

**MASTER**

**Reduction of distribution costs for EMI Music in Europe**

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# Reduction of distribution costs for EMI Music in Europe



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## **Abstract**

This report is concerned with reducing the distribution costs of EMI Music in Europe. It contains a general background about EMI Music and focuses on EMI Compact Disc (Holland) BV. Several issues within EMI Music in Europe have led to the establishing of a number of objectives, which are meant to reduce the distribution costs of EMI Music in Europe. This report focuses on the standardisation of the distribution boxes (cardboard boxes used to distribute an order to the retailer). By means of a simulation programme, standardisation of distribution boxes used by EMI Music in Europe is accomplished. This report, written in English, tries to answer questions from employees of EMI Music in Europe who want to know more about the research after the standardisation of distribution boxes.



## Summary

EMI Compact Disc (Holland) BV in Uden is part of EMI Music, which is part of The EMI Group. EMI Compact Disc (Holland) BV is the largest production unit within The EMI Group. The European Distribution Centre is also located in Uden.

### Assignment

This assignment was part of the project "Packaging, a strategy for improvement" executed for EMI Music in Europe. The goal of this project was to reduce distribution costs. All costs in this report are annual costs and are expressed in Euros (unless otherwise stated). This assignment focused on the secondary packaging (the packaging as received by the retailer from his wholesaler, packaging of a trade unit), namely the cardboard distribution boxes and on the filling material for the distribution boxes. EMI Music in Europe purchased 43 different sized distribution boxes in 1999/2000. The total quantity of distribution boxes purchased in 1999/2000 was 2,446,113. The total purchase costs of distribution boxes in 1999/2000 were 1,088,518 Euros. The assignment has been defined as follows:

*Reduce distribution costs of EMI Music in Europe by:*

- *standardising the physical dimensions of the distribution boxes so that they comply with the packaging legislation and limitations caused by the logistical processes with a minimum number of different sized distribution boxes*
- *considering the possibilities (with respect to costs and environmental burden) of introducing reusable distribution items with the determined standard physical dimensions*
- *reducing the cardboard waste*

Cardboard waste was defined as all cardboard that is disposed of as waste paper via the Waste & Recycling department at EMI to a recycling company. Cardboard waste has two sources, namely manufacturing boxes and other cardboard. The reduction of cardboard waste was only briefly examined because the conclusion was drawn that a system had to be set up so that insight can be gained into which department disposes which part of the cardboard waste.

The possibilities of introducing reusable distribution items were not examined in this assignment, because the standard physical dimensions of the distribution boxes had to be determined first. When the standardisation was completed there was not enough time left to further examine the possibilities of introducing reusable distribution items. A system has to be designed to make it possible for retailers to return the reusable distribution boxes. The criteria for the design of the reusable distribution box should be investigated and support from all parties in the return flow has to be gained (retailers, associates, transporters, and suppliers).

### Aspects of distribution boxes

EMI uses two different kinds of cardboard boxes, namely manufacturing boxes, which are the first cardboard boxes wherein, finished products are packed to keep together a certain quantity of finished products, and distribution boxes which are used to distribute an order to a retailer. Because manufacturing boxes are already standardised to a large extent and because somebody else in the project team was



analysing the manufacturing boxes, only distribution boxes used by EMI Music in Europe were taken into account with regard to the standardisation. EMI Music in Europe used 43 different sized distribution boxes to distribute the finished products, mostly Compact Discs (CDs; finished products). Standardising the physical dimensions of the distribution boxes used to distribute CDs, Digital Versatile Discs (DVDs), Sega (Giga Disc containing a video game) and Long plays (LPs) could reduce the distribution costs. The assignment focused on the physical dimensions of a jewelbox (the primary packaging of a CD), because this primary packaging (the packaging as found by the customer on the shelf, packaging of a customer unit) is used most.

After an order analysis, which showed the frequent customer order quantities (order quantities that are frequently ordered by retailers), ten experts within EMI Compact Disc (Holland) BV gave their opinion on which distribution boxes should be used by EMI Music in Europe. Together, they selected 27 different sized distribution boxes. One order is distributed in one distribution box, because the handling costs of the transporter increase linearly with the number of distribution boxes delivered per address. Finished products are put in a distribution box in two different ways in Europe; laying flat and standing. The way in which finished products should be put in a distribution box had to be standardised first. It seemed that laying finished products flat had more advantages than finished products standing in a distribution box.

### **Packaging legislation**

The standard distribution boxes had to comply with the European packaging legislation. From a study of the Dutch and European packaging legislation the following conclusions were drawn with regard to the standardisation of distribution boxes:

1. The maximum weight of a filled distribution box is 18.5 kilogrammes, which equals the weight of 150 CDs. One order is distributed in one distribution box. When more than 150 CDs have to be distributed, the distribution box for 150 CDs is used and the remainder of the order is distributed in a second distribution box which results in as less transported air as possible.
2. Weight and volume of the packaging has to be limited. The possibilities of increasing the fill rate of the distribution boxes had to be taken into account.
3. The cardboard suppliers have to ascertain that their cardboard complies with the CEN-norms.
4. A guarantee for reprocessing the packaging waste has to be obtained from the reprocessing industry.

### **Analysis of the logistical processes**

Every activity in the physical and information flow of the distribution boxes was mapped in order to examine whether or not the usage of different sized distribution boxes would lead to a change in the costs per activity. As a result of the physical flow of distribution boxes, the logistical limitations for the physical dimensions of the standard distribution boxes were determined. Limitations relevant for the physical dimensions of distribution boxes were caused by distribution equipment, legislation, and by the transporter.

### **Standardisation of distribution boxes**

The method used to determine which costs should be taken into account as distribution costs is summarised in the figure on the next page. First, the distribution

costs were inventoried and defined. It is possible that the workload of employees increases by using different sized distribution boxes, but the costs do not necessarily increase (for example when no extra employees are hired). Only costs that change when different sized distribution boxes are used were taken into account. A further selection of distribution costs that were taken into account was made by calculating the order of magnitude of the difference between the maximum and minimum costs per cost type. This difference between the maximum and minimum costs per cost type is a measure for the relationship between the savings of the different cost types. Costs that would not change the outcome of the standardisation because they were too low compared to the greatest difference between maximum and minimum costs of a cost type, were not taken into account. The result was that the purchase costs of distribution boxes and filling material, the handling costs of activities in the Picking area, and the transportation costs for the transportation of the distribution boxes to the retailers were taken into account.

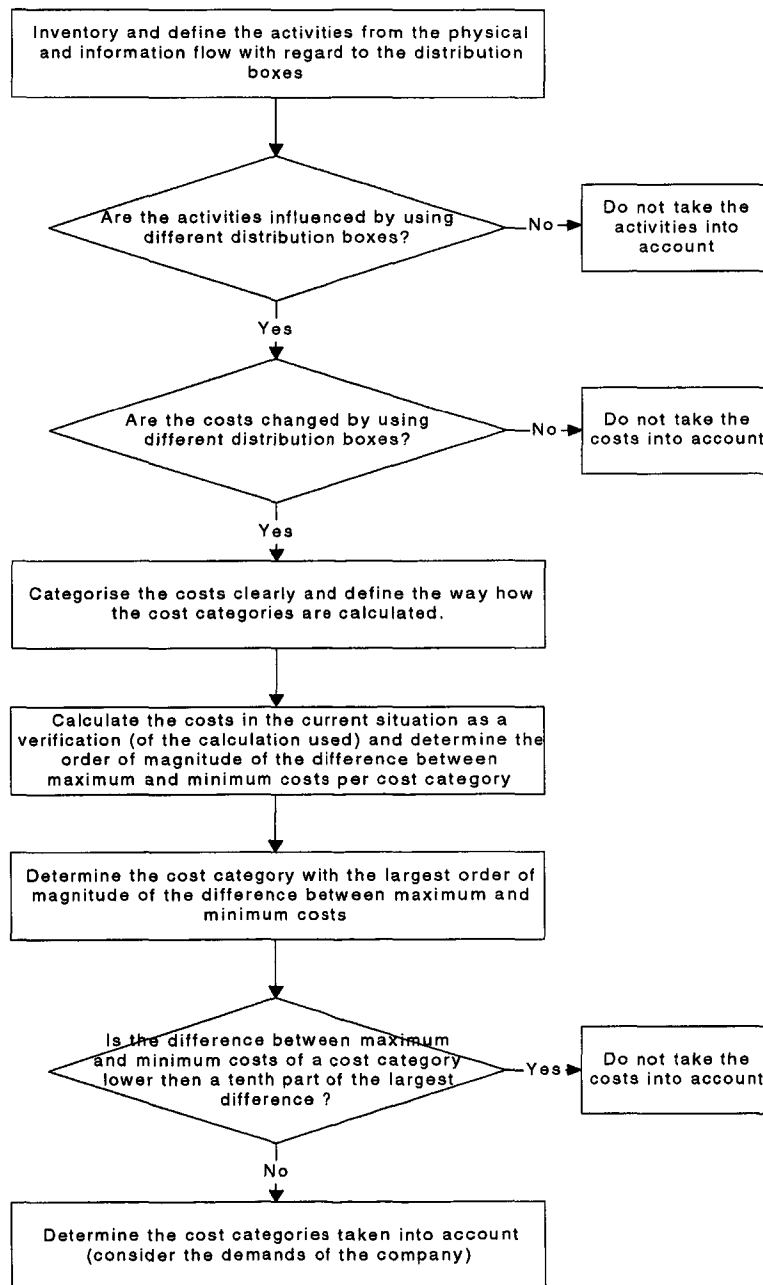


Figure 1: Method used to determine the distribution costs



### **Simulation used to calculate the minimum distribution costs**

The maximum number of different sized distribution boxes, which can be used in an NDC, appeared to be nine. A simulation programme has been designed, to calculate the minimum distribution costs when nine distribution boxes out of the 27 selected distribution boxes are used.

### **Analysis of the results of the simulation programme**

An analysis was made of the influence on distribution boxes chosen when a different number of distribution boxes was used out of the 27 selected distribution boxes as was an analysis of the influence on distribution boxes chosen when a sub-set of the nine standard distribution boxes was used. This because a Distribution Centre (DC) might want to reduce the range of standard distribution boxes even further than the nine standard distribution boxes.

### **Conclusions**

- The maximum physical dimensions of the distribution boxes are restricted to 320x320x400 (length x width x height in mm) and the maximum weight of a filled distribution box is 18.5 kilogrammes (which equals the weight of approximately 150 finished products). The distribution boxes have to be easily stackable on an Europallet (1200x800 in mm), and have to be able to contain a label, which has the physical dimensions of an A5 piece of paper and which has to be read by the conveyor and by the transporter.
- Nine is the maximum number of different sized distribution boxes that can be used in an NDC.
- The nine distribution boxes chosen as standard distribution boxes are the distribution boxes for 3 (365,947), 16 (729,088), 25 (271,162), 32 (120,989), 50 (230,747), 75 (139,771), 80 (19,326), 100 (74,887) and 150 (142,953) finished product quantities. The figures between brackets indicate the quantity of the distribution boxes that has to be purchased per year.
- With these nine distribution boxes, the total annual distribution costs are reduced with approximately 5% and the number of kilogrammes per cubic metre is increased with approximately 32%. The number of kilogrammes per cubic metre is a measure for the fill rate of the distribution boxes. The savings resulting from a decrease in the purchase costs are approximately 45% with regard to the purchase costs in 1999/2000. The savings resulting from a decrease in the transportation costs are approximately 3% with regard to the transportation costs in 1999/2000. The handling costs increase by approximately 14%.
- A suggestion for the internal physical dimensions of the distribution boxes has been made. When these internal physical dimensions are used in the actual design of the distribution boxes, the number of kilogrammes of cardboard needed to manufacture the distribution boxes is reduced by 18%. The number of transport movements is not increased.