

## Summary

The company Libridis N.V. is a distributor of books, comics and related goods. The total assortment contains about 13000 different items.

This thesis proposes a solution for the improvement of the placement system of items. The solution suits the warehouse layout and the semi-free location system applied by Libridis. The placement system of items must ensure that, when the items are stored in the warehouse, the handling frequencies of the items are taken into account so that the length of the order picking route is reduced.

A thorough analysis of the sales data showed the following three important results:

- Working with three location sorts (A, B and C) will be sufficient in real life.
- The best base for appointing a location sort to an item is the number of pickings within a certain time frame for that item.
- The best forecast for the number of pickings is obtained by making a forecast for each individual item.

Besides these results, which will be used as axioms for the proposed solution, it was decided that the relocation of the items must only take place within a warehouse aisle.

Using the above conclusions a solution is created by means of the SADT modelling technique. This resulted in a function model, which later on is translated into a computer programme (PASCAL). A number of experiments has been done with this programme which led to the following final conclusions:

- The solution reduces the average order picking route by 30%. To establish this reduction the items must be relocated 2.7 times on an average during their shelf life of about 42 months in the warehouse.
  - By a controlled appointing of locations to new items the contents of the several warehouse aisles, when looked at the sales potentials of the items, stays equal. This results in an equal chance for each warehouse aisle to be visited, so the employees who do the order picking will have the least possible hinder of each other's activities.
  - Opposed to the present situation, where 19.4% of the A-items have a correct location sort, during the simulation runs 76% of the A-items were appointed a correct location sort. Since the size of a location sort is linked with the sales potential of the item that should be placed there (an A-location has more space than a B-location) this can result in less replenishment handling than in the present situation.
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