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CONSOLIDATION OF CAPACITY OF INSTITUTE OF FOOD TECHNOLOGY
THROUGH CREATION OF A NATIONAL FOOD PACKAGING CENTRE

DP/BRA/82/030/11-04/E

BRAZIL

Technical report: Transport Packaging *

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

Based on the work of Ernst Schmidt,
expert in transport packaging

Backstopping officer: J. Belo, Agro-based Industries Branch

United Nations Industrial Development Organization
Vienna

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A. Introduction

1964 the "Tropical Centre of Research on Food Technology" was established as a result of an agreement signed between the Brazilian Government and the United Nations Development Programme.

1969 the "Tropical Centre of Research on Food Technology" became the "Institute of Food Technology (ITAL)."

In 1965 the Tropical Centre of Research on Food Technology was the first institution in the country engaged in pioneer research to the packaging industry.

ITAL's packaging section has followed the demands of national industry in such a way that in 1982 it expanded its activities and facilities through an integrated programme to put a Food Packaging Centre CETEA into operation, under the sponsorship of the Government of the State of São Paulo, the Brazilian Government (FINEP-EMBRAPA) and the United Nations Development Programme (UND), through the United Nations Industrial Development Organization (UNIDO). The main objective of the Food Packaging Centre is to up-scale support to the packaging and food industry in Brazil and also to serve as an international training centre to assist Latin America and other countries on this technological matter.

The UN/Brazil Food Packaging Centre project is identified as the project BRA/82/030, with a duration of five years.

During the first phase of the project it was planned to combine the packaging section of IPT (S. Annex IV, visit to IPT) with the facilities of CETEA to cover the necessities of testing in the general field of distribution packaging.

As this could not be realized CETEA plans now to enlarge the existing facilities on its own.

The mission of Mr. Schmidt as the last one of the project BRA/82/030 had the object to prepare the new project to establish the area a Transport Package at CETEA.

B. Conduct of the mission

Mr. Schmidt arrived at 00³⁰ on the 4th of November 1986. On the same day the activities began according to a schedule established by ITAL/CETEA (S. Annex I).

Eight lectures for the staff members (S. Annex II) four group discussions referring to testing and five group discussions referring to the visits (S. Annex IV) were brought about.

On November 24 a round table conference took place (S. Annex V)

Mr. Schmidt left Campinas on November 28 at night.

C. Summary

With the expiring project DP|BRA|82|030, ^{CETEA} wanted to prepare the basis for another project aimed at enlarging its facilities and possibilities so that it would be possible to treat problems in the whole field of the distribution of goods of all kinds inside the country and including export.

Therefore essential methods for testing properties of distribution processes, of goods to be distributed, of materials for the production of packages, auxiliary packaging means, of pallets and freight containers and of these packaging means themselves were treated in lectures, discussions and on the occasion of visits.

It is recommended to enlarge still more the knowledge referring to the situation of physical distribution in the country, to organize a computerized system for storage and retrieval of information, to feed it and use it to inform the participants in the distribution processes, and to work for the standardization of package sizes in the country on the basis of the modal 600mm x 400mm accepted by the ISO.

D. Activities and their results

(a) Group discussions referring to testing

The following test methods were discussed:

compression and stacking test

drop test

inclined plane test

vibration test

The aim was always to demonstrate the possibilities existing in the corresponding test equipment. In order to reach that the field between the two axes: "Parameters of the test" and "Test standards" was ^{discussed.} "Parameter of the test" means the details of a test that may and must be chosen and determined.

"Test standards" are ISO - Standards, standards of other institutions or organizations or internal standards of a packaging institute.

The charts developed during these discussions remained at the CETEA.

The results of the discussions referring to the necessary equipment are described in Annex VI. The principle idea was to determine only the minimum of equipment possessing the minimum of properties necessary to fulfill the basic functions of a laboratory for testing objects essential in the field of distribution. That means one has to deal not only with packages but also with auxiliary packaging means, pallets, distribution hazards etc.

(b) Group discussions referring to the visits

The reports in Annex IV describe the observations made during the visits and communicate remarks that are or could be tasks of CETEA. This underlines also the importance of visits, that one makes or receives: they represent sources of information, that within some hours might enlarge the stock of information already existing to a large degree.

(c) Lectures

Annex I enumerates the topics treated during the lectures, using charts, transparencies (Annex II) and slides. Every participant has got copies of the transparencies and of Annex III, Testing Technology.

The following should be emphasized:

(1) The number of hours provided for these topics was so small that only a survey combined with only a few examples could be given.

(2) The staff members should take into account with reference to distribution hazards, that exact data are not possible, but one should use the data given by ISO-Standard 4180/2 or of other organizations if these ones demand them.

(d) Visits *

3 visits were made to distribution centers for food and other household goods. They could be regarded as representative for the great number of distribution centers in the country and offered an informative view on the methods and means they use to fulfill their function.

The visit to IPT showed which facilities already exist in the country for testing distribution packaging.

The visit to "Transway" informed about a complete other branch of packaging: industrial packaging, that is to say individual packaging of industrial goods.

The visit to the airport of Viracopos offered a first view on handling procedures in connection with transport.

More visits to transportes and also to producers of goods and packages should be provided.

* S. Annex IV

E. RECOMMENDATIONS

1. Accomplishment of more visits to all groups of participants in the main distribution processes, when "distribution" comprises the whole system from the production of goods and packaging means in the broadest sense over transport, handling, storage to the final user or consumer.

Results of these visits should be:

a) reports on critical observations complaints, wishes, proposals of the visited people.

b) consequences with reference to work to be accomplished by CETEA.

c) discussion of these reports with those concerned.

2. Installation of an information storage and retrieval system comprising information coming from outside CETEA and produced inside.

3. Collect photos and models of packaging means and packages as part of the information system according to 2.

4. Publish information gathered and treated according to 1, 2, 3 in adequate periodicals.

5. Do all the necessary work to minimize the number of sizes for packages, i. e. promoting standardization on the basis of modul 600mm x 400mm adapted by ISO, and the corresponding pallets 1200mm x 1000mm and 1200 x 800mm.

6. If the necessary equipment will be available - e.g. at IPT the essential properties of packaging material and packages produced in Brazil should be found out in order to know where the national production stands compared with the world market and in order to find out which of these products could be

recommended for definite purposes e. g. for definite distribution process.

7. On the basis of the results of 6, standardization of the most appropriate packages should be tried.

8. The reports concerning visits in the annex recommend more in detail.

Annex I

Curso Interno: "Topics on Distribution Packaging Systems"

Prof.- Dr. Ernest Schmidt - FRG

Período - 6 - 24/11/86 - Local - Auditório da SEMB

Aula nº 1 - 6/11/86 (9-11:30) - "Distribution Processes"

Aula nº 2 - 10/11/86 (9-11:30) - "Distribution Hazards"

Aula nº 3 - 12/11/86 (9-11:30) - "Properties of the goods to be distributed and their behavior under distribution conditions".

Aula nº 4 - 13/11/85 (9-11:30) - "Materials and packages made of those materials apt to withstand the distribution hazards.

Aula nº 5 - 17/11/86 (9-11:30) - "Functions and general rules for testing".

Aula nº 6 - 19/11/86 (9-11:30) - "Testing Methods"

Aula nº 7 - 20/11/86 (9-11:30) - "Laws, Regulations and international practices which must be observed by distribution packaging designer"

Aula nº 8 - 24/11/86 (9-11:30) - "Organization of an Institute for Distribution packaging"

Discussões em grupo

nº 1 - 5/11/86 - "Set up of a transport laboratory"

nº 2 - 14/11/86 - "Vibration Tests"

nº 3 - 14/11/86 - "Drop, Shock and Impact Tests"

nº 4 - 24/11/86 - "Climatics conditions for tests"

Atendentes

- Pedro Francisco Moreira
- Marisa Padula
- Edina H. Takemura
- Valéria Delgado de Almeida Anjos
- Eloisa Elena Corrêa Garcia
- Elizabeth de Fatima Gazeta Ardito

Coordenador Técnico

Assis Euzébio Garcia

Carga Horária : 30 horas (20 aulas + 10 Discussões em Grupo)

Annex II

Lectures

Transparencies prepared for

Distribution process

Properties of products

Properties of packaging materials
and packages

Packaging institute as information center

Regulations

Vibration test

Charts covering the other topics have remained
at the institute

1. Definition of the terms

"Test and Testing Technology"

In this context the term "Test" means a procedure that find out the behaviour of a material or manufactured product under specific conditions. This behaviour is described by measuring and communicating one or more specific properties.

Tests may be laboratory or field tests. Laboratory tests are carried out under predetermined laboratory conditions, so that the test can be repeated as often as possible and the results may vary only on account of variations of properties of the test specimen. (S.2.1) Tests carried out directly in a definite distribution system are called "field tests" or "distribution trial" (according to ISO 4180/1). A field test normally can not completely be repeated because each realization of a definite distribution process will vary from the other. Therefore a field test should be carried out so that a complete test or research programme can be accomplished during one test. ISO 4180/1 describes what should be recorded when carrying out a field test or distribution trial.

"Testing Technology" comprises the general rules that should be taken into account in planning and performing tests especially in the field of packaging.

ISO Standard 4180/1 and 2 concerning "General rules for the compilation of performance test schedules" is used in this paper.

2. Other Basic Definitions

2.1. Test specimen.

The objects that are submitted to a test are called: test specimens. Test specimen may be one of the following types:

- 2.1.1. A piece of a material of a definite shape and size e.g. according to the respective standard.
- 2.1.2. A piece of a product or a package e.g. an edge of a corrugated board case.
- 2.1.3. The product e.g. the empty package or the complete filled and closed package.

2.2 Multi-test-Schedule

This term is used in ISO 4180 and defined as follows:

"A performance test schedule compiled from some or all of a series of tests". Normally the term "test programme" is used instead of "Multi-test-schedule." This means a series of tests that are performed one after the other in using the same test specimens or in using other test specimens.

2.3 Sampling

Sampling is the activity to select a definite number of test specimens out of a lot of products in using a definite method guaranteeing that the selected number of products - the sample - represents the whole lot. Such a method is described in ASTM D85.

3. Materials tests and package tests

One should distinguish between the following two kinds of tests:

3.1 Tests in which all the details are fixed by a standard i.e. the test equipment and the method of using it. Nearly all material tests belong to this kind of tests. The report about such a test, therefore, mentions only the respective standard and the results obtained after having used it.

3.2 Tests in which only some of the details or parameters are fixed by a standard but have to be fixed by the person who uses the standard. Nearly all tests concerning "complete filled and closed packages" are in this group.

ISO/4180/2 names the details that are not fixed by the standard: "factors requiring quantification" but one must not only decide on "quantification" but also on details like "attitudes of the test specimens." It is, therefore, proposed to use as a general term for variables that are kept constant for a special purpose: "parameters." The parameters of a test method and their realizations are described in the context of the description of the test methods.

4. Possible Purposes of Laboratory tests and multi-test-Schedules

Before choosing or conceiving a test the purpose of the test should be known. The following are possible purposes:

4.1 To find out if the properties of a product (package) correspond to the requirements of the relevant specification. This specification may concern the production or the purchase of the product. (see 7.1 of ISO 4180/1).

4.2 To find out if the production runs as planned (in-line testing for quality control) (see 7.1 of ISO 4180/1).

Such tests are performed during the manufacturing process. They have show if properties that are essential for the different stages of production comply with predetermined standards. These are normally internal standards of the producer based on previous experiences.

4.3 Finding out if a package is appropriate for a specific purpose.

E.g. the test on "complete filled transport packages" have to show the suitability of a package to withstand the hazards of a specific distribution process. (see 7.1.a of ISO 4180/1) This mean that test conditions have to simulate as closely as necessary the conditions that are thought to exist during a specific distribution process.

The following rules are consequences of this requirement:

(a) Hazards occuring simultaneously in practice

must be simulated by a test that submits the test specimen simultaneously to the corresponding mechanical and climatic conditions, e.g. vibration + stacking + climate

(b) Hazards occuring one after the other during the distribution process must be simulated by a "multi-test schedule". This comprises a sequence of tests applied to the same test specimen.

(c) The levels of intensity to be used as test conditions depend upon the intensities of the conditions to be expected normally or rarely during a specific distribution process. Rare conditions which usually mean high level of intensity are to be taken into account when the product is very expensive or very important or

dangerous for its environment. (see 9 and 10 of ISO 4180/1)

(d) Often the receivers of the packages or the transporters prescribe the tests and the test intensities that the packages must comply with. If the packaging institute does not agree with these tests or thinks they are not sufficient, it must inform the client above.

4.4 Finding out how to improve a package or the product to be packed. (see 7.1.C of ISO 4180/1)

Normally there will be one or more standardized tests that seem to be appropriate to test and to measure those properties that are to be improved. If not, existing tests must be adopted to the special questions or new tests must be conceived. The intensity of the test conditions to be used for this purpose normally should be raised to the highest possible level, i.e. until breakage or deformation or sufficient other deterioration has been achieved. This procedure yields information about the differences between test specimens, if there are any.

4.5 Finding out the causes of loss and damage that has occurred (see 7.1.b of ISO 4180/1).

The tests must be conceived so that they repeat or simulate as exactly as possible the conditions believed to have occurred.

If all of these conditions are not exactly known one should try to reproduce the same damage by varying these conditions within a range that may occur in reality.

4.6 Finding out how to improve existing specifications or how to establish new specifications

One has to determine all the tests necessary to simulate all the hazards occurring inside and outside the users factory. Then one has to determine the properties that the packaging should have to withstand these hazards.

If, nevertheless, the delivered packaging fails, there are three possibilities:

(a) the tests required by the specification have not been performed correctly.

- (b) the treatment of the packaging has become worse .
- (c) there are one or more properties of the packaging that have not been sufficiently identified. In this case the specification should be changed to cover also this or these properties.

5. Laboratory tests and field tests (distribution trials according to ISO 4178)

Field tests subject the test specimens to the conditions of the field i.e. in that context: to the conditions of a specific distribution process, that means; after having decided the itinerary, the means of transport, the test specimens and their arrangement in the transport means care must be taken only to measure and record hazards and not to influence them in any way. Field tests only yield sufficient information about the suitability of a definite package for a definite distribution process, if the hazards have been measured and compared with the hazards of other distribution process of the same type.

Under these conditions it is possible to find out if the hazards having occurred during a field test have been normal or abnormal (see chapter 4.3).

Field tests should be performed so that during the same journey reasonable solutions to a problem should be subjected to the same hazards. In this manner, sufficient information may be gained for finding out the optimal solution to each problem that had to be investigated by the field test.

Stresses applied during laboratory tests are completely predetermined after having decided what standard should be used and how it should be performed. In a laboratory one test specimen can yield the same or more information as several test specimens in a field test because it is possible to vary the intensity applied on this test specimen.

6. Procedure for the "Compilation of Multi-test-Schedules" (according to ISO 4180)

"The step-by-step procedure is as follows:

(a) "identify the elements of the distribution system"

i.e. the different transport, handling and storage processes.

(b) "decide what hazards these elements involve"

(c) "decide which tests are necessary to represent or simulate hazards."

This includes as a matter of fact the necessary decisions about those parameters of a test that are not sufficiently determined by test standard.

(d) "decide what are the basic values of the test intensities associated with the distribution system and the particular package" or determine the "normal" intensities according to data published by BFSV. (see Annex II)

(e) "decide what test-intensity-modifying-factors, if any, should be applied to the normal values of test intensity" or use the values for "rare" hazards given in the table of BFSV (see Annex II).

(f) "place the tests, thus identified into an order corresponding to the respective system of distribution or according to the following order:

"Conditioning for testing (ISO 2233)

stacking (ISO 2234)

impacts (ISO 2248 and 2244)

vibration with resonant frequency

climatic treatment (ISO 2875)

vibration (ISO 2247)

stacking ISP 2234)

impacts (ISO 2248 and 2244)

This sequence of tests is called a "multi-test-schedule"

7. Testing costs

Testing costs are determined by costs per unit of time for persons and equipment involved in the test and the time needed to determine and to perform the tests to assess their results and to write the report.

Testing costs may be diminished by using one or more of the following rules:

7.1 Package tests should be replaced by material tests if there are such material tests that allow one to draw sufficiently reliable conclusions to define package properties e.g. edge-

crush-test instead of compression test.

7.2 Test duration of some days or weeks may be reduced to short-time tests of some minutes or hours if the correlation between both kinds of test are known. Time normally worsens the properties of a product, therefore short time tests must compensate this influence of time by exaggerating the test conditions e.g. corrosion tests are performed in higher humidity than in reality occurs in order to shorten the time.

7.3 The number of replicate test specimen should be restricted as much as possible depending upon the purpose and the kind of test e.g. if the range of distribution of test results is rather small the number of replicate test specimens may be reduced.

7.4 Time for designing and describing a test or test sequence may be shortened when test programmes that may occur often within the scope of work to be done by the institute have been fixed previously in every detail.

7.5 If it seems to be necessary to investigate the influences of a great number of variables on the behaviour of a package usually it is not necessary to investigate the combinations of all variations with one another, if the influence of a variable on the package may be assumed to be the same also when other variables are varied.

8. Reproduction of test results

Testing procedure must be conceived, test standards interpreted and used and testing devices used so that the variations in the results produced by them are negligible i.e. that they are much smaller than the variations of production for a definite product. ASTM Standard D1749.

"Inter laboratory evaluation of test methods used with paper and paper products", give additional, information in this field.

9. Substitution of original contents of a package to be used for testing purposes

All dynamic tests - vibration test, drop test, inclined plane test, rolling test - must be performed with filled packages. Static tests also need filled packages when an influence of the contents on the test results may be expected. The contents normally will not be the original one when it is possible that it will be destroyed during the test and when its replacement by a substitute seems to be admissible.

The following requirements should be fulfilled by a substitute for a solid original contents:

The same means, the same centre of gravity, the same size of all load - bearing faces, the same stiffness, the same friction between parts of the contents.

The following requirements should be fulfilled by a substitute for a liquid or pourable contents:

the same volume

the same density

the same flow behaviour

Annex IV

Visits

to SADIA on Nov. 11, 1986
to IPT on Nov. 11, 1986
to PÃO DE AÇUCAR on Nov. 18, 1986
to COBAL on Nov. 21, 1986
to TRANSWAY on Nov. 21, 1986
to HORTINEXA on Nov. 22, 1986

REPORT ON THE VISIT AT THE DISTRIBUTION CENTER OF
"SADIA" IN SÃO PAULO ON NOV. 11, 1986.

Participants of Sadia

Geraldo Cia
Clovis P. Manczyk
Lucia B. R. Guedes
Paulo Cabral

Participants of ITAL

Luis F. Ceribelli Madi - Project Coordinator
Assis Euzébio Garcia - Technical Coordinator
Eloisa Elena Corrêa Garcia
Ernst R. W. Schmidt - Consultant of UNIDO

The products

Sadia produces and/or sells three types of food products:

1. frozen products (-20°C)
2. refrigerated products (5..8°C)
3. other products that need no special environment

The products arriving at the distribution center from other factories or from the production lines nearby are packed in retail (consumer) packages--mostly plastic films - and then in corrugated board boxes.

Boxes of 300 different sizes and/or board qualities are used. They are mostly rather small: inner volume about 2000cm³. The packaging department performs the following tests to control the deliverances: puncture test, mullen-test, flat and edge crush test, compression test. The quality of the board for frozen goods seemed to be rather poor.

The boxes were not always completely filled so that they got deformed more or less.

The handling of the products in the warehouses conditioned

to the corresponding temperature.

The warehouses were equipped with racks of about 6.m height, where the products were stored about 1,70cm high on pallets.(+)

Special fork lift trucks put the units into free places and took them out when they were needed. By means of manual fork lift trucks these units were brought to "separation areas" where the products were picked out of the different units according to the orders of the clients. They are stacked on corresponding pallets.

70% of the clients are small shops or restaurants who order only very small quantities of some different products. Sometimes one has to open the boxes that already contain only small quantities of a product because the order demands only one piece.

The pallets containing the ordered products are brought to an opening in the separation area, where a truck is loaded, using a telescopic conveyor to bring the single packages to the charging place, where they are stocked manually one by one. The storage cabins of the delivery trucks are not conditioned, only well isolated.

(+) Any means to keep the loads on the pallets together - as strapping- were not used.

Questions and proposals concerning possible improvements in the distribution processes of SAIDA in cooperation with the distribution packaging department of ITAL.

1. What possibilities exist to standardize still more the size of the frozen products, in order to diminish the number of different sizes and to utilize their stiffness to withstand the stacking forces alone practically without loading the boxes?
2. What other possibilities exist to reduce the number of different boxes?

Among other ones the following analysis should be accomplished:

2.1. Eliminate the small boxes and find out some optimal bigger ones because already now small boxes must be opened in the separation area.

2.2. In connection with 2.1 one should analyze the procedures used now for handling the products in retail packages only during the delivery to the clients. It could be advisable to use reusable trays for these products.

2.3. In consequence of 2.2 one should consider the possibility to introduce generally a distribution packaging system on the basis of trays, that could be reusable plastic ones.

3. The analysis of the box sizes should be guided also by the aim to introduce a modular system on the basis of 600mm x 400mm, provided by ISO 3394.

4. On the basis of intense studies of the process of "separation" and composition of the customers orders one should try to use palletization also from separation until delivery to the customers e.g. using rolling rack pallets.

5. One should analyse the whole distribution system in São Paulo and the whole country if it is optimally organized e.g. one should try to avoid too many stops on account of small orders introducing perhaps small distribution points at some of the customers.

Report on the visit to the packaging department of IPT (Instituto de Pesquisas Tecnológicas do Estado de São Paulo S/A) in São Paulo on Nov. 11, 1986.

Participants of IPT: Ernesto F. Pichler and an engineer

Participants of ITAL: The same as for Sadia

Equipment

Compression tester	Locally built
Shock producer	Lansmont
Vibration table	MTS
Stacking test equipment	Locally built
Release hook	Locally built

Activities

The department had started its activities in 1977 with a rather large staff. In the meantime many have left because they could get higher salaries in the industry, but it is possible that students of the university work there. Mr. Pichler has put much time in the elaboration of standards and test equipment needed by various tasks coming out of the industry.

Relations between ITAL and IPT referring to the distribution packaging departments. A cooperation of the two departments seems to be possible and necessary referring to the special fields of activities of the institutions that they belong to: The pack. dep. of ITAL develops its special field of activities for the distribution of food products of all kinds that means the corresponding retail and distribution packaging.

The pack. dept. of IPT sees its main activities in the field of standardization and education.

Besides that it depends or should depend upon the

the initiatives of the directors of these departments, what they make out of their possibilities and knowledge to diminish the losses occurring actually in the country and to the exports.

Report referring to a visit to the "Pão de Açucar" distribution center in São Paulo on Nov. 18, 1986.

Participants:

of "Pão de Açucar ":

Luiz Cyrillo Ferrari- Gerente Deposito Central
Walter Onofre Junior- Gerente de EngºAlimentos

of ITAL:

Luis Fernando C. Madi
Assis Eusébio Garcia
Elisabeth de Fátima G. Ardito
Ernst R. W.Schmidt - Consultant of UNIDO

Observations

In this center only nonperishable goods were stored. One must differ as to arriving goods:

- a) goods produced not by "Pão de Açucar" but to be sold under their name and mark
- b) goods produced by producers near São Paulo packed and sold under their own label and mark

Products according to (a) are checked for quantity and quality when the trucks arrive. They are not unloaded until the laboratory will give its permission

Arriving trucks are positioned with their rear side to a ramp. Height differences between ramp and truck platform do not allow to put the pallets always to the places where the stowed packages are grabbed. One uses telescopic conveyors or throws the packages along a chain of workers.

The pallets are always placed along the edge of the ramp. Fork-lift-trucks take them when they are stowed 1,50m high.

The units are transported and stowed until 8m high partly on steel racks. Damaged boxes were rarely to be seen. Damaged packages could be recognized from the outside only in the case of soja oil cans, that were not proof.

The products to be delivered to their supermarkets are collected on pallets or in container pallets on special places where the delivering trucks are loaded by means of manual fork lift trucks

All the pallets used in the warehouse until their

supermarkets have the size of 1200mm x 1000mm and are of the two-way-type. The container pallets are additionally fitted with the racks .

It was said that pallets of the four-way-type would be better.

Remarks

a) The cost for unloading the arriving trucks must be paid by the deliverer. But anyway it is always the last consumer who has to pay for the cost, justified or not. The cost for unloading comprise the direct cost for wages of the unloaders and the indirect cost for the truck standing without working . Pão de Açucar could increase the field where their pallets are used , leasing pallets to their deliverers and adapting by any means the heights of the trucks platforms to the height of the ramp.

b) Pão de Açucar did not seem to bother about the leakages of the soja oil cans. But a consumer will avoid fatty cans if he can find other fitting products.

Report referring to a visit to the "COBAL" distribution center in São Paulo on Nov. 21, 1986.

Participants:

of COBAL:

Sérgio Dedecca, Acessor
Nivaldo Vitrio ,Gerente

of ITAL:

Assis Eusébio Garcia
Pedro Francisco Moreira
Ernst Schmidt , Consultant of UNIDO

Observations:

In this center only packed non-perishable food products arrive ,are stored and distributed to their customers.

The arriving trucks are unloaded without a ramp, stowing the packages on pallets, that are of the 4-way-type and of very good design.

Fork lift trucks put the units in racks, stow them one above the other or leave them on the floor. So the storage space of the warehouse is not sufficiently used.

They have not accepted a delivery of soja oil cans because of the leakages.

Products to be delivered to their customers are collected on pallets. They use a stack of several pallets to put loaded pallets on them to be unloaded on the truck.

Remarks

One should find out if the use of the warehouse could be made more efficient.

It seems to be remarkable that Cobal doesn't accept defective oil cans, that Pão de Açúcar accepts.

Report referring to a visit to " Transway Transportes Internacionais on Nov. 21 , 1986.

Participants:

of Transway:

Clelia T. Arana
José M. Arana
Erasmus T. Azevedo

of ITAL:

Assis Eusebio Garcia
Pedro F. Moreira
Ernst R. W. Schmidt , Consultant of UNIDO

Observations

The field of activities comprises individual packaging of household goods and of industrial goods for transports inside the country and for exports by plane and ship.

The head office together with workshops for machining wood plywood and other materials and for preparing the crates and boxes as far as possible. Normally the prepared parts are transported to the customer's place or factory, where the good then is packed.

The company has "Regional Branches" in Rio de Janeiro, Salvador, Brasília, Santos, Goiânia. The necessary transports are normally accomplished by their own trucks.

They have already packed very expensive goods of art. They are members of international transport companies.

For the manufacturing of the boxes they use very often plywood, although they have to replace it now-a-days often by pressed wood particle plates (. aglomerado). To protect the goods against shocks and also against rain and dust they wrap the goods and/or line the packages with bubble-foil. They use a heat sealing equipment of their own design for closing the film around a good.

They use Silica-Gel to protect the packed good against high humidity and provide humidity indicators from Hermann/FRG.

Sometimes they act as consultants for industrial individual or also series packaging.

Remarks

Very probably transway realizes well the different functions of industrial packaging, because of their stock of experiences with different goods and of their international connections in this field.

It would be advisable for ITAL/CETEA to use these experiences and to complete them by finding out the essential properties of the equipment and of the materials used by Transway to pack the goods, e.g.:

- a) water vapour-transmission rate of the used films without and with heat sealed seams ,
- b) mechanical properties of the films and of the seams,
- c) properties of the bubble foil, especially its cushioning effect,
- d) properties of the "acglomerado" especially to its behaviour when being nailed and in humid climate.
- e) the same referring to the plywood
- f) water content of the wood used inside so called "hermetic" packages.

Report referring to a visit to Hortinexa at the Viracopos airport on Nov.22, 1986.

Participants from Hortinexa:

Participants from ITAL/CETEA:

Luis F. Ceribelli Madi - Project Coordinator
Assis Eusébio Garcia - Technical Coordinator
Eloisa E. Corrêa Garcia
Elisabeth de Fatima G. Ardito
Ernst R. W. Schmidt - Consultant UNIDO

Observations:

Fresh fruit arrive on trucks Saturday and Sunday each week.

During the visit mostly mangos arrived. They are packed

individually by paper and/or wood wool in corrugated board cases of different sizes and design. Partially the boxes are similar to trays because the short flaps are used to reinforce the short vertical walls. Parts of the flaps are used to fix the position of the box stowed above the former one relatively to this one.

The transporters present samples of the boxes to the control office of the Ministry of Agriculture. The fruit are checked visually if they are healthy and may be admitted to export

The greatest part of the fruit and vegetable has been grown in the region. But many products must be carried several thousand km by truck to this airport because the lack of facilities in other airports .

The trucks are unloaded manually. The boxes are stowed or platform of the airline about five boxes high. The load on the platform is fixed to it by nets.

The temperatures in the plane's hold differ according to the type of the plane.

Some fruit are mitigated in a spefial equipment.

Remarks

a) CETEA should try to cooperate with producers of boxes and fruit farmers for diminishing the number of box sizes and designs in order to diminish the prize of the boxes.

b) The efficiency of visual checking should be found out.

c) It would be advisable to contact the "confederation of
Tranporters and Marketing Organizations in Europe of Fresh
Fruit and Vegetables" (C.I.M.O.)

Av. de Broqueville 272 BTE 4

1200 Bruxelles

Belgique

They organize meetings and congresses.

Report referring to a round table conference about problems related to the physical distribution of CETEA on Nov. 25, 1986.

Participants:

Guests: José Geraldo Vantine - Diretor Geral de I.G
Vantine Y Associados

Antonio Carlos Falanga-Consultor de I.G.
Vantine

CETEA: Luis F. Ceribelli Madi-Project Coordinator
Assis Euzébio Garcia -Technical Coordinator
Sylvio Alves Ortiz
Eloisa Elena Corrêa Garcia
Elizabeth de Fatima G.Ardito
Pedro Francisco Moreira

UNIDO: Ernst Schmidt - Consultant

Mr. Madi explained his intentions with reference to upgrading CETEA to a packaging institute.

Mr. Vantine seemed to want the activities of the institute restricted to service to producers, to consultants like himself, and to publications and courses.

CEMAT (Committee for packaging, handling, storage and transport) was discussed with reference to its actual activities and to the possibilities to reactivate it.

Mr. Schmidt reported on palletization problems, observed in Brazil, and their solutions in other countries.

Mr. Vantine mentioned that in Brazil 5 sizes of pallets are provided for standardization; among these also the sizes used and standardized in Europe: 1000mm x 800mm

1200mm x 1000mm

1600mm x 1000mm.

**List of equipment necessary for a packaging
institute**

Testing equipment

1. Compression tester

Minimum load capacity: 50 kN

Necessary size of the compression platens: 1400mm x
1200mm.

Height of the test specimen: 1,8m

Admissible

Possible producers:

a) MTS Systems corporation

Testing Products Division

Box 24012

Minneapolis, Minnesota 55424

Telex: 29 - 0521

b) AB Lorentzen and Wettre

Box 49006

S 10028 Stockholm 49

Sweden

**2. Several sets of weights for stacking tests, each 5 x
20 kg, 3 x 5 kg.**

3. Drop tester

Minimum load capacity: 50 kg

Minimum size of the drop table: 800mm x 600mm

Necessary maximum drop height : 1,8m

Necessary minimum drop height : 0,3m

Garantee. that the inicial position of the test
specimen will not be influenced by the release mechanism.

Possible producers

S. 1

4. Release hook for goods 50 kg

5. Vibration table

Minimum load capacity: 1000 kg

Minimum size of the table itself:

1300mm x 1100mm

Frequency range: 3..100 Hz at least

Acceleration at least until 1g

Producer S.1 and

Carl schenck GmbH, Pf 4018

6100 Darmstadt, Fed. Rep. of Germany

6. Inclined or horizontal plane apt to produce a bumping velocity of at least 5 m/s.

The dolly and the construction of the plane in general must be appropriate for testing unit loads of a mass of 1t and the pallet size 1200mm x 1000mm.

Producer S. 1 or local ones.

7. Climatic chamber

At least one chamber appropriate for two unit loads 1200mm x 1000mm.

Range of temperature: 5°C to 80°C

Range of rel. humidity: 20% to 95%

Periodical change from one climate to the other one.

Producers:

a) Heraeus - Voetsch

Pf 40

7460 Balingen 14

Fed. Rep. of Germany

b) Karl weis

6301 Reiskirchen/Lindenstruth

8. Climatic chamber

of about 1m³ volume of the test space for single packages and material specimens. Data 5. 6.

Producers: 5. 6.

9. Rain chamber
according to ISO

10. Measuring devices:

for vibrations in packages during transport:

Producer: Yoshida Seiki Co. Ltd.

5 - 14, 2 - Chome

Shitaya, Daito-Ku

Tokyo, Japan

for accelerations and displacements in packages during testing:

Producer: Hottinger Baldwin

Messtechnik

Pf. 4235

6100 Darmstadt 1

Fed. Rep. of Germany

for temperature and humidity with registration:

Producer: Wilhelm Lambrecht KG

Pf 76

3400 Goettingen

Fed. Rep. of Germany

for humidity contents of wood and board ;

Producer: Max Doser GmbH u. Co. KG

Pf 1545

8958 Fuessen

Fed. Rep. of Germany

11. Apparatus for manufacturing in laboratory style boxes out of corrugated board or compact board.

Producer: Heinrich Fongern

Braunstr 1

4050 Moenchen Gladbach