



TOGETHER
for a sustainable future

OCCASION

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



TOGETHER
for a sustainable future

DISCLAIMER

This document has been produced without formal United Nations editing. The designations employed and the presentation of the material in this document do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations Industrial Development Organization (UNIDO) concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries, or its economic system or degree of development. Designations such as “developed”, “industrialized” and “developing” are intended for statistical convenience and do not necessarily express a judgment about the stage reached by a particular country or area in the development process. Mention of firm names or commercial products does not constitute an endorsement by UNIDO.

FAIR USE POLICY

Any part of this publication may be quoted and referenced for educational and research purposes without additional permission from UNIDO. However, those who make use of quoting and referencing this publication are requested to follow the Fair Use Policy of giving due credit to UNIDO.

CONTACT

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

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

RESTRICTED

17847

DP/ID/SER.A/1273
8 November 1989
ORIGINAL: ENGLISH

ESTABLISHMENT OF A PACKAGING UNIT AT INSTITUTE FOR RESEARCH
AND DEVELOPMENT OF CHEMICAL INDUSTRY (BBIK)

DP/INS/86/005

INDONESIA

Technical report: Termination of the implementation project*

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

Based on the work of Kurt H. Garmin, senior consultant on packaging

Backstopping officer: J. Belo, Engineering Industries Branch

United Nations Industrial Development Organization
Vienna

* This document has not been edited.

CONTENTS

	Page
I. Introduction	1
II. Description of the mission	1
III. Observations	3
1. Implementation of the internationally funded part of the project	3
2. The Government funded part of the project	7
3. Finances	11
IV. Conclusions	11
V. Recommendations	14
Annexes	
Annex I. Principal contacts made during the mission	15
Annex II. List of books ordered 5 Oct 1988, but not yet delivered	16
Annex III. Documents foreseen to be provided for the BBIK packaging library which have been informed to be out of print	19

SUMMARY

This report describes the activities of the project INS/86/005 over the period from January 1989 until the termination of its implementation on 26 September 1989.

In this period the managers of the packaging materials testing laboratory, the laboratory for testing primary packaging for food and the transport packaging laboratory were trained at Michigan State University, and at ITAL/CETEA and IPT in Brazil.

The last pieces of equipment to be provided by UNDP/UNIDO arrived and were installed, except for the climatic cabinet for which power could not be provided. Steps were taken to make the box compression tester which arrived defective in 1988 fully operational.

Important equipment was provided by the counterpart for the project, the most prominent a combined incline impact tester/heavy duty drop tester/static load compression tester.

The experts on testing packaging materials and on testing primary packaging for food installed the equipment relevant to their respective fields of expertise, and trained the staff at BBIK in operation of the equipment and in interpretation of the results

A Terminal Report for the project was prepared by the Senior Consultant on Packaging during his final mission to Jakarta in June and August-September 1989.

I. INTRODUCTION

The purpose of this project was to establish a packaging unit at the Development Division for Fertilizers and Petrochemicals of the Institute for Research and Development of Chemical Industry (BBIK) in Jakarta, this unit to provide testing and advisory services to packaging materials producers, converters and users of packaging, packaging to the food sector in particular.

The purpose of this mission was to supervise and carry out the final activities of the project implementation, including preparation of the Terminal Report.

II. DESCRIPTION OF THE MISSION

The Senior Consultant arrived in Jakarta on 18 June 1989. He was briefed about the development of the project by the UNIDO Junior Professional Officer, Mr. D. Andersen, the National Project Coordinator, Mr. J. Kusnadi, the acting chief of the BBIK packaging unit, Mr. D. Karyadi Joyoatmojo and the two UNIDO experts, Mr. J. Salisbury and Mr. B.I. Turtle.

The Senior Consultant assisted in the execution of the seminar on packaging materials and food packaging at BBIK 19-23 June 1989. This seminar was part of the project activities, the two UNIDO experts as the major lecturers.

Advices were provided to the three laboratory managers who went on overseas training on preparation of their training reports.

40 documents on packaging which had arrived since the Senior Consultant left Jakarta in January, or which arrived during the present mission were transferred to the BBIK packaging library and registered. A review of the outstanding items on the purchase order of 5 October 1988 to Munksgaard on documentation was prepared and forwarded to Munksgaard with a request for comments. No response was received, neither within the time limit indicated in the re-

quest, nor before the Senior Consultant left Jakarta.

Advices were provided on technical details of the combined incline impact tester/heavy duty drop tester/static load compression tester designed by the Expert on Testing Transport Packaging, and now constructed and installed at BBIK, financed through the 1989/90 government contribution to the project. Moreover, advices were provided with regard to repair of defective equipment and reconditioning of improper functioning equipment, project equipment as well as equipment allocated to the packaging unit.

The Senior Consultant assisted the new Head of Development Division for Fertilizers and Petrochemicals and acting chief of the packaging unit from 15 August 1989, Mr. Triyanto Hadisoemarto in establishing contacts to packaging related organizations in Indonesia.

A terminal report for the project was prepared, and the implementation of the project, its results and the demand for follow-up activities were discussed with representatives from BAPPENAS and from the Agency for Industrial Research and Development, Department of Industry.

The mission was interrupted in the period 2 July to 13 August 1989. The Senior Consultant left Jakarta on 26 September 1989.

At the end of this final mission the Senior Consultant wishes to express his gratitude to the Director, Mr. Bachrum S. Harahap and the Secretary, Mr. Garjito Pringgo Sudirjo for their interest and support of the project, to the UNIDO Senior Industrial Development Field Adviser, Mr. G.L. Narasimhan and the UNIDO Junior Professional Officer, Mr. D. Andersen for their valuable advices and assistance, and to the Director of BBIK, Mr. J. Kushadi, the two acting chiefs of the packaging unit who served during this mission, Mr. D. Karyadi and Mr. Triyanto Hadisoemarto and the entire staff of the BBIK packaging unit for their friendliness and helpfulness.

III. OBSERVATIONS

1. Implementation of the internationally funded part of the project

The implementation of the internationally funded components of the project was completed during the period January to September 1989, as scheduled in the work plan and stated in the Project Document.

1.1. Overseas training of the staff

The three managers of the BBIK packaging laboratories were trained in February 1989 at Michigan State University, East Lansing, Michigan and in March in Brazil, the managers of packaging materials testing laboratory and the laboratory for testing primary packaging for food at ITAL/CETEA, Campinas, and the manager of the transport packaging laboratory at Instituto de Pesquisas Tecnologicas in Sao Paulo.

The three trainees produced reports on their overseas studies.

The manager of the packaging materials testing laboratory was promoted and transferred to other activities within BBIK on 15 August 1989.

1.2. Consultancies

The Expert on Testing Packaging Materials arrived in Jakarta on 2 January 1989 and carried out the first part of his mission during the month of January, until his counterpart left for overseas training.

He took up his assignment again on 1 June after having served with other projects in the intermediate time, including 3 months with the Indonesian Packaging Institute (IPI), primarily on training the IPI consultants on testing packaging materials in order to make these consultants acquainted with the service possibilities now available to the In-

donesian industry at BBIK.

A major output of this consultancy was formulation of 20 testing procedures, based on international standards and directly relating to the equipment installed. A major part of these procedures were translated into Indonesian by the IPI consultants.

The project materials testing equipment was calibrated by the Expert, and the manager of the packaging materials testing laboratory trained in the operation under the agreed arrangement that the other staff members would later be trained, in Indonesian, by the laboratory manager. This procedure was selected due to the weak knowledge of English of the other staff members.

In addition, the Expert gave lectures in packaging materials properties and testing to a group of packaging unit staff members with sufficient knowledge of English. The Expert also lectured at the seminar on packaging materials and food packaging at BBIK 19-23 June 1989.

The Expert on Testing Primary Packaging for Food arrived in Jakarta on 1 January 1989 on the first part of his split mission ending at the end of January when his counterpart, the manager of the laboratory for testing primary packaging for food left for overseas training. He took up his assignment again on 1 May 1989 and left Jakarta on 27 June.

The Expert carried out shelf life testing, in co-operation with his counterpart and her assistants, of a typical Indonesian small scale industry food product, dodol, using various types of packaging materials, and under normal and cooled conditions.

Moreover, the Expert introduced the staff of the laboratory for testing primary packaging for food to methods of organoleptic testing of food and statistical methods applicable in ranking results of such testing.

In total, nine testing methods were formulated and introduced to the staff.

In addition, the Expert gave lectures in packaging of food stuff to a group of packaging unit staff members with sufficient ability to understand English. Moreover, he lectured at the seminar on packaging materials and food packaging at BBIK 19-23 June 1989.

The Senior Consultant in Packaging at his return to Jakarta assisted at the seminar on packaging materials and food packaging at BBIK 19-23 June 1989.

A major part of his final mission was devoted to the control of the project deliveries and production of the Terminal Report for the project.

1.3. Equipment

All equipment foreseen in the work plan to be supplied by UNDP/UNIDO arrived at BBIK before the termination of the project. This equipment was all checked, except for the climatic cabinet which could not be controlled due to the electric power requirement which exceeds the installation capacity.

Advices had been requested from Gaynes, the supplier of the box compression tester which arrived defective, but only little help was provided for the repair of the tester. Moreover, it was found when the Senior Consultant took up a diagnosis study of the tester that the main fuse was burned. This special type of fuse was not available in Jakarta, and the replacement fuse ordered from USA did not arrive before the Senior Consultant left Jakarta.

It has then been agreed that equipment specialists from the B4T institute in Bandung will carry out the diagnosis of the tester when the fuse arrives, and report to the Director BBIK about the defects and possible measures to be taken in

order to bring the equipment in full operation. It has been recommended in the Terminal Report that funds should be set aside of the remaining budget for procurement of spares which may be needed for the repair of the box compression tester.

Before the Senior Consultant left Jakarta it was found that the gas permeability tester was inoperative due to grease and dust in the capillary system and the mercury reservoir. Advice was provided on reconditioning of the equipment.

In total, 110 documents provided by the project for the packaging unit library had arrived prior to the termination of the project, the major part through Munksgaard (purchase order of 5 Oct 1988).

As per the termination of the project 27 documents ordered from Munksgaard on 5 Oct 1988 were neither cancelled, nor delivered according to the records of the Senior Consultant, see Annex II. A confirmation has not been obtainable from Munksgaard. It may be presumed that the major part, may be all, of the documents are unobtainable from Munksgaard.

Annex III lists the documents, planned for provision according to the work plan of 31 March 1988, and which have been informed, by Munksgaard and others, to be unavailable. The outstanding documents listed in Annex II are not included in Annex III.

An arrangement has been made with the ITC packaging library that photocopies may be provided by ITC of out-of-print documents, free of charge when less than 50 pp, and on a fee basis, approx. 0.33 CHF per page, when 50 pp and over. All documents listed in Annexes II and III to this report are believed to be present in the ITC packaging library.

All documents less than 50 pp and known to be out of-print have already been ordered from ITC according to the above mentioned arrangement.

2. The Government funded part of the project

2.1. Building facilities

No measures had been taken since January 1989 to construct a temporary separation of the transport packaging testing facility from the pilot plant equipment installed in the same hall. Neither had steps been taken to install a new gate to the hall, exclusively for the use of the transport packaging laboratory.

Dust and moist continues to create problems in the transport packaging testing laboratory, with no immediate possibility of fully avoiding these problems. Neutral, not corrosion protecting oils as recommended have been applied to the equipment. These oils attract dust, as protective covers are not rigorously used when the equipment is not in use.

No changes have been made in the packaging materials testing laboratory, or in the laboratory for testing primary packaging for food. The packaging materials testing laboratory is air conditioned on a 24 hours basis. This provides a certain reduction in the temperature and relative humidity, and reduces variations. However, this conditioning is insufficient to provide climates according to the requirements in international standards. The air conditioning provides a protection of the equipment with regard to humidity, and also with regard to dust, as windows are not required to be opened in order to provide an acceptable working temperature for the staff.

The laboratory for testing primary packaging for food is not air conditioned at present, and the scarce power supply to the BBIK complex does not allow for such installation in the

immediate future. relatively little equipment is installed, and this equipment is of a more robust nature. However, installation of air conditioning may be required, or a special cooling air duct system, when the climatic cabinet is put into operation.

An application in the 1989/90 budget for a supplementary electric power supply for the BBIK complex to overcome the most urgent demand for power was not approved in the final budget.

The immediate effect of this has been that the power supply is insufficient to put the climatic cabinet provided for the project by UNDP/UNIDO into operation. In addition to the high power consumption of the cabinet, 4500 W, it complicates the installation that the demand is on one phase only.

2.2. Equipment

Consumables required for the library and for the operation of the laboratory equipment, as listed in the work plan, were provided by the counterpart in June 1989.

The combined incline impact tester/heavy duty drop tester/ static load compression tester was constructed and installed by the counterpart in August-September 1989.

After these provisions the following equipment listed in the work plan as to be provided by the counterpart for the project was not completed, or not initiated at the time of termination of the project:

- sample making tables and tools for the packaging materials testing laboratory and the transport packaging laboratory;
- drafting machine/tracker for sample making;
- timers for Cobb testing;
- racks for pre-conditioning of packaging materials and packages prior to testing;
- racks for storage of transport packages for testing and of materials for preparation of sample packages;

- holding hooks (and also flat nylon belts) for heavy duty drop testing;
- pallets and pallet trolley for transport of heavy packages for testing;
- water tank for leakage testing; and
- pump for transfer of water and other non-corrosive liquids used in testing.

Photocopies of a few additional documents in the IPI library have been prepared and introduced in the BBIK packaging unit library. Bookshelves and registration card filing cabinets have been installed in the BBIK packaging unit library.

2.3. Organization and staff

The organizational structure of the packaging unit continues to be diffuse. The packaging unit has no permanent status in the organigramme of BBIK, but management and staff are associated with the unit on a part time basis.

It is the opinion of the Senior Consultant that this diffusion and provisional character adds to the management, discipline and motivation problems which are already considerable within BBIK. Only a permanent, 100 per cent packaging employed and devoted staff and management will be able to develop the BBIK packaging activity to a level which will make it an attractive co-operation partner for the industry.

The staff mix has remained unchanged with a high share of undergraduates and service staff. The character of the work of a packaging service laboratory, especially at the present stage of development of the BBIK packaging unit, requires a high rate of graduates and other staff members with competence to initiate activities and negotiate with the industry on equal terms. Moreover, it has been observed that the present middle management level, the managers of the laboratories, are unused to public appearance and feel insufficiently self-confident to lecture or intervene in meetings.

The chief of the packaging unit was transferred to other duties in Semarang in mid-August 1989, one year only after completion of the UNDP financed study tour to Europe and India on management of packaging laboratories.

The manager of the packaging materials testing laboratory was promoted and transferred, likewise in mid-August 1989, to other duties within BBIK, only 4½ months after her completion of a two months UNDP financed overseas, individually designed training programme on testing packaging materials, and only two weeks after completion of an intensive on-the-job training programme by the UNIDO Expert on Testing Packaging Materials.

The time registration system for the staff of BBIK which was foreseen to be put into general operation had not progressed. Without such registration system, properly monitored, it is difficult to transform the present institution into a result oriented, cost conscious organization.

The packaging unit has been able to build up only few professional contacts to the relevant industries, and uncommitted relations only to other institutions. Taking into consideration that the laboratories were made operational, and the staff trained only within the last months of the project this situation is not surprising. However, efforts are now required to make the unit an attractive partner to other institutes, in Indonesia and abroad.

The activities of the Packaging Forum have slowed down considerably. No meetings of the Forum have been arranged since December 1988.

Two important initiatives have been initiated in 1989. A study was made by Mr. J.F. Victor, "Centre Inter Laboratoires d'Etudes et de realisations" on co-ordination of the testing, consultancy and information activities of the BBIK packaging unit (Department of Industry), Indonesian Packaging Institute (Indonesian Packaging Federation) and the

packaging laboratory of the Centre for Testing and Quality Control (PPMB) (Department of Trade). Whether a structure for co-ordination will be established is still unclear.

It has been decided by the Department of Industry that a study should be carried out on the structure of the packaging subsector. This study is financed by a World Bank loan. Preparation of recommendations regarding institutional support is included in the terms of reference. This study is planned to be completed in 1990.

3. Finances

The total budget for the UNDP contribution to the project has been increased gradually over the life time of the project in order to cover increases of costs, also due to the declining value of the USD from the time when the Project Document was signed. According to the latest revision the total budget is USD 403,404 (originally USD 300,000) of which USD 399,631 was disposed by 31 August 1989.

The total budget for the direct Government contribution to the project has likewise been increased. Including the 1989/90 financial year budget contribution the total Government budget for the project is Rps 59,751,297 (originally Rps 30,069,500). Of this Rps 47,330,694 was spent by 31 August 1989, the remaining parts mainly for "construction" and "miscellaneous" (Rps 9,093,603).

IV. CONCLUSIONS

1. The final part of the project was implemented within the time limit set in the Project Document. The objectives expressed in the Project Document were essentially achieved, especially with respect to the delivery of equipment and services listed in the Project Document to be provided for the project by UNDP/UNIDO, although in some cases with a delay compared to the work plan elaborated during the ini-

tial phase of the implementation.

2. An elementary facility for testing packaging is now in an operative condition. Its equipment cover
 - a fairly wide range of testing for fibre and plastic based packaging materials,
 - limited possibilities for preparation of flexible test packages, including vacuum/modified atmosphere packages for food, and for shelf life studies under controlled temperature and humidity conditions, and
 - basic methods of functional testing of resistance and protective properties of distribution packaging by standardized transport simulation.

3. Certain pieces of non-expendable equipment, mainly peripheral, which were foreseen in the work programme to be provided locally by the counterpart were not initiated or not completed at the termination of the project. This applies to sample making tables and tools, drafting machine, racks for preconditioning of packaging materials and packages for testing, racks for storage of transport packages awaiting testing and of materials for preparation of sample packages, holding hooks and flat nylon belts for heavy duty drop testing, pallets and pallet trolley for transport of heavy packages for testing, water tank for leakage testing and pump for transfer of water and other non-corrosive liquids used in testing.

4. Two pieces of project equipment were not operative at the termination of the project, the box compression tester and the gas permeability tester.

One piece of allocated equipment, the density column, was found defective (leaking) and could not be brought into operation.

One piece of project equipment, the climatic cabinet, could not be put into operation due to insufficient power supply.

5. Further input of equipment is needed, especially climatic conditioning equipment, equipment for preparation of sample packages for food and for functional testing of transport packaging.
6. A specialized library is now established as part of the packaging unit. The major part of the documentation foreseen to be provided for this library arrived before the termination of the project. A number of the documents listed in the work programme are out-of-print, and available as photocopies only.
7. The staff of the packaging unit was trained overseas and by the UNIDO experts on-the-job and in classroom form under the later phases of the implementation. However, the insufficient knowledge of the English language restrained the participation in this training. The practical knowledge of the staff about packaging and package testing is still insufficient to make the BBIK packaging unit an attractive cooperation partner for the industry.
8. The cooperation between the BBIK packaging unit and the relevant industries and other institutes is weakly developed, formally as well as informally. Only little testing work is carried out at all, in the form of testing for individual industries or as part of projects with a wider development scope. Only little co-ordination has been organized through the Packaging Forum which, moreover, has not been assembled in 1989.
9. Two packaging laboratories are established in Jakarta within a distance of 3 km, widely duplicating the equipment, the BBIK packaging unit and the PPMB packaging laboratory. The present need for institutional testing of packaging does not justify two testing facilities. Consequently, the two units should be physically merged, and administrative arrangements made to secure that the testing facility would be available for the various functions, such as testing on contract, development projects and certification testing.

However, the two facilities are controlled by two departments, the Department of Industry and the Department of Trade.

V. RECOMMENDATIONS

The main recommendations at the termination of the project are reproduced in the Terminal Report.

With reference to Recommendation No. 3 in the Terminal Report it is recommended that all efforts are made to support BBIK in making the Gaynes box compression tester operational, including supply of necessary replacement parts. It is not, at present, possible to estimate the costs involved in such support.

Moreover, it is recommended that funds are made available, maximum USD 800, to procure photocopies from ITC of the documents listed in annexes II and III to this report. This will complete the delivery of UNDP/UNIDO services and equipment foreseen. As a consequence, the order of documents listed in Annex II should be cancelled.

Annex I. Principal contacts made during the mission

Departemen Perindustrian Badan Penelitian Pengembangan Industri Jalan Gatot Subroto Kav. 52-53 Jakarta Selatan	Mr. Garjito Pringgo Sudirjo Secretary Drs. Sudarmarji
Departemen Perindustrian Direktorat Jenderal Industri Kecil Jalan Gatot Subroto Kav. 52-53 Jakarta Selatan	Mrs. Luky Hartini Setiadi
Biro Perdagangan dan Industri Badan Perencanaan Pembangunan National (BAPPENAS) Jalan Taman Suropati No. 2 Jakarta Pusat	Mr. Eiko Whismulyadi Mr. Dida Heryadi Salya
United Nations Industrial Development Organization Jalan M.H. Thamrin No. 14 Jakarta Pusat	Mr. G.L. Narasimhan, Senior Industrial Development Field Adviser Mr. Dagfinn Andersen, Junior Professional Officer
Balai Besar Penelitian dan Pengembangan Industri Kimia Pekayon, Pasar Rebo Jakarta Timur	Mr. J. Kusnadi, Director Mr. D. Karyadi Jomoatmojo, Chief of Packaging Unit (until 14 Aug 1989) Drs. Triyanto Hadisoemarto, Chief of Packaging Unit (from 15 Aug 1989)
Institut Pengemasan Indonesia Jalan Cikini IV/8 Jakarta Pusat	Mr. Harris Sutakaria, Executive Director Mr. Soetanto R., Consultant Mr. D. Budioni, Consultant
Federasi Pengemasan Indonesia Wisma Indocement, 18th Floor Jalan Jendral Sudirman Kav. 70 Jakarta Selatan	Mr. Bugie Iskandar, Executive Director
P.T. Guru Indonesia Jalan Raya Bogor, 26 km Jakarta Timur	Mr. Tugimin, Technical Development Manager

Annex II

PROJECT DP/INS/86/005 - PACKAGING UNIT

List of books ordered 5 October 1988 from Munksgaard, but neither delivered nor cancelled by 15 August 1989.

- AFERA Test Methods
AFERA
- Andersson, L.O. & Heebink, T.B.
Wood Crate Design Manual
U.S. Dept. of Agriculture Handbook 252
Superintendent of Documents
- Bray, R.W.
Paper & Board Calculations with an Electronic Calculator
Northwood Publications
- Brown, K.
Package Design Engineering
John Wiley & Sons
- Cairns, J.A.
Packaging for Climatic Protection
Newnes - Butterworths
- Choice of Packaging Technology for Developing Countries
Indian Institute of Packaging
- Griffin, R.C. & Sacharow, S.
Drug and Cosmetic Packaging
Noyes Data Corp.
- Japan Packaging Machine Guide
Japan Packaging Machinery Manufacturers Association
- Jones, A.
Meat and Its Packaging
PIRA

- Kamath, J. et al.
Manufacture of Woven Sacks from Natural and Synthetic Fibre
Tropical Development and Research Institute
- Leonard, E.
Packaging Economics
Books for Industry
See attached note
- Lutz, J.M. & Hardenburg, R.E.
The Commercial Storage of Fruits, Vegetables and Florist
and Nusrery Stocks
U.S. Dept. of Agriculture Handbook 66
Superintendent of Documents
- Packaging Machinery Directory
Packaging Machinery Manufacturers Institute
- Pintauro, N.D.
Food Packaging
Noyes Data Corp.
- Printing Ink Handbook
ISBN 0-318-15106-5
National Association of Printing Ink Manufacturers
- Procedures for Inspection of the Condition of
Filled Food Containers
U.S. Dept. of Agriculture
Superintendent of Documents
- Raphael, H.J.
Packaging, A Scientific Marketing Tool
Michigan State University Press
- Raphael, H.J. & Olsson, D.L.
Package Production Management
ISBN 0-87055-307-0
AVI Publishing Co., Inc.
- Ross, C.F.
Packaging of Pharmaceuticals
Newnes - Butterworths
- Sacharow, S.
Basic Guide to Plastics in Packaging
ISBN 0-8436-1208-8
Van Nostrand Reinhold Co., Inc.

- Sacharow, S.
Handbook of Package Materials
AVI Publishing Co., Inc.
- Sacharow, S.
Packaging Primer
Harcourt Brace Javanovich Publ.
- Saechtling, H.
International Plastics Handbook
ISBN 0-02-949620-9
Macmillan Publishing Co.
- Sayers, R.
Wax. An Introduction
Gentry Books Ltd.
- Swinbank, C.
Packaging of Chemicals and Other Industrial
Liquids and Solids
Newnes - Butterworths
- Tags
National Business Forms Association
- World Packaging Congress Report
New Delhi Jan. 1987
Indian Institute of Packaging

Annex III. Documents foreseen to be provided for the RBK packaging library, and which have been informed to be out of print

A. UNIDO documents

Castelli, D

Wooden packaging for fruit and vegetable products
1983, 47 pp

Glass and glassmaking
1977, 111 pp

Hochart, B

Wood as a packaging material in developing countries
1972, 111 pp

Information sources on the canning industry. UNIDO guide to information sources No 19
1975

Information sources on the packaging industry. UNIDO guide to information sources No 27
1977, 112 pp

Information sources on the printing and graphic industry. UNIDO guide to information sources No 14
1975, 65 pp

Information sources on the pulp and paper industry. UNIDO guide to information sources No 11
1974, 92 pp

Iqbal, F M

Factors concerning the choice of packaging production and process in a developing country
1983, 34 pp

Narayanan, P V

Reference standard guide, annex XVI of Technical Report LP/ID/SER.A/347
1982, 15 pp

Narayanan, P V

Equipment utilization, annex XI & XII of Technical Report DP/ID/SER.A/347
1982, 20 pp

Packaging and packaging materials: With special reference to the packaging of food
1969, 56 pp

Packaging of furniture for export. Doc No ID-WD.209/28
1976

Paine, F A

Exercise to familiarise LANFI package testing personnel with box compression and related material tests. Appendix III DP/ID/SER.A/344
1982, 13 pp

Paine, F A
Suggested standard performance test-schedule for complete filled
transport packages - Internal transport Mexico. Appendix VI
(A) DP/ID/SER.A/344
1982

B. Other documents, over 50 pp

Brody, A
Flexible packaging of foods
1970, 103 pp
Butterworths

Containers, pallets and other unitized methods for the intermodal
movement of freight: Application to developing countries
1970, 66 pp
UN Dept. of Economic and Social Affairs

Food standards committee second report on claims and misleading
descriptions
1980, 128 pp
HMSO

Glass containers in packaging
1971, 100 pp
Indian Institute of Packaging

Good practices manual and glossary
Society of the Plastics Industry INC.

Guide to establishing small scale packing facilities for fruit
and vegetables in rural areas
1984, 84 pp
FAO

Hersom, A C & Hulland, E D
Canned foods: Thermal processing and microbiology, 7th ed.
1980, 380 pp
Churchill Livingstone

Kroeschell, W O
Fibreboard shipping containers: Selected test methods
1981, 86 pp
TAPPI

Kroeschell, W O
Preparation of corrugated adhesives
1977, 98 pp
TAPPI

Machesney, J C
Packaging of cosmetic and toiletries
1974, 137 pp
Newnes-Butterworths

Manual on shrink film and stretch film: Technology, knowledge,
experience, data, tolerances
56 pp

Packaging of handicraft
1978, 176 pp
Korea Design and Packaging Centre

Paper and paperboard in packaging
1973, 167 pp
Indian Institute of Packaging

Parnam, R A & Gray, R L
Practical identification of wood pulp fibres
1982, 212 pp
TAPPI

Preservation and packaging for export and storage
1959, 56 pp
Shell International Petroleum Co, Ltd.

Quality assurance in the glass container industry
1986, 72 pp
Glass Manufacturers Federation

Tinplate in packaging
1968, 88 pp
Indian Institute of Packaging