OCCASION

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

DISCLAIMER

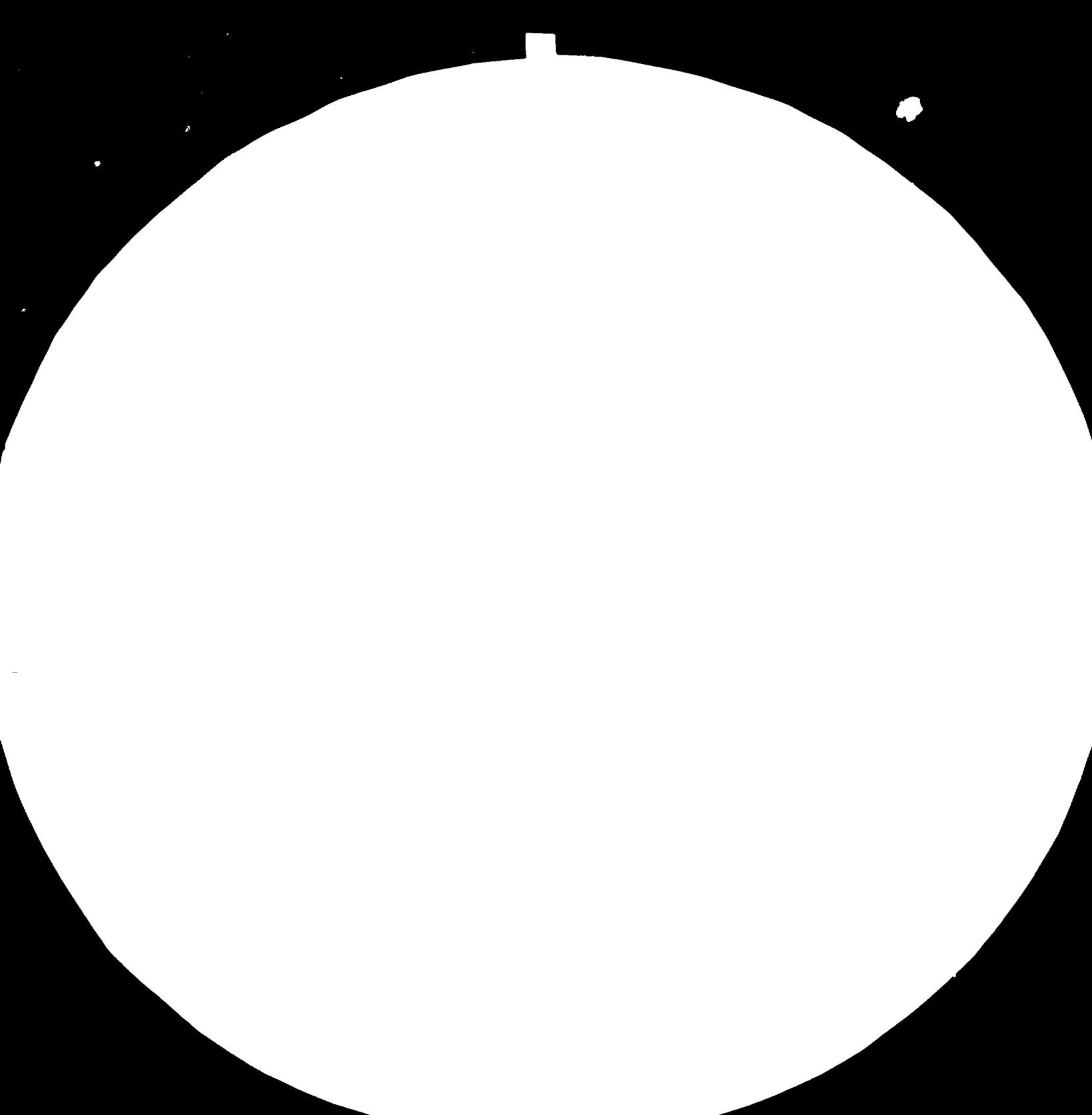
FAIR USE POLICY

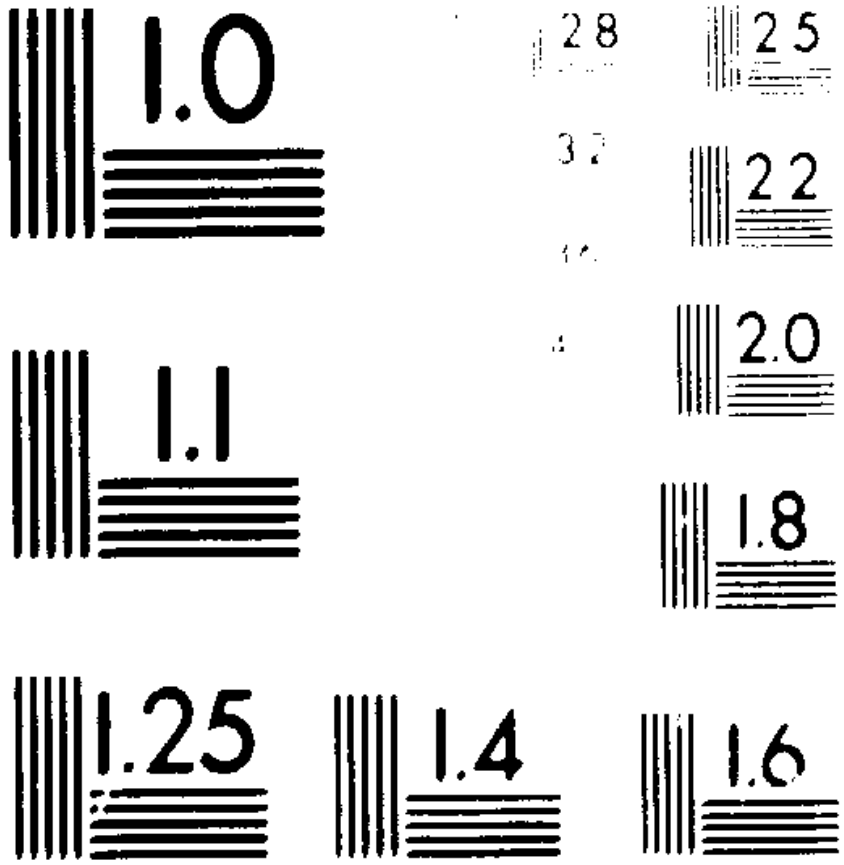
CONTACT

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

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

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org





RESTRICTED

13536

DP/ID/SER.A/506
28 March 1984
English

ESTABLISHMENT OF THE ARAB REGIONAL PACKAGING CENTRE

DP/RAB/80/013

REGIONAL ARAB STATES

Technical report: The situation of the Corrugated Board Industry in the Arab Region and Development Plan for the Industry *

Prepared by

the United Nations Industrial Development Organization
acting as executing agency for the United Nations Development Programme

Based on the work of Sture V. Ostlund
Corrugated Board Consultant

United Nations Industrial Development Organization

Vienna

* This document has been reproduced without formal editing.

V.84 34250

CONTENTS

APPENDICES

I. PROJECT BACKGROUND

This report must be seen as one part of the total project "ESTABLISHMENT OF THE ARAB REGIONAL PACKAGING CENTER RAB/80/013/ARPAC" and dealing only with the corrugated board industry in the region. The duties outlined in the Job Description i.e. "Carry-out a survey of the present situation of the corr. board industry in selected countries in the region and working out a plan for development of corr. board industries" have not been feasible due to a cut of the duration time from 3 months to 2 months. The comments made in the report regarding the present situation of the corr. board industry in the Arab region are based upon visits to four corrugated plants in Morocco, two plants in Tunisia and earlier visits to plants in Algeria, Yemen Arab Republic, Iran and other countries considered as developing countries. In total 108 plants representing 38 % of all visited plants around the world.

This report and suggested activities may be seen as a "practical report", which means that the results of taken actions in most cases can be obtained within a period of six to twelve months, after implementation especially activities under "TRAINING" and "TECHNICAL ASSISTANCE".

II. RECOMMENDATIONS

1. Continuously increasing demand for high quality packaging calls for an improvement of the corrugated board technology in the region.

2. The corrugated board industry should benefit more from the high quality of imported raw material by means of improved technology in manufacturing corrugated board and boxes.

3. The corrugated board industry could contribute to the national economy through less product damages, (to high extent food products) by improved manufacturing technology.

4. The corrugated board industry could also contribute to the national economy in certain cases through lower basis weight raw material (liner, medium) by improved manufacturing technology.

5. The corrugated board industry could contribute to the export industry by improved printing technology.

6. In order to improve the manufacturing technology on all levels in a corrugated plant, there should URGENTLY be established a training centre in connection with a corrugated board plant somewhere in the region. This training centre should be capable to organize theoretical studies combined with practical work at the machines.

7. As the corrugated board industry is a very laborintensive industry with a lot of manual operations it could be a means to reduce unemployment, and should therefore be given high priority by ARPAC.

8. Due to the possibility to recuperate the corrugated board boxes and recycle the fibres, this industry should be given high priority. The aspect of recuperation could also to a certain extent contribute to the reduction of unemployment.

9. IMEC is fully capable to carry out all activities in the corrugated board packaging field and represents adequate basis for implementation of ARPAC activity programme. UNDP/UNIDO assistance in terms of experts is anyhow necessary to carry out certain activities.

10. IMEC /ARPAC should participate more in corrugated board conferences like TAPPI and FEFCO.

III. JOB DESCRIPTION

DP/RAB/80/013/11-04/B/31.7.E.

Post Title : Expert in Corrugated Board Packages.

Duration : 2 Months

Date required : As soon as possible

Duty Station : Casablanca, with travel within the region

Purpose of Project : To foster the growth and expansion of the packaging industry in the region through the establishment of a Regional Packaging Centre.

The Expert will be assigned to the Moroccan Institute of Packaging and will co-ordinate the activities with the counterpart General Director, in consultation with the Arab Industriel Development Organisation (AIDO) whenever appropriate. More specifically, the expert will be expected to :

1. Become acquainted with the structure and technical resources of the Moroccan Institute of Packaging in terms of personnel and equipment, and with the aims, plans and studies already carried out on its conversion into the Arab Regional Packaging Centre :

2. Carry out a survey of the present situation of the corrugated board industry in selected countries in the region in terms of supply and demand of corrugated board boxes, and of available raw materials and appropriate technology for the local or regional production of corrugated board :

3. Work out a unified plan for the development of new or existing corrugated board industries in the selected countries in the region, aimed at substantially contributing to the national and regional self sufficiency within the field of corrugated board boxes taking into account financial, economic and social conditions involved ;

4. Ascertain the availability and need of national and regional expertise which would be required for implementation of the afore-mentioned unified plan, as well as the type and extension of technological support services which should be granted by the Arab Regional Packaging Centre and existing or forthcoming national packaging institutions ;

5. Give ad hoc advice on other matters upon specific request from the General Director of the Moroccan Institute of Packaging.

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

Qualifications

University degree in Packaging Technology and /or Economics, or equivalent experience ; experience in the production of corrugated board and its conversion into corrugated board boxes.

Language — English, French an asset

Background information — The Moroccan Institute of Packaging (IMEC) was established with UNDP/UNIDO assistance. Since 1974, the IMEC has been receiving UNDP/UNIDO assistance and has been transformed rapidly into a "Centre of Excellence".

In 1973, Arab experts held a meeting and decided on the following :

a) To work to develop the packaging industry and related sectors both at the national and regional level ;

b) To create specialised packaging institutes ;
c) To exchange experience and take advantage of the facilities existing in countries in the region.

One of the most important recommendations of this meeting was the designation of the Moroccan Institute of Packaging, to carry out, with the collaboration of IDCAS, the task of documentation and information until the creation of an Arab Regional Packaging Centre.

The second meeting of the Arab National Packaging Committees requested IDCAS to carry out a comprehensive study concerning the creation of the Arab Regional Packaging Centre.

Indeed, this study was carried out by IDCAS and presented at the third Arab National Packaging Committees meeting where it was decided to convert the Moroccan Institute of Packaging into the Arab Regional Packaging Centre.

Upon the request of IDCAS, a UNIDO expert was fielded in September 1979 to give advice on the establishment of the Regional Centre and its terms of reference. IDCAS took the report of the UNIDO expert as the basis for working out the statute of the Regional Centre and the Fourth Meeting of the Arab National Packaging Committee approved the draft statute of the Regional Centre. A work Plan for four years, proposed by IDCAS, was discussed and approved at the same meeting as a transition project to be implemented jointly by IDCAS and IMEC.

Despite the lack of precise and reliable statistics regarding the packaging industry in the region, one can give a brief outline of the importance of this industry in the national economies of the countries ; in Morocco, for instance, more than 12,000 people are employed in the packaging sector. The investments reach US $ 30 million and the annual product more than US $ 180 million ; in Jordan, every year , 10-12 million wooden boxes are used locally or exported. The countries in the region, however, import large quantities of packages.

Generally speaking, the rate of waste and damage of raw materials and finished products due to bad or inappropriate packaging is very high. For instance, the percentage of waste and damage in food packaging is about 25 %.

It is mainly for the above mentioned reasons that countries in the region have shown an increasing interest in the packaging industry.

IV. LIST OF ARAB COUNTRIES

- ALGERIE
- ARABIE SEOUDITE
- BAHREIN
- EGYPTE
- EMIRATS ARABES UNIS
- DJIBOUTI
- IRAK
- JORDANIE
- KOWEIT
- LIBAN
- LYBIE
- MAROC
- MAURITANIE
- OMAN
- QATAR
- SOMALIE
- SOUDAN
- SYRIE R.A.
- TUNISIE
- YEMEN R.A.
- YEMEN R.D.P.
- PALESTINE

V. PROGRAMME OF THE MISSION

DATE	ACTIVITY
13 January 83	Arrival Rabat
14 " 83	Briefing at UNDP Office Rabat and arrival duty station Casablanca
17 " 83	Arrival to Moroccan Institute of Packaging, IMEC Receiving necessary documents regarding Arab Regional Packaging Centre (ARPAC).
24 " 83	Visit corrugated plant "OGDEN MAGHREB", Casablanca.
27 " 83	Visit Corrugated plant " ONDUMAR, Casablanca.
28 " 83	Visit "LE CARTON ", Casablanca
3 February 83	Visit corrugated plant "C.M.C.P.", Kénitra, Morocco
8 " 83	Departure to Tunis for discussions with Mr. BELGACEM Ouchtati, President Director General Sté. Nationale Tunisienne de Cellulose and Mr. Salah FESSI, Sous-Directeur des Industries du Cuir et Diverses - Ministère de l'Economie Nationale.
9 " 83	Visit de la Sté. Nationale Tunisienne de Cellulose Kasserine Tunisia.
10 " 83	Visit Corrugated Board Plant - Sté. Tunisienne d'Imprimerie et de Cartonnage (STIC), Tunis.
11 " 83	Visit Corr. Board Plant (STEMCA), Tunis
12 " 83	Return to Casablanca.
14 " 83	Preparing a paper for Seminar at IMEC.
16 " 83	Presenting paper at IMEC Seminar.
17 " 83	Preparing Final Report on Mission
23 " 83	Debriefing, Vienna.

VI. IMPORTANCE OF CORRUGATED BOARD PACKAGING

Following comments are aimed to show the importance of the Corrugated Board Industry in the developed areas of the world. As U.S. is the leader in the packaging field and a lot of statistics are available, the consultant has taken the liberty to give some figures showing the important roll that the corr. Board Industry plays in the packaging industry.

Paper packaging of all kinds, including paper bags, accounts for around 50 % of all packaging. The Box Board container industry accounts for around 33 % of the total packaging market.

The Corrugated Board Industry accounts for around 62 % of the total box board container industry in U.S. Following table shows the break down of box board containers in different sectors.

Corr. Containers	62,0 %
Solid Fibre Containers	0,6 %
Folding Cartons	18,0 %
Milk cartons	5,0 %
Fibre Cans and Tubes	6,5 %
Fibre Drums	1,9 %
Rigid Boxes	6,0 %
	100,0 %

As the figures show the corr. board industry is set well apart from the rest of the paper packaging industry and even more when talking about producers of metal, glass, plastic, wood and textile packaging.

Following table shows the end-use of corrugated boxes, in United States :

Food and kindred products	33
Paper and Paper Products	10
Glass and Glassware	9,2
Beverages	5,0
Miscellaneous Manufactures	3,2
Fabricated Metal Products	2,9
Miscellaneous Plastic Products	3,4
Household Appliances	2,7
Soap Detergents, Cleaners, Perfumers	2,6
Textiles	2,8
Household Furniture	2,8
Machinery (except Electrical)	2,5
Chemicals and Allied Products	2,0
Motor Vehicles and Equipment	1,7
Plastics material, synthetic resins, etc	1,5
Metal Cans	1,1
Toy and Sportinggoods	1,2
Printing, Publishing and Allied Industries	1,2
Electrical Machinery, Equipment, Supplies	0,9
Rubber Miscellaneous Plastic Products	1,1
Furniture and Fixtures	0,9
Tobacco	0,8
Leather Products	0,4
Petroleum, Refining Related Industries	0,7
Radio. and TV	0,7
Others	5,0
	100,0

As the **end-use table** shows, food and related products is the largest single market for corrugated boxes with beverages added in the total market would be 38 %.

Due to social conditions and the economic profile in the Arab -Region, it is probably not realistic to calculate that the Region will reach these figures in the near future. It can anyhow be predicted that the Region will come closer to those figures every year. Therefore the corrugated board industry, in this Region, should be prepared not only with adequate machines (because these can be bought with relatively short notice) but more in terms of "Know-How" in manufacturing and quality control of corrugated boxes in order to reduce the percentage of waste, in for example food packaging.

The importance of food products as a market for corrugated boxes is obvious. The development of wax and polymercoating for corrugated boxes has opened up markets in packing fresh fruits, vegetables, meat and fish. This market is continously growing and will probably grow very fast in the Region.

The main function of a corrugated box is of course to protect the packed goods during transport from producer to consumer and thus reducing waste and damage.

There are anyhow other functions like :

Storage

It is convenient and offers a safe method for storing the product until it is sold. It also allowsfull utilization of available warehousespace one facilitate inventory control and orderpicking.

Handling

It facilitates handling and automatic processing and offers easy manuel handling and inspection procedures.

Advertising

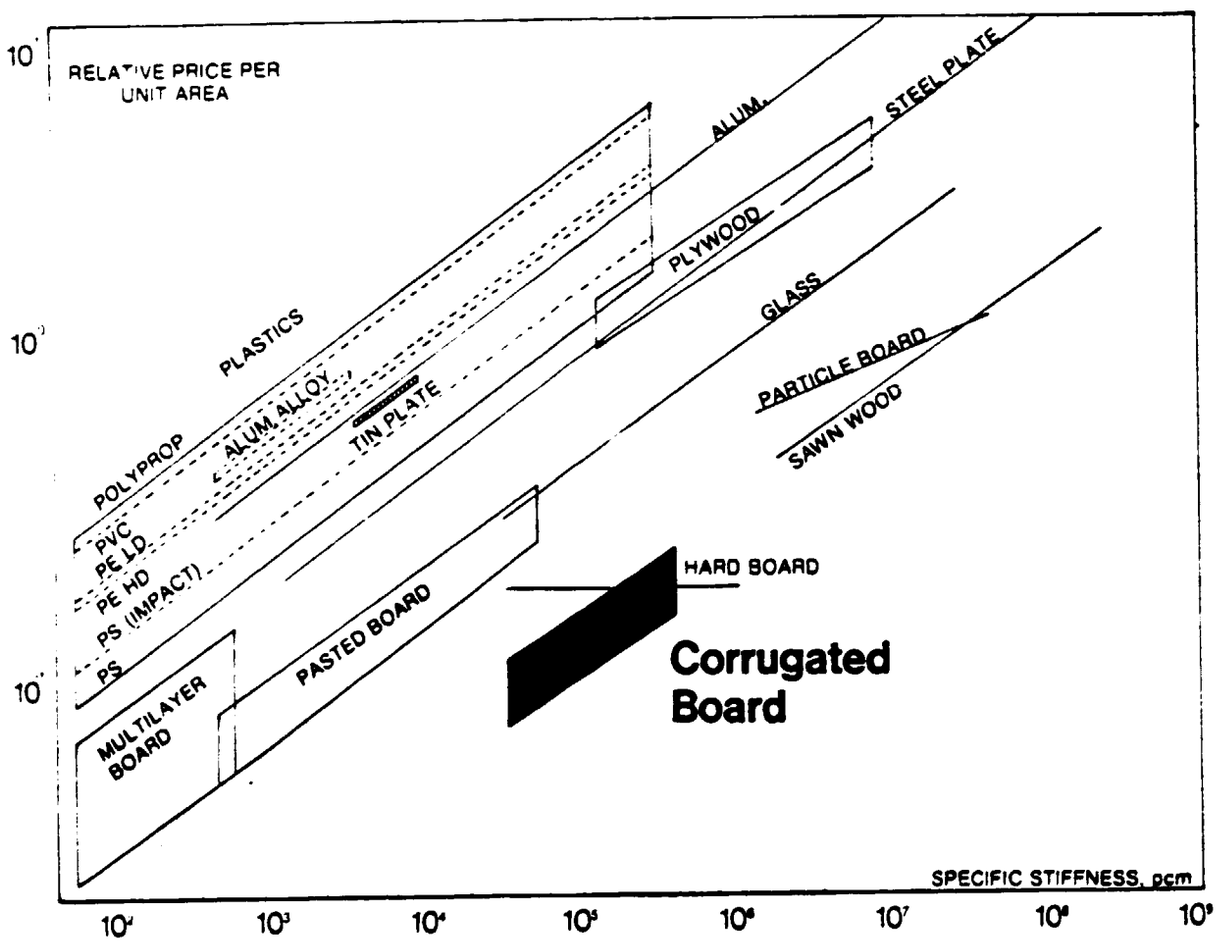
Colourfully printed corrugated boxes help market a product. It serves as an advertising billboard, while in transit or display in storage, which must be of great importance to promote Arabic-products.

Costs

It can be the means of reducing the packaging costs.

VII. CORRUGATED BOARD BACKGROUND

The corrugated industry has both contributed to and benefited from the development of the modern economy. The low-cost, lightness and durability of corrugated boxes make them vital to the successful operation of to-day's nationwide and worldwide distribution system. Corrugated boxes can withstand the forces appearing during transport and storage conditions.
Corrugated boxes are also the most compatible packaging available for the automatic equipment now in common use and at the same time the most economical from the specific strength point of view.
The clearest proof of the importance of rigidity is contained in Prof. B. Steenberg's (Sweden) exhaustive treatise on "COMPETITION IN RIGID PACKAGING MATERIALS". He shows that the competitive position of corrugated board depends on its having a lower cost than materials of comparable rigidity.
It is less costly and more rigid than most plastics, alluminium alloy tin plate, and is also significantly cheaper than plywood, particle board or sawn timber.
See following Fig.


RELATIVE PRICE PER UNIT AREA
10
10
10
PLASTICS
POLYPROP
PVC
PE LD
PE HD
PS (IMPACT)
PS
ALUM. ALLOY
TIN PLATE
ALUM.
STEEL PLATE
PLYWOOD
GLASS
PARTICLE BOARD
SAWN WOOD
HARD BOARD
PASTED BOARD
MULTILAYER BOARD
Corrugated Board
SPECIFIC STIFFNESS, pcm
10²
10³
10⁴
10⁵
10⁶
10⁷
10⁸
10⁹

Corrugated is commonly made in any of four sizes :
They are :

Flute	Fluteheight
A	4,7
B	2,5
C	3,6
D	1,3 (Consumer packaging)

Corrugated board can be used either as TRANSPORTPACKAGING (most common around 90 %) CONSUMERPACKAGING (around 10 %).

Flutetypes A, B and C are used single or in combination for TRANSPORTPACKAGING and E - Flute is mostly used for CONSUMERPACKAGING.

It would be too comprehensive to explain all phases of corrugated board production, but it has to be explained that corrugated board is produced on a large complex machine called a CORRUGATOR. The Corrugator is the most expensive single item in a corrugated box plant. Corrugators also have elaborate systems for applying adhesive to the board and steamsystems which supply heat and moisture for softening the board and drying the board and the adhesive. After the corrugator the corrugated boardsheets require a number of additional operations, to be transformed into boxes.
Manufacturing of corrugated boxes may be regarded as a very simple technique, but it is not that easy as it may look at the first glance.
What makes it difficult to produce is the fact that it is a combination of different papers from 3 - 7 papersheets. There is a variety of different liners and flutingmedia, varying in furnish absorbency, surface treatment, density, moisturecontent, profile, flexibility and finish. Also every grade will differ according to caliper, basisweight and deckle. From local papermills, the maturity and temperature of the paper can vary. These differences already exist prior to the receipt of these reels into store. Thereafter the paper is affected by storageconditions. It may be horizontally or vertically stacked, and stored outside or inside, each situation introduces additional variations not only between one roll and another, but also within each roll itself.

The most important papervariables which affect adhesion are moisturecontent and temperature. Because of dimensional changes which occur when paper is heated the hotter it is, the more readily it absorbs moisture when adhesive is applied (the adhesive contains 80 % water). Up to a limit, which depends on thegrade of paper, the higher the moisturecontent, the more readily the paper absorbs moisture from the adhesive. To ensure that optimum penetration is achieved, the papertemperature and moisturecontent must be adjusted prior to theadhesive application.
There are other, runnability wetstreaks in the paper cause warp or poor bonding thin edges lead to edgedelamination.
As all boxes are tailor-made to the product packed, and very frequently the orders are very short, sometimes 100 - 500 boxes, it is obvious that the productivity is very low, if the workers are not trained to make fast orderchanges.
Only with long experience or well trained personnel the corrugated plant can overcome the problems when making corrugated board.

VIII. PRESENT SITUATION OF THE CORRUGATED INDUSTRY IN THE ARABIC COUNTRIES

As mentionned during PROJECT BACKGROUND it has been impossible for the consultant to fulfil the duties outlined in the Job Description.
The consultant has therefore taken the liberty of giving comments to the situation of the corrugated board industry in the region based upon earlier experience of developing countries (see PROJECT BACKGROUND)

Bearing in mind the corrugated board industry's importance on the market, specially the food-market, and the difficulties the industry encounters in the manufacturing process it is obvious that this industry must be considered as number one of the packaging industries to be up-graded in the Arab region.

Following activities are considered to be of importance for a corrugated plant from the technical point of view :

1. Manufacturing facilities
2. Maintenance and spareparts
3. Production knowledge
4. Job descriptions
5. Production reports
6. Waste situation
7. Housekeeping
8. Quality Control

The comments refer to the average standard of the corrugated plants in the region. There may be some exceptional cases which differ from the average.

1. Manufacturing facilities

- Buildings

  Relatively low standard with floors not treated with antidust treatments and roofs leaking in rainseasons.

  No fire-extinguishing equipment.

- Machinery

Relatively old machines, usually bought as second hand machines. The corrugators are in many occasions not equipped with the basic elements to treat the papers like preheators or are conditioners.
The millrollstand are in many occasions of shafted type, the belts for the doublebacker in bad condition , creasers and cutoffs of relatively old models which makes the sheet lengths vary a lot, thus generating high waste-percentage.
The machine speed 20 - 50 m/mn. The conversion machinery like printerslotters and stitching or gluingmachines are also old and work with low productivity.
The Consultant has seen relatively new modern machinery 3 - 10 years old, working at a speed of 30 - 60 m/mn when the machines are made for 150 m/mn. The reason for this is lack of maintenance and production knowledge.

2. Maintenance and spareparts

Maintenance is neglected because no formal program exists and no single individual has the knowledge and training to develop one.
Therefore, it is performed in a hit or miss fashion or not at all.
Preventive maintenance is nonexistant.
The Consultant has seen 2 year old machines which look like they have been in production for 15 years just due to lack of preventive maintenance.

Spare parts, in many occasions non existent, which is not strange bearing in mind the difficulties to get now spareparts for very old machinery. In many cases the suppliers do not exist any more.
On some occasions the Consultant has visited relatively modern plants with modern machinery, but the sparepart recording has been beneath all criticism.

3. Production knowledge

This part is probably the most important of them all and the most neglected. One can possess the most modern machines, but if the people, going to work with them do not have sufficient knowledge to handle the machines it could be a disaster . Unfortunately this is a fact in developing countries . The lack of basic knowledge on all levels in a corr. plant is obvious in this region, starting with the techn. manager in most cases.

4. Job Descriptions

No job descriptions or check up lists exist for the techn. manager and his subordinates such as supervisers or operators of the machines. This point is very important for the function of the plant.

5. Production reports

To get precise figures of machine production, productivity and other data related to the machines is very difficult due to incomplete, or non existant, production reports. The production report is the only instrument in which the management can judge the function of each machine, or the whole plant, and take necessary steps to improve or turn the economical result from losses into profits. It can be stated that the plants in the region work with half of the efficiency of similar plants in Europe or United States in terms of manhour/produced 1000 m2.

6. Waste situation

The average waste percentage can be estimated to be around 16 % . As mentioned before the paper costs represent approximatily 70 % of the sales value of the box, thus a very important cost. In some plants figures of 23 % are normal, which means from 7 to 14 % above the average of plants in Europe or U.S. where the figures are around 9 % in an average plant with 15 % of the production run through die-cutting machines.

Following calculation may show the importance to have the waste under control in a corrugated plant.

Assumptions :

Production : 10 000 ton corr. board per year,

Paper price : according to informations, around 530 US $ /ton

Paper cost : 5 300 000 us $ per year

One percent waste = 53000 US $ per year

Unnecessary waste = 9 % average

" " = 14 % in some cases

Average loss per year in waste = 477.000 US $

In some cases = 742.000 US $

This is paper cost without added value for conversion. With added value the cost will probably be 530 000 US $ /year in waste. In some cases 800.000 US $/year

7. Housekeeping

The housekeeping is in most cases very much neglected. This title may look irrelevant but is considered to be very important in this type of industry which generates a lot of waste, dust and so on. It has been proven that the efficiency in a corrugated plant has increased by 4-5 % just by maintaining the machines in proper condition and the working areas free from waste and scrap.

8. Quality Control

The quality control is in most cases nonexistant. Even if in some occasions, the plants possess instruments they are not used because nobody knows how to operate them or organize and evaluate the results.
Climate room is nonexistent and has to be pointed out that TEST RESULTS ARE OF LIMITED VALUE IF THE TEST ARE CARRIED OUT IN ANY IMPROPER CLIMATE.

IX. SUMMARY OF THE SITUATION

To wrap up the observations, it can be stated that many of the corrugated plants are in bad condition with regard to production facilities, production knowledge, organization and quality control. Obviously this will result in a box of low quality, which would not be accepted as "first class packaging" in areas with developped corrugated board technology.
Maintenance and set-up time is also neglected, resulting in unnecessary downtime, and together with high waste percentage this will result in excessive production cost.
As a conclusion it must be stated that the corrugated board industry in the Region has to be up-graded with modern production technology in order to be competetive with the rest of the world.

X. I.M.E.C. AS A CENTRE FOR ARPAC

I.M.E.C. is a fully capable centre to carry out all activities in the corrugated board field regarding research work testing activities and organizing of seminars, and may well serve as a base for regional activities in this field. There are anyhow some additional inputs to be considered for the implementation of the ARPAC activity programme.

1. ARPAC will to a great extent be depending upon experts assistance in certain areas, and therefore it is of utmost importance that IMEC is strengthened with an adequate list of experts, who are available at relatively short notice. These experts could be recruited via UNDP/UNIDO or direct from the industry .

2. IMEC has to be strengthened with more documentation and literature in the corrugated board field, such as publications and conferences from TAPPI (TECHNICAL ASSOCIATION OF PULP AND PAPER INDUSTRY), FEFCO-Conferences, Machine and raw materials suppliers publications. It is recommended to subscribe for "PAPER BOARD PACKAGING" which is published monthly by Magazines For Industry Inc. A careful study of this magazine, together with already subscribed "Box Board Container" can give many valuable hints on what is going on and what is new in the corr. board industry all over the world.

3. It is recommended that selected persons from IMEC are given apportunities to visit packaging exhibitions outside Morocco.

4. Some additional machinery and instruments are recommended to buy such as :

   a - Manually operated slott and scoring machine for manufacturing of limited series of boxes for trial shipments,

   b - ECT-CUTTER

Following strenght-and weak points regarding IMEC can be listed.

Strength

- Excellent working facilities
- Excellent equipment
- Good and reliable staff
- Well organized seminars
- Training facilities for lab. personal from the industry
- Research in new packaging

Weak

- Personal with very limited practical experience from the industry
- Limited documentation in the corrugated board field
- Lack of roster of experts for ARPAC
- Lack of basic printing facilities (Screen print)
- Lack of manually operated box making - machine (slott-and scoring machine)

All of the weak points are not obligatory for a packaging centre, but as IMEC is going to be the institutional basis for ARPC and dealing with all sectors of the corr. board industry, even production, it is necessary to point out these signs of weakness.

XI. FOUR YEARS PLAN FOR ACTIVITIES
1983 - 1986

N°	PROJECT ACTIVITY	START DATE	ESTIMATE DURATION
1	2	3	4
	DOCUMENTATION AND INFORMATION		
1	Setting up a roster of Arab Experts in the field of corrugated board Industry.	April 1984	
2	Expansion of existing litterature and documentation for corrugated board at IMEC.	Nov. 1983	
	T R A I N I N G		
3	Seminar on substitution of packaging materials and containers, emphasizing Corr. Board.	20-24 Sep.83	
4	Training course for engineers on testing and quality control in a corrugated plant.	May 1984	10 days
5	Organize and carry out a study-tour for selected persons from Arab Countries to advanced centres of expertise Sweden, Finland) in paper and corr. board . Technical Manager	12.5.84	2 Weeks
6	Select and study a corr. board plant to be utilized as a training center (Pilot plant) for the region.	Nov.83	1 Month
7	Preparation of an in-plant training program for a pilot-plan in the Corr. Board Industry. Four different training programs to be established 1. Tech. Managers 2. Supervisors 3. Operators 4. Quality control	Sept. 84	12 Months
8	Seminar on vital points to be considered in connection with manufacturing of Corr. Board . Technical Managers	Oct. 85	3 days

1	2	3	4
9	Seminar on new developments in the Corr. Board Industry . Selected machines suppliers to be invited as well as raw material suppliers.	Oct.85	3 Days
10	Training course in quality control of packaging a/ Paper, carton and Corr. Board b/ Food packaging, metal, glass and plastic	7-15.11.83 1 Week	
11	Seminar on Standardization and quality control (to be organized by ASMO)	Nov.83 Nov.84 Nov.85	
12	Organization of one regional packaging congress cum exhibition in one of the Arab Countries.	Oct.85	10 Days
	TECHNICAL ASSISTANCE		
13	Complete the survey of the present situation of the corrugated board industry in selected countries.	Nov.Dec.83	2 Months
14	Work out a plan for consultancy service to the Corr. Board Industry in selected countries , new as well as existing corrugated plants.	March 84	2 Months
15	Work out a program for energy conservation in a corr. plant.	Oct. 85	3 Months
16	Adaptation of modern paper-packaging technologies to the local conditions and needs.	Jan .86	Continuous
	STANDARDIZATION		
17	Unification of the transport packaging dimensions in the region taking into consideration international recommendations.	Feb. 86	6 Months
18	Establishing a regional packaging quality certification emphasizing export packaging		8 Months
19	Establishing a glossary of paper and corr. board terms (English - Arabic).	Oct. 85	Continuous

	2	3	4
	TECHNO-ECONOMIC STUDIES		
20	Assessment and analysis of the Corr. Board Packaging requirements imposed by the Arab export-markets	June 84.	8 Months
21	Establishing a Capital Planning Manual for the Corr. Board Industry ex. Calculation of Return on Investment (R O I)	Sept.85	Continuous
	R E S E A R C H		
22	Search for new packaging materials based upon locally available resources.	March 85	Continuous

XII. WORK PLAN FOR 1983 - 1984

N°	PROJECT DESCRIPTION	Location	Starting Date	Duration
1	DOCUMENTATION AND INFORMATION			
	Setting up a roster of Arab Experts in the field of Corrugated Board.	Casablanca (IMEC - AIDO)	1 April	Contin.
	a. Search in available documentation , seminars and participants in Congress			
	b. During the completion phase of the survey of the Corr. Industry in selected countries ask all available authorities in countries and visited.			
	c. Send inquiry to authorities in countries not visited.			
	d. Set up the roster.			
2	Expansion of existing Litterature and documentation for corr. Board Industry at IMEC.	Casablanca	NOV.83	Contin.
3	TRAINING			
	Seminar on Substitution of packaging material and container , emphasizing corrugated board .			
	a. Selection of responsible organizations and working out the programme.	Casablanca	1 March 1983	1 Month
	b. Selection of regional lecturers and UNIDO-Consultants	Casablanca	1 March 1983	1 Month
	c. Inviting participants from the member-countries.	Casablanca	1 April	2 Weeks
	d. Preparing necessary audio-visual aids and detailed programme of the seminar	Casablanca	1 May 83	2 Months
	e. Collection of papers and teaching aids and preparation.	Casablanca	1 July 1983	2 Months

WORK PLAN FOR 1983 - 1984

No	PROJECT DESCRIPTION	Location	Starting Date	Duration
	f. Carry out the seminar	Casablanca	20 Sept. 1983	5 Days
	g. Report and evaluation of the seminar and give recommendations.	Casablanca	26 Sept.	2 Weeks
4	In plant training course for engineers on testing and quality control in a corr. plant.	Casablanca	2 May 1983	
	a. Preparation of training programme . Selection of lecturers and commisioning the work.	Casablanca	1 Oct. 1983	1,5 month
	b. Contact with suitable corrugated plants and organisation of practical in-plant work.	Casablanca	1 Oct. 1983	2 Weeks
	c. Inviting participants from the member countries.	Casablanca	1 Nov. 1983	2 weeks
	d. Preparing teaching aids and detailed programme for the course.	Casablanca	15 Jan 1984	2,5
	e. Carry out the course	Casablanca	2 May 84	10days
	f. Report and evaluate the course.			
5	Study tour for selected persons from the Arab Countries to advanced centres of expertise in the field of paper, corrugated board and packaging research centres, as well as visit to the packaging exhibition "Interpack" in Düsseldorf.		12May 84	14 Days
	a. Preparation of a preliminary study tour programme to be presented to the paper packaging industries (mainly corr. board) in the member countries. together with a form to be filled in by recommended participants and returned to IMEC/ARPAC not later than end April 1983.	Casablanca	April 83	

WORK PLAN FOR 1983 - 1984

N°	PROJECT DESCRIPTION	Location	Starting Date	Duration
	b. Confirmation from selected industries and research centre in Sweden about a visit May 1984 .	Casablanca	April 1983	
	c. Selection of participants and obtaining their official nominations.	Casablanca	May 83	Not later than end of May 83.
	d. Making necessary travelling (mainly obtaining visa) and accomodation arrangements for visiting the packaging exhibition "INTERPACK" Düsseldorf, Germany. This point is critical due to the hotel situation during "INTERPACK".			
	e. Preparation of detailed study tour programme, itinery and nomination of persons responsible for the arrangements.	Casablanca	15 Jan.	1Month
	f. Inform host industries about forthcoming visits - Objective with the visit - Itinery - Responsible person for the study tour. and making travel and accomodation arrangements.	Casablanca	Janv.84	1 Month
	g. Carry-out the study tour	Morocco Sweden Finland Germany	12 May 83	12 days
	h. Wrap-up of the impressions made during the Study Tour (Study Tour participants)	Casablanca		2 days
	i. Preparing report and evaluation of the study tour	Casablanca		2 Weeks

WORK PLAN FOR 1983 - 1984

N°	PROJECT DESCRIPTION	Location	Starting Date	Duration
6	Select and study a corr.board plant to be utilized as a training centre (Pilot plant) for the region.	Casablanca Various	Oct.84	1 Month
7	Preparation of a complete in-plant training programme for a training centre (Pilot plant) for the corr.board industry in the Arab Region.	Casablanca	Nov.84	12 Months
	a. Defining different levels of in plant training programmes - Techn. Managers - Supervisors - Operators - Quality control	Casablanca	1 Nov.83	3 weeks
	b. Start collecting existent courses, lectures and teaching aids from paper and corrugated board - associations machine - suppliers and UNIDO/UNDP experts.	Casablanca	1 Dec.84	2 months
	c. Make up compendiums for different activities such as : - Organisation - Maintenance - Planning . - Production reports - Waste control - Down time recording - Quality control	Casablanca	Feb.84	4 Months
	d. Make-up practical courses to be carried out in the pilot plant - Corrugator - Printing machines - Diecutting machines - Gluepreparation - Quality control		June 85	3 Months

WORK PLAN FOR 1983 - 1984

N°	PROJECT DESCRIPTION	Location	Starting Date	Duration
	e. Translation of compendium into Arabic.		1 Nov.85	2months
	f. Set up questionnaires for final examination of different courses.		1 Nov.85	1month
	g. Carry out first in plant-training course	Casablanca	April 86	1 Month
8	Seminar on vital points to be considered in connection with manufacturing of Corr.Board. Technical Managers.		Oct.85	3 days
9	Seminar on new developments in the Corr. Board Industry. Selected machines suppliers to be invited as well as raw material suppliers		Oct.85	3 days
10	Training course in quality control of packaging.		7.15.11. 1983	
	a) Paper, carton and corr. board b) Food packaging, metal, glass and plastic		1 Week	
11	Seminar on Standardization and quality control (to be organized by ASMO)	Amman (ASMO)	1 Nov. 83 1 Nov.84 1 Nov.85	5 days
	a. Working-out the programme with the assistance of the UNIDO Consultant	Amman	1 May 83	1 Month
	b. Selection of lecturers and commissioning the work	Amman	1 June83	1 Month
	c. Selection and invitation of the participants	Amman	1July 83	1 Month
	d. Preparation didactic teaching aids		1 Aug.83	3Months
	e. Carry-out the seminar	Amman	1 Nov.83	5days
	f. Preparing report and evaluation of the seminar	Amman	6 Nov.83	2weeks

WORK PLAN FOR 1983- 1984

N°	PROJECT DESCRIPTION	Location	Starting Date	Duration
13	Complete the survey of the present situation of the Corr. Board Industry in Selected Countries.	Casablanca Various	5Nov.83	2months
14	Work out plan for consultancy service to the corr.board industry in selected countries new as well as existing plants	Casablanca	March 84	2 months

XIII. COMMENTS TO PROPOSED ACTIVITIES 1983/ 1986

ACTIVITY

1. It is of utmost importance for ARPAC to have roster of experts in the Region to call upon, to solve problems, carry out studies or giving paper during seminars.

2. IMEC as a base for ARPAC must be up to date with what is happening in the paper and corrugated board industry and be able to give information about research - work carried out, different standards , raw material, conferences, production, machinery and so on. The existing documentation at IMEC is not up to date and has to be upgraded.

3. No comments.

4. As mentioned in this report most of the corrugated plants in the region do not have any quality control instruments or laboratory and if they have, they do not know how to use and evaluate the results. It is necessary to inform about the importance of QC, which should comprise incomming raw material as well as manufactured corr. board and boxes. There are many practical test procedures in a corr. plant which do not include instrumentation to carry out.

5. It is important that persons in responsable positions like Techn. Managers, Managing Directors are aware of modern technology in Papermills, Corrugated Board Plants and Research Centres. This can give them new ideas of how to develop their own plants and also give them valuable contacts for the future in the packaging field.

6. This is an essential question for ARPAC and probably the most important one and as the manufacturing technology in many corr. plants, as not up to date, and the need for training is crucial for the quality as well as productivity.
As IMEC is chosen as base for ARPAC it seems to be obvious to have a plant in Casablanca, The selected plant has anyhow to be well equipped in terms of machinery, organisation (Maintenance production planning production reports, waste control and quality-control) before it can serve as a pilot plant or training center for ARPAC.

7. Once a pilot plant has been selected it is very essential that a detailed training program is worked out comprising a combination of theory and practical work. Different types of programs should be available for example production management, supervisors, operators and quality-control. It must be mentioned that this will be the first organized training center in the industry all over the world and it could be open for non members of ARPAC against a fee.

8. The objective should be to inform the Technical Managers in the region of the importance of maintenance order planning, production reports. Job descriptions, waste control, housekeeping, etc. Almost all of these points are neglected in the region.

9. The objective should be to inform General Managers, Technical Managers about new developments in the industry. There have been more developments in the last 5 years than in the past 15-20 years. It is essential that the management are aware of this when buying new equipment. The reason for all developments has of course been as in all industries, the three well known objectives :

- Higher output
- Better quality
- Lower costs

10. No comments

11. No comments

12. No comments

13. The consultant has not been able to fulfil the objectives in the Job Description due to reasons mentioned before in this report. It must be stressed that it is of utmost importance to complete the survey of the member countries of ARPAC in order to get a clear picture of the situation and thus be able to assist the member countries with valuable information.

14. Based upon the survey of the corrugated board industry in the member countries of ARPAC it should be worked out a program for technical service to selected existing plants as well as projects for new plants. This may serve as an example of the strength of ARPAC.

15. There is a need for establishing a energy conservation program for a corr. plant. The energy costs could in many cases be cut by 30 %, if correct measures are taken.

16. No comments.

17. No comments

18. No comments

19. Most of the modern literature in the paper and corrugated board industry is written in English it is essential to establish this glossary.

20. No comments

21. No comments

22. No comments.

XIV. SUMMARY OF CORRUGATED BOARD INDUSTRY IN MOROCCO

There are 6 corrugated plants in Morocco producing around 75.000 tons of corrugated board which means approximately 3,8 kg per capita United States 60 kg, Scandinavia 45 kg, Southern Europe 25 kg.

The standard of the plants in terms of machinery and buildings is relatively good, (except for one plant in Casablanca) and can be considered to be well above the average in the region. One plant can be compared with average standard in Europe. From the function and organisation point of view, there are anyhow more to expect. The machines are running at about 60 % of their capacity and the "Know-How" on the technical side is in most cases very poor. This statement includes technical management, supervisors and operators. Quality control is in most cases very neglected and must be improved both with necessary instrument and with knowledge of how to evaluate the test results (statistical methods). Maintenance and specially preventive maintenace is also neglected, which makes the down time of the machines unnecessary high.

Machine preparation for nex order (set-up time) is also very high about 3 times higher than the average in Europe.

This testify to some extent lack of production knowledge

Raw material (liner and medium) is imported from Scandinavia and Canada to 80 %.

There are two papermills in Morocco producing paper for the packaging industry, "LE CARTON - Casablanca and la "C.M.C.P." Kénitra with a total capacity of around 60.000 tonnes of paper. for the packaging industry of which 24.000 tonnes for the corr. Board Industry representing 32 % of the total production of corrugated board in Morocco. The remaining quantity 68 % (51.000 tonnes) is imported from Scandinavia and Canada. There are no official plans of increasing the local paper production for the corr. board industry the import duty in Morocco is 36 %.

XV. SUMMARY OF CORRUGATED BOARD INDUSTRY IN TUNISIA

There are 2 corrugated plants, and one coming on stream June 1983 in Tunisia producing around 16.000 tons of currugated board, which means around 2,5 kg per capita. The standard of the plants in terms of machinery and buildings can be considered to be just above average standard in the region. The lack of basic knowledge of paper and its behaviour during production is obvious as well as quality control and production knowledge. Without any investments the production could very easy be increased by 20 %.

Today the machines are working at 40 - 50 % of the capacity. Preventive maintenance is neglected to high extent.

Raw material (kraftliner and medium) is imported to 100 % with an import-duty of 18 % . Yearly increase of production of corrugated board around 8 - 10 % water and humidity resistent boxes are imported from France annually, representing around 600 tonnes.

According to published information now planned investments in the pulp and paper industry amount to 40 million US $ and thus raising the capacity by 25 percent.

Tunisian paper and board consumption during 1980 was about 80.000 tonnes of which 50.000 tonnes were imported. The development plan for 1982/86 includes a project for the building of a new papermachine to produce 35.000 tonnes of cement sack kraft paper per year, with the possibility to later on produce 50.000 tonnes.

Espartograss is the basic raw material for making pulp and paper in Tunisia (Paper mill in Kasserine).

In the 6th Development Plan, it is foreseen R&D studies regarding increasing Eucalyptus-wood forests in the country to secure future pulp needs, even if Espartograss supplies are increasing and plans are concentrated on developing means of improving collection of Espartograss.

INSTITUTION MAROCAIN DE L'EMBALLAGE
ET DU CONDITIONNEMENT

Département Etudes & Recherches

Service Papier/Carton

COMPTE RENDU DE LA VISITE EFFECTUEE EN TUNISIE DU 09 AU 12 FEVRIER 1983

PAR MME ALARDA ET MR OSTLUND

OBJET / Dans le cadre de l'établissement de l'ARPAC diagnostic des entreprises de Papier et Carton.

PERSONNES RENCONTREES :

1°) - Société Nationale Tunisienne de Cellulose et de Papier Alfa : S.N.C.P.A.

Mr OUCHTATI BEL GACEM : -Président de l'Union Arabe des Industries Papetières et de l'impression.
-PDG de la Société Nationale Tunisienne de Cellulose et de Papier Alfa (SNCPA).
-PDG de la Société SOCO PAPIERS.

Mr JAZIRI Nourredine : -Directeur Commercial de la SNCPA.
-Directeur Commercial de la Société SOCO PAPIERS.

Mr ALLAGUI : -Chef de la production pâte de la SNCPA.

Mr BISBASSE : -Directeur Général Adjoint de la SNCPA.

2°) - CAISSERIES :

2-1- Caisserie STIC : Société Tunisienne d'imprimerie et de cartonnage

Mr Salem BEN SEDRINE : - Directeur Général.
Mr Moncef BEN YAHIA : - Directeur.

2-2- Cartonnerie STEMCA : Société Tunisienne d'Emballage et de Cartonnage.

Mr CHATTI : Directeur Général.

Mr Mohamed AMAR : Directeur Général Adjoint.

3°) - MINISTERE DE L'ECONOMIE NATIONALE :

Mr : Directeur de l'Industrie.

Mr Salah FESSI : Sous Directeur des Industries du Cuir ; et Diverses.

Mr Fathi SOUISSI : Ingénieur Principale à la Direction de l'Industrie.

4°) - P.N.U.D. :

Mr N. VAN DE WALL : Chargé de programmes.

08 FEVRIER 1982 :

REUNION AVEC MESSIEURS OUCHTATI ET JAZIRI AU SUJET DE LA COOPERATION SUR LE PLAN ARABE :

Aprés la présentation du but de la visite en Tunisie, trois points ont été discutés :

1er point : Le programme de formation de l'IEMEC pour les cadres et techniciens des pays Arabes.

2ème point : Le but et les résultats obtenus par l'etude entreprise par l'Union Arabe des Industries Papetières et de l'Impression dans les pays Arabes.

3ème point : L'etat des industries du papier et carton :

- En Tunisie.
- Dans les autres pays Arabes.

1er point : FORMATION :

Aprés présentation du programme de stage établi par l'IEMEC pour l'année 1983, Mr OUCHTATI accepte de le diffuser aux différents membres de l'UAPI.

Il souhaiterait toute fois avoir le plus tôt possible :

1-1- Le programme précis des différents thémes ainsi que les modalités soit (nombre exact des participants, la limite des participants, la limite d'inscription, les conditions financières et le nom de l'organisme à qui on doit s'adresser).

1-2- Le programme de stage de l'année 1984 afin de le communiquer aussi dés maintenant aux différents membres de l'UAPI.

En ce qui concerne la proposition d'autres thémes qui n'ont pas été exploités dans le programme 1983 et qui sont susceptibles d'interesser les Cadres et Techniciens des pays Arabes, Mr OUCHTATI par l'intermédiaire de son Secrétariat Général à Bagdad essayera de contacter les gens interessés dans les pays Arabes et nous avisera prochainement.

2ème point : Etude de l'Union Arabe des Industries Papetières et de l'Impression :

Cette étude assez générale va permettre de déterminer au niveau des pays Arabes :

* La production,
* Les besoins en papier et carton,
* Le tonnage en papier et carton importé.

Les informations recueillies guideront le choix des projets des pays Arabes pour la fabrication de certains types de papiers ou de cartons importés en grande quantité

Le rapport final de cette étude sera terminé dans un mois environ.

3ème point : Etat des industries du papier et carton :

3-1- En Tunisie :

Dans le cadre du grand projet Arabe, il a été prévu dans le 6ème plan de Développement un investissement de 120 Millions de Dollars pour tous les secteurs de papiers (impression, papier, et carton) réparti comme suit :

- La création d'une usine de fabrication de papier kraft sac (35.000T/an) et de papier kraft liner (15.000T/an)qui est déjà à un stade avancé de réalisation : 40 Millions de dollars.
- Pour le secteur du papier 50 Millions de dollars.
- Pour les autres secteurs (impression) 30 Millions de dollars.

Le projet est prévu dans 4 à 5 ans.

Actuellement la Tunisie dispose de :

- 1 Société de fabrication de pâte à base d'Alfa.
- 1 Société de fabrication de papier d'impression et d'écriture à base de pâte d'Alfa.
- 3 cartonneries dont 2 opérationnelles et la 3ème le sera au mois de juin prochain.
- 3 sacheries : pour sac ciment et engrais.
- Des imprimeries.

La présentation des différentes sociétés visitées est donnée en annexe.

3-2- Dans les pays Arabes :

Les résultats de l'étude n'ayant pas encore été publiés les informations que nous avons recueillies sont les suivantes :

En Algérie :

- 11 unités dans le domaine du papier et carton, (y compris les imprimeries) dont :
  - 1 caisserie à Saida : capacité : 40.000T/an.
  - Une 2ème caisserie est en construction dans le Nord.

En Jordanie :

- Une caisserie.

En Irak :

- Une caisserie.
- Un projet d'etude d'une usine de fabrication de pate à base de palmier est en cours.

En Egypte :

- 2 ou 3 caisseries.
- Aucune idée sur les papeteries.

Dans les Emirats Arabes : Ste du Khalidje pour la fabrication des sacs en papiers.

En Arabie Séoudite : Pas de caisserie ni d'industrie de papier

09 FEVRIER 1983 :

1 - Visite de la Société Nationale Tunisienne de Cellulose à Kasserine (voir annexe).

2 - Visite de la Sacherie du Centre à Kasserine :

Fabrication de sacs ciment et sacs pour aliment de bétail en papier Kraft.

- Machine : AMV 2170
- Capacité : 100.000 Sacs/jour.
- Production : 350 à 400 sacs/jour.
- Matières Premières : Papier Kraft d'importation (Canada et Papelera de Navarra en Espagne) Commercialisé en Tnisie par SOCO PAPIERS.

  Papier Kraft de SNCPA (Kasserine).

10 FEVRIER 1983 :

1 - P.N.U.D. :

Entretien avec Mr SALAHIE et N.VAN DE WALLE, pour les informer du but de la mission en Tunisie.

2 - CAISSERIE STIC :

Voir annexe.

'' FEVRIER 1983 :

1 - MINISTERE DE L'ECONOMIE :

Reunion avec Messieurs FESSI et SOUISSI :

Lors de cette réunion trois points ont été discutés :

1- Dans le cadre de l'ARPAC :

Diagnostic des entreprises de papier et carton des Pays Arabes par des Spécialistes avec publication des rapports sur les possibilités d'amélioratic de fabrication.

2- Publication de rapportséconomiques concernant l'industrie de l'emballage dans les Pays Arabes.

3- Créer un contact permanent de l'ARPAC dans chaque pays Arabe qui diffuse les programmes de stage ainsi que toute la documentation de l'ARPAC ou l'IMEC dans le pays.

Par exemple en Tunisie la personne la plus indiquée c'est Monsieur OUCHTATI.

2 - Caisserie STEMCA :

Voir annexe.

****

INFORMATION

A. GENERAL INTRODUCTION — MOROCCO

POPULATION : 20. MILLIONS . . 50 % < 20 years

AREA Km2 : 450.000 km2

DENSITY : 27/Km2

INFRASTRUCTURE :

- Roads km : 56.200
- Railway Km : 1770
- Airports : 5 international
- Ports : 6 international
- Telephone :

G N P : 860 $

ECONOMIC PROFILE

- Agriculture : Wheet, Vegetables Cotton, Wine , Mais
- Fishing : Sardines, Tunny, Mackerel Anchory
- Mining : Lead, Phosphate, Iron, Copper
- Industries : Steel Works, Canned Goods
- Energy : Electr. Coal

MAIN EXPORTS : Food products, oranges, tomatoes, olive oil, industrial products

MAIN IMPORT :

INTERNATIONAL RELATIONS :

SUPPLIERS	CLIENTS
FRANCE	FRANCE
R.F.A.	E.E.C.
U.S.A.	U.S.A.
ITALY	SAUDI ARABIA (ARAB COUNTRIES)
JAPAN	U.R.S.S. (Phosphates)

ECONOMIC DEVELOPMENT PLAN

Sectors of priority : Economic development
Regional Development Education
Birthcontrol, Social equlaity,

B. INFORMATION PAPER INDUSTRY

PAPERMILL : ...C.N.C.P...KENITRA.....

MANAGER(Sales) : .Gabriel.Teste.De.Sacey.....

DATE : ..3.02.83.....

MACHINEBRAND : ..Mixed.2.machines.....

MACHINEWIDTH : ..36.m.....

MACHINETYPE : ...-.....

CAPACITY TON/YEAR : ..38.000.carton.20.000.liner..Medium.....

PRODUCTION TON/YEAR : 55.000.....

MARKET TON /YEAR : -.....

MARKET INCREASE % : -.....

NEW CAPACITY ?

YEAR ON STREAM : ...-.....

ADD. CAPACITY : ...-.....

BASIC LOCAL RAW MATERIAL:

TYPE OF PAPER	Bico LINER	MEDIUM	SACK
Production T/Year	9-11000	6-9000	3000
Basisweight gr/m2 150, 200	220	340	127 145
Recycled Fiber %	?		
Av. Machinespeed m/mn	?		
Local raw materials %	-		
Av. Price /ton 325 DH	3000 DH	3176 DH	
Speciality ?			

MARKET SITUATION

CLIENTS : .....

.....

.....

.....

.....

COMPETITORS : .....

.....

.....

.....

.....

COMPLAINTS .....

.....

.....

.....

.....

GENERAL IMPORT .....

.....

.....

.....

.....

CORRUGATED BOARD PLANT ..... C.M.C.P. Kenitra .....

.....

MANAGER : ..... Larbi Yessef .....

DATE . ..... 3.02.83 .....

CAPACITY TON/YEAR ; ..... 35.000 .....

PRODUCTION TON/YEAR : ..... 20 - 23.000 3 Shifts .....

PRODUCTION AREA m2 : ..... 3000 .....

PRODUCTION PEOPLE : ..... ? .....

AVERAGE BASIS WEIGHT BOARD gr/m2 : ..... 250 - 1200 .....

STARCH CONSUMPTION gr/m2 : ..... 13 .....

FUEL CONSUMPTION kg/ton paper : ..... - .....

WASTE PERCENTAGE : ..... 15 .....

PAPER STOCK TON : ..... 2 - 3 Months production .....

SUPPLIERS'DELIVERY TIME WEEKS : .....

LINER GRADES gr/m2 : .....

MEDIUM GRADES gr/m2 : .....

QUALITY CONTROL : .....

PAPERSUPPLIERS :

IMPORT %	DOMESTIC %
SCANDINAVIA	C.M.C.P.

MCAHINERY COOR PLANT ..... CMCP ....

	BRAND	YEAR	WIDTH m	SPEED m/mn	AUTOM STACKER	COLOURS	A	B	C	E
CORRUGATOR I	M.Martin	1968	2.05	70				X	X	X
CORRUGATOR II										
INLINEMACR I	Simon	1971	2300	7000 box/h		3	Cutting Unit			
PRINTERSLOTT I	SoS	1979	2080	7000 box/h		3	Cutting Unit			
PRINTERSLOTT II										
PRINTERSLOTT III										
DIECUTTER I	Bobst Bobst	1975 1979	1575 1600	2000 2500		3				
DIECUTTER II										
FOLD GLUER I	SOS									
FOLD GLUER II										
AUT. STITCH	Coating Mach. BURKLE	1970					Amount of max 20 - 30 gr/m2			
S. AUT. STITCH	Rapidex Emba	1979 1978								
MAN. STITCH										

T R A I N I N G

NEED FOR TRAINING	YES	NO	LEVEL OF EDUCATION
TECHN.MANAGER		X	
PROD. MANAGER		X	
PLANNING MANAGER		X	
MAINTENANCE MANAGER		X	
QUALITY CONTROL		X	
FOREMEN		X	
OPERATORS		X	
BOX DESIGNERS			

ORGANIZATION OF TRAINING

NONEXISTENT .....

INPLANT TRAINING ..... Yes .....

TRAINING PERIODS IN OTHER COUNTRIES .. Yes .....

SUPPLIERS'TRAINING ..... Yes .....

CONSULTANTS .....

UNIDO EXPERTS .....

TRAINING FACILITIES WITHIN THE COUNTRY

SCHOOLS .....

PACKAGING CENTERS .....

PILOT PLANTS .....

ORGANIZED SEMINARS PERIODICALLY .....

D O C U M E N T A T I O N

PACKAGING LITTERATURES ..... Yes

TRADE MAGAZINES ..... Yes

PAPER STANDARDS .....

MACHINE SUPPLIERS CATALOGUES ..... Yes

RESEARCH WORK IN THE PAPER INDUSTRY ..... ?

CORR. BOARD STANDARDS ..... ?

IMPORT DUTIES ..... -

RETURN ON INVESTMENT CALCULATION (ROI) ..... ?

FILMS ..... -

VIDEO ..... -

DIAPOSITIVS ..... -

DICTIONARY PACKAGING TERMS .....

EXPORT CORR.BOARD .....

IMPORT CORR. BOARD .....

LOCAL EXPERTS

NAME	FIELD

LOCAL TRAINERS

NAME	FIELD

CORRUGATED BOARD PLANT ONDUMAR

MANAGER : Jean Pierre BOILEAU. Techn. Manager.

DATE : 27 FEVRIER 1983

CAPACITY TON/YEAR ; 20.000 two shifts

PRODUCTION TON/YEAR : 7.000

PRODUCTION AREA m2 : 10.000

PRODUCTION PEOPLE : 100

AVERAGE BASIS WEIGHT BOARD gr/m2 : 450

STARCH CONSUMPTION gr/m2 : 12,3

FUEL CONSUMPTION kg/ton paper : -

WASTE PERCENTAGE : 14

PAPER STOCK TON : 3 months production

SUPPLIERS DELIVERY TIME WEEKS : 2 months

LINER GRADES gr/m2 : 125, 150, 200

MEDIUM GRADES gr/m2 : 112, 127, 150

QUALITY CONTROL : NO

PAPERSUPPLIERS :

IMPORT %	DOMESTIC %
SCANDINAVIA 100 %	

MACHINERY CORR. PLANT ONDUMAR

	BRAND	YEAR	WIDTH m	SPEED m/min	AUTOM STACKER	COLOURS	A	B	C
CORRUGATOR I	SOS	-	2,2	60	-			X	
CORRUGATOR II									
INLINEMACH. I									
PRINTERSLOTT I	Langston	-	2,6	3000	-	4			
PRINTERSLOTT II									
PRINTERSLOTT III									
DIECUTTER I	Iurine	-	1,2 X 0,8	-	-				
DIECUTTER II									
FOLD. GLUER I	Emba	-	-	-					
FOLD. GLUER II									
AUT. STITCH									
S. AUT. STITCH									
MAN. STITCH									

MARKET :

MAINMARKET : .....
.....
.....

RSC (Regular Slotted Container) : Ton/year Increase Potential

95 % 5-8 %

5 %
DISCUT : .....

SPECIALITIES : .....

CLAIMS : .....
.....
.....

GENERAL IMPRESSION : .....
.....
.....
.....
.....

END - USE OF CORRUGATED BOXES

FOOD AND KINDRED PRODUCTS ..X.....

PAPER AND PAPERPRODUCTS .....X.....

GLASS AND GLASSWARE .....

BEVERAGES .....X.....

FABRICATION METAL PRODUCTS .....

HOUSEHOLD APPLIANCES .....X.....

SOAPS, DETERGENTS, CLEANERS .....

MACHINERY .....X.....

CHEMICALS .....X.....

PLASTIC MATERIAL .....

METAL CANS .....X.....

TEXTILE .....X.....

TOYS AND SPORTING GOODS

FOURNITURE .....

TOBACCO .....X.....

LEATHER PRODUCTS .....X.....

RADIO TV. .....

T R A I N I N G

NEED FOR TRAINING	YES	NO	LEVEL OF EDUCATION
TECHN.MANAGER		X	
PROD. MANAGER		X	
PLANNING MANAGER		X	
MAINTENANCE MANAGER	?		
QUALITY CONTROL	?		
FOREMEN	?		
OPERATORS	?		
BOX DESIGNERS			

ORGANIZATION OF TRAINING

NONEXISTENT .....
INPLANT TRAINING ..YES.....
TRAINING PERIODS IN OTHER COUNTRIES .....
SUPPLIERS'TRAINING .....
CONSULTANTS ....
UNIDO EXPERTS ....

TRAINING FACILITIES WITHIN THE COUNTRY

SCHOOLS .....
PACKAGING CENTERS .....
PILOT PLANTS .....
ORGANIZED SEMINARS PERIODICALLY .....

D O C U M E N T A T I O N

PACKAGING LITTERATURES ..... -

TRADE MAGAZINES ..... -

PAPER STANDARDS ..... -

MACHINE SUPPLIERS CATALOGUES X

RESEARCH WORK IN THE PAPER INDUSTRY ..... -

CORR. BOARD STANDARDS .....

IMPORT DUTIES .....

RETURN ON INVESTMENT CALCULATION (ROI) .....

FILMS ..... -

VIDEO ..... -

DIAPOSITIVS ..... -

DICTIONARY PACKAGING TERMS ..... -

EXPORT CORR.BOARD ..... -

IMPORT CORR. BOARD ..... -

LOCAL EXPERTS

NAME	FIELD

LOCAL TRAINERS

NAME	FIELD

CORRUGATED BOARD PLANT OGDEN MAGHREB CASABLANCA

MANAGER : Lahcen MOUHCINE Gen Manager

DATE . 21 FEVRIER 1983

CAPACITY TON/YEAR ; 35.000

PRODUCTION TON/YEAR : 11.000

PRODUCTION AREA m2 : 9.000

PRODUCTION PEOPLE : 238

AVERAGE BASIS WEIGHT BOARD gr/m2 : 550

STARCH CONSUMPTION gr/m2 : 19

FUEL CONSUMPTION kg/ton papér : 50

WASTE PERCENTAGE : 16

PAPER STOCK TON : 3.700

SUPPLIERS'DELIVERY TIME WEEKS : 8

LINER GRADES gr/m2 : 125 . 150 . 200

MEDIUM GRADES gr/m2 : 112 . 127 . 150 . 180

QUALITY CONTROL : To some extent

PAPERSUPPLIERS :

IMPORT % DOMESTIC %

SCANDINAVIA :

- Kraft liner 6500 ton/year
- Medium " 4500 ton/year

MACHINERY COOR PLANT .....

	BRAND	YEAR	WIDTH m	SPEED m/mn	AUTOM STACKER	COLOURS	A	B	C
CORRUGATOR I	SOS		2,2	70	–			X	X
CORRUGATOR II									
INLINEMACH. I	SIMON CASEMAKER			2600		2			
PRINTERSLOTT I									
PRINTERSLOTT II									
PRINTERSLOTT III									
DIECUTTER I	Bobst			1250	–	3			
DIECUTTER II	SOS DIEMASTER			900		3			
FOLD. GLUER I									
FOLD. GLUER II									
AUT. STITCH									
S. AUT. STITCH									
MAN. STITCH									

MARKET :

MAINMARKET : O C E 70 % : Oranges, Tomatoes
.....
.....

RSC (Regular Slotted Container) : Ton/year Increase Potential
10 %

DIRECT : 35.000 ton/year (32 %)

SPECIALITIES : .....

CLAIMS : .....
.....
.....

GENERAL IMPRESSION : Machinery : Rel good, but maintenance neglected
.....
.....Organisation : Average in the Region....
.....
.....

END - USE OF CORRUGATED BOXES

FOOD AND KINDRED PRODUCTS	X
PAPER AND PAPERPRODUCTS	X
GLASS AND GLASSWARE	
BEVERAGES	
FABRICATION METAL PRODUCTS	
HOUSEHOLD APPLIANCES	
SOAPS, DETERGENTS, CLEANERS	X
MACHINERY	
CHEMICALS	X
PLASTIC MATERIAL	
METAL CANS	X
TEXTILE	
TOYS AND SPORTING GOODS	
FURNITURE	
TOBACCO	
LEATHER PRODUCTS	
RADIO TV.	
Oliveoil	X

T R A I N I N G

NEED FOR TRAINING	YES	NO	LEVEL OF EDUCATION
TECHN.MANAGER	X		
PROD. MANAGER	X		
PLANNING MANAGER	?		
MAINTENANCE MANAGER	X		
QUALITY CONTROL	X		
FOREMEN	X		
OPERATORS	X		
BOX DESIGNERS			

ORGANIZATION OF TRAINING

NONEXISTENT .....
INPLANT TRAINING NO .....
TRAINING PERIODS IN OTHER COUNTRIES To some extent .....
SUPPLIERS'TRAINING .....
CONSULTANTS .....
UNIDO EXPERTS .....

TRAINING FACILITIES WITHIN THE COUNTRY

SCHOOLS – .....
PACKAGING CENTERS IMEC .....
PILOT PLANTS – .....
ORGANIZED SEMINARS PERIODICALLY YES .....

D O C U M E N T A T I O N

PACKAGING LITTERATURES	-
TRADE MAGAZINES	X
PAPER STANDARDS	
MACHINE SUPPLIERS CATALOGUES	X
RESEARCH WORK IN THE PAPER INDUSTRY	
CORR. BOARD STANDARDS	
IMPORT DUTIES	
RETURN ON INVESTMENT CALCULATION (ROI)	
FILMS	-
VIDEO	-
DIAPOSITIVS	-
DICTIONARY PACKAGING TERMS	
EXPORT CORR.BOARD	NO
IMPORT CORR. BOARD	NO

LOCAL EXPERTS

NAME	FIELD

LOCAL TRAINERS

NAME	FIELD

MARKET SITUATION

CLIENTS : .....

.....

.....

.....

.....

COMPETITORS : .....

.....

.....

.....

.....

COMPLAINTS : .....

.....

.....

.....

.....

GENERAL IMPRESSION : .....

.....

.....

.....

.....

CORRUGATED BOARD PLANT LE CARTON

MANAGER: Jean Luc MARTINET

Date: 27. 1. 83

CAPACITY TON/YEAR: 6,000

PRODUCTION TON/YEAR: 4,000

PRODUCTION AREA M2: 1,200

PRODUCTION PEOPLE: 60

AVERAGE BASIS WEIGHT BOARD gr/m2 450

STARCH CONSUMPTION gr/m2 12

FUEL CONSUMPTION kg/ton paper: -

WASTE PERCENTAGE: 15%

PAPER STOCK TON: 1,000 TONNES

SUPPLIERS DELIVERY TIME: 3 MONTHS

LINER GR/DES gr/m2: 125, 150, 200

MEDIUM GRADES gr/m2: 127, 150

QUALITY CONTROL: No

PAPERSUPPLIERS:

IMPORT %	DOMESTIC %
SCANDINAVIA 100 %	

B. INFORMATION PAPER INDUSTRY

PAPERMILL : ...LE CARTON.....

MANAGER : ...Jean Luc MARTINET.....

DATE : ...27.1.83.....

MACHINEBRAND : ..De Julis Italve.....

MACHINEWIDTH : ....1,28 m.....

MACHINETYPE : .Cylinder machine.....

CAPACITY TON/YEAR : ....3.600.....

PRODUCTION TON/YEAR : ...3.000.....

MARKET TON /YEAR : .....?.....

MARKET INCREASE % : .....?.....

NEW CAPACITY ?

YEAR ON STREAM : .....

ADD. CAPACITY : .....

BASIC LOCAL RAW MATERIAL :

TYPE OF PAPER

	LINER	MEDIUM	SACK	
Production T/Year				
Basisweight gr/m2		100 - 300		
Recycled Fiber %		100		
Av. Machine speed m/mn		50		
Local raw materials %		100		
Av. Price /ton		-		
Speciality ?				

MACHINERY CORR. PLANT ..A.S. Carton.....

	BRAND	YEAR	WIDTH m	SPEED m/mn	AUTOM STACKER	COLOURS	A	B	C
CORRUGATOR I	Mix	1968	1,35	50				X	X
CORRUGATOR II	Novatec Spain	1978	1,35	50				X	X
INLINEMACH. I									
PRINTERSLOTT. I	Jrine								
PRINTERSLOTT II	DCM								
PRINTERSLOTT III									
DIECUTTER I	Miehle								
DIECUTTER II	Jurine								
FOLD. GLUER I									
FOLD. GLUER II									
AUT. STITCH	-						One machine		
S. AUT. STITCH	-						Three machines		
MAN. STITCH									

MARKET :

MAINMARKET : .....
.....
.....

RSC (Regular Slotted Container) : Ton/year Increase Potential
10%

DIECUT : .....

SPECIALITIES : .....

CLAIMS : .....
.....
.....

GENERAL IMPRESSION : Machinery : very old and narrow
Housekeeping : poor
Maintenance : poor
.....
.....

END - USE OF CORRUGATED BOXES

FOOD AND KINDRED PRODUCTS .....X.....

PAPER AND PAPERPRODUCTS .....

GLASS AND GLASSWARE .....

BEVERAGES .....Y.....

FABRICATION METAL PRODUCTS .....

HOUSEHOLD APPLIANCES .....

SOAPS, DETERGENTS, CLEANERS .....

MACHINERY .....

CHEMICALS .....

PLASTIC MATERIAL .....

METAL CANS .....

TEXTILE .....

TOYS AND SPORTING GOODS

FURNITURE .....

TOBACCO .....

LEATHER PRODUCTS .....

RADIO TV. .....

T R A I N I N G

NEED FOR TRAINING	YES	NO	LEVEL OF EDUCATION
TECHN.MANAGER			
PROD. MANAGER	X		
PLANNING MANAGER			
MAINTENANCE MANAGER	X		
QUALITY CONTROL	X		
FOREMEN	X		
OPERATORS	X		
BOX DESIGNERS			

ORGANIZATION OF TRAINING

NONEXISTENT .....
INPLANT TRAINING .....
TRAINING PERIODS IN OTHER COUNTRIES ...TO SOME EXTENT.....
SUPPLIERS'TRAINING .....
CONSULTANTS ....
UNIDO EXPERTS ....

TRAINING FACILITIES WITHIN THE COUNTRY

SCHOOLS .....
PACKAGING CENTERS .....IMEC.....
PILOT PLANTS .....No.....
ORGANIZED SEMINARS PERIODICALLY ....Yes.....

D O C U M E N T A T I O N

PACKAGING LITTERATURES .....

TRADE MAGAZINES .....

PAPER STANDARDS .....

MACHINE SUPPLIERS CATALOGUES .....

RESEARCH WORK IN THE PAPER INDUSTRY .....

CORR. BOARD STANDARDS .....

IMPORT DUTIES .....

RETURN ON INVESTMENT CALCULATION (ROI) .....

FILMS .....

VIDEO .....

DIAPOSITIVS .....

DICTIONARY PACKAGING TERMS .....

EXPORT CORR.BOARD .....

IMPORT CORR. BOARD .....

LOCAL EXPERTS

NAME	FIELD
—	

LOCAL TRAINERS

NAME	FIELD

I N F O R M A T I O N

A. GENERAL INTRODUCTION TUNISIA

POPULATION : 6.500.000

AREA Km2 : 165.000 Km2

DENSITY persons/Km2 : 36

INFRASTRUCTURE : Average but in progress.

Roads km : 17.000

Railway Km : 2.100

Airports :

Ports : 6 IMPORTANTS

Telephone : 80.000 lines

G N P : 840 $ 6 th rang in Africa

ECONOMIC PROFILE

Agriculture : Wheat. Barley. Tomatoes. Vegetables. Fruits. Alfa Wine Sugarbeet.

Fishing :

Mining : Phosphate, Petrol, Ironore.

Industries : Agricultural, Chemical products.

Energy : Mecanic, Electric, Cement, Petrolprod.

MAIN EXPORTS : Petrol, Food Oliveoil Phosphate.

MAIN IMPORT : Machinery, Rawmateriel , Food products.

INTERNATIONAL RELATIONS :

SUPPLIERS		CLIENTS
FRANCE	31 %	ITALY
R.F.A.	10 %	FRANCE
ITALY	9 %	GREECE
U.S.A.	6 %	U.S.A.
E.E.C.	51 %	R.F.A.

ECONOMIC DEVELOPMENT PLAN

Sectors of priority : To make the country to an economical cente in the Arab world.

Industrialisation and education.

B. INFORMATION PAPER INDUSTRY

PAPERMILL : SOCIETE NATIONALE TUNISIENNE DE CELLULOSE

MANAGER : BELGACEM OUCHTATI

DATE : 09.02.83 - KASSERINE -

MACHINEBRAND :

MACHINEWIDTH : Wyech 4,2 m

MACHINETYPE : Escher Wyss

CAPACITY TON/YEAR : 35.000

PRODUCTION TON/YEAR : 24.000

MARKET TON /YEAR : -

MARKET INCREASE % :

NEW CAPACITY ?

YEAR ON STREAM : 1984 - 85

ADD. CAPACITY : 35.000 ton/year sack paper with a possibility to produce 50.000 ton/Year. later

BASIC LOCAL RAW MATERIAL :

TYPE OF PAPER

	LINER	MEDIUM	SACK	
Production T/Year			6.000	18.000
Basisweight gr/m2				52
Recycled Fiber %				
Av. Machinespecial m/mn				
Local raw materials %				ALFA
Av. Price /ton				
Speciality ?				

MARKET SITUATION

CLIENTS : .....

.....

.....

.....

.....

COMPETITORS : .....

.....

.....

.....

.....

COMPLAINTS : .....

.....

.....

.....

.....

GENERAL IMPRESSION : .....

.....

.....

.....

.....

CORRUGATED BOARD PLANT .S.T.I.C..(SOCIETE TUNISIENNE D'IMPRIMERIE ET .DE.CARTONNAGE).....

MANAGER : SALEM BEN SEDRINE Gen-Manager.....
BEN YAHIA Moncef Director.

DATE . ..10 FEVRIER 1983.....

CAPACITY TON/YEAR ; 2 corrugators.30.000.ton/year.2 Shift.....
PRODUCTION TON/YEAR : 10.000.ton/year.....
PRODUCTION AREA m2 : 2.000 m2.....
PRODUCTION PEOPLE : 200.....
AVERAGE BASIS WEIGHT BOARD gr/m2 : 550 gr/m2.....
STARCH CONSUMPTION gr/m2 : 20 gr/m2.....
FUEL CONSUMPTION kg/ton paper : ..-.....
WASTE PERCENTAGE : 12 %.....
PAPER STOCK TON : 3-4 months production.....
SUPPLIERS'DELIVERY TIME WEEKS : 2.5 months.....
LINER GRADES gr/m2 : 150 - 175 - 200.....
MEDIUM GRADES gr/m2 : 127 - 112.....
QUALITY CONTROL : -.....
PAPERSUPPLIERS :

IMPORT %	DOMESTIC %
SCANDINAVIA	-
U.S.A.	
CANADA.	

MACHINERY CORR. PLANT .....

	BRAND	YEAR	WIDTH m	SPEED m/mn	AUTOM STACKER	COLOURS	Type of Flote A	B	C
CORRUGATOR I	SOS	1978	2,2	80	-		x	x	
CORRUGATOR II	Peters	1960	1,65	40			x	x	
INLINEMACH. I									
PRINTERSLOTT. I	Jurine		2,45	5000 Boxlhour	x	2			
PRINTERSLOTT. II	Peters		1,80	5000 boxthour	-	2			
PRINTERSLOTT. III									
DIECUTTER I									
DIECUTTER II									
FOLD. GLUER I	SOS	1979							
FOLD. GLUER II									
AUT. STITCH									
S. AUT. STITCH	Compte Dupriet	-							
MAN. STITCH 9	Handstitch						Number of machines 9		

MARKET :

MAINMARKET : Food products and various products
.....
.....

RSC (Regular Slotted Container) : Ton/year Increase Potential

DIECUT : -

SPECIALITIES : - .....

CLAIMS : -
.....
.....

GENERAL IMPRESSION : Machinery : above average in the région
.....Organisation : average.....
.....
.....
.....

END - USE OF CORRUGATED BOXES

FOOD AND KINDRED PRODUCTS	X
PAPER AND PAPERPRODUCTS	X
GLASS AND GLASSWARE	
BEVERAGES	
FABRICATION METAL PRODUCTS	
HOUSEHOLD APPLIANCES	X
SOAPS, DETERGENTS, CLEANERS	
MACHINERY	
CHEMICALS	X
PLASTIC MATERIAL	
METAL CANS	
TEXTILE	
TOYS AND SPORTING GOODS	
FURNITURE	
TOBACCO	
LEATHER PRODUCTS	X
RADIO TV.	

T R A I N I N G

NEED FOR TRAINING	YES	NO	LEVEL OF EDUCATION
TECHN.MANAGER	X		
PROD. MANAGER	X		
PLANNING MANAGER	X		
MAINTENANCE MANAGER	X		
QUALITY CONTROL	X		
FOREMEN	X		
OPERATORS	X		
BOX DESIGNERS	--		

ORGANIZATION OF TRAINING

NONEXISTENT .....
INPLANT TRAINING .....
TRAINING PERIODS IN OTHER COUNTRIES .....
SUPPLIERS'TRAINING .....
CONSULTANTS .....
UNIDO EXPERTS .....

TRAINING FACILITIES WITHIN THE COUNTRY

SCHOOLS .....
PACKAGING CENTERS .....
PILOT PLANTS .....
ORGANIZED SEMINARS PERIODICALLY .....

D O C U M E N T A T I O N

PACKAGING LITTERATURES ..... Tappi Fefco conferences .....

TRADE MAGAZINES ..... - .....

PAPER STANDARDS ..... - .....

MACHINE SUPPLIERS CATALOGUES ..... YES .....

RESEARCH WORK IN THE PAPER INDUSTRY .....

CORR. BOARD STANDARDS ..... NO .....

IMPORT DUTIES ..... 18 % .....

RETURN ON INVESTMENT CALCULATION (ROI) ..... - .....

FILMS ..... - .....

VIDEO ..... - .....

DIAPOSITIVS ..... - .....

DICTIONARY PACKAGING TERMS .....

EXPORT CORR.BOARD ..... Today no, 2 Years ago yes .....

IMPORT CORR. BOARD ..... Water and humidity resistent boxes from France. .....

LOCAL EXPERTS

NAME	FIELD
Moncef Fertani C M E I Tunis	

LOCAL TRAINERS

NAME	FIELD

CORRUGATED BOARD PLANT ..... S T E E C A .....

.....

MANAGER : Chatti Gen Mgr. (absent during meeting)
Mohamed Amar : Director.

DATE . ..... 11 FEVRIER 1983 .....

CAPACITY TON/YEAR ; ..... 9000 .....

PRODUCTION TON/YEAR : ..... 5500 .....

PRODUCTION AREA m2 : ..... 2500 .....

PRODUCTION PEOPLE : ..... 60 .....

AVERAGE BASIS WEIGHT BOARD gr/m2 : ..... 500 .....

STARCH CONSUMPTION gr/m2 : ..... 20.5 .....

FUEL CONSUMPTION kg/ton paper : ..... 60 .....

WASTE PERCENTAGE : ..... ? .....

PAPER STOCK TON : ..... 4-5 months production .....

SUPPLIERS'DELIVERY TIME WEEKS : ..... 6 .....

LINER GRADES gr/m2 : ..... 125 - 150 - 175 - 200 .....

MEDIUM GRADES gr/m2 : ..... 112 - 127 .....

QUALITY CONTROL : ..... - .....

PAPERSUPPLIERS :

IMPORT %	DOMESTIC %
SCANDINAVIE.	
CANADA	
I.S.A.	

MACHINERY CORR. PLANT .....

	BRAND	YEAR	WIDTH M	SPEED M/MN	AUTOM STACKER	COLOURS	A	B	C
CORRUGATOR I	ISOWA	1979	1,65	65	-		X	X	
CORRUGATOR II									
INLINEMACH. I									
PRINTERSLOTT. I	ISOWA	1979	2,2		-	2			
PRINTERSLOTT. II									
PRINTERSLOTT. III									
DIECUTTER I									
DIECUTTER II									
FOLD. GLUER I	UNIVERSAL								
FOLD. GLUER II									
AUT. STITCH	ITALY								
S. AUT. STITCH	ITALY						ONE MACHINE		
MAN. STITCH	?						SIX MACHINES		

MARKET :

MAINMARKET : Various .....

.....

.....

RSC (Regular Slotted Container) : Ton/year Increase Potential

DIECUT : .....

SPECIALITIES : .....

CLAIMS : .....

.....

.....

GENERAL IMPRESSION : Machinery : Average in the region .....

.....Organisation : Below average.....

.....

.....

.....

New factory under installation

Starting date june 83

Machinery : ISOWA corr. 1,80

Place : Sfax Tunisia.

END - USE OF CORRUGATED BOXES

FOOD AND KINDRED PRODUCTS X .....

PAPER AND PAPERPRODUCTS ....X.....

GLASS AND GLASSWARE .....

BEVERAGES .....

FABRICATION METAL PRODUCTS .....

HOUSEHOLD APPLIANCES .....X.....

SOAPS, DETERGENTS, CLEANERS .....

MACHINERY .....

CHEMICALS .....

PLASTIC MATERIAL .....

METAL CANS .....

TEXTILE .....

TOYS AND SPORTING GOODS

FURNITURE .....

TOBACCO .....

LEATHER PRODUCTS .....X.....

RADIO TV. .....

T R A I N I N G

NEED FOR TRAINING	YES	NO	LEVEL OF EDUCATION
TECHN.MANAGER	X		
PROD. MANAGER	X		
PLANNING MANAGER	X		
MAINTENANCE MANAGER	X		
QUALITY CONTROL	X		
FOREMEN	X		
OPERATORS	X		
BOX DESIGNERS			

ORGANIZATION OF TRAINING

NONEXISTENT ..... Yes
INPLANT TRAINING .....
TRAINING PERIODS IN OTHER COUNTRIES .....
SUPPLIERS'TRAINING ..... Yes
CONSULTANTS .....
UNIDO EXPERTS .....

TRAINING FACILITIES WITHIN THE COUNTRY

SCHOOLS .....
PACKAGING CENTERS .....
PILOT PLANTS .....
ORGANIZED SEMINARS PERIODICALLY .....

D O C U M E N T A T I O N

PACKAGING LITTERATURES .....

TRADE MAGAZINES .....

PAPER STANDARDS .....

MACHINE SUPPLIERS CATALOGUES .....

RESEARCH WORK IN THE PAPER INDUSTRY .....

CORR. BOARD STANDARDS .....

IMPORT DUTIES ....18%.....

RETURN ON INVESTMENT CALCULATION (ROI) .....

FILMS .....

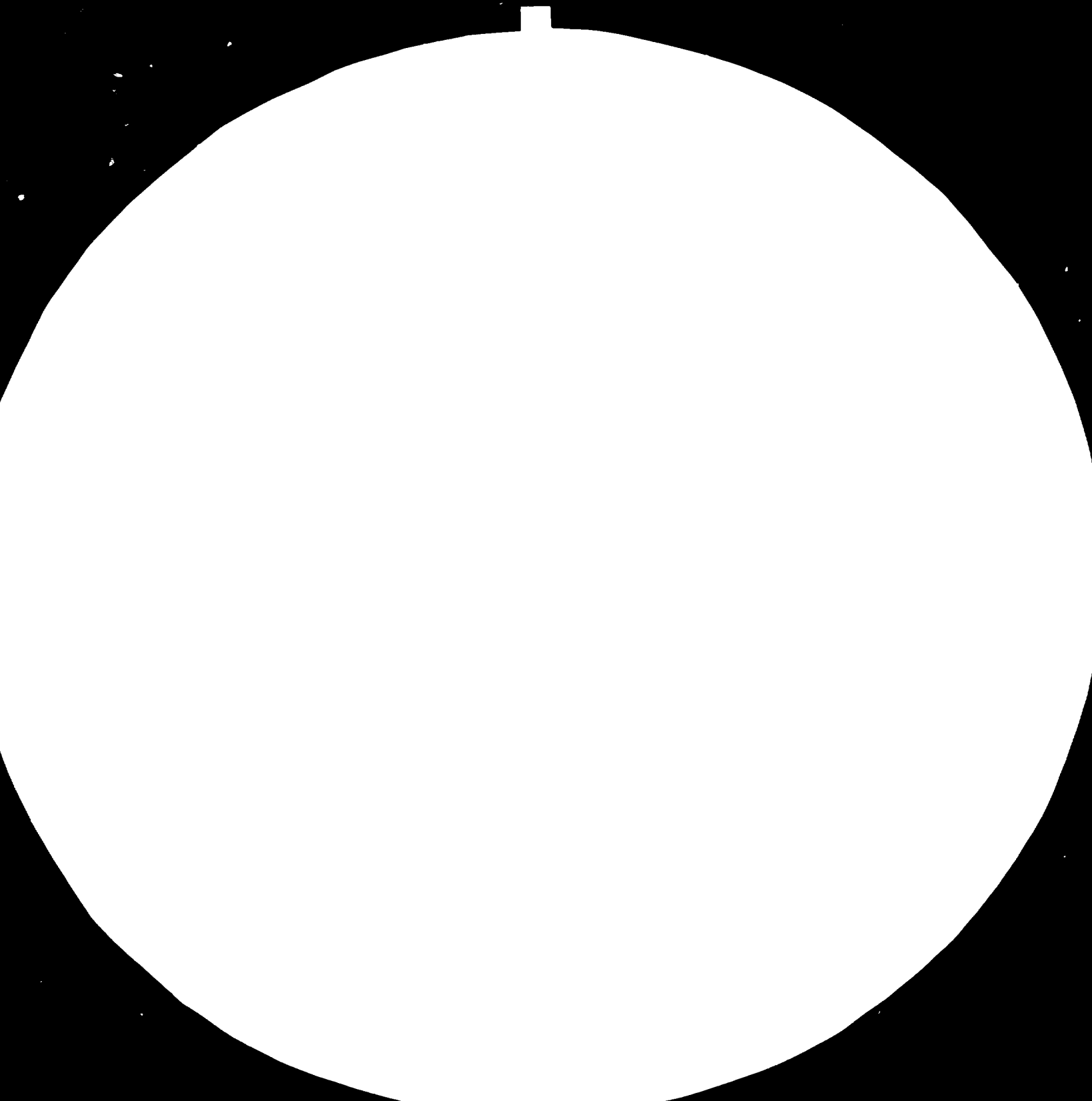
VIDEO .....

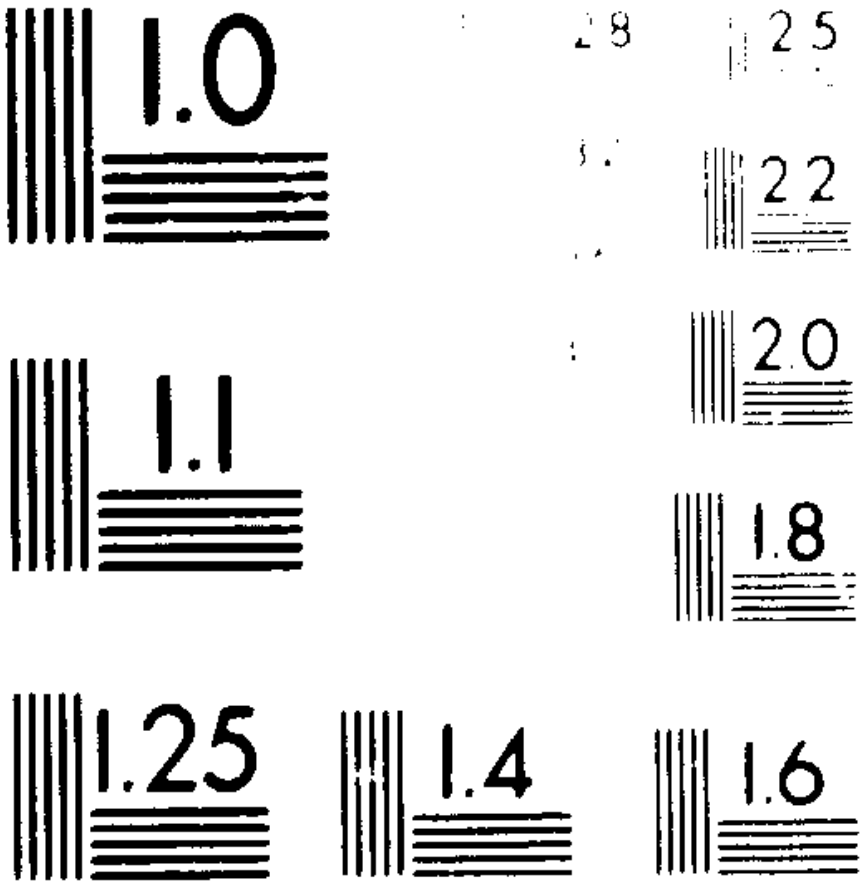
DIAPOSITIVS .....

DICTIONARY PACKAGING TERMS .....

EXPORT CORR.BOARD .....

IMPORT CORR. BOARD .....





LOCAL EXPERTS

NAME	FIELD

LOCAL TRAINERS

NAME	FIELD

LES CAISSES EN CARTON ONDULE

Qu'est ce qu'une caisse en carton ondulé:

La caisse est fabriquée à partir du carton ondulé fabriqué sur train onduleur qui est constitué de 1,2 ou 3 machines simple face, double ou triple station de colle, table chauffante, mitrailleuse (rainurage et découpe), une coupeuse.

Selon le nobmre de machines simple face (1 ou 2 ou 3) existant dans le train onduleur, on peut réaliser (Slide n°1):

- Le carton ondulé double face;
- Le carton ondulé double double;
- Le carton ondulé triple cannelure.

(Slide n°2)
(Overhead n°3)

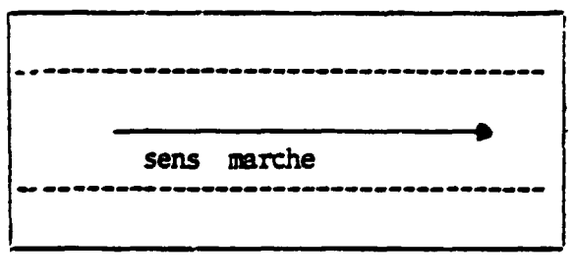
Différentes hauteurs de cannelure sont d'usage dans la fabrication du carton ondulé:

A. Cannelure de hauteur environ 5 mm (gde cannelure)
B Cannelure de hauteur envrion 4 mm (moyenne cannelure)
C Cannelure de hauteur environ 3 mm (petite cannelure)
E. Cannelure de hauteur environ 2 mm (micro-cannelure).

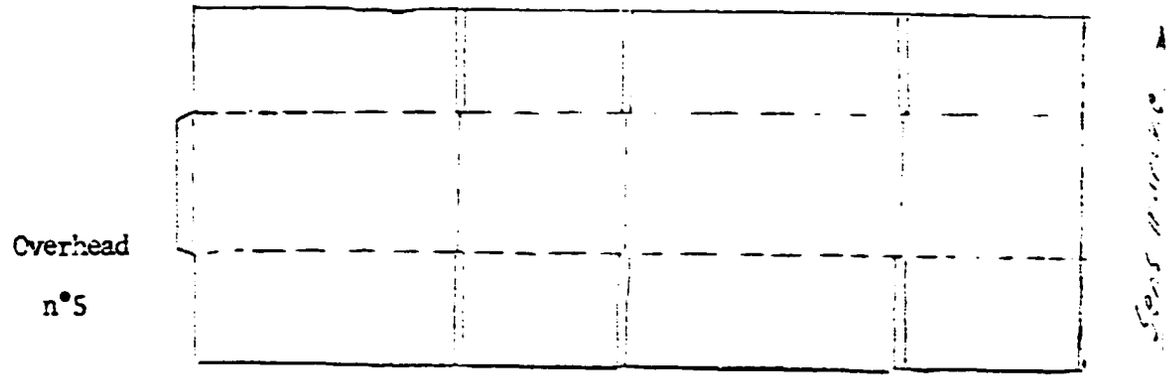
Le train onduleur combine les couvertures et la cannelure à l'aide d'une colle normalement utilisée à base de maïs.

Après la table chauffante, le carton entre dans la mitrailleuse où on réalise l'opération de rainurage et de découpe, ensuite le carton entre dans la coupeuse.

Overhead n°4



La feuille de carton ondulé ainsi obtenue, est introduite au printerslotter, où le rainurage parallèle aux cannelures et le slott est fait; ainsi que l'impression.



Après cette opération, la feuille réalisée est prête pour la finition.
S'il y a une patte de jonction, elle est soit agrafée soit collée à l'autre bord pour constituer la caisse.
Ou bien, les 2 bords sont reliés par une bande adhésive; et dans ce cas, il n'est pas nécessaire d'avoir une patte de jonction (ex: caisse de regroupement pour les petits emballages de beurre).

Dans les machines de finition modernes, la feuille réalisée à partir du train ondu-leur est imprimée, rainurée et encochée et pliée pour former la caisse dans une seule machine appelée "IN LINE MACHINE".

Après cette brève introduction sur la définition du carton ondulé et les étapes de fabrication d'une caisse en carton ondulé, on va essayer de traiter d'une manière plus poussée le paragraphe suivant:

INFLUENCE DE L'HUMIDITE ET LES CONDITIONS DE STOCKAGE SUR LA CAISSE EN CARTON ONDULE/

Près que 80 à 95% de l'emballage en carton ondulé est utilisé comme moyen pour trans-porter des biens et denrées essentiels sur de longues distances à l'intérieur ou à l'extérieur des centres de population:

C'est l'emballage de transport

Le reste,c'est à dire, 5 à 20% est utilisé comme emballage de consommation.
Je vais traiter la partie de l'emballage de transport:

Durant sa vie, la caisse en carton doit assurer plusieurs fonctions et cela en res-pectant:

1. LA PROTECTION/

C'est un emballage qui doit assurer la sécurité du produit pendant le transport

du producteur jusqu'au consommateur.
Autrement dit, il protège le produit et réduit le gaspillage et avaries.

2. LE STOCKAGE/

Il est commode et offre une méthode sûre, pour stocker le produit jusqu'à sa vente.
Il permet aussi une utilisation optimale de l'espace disponible au magasin et facilite le contrôle et l'inventaire des commandes.

3. LA MANIPULATION/

Il facilite la manipulation et le traitement automatique et offre une manipulation manuelle facile ainsi qu'une procédure d'inspection plus simple.

4. LA PUBLICITE/

Il peut servir comme un renfort publicitaire, pendant qu'il est en transport ou en présentation ou en stockage.

5. LES COUTS/

Il peut être le moyen de réduction des coûts d'emballage.
Dans beaucoup de circonstances la caisse sera exposée à des conditions très humides et cela peut évidemment réduire les fonctions de la caisse.
Le sujet de cette action de l'humidité vis à vis de la caisse est très complexe et ne peut pas être traité dans les détails en un temps si court.

Il y a quelques règles générales qui peuvent être utilisées pour estimer la performance de la caisse dans des conditions d'humidité très élevées.

Initialement, tous les papiers absorbent facilement l'humidité de la même façon. Quand l'humidité relative augmente, tous les produits à base de papier l'absorbent dans les mêmes proportions.

Il y a des différences entre les différents papiers mesurables au laboratoire; mais pour la plupart des cas pratiques, ces différences sont négligeables.

Quand l'humidité augmente, toutes les caractéristiques du papier qui contribuent à la résistance au gerbage diminuent.

La résistance à la compression verticale diminue dans des proportions uniformes de l'augmentation de l'humidité dans prèsque tous les cas de stockage.

On peut illustrer ceci par les exemples suivants:

- Si nous exercons une résistance à la compression verticale à 100 % pour un emballage avec 7% d'humidité, le même emballage aura 50% de sa résistance à la compression verticale pour 15% d'humidité.

Dans cette échelle, la résistance à la compression verticale diminue de 6,5% pour chaque 1% d'augmentation de l'humidité.
Un contenu d'humidité dans le papier de 7% correspond à une humidité relative de 50% de l'ambiante et un contenu d'humidité dans le papier de 15% correspond à une humidité de l'ambiante de 90%.

Le contenu d'humidité dans le papier est généralement proportionnel à l'humidité relative de l'ambiante entre environ 30% et 80% d'humidité relative.

Au delà de 80% d'humidité relative, le contenu d'humidité dans le papier augmente très rapidement avec l'augmentation de l'humidité relative de l'ambiante.

De ce fait, le papier absorbe plus d'humidité dans une ambiante de 80% à 100% d'humidité relative qu'il n'absorbe dans une ambiante où l'humidité relative varie de 0 à 80%.

A cause de ceci, la caisse perd beaucoup de sa résistance à la compression verticale dans des conditions très humides.
De ce fait, il est très difficile de faire des tests de compression sur les caisses dans des conditions d'humidité très élevées.

Afin de résoudre ce problème d'humidité différentes techniques ont été étudiées pour prévenir l'entrée de l'humidité dans le papier et le traitement à la cire a été l'un des procédés les plus réussis.

A ma connaissance, il n'existe aucun rapport complet, qui traite de tous les aspects du traitement des caisses en carton ondulé.

Généralement le carton ondulé est traité avec de la cire pour obtenir un degrés de résistance à l'eau, ceperdant ceci augmente considérablement la résistance à sec du carton et cette résistance à sec peut être aussi importante que la résistance à l'eau dans certaines applications.

La cire ne protège pas entièrement le carton contre la pénétration de l'eau.
Elle diminue l'effet de l'eau ou le retarde.

Ainsi, une caisse traitée à une performance meilleure par rapport à une caisse non traitée dans certaines situations; soit parceque la caisse traitée retarde la pénétration de l'eau assez longtemps jusqu'à l'utilisation finale de la caisse, ou que le traitement diminue l'effet de l'eau suffisamment pour que la caisse aie une résistance à la compression verticale adéquate même si elle est mouillée.

Il existe 3 niveaux de traitement possibles dans l'industrie du carton, ce sont:

a) traitement de la cannelure uniquement;
b) traitement des cannelures et la cannelure séparement;
c) traitement complet de la caisse;
d) revêtement.

Les premiers traitements sont généralement opérés au niveau de l'onduleuse, tandis-que le dernier type est réalisé sur les emballages finis comme opération spéciale.

a) Le traitement de la cannelure, apporte anviron 5 à 8% à la résistance, à la compression verticale du carton ondulé et de 50% à la compression à plat; ce qui est un facteur important pour la résistance de la caisse.

Ce type de traitement est généralement utilisé pour des applications où la caisse est très peu exposée à l'eau; mais quand il y a une possibilité de pénétration de l'eau (ou d'une humidité relative très élevée) dans la cannelure, la caisse s'effondre.

Avec ce traitement, le poids de la cannelure augmente de 17 à 20%.

b) Avec le traitement des cannelures et la cannelure séparement, le poids de la caisse augmente de 17 à 20% et la résistance à la compression verticale augmente de 20 à 30%.
La résistance à la compression à plat du carton ondulé est augmentée de 30 à 50%, ce type de traitement est utilisé quand il y a suffisamment d'eau pour causer des problèmes aux couvertures de la caisse.
Mais, il n'est pas adapté dans des conditions très humides, ou pour des caisses qui transportent des produits glacés.

On peut compléter ce mode de traitement par un revêtement (coating) de la caisse, afin d'avoir une très haute résistance à l'eau.

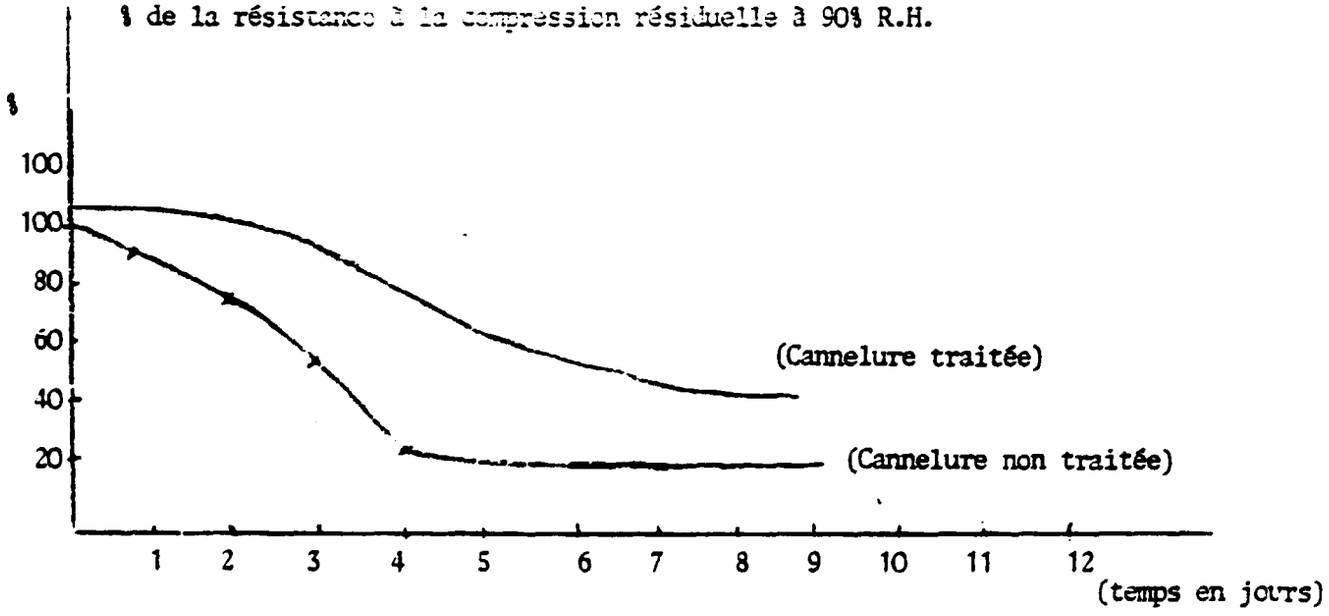
c) Le traitement complet de la caisse par immersion dans un bain de cire en fusion, est utilisé pour les conditions les plus sévères, par exemple pour une caisse transportant des produits glacés (iced products).

Le problème du choix du type de traitement adéquat à utiliser ou du non traitement dépend d'une part des exigences de l'utilisation de la caisse et d'autre part du prix du traitement.

Dans certains cas, il est pratiquement impossible de fabriquer une caisse fonctionnelle sans traitement; la seule solution est de faire un traitement.
Dans d'autres cas, une caisse non traitée peut fonctionner par l'utilisation de couvertures et cannelures très lourdes, ou par une autre conception de la caisse.

Le traitement à la cire permet d'avoir des composants du carton ondulé plus légers; ou une conception plus simple de la caisse; le choix étant guidé par le côut relatif à chaque alternative.

Le schéma suivant montre le pourcentage de la compression résiduelle de la cannelure traitée en fonction du temps.



L'effet de la durée de stockage:

Un autre facteur qui est important dans les performances de stockage, est le comportement de vieillissement du papier.

Sous l'effet d'une charge statique les caisses en carton ondulé auront une déformation continue, et si cette charge statique est maintenue pour longtemps, la caisse

finira par s'effondre.
Ce comprtement a été étudié d'une manière très détaillée mais il reste des points à éclaicir.
De toute façon, on peut prévoir la durée de vie de la caisse en carton ondulé.
Si nous appelons (T/B) la force de compression verticale, déterminée par les méthodes normalisées à 100%, si on exerce une charge statique de 70% sur la caisse, la caisse s'effondrera après une journée.

La même caisse peut supporter une charge statique de 60% de (T/B) pendant 3 semaines et 50% de la charge pendant 8 à 10 semaines.
Le vieillissement du papier et la perte de résistance à cause de l'augmentation de l'humidité peuvent causer une déterioration imprévue de la caisse.
Par exemple, si nous avons des caisses stockées dans un local avec une charge statique équivalente à 40% de la résistance à la compression verticale, on peut espérer 3 ans de stockage sans problème.
Si, cependant les conditions de stockage changent en augmentant l'humidité relative ambiante, de telle façon que les caisses perdent 40% de leur résistance à la compression verticale, dans ce cas on peut estimer que les caisses sont chargées à 60% de leur compression verticale.au lieu de 40% et à 66% de la compression verticale les caisses s'effondrent dans une semaine. C'est un cas hypothétique, bien sûr, mais cela peut arriver pendant le stockage.

En d'autre termes le client peut avoir une caisse avec une performance excellente, si les conditions de stockage ne changent pas.
Mais si les conditions changent, l'humidité relative change dans l'ambiante et les caisses absorbent cette humidité et perdent leurs résistance et s'effondrent sous une charge qu'elles auront pu supporter sans problèmes dans les conditions initiales de stockage.

L'effet de gerbage

La méthode de gerbage est aussi importante et une nette amélioration de la résistance au gerbage peut être obtenue (environ 30%) et souvent sans des coûts excessifs.
Ceci peut être obtenu par une disposition en colonne lors de gerbage, au lieu d'une disposition alternée.