

Summary

This report describes the investigation of a possible solution to a series of cutting problems. The main question is whether it is possible to construct a solution in such a way that it is beneficial for the business.

A cutting problem is defined as the cutting of source material with known dimensions into orders with required dimensions. Cutting problems show much resemblance to packing problems, as can be derived from their definition: the placing or fitting in of parts with certain dimensions on a surface or in an object. Both definitions are dealing with a base (an object) which has to be divided in smaller parts (items). The composition of these items in or on these objects is called a pattern. The abstract terms items and objects are translated in this report to orders and rolls.

To give a better classification of these problems the typology of Dyckhoff is used. That typology characterizes a Cutting & Packing Problem using four features: the number of dimensions, the way of assigning items to the objects, the characteristics of the items and objects, and the limitations caused by the patterns. The cutting problem dealt with in this report is classified using the tuple $2/V/I/F$, $2/V/I/M$ or $2/V/I/R$.

Many solutions to this kind of problem can be found in literature. They can be divided in two categories: optimization methods and heuristics. Based on a couple of criteria a choice is made which methods to use to solve the problems described in this report. To show whether these methods have a beneficial influence on the business, a model is developed and software was written. How this software works is explained in Program Description Language. The input parameters are described, as are the output parameters which will be used to measure the performance of the system. The main variable input parameters are for instance the numbers of orders, the maximum stocksize and the (variation of the) dimensions of the orders. The main output parameters are waste and average stocksize.

After verification and validation of the software various sets of calculations have been carried out. The main conclusions that can be drawn from these calculations are:

- Automization is beneficial for the business.
- Using a optimization method based on the branch&bound technic gives the best results for both waste and average stocksize.
- Changes in number of orders, dimensions of orders and dimensions of source material affect those results as well.
- Bringing the flow of orders to two locations together into one flow to only one location is beneficial as well in that it creates less waste and a smaller required stock.