



H I P E R

HANDBOOK FOR IMPROVING THE MANAGEMENT OF
USED CARDBOARD PACKAGING IN HYPERMARKETS

Every day, the hypermarket business generates a significant amount of waste that has to be managed on site. This calls for systematic models of management for the different types of waste generated in the shops. The fact that each hypermarket has different characteristics and needs makes any systematisation or standardisation more complex, as waste management has to be adapted to the particular needs at each individual centre. Paper and board waste is prominent among the different waste products handled at the shops.

With regard to paper and board packaging, according to **ASPAPPEL's** study entitled "Diagnosis of Paper and Board Collection in Spain" ⁽¹⁾, in 2001 hypermarkets generated and managed on site in Spain 363,000,000 kilos of packaging and wrapping papers, i.e. 14% of the total, with a recycling rate of nearly 100%.

Given the significance of this constant flow of paper and board packaging for recycling, the Spanish Association of Corrugated Board Manufacturers (**AFCO**) ⁽²⁾ sponsored a collaboration project

between **CARREFOUR** and the **Polytechnic University of Madrid** to study the internal flows of cardboard packaging in CARREFOUR hypermarkets, identifying possible improvement areas and attempting to contribute a methodology for managing used cardboard packaging in the centres. The methodology included in this handbook is the result of that project, where more than 25 CARREFOUR hypermarkets in different locations in Spain have been studied. We hope that it will provide an efficient tool for those with responsibilities for implementing specific systems in each hypermarket.

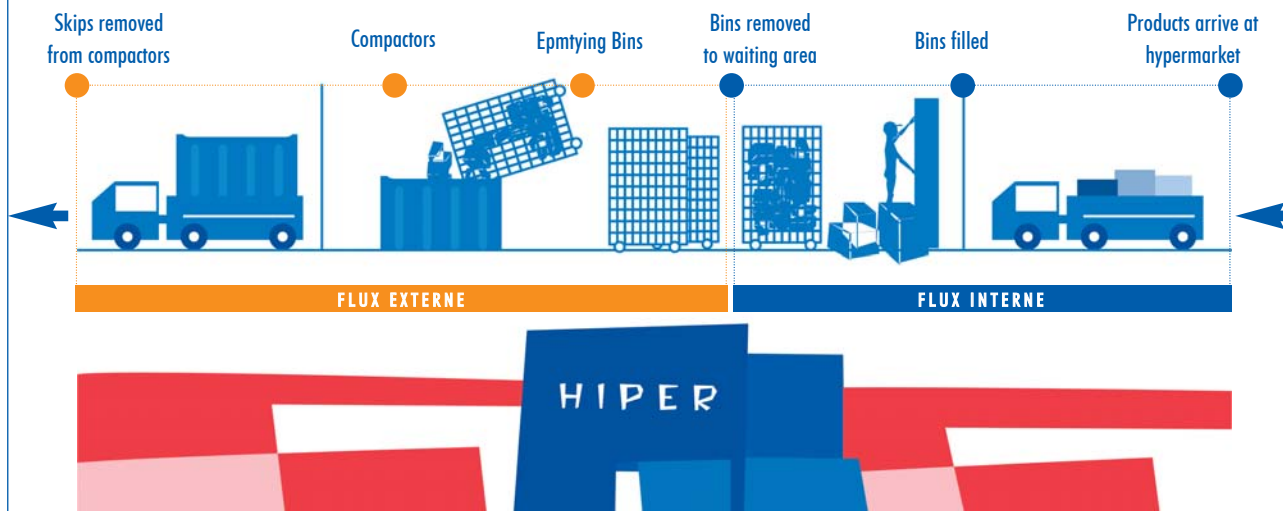
Firstly, this document describes the flows involved in managing used board and reveals certain interesting conclusions with regard to the type of centre and used board generation by sections. Secondly, it lists a series of recommended parameters for designing a used board recycling service, as well as for the post-management and monitoring of the system.

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Cardboard packaging flows in Hypermarkets

Cardboard packaging flows in hypermarkets follow the steps shown in the following diagram:



Of these flows, we need to distinguish between those that refer to internal, on-site management and those that are generally sub-contracted and which we can consider external flows. Internal, on-site management includes all flows related to products arriving and being stored, products being placed on lines (which entails undoing the freight or bulk packaging and placing the wrapping in a cage or bin), bins being removed to a waiting area where the compactors and board handling are found. External or sub-contracted flows refer to emptying

and handling of full bins, compactor feeding and the replacement of compactor skips when full.

Approved waste management firms exist in the paper chain authorised to perform this type of outsourcing. The provision of their services is regulated by means of a contract which generally describes the obligations for the provider and the associated costs, while the total costs of the service are partially offset by the value of the used board removed from the centre.

To classify hypermarkets, specific business traits are generally taken into account, such as surface area, number of employees, and turnover.

But from the point of view of used board management, other factors need to be considered, such as:

- ✓ Those sections with the greatest turnover, and therefore waste generation per type of cardboard packaging.
- ✓ The space available for the installation, handling and free movement of equipment and vehicles.
- ✓ Waste generation seasonality and peak sale periods.
- ✓ The distance from the hypermarket to the collection plant in order to determine how many used board-removal journeys are required and the service provider's response time.

Used board generation per section

The objective of this analysis is to determine and quantify used board flows that are generated as a result of shelf re-filling in each section, and also to determine the

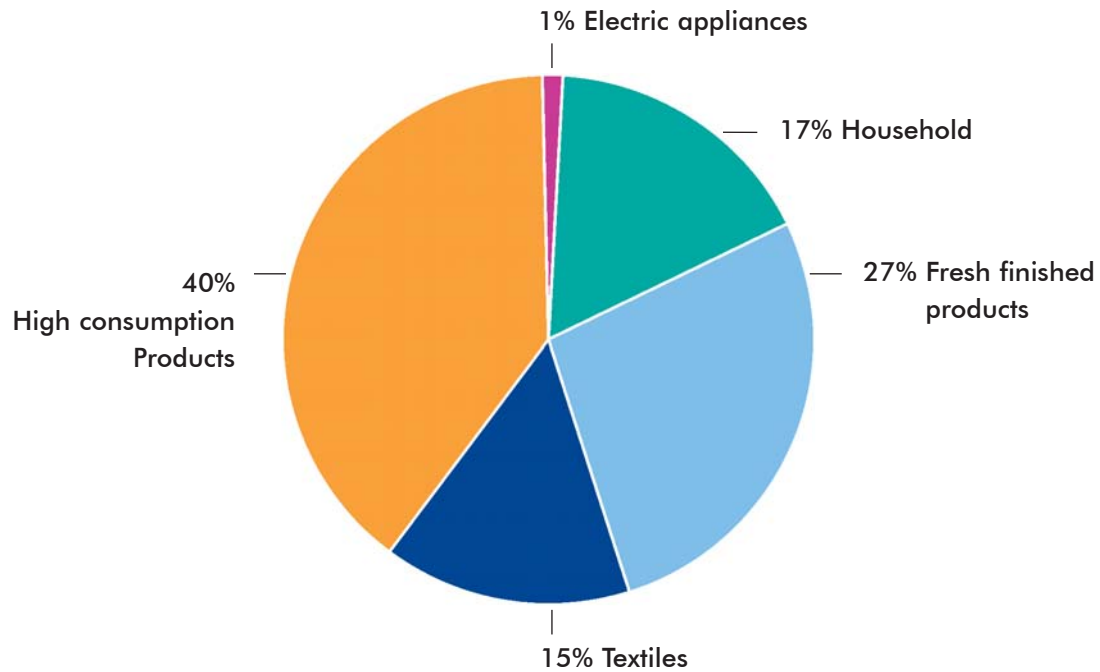
generation of used board in hypermarkets. For that purpose, the type of cardboard box associated with each section/sub-section and the weight of each type of box need to be

Division	Section	Sub-section groups
FOOD	High-consumption products	Liquids and dry foods, Personal hygiene, Self-service products
	Fresh finished products	Fruit & vegetables Meat & Poultry Bakery & Fishmongers Delicatessen & Ready Meals
PAS ALIMENTATION	Household	Leisure, Free Time & Culture Garden, Automobile, D-I-Y Household utensils
	Textile	Ladies, Gentlemen, Children, Babies, Shoes
	Electrics & Appliances	Large-size appliances Hand-held appliances TV and Hi-Fi, PCs and Jewellery

identified to define the hypermarkets in terms of the different sections and sub-sections and the amount of waste board each one generates.

The results of this analysis are shown in the two tables below:

Waste board generation per section



staff

Staff

It is recommended that the outsourced company responsible for the waste management system (external flows) should assume the commitment to provide the necessary workforce for loading the compactor. These operators are generally known as "loaders" and should be made available in sufficient number and for a sufficient amount of time to ensure the service is provided according to the needs of each centre.

The loaders will work at a pace that depends on how quickly or how often the cages full of waste board are brought by the shelf-fillers to the compactor. It was observed that a different amount of waste board is generated in the morning than in the afternoon. It was also seen that significant peak waste generation occurs during the week and on certain concrete days of the month due to the start of the season for a particular product or the launch of new products or special offers.

Apart from the used board supply frequency to him, the 'loader' work efficiency also depends on how clean and well-prepared the material arriving in the cages is. If the loader does not receive clean material, he has to spend a long time separating cardboard from plastic and other materials, thereby creating a bottleneck in the service.

The loader's professional status should be at least that of general worker and an analysis of the position shows that his duties should include the following jobs:

duties

- ✓ Receive the cage with the folded board brought in by the shelf-filler.
- ✓ Remove the largest unwanted materials (plastics and wood) and any organic matter and deposit them in separate skips or compacting devices.
- ✓ Empty cage into compactor and place empty cage in a suitable place for the shelf-filler to remove when he/she returns with the next cage.
- ✓ Start and stop compactor.
- ✓ Load compactor and control filling.
- ✓ Call manager when compactor is almost full.

In some cases, the shelf-filler has been seen to assist the loader when the amount of generated waste is above normal.

compacting equipment

Compacting equipment

Most of the hypermarkets in the study used static compactors backed-up, in some cases, by auto-compactors, to optimise access and the space available in the storeroom or warehouse. Normally these operations require between 20 and 40 square metres.

Crushing speeds of between 2 and 10 operations per minute were observed. This factor is as significant as the nominal capacity of the compactor because very often the used board is generated as certain times during the day and the capacity of the equipment to respond will depend to a large extent on its crushing speed.

AUTO-COMPACTOR: Recommended for volumes up to 25/30 ton/month

Approximate cardboard loading capacity:	3.5 Ton.
Average crush cycle duration:	50 seconds
Average volume crushing chamber:	1,4 cubic metres
Theoretical capacity:	100 m ³ /h
Dimensions: Length:	6 metres
Width:	2,5 m
Height:	2,2 m
Space required for operating:	11 metres' free space in front of machine

STATIC COMPACTOR: For larger volumes

Cardboard loading capacity:	4 - 4,5 tons
Average crush cycle duration:	50 seconds
Average volume crushing chamber:	2,2 cubic metres
Theoretical capacity:	158 m ³ /h
Dimensions: Length:	2,5 to 4 metres depending on model
Skip length:	6 metres standard
Width:	2,5 m
Height:	2,2 m
Space required for operating:	11 metres' free space in front of machine

Skip removal frequency

Skip removal frequency

The removal of full compactors varies according to each hypermarket, from one removal per day to one removal per week. It is generally determined either by how full the skip is or it can be pre-programmed to a specific schedule.

[varies between 1 - 7 days depending on the centre]

The analysis shows that the amount of cardboard that can be compacted in two identical compactors depends on the nature of the sales at the centre in question. Thus, depending on which sections account for the greatest turnover in each centre, one or other type of box will be generated in greater quantities, which in turn bears upon the mix of boxes going into the compactor and therefore upon the machine's crushing speed.

By analysing the type of waste generated at each centre, it is possible to determine a standard weight for each machine at that particular centre and therefore programme how often the collection service needs to be scheduled.

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Quality of recovered material

Quality of recovered material

The board recovered from hypermarkets is taken to a collection store where it is cleaned, sorted and baled in accordance with European Standard EN 643 List of Standard Recovered Paper and Board Grades ^(***).

To guarantee that the board collected from hypermarkets is recycled, it needs to be completely clean of organic waste. Likewise, it is highly recommendable that the hypermarket itself separate board from plastic, as once compacted together, separation at the recovery plant is much more costly and therefore acts against the economic feasibility of the waste management process.

Approval of service providers

Approval of service providers

One of the most important factors when contracting the provision of waste board management service is that the companies providing the service are duly authorised and approved. The fundamental matters that need to be reviewed during the provider authorisation process are as follows:

[Selection criteria]

1. Basic administrative documentation (permits, licences, H&S policy, etc.) suitable for the business.
2. Availability of adequate plant & machinery and workforce.
3. Environmental and Quality Management.
4. Financial details (basic documentation).
5. Number of plants, waste treatment capacity, and traceability of recovered board (guaranteed recycling).
6. Prevention of occupational hazards management and scheme.

Service monitoring

Periodic service monitoring report

The homologation described in the previous section means that a process of continuous improvement can be established between client and provider. The provider must report periodically the most relevant data regarding the service to the client so that both parties may take measures to correct any faults detected and to improve any parts of the process as required. This report shall include, at least, data about the number of trips made per centre to remove board, the weight of the board removed, any incidents regarding the quality of the board recovered, data about the provider's employees allocated to the hypermarket, as well as information about the destination of the recovered paper once cleaned, sorted and baled.

One question that may be relevant in this monitoring process is to determine, at the time of contract, what centres are going to be serviced directly by the provider and what centres will be serviced by his subcontractors. In any case, we recommend that monitoring of all centres be carried out centrally.

Audits

Audit scheduling

Controlling the weight of the trucks removing the board from the hypermarket determines both the efficiency of the service, i.e. how full in percentage terms the compactor is and therefore the number of journeys to the recovery plant that need to be made, and the economic value of the flow of removed board.

To perform such control, the service provider shall draw up an audit schedule for all items relating to the service, especially with regard to weighing and weighbridges and the staff allocated to the centres.

Staff training

Prevention

Staff training

The service provider and the client shall both commit themselves to a joint, continuous training scheme for all employees involved in the service. This training scheme shall include general information about paper recovery and recycling (why do we do it?), information about matters relating to efficiency and quality in the service (how to do it?), and information about safety and hygiene at work.

This training scheme shall have the firm support of the top management at the centre and shall involve not only compactor loaders but also store-men, heads of section, shelf-fillers and generally, all employees directly involved with the service.

Prevention

All the actors in the packaging chain, from the papermaker, the box-maker, the packer, the wholesaler down to the paper recycler, shall strive to uphold a cycle of efficiency in the recycling of cardboard packaging. In this sense, when studying eco-design and setting up prevention measures, all issues related to the on-site management of packaging and the materials that make it up shall be borne in mind throughout the process, from unpacking by the shelf-filler to its final recycling.

In the same way, all actors in the paper chain shall take all measures possible to prevent damaging the characteristics and essential properties of the packaging materials.

- 1 **Efficient solutions exist for managing** the used cardboard packaging at hypermarkets; these solutions can be designed around a standardised model to which the particular characteristics of each centre are then added.
- 2 **To adapt the standard model** to the particular requirements of each centre, **we have to take into account those factors that allow us to classify each hypermarket into a specific type**, especially when quantifying those sections with the highest turnover and seasonality.
- 3 Once the specific factors of each centre have been determined, the most suitable combination of workers, machinery and board removal frequency needs **to be decided** in order to achieve **optimum quality for the service** and the materials being recovered for recycling.
- 4 Finally, in order to optimise the service by efficiently combining in-house flow operations with outsourced flows, **suitable homologation should be sought for the external provider of the waste management system, and a process of continuous improvement between provider and client should be designed and put into place.** Such continuous improvement includes training and prevention schemes and measures, audit scheduling and a periodic report about the service provided and proposals for improvement.

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5 Within the paper chain, there exist **homologated waste management companies that are duly authorised** to provide this type of outsourced recycling service and **who guarantee traceability and recycling** for all the board they collect.


6 This **guarantee** that all used cardboard collected at supermarkets will be **recycled** means that one's confidence can be placed in a material like **paper-board**, which apart from being **100% recyclable, is also renewable** as it originally comes from forest plantations. Furthermore, by recycling paper, we help to improve the environment, as we are making better use of a natural resource and help to reduce the amount of waste going onto dumps.

(*) Available at www.tupapelesimportante.com and at www.aspapel.es

(**) All information about corrugated packaging, its use and its recycling is available at the websites www.afco.es and www.fefco.org

(***) Available at www.cepi.org

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