Resubmission of the article initially submitted on the 26th November 2012 with feedback from the editor on the 4th April 2013.
Title (original): A waste reduction algorithm based on alternative underestimates for the modified Wang method.

Title (new): Efficient waste reduction algorithms based on alternative underestimates for the modified Wang method.
(Based on the referees’ comments and suggestions, we changed the title slightly and altered the content of the article where deemed necessary to reflect the valued comments and suggestions. In what follow below we explain the aspects, especially those mentioned by the one referee).

Thank you for the opportunity to resubmit.
Regards: Tjaart Steyn

Notes on comments and suggestions:

In general:
After considering the feedback from the two reviewers and the largely different views that they have of the paper, we realise that we need to clarify some aspects. Stock cutting is a very lively topic in practice as well as research. Because of the complexity (especially computational and time wise), not much success is reported regarding the exact solution approaches. The majority of work done in the area is often based on some form of approximate solutions based on approximate heuristic methods that do not guarantee optimality. We consider a class of exact methods based on the Wang approach that guarantees optimality. The research that led to the modified Wang method has created the belief that more informed heuristic functions generally lead to faster solution times since the more informed methods search a smaller subset of possible cutting patterns. (This is based on the theory of the A* method of artificial intelligence).

In this paper we consider the validity of this perception by investigating the trade-off between the control strategy cost of the search process and the rule application cost. A class of algorithms is defined and used as a vehicle for experimentation. Although some practitioners may consider using these (exact) algorithms, the main finding of this research is that the cost of informed search has to be kept (very) low otherwise it has a huge detrimental effect on computational time for complex problems.

Some changes were made in the presentation of the research results of the paper to reflect the focus explained above. We want to thank the reviewers for pointing at some of the weak parts of the paper and we are convinced that the paper is now clear with respect to the goals of the research.
Regarding feedback from **Reviewer B**:

Detailed comments and/or corrections:

The article was very well presented. However, the authors make no effort to put their work into context with the enormous amounts of other work that has been done in the realm of 2D packing problems. We tried in the revision to reflect on this issue by means of some adjustments. See also comments under general above.

I would like to see the authors make an effort to compare their algorithms with similar algorithms in the literature. Wang's method was published in 1983, Oliveira and Ferreira did their work in 1990, and Daza et al. in 1995. The main thrust of the paper is not to suggest new algorithms and to prove their efficiency but to test the effects of informedness. See also comments under general above.

I am certain a large amount of work has been done in this field since. Does this new method improve on the state of the art, or is it an interesting (and better) approach to an old method? It is true, but the contribution of the paper is the effort to guide practitioners concerning the more efficient methods.

I could understand the lack of context if the work this paper was based on was very recent.

I have some further questions:

1) Where are the results of Daza et al.'s work? Why are they not included in the comparison. Daza et al propose a method that is very similar to Oliveira and Ferreira and the motive behind their method is mostly of a theoretical nature. It has very little effect on computational aspects.

2) Has there not been an improvement to solutions to the 2D knapsack problem since Gilmore & Gomory's 1966 paper? Could an improved algorithm yield better results? Yes, an improved algorithm can yield better results. This paper illustrates this to a certain extent.

3) Could one not determine bounds on S based on the sizes of the demand rectangles relative to the width of the stock sheets? Would that speed up the algorithm? 0.6 makes a good selection in the example because then S.W = the maximum dimension of a demand rectangle. We did some empirical work on this and the values being used, e.g. the 0.6 (page 7) and the 0.25 (page 9) are examples.

4) How do the algorithms perform if the demand rectangles are either far smaller than the stock sheets, or a similar size to the stock sheets? We haven't looked into this. Small items relative to the size of the the stock sheet would in general imply a
much larger set of possible combinations of items to consider and thus would generally increase the computational effort. One of the basic ideas of better underestimates and thus this article is that a lot of the candidate combinations can be eliminated early from the search process.

5) How do the algorithms perform for homogeneous (b is large, demand rectangles are similar sizes) vs heterogeneous (b is small, demand rectangle sizes vary greatly) data sets? We haven’t looked into this issue – we didn’t see it as part of the scope.

6) Why show trim loss in Table 5 when all algorithms find the optimal solution? It would only be useful if the trim losses varied between the algorithms for the same data set. These days almost all the approaches are based on approximate solutions and not exact/optimal solutions. The trim loss values can be omitted, but is included for the purpose of illustrating that the different approaches reached the same (optimal) solution. It can also be used by researchers that want to compare non-exact solutions and solution times with the exact solutions (and some of our experiences with solution times).