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PACKAGING OF FURNITURE FOR EXPORT^{1/}

by

R. Koskenranta*

and

O. Aaltonen**

* Sales Director, United Paper Mills Ltd. Paperituote, Lahti, Finland

** Packaging Engineer, United Paper Mills Ltd. Paperituote, Lahti, Finland

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Packaging

The packaging methods for protecting and transporting furniture have changed considerably in recent years. In the 1930s furniture dealers were frequently still handicraftsmen. While industry produced furniture, the dealers purchased it unfinished and painted or lacquered and upholstered it before selling it to customers. Today factories are responsible for the entire manufacturing process. Therefore, furniture must be protected for transport and storage. Often the article is delivered to the consumer in a package made at the factory. The packaging of products is one of the most difficult problems encountered in export. A badly designed package and the resulting damage to the product can be disastrous to the trade. When products are sent abroad, their proper packaging is essential.

Damage to furniture

Furniture is expensive and must be handled with care. Repairing damage elsewhere than in the factory where the furniture has been manufactured is difficult, sometimes even impossible, and above all expensive, owing to differences in finishing materials and methods. The more claims that are made for transport damages, the higher the costs are for transport and the more reluctant the manufacturer becomes to ship furniture. Returning products, ordering new ones, waiting for the new delivery and making claims for damage are a strain on the retailer. Thus, damage to furniture concerns three parties: the furniture manufacturer, the owner of the transport company and the dealer. Each has his own problems and responsibilities, although the manufacturer loses most if damage occurs. Transport companies and dealers are not dependent on furniture alone. However, the furniture manufacturer is dependent on them and, consequently, he is responsible for delivering the product undamaged.

Reasons for damage

There are many reasons for damage. Three are dealt with in the following section; they are incompetent handling, defective packaging and the wrong choice of means of transport and storage.

Incompetent handling

The most damage to furniture occurs during transport and storage because of incompetent handling. Usually the lorry drivers or workers in the storerooms have received no training in how to handle furniture. Often they simply cannot afford to handle furniture packages with care; because of their low weight per volume, they are often loaded into trucks or railway cars to full capacity. Furniture packages have always been designed to protect the product in its normal position of use. Packages are often marked to indicate their upper side. Designers and packagers expect the products to be handled in the way indicated by the signs; this, however, does not always happen because of the tendency to use the transport or storage space as economically as possible.

Defective packaging

Considerable damage occurs when products are packaged badly. If the package is too large, the product moves inside it, causing rubbing and other damage. A furniture package must be so tight that the product cannot move in it. Tightness is obtained by filling the inner parts. The package is also defective when too light packaging materials are used. Materials used in domestic transport are not generally strong enough; stronger materials must be used. Most furniture is moved manually. A transport package must be designed so that it is easy to take hold of when moved. If the product should travel in a certain position, openings for hands would be helpful. However, some articles are nearly always loaded in a certain position to save space. A rectangular object, if longer than 140 cm, is loaded and stored on its end; hence the ends must be strengthened. The package is also defective if weather hazards are not considered.

Wrong choice of transport means and improper storage

The right mode of transport is not necessarily the most expensive. It is recommended that the best means of transport be chosen first before the cost is reckoned. During the transport there is not as much damage as during loading and unloading, and thus reloading should be minimized; reloading cannot be controlled and therefore the chances of wrong and careless handling are greater. A container going straight to the purchaser may be considered as safe as a full truck-load or railway car. But if other merchandise is transported in the same vehicle and there are reloadings, the risk increases. If it is not possible to arrange a full load to be transported to the customer,

it is advisable to arrange one full load destined for one city or at least for one country; this would reduce considerably the risk of damage. In storage high stacks should be avoided. Temperature changes can also damage furniture and in particular severe changes in temperature should be avoided. The storage area should be free from water and water vapour. Part of the products may have been damaged in the factory warehouse. The manufacturer should also pay attention to his own storage. If it can be seen that a package may have been damaged, the product must be checked before being sent further. Many furniture dealers have limited storage areas and this often contributes to further damage.

Function of furniture package

A package that protects the product in all conditions is too expensive to manufacture and use. Thus the purpose of a package is to protect the product during transport and storage in reasonable circumstances against mechanical strain and weather hazards.

The package must protect the product in the following storage conditions: storage indoors and storage outdoors under a roof.

The package must facilitate transport and handling. It must also promote sales of the product through identifying the product and its manufacturer and describing it.

Designing process of furniture package

Package design should be started almost simultaneously with product design. In that way savings may be made in packaging work, storage and transport. The product is protected longer because of a correctly dimensioned and manufactured package. However, in most cases the furniture designer wants individual design requiring individual packages for all products. The package manufacturing industry should be consulted in designing furniture packages.

To obtain efficient package design suited to the purpose, it is important to be familiar with the conditions in which the package will be during transport and storage and other handling. Unlike transport within the home country, in export transport several unknown and rather complicated factors must be considered. The following are some of the more important points that should be considered in package design for export:

Shape, size, weight, structure, quality and price of the product

Destination and route of transport

Mode of transport

Handling of product during transport and storage

Mechanical strain and weather hazards

Packaging standard

Possible use later (secondary use)

The following section deals with different transport means and their effect on packages.

Transport

Railway transport

Railway transport is used frequently since it is an inexpensive and secure means of transport. Experience shows that it requires careful packaging. Special care and skill must be used when loading the car. Fragile objects must not be put under heavy objects. The load must be very tight, since the objects must not move during transport. Reloadings should be avoided since they cannot be controlled.

Container transport

Container transport is used fairly often in furniture export. It usually reduces the need for and costs of packaging. Experience shows that this often is the case, but only if the respective special conditions have been considered. Container transport saves packaging costs most when the container goes directly from the manufacturer to the purchaser without intermediate handling. If the container must be unloaded and the products are packaged more lightly than normally, there may be damage. The problem is not whether to use containers but how to place the packages in them. For example, in a ship's hold the container and the packages in it sway as much as the ship; therefore, packages intended for container transport should not be made light.

Sea transport

Packages during sea transport are exposed to strong mechanical strain and wear. Condensation in the hold and moisture permeation must also be considered when choosing raw materials for the package cover and its inside.

Transport in the company's own trucks

Most furniture factories have their own trucks for the major part of domestic transport. Research and development should be devoted to improving the loading areas so that packages could be made lighter. It may be uneconomical to use the company's own trucks, but it is definitely the surest way.

Packaging materials

Wrapping materials

Corrugated board. At present corrugated board is the most popular raw material for the cover of furniture packages. It is made of two rather thin boards, at least one of which is corrugated.

The main types of corrugated board are:

- Single-faced corrugated board (figure I)
- Double-faced corrugated board (figure II)
- Double-wall corrugated board (figure III)
- Triple-wall corrugated board (figure IV)

Single-faced corrugated board is delivered in rolls or sheets. To facilitate packaging, it can be grooved at the back. It is used in packages, and as wrapping, cushions and insulation.

Furniture packages made of single-faced corrugated board are still commonly used, but their use is expected to diminish in the future. Its use in packages for export is rare since its modest appearance makes it unsuitable. It is used mainly to prevent objects from moving in a box, or it can be used as a filler to make the packages tight.

Double-faced corrugated board is mainly used for the manufacture of package boxes and interior fitments. Boxes made of it are used mainly to package furniture for export. It can be used for the manufacture of ready packaging boxes, or if the furniture factory wishes, it may be delivered in sheets cut to the desired dimensions which are used at the factory for the manufacture of packages for export.

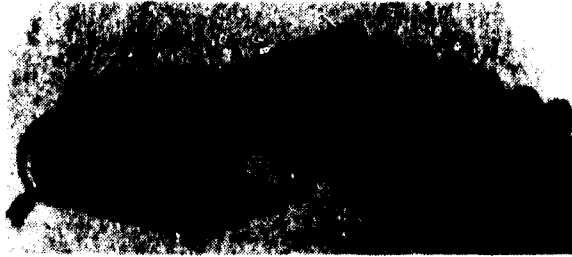


Figure I. Corrugated board is increasingly used for packaging furniture.
This type is single-faced and is a flexible material
used for wrapping

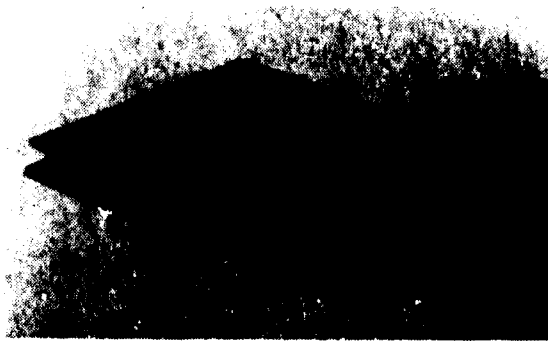


Figure II. Double-faced or single-wall corrugated board
is used for lighter packages

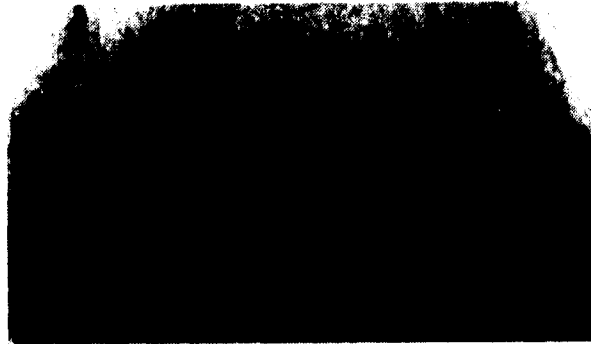


Figure III. Double-wall or double-double corrugated board is used especially for export packages



Figure IV. Triple-wall corrugated board is used for very heavy packages

Various factors affect the choice of quality of corrugated board. The most important are:

- (a) The mode of transport used by the factory;
- (b) Whether the package is intended for domestic or export transport;
- (c) Quality and structure of the product.

When choosing the quality of corrugated board it has to be decided whether it is enough to protect the product against impacts and foreign objects, or if the package is able to carry a load on top of it. In other words, is the product's own capacity sufficient or is it so low that the packaging box alone must take a load on top of it, particularly in storage? A heavily built chest is probably strong enough to carry a heavy load, but a bedside table may easily be damaged.

Other packaging materials

In special cases the package can be made of wood, fibreboard or plywood. These are used particularly in export packages, which are delivered (as an example) individually by sea. All three materials can be used in combination if so desired.

Raw materials for the inner package

The following are different raw materials that may be used in combination or alone in making the inner part of the package:

- Single-faced corrugated board
- Wax paper
- Plastic film
- Synthetic paper
- Kraft paper
- Sulphite paper

Corner and edge covers

These are used to restrain impacts and knocks during transport and storage. They protect the most fragile areas and are made of expanded polystyrene (figure V), corrugated board (figures VI and VII) or plastic.

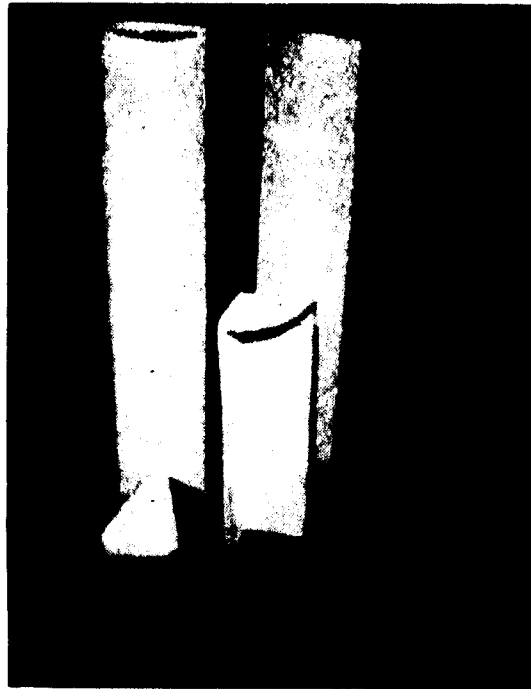


Figure V. Protectors made from expanded polystyrene are very popular in the furniture industry. They are supplied in standard shapes and lengths and can be easily cut to the size required

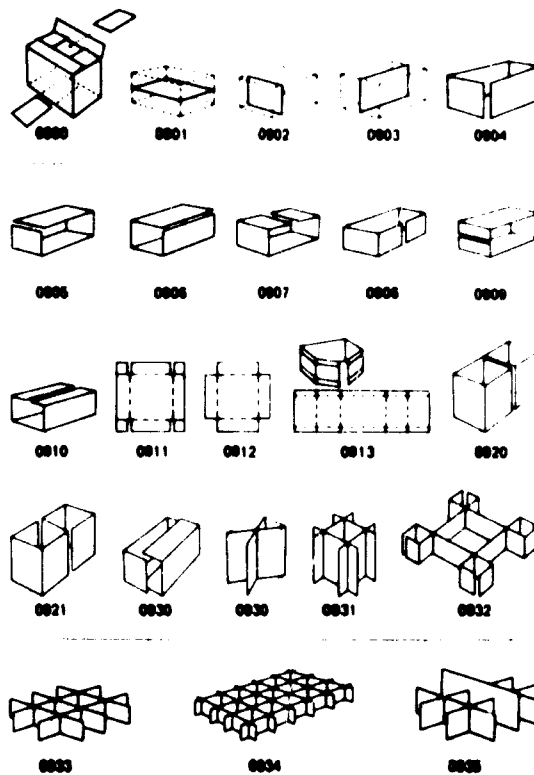


Figure VI. Corrugated board in general provides good possibilities for constructing interior fitments for all kinds of furniture packages

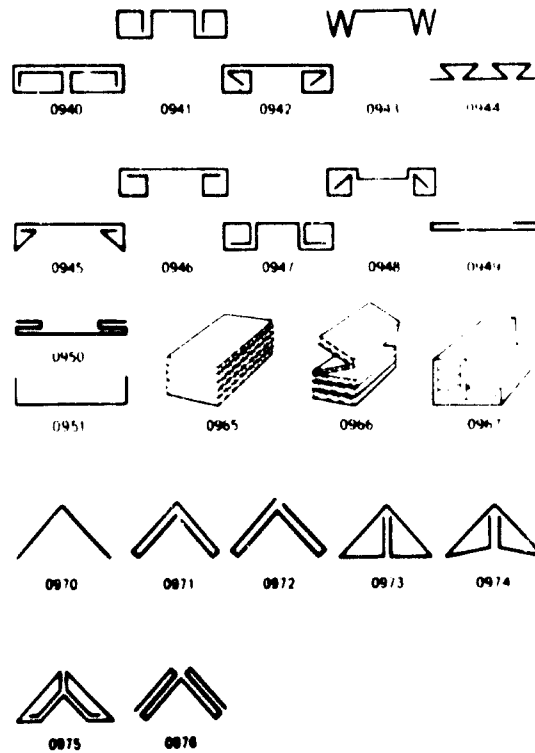


Figure VII. Some applications of corrugated board as corner and edge protectors, pads etc.

Closing materials and equipment

Materials that can be used alone or in combination to close the package are:

- Gummed tape
- Self-adhesive tape
- Staples and yarn
- Plastic strapping
- Steel strapping
- Glue

Marking materials and equipment

In the final phase the packages are marked; for this, labels and text slips, pens, chalks etc. are needed.

Box packaging of furniture

The basic principles of packaging are:

(a) That there must be some material to prevent rubbing against the surface of the product (figures VIII-XII);

(b) That edges and corners, which can be damaged easily, must be protected separately (figures XIII-XV);

(c) That detachable parts (such as table legs) must be fastened tightly inside the package so that they cannot become loose during transportation and storage (figures XVI-XVIII);

(d) That the product must be packaged in the box so that it cannot move at all (figures XIX and XX);

(e) That the box must be closed carefully.



Figure VIII. The table is wrapped in padded paper

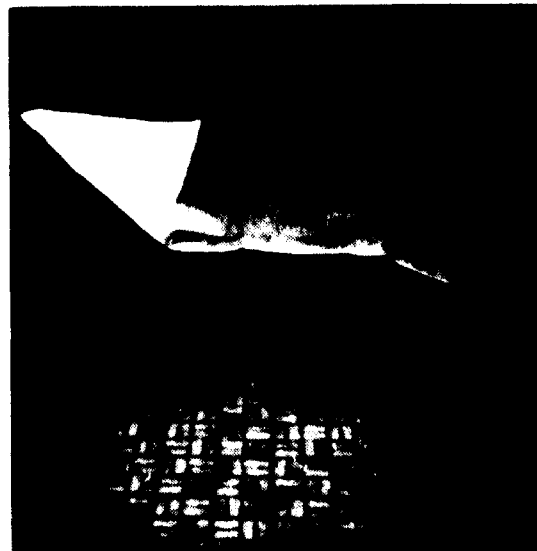


Figure IX. A small cabinet with its polished surface protected by a padded paper wrap



Figure X. To package small chairs, start by protecting the surfaces of the chair with a padded paper wrap



Figure XI. An empty corrugated folder is placed on the seat of the chair

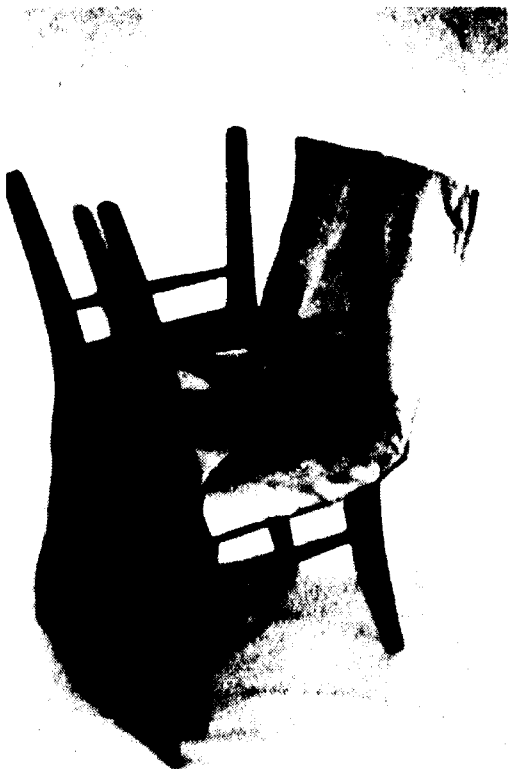


Figure XII. Another chair is placed in an inverted position on top of the first one

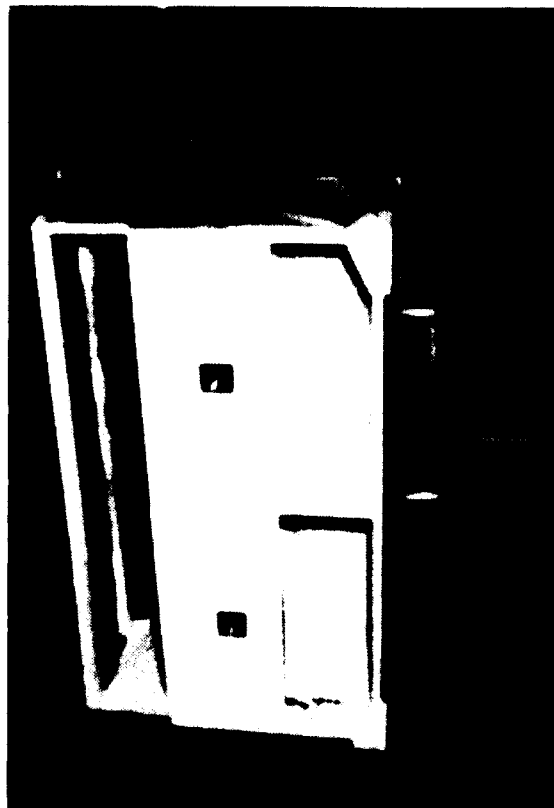


Figure XIII. An example of a pointed cabinet with corner protectors

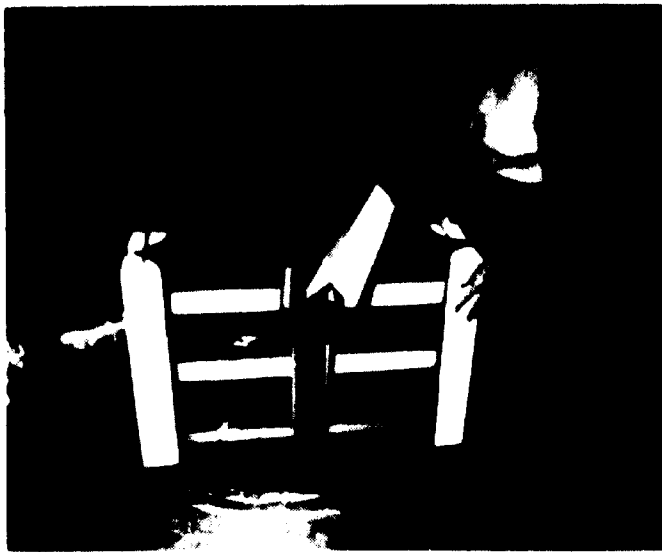


Figure XIV. This cabinet is first wrapped in a loose plastic film and the protectors fixed in their correct place by strings or tape

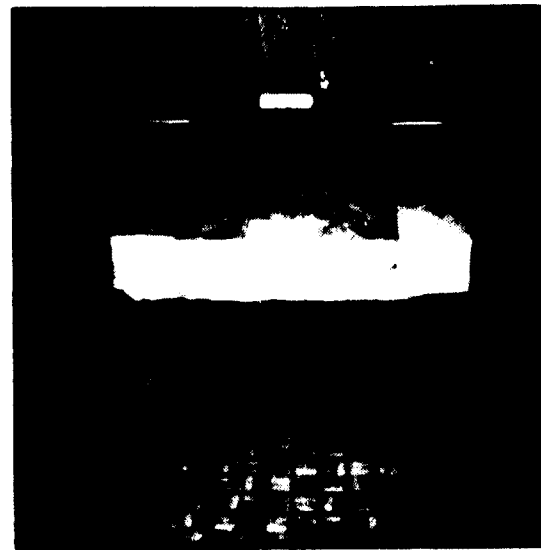


Figure XV. Corner protectors are added

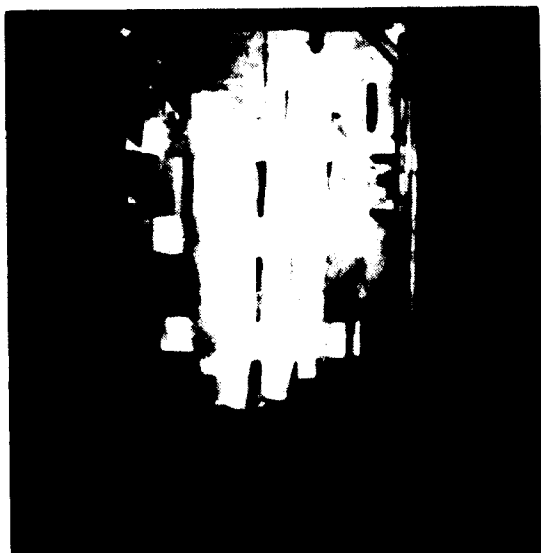


Figure XVI. The legs are removed individually wrapped and secured under the table top

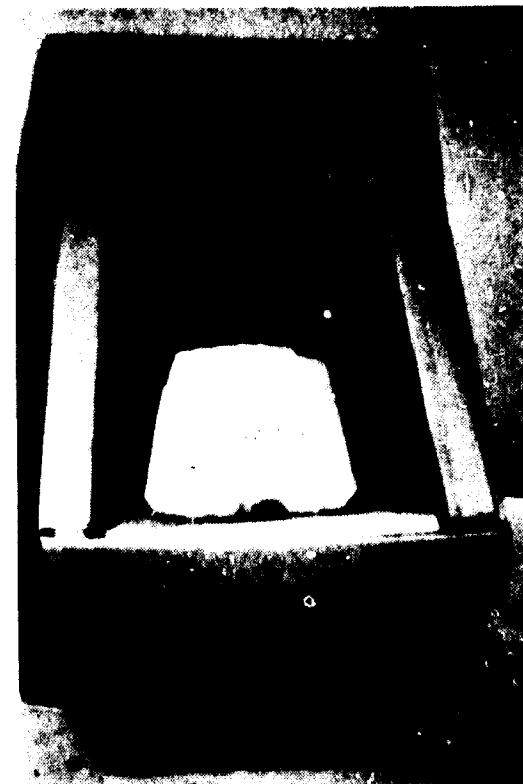


Figure XVII. The legs of the two chairs in the corrugated box are protected by special corrugated interior fitments

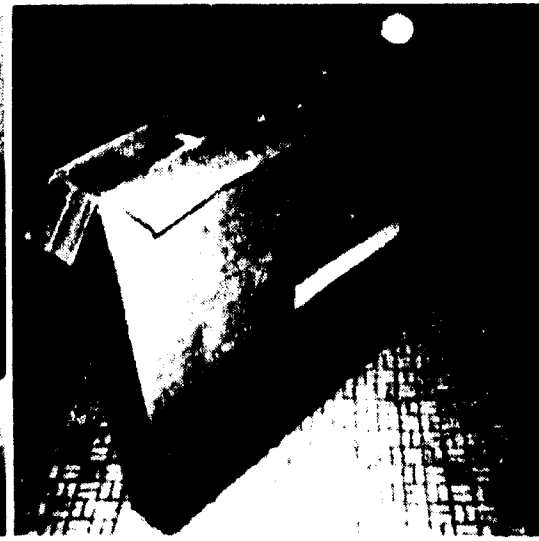
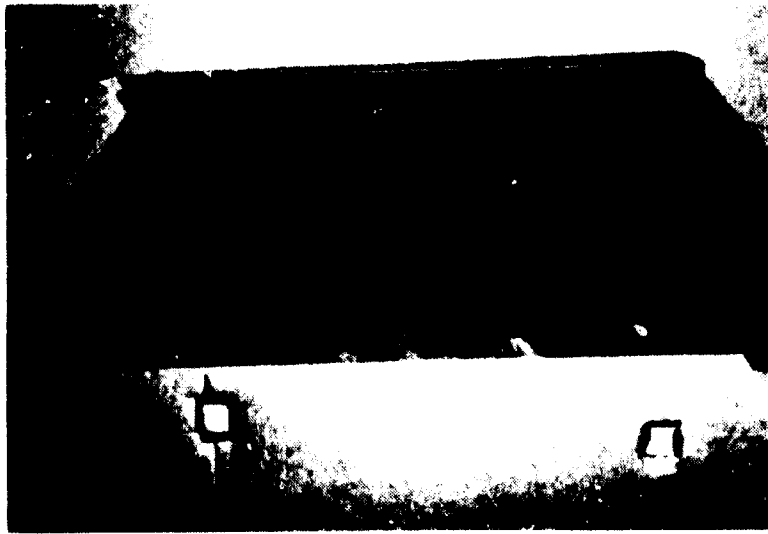


Figure XVIII. The chair legs may be fixed into holes in the inner flaps of the box itself

Figure XIX. The finished package for a dining table

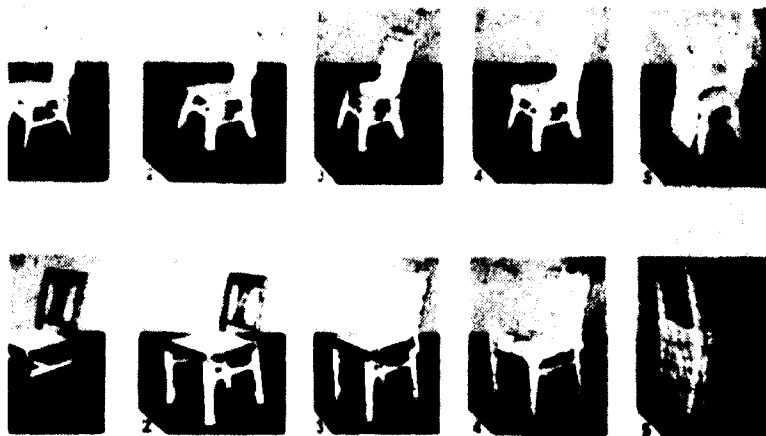


Figure XX. The proper wrapping of furniture is a time-consuming operation. (a)-(e) shows how it should be done

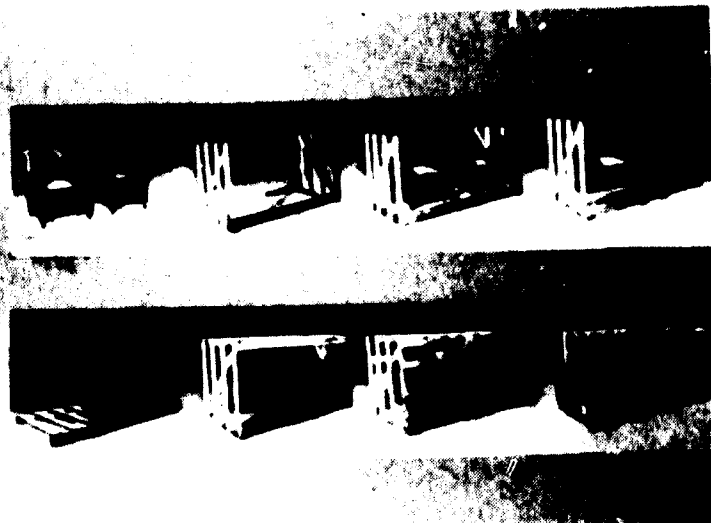
(a) Steps in wrapping two chairs



(b) Packaging two chairs



(c) Packaging a lounge chair



(d) Packaging two lounge chairs



(e) Packaging a large-size sofa

Closing the box

The strength of the package is also dependent on the correct closing method. A box made of first-class raw materials and of solid construction is worthless if it is not closed so that the closing points are at least as strong as the other parts of the package. A frequent reason for transport damage is failure in the closing point.

The following materials may be used for closing furniture packages:

- Gummed tape
- Self-adhesive tape
- Staples
- Strapping
- Glue

Closing with gummed tape is a good method. A box closed with gummed tape is tight and neat, easy to open, and when properly done it strengthens the box. This method, however, requires absolute care and skill. Devices and auxiliary equipment designed especially for this purpose must be used.

The use of adhesive tape in closing can be compared with gummed tape. Its price is higher, but it is easy to use and the auxiliary devices are simple. When using different types of tapes, very strong joints can be obtained.

The use of staples involves a risk owing to the penetration of staples. The method as such is fast, and when properly made the joint is strong. A box closed with staples is not tight, so that moisture and dirt penetrate to the products through the seams. The staples can rub the product or tear the upholstering material.

The packages can be strengthened with strappings, but straps are not recommended for use in closing packages in which the product does not give support to the package.

Standardization of box packages

The main difficulty in using corrugated board boxes in the furniture industry is the short production series of the factories and their wide product range. Therefore the amounts of boxes of different sizes and shapes ordered are relatively small from the point of view of the box manufacturer. For this reason the furniture factory should standardize packages so that the same box would be suitable for many different products.

Shrink-film package

There is no reason to deal here with shrink-film packages in detail since packaging with shrink film requires equipment that is not possible to buy for small factories. Shrink-film packages are not recommended for export packaging except as inner packages for which purpose they are very efficient. The transparency of the package apparently results in more careful handling.

Marking packages

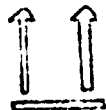
Corrugated-board boxes can be printed either with continuous print or individual design. Individual printing is recommended because it can give necessary information to the receiver, such as name of product, wood species, colour, fabric etc.

Handling instructions and end-use

Handling instructions can also be printed in advance. The signs have been designed so that the symbols indicate the method of handling. The use of signs is supposed to guarantee correct handling in all phases. The symbols are based on the recommendation of ISO. The following signs are the most common handling instructions for furniture packages:



handle with care



this side up



protect from moisture

A general rule about the position of signs is that the person handling the packages should be able to notice them easily.

The handling instructions are part of proper packaging and are very important in preventing damage. They are a prerequisite for claims against the person responsible for careless handling that has caused damage.

Packaging costs

Packaging costs may be grouped as material costs, labour costs, machinery costs and factory area costs.

The costs of machinery and factory area are rather small in the furniture industry, so that cost saving through them is difficult. The main costs are material and labour, which are both significant. The following list indicates the packaging costs of a Finnish furniture factory in which domestic and export packages are compared. The costs are given as percentages of selling prices of the product.

Product	<u>Packaging costs as percentage of selling prices</u>	
	<u>(Domestic)</u>	<u>(Export)</u>
Chair	0.7 to 3.0	2.7 to 10.0
Chair, with arms	0.8 to 1.6	3.0 to 6.0
Table, delivered in parts	0.7 to 4.2	1.9 to 7.5
Cabinet, large	0.7 to 1.1	1.8 to 3.0
Cabinet, small	1.8 to 2.7	5.4 to 8.1
Sofa and two armchairs	0.3 to 1.5	0.8 to 3.7
Approximate average	1.7%	4.5%

As one can see, export packages are a considerable expense. The variation in percentage share in package costs results from the fact that a more expensive product is packaged in a package similar to that of a less expensive product.

Significance of packaging

Packaging as a means of protecting the product is particularly important in transport and product transfer, since that is when the strength of the package is thoroughly tested. A proper package is an important form of service. It speeds the handling of products and guarantees their arrival to the receiver in good condition; it also testifies to the dependableness of the factory.

Correct export package

No single method of packaging may be called the correct one. The article to be packaged and the conditions change even within the factory, not to speak of the variations in articles and conditions in different countries and continents. The principles remain the same: the package has to be suited to the purpose. When it is made, thought must be given to the risks that the article may encounter during transport and storage. Development of packages to suit the different phases of transport requires close co-operation between factory and the people handling the product during transport and storage.

Conclusions

Packaging of furniture, especially for export, is one of the most difficult problems in packaging technology. There are a number of reasons for this:

- (a) Furniture is an expensive commodity;
- (b) Furniture is very fragile and even small defects caused by damage during transport will make it difficult to sell;
- (c) Furniture usually has a large shipping volume and is irregular in shape.

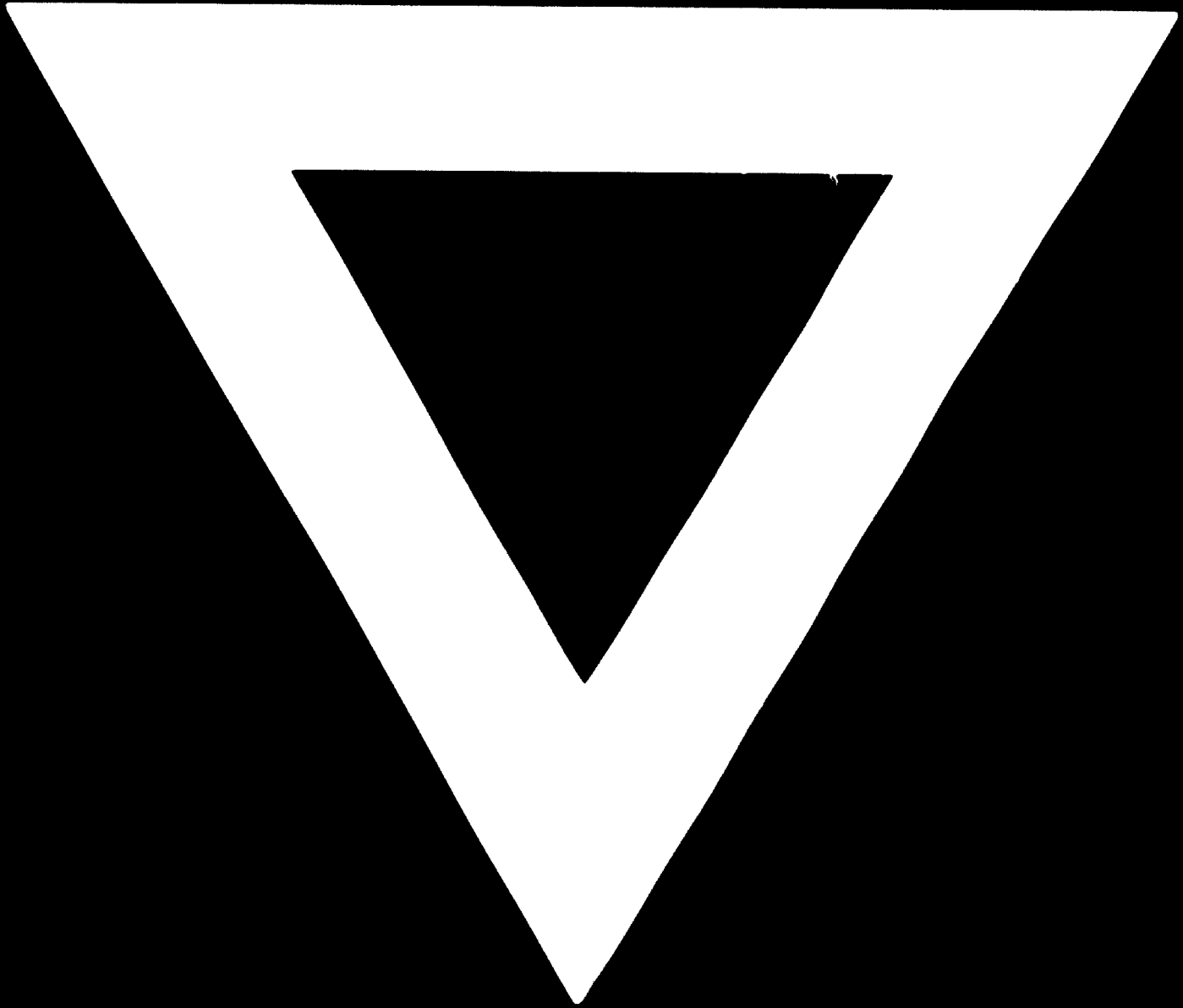
A study on furniture packaging shows three main reasons for damage during transport: inadequate handling, inadequate packaging and inadequate storeroom facilities.

The most important things to remember in packaging furniture are:

- (a) A very tight fit in the package in order to prevent any movements of the furniture item inside;
- (b) Protection against mechanical shocks by use of cushioning materials, especially to protect edges and corners;
- (c) Protection against scuffing or other damage to lacquered or painted surfaces;
- (d) Protection against dust and excessive moisture.



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