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CONSOLIDATION OF THE FOOD PACKAGING CENTRE -
CETEA, WITHIN ITAL
DP/BRA/88/017
FEDERATIVE REPUBLIC OF BRAZIL

Technical report: Laboratory testing of distribution
packaging and related materials and products*

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 R. M. Fiedler,
expert in distribution packaging and related laboratory testing

Backstopping officer: J. Belo, Engineering Industries Branch

United Nations Industrial Development Organization
Vienna

* This document has not been edited.

V.92-50511

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SUMMARY

For the period from 23 November to 18 December in 1991 (26 days), Robert M. Fiedler was on assignment as an expert in distribution packaging and related laboratory testing. An additional 5 days was used in preparation for the mission and preparing the final mission report. The mission was conducted at the Food Packaging Technology Center, CETEA (Centro de Tecnologia de Embalagem de Alimentos), at the Institute of Food Technology, ITAL (Instituto de Tecnologia de Alimentos), Campinas, Sao Paulo, Brazil, for the UNIDO project DP/BRA/88/017.

During the mission all of the basic mission objectives were accomplished. 1. An internal training course was conducted over the mission period for a group of key individuals addressing distribution packaging and related testing methodologies. 2. A seminar on distribution packaging and testing methods was also conducted for external industrial interests and additional staff members of CETEA. 3. The condition and effectiveness of the available equipment in the Distribution Laboratory were evaluated and recommendations for improvements and additions were made. 4. Training was provided to individuals on the operation and use of available laboratory testing equipment including specific guidance in testing and evaluation application techniques. 5. The scope and direction of the 5th objective was redirected from research programs for determining optimal corrugated board composition to addressing the issues associated with defining distribution hazards unique to Brazil that will directly define the performance requirements of optimal corrugated board.

In addition, discussions were conducted on research techniques and instrumentation available to record and define hazard levels in the distribution environment. Demonstration trials were conducted resulting in the development of data suitable for transportation reproduction trials in the Distribution Laboratory. Transportation vibration reproduction trials using demonstration instrumentation were then conducted to further develop the available techniques.

Discussions with individuals from industry and other individuals outside of the CETEA staff were conducted to address specific distribution packaging needs.

Resource materials including a course notebook, ASTM standards and related publications, and several reference documents were provided for the Packaging Information Documentation System. The PACKDATA resource was also effectively used to support information needs in related areas.

Future needs of the Distribution Laboratory to support research and testing needs were discussed and developed. These include completing the drop test equipment; obtaining a pallet load compression tester; obtaining transportation environmental recording and analysis instrumentation; developing or obtaining a cushion testing capability; and obtaining additional impact recording and analysis instrumentation.

The staff supporting the distribution packaging and Distribution Laboratory are highly motivated, knowledgeable and work together as a cohesive group. They have a good understanding of the basic technologies and are able to apply the available technology. They are developing plans to support research opportunities and to continue supporting industry needs using these technologies and information.

INTRODUCTION

In an integrated program between the Brazilian Federal Government and the United Nations Development Program through the United Nations Industrial Development Organization, UNIDO, project number DP/BRA/88/017 was planned for a project at ITAL (Instituto de Tecnologia de Alimentos) in Campinas, Sao Paulo, Brazil.

Within this project, an expert in distribution packaging and related laboratory testing was requested for CETEA (Centro de Tecnologia de Embalagem de Alimentos), a department of the ITAL institute. A job description listing the work that was to be performed is shown in Enclosure 1.

In May 1988, I previously provided expert consulting services to CETEA in conjunction with an assignment supported by the Organization of American States, OAS, and the MTS Systems Corporation in a seminar program initiated by Dr. Luis Madi, Head of CETEA. I received invitations from UNIDO to conduct a mission with CETEA in 1989, 1990 and again in 1991. When the Distribution Laboratory was ready in 1991, the mission was scheduled. It was conducted during the period between 23 November and 18 December 1991. An additional 5 days was used in preparation for the mission and in preparing the final mission report.

The focus on distribution packaging is critical to the success of both domestic and export commerce for Brazil. If products do not arrive at their intended destinations undamaged, all the prior efforts to develop high quality value added products are wasted efforts. CETEA is rapidly developing the capabilities needed to evaluate the ability of packaged products to withstand distribution hazards. The laboratory testing capabilities to test distribution packaging will significantly improve the quality and success of protective packing in Brazil.

The transportation environment treats packaged products without regard for the contents and with equal severity. Because of this, the distribution testing capabilities can be used to evaluate all product categories. Information developed to protect one category of products such as glass bottles can be directly used to compare with the protection needs of other products such as cans and plastic tubs. Information obtained from evaluating the fragility of computers can be directly applied to determining the fragility of products such as eggs and fresh foods. The testing facilities being developed by CETEA provide these capabilities on a world class level.

Upon my arrival at CETEA, a detailed daily program schedule was developed with the Distribution Packaging Staff under the direction of my special CETEA contact, Assis Euzebio Garcia (see Enclosure 2). The proposed program schedule included staff training and lecture schedules, a one-day external seminar and an industry visit. In addition, specific plans for recording the transportation environment and for assessing the laboratory testing capabilities were scheduled.

After arriving and discussing the specific mission objectives, plans were initiated to address each specifically listed objective. The scope and direction of the 5th objective was redirected from determining optimal corrugated board composition to addressing research programs associated with defining the dynamics of the transportation environment. The measurement and laboratory reproduction tests of distribution hazard levels that are unique to Brazil establish the performance levels that corrugated board must be designed to withstand.

During the mission all of the basic mission objectives were accomplished. Future needs were discussed including: environmental recording and hazard level rating; addressing intermodal transportation needs; addressing material handling concerns including unitizing and blocking and bracing methods and systems; quantifying the protective abilities of cushioning materials; and determining the compression resistance of packaging materials in unit loads.

I. ACTIVITIES IN THE MISSION

A. Situation upon arrival

The Distribution Testing Laboratory is being developed into a world class research and testing center with facilities, equipment and instrumentation second to none. It is staffed with a highly motivated, knowledgeable and energetic staff of engineers under the direction of Assis Garcia. The newly completed facilities provide excellent

access to the testing equipment and adjacent supporting research and testing facilities located on the site. The on-site office and conference facilities supported with video recording and projection capabilities will further enhance the conducting of projects for clients and industry.

The distribution testing laboratory includes state-of-the-art vibration and shock test systems with excellent control and readout instrumentation. A drop tester with 6 meter drop testing capabilities has been designed and manufactured by the CETEA staff and is in the final stages of assembly. Conditioning rooms are adjacent to the laboratory and a temperature and humidity conditioning chamber located within the new lab facilities is undergoing final installation check out.

The distribution testing laboratory lacks compression testing capabilities needed for unit load testing. With this major exception, the facilities are complete for current state-of-the-art testing needs. Cushioning testing equipment and additional data collection and analysis instrumentation will complete the anticipated complement of equipment needs.

The distribution testing task group staff is headed up by Assis Garcia, a ME with exceptional knowledge and understanding of testing needs. He is complemented by a staff of professional engineers with specific experience in material specializations and strong interests in distribution packaging. The staff will benefit from two new engineering graduates dedicated to the laboratory operation and research projects in distribution packaging and testing. The staff addressing the distribution packaging and testing is noted in Enclosure 3.

B. Training of CETEA staff in the laboratory

The first objective of the mission was to organize and carry out short courses and seminars related to distribution and corrugated board packaging. This was addressed by conducting a series of training sessions for the distribution packaging staff and a one day seminar for interested industry representatives.

The training sessions were conducted over the period of the mission. The initial schedule presented in Enclosure 2 was followed and revised as necessary to address conflicting schedules. All of the planned sessions were conducted. The primary participants attending the training sessions are noted in Enclosure 3.

The training sessions were conducted with the use of slides, video presentations, discussions, demonstrations and testing in the laboratory. The format provided opportunities

for good interactive discussions and opportunities to become familiar with the use of the testing systems.

A one day seminar for industry was conducted after being promoted to the industry. Information describing the seminar is shown in Enclosure 4. A partial list of the attendees is included in Enclosure 5. The seminar consisted of slide and video presentations and lectures. The presentations were followed by laboratory demonstrations with opportunities for discussions. The seminar was well received and generated interest in future research and testing programs at CETEA.

Throughout the mission, additional training was provided on the specific use of the shock and vibration testing systems. This included set up, operation, calibration, and recording discussions and trials. The performance range of the systems were evaluated and various control capabilities were explored and practiced. System performance and calibration issues were reviewed and service engineers for the equipment manufacture came during the mission to optimize the performance of the systems.

C. Environmental recording and reproduction

We redirected the scope and direction of the fifth objective. Initially it was directed to research programs for determining optimal corrugated board composition. It was redirected to addressing the issues associated with defining distribution hazards unique to Brazil that will directly define the performance requirements of optimal corrugated board.

We conducted field recording trials to measure the vibration and transient shock levels experienced on trucks on the highways in Brazil. The process was demonstrated using an EDR3 (Environmental Data Recorder) that I brought as part of the training mission. The EDR3 recorder, manufactured by Instrument Sensor Technology, provided a self-contained data recording device that was placed directly onto a trailer for highway vibration measurements. The recorder was returned to the laboratory and the data analyzed with the software provided to define the recorded levels.

The recorded levels were then compared with test levels included in test standard to provide a means of directly comparing their relative intensities. The process for reproducing the recorded environmental levels was then discussed with respect to the laboratory vibration test systems. This process, if incorporated into research programs, provides the basis for developing relative test intensities for test standards for package distribution systems throughout the world.

In addition to the discussions and trials using instrumentation to record and define hazard levels in the distribution environment, we explored real-time vibration reproduction techniques. Using the existing laboratory vibration testing system, additional control instrumentation trials were conducted resulting in the reproduction of recorded vibration time-histories. The PC-RPC (Remote Parameter Control) vibration control system, developed in Brazil for use on personal computers, was demonstrated by MTS Systems to show how to bring recorded test shipments directly into the laboratory.

D. Technical discussions outside of CETEA

In addition to technical discussions held with members of CETEA, I conducted discussions with individuals outside of CETEA in support of CETEA's ongoing programs. A listing of outside technical discussion contacts is included as Enclosure 6. Included in the meetings were programs with ITAL and a trip to the IBM international procurement office in Campinas. The discussions supported continuing programs of CETEA relating to distribution packaging needs.

E. Reference materials for the CETEA information center

To support the development of the CETEA Information Center, I provided several distribution packaging and testing method references to CETEA. A listing of the major books and references provided is in Enclosure 7. These references provide the basis for developing an information source for internal development programs and to support external inquiries. In addition to the reference materials, I provided CETEA with a copy of the video tape programs I used in the training sessions and for the industry seminar.

II. RECOMMENDATIONS FOR EQUIPMENT AT CETEA

A. Drop test system completion

A drop tester with 6 meter drop testing capabilities has been designed and manufactured by the CETEA staff and is in the final stages of assembly. Final completion of the system will provide needed capabilities.

B. Unit load compression tester

CETEA has two compression test systems used primarily for single container tests and basic material testing. These test systems are located in adjacent but not readily accessible laboratory facilities. There is a need to have larger unit load compression test capabilities located within

the distribution packaging testing laboratory. This will provide capabilities for testing larger integrated unit loads and to test distribution packaging in sequence with impact and vibration testing.

C. Cushion testing capabilities

Instrumentation is available to evaluate cushioning materials using in-package test methods. There is a need to develop more basic cushion testing capabilities to evaluate alternative cushion materials not yet configured into in-package cushions.

D. Environmental recording/analysis instrumentation

The distribution environment hazards in Brazil are undocumented and not well defined. There is a need to begin recording and defining typical environmental vibration hazard levels that may be unique to Brazil. Instrumentation available for this task is compatible with the vibration reproduction capabilities within the CETEA facilities.

E. Shock recording and analysis instrumentation

Available recording and analysis instrumentation needs to be supplemented with additional back up capabilities. This is needed to ensure the shock test systems can remain operational and in calibration should anything adversely effect the single channel system currently being used. Having a backup system would also be helpful for more expedient testing.

In addition to the need for backup instrumentation, there is a need for higher frequency responses analysis instrumentation. The instrumentation should be compatible with Shock Response Spectrum instrumentation that will provide enhanced capabilities when needed in the future.

III. COMPILATION OF FINDINGS

The CETEA distribution package testing laboratory is well on its way to being completed and operational. The new facilities are ideally designed and constructed to facilitate testing needs. The laboratory is well equipped with state-of-the-art technology and will be substantially complete with the addition of unit load compression testing capabilities.

The staff supporting distribution packaging and the distribution testing laboratory are highly motivated, knowledgeable and work together as a cohesive group. They

have a good understanding of the basic technologies and are able to apply the available technology.

Plans to support research opportunities and to continue supporting industry needs using the distribution packaging technologies are developing. Several ongoing programs are addressing distribution packaging and more programs are being proposed. The capabilities and interests are addressing real needs.

1 August 1991

- 11 -

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

PROJECT IN THE FEDERAL REPUBLIC OF BRAZIL

JOB DESCRIPTION

DP/BRA/88/017/11-02/J-13320

Title Expert in distribution packaging and related laboratory testing

Duration 26 days

Date required 6 to 31 October 1991

Duty station Campinas (Sao Paulo), with travel as required

Purpose of project The Food Packaging Technology Centre (CETEA - Centro de Tecnologia de Embalagem de Alimentos) of the Institute of Food Technology (ITAL - Instituto de Tecnologia de Alimentos) presently works in four research areas of packaging materials and packages, namely within the fields of metal, glass, paper and board, and plastics. This project is expected to increase the number of research areas to six by including a laboratory on distribution packaging and a packaging information documentation system.

Duties The expert will be assigned to CETEA/ITAL, where he will work in close co-operation with the technical counterparts designated for the mission, in consultation with and under the guidance of the National Project Co-ordinator. He will be specifically expected to:

1. Organize and carry out short courses and seminars related to distribution and corrugated board packaging;
2. Appraise the equipment available at the Distribution Laboratory;
3. Train the CETEA personnel in the equipment already available;
4. Provide guidance in testing and evaluation methods for distribution, paperboard and corrugated board packaging;
5. Establish a programme of research in optimal corrugated board composition related to corrugated board performance;

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

Qualifications

Packaging technologist with a university degree or equivalent experience and specific specialization in applied research on distribution packaging and related laboratory testing, namely covering paperboard and corrugated board packaging.

Languages

English; also Portuguese would be an asset.

**Background
information**

The Food Packaging Technology Centre (CETEA) was created under a former technical assistance project of UNDP/UNIDO, DP/BRA/82/030, entitled Consolidation of the Existing Capacity of the Institute of Food Technology through the creation of a National Food Packaging Centre. The Institute, which is located in the city of Campinas, started its activities as a "Laboratory of Technology", on 27 January 1963, with the inauguration of the new facilities. On 18 December 1964, it was established as the "Tropical Centre of Research on Food Technology", as a result of an agreement signed between the Government and the United Nations Development Programme, the executors of which were the Government of the State of Sao Paulo (Secretariat of Agriculture), representing the Government of the country, and the Food Agriculture Organization (FAO), representing UNDP.

On 14 July 1969, the "Tropical Centre of Research on Food Technology" became the "Institute of Food Technology - ITAL", co-ordinated by the Co-ordination of Agricultural and Animal Husbandry Research (CPA) of the Secretariat of Agriculture of the State of Sao Paulo.

Until 1969, ITAL has only dealt with the technology of products of vegetable origin. However, from that year on, the research has been gradually extended to products of animal origin, namely dairy products, meat and fish. A dairy pilot plant was put into operation in 1974, followed by the meat and derivatives pilot plant in 1976, both in Campinas. Finally, a pilot plant for fish and marine products was set up in 1978 in the city of Guarujá near Santos.

The present staff of ITAL includes 13 Ph.D.s, 40 M.Sc.s, 21 graduate specialists and 27 graduates. Technical aid staff amount to 52 administratives; there is a general supporting staff of 192.

The physical installations in Campinas cover a surface of 23,000 square meters of buildings located in an area of 101,500 square meters, whereas in Guarujá the Institute has 8,600 square meters and a constructed area of 750 square metres.

Since its establishment in 1963, the Institute of Food Technology has acted as a leader in its field in the country. It is acknowledged as one of the best research institutions in this area.

In 1965, the Tropical Centre of Research on Food Technology was the first institution in the country engaged in pioneer research and technical assistance to the food packaging industry. At that time, only basic quality control tests were carried out by a few packaging industries. Recently, more industries, institutions and universities have contributed to this field.

The priority received by the Food Packaging Section in 1969 has made ITAL the leading Institute in this particular area of activity in the country.

Packaging demand in the country is growing very fast, especially in the food packaging field, which accounts for 64 per cent of metal packaging, 60 per cent of plastic, 40 per cent of paper and corrugated board and 75 per cent of glass in 1979.

Besides the increasing consumption of packaging materials, the technological aspects are becoming more and more important today in the country. As a consequence of the fast rate of industrialization that the country is experiencing, the need for new and better packaging has been hampered by a series of problems, such as the lack of know-how, information support, trained human resources and research facilities.

ITAL's packaging section has followed the demand of the country's industry in such a way that in 1982 it expanded its activities and facilities through an integrated programme to put a Food Packaging Centre into operation under the sponsorship of the Government of the State of Sao Paulo, the Government (FINEP-EMBRAPA) and the United Nations Development Programme (UNDP), 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 the country and also to serve as an international training centre to assist Latin America and other countries in this technological matter.

Mr. Bob Fiedler - Adviser - Transport and Distribution

Period: November, 26th to December, 17th

MISSION PROGRAMME

- . November, 26th - Tuesday
 - Morning - Get together and discussion about the programme
 - Afternoon - Equipment start up

- . November, 27th - Wednesday
 - Morning - Discussion in the T & D laboratory
 - Afternoon - Internal Course: Overview
Conceptual approach
Product fragility (theory)

- . November, 28th - Thursday
 - Morning - Discussion in the T & D laboratory
 - Afternoon - Internal Course - Tests to evaluate fragility

- . November, 29th - Friday
 - Morning - Packaging for fresh fruit (general discussion)
 - Afternoon - Free

- . December, 2nd - Monday
 - Morning - Internal Course - Vibration (theory)
 - Afternoon - Free

- . December, 3th - Tuesday
 - FM recording of vibrations in truck transportation
Campinas - S. Paulo - Campinas

- . December, 4th - Wednesday
 - Visit to IBM

- . December, 5th - Thursday
 - Morning - Discussion in the T & D laboratory
 - Afternoon - Internal Course - Vibration reproduction
- . December, 6th - Friday
 - Morning - Internal Course - Shock (theory)
 - Afternoon - Discussion in the T & D laboratory
- . December, 9th - Monday
 - Morning - Internal Course - Compression (theory)
 - Afternoon - Free (to prepare the external seminar)
- . December, 10th - Tuesday
 - External seminar
- . December, 11th - Wednesday
 - Visit to Industry
- . December, 12th - Thursday
 - Open (programme to be set up)
- . December, 13th - Friday
 - Open (programme to be set up)
- . December, 16th - Monday
 - Open (programme to be set up)
- . December, 17th - Tuesday
 - Final discussion

Enclosure 3

CETEA PROFESSIONAL STAFF

| | |
|-----------------------------|-------------------------|
| Luis Madi | Coordinating Director |
| Assis E. Garcia | Mission Primary Contact |
| Claire I.G.L. Sarantopoulos | |
| Eliete Vaz de Faria | Individual Training |
| Elizabeth Ardito | Individual Training |
| Eloisa E.C. Garcia | Individual Training |
| Lea M. Oliveira | |
| Marisa Padula | |
| Roberto L. Xavier | Individual Consulting |
| Rosa M.V. Alves | |
| Silvia T. Dantas | |
| Sylvio A. Ortiz | Individual Consulting |
| Valeria D. A. Anjos | |
| Maria A. Venega | |
| Ana de C. S. Enz | |
| Bras D. Scersolino | |
| Maria Aparecida G. Sabadin | |

INTERN STAFF

| | |
|--------------------|---------------------|
| Henry N. Kagayama | |
| Mauricio R. Bordin | Individual Training |

Seminário Internacional Desenvolvimento de Embalagens de Distribuição

Enclosure 4

10 de dezembro de 1991



**CENTRO DE TECNOLOGIA DE
EMBALAGEM DE ALIMENTOS**



GOVERNO DE SÃO PAULO
CONSTRUINDO UM FUTURO MELHOR



**SECRETARIA DE
AGRICULTURA E
ABASTECIMENTO**

PARTICIPE DO DESENVOLVIMENTO DE SÃO PAULO

Será realizado no dia 10 de dezembro, no CETEA do ITAL, o Seminário Internacional sobre Desenvolvimento de Embalagem de Distribuição, ministrado pelo Dr. Robert Fiedler da Robert Fiedler & Associados e o Eng. Assis Garcia do CETEA.

Este evento destina-se aos profissionais envolvidos em desenvolvimento de embalagens para distribuição de produtos industrializados e *in natura*. O evento não será voltado apenas para a área de produtos alimentícios, mas abordará também a especificação de embalagens de transporte e distribuição de outros produtos tais como os eletro-eletrônicos e farmacêuticos.

Os participantes poderão trazer amostras para serem avaliadas durante o evento.

| Programa | Terça-feira, 10 de dezembro de 1991 |
|--|--|
| 8:00 - 12:00 | 14:00 - 18:00 |
| <ul style="list-style-type: none">• Introdução<ul style="list-style-type: none">- Abordagem conceitual da embalagem protetiva• Sistemas de Distribuição<ul style="list-style-type: none">- Definições- Parâmetros e modelos- Esforços Dinâmicos que afetam as cargas: suas fontes e níveis• Fragilidade dos Produtos<ul style="list-style-type: none">- Definições- Forma de falha- Estimativas da fragilidade | <ul style="list-style-type: none">• Vibração<ul style="list-style-type: none">- Teoria e métodos de ensaio- Embalagem: seleção- Simulação de transporte• Choque<ul style="list-style-type: none">- Teoria e métodos de ensaio- Embalagem: seleção- Simulação de transporte• Compressão Dinâmica<ul style="list-style-type: none">- Teoria e métodos de ensaio- Embalagem: seleção- Simulação de transporte |
| OBS.: Não haverá tradução simultânea (inglês-português) para as palestras proferidas pelo Dr. Robert Fiedler | |

Ficha de Inscrição

Seminário Internacional Desenvolvimento de Embalagem de Distribuição

| | |
|--------------|----------|
| Participante | Cargo |
| Participante | Cargo |
| Endereço | |
| | Telefone |
| Empresa | |

Envie para: Centro de Tecnologia de Embalagem de Alimentos
Av. Brasil, 2880
Telefone: (0192) 41-5111 - Telex: ITAL - 19 1009
Fax: (0192) 41 8445
13.073 - Campinas, SP

TAXA
Cr\$ 30.000,00 - não-associados do CETEA
Os associados do CETEA participarão gratuitamente deste seminário

"SEMINARIO INTERNACIONAL SOBRE DESENVOLVIMENTO DE EMBALAGEM DE DISTRIBUICAO"

(10/12/91)

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.Claire Isabel G.L.Sarantopoulos
.Elizabeth E.G. Ardito

Enclosure 6

PEOPLE MET FOR INDIVIDUAL TECHNICAL DISCUSSIONS

ITAL, Instituto de Tecnologia de Alimentos

- * Ernesto Bleinroth, Head Post-Harvest Section of ITAL.
- * Agide Gorgatti Neto, Research Scientist with the Brazil Fruit Institute, (I.B.R.A.F).

IBM BRAZIL

- * Mauro Lucio Carrusca, Manufacturing & Quality Engineering, International Procurement Office, Campinas.
- * Goro Tsuga, Engineer, Central Technology for Export, Campinas.

MTS SYSTEMS BRAZIL

- * Ken Manke, Director General, MTS Brazil
- * Idelson Cordeiro, Sales Manager
- * Haroldo M. Coutinho Simoes, Manager of Service

SPECTRA TECNOLOGIA

- * Auelio da Dalt, Engineer, Sao Paulo

THAI PACKAGING CENTRE

- * Pattra Maneesin, Thailand Institute of Scientific and Technological Research.

Enclosure 7

REFERENCE MATERIALS PROVIDED FOR THE CETEA INFORMATION CENTER

BOOKS:

- * 1990 ANNUAL BOOK OF ASTM STANDARDS, VOLUME 15.09, Paper, Packaging, Flexible Barrier Materials, Business Copy Products, American Society for Testing and Materials. March 1990, Philadelphia, PA.
- * PERFORMANCE TESTING OF SHIPPING CONTAINERS, Second Edition 1987, ASTM Committee D-10 on Packaging, Philadelphia, PA.
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- * PACKAGING DATA SOURCES, Warrington & Company, 1990, Burlingame, CA.
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Backstopping Officer's comments

The mission of Mr. Fiedler, expert in distribution packaging and related laboratory testing, was basically aimed at training the concerned CETEA's staff in operation and wide utilization, for research and quality control purposes, of the newly acquired and very specialized complementary testing equipment.

The Food Packaging Technology Centre had received already a set of appropriate laboratory measuring and testing instruments particularly suited to its utilization for food packages and packaging materials.

The new equipment included, among its main components, a vibration system and a shock machine, each of them of big size and with the most modern instrumentation to be used in the specific field of distribution packaging laboratory testing.

The field of distribution packaging has been a logical further development of the CETEA activities, based on the need of being the food packages grouped and/or packaged in appropriate distribution packages, well-adapted to the loading, transportation and storage conditions which most probably will be encountered during the distribution circuit.

The expert's report shows that the mission actually fulfilled the related expectations according to the job description concerned and the slight re-adjustment which took place upon the counterpart's request.

Mr. Fiedler's recommendations are particularly devoted to the additional equipment which is still required for CETEA's performance of the integrated programme of activities being required within the field of distribution packaging and specific sectors of activities, which should be given priority at the present stage.

We particularly support the recommendations concerned to acquisition of a unit load compression tester and of the complementary shock recording and analysis instrumentation, the implementation of which will require additional financial support.

From our previous experience with CETEA we believe that the recommendations on specific programmes of activities will be appropriately followed up, in line with the dedication and effort which already raised this institution to its present position as a centre of excellence for training in packaging science and technology.