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SCOPE AND ACTIVITIES OF A [1/] REGIONAL PACKAGING CENTRE IN ARAB STATES

by

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01. PREAMBLE

Developing countries are estimated to be losing about 30% of their exports due to inadequate packaging. There is consciousness in many developing countries that packaging standards should improve for exports and packaging specifications should be optimised for imports in order to achieve overall economies. The science and technology of packaging itself is relatively new and most packaging developments have taken place only from the middle of the 20th century. Packaging Technology includes different disciplines of science, besides, management disciplines such as marketing, distribution, etc. Industrially advanced countries which have been quick in developing this technology have been setting the trend for global development in this field. Developing nations are striving hard to meet the situation by setting up packaging laboratories to promote the cause of packaging research. Regional Centres are contemplated and aimed at co-ordination of efforts to improve packaging standards in the region. Inter-regional centres are also contemplated to achieve global standardisation and optimisation of packaging in different parts of the world.

02. SCOPE OF PACKAGING CENTRES:

As packaging covers a wide variety of disciplines, the programme of work which may be undertaken by a Packaging Centre, whether a National Centre or a Regional Centre, may cover any or all of the following:

a) Economic - priorities in national/regional planning, research, export and import, trade needs, distribution, investments, etc.

b) Technology - covering systems, machinery, processes, materials, techniques, applications, design, performance, environment, handling, warehousing and transportation;

c) Testing & Research - fundamental and applied research, evaluation, development, quality control- covering materials, packages and ancillaries and other areas of technology; pilot plant;

d) Training - i) management personnel at various levels in industry, trade, commerce and agriculture, (ii) technicians, (iii) industry groups, (iv) in-plant, (v) Post-graduate (as technologists).

e) Standardisation- materials, processes, systems;

f) Information - data bank (dealing with all aspects of packaging - books, periodicals, patents, statistics, catalogues, leaflets) services (including bibliography, reprography, translation, documentation, etc.), management information systems (economic and commercial), publications (journals, abstracts, bulletins), selective dissemination of information.

g) Social - consumer protection

h) Legal - packaging laws, international regulations, etc.

i) Marketing - research, promotion, graphics, etc.

j) Industry co-operation- among related interests in packaging, viz. production, conversion, use, warehousing, transportation, distribution, standardisation, marketing, etc.

k) Promotion - exhibitions, contests, seminars, conferences, etc.

l) International co-operation - transfer of technology, technical assistance, etc.

03. PACKAGING LABORATORIES IN DEVELOPING NATIONS

During the last decade, some developing countries in the world have established packaging centres in their respective countries with varied functions.

Most of them are engaged in promotional activities without being largely involved in technological work such as testing, development, research, etc. The institutions of this nature include the Packaging Association of Jamaica and Jamaican Bureau of Standards, the Institute of Packaging Technology of Brazil, the Packaging Institute of Philippines, the Hong Kong Packaging Council, the Sri Lanka Institute of Packaging, the Packaging Divn. of the Industrial Service Institute of Thailand, etc.

In some countries a limited amount of testing facilities, for packaging materials is provided by their Packaging Institutes or their Standards Institutes. Examples of these are found in the Hong Kong Standards & Testing Centre, Singapore Institute of Standards and Industrial Research, etc. They do notoffer facilities for testing transport packages.

A few packaging institutes in developing countries have set up and, are expanding their laboratory facilities. They include the Korea Design & Packaging Centre, Republic of Korea; the Moroccan Institute of Packaging, the Mexican Packaging Institute(IMEE), etc. Because some facilities are available, they are in a position to undertake a variety of useful and practical programmes of work to aid the industry. The example of the Indian Institute of Packaging also falls in this last category with the difference that its laboratories already equipped to meet the vast and diversified needs of the country and functioning for over a decade now are being further expanded to strengthen its services to the fast developing trade and industry.

The activities of the Indian Institute of Packaging include:

a) Testing of Packaging Materials for their characteristics: i.e. materials like paper, plastics, metals, glass, timber, jute and ancillary materials like adhesives, bitumen, waxes, etc. The tests also include those for mechanical, chemical and physico-chemical properties.

b) Testing of Retail Packages: i.e. packages made of flexible as well as rigid materials. The tests include shelf-life studies, compatibility, resistance to mechanical and environmental hazards;

c) Testing of Transport Packages: i.e. packages made of paper, metal, timber, plywood, plastics, etc. The tests include transportworthiness of packages, such as measurement of resistance to shocks, impacts, vibration, compression, rolling, stacking, rain, salt-spray, humidity, etc.

d) Development- i.e. development of materials, retail and transport packages; also upgradation of indigenous materials.

e) Applied Research. Studies of different methods of testing for deciding on the ideal choice of alternatives, performance testing for standardization, determination of performance requirements of packages for optimising specifications, etc.

f) Consultancy: To meet short-term and long-term problems of individual industrial enterprises and groups of industries, by designing and developing suitable packages for new products, improvements in existing packages, etc. This also includes trouble-shooting.

g) Training: (a) Short-term- for senior and middle management in industry, and trade (b) long-term - for developing packaging technologists (c) In-plant - for individual enterprises (d) Industry groups, such as pharmaceuticals, chemicals (e) machine operators, such as, for closing machines.

h) Information - documentation, (books, periodicals, patents, bibliography, translation, reprography, standards, trade catalogues reports) publications, techno-economic, commercial, abstracts and title service, directories, survey reports) dissemination of information

i) Marketing Research: - Survey of demand and supply of packaging materials, research for identifying new areas of application; overseas marketing research for packaging of export products.

j) Graphic Design - for consumer packages

k) Promotional - exhibitions, packaging contests, seminars, conferences.

l) Packaging Laws: Compilation of different laws in force

m) Standardisation: Assisting national standards body in formulation of standards

n) Industry co-operation and international collaboration - for promoting research, transfer of technology, training, etc.

04. GROUP EFFORTS IN PACKAGING ACTIVITY IN DEVELOPING COUNTRIES:

The present pattern of growth of packaging organisations in developing countries in the world, would indicate that besides national centres as might come up regional packaging centres would be set up in selected centres(in Asia, Africa and America). Possible regional centres that may come up would include West Asian, South Asian, South East Asian and Far East Asian, Central American, South American and Carribean - North African, West African, Central African and East African etc. Inter-regional centres may be established in Asia, America and Africa. The grouping of various nations located in a region would be influenced by economic and other political interests and possibly languages and customs. But the common objective of all will be the promotion of the packaging standards and packaging technology.

05. REGIONAL CENTRE FOR ARAB NATIONS:

United by religion and ideology and located geographically in the same belt, mostly deserts and semi-deserts but rich in oil resources and some areas rich in agricultural resources, these nations export oil and agricultural produce and simply processed products but import industrial and consumer goods to promote living standards

and industrialisation. Hence group efforts in improving packaging is expected to yield better results as packaging activity is otherwise on a low key. The one minor bottleneck is language, some using Arabic, others using French or English.

06. OBJECTIVES OF THE REGIONAL CENTRE:

The organised growth of packaging activity in the developing world is expected to take shape in the following manner:

a) Group Exercises, trouble shooting and promotional work;
b) Testing Laboratory;
c) Research Institutes;
d) Pilot Plants;
e) Techno-economic centres;
f) National Packaging Centres;
g) Packaging Associations;
h) Regional Centres;
i) Inter-Regional Centres

Depending upon the status of packaging activity in the countries constituting the region, institutional efforts aimed at promoting packaging standards would get distributed between the National and the Regional Centres.

Regional Centres are considered a convenient and economical form of acceleration of the packaging industry and packaging standards through co-ordination of the work of the National Centres and research on the utilisation of indigenous materials of the region.

Thus, the objective of setting up a regional centre, should include: (i) promotion of right packaging concepts in the region aimed at optimising packaging and resources utilisation . (ii) upgradation of locally available materials (iii) promotion of regional planning for the growth of the packaging industry through establishing contacts with the Governments in the region, (iv) organising programmes aimed at developing the requisite technological and managerial skills with a view to approach to the problems of the region connected with industry, commerce and agriculture, (v) rationalising packaging for imports to and for exports from the region, (vi) help developing packaging machinery, materials and systems most suited to the requirements of the region.

07. [illegible]:

A survey of the packaging situation in the developing countries of the world would reveal some common features, viz. (a) the packaging user industries are not aware of their problems; (b) managements in packaging user industries do not give adequate importance to the subject; (c) packaging is considered as an additional cost; (d) arising from these, there is a total lack of co-operative effort in setting up developmental centres for the promotion of packaging; (e) Governments of the countries do not provide for priority treatment for packaging industries as other subjects like food, health, industrialisation, etc. which need to be given greater attention. However, packaging which contributes to these is not paid attention (f) even where packaging services are set up, they need to establish their credibility as the public at large tends to suspect (g) because of the lack of appreciation of the importance of the subject, even packaging development centres that are established find it difficult to raise the

necessary resources for effective operation.

It would therefore appear desirable that regional centres by virtue of their international status influence the local Governments and the packaging user industries in the region and help in the upliftment of standards.

In setting up such a regional centre, the principal consideration would be the availability of the minimum facilities and skills at the chosen centre. This is emphasised by the reason that in order to guide and to co-ordinate, there must be available a body of personnel with some basic understanding of not only the right concepts but also the problems of the region. This group could be entrusted with the task of organising a meeting of the planners in the Governments of the region with a view to highlighting the benefits of improving the status of packaging in the region. The subject would as a result get subsequent acceptability and the industries in the region would find it easier to plan the growth of packaging industries. The next step would be to organise group exercises for the management personnel in the industries in the region to promote the right concept, viz. that packaging is an investment and not an item of cost. The diffusion of the subject in an industrial situation would be easier if it starts from the top. When the primary acceptance of the subject is achieved, it would then become necessary to meet the demand for trained technologists, for which a programme should be undertaken. This cadre could then be utilised to identify the significant problems of the region requiring immediate attention. The programme of

work which would be of immediate benefit in overcoming some chosen problems could then be drawn up and in meeting this problem, co-operation may be necessary with the developed countries of the world. Solution to problems when found should be implemented, reviewed and refined. This would develop in the industry the necessary confidence to promote such efforts by regional centres and help in planning the pattern of their future programmes of work.

In the second stage, the regional centres may undertake surveys of regions' requirements of materials, machinery and equipment which need to be standardised in order to enable planning for the production of these within the region itself. The other activities which a regional centre may undertake are listed elsewhere in this paper.

08. RESEARCH & TESTING ACTIVITIES OF REGIONAL CENTRES:

Packaging is need-based. It would therefore be enough if the research and testing activities of a packaging centre are just sufficient to meet the identified needs - present and future.

Research aims at obtaining information and utilises skills, equipment, time and money. For any worthwhile research, skilled manpower and good laboratory facilities are a must. Research may relate to materials, testing methods, equipment and merchandising aspects.

Tests aim at quality control, determination of right application, help in package selection, optimising packaging and packaging costs, etc. Tests may relate to materials, retail and transport packages and ancillaries.

These are elaborated in the work programme.

09. WORK PROGRAMME OF NATIONAL AND REGIONAL CENTRES:

The foregoing would indicate that, depending upon the status of the industry and demand but restricted by the availability of the necessary skills and facilities, the programme of work that may be undertaken by a National Centre or a Regional Centre, may vary from one another. For this reason, it may perhaps be desirable that certain minimum test facilities for testing of packaging materials and packages are provided at the National Centres and till the packaging activity grows to sufficient levels, the Regional Centre may undertake programmes of applied research and development. This would appear to be particularly realistic in the almost homogenous set up witnessed in the Arab States which are not yet highly industrialised. In deciding on the facilities to be set up for testing of materials, each nation could choose only those with reference to local needs. An important aspect which may be re-emphasised here is that both testing and research demand the best in scientific talent which in the field of packaging is presently scarce.

In planning the programmes of the centres special mention may be made of two major items of work considered urgent; one is standardisation of technical requirements of packaging materials and packages imported/exported and the other, quality control of packaging materials and packages.

Technical Requirement for Import/Export of Materials

The objective of the standardisation effort is rationalisation, variety reduction and cost optimisation. It is expected to lead to

to consideration being given for the production of materials within, as a large and ready market would be available after rationalisation. It would simplify planning of handling and transportation systems. The programme would include development of standards for (a) packaging materials (b) retail packages; (c) transport packages. In the case of export packages it would aim at satisfying convenience of importing countries while in respect of imports, it would aim at local needs coupled with efforts at rationalisation.

Quality Control of Raw Materials

Work on quality control should aim at quality improvement or value improvement. The initial step would be to identify quality of presently adopted packages and materials and the second step is to effect improvements thereon. The national laboratories would meet individual country needs and the data generated would help regional laboratories to achieve regional standardisation, through mutual co-operation in the region. A major effort in this area would be the development of performance quality measurements with the objective of eliminating useless specifications. This would also enable the introduction of newer materials for performing the same functions and offer economic benefits. For example, in respect of transport packages made of corrugated fibreboard, performance quality determination may help in the use of suitable economic alternatives to virgin kraft paper as has been the experience in India. It has been able to use a host of new materials as alternatives to paper offering substantial economies to the industry.

On this basis, the following would appear to be a desirable pattern of distribution of the programme of work between the National Centres that may be established and the Regional Centre proposed.

National Centre:

Testing:

a) Carry out routine, simple testing of packaging materials for purposes of identification, determination of mechanical, optical and chemical properties, permanence, compatibility, printability, etc. Also feed regional centres with data so generated.

b) Test bulk packages for transportworthiness for export/import into the country. Also feed regional centre with data so generated therefrom;

c) Test retail/shelf-packs produced or imported into the country for compatibility, shelf-life and mechanical properties, feed regional centres with data so developed, with reference to actual use conditions. This may be restricted to, to begin with, food, pharmaceuticals and consumer products.

(Some indicative tests are listed in Appendix I. These are routine tests for which packaging laboratories need to be equipped. The list is not exhaustive)

Development:

a) Develop suitable packages (retail/bulk) on request received from industry/trade which would either optimise packaging cost or minimise product loss and damage. As far as possible, utilise materials indigenously produced - Publicise the activity to make industries more conscious of possibilities in packaging.

Research

(a) Analyse specimen of packages for agricultural products and processed products exported from the country or of consumer goods and industrial products imported into the country, identify their characteristics and performance levels and co-ordinate research with regional centre aimed at standardisation/optimisation;

(b) Analyse packaging materials imported into the country for their characteristics and develop comparative data with those produced within the country or alternatives produced in the country. This is expected to lead to identification of improvements in both areas-aimed also at substituting imports.

Information

(a) Set up a good reference library of journals, books, standards, etc.

Training

(a) Utilise laboratory facilities to train industry personnel at different levels of management in various aspects of package development and testing.

Promotional

(a) Organise group exercises of like industries to analyse packaging needs. This may be done through local expertise or expertise obtained from the region.

(b) Carry out national surveys to pinpoint packaging material and technology needs of the nation;

(c) Promote improved graphics on packaging through design organisations available in the country;

(d) Organise promotional events such as awards for packaging optimisation;

(e) Promote exchange visits among like countries in the region-aimed at transplantation of ideas;

(f) Promote publication of packaging information

Regional Centre:

Surveys:

(a) Survey national plans for industrialisation to assess packaging needs that may have to be satisfied for internal trade and exports;

(b) Survey imports of products in packaged form to prepare an inventory of nature of packaging adopted for imports into the region;

(c) Survey various packaging laws in force in the region and attempt compilation and codification. The objective is to introduce packaging laws aimed at consumer protection in the region.

Promotion:

a) Hold conference of planners in Government to highlight packaging needs of the region to hasten the pace of development;

Training:

a) Establish the necessary infrastructure as a pre-requisite to developmental activities by undertaking programmes to train packaging technologists and to equip the regional laboratories.

Testing & Applied Research:

a) Generate data on export packages of the region and evaluate alternatives and arrive at standardised packages - develop proto-types of standardised packages, evaluate efficacy for

refinement and adoption by the region.

(b) Evaluate alternative shelf-packs imported into the region to achieve standardisation and variety reduction and to optimise packaging specifications - keeping in mind sizes, shapes, materials, quantities, etc. This may be restricted to, to begin with, food, pharmaceuticals and consumer products;

(c) Develop, with reference to local conditions in the region, performance standards for packages imported into the country and packages exported from the country. These will aim at eliminating unwanted requirements leading to cost savings and value improvement. This opens up the entry of new materials into use including indigenous materials which may have been presently discarded;

(d) Interpret packaging problems in terms of material characteristics with a view to co-ordinating material improvement with basic material sciences laboratory in the region, etc.

Standardisation:

(a) Develop and standardise test methods to bring in uniformity;

(b) Standardise test equipment (instruments) for testing packaging materials and packages in order to bring uniformity in the use of equipment;

Development:

(a) Survey packaging machinery used in order to decide on the most appropriate requirements suited to the level of technology in the region to bring in uniformity in machinery and systems adopted for various applications;

(b) Based on the survey of packaging machinery, consider promoting proto-type production facilities;

(c) Simultaneously suggest to the Governments in the region, the establishment of packaging material manufacturing facilities taking into account the locally available raw materials.

Pilot Plant:

(a) For on-the-job training of personnel in the region, establish pilot-plant facilities, such as for laminates and coatings, bottle manufacturing, plastic packaging, processing, etc.

Fundamental Research:

Undertake research on machineability characteristics and identify relevant characteristics of packaging materials for conversion or for packaging operations;

Marketing:

Undertake consumer research in the region to promote marketing possibilities for packaged products in the region and abroad;

Information:

Establish a Data Bank;

Post Graduate Training:

Undertake Intensive Post-Graduate Training in the field of packaging - may be of duration of a year or two;

Transfer of Technology:

Identify technologies most suited to the region and help in their transfer to the countries of the region through inter-regional and inter-national co-operation.

10. CO-OPERATION WITH DEVELOPED COUNTRIES:

Mutual co-operation between regional centres in developing nations and with laboratories in the advanced countries of the world is considered a must for faster growth of packaging standards. The regional centre is expected to seek assistance of laboratories in

(a) highly developed nations to improve packaging for exports to those very nations or for imports from the same. This can also be used for exports to or imports from third countries. Ready-to-use skills and facilities available with these laboratories can help in the speedier implementation of programmes;

(b) intermediately developed countries in order to study the methods of standardisation of performance requirements and to study their appropriateness to local needs. This is expected to be a little difficult with highly advanced countries where a high degree of standardisation is already being practised for a number of years;

(c) developing nations which are presently engaged in national standardisation efforts with a view to understanding the type of approach to the problem by these laboratories.

At a later date, regional centres of developing countries may also extend their co-operation in turn to those nations which are still less developed or dormant.

Co-operation with developed laboratories may also aim at:

1. Training for regional personnel in packaging research, testing and development;

2. Training for region's personnel in problem solving consultancy;
3. On-the-job training in package conversion/use.

11. FINANCIAL IMPLICATIONS:

For a reasonably well- equipped laboratory which would be in a position to test and evaluate packaging materials and packages, the cost of equipment along would be required in the region of one million US dollars. Depending upon the country, the cost of facilities and manpower needs would vary. The recurring cost of running such establishments would also vary from country to country depending upon their levels of affluence. While capital expenditure may have to be incurred without looking for returns it may be possible to recover running costs through income generative programmes such as training, testing, consultancy etc. Establishment of facilities for setting up pilot plant or for undertaking intensive research may involve several million US Dollars in the form of equipment alone. When regional centres, undertake projects on behalf of national centres or for industries, it would be possible to meet atleast the direct cost of such projects by apportioning it among partitipant nations.

Experience in developing countries indicates that the national laboratories themselves cannot command adequate financial resources and hence it may be necessary to seek the assistance of International Agencies for setting up such Centres and adequate financial support from the Government of the country for the initial start up. The International Agencies may include:

a) Technical Co-operation Schemes of Developed Nations;

b) Trade Development Funds of Developed & Developing Countries;

c) Regional/Inter-Regional plans of assistance such as Special Commonwealth African Assistance Programme (SCAAP), Colombo Plan, Commonwealth Fund for Technical Co-operation (CFTC), Swedish International Development Aid(SIDA), USAID, etc.

d) International Trade Centre (ITC)

e) UNDP (UNIDO) etc.

Programmes of international co-operation discussed above involve varying amounts of cost. Package development programmes with developed countries may cost several thousand pounds sterling per product. For example, studies relating to the development of suitable packages such as for fruits, may cost about £. 20,000 per product and involve a period of about four to six months each. But such expenditure would be justified on the ground that the pace of growth is quickened and the solutions implementable. Training in developed world laboratories, likewise, would cost several thousand pounds sterling, for the number of people to be trained.

12. INTER REGIONAL CO-OPERATION:

Once regional laboratories are set up in various groups of nations and take up meaningful activities and programmes, they are expected to become the fountainhead of knowledge and information on

packaging in the region. A united effort among such regional laboratories may lead to the establishment of Inter-Regional Centres, may be one each in Asia, Africa and South America. The flow of technology among regions could be channelised through such inter-regional centres with the ultimate objective of arriving at practical solutions to the problems posed by packaging and lead to global standardisation activities. By and large, the establishment of such centres providing for co-operation among laboratories in the region would be largely decided by the amount of activity generated by regional centres.

13. INTER-NATIONAL CO-OPERATION:

The ultimate objective of all developmental efforts is the search for the right use of materials and to make international trade easier. Inter-regional centres can assist world organisations such as the International Standards Organisation(ISO), and the World Packaging Organisation (WPO), in formulating standards, codes of practices, etc., so that developing countries find proper response to meeting the problems they face as the gap between the developed and developing nations would still continue for quite a long time to come.

INDICATIVE LIST OF TESTS FOR WHICH PACKAGING LABORATORIES SHOULD BE EQUIPPED

TESTS	MATERIAL/PACK FORM/ MATERIAL OF PACKAGE	TEST EQUIPMENT
FOR CONTAINERS		
MECHANICAL		
Drop	Boxes, Sacks, Crates	Divided drop table, Sling and release devices
Vibration	Filled Containers	Vibration table with variable speed
Compression	Boxes & Shipping Containers	Compression Testers
Impact	Boxes	Inclined Impact Tester
Rolling	Boxes	--
Incline	Containers	Loading platform and weight
Stress cracking	Plastic Containers	Conditioned Chamber
Rough handling	Shipping Containers	Revolving Drum
Hydrostatic pressure	Containers	Hydraulic Pressure Pump
ENVIRONMENTAL		
Rain	Boxes & Shipping Containers	Rain Chamber
Sand and Dust	Boxes	Dust Chamber
Salt Spray	Boxes	Salt Spray Chamber
Weather	Packages, Materials	Weatherometer
CHEMICAL		
Compatibility	Product & Packing Material	Humidity Cabinet
Solvents, Migration	do	Chemical Analysis
Odour	-do-	Gas Liquid Chromatograph
MICROBIAL		
Susceptibility to mould	Product, Packing material & Suiture	Humidity Cabinet
CUSHIONING		
Resilience	Cushioning Materials	Slow speed compression tester, guided drop hammer with measuring devices
Creep	Cushioning Materials	Creep Tester
FOR MATERIALS		
STRENGTH		
Bursting	C.F.B., Solid board, paper, duplex board, fabrics, ply wood, laminates	Bursting Strength Tester
Puncture	do	Puncture Resistance Tester
Tensile, Elongation	Paper, Board, Straps plastics sheets/films fabrics, threads	Tensile Strength Tester

TESTS	MATERIAL/PACK FORM/ MATERIAL OF PACKAGE	TEST EQUIPMENT
Tear	Paper, Board, Plastic/films/ sheets	Tear Strength Tester
Ring Stiffness Edge crush, Flat crush	Paper/duplex board/C.F.B./ Board	Flat crush and ring stiffness tester
Impacts	Boxes	Inclined Impact Tester
Folding Endurance	Paper, Plastic films/sheets	Folding endurance Tester
Bending Stiffness	Paper, Board	Bending stiffness Tester (Kenley, Gurley, Taber type of tester)
Adhesion	Gummed paper tapes (Corrugated and liner board)	Ply adhesion Tester
IDENTIFICATION		
Flame	Plastic Films/Sheets, Rubber, Textiles/Paper	—
Solubility	Plastic Films/Sheets	Different Solvents
ENVIRONMENT		
Resistance to mould and bacteria	Products, Culture, Medium and Packing Material	Humidity Cabinet, Different Sterilizers
Fade	Materials	Fadometer
SHELF LIFE		
Moisture Penetration	Products, Packing Materials	Humidity Cabinet
CLOSURES		
Leak	Containers, Product & Closures	(a) Variable Speed Vibration Tester (b) Hydraulic Pressure Pump
Seam	Containers	Hydraulic Pressure Pump
Seal Efficiency	Container & Closures	(a) Variable Speed Vibration Tester (b) Hydraulic Pressure Pump (c) Humidity Cabinet
ANALYTICAL TESTS		
Acidity, Alkalinity	Packing Materials	pH Meter
Ash	-do-	Silica Crucibles, Burner Muffle Furnace, Balance etc.
Sulphate	Packing Materials	Silica Crucibles, Burner Muffle Furnace, Chemical Balance etc.
Chloride	-do-	Burette, Pipette, Flask chemicals etc.
Reducible sulphur	-do-	Chemicals, Heater

TEST	MATERIAL/PACK FORM/ MATERIAL OF PACKAGE	TEST EQUIPMENT
Bitumen Content	do	Soxhlet Extractor, Heater chemicals etc.
Exudation Test	Bitumen Impregnated Sample	Oven, Standard Weights & Bed Plates
Gum Pick-up	Gum Tape	Balance
DIMENSIONAL		
Curl	Paper	Curl Tester
Dimensional Stability	Paper, Plastic Films	Scales
OPTICAL		
Brightness	Paper, Printed surfaces	Colour brightness Tester
Haze-Opacity	Paint & Varnished surfaces, Plastics etc.	Hazemeter
Whiteness	-do-	Colour brightness Tester
MACHINEABILITY		
Blocking	Wax coated paper/board Bitumen Sandwiched papers	Standard weights, Oven, bed plates etc.
Friction, Slip	Foils, films and laminates, Paper	Static and dynamic friction Testers
Stiffness	Paper boards	Stiffness Tester
SURFACE		
Abrasion/Scuff	Paper, Paperboards and films	Rubproof Tester
TREATMENT		
Water Absorption	Paper, Paperboards, Corrugated boards Waxed paper board, Bitumen Sandwitched Papers	Cobb Tester, Stop Watch
Wax	Waxed paper/board, Wax coated corrugated Board	Soxhlet Extractor Heater, Chemicals, Balance etc.
PERMEABILITY		
Water Vapour Permeability	Paper/boards, Films and laminates	Dishes (WVTR) Desiccant, Humidity Chamber, Bee Wax and wax applicator
Grease proofness Test	Paper	Sand, Chemicals and Graduated pipette, stop clock
Oil Penetration	Papers, Paper boards	Oil penetration tester
Gases (O_2, N_2, CO_2)	Paper, Paperbords, films and laminates	Gas analyser
PRE-CONDITIONING		
For Humidity and Temperature	Packages and Materials	Conditioned Room, Climatic Chambers

APPENDIX II

TYPICAL PROGRAMME OF DEVELOPMENT AND STANDARDISATION OF PACKAGES BY THE REGIONAL CENTRES

1. Standardisation of bulk packaging systems for export of
   (a) Marine products - e.g. 20 kg and above - by Sea
   (b) Fruits - 5 kg and above - by Air

2. Development and Rationalisation of
   (a) Retail packages for export of marine products to selected overseas markets
   (b) Prepackaging systems for export of vegetables to selected overseas markets

3. Development of standard specifications for packages for import of
   i. Fruits
   ii. Vegetables
   iii. Processed Foods - Fruit juices and jams

4. Identification of shelf life needs of pharmaceutical products imported into the region and developing performance standards for packages imported into the region.

5. Identification of transport hazards especially for packages of industrial goods in the region and development of test methods for evaluating efficacy and preparation of a code of practice for packaging for imports.

6. Analysis of characteristics of packaging materials produced in the region to develop comparative data vis-a-vis materials imported into the region.

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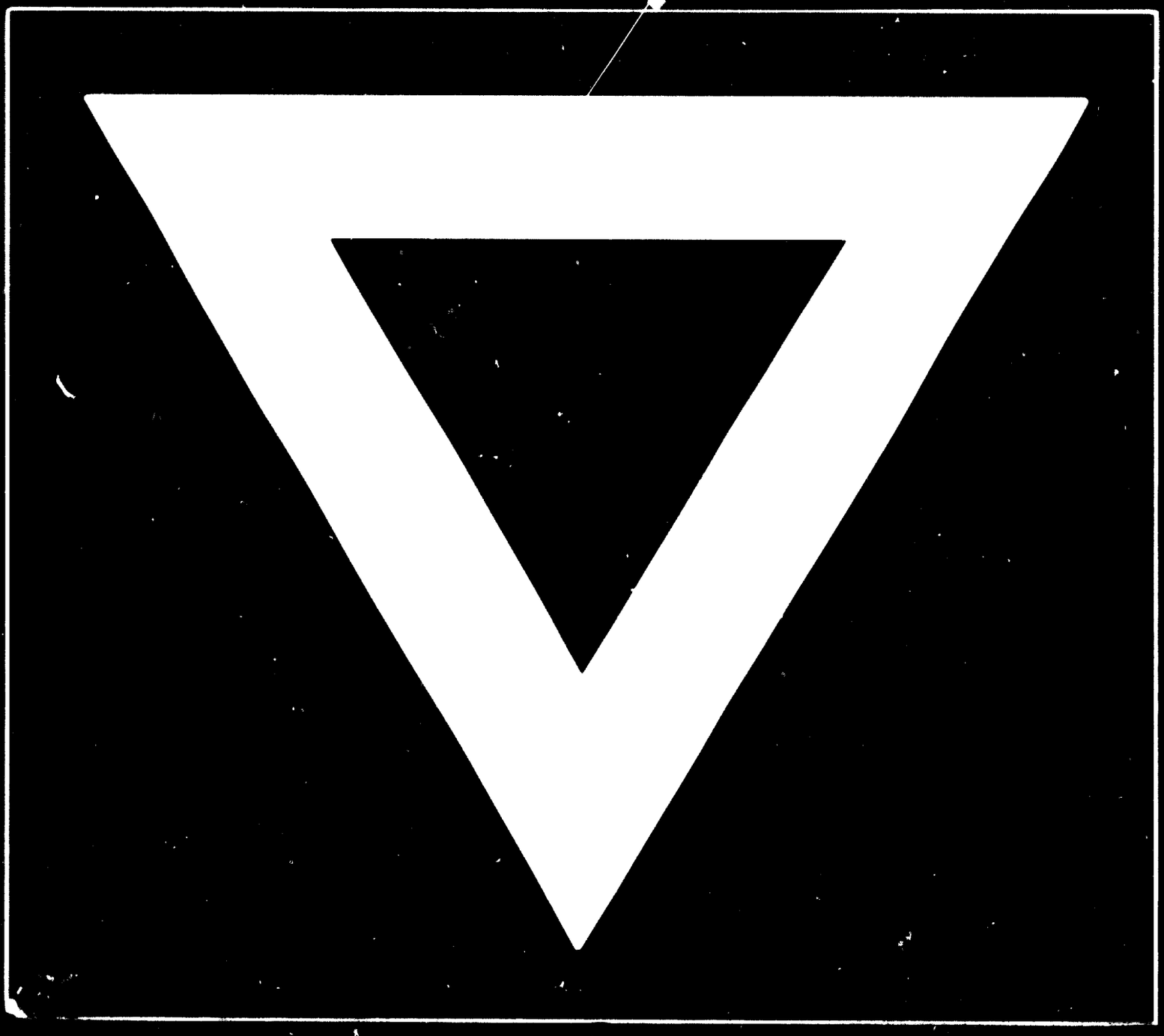

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