tr>
<td>59</td>
<td>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.</td>
<td></td>
<td>3,000</td>
</tr>
<tr>
<td>60</td>
<td>Curl Device. For measuring the curl of paper samples.</td>
<td>1. TMI p234 7E-3</td>
<td>200</td>
</tr>
<tr>
<td>No.</td>
<td>Equipment</td>
<td>Possible Suppliers</td>
<td>Est. Cost</td>
</tr>
<tr>
<td>-----</td>
<td>-----------</td>
<td>--------------------</td>
<td>----------</td>
</tr>
<tr>
<td>61</td>
<td>Tachometer. For measuring the belt or roller speed on packaging equipment. Five-speed type.</td>
<td>1. TMI p246</td>
<td>$400</td>
</tr>
<tr>
<td>62</td>
<td>Stop Watches and Clocks. For sixty minutes. Start and re-set button. Spring operated.</td>
<td>1. Fischer Scientific 2. Gallenkamp, UK</td>
<td>$50</td>
</tr>
<tr>
<td>63</td>
<td>Desk Top Computer. For storing and retrieving data relevant to material test results and useful information references.</td>
<td></td>
<td>$2,500</td>
</tr>
<tr>
<td>64</td>
<td>Portable, Electric Typewriter. Turkish keyboard. For laboratory staff, reports, forms, etc.</td>
<td></td>
<td>$400</td>
</tr>
<tr>
<td>65</td>
<td>Slide Mounting Equipment. 35mm. For preparing slides for training purposes in the laboratory.</td>
<td></td>
<td>$200</td>
</tr>
<tr>
<td>66</td>
<td>Copying Stand for the 35mm Camera. Twin lamp. For copying documents, charts, diagrams, etc. for making 35mm slides. 220v 50Hz.</td>
<td></td>
<td>$150</td>
</tr>
<tr>
<td>67</td>
<td>G Meter. Amplifier. Accelerometers. Oscilloscope and Impact-o-meters with the drop table to measure the recorded deceleration. Range 10G, 20G, 50G, 100G, 120G and 300G. High impedance cathode preamplifier matching accelerometer to the oscilloscope. Type 511, 5000 (Tektronix 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.</td>
<td>1. Tektronixs (USA)</td>
<td>$15,000</td>
</tr>
<tr>
<td>68</td>
<td>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 Ismit.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>69</td>
<td>Overhead Sewing Machine for sacks.</td>
<td></td>
<td>$1,200</td>
</tr>
</tbody>
</table>
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.


11. Shelf life testing of filled retail containers, especially packaged foods.
LIST OF SUPPLIERS' NAMES AND ADDRESSES

AB Coldator

Low temperature cabinets and air-conditioning.

Adamel Lhomarzy
15 HAV. Jean-Jaures
BP 238
F-94201 Ivry-sur-Seine
France
Telex 204342. Tel. 6701130

Ameresco Inc.
101 Park St.
Montclair
New Jersey 07042
USA
Tel. (201) 7463300. Tlx. 138614

American Glass Research Institute (AGRI)
P.O. Box 149, Butler
Penn. 16001
USA
Tel. (412) 287 4779 Tlx. 86-6269

Auriema
BP 46
F 94170
Le Perreux, France
Tel. 680124 Tlx. 871 0230

Baird & Tatlock (Export Sales)
P.O. Box 1
Romford RM1 1HA
UK
Tlx. 24225

Brue & Kjaer

Durometer.

Bell and Howell AV Ltd.
Alperton House
Bridgewater Rd.
Wembley
Middlesex HA0 1ZC
UK

British Cellophane
3ach Rd.
Bridgewater
Somerset TA6 4QH
UK. Tel. 0278 424221 Tlx. 46266

Sales Organization for LAB
Wide range of transit pack test equipment.

Humidity cabinets and storage rooms.
Glassware. General laboratory equipment.

Tape/slide projectors.
Far der Korput
Nederland 3V
Postbus 119
Baan
Netherlands

Cysella, C.F. & Co. Ltd.
Regent House
Britannia Walk
London N1 1ND
UK

CEFIL
(French Packaging Institute)
11-13 Avenue Georges Politzer
F 78190 Trappes
France
Tel. 051 1009

Continental Can Co.
Can Division
1350 West 76 St.
Chicago, Ill. 60620
USA

Creusot-Loire Inst.
France

Custom Scientific Instruments (CSI)
13 Wing Drive
Whippany
New Jersey 07981
USA Tel. 201 535 8500

Davenport (Daventest) Ltd.
Tewir Rd
Welwyn Garden City
Hertfordshire
UK

Do Boy Packaging Machinery
Domain Ind.
New Richmond
Wisconsin
54017
USA

Electrosonic Ltd.
315 Woolwich Rd.
London SE7 1LT
UK

Fisher Scientific Co.
Nottingestrasse 14
8022 Zurich
Switzerland

---

Wide range of test equipment.
Possibly not part of Vismet UK.

Psychrometer.

Drawings for transit test equipment.

Special micrometers used for the measurement of can dimensions.

Wide range of test equipment.

Wide range of test equipment.

Friction tester, falling dart tester and others.

Heat seal equipment.

Tape/slide projectors.

Wide range of general laboratory equipment.
Humidity cabinets.
Gallenkamp
P.O. Box 230
Technico House
Christopher St.
London EC2Y 3AN

Gerrard Industries
96-104 Bright High St.
London SE1 UK

Hartmann & Braun AG
Postfach 900507
D-6000 Frankfurt 90

Impact-o-Graph Div.
Chatsworth Data Corporation
20710 Lassen St.
Chatsworth, Calif. 91311 USA

Instron Ltd.
Coronation Rd.
High Wycombe
Bucks. UK
Tel. 33333 Tlx. 83222

Karl Frank Gmb
Postfach 1320
D-6940 Weinheim
FRG. Tel. 0621 896081

Karl Kolb Buckslag
Steingrund 3
Postfach 102040 D 6072
UE
FRG. Tel. 06103 61076. Tlx. 0417981

Karl Schroder AG
Prüfmaschinen-Messgeräte
Postfach 1768
D 6940 Weinheim
FRG

Katoh & Co.
Mitsui Building
Muromachi
Nihombashi
Chuo ko, Tokyo, Japan
Tel. 03 270 3611 Tlx. 0222 4775 KATOHTJ

Keifel Paul
D-8223 For.lassing
Industrias 17-19
Postfach 537
FRG

LID Division
Mechanical Technology Inc.
303 Albany-Shaker Rd.
Latham, NY 12110
USA

**General laboratory equipment.**

**Strapping equipment.**

**Stroboscope and recorders.**

**Accelerometers, trip recorders, shock recorders.**

**Tensile and compression testers, universal testers.**

**Full range of test equipment.**

**General test equipment.**

**Wide range of test equipment.**

**Accelerometers.**

**Vacuum packing equipment.**

**Equipment for transit testing.**
Komet Maschinen Fabrik
Ernst Deimold 7000
Stuttgart
Kornerweg 77-79
FRG

Lansmount Corp.
Box 1390
Monterey
Ca. 93940
USA

Lenk, DR GmbH
CH 8274
Tagel Wilen
Oberdorfstr. 15
Switzerland

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

Lubeco Maschinen Anlagen GmbH
Libech
FRG

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

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

Marubishi Scientific Instr.
Japan

Messer R.E. Ltd.
144c Offord 3d
London N 1
UK Tel 01 607 2416 Tlx. 27453

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

Vacuum packing equipment.

Vibration table, compression and other transit test equipment.

Vibration table.

Wide range of test equipment.

Can omscope and sample saw.

Gas and water vapour permeability tester.

Box compression testers.

Wide range of test equipment.

Can testing equipment.
Pettier Instruments
CH 8606 Greifeasee
Switzerland
Tel. 01 9412241 Tlx. 54932

Yo-Con
USA

Mitutoyo Manufacturing Co. Ltd.
33-7 Shiba 5 Chome
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

Test equipment in general.

Multilight Ltd.
13 Bone Lane
Newbury
Berkshire RG14 5TE UK
Tel. (0635) 30504 Tlx. 847534

Range of test equipment for transit testing.

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 Chome
Akabane
Kitaku
Tokyo
Japan

Climatically controlled cabinets.

Otto Brugger Feinmechanik
Gas permeability tester.

Owens Illinois
USA

Closure torque tester.

Packaging Industries
Airport Rd.
Wyannis P.O. Box 5
Mass. 02501
USA

Heat seal equipment (Sentinel).
Perkin Elmer Ltd. or Perkin Elmer Ltd. or
P.O. Lane Main Ave.
Beaconsfield MS 12
Bucks MP91QA Norwalk
UK CT 06850 USA

Gas chromatograph.

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

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

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

Air conditioning equipment.

Riga Ku Kogyo Co. Ltd.
59-8-301 1 Chrome
Akabane
Kitaku 7
Tokyo
Japan Tel. 902 7541 2538

Climatically controlled storage rooms.

Sanko Denshi Kogyo Co. Ltd.
3-71 Furuiuchi 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
Hamamatsu Cho
Minato Ku 105
Tokyo
Japan

Tape adhesion tester.

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

Climatically controlled cabinets.

Satorius Werke
Meender Landstrasse 94 108
D 3400 Göttingen
FRG

Precision balances.

Scott Tester Inc.
Providence
Rhode Island
R.I., USA

Packaging machinery.

Showa Boeki
27 10 1 Chrome
Edohori Nishi Ku
Osaka
Japan Tel. 06 441 3333
Siemens
Postfach 21 080
D 7500
Karlsruhe
FRG

Signode Corp.
Dept. 426 PMC
2600 N. Western Ave.
Chicago, Illinois 60647
USA

Sheffield Inc.
USA

Stanley Strapping Systems
1300 Corbin Ave.
New Britain
Conn. 06050
USA

Taber Instrument Corp.
111 Ground St.
North Tonawanda
N.Y. USA

Technidyne
1862 Production Drive
Louisville
Kentucky 40299
USA

Tektronix Inc.
P.O. Box 500
Beaverton
Oregon 97005
USA

Testing Machines Inc.
400 Bayview Ave.
Amityville N.Y. 11701
USA
Tel. 516 842 5400 Tlx. 96-1302

Thwing Albert Instruments Inc.
10960 Cotton Rd.
Philadelphia
PA 19154
USA

TNO
Shoemakerstrasse
Delft
Netherlands.

X-Y recorder.

Strapping equipment.

Smoothness, porosity of paper, other test equipment.

Strapping equipment.

Paper and board stiffness testers.

Reflectometers.

G meters, accelerometers, oscilloscopes, etc.

Wide range of test equipment.

Wide range of test equipment.

Printability tester, friction testers.
Wide range of test equipment.

Wallace H.W. and Co.
St. James Rd.
Croydon
Surrey CR92IR
UK
Tlx. 946300

United Glass Co.
UK

Weiss, Karl
Giessen K.G.
D 6301 Reiskirchen
Greizerstrasse 21-29

Range of test equipment.
Closure torque tester.
Salt spray cabinet.
COURSE FEE

The Course Fee for students in the United Kingdom and Else 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 also 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 C.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

November 1981

Fountain House, LA 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. Journeys 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 enrolled 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 Packaging and Material Testing Service into the Industrial Areas of Izmir, Bursa and Istanbul.

At some time in the future, service laboratories for the TSS 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 emphasised 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.

1. 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 readily 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.
The Limitations of the Conventional Approach to Introducing Packaging Technology

1. 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 company’s 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 judgment 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 "sighting 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 graduates 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 recourse to permission.
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.
11. Shelf life testing of filled retail containers, especially packaged foods.
Suggested Reading Concerned with all Aspects of Training Courses for Adults.


## Annex 3

Test equipment already installed in the Turkish Packaging Centre

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Supplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Puncture Tester. Beach type.</td>
<td>TMI, USA.</td>
</tr>
<tr>
<td>2. Concura Fluting Medium Tester.</td>
<td>Karl Frank, FRG.</td>
</tr>
<tr>
<td>3. Platen Press for edge, flat and ring crush. Model 18938</td>
<td>Karl Frank, FRG.</td>
</tr>
<tr>
<td>4. Mullen Burst Tester. 0 to 230 PSI (0 to 16 bar) Model EC03 0 to 700 PSI (0-50 bar)</td>
<td>Lhomargy, France.</td>
</tr>
<tr>
<td>5. Stiffness Tester. Taber Model 50B. Sample Cutter.</td>
<td>Taber Corp, USA.</td>
</tr>
<tr>
<td>6. Ovens. Laboratory bench. Model FN500 0 to 250°C Model EN400 0 to 125°C</td>
<td>American Glass Research Inc.</td>
</tr>
<tr>
<td>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</td>
<td>Made locally.</td>
</tr>
<tr>
<td>13. Cobb Test Equipment.</td>
<td>Karl Frank, FRG.</td>
</tr>
<tr>
<td>14. Calipers, large, 17&quot; capacity, internal/external.</td>
<td>Karl Frank, FRG.</td>
</tr>
<tr>
<td>15. Thickness Gauge. Motorized Model 16867.</td>
<td>Karl Frank, FRG.</td>
</tr>
</tbody>
</table>
21. Falling Ball Viscometer.

22. Climatically Controlled Cabinet, cyclic.

23. Compression Tester. Small platen (rather old). 0 to 1,000kg.

24. Salt Spray Cabinet. Model S 1000

25. Cold Storage Chamber. Model K660 S 1000


27. Drop tester. Two doors, approximately 1m x 0.6m. Sacks.

28. Platform Scales "NAN", capacity 500kg. 0.3m x 0.5m.

Supplier

Fisons, Loughborough, UK.

Tinius Olsen Testing Mach.

Karl Weiss, FRG.

Karl Weiss, FRG.

Made locally.

Made locally.
### ADDITIONAL EQUIPMENT LIKELY TO BE REQUIRED IN THE FUTURE - PRIORITY 3

<table>
<thead>
<tr>
<th>No.</th>
<th>Equipment</th>
<th>Possible Suppliers</th>
<th>Est. Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>51</td>
<td>Dynamic Friction Tester. For measuring the slip characteristics of paper and film when in motion. TNO model preferred. 220v 50Hz.</td>
<td>1. TNO (Holland) 2. Messmer (UK) 3. Davenport (UK)</td>
<td>USD3 2,000</td>
</tr>
<tr>
<td>52</td>
<td>Stereo Binocular Microscope. Low power eyepiece X10 and X20.</td>
<td></td>
<td>USD3 1,500</td>
</tr>
<tr>
<td>53</td>
<td>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.</td>
<td>1. Messmer 2. TTC 53-20 3. Toyo Seiki</td>
<td>USD3 1,000 to 5,000</td>
</tr>
<tr>
<td>54</td>
<td>Printability Tester. For measuring the printability of paper and board. 2. Messmer UK Equipment measures absorption, smoothness and pick for printing papers. IGT type preferred.</td>
<td>1. IGT (Holland)</td>
<td>USD3 37,000</td>
</tr>
<tr>
<td>55</td>
<td>Paper Extension Tester. For measuring the degree of expansion of paper under different humidity conditions. 4 column.</td>
<td>1. TMI 78-3 p231 2. Messmer</td>
<td>USD3 4,350</td>
</tr>
<tr>
<td>56</td>
<td>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.</td>
<td>1. Messmer</td>
<td>USD3 600</td>
</tr>
<tr>
<td>57</td>
<td>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.</td>
<td>1. TMI 2. Toyo Seiki 3. Mas</td>
<td>USD3 1,000 to 15,000</td>
</tr>
<tr>
<td>58</td>
<td>Hazameter. 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.</td>
<td>1. Toyo Seiki</td>
<td>USD3 6,500</td>
</tr>
<tr>
<td>59</td>
<td>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.</td>
<td>1. TMI p234 78-3</td>
<td>USD3 3,000</td>
</tr>
<tr>
<td>60</td>
<td>Curl Device. For measuring the curl of paper samples.</td>
<td>1. TMI p234 78-3</td>
<td>USD3 200</td>
</tr>
<tr>
<td>No.</td>
<td>Equipment</td>
<td>Possible Suppliers</td>
<td>Est. Cost</td>
</tr>
<tr>
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</tr>
<tr>
<td>61</td>
<td>Tachometer. For measuring the belt or roller speed on packaging equipment. Five-speed type.</td>
<td>1. TMI p245</td>
<td>400</td>
</tr>
<tr>
<td>62</td>
<td>Stop Watches and Clocks. For sixty minutes. Start and re-set button. Spring operated.</td>
<td>1. Fischer Scientific 2. Gallenkamp, UK</td>
<td>50</td>
</tr>
<tr>
<td>63</td>
<td>Desk Top Computer. For storing and retrieving data relevant to material test results and useful information references.</td>
<td></td>
<td>2,500</td>
</tr>
<tr>
<td>64</td>
<td>Portable, Electric Typewriter. Turkish keyboard. For laboratory staff, reports, forms, etc.</td>
<td></td>
<td>400</td>
</tr>
<tr>
<td>65</td>
<td>Slide Mounting Equipment. 35mm. For preparing slides for training purposes in the laboratory.</td>
<td></td>
<td>200</td>
</tr>
<tr>
<td>66</td>
<td>Copying Stand for the 35mm Camera. Twin lamp. For copying documents, charts, diagrams, etc. for making 35mm slides. 220v 50Hz.</td>
<td></td>
<td>150</td>
</tr>
<tr>
<td>67</td>
<td>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 (Tektronix 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.</td>
<td>1. Tektronixs (USA)</td>
<td>15,000</td>
</tr>
<tr>
<td>68</td>
<td>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.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>69</td>
<td>Overhead Sewing Machine for sacks.</td>
<td></td>
<td>1,200</td>
</tr>
</tbody>
</table>
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 qualities 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;

Applications and communications regarding this Job Description should be sent to:
Project Personnel Recruitment Section, Industrial Operations Division
UNIDO, VIENNA INTERNATIONAL CENTRE, P.O. Box 300, Vienna, Austria
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. UNIDO's assistance has, therefore, been requested for this purpose.

CANDIDATES REQUESTED BY 27 AUGUST 1982