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Solving steel mill slab design problems

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SOLVING STEEL MILL SLAB DESIGN PROBLEMS

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Abstract. The steel mill slab design problem from the CSPLIB is a combinatorial optimization problem motivated by an application of the steel industry. It has been widely studied in the constraint programming community. Several methods were proposed to solve this problem. A steel mill slab library was created which contains 380 instances. A closely related binpacking problem called the multiple knapsack problem with color constraints, originated from the same industrial problem, was discussed in the integer programming community. In particular, a simple integer program for this problem has been given by Forrest et al. [4]. The aim of this paper is to bring these different studies together. Moreover, we adapt the model of [4] for the steel mill slab design problem. Using this model and a state-of-the-art integer program solver *all* instances of the steel mill slab library can be solved efficiently to optimality. We improved, thereby, the solution values of 76 instances compared to previous results [13]. Finally, we consider a recently introduced variant of the steel mill slab design problem, where within all solutions which minimize the leftover one is interested in a solution which requires a minimum number of slabs. For that variant we introduce two approaches and solve all instances of the steel mill slab library with this slightly changed objective function to optimality.

1. Introduction

The *steel mill slab design problem* is motivated by a real world application from the steel industry. Mathematically, the problem consists of a set of $n \in \mathbb{N}$ orders, each order j coming with a size $s_j \in \mathbb{N}$ and color $c_j \in C$, where C is a finite set. Furthermore, we are given a set $K := \{k_1, \ldots, k_m\} \subset \mathbb{N}$ of $m \in \mathbb{N}$ capacities. The task is to equip each used slab with one capacity and assign each order to exactly one slab with the requirements that the selected capacities are respected and that each slab only processes orders of at most two different colors. The objective is to minimize the *leftover* that is the total loss or equivalent the residual capacity. Recently, Schaus et al. [13] considered a variation of the problem by adding a second criteria to the objective. Within all solutions, which minimize the leftover, one searches for a solution with a minimal number of used slabs.
The steel mill slab design problem is problem number 38 of the CSPLIB[1]. This library provides one instance which consists of 111 orders with 88 different colors, and 20 possible capacities. We call this instance the *original instance*. Furthermore, there exists a steel mill slab library [14]. This library contains 380 instances which are grouped into 19 classes each with 20 instances. These instances have been created by changing the set of possible capacities of the original instance. This means, the orders are the same as the one of the original instance. The capacities are generated uniformly and range between 10 and 50; the 19 classes are ranging from having 2 to 20 possible capacities. For more details about the generation of these instances and the library we refer to [13].

[1] `http://www.csplib.org/`

Outline. In the following section, we give a brief overview on different approaches to solve the steel mill slab design problem and related binpacking problems. We recall among others a set packing formulation [4] to the so-called *multiple knapsack problem with color constraints* which can be perceived as a slight generalization of the steel mill slab design problem. In Section 3, we adapt this model to the steel mill slab design problem and the variant where also the number of used slabs is minimized. In Section 4 we report on our computational results. Using a state-of-the-art integer program solver, we solved *all* instances of the steel mill slab library and the original instance to optimality improving the solution value of 76 instances. Moreover, we solved all these instances for the above-mentioned modification of the problem to optimality as well.

2. Related work

In the past, several different models have been proposed to solve the steel mill slab design problem. A first set of constraint programming models was presented by Frisch et al. [5] and first computational results for a (small) subset of orders of the original instance were given by the same authors in [6]. Dawande et al. [3] presented an asymptotic polynomial time approximation scheme and two 3-approximation algorithms. Hnich et al. [9] introduced an integer programming formulation, a constraint programming formulation, and a hybrid model and solved also one instance which consists of a subset of orders of the original instance. A first optimal solution of the original instance (total loss of zero) was given by Gargani and Refalo [7] using a large neighborhood search heuristic. Van Hentenryck and Michel [15] introduced a constraint programming model which can be used to solve the original instance using a heuristic approach. Recently, Schaus et al. [13] presented a collection of different constraint-based solving techniques for this problem and introduced the steel mill slab library [14]. All previously used models and solving techniques are not capable of solving all instances of the steel mill slab library.

Kalagnanam et al. [10] and Forrest et al. [4] studied a closely related binpacking problem called the *multiple knapsack problem with color constraints*. The problem provides another view on the same industrial application as the steel mill slab design problem. The problem input consists of m slabs, each slab j coming with a capacity $k_j \in \mathbb{R}$, and n items, each item i coming with a size $s_i \in \mathbb{R}$, a color $c_i \in \mathbb{N}$, and a specification in form of a subset of slabs indicating from which slabs this item can be manufactured. We say that an item is *valid* for a slab if the item can be manufactured from it. The goal is to find an assignment such that each slab contains valid items of at most two different colors, the capacities of the slabs are respected, and the unused capacity of the used slabs is minimized. For this problem, Kalagnanam et al. [10] presented a compact integer programming formulation, while Forrest et al. [4] gave a set packing formulation and designed a simple column generation approach. Their computational results indicate that this method is superior in practice. They solved an instance with 439 orders, 347 different colors, and 24 slabs (two having the same capacity). Due to the additional assignment restrictions, a slab has a restricted set of items which can be manufactured from it. The number of different colors of the associated valid items is at most 222. This instance is called `mkc` and is part of the MIPLIB2010 [11].

Interpreting,[2] this instance w.r.t. the steel mill slab design problem, it consists of 439 orders, 23 different slab capacities, and 347 colors. Forrest et al. [4] tried to solve an even larger instance called `mkc7`. This instance has 74 slabs, 9484 orders, and 233 colors within the context of the multiple knapsack problem with color

[2]We ignored the assignment restrictions and allowed an arbitrary number of slabs of each capacity.

constraints. This boils down to 70 different slab capacities and 642 colors w.r.t. the steel mill slab design problem. See the appendix for a more detailed description of the transformation and the particular problem instances in the context of steel mill slab design.

One main reason why these two binpacking problems are hard to solve in practice is that the used models, with the exception of the set packing formulation of Forrest et al. [4], are symmetric. In these models, orders are explicitly assigned to slabs, and therefore, symmetry naturally arises by permuting slabs. It is well known, for instance, that symmetry causes branch-and-bound algorithms to perform poorly, since the resulting problems change only marginally after branching, see Barnhart et al. [2]. In principle, one can respond to this difficulty by either adding symmetry breaking constraints to the given model or by avoiding such a symmetric model in advance. The first strategy was pursued by several authors. Van Hentenryck and Michel [15] partly broke symmetry using a customized search routine. Other symmetry breaking techniques are discussed in [6]. The set packing formulation of Forrest et al. [4], however, provides a model that avoids this kind of symmetry, which is one explanation for the performance of their column generation algorithm.

3. Integer programming formulation

Adapting the set packing formulation of Forrest et al. [4], we obtain an integer programming formulation for the steel mill slab design problem. This model does not contain the kind of symmetry mentioned in the previous section.

Let S be the set of all feasible slab designs. A slab design s is an assignment vector $\lambda_s \in \{0,1\}^n$. This vector defines which orders belong to this particular slab design s. This means, order $j \in \{1,\ldots,n\}$ belongs to slab design s if $(\lambda_s)_j$ is one. A slab design is *feasible* if the total order size is not greater than the largest available capacity and if s contains orders of at most two different color classes. Each slab design s comes with an unique leftover l_s which is given by

$$l_s = \min\{k \in K \mid k \geq \sum_{j=1}^{n} (\lambda_s)_j\} - \sum_{j=1}^{n} (\lambda_s)_j.$$

Introducing for each feasible slab design $s \in S$ a binary decision variable x_s which is one if s is used and zero otherwise, we can formulate the steel mill slab design problem as an integer program:

$$\begin{aligned} \min \quad & \sum_{s\in S} l_s x_s && && (1)\\ \text{subject to} \quad & \sum_{s\in S} (\lambda_s)_j x_s = 1 && \forall j \in \{1,\ldots,n\} \\ & x_s \in \{0,1\} && \forall s \in S. \end{aligned}$$

This is a set partitioning problem. The objective is to minimize the total leftover. The equalities are set partitioning constraints to ensure that for each order j exactly one slab design s is chosen. Finally, the last conditions state that all variables are binary.

In contrast to the setting of Forrest et al. [4] we consider the case that all orders must be covered. This is simply reflected by the transition from packing to partitioning constraints. As a result we focus on pure minimizing of the total leftover whereas Forrest et al. [4] additionally consider to maximize satisfied orders, i.e., they combine both goals in one objective function. In general we would propose the same solution methodology as Forrest et al. [4] to cope with such formulations. Since the number of columns/slab designs can become quite large, an integer program like the one above is usually solved with a branch-and-price [2] algorithm.

Checking the instances of the steel mill slab library revealed, however, that these instances have between 7103 and 10011 feasible slab designs. Therefore, all variables can be generated, i.e., all feasible slab designs can be enumerated, in advance. In [8] a branch-and-price approach for the steel mill slab design problem is briefly discussed.

The set partitioning Model 1 can also be used for the problem of finding within the solutions with minimal leftover one which additionally uses a minimal number of slabs. To cope with this tie breaker rule for different optimal solutions, we can use a simple sequential approach or integrate that tie breaker rule directly in to the first model.

The sequential approach works as follows. First, we solve Model 1 to compute the minimal leftover, say $L^\star$. Then we add a knapsack constraint to limit the total leftover by $L^\star$, and change the objective function to $\min \sum_{s\in S} x_s$ which leads to:

$$\begin{aligned} \min \quad & \sum_{s\in S} x_s && (2)\\ \text{subject to} \quad & \sum_{s\in S} (\lambda_s)_j x_s = 1 && \forall j \in \{1,\dots,n\}\\ & \sum_{s\in S} l_s x_s \le L^\star \\ & x_s \in \{0,1\} && \forall s \in S. \end{aligned}$$

Solving this integer program, knowing $L^\star$, gives us a solution with minimal leftover which uses the minimum number of slabs. Note that the knapsack constraint can be replaced by an equation. Computational experiments showed that this variant performed with a similar efficiency as the above knapsack version.

As mentioned above, one also can integrate the additional optimization criterion directly into the first model. Since n orders require at most n slabs to be served, we can slightly manipulate the objective function by adding $\frac{1}{2n}$ to each coefficient. Then, each used slab design contributes a fixed amount to the objective value independently of the leftover. Therefore, a solution with minimum leftover which uses fewer slabs is cheaper then one which uses more slabs. Using this known technique results in the following integer program:

$$\begin{aligned} \min \quad & \sum_{s\in S} (l_s + \tfrac{1}{2n})\, x_s && (3)\\ \text{subject to} \quad & \sum_{s\in S} (\lambda_s)_j x_s = 1 && \forall j \in \{1,\dots,n\}\\ & x_s \in \{0,1\} && \forall s \in S. \end{aligned}$$

In the following section we present computational results for the steel mill slab library in its original formulation and the variant which also minimizes the number of slabs.

4. Computational results

In this section we present our computational studies. We used IBM ILOG CPLEX 12.1.0 to solve the resulting integer programs. All computations were performed on computers with an Intel Core 2 Extreme CPU X9650 with 3 GHz, 6 MB cache, and 8 GB of RAM. We used the deterministic parallel mode with 4 threads of IBM ILOG CPLEX. The remaining parameters are kept at their default values. As test set we chose the recently established steel mill slab library [14]. This library contains 380 steel mill slab design instances. We first present the overall results for

TABLE 1. Optimal leftover for all instances of the steel mill slab library [14].

	Instance																			
$\|K\|$	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
2	***22***	***54***	***100***	***34***	***15***	***36***	***40***	***42***	531	76	***66***	***64***	***19***	***78***	***44***	296	***56***	***155***	***36***	***36***
3	***5***	***15***	***10***	***14***	***7***	35	***11***	***39***	***63***	***155***	***39***	***14***	***6***	***19***	***15***	45	***35***	***8***	***22***	***17***
4	***32***	***18***	***10***	***7***	8	6	***6***	3	1	***12***	***13***	***8***	***1***	***19***	1	***11***	***15***	0	5	***12***
5	0	***21***	***5***	***1***	***9***	***8***	0	0	***1***	***2***	***7***	***5***	***17***	***7***	2	***10***	5	***11***	***15***	0
6	0	***19***	***0***	0	0	***1***	***0***	0	0	1	***0***	7	0	***12***	***2***	***3***	0	0	0	***0***
7	0	0	***1***	0	***1***	***2***	0	***1***	0	0	7	0	2	4	0	0	0	1	0	1
8	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	***3***	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

the original steel mill slab version and its variant. Second, we present more detailed performance results for the different models and selected instances.

4.1. **Overall results.** For each instance we generated all feasible slab designs in advance. For the instances of the steel mill slab library this took a negligible amount of time (at most 0.02 seconds). The overall results for the minimization of the leftover are summarized in Table 1. The rows represent capacity classes, each of them consisting of 20 problem instances. The first column, indexed by "$|K|$", states the number of available capacities in this class. The other columns, indexed from 0 to 19, list the *optimal* objective values (leftover) of the 20 (ordered) instances of the corresponding capacity class. Values written in bold italic font indicate an improvement to the previous best known solutions [13]. Overall we improved 76 instances and proved for *all* instances optimality. The running time, which does not included the time for generating all feasible slab designs, for these instances were around one second each, except for five instances of the capacity class 2. Instance 2 required 2.5 seconds, instance 5 took 101.5 seconds, instance 6 ran in 174.8 seconds, instance 8 needed 7.2 seconds, and instance 15 required 14.6 seconds (see Table 4). In these cases most of the time is spend for proving optimality.
Table 2 gives the overall results for all instances of the steel mill slab library for which we additionally minimized the number of slabs. The columns of this table are arranged in the same fashion as in the previous table. The values state for each instance the minimum number of used slabs (w.r.t. the minimum leftover). Again, all problems of the steel mill slab library are solved to optimality.

4.2. **Detailed results.** In what follows we give some more insights on the different models. Table 3 summarizes performance results for each capacity class and model. Thereby, the first column "$|K|$" shows the capacity class by stating the number of available capacities. Followed by pairs of columns for the results of Model 1, Model 2, the sequential solving approach (Model 1+2) to find within all solutions with minimal leftover one which uses a minimal number of slabs, and the integrated Model 3 which solves the secondary slab minimization directly. For performance measures we choose the shifted geometric mean[3] for the number of search "nodes"

[3]The shifted geometric mean of values $t_1, \dots, t_n$ is defined as $\left(\prod(t_i + s)\right)^{1/n} - s$ with shift s. We use a shift $s = 10$ for time and $s = 100$ for nodes.

TABLE 2. Minimal number of used slabs for all instances of the steel mill slab library [14].

	Instance																			
$\lvert K\rvert$	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
2	58	51	48	50	50	48	50	52	47	48	52	54	51	56	56	47	50	47	49	55
3	59	55	52	53	52	51	51	53	58	47	55	50	53	52	48	53	53	56	57	59
4	54	53	50	50	47	50	49	51	52	51	51	52	51	48	55	57	55	50	52	52
5	57	56	56	51	51	53	55	49	51	53	49	50	51	54	52	52	52	52	48	51
6	51	50	51	47	47	51	54	48	49	50	52	51	50	52	53	52	52	48	47	53
7	56	48	53	47	50	49	47	50	47	51	54	49	48	51	47	48	50	55	47	47
8	47	50	52	47	51	48	48	47	51	49	51	47	50	49	47	49	48	49	50	47
9	51	50	47	48	47	48	47	49	48	47	50	47	51	47	47	50	49	47	55	48
10	47	47	49	47	48	47	48	47	47	47	51	47	47	47	49	48	49	50	47	47
11	47	47	47	47	47	47	48	51	48	47	48	47	47	49	47	47	47	48	48	47
12	47	48	47	47	47	50	49	47	56	47	47	47	47	47	48	47	47	47	47	47
13	47	47	47	47	47	47	47	50	47	47	47	47	47	47	47	47	47	47	47	47
14	47	47	47	47	47	48	47	47	47	47	47	47	47	47	47	47	47	49	47	47
15	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	48	47	47	47	47
16	47	47	47	47	47	47	47	47	47	48	47	47	47	47	47	47	47	47	47	47
17	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47
18	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47
19	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	48	47	47	47
20	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47

TABLE 3. Number of search nodes and running times for all models summarized for the different capacity classes of the steel mill slab library [14].

	Model 1		Model 2		Model 1+2		Model 3	
$\lvert K\rvert$	nodes	time [s]	nodes	time [s]	nodes	time [s]	nodes	time [s]
2	1285	5.0	179	2.8	1656	8.2	2178	11.1
3	86	0.3	41	0.9	117	1.2	185	0.6
4	43	0.2	49	0.7	91	0.9	325	0.5
5	1	0.1	23	0.3	25	0.4	115	0.3
6	15	0.2	6	0.2	21	0.3	50	0.3
7	1	0.1	2	0.1	3	0.2	71	0.3
8	1	0.1	1	0.1	2	0.2	77	0.3
9	1	0.1	2	0.1	3	0.2	37	0.3
10	1	0.1	2	0.1	3	0.2	78	0.3
11	1	0.1	1	0.1	2	0.2	29	0.2
12	1	0.1	1	0.1	2	0.2	56	0.3
13	1	0.1	1	0.1	2	0.2	62	0.3
14	1	0.1	1	0.1	2	0.2	54	0.3
15	1	0.1	1	0.1	2	0.2	20	0.2
16	1	0.1	1	0.1	2	0.2	58	0.3
17	1	0.1	1	0.1	2	0.2	12	0.2
18	1	0.1	1	0.1	2	0.1	10	0.2
19	1	0.1	1	0.1	2	0.2	33	0.2
20	1	0.1	1	0.1	2	0.2	32	0.3

and for the running "time" in seconds. The *shifted geometric mean* has the advantage that it reduces the influence of outliers. The geometric mean ensures that hard instances are prevented of having a huge impact on the measures. Similar shifting reduces the bias of easy instances, those solved in less than 10 seconds and/or less than 100 nodes. Note that the measures for the columns related to Model 1+2 are computed by first adding the measure values of Model 1 and Model 2 for each instance and then applying the shifted geometric mean to these values. For a detailed discussion about different measures we refer to [1].

All instances belonging to a class with more than 2 capacities are easy to solve independently of the chosen model. Regarding the running times all models need less than one second w.r.t. the shifted geometric mean except for the sequential approach (Model 1+2) for capacity class 3 which takes 1.2 seconds. The number of visited search nodes reveals that for larger capacity classes almost no search is

TABLE 4. Individual results for the instances from capacity class $|K| = 2$ of the steel mill slab library [14] and the steel mill slab version of the `mkc` instance.

	Model 1		Model 2		Model 1+2		Model 3	
Inst.	nodes	time [s]	nodes	time [s]	nodes	time [s]	nodes	time [s]
0	150	0.2	1	0.5	151	0.7	1274	0.4
1	507	0.6	520	1.6	1027	2.2	555	0.7
2	541	2.5	1	0.6	542	3.1	544	3.0
3	531	1.1	529	5.5	1060	6.6	534	1.0
4	1	0.1	1	0.4	2	0.5	39	0.1
5	226 348	101.5	1	0.6	226 349	102.1	1 850 052	1149.5
6	367 617	174.8	530	2.3	368 147	177.1	310 277	195.7
7	520	0.8	1	0.7	521	1.5	527	0.8
8	3421	7.2	1	1.0	3422	8.2	275 385	402.5
9	367	0.6	1	0.2	368	0.8	1	0.4
10	375	0.3	88	1.0	463	1.3	496	0.7
11	1024	0.5	536	4.1	1560	4.6	66	0.3
12	526	0.9	1183	6.5	1709	7.4	1109	1.4
13	713	0.6	1	0.4	714	1.0	565	0.7
14	1589	1.0	540	3.1	2129	4.1	55 464	18.2
15	10 569	14.6	7906	41.2	18 475	55.8	555	2.9
16	530	0.7	157	2.0	687	2.7	1480	1.7
17	1012	2.0	1402	9.7	2414	11.7	830	2.1
18	517	2.3	1	0.5	518	2.8	21 165	14.9
19	509	0.2	1	0.2	510	0.4	206	0.2
`mkc`[4]	13 041	119.2	496	136.1	13 537	255.3	207 003	639.7

required. That means problems are solved in the root node of the search tree. Concerning the sequential and integrated approaches for additionally minimizing the number of used slabs, it makes (almost) no difference regarding these two methods.

Next, we have a closer look at the results for the capacity class two which are given in Table 4. The columns of this table have almost the same meaning as in Table 3 except that we are stating the real number of search nodes and running times in seconds. The table shows that within this capacity class there are only a few instances which are slightly harder. For the sequential and integrated approaches to minimize, in addition, the number of used slabs, we note that for the instances 5, 8, 14, and 18 the sequential method is superior to the integrated model. In case of the instances 11, 12, 15 and 17, however, the integrated approach slightly dominates the sequential method.

Finally, we consider the two instances `mkc` and `mkc7` (see [4]). Our approach works for the smaller `mkc` instance which consists in the steel mill slab context of 439 orders, 23 (different) capacities, 347 colors. There exist 140 223 feasible slab designs which lead in our models to the same number of binary variables. It takes 0.2 seconds to generate these variables. Table 4 shows in the last line the performance results for this particular instance (excluding the problem generation time). The minimal leftover is 48.32 which requires at least 191 slabs. In case of the much larger instance `mkc7` our static approach already failed to generate all feasible slab designs. There exist more than 12 billion slab designs. To cope with that issue a branch-and-price approach using the introduced set partitioning models as basis could be a promising approach, see for example [8].

[4]Note that in this paper the `mkc` instance is not equivalent to the correspond instance in the MIPLIB2010 [11]. The MIPLIB2010 version just gave the data input for the steel mill slab design problem which is consider in this paper. See appendix for more details.

5. Conclusion

We utilized a standard integer programming model to solve the steel mill slab design problem. An advantage of the proposed model is that the naturally arising symmetries are removed. We solved all instances of the steel mill slab library efficiently. This approach is superior to all previous techniques applied to this problem. Furthermore, we showed that the recently introduced variant of that problem, which additionally minimizes the number of used slabs, can be easily incorporated into our integer programming approach. Again, all instances of the steel mill slab library with that secondary objective criteria are solved efficiently to optimality. Besides these instances which all consists of 111 orders we solved the steel mill slab version of `mkc` which contains 439 orders.
All results state that the current steel mill slab library needs an update. Instances with 111 orders can be solved with the introduced integer programming models using a general purposes state-of-the-art solver efficiently.
The introduced models, however, are not scalable. They have the drawback that the number of required variables increases rapidly if there are more orders to be placed. For example, in case of the `mkc7` instance, which has more than 12 billion feasible slab designs, we were not able to create all feasible slab designs in advance. This challenge, however, can be overcome using a branch-and-price approach which generates feasible slab designs only on demand and by reducing the number of required slab designs by considering dominance between one slab design and m others. For the latter one we refer to Prestwich and Beck [12].

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References

[1] T. Achterberg, *Constraint Integer Programming*, PhD thesis, Technische Universität Berlin, 2007.

[2] C. Barnhart, E. L. Johnson, G. L. Nemhauser, M. W. P. Savelsbergh, and P. H. Vance, *Branch-and-price: Column generation for solving huge integer programs*, Operations Research, 46 (1998), pp. 316–329.

[3] M. Dawande, J. Kalagnanam, and J. Sethuraman, *Variable sized bin packing with color constraints*, Electronic Notes in Discrete Mathematics, 7 (2001), pp. 154–157.

[4] J. J. H. Forrest, J. Kalagnanam, and L. Ladányi, *A column-generation approach to the multiple knapsack problem with color constraints*, INFORMS Journal on Computing, 18 (2006), pp. 129–134.

[5] A. M. Frisch, I. Miguel, and T. Walsh, *Modelling a steel mill slab design problem*, in Proceedings of the IJCAI-01 Workshop on Modelling and Solving Problems with Constraints, 2001, pp. 39–45.

[6] ———, *Symmetry and implied constraints in the steel mill slab design problem*, in Proceedings of CP'01 Workshop on Modelling and Problem Formulation, 2001, pp. 8–15.

[7] A. Gargani and P. Refalo, *An efficient model and strategy for the steel mill slab design problem*, in Principles and Practice of Constraint Programming – CP 2007, C. Bessiere, ed., vol. 4741 of LNCS, 2007, pp. 77–89.

[8] S. Heinz, T. Schlechte, and R. Stephan, *Solving steel mill slab problems with branch-and-price*, ZIB-Report 09-14, Zuse Institute Berlin, 2009.

[9] B. Hnich, Z. Kiziltan, I. Miguel, and T. Walsh, *Hybrid modelling for robust solving*, Annals of Operations Research, 130 (2004), pp. 19–39.

[10] J. R. Kalagnanam, M. W. Dawande, M. Trumbo, and H. S. Lee, *The surplus inventory matching problem in the process industry*, Operations Research, 48 (2000), pp. 505–516.

[11] T. Koch, T. Achterberg, E. Andersen, O. Bastert, T. Berthold, R. E. Bixby, E. Danna, G. Gamrath, A. M. Gleixner, S. Heinz, A. Lodi, H. Mittelmann, T. Ralphs, D. Salvagnin, D. E. Steffy, and K. Wolter, *MIPLIB 2010*, Mathematical Programming Computation, 3 (2011).

[12] S. Prestwich and J. C. Beck, *Exploiting dominance in three symmetric problems*, in Fourth International Workshop on Symmetry and Constraint Satisfaction Problems, 2004, pp. 63–70.

[13] P. Schaus, P. Van Hentenryck, J.-N. Monette, C. Coffrin, L. Michel, and Y. Deville, *Solving steel mill slab problems with constraint-based techniques: CP, LNS, and CBLS*, Constraints, 16 (2010), pp. 125–147.

[14] *Steel mill slab library*. `http://becool.info.ucl.ac.be/steelmillslab`.

[15] P. Van Hentenryck and L. Michel, *The steel mill slab design problem revisited*, in Integration of AI and OR Techniques in Constraint Programming for Combinatorial Optimization Problems (CPAIOR 2008), L. Perron and M. A. Trick, eds., vol. 5015 of LNCS, 2008, pp. 377–381.

Appendix A. Converting mkc and mkc7

The `mkc` instance is part of the miplib2010 [11] and `mkc7` is provided by the Coin-OR project.[5] Both instances are given as assignment formulation of the multiple knapsack problem with color constraints as described in [4] Section 2. Thereby, the variable names introduced by the authors are the same as the ones used in both files. The assignment formulation consists basically of 4 constraint classes. That are the constraints ensuring that the capacity of each slab is not exceeded, the constraints taking care that a item is manufactured at most once, the set of constraints which check if a color class is used within a slab, and the set of constraints which enforce that at most two different colors are present within a slab. To construct a steel mill slab design problem out of these instances, we only need to consider the constraints ensuring that the slab capacities are respected and the set of constraints which check if a color class is used within a slab. The first constraint class provides for each item its size and for each slab its capacity. The later class states for each item the corresponding color class. In both cases the item sizes and capacities are rational numbers. By multiplying all numbers with 100, we are left with integer values for the sizes and capacities. The leftover we stated in that paper for the `mkc` instance is 48.32 which belongs to the instance without multiplying the sizes and capacities.
In the following two sections we explictly state for `mkc` and `mkc7` the steel mill slab design problem input data.

A.1. **Instance `mkc`.** Using the instance provided in the miplib2010 [11] we detected 23 different capacities and 439 orders belonging to 347 color classes. Below we list the capacities and order tuples which give the size and the color. These tuples are listed in the form

$$s_1\ c_1; s_2\ c_2; \ldots; s_n\ c_n;$$

List of capacities.

2120; 2274; 1955; 1982; 2257; 2322; 1807; 2088; 1971; 1467; 2346; 2458; 2805; 2872; 2971; 3213; 3388; 3615; 3742; 3831; 3418; 3636; 3660;

List of order tuples.

1000 0; 1500 1; 1500 2; 1000 3; 1000 4; 1000 5; 1000 6; 500 7; 1200 8; 1500 9; 1000 10; 500 11; 1000 5; 1000 12; 500 7; 500 13; 1000 14; 1000 15; 720 16; 1000 17; 2000 18; 1500 19; 500 20; 1000 21; 1000 21; 500 22; 1000 23; 500 24; 800 25; 1500 26; 1000 27; 900 28; 1500 29; 1500 30; 1500 31; 1200 6; 500 32; 1000 17; 500 33; 1500 34; 1500 2; 1000 35; 1500 36; 900 37; 500 38; 1000 21; 1000 39; 500 40; 1000 41; 1500 42; 1000 43; 500 33; 1500 44; 1500 45; 1500 45; 500 46; 500 47; 500 38; 1500 48; 2000 49; 1000 50; 1000 51; 2000 52; 1000 14; 1250 53; 1200 54; 1000 43; 1000 55; 1750 56; 1500 34; 500 57; 1490 58; 500 59; 500 60; 500 61; 1000 62; 1500 63; 500 46; 500 46; 1000 64; 1200 65; 890 66; 1500 67; 1500 68; 530 69; 1500 31; 1000 70; 1000 55; 1500 71; 1750 56; 1000 72; 1800 73; 1000 74; 1000 74; 1370 75; 720 76; 1000 77; 500 78; 1800 79; 500 78; 1500 80; 1400 81; 1500 82; 1500 83; 2000 84; 1500 85; 1750 86; 1750 86; 1500 87; 1000 88; 1500 89; 1500 89; 1750 86; 1500 87; 1750 90; 1750 90; 2000 91; 2000 91; 500 92; 1500 89; 1750 90; 2000 93; 1500 94; 500 95; 2000 96; 2000 97; 1500 94; 2000 96; 1500 94; 500 95; 500 98; 1490 0; 500 99; 1320 100; 840 101; 819 102; 810 103; 1200 104; 840 101; 810 105; 840 101; 1200 104; 810 105; 1500 106; 810 103; 1200 104; 800 107; 1500 108; 1500 109; 1500 110; 1430 111; 540 112; 400 112; 1000 113; 1000 113; 1300 114; 1500 115; 1000 116; 1500 117; 1500 118; 2000 119; 2000 120; 1300 121; 1300 121; 930 122; 930 123; 930 123; 1500 124; 1500 117; 900 125; 900 22; 1300 126; 900 127; 1300 126; 900 126; 900 126; 900 128; 1500 129; 1500 130; 1500 125; 2000 131; 2000 132; 900 22; 1500 133; 1500 134; 1500 135; 1500 136; 1500 137; 1500 138; 1500 139; 1500 119; 1500 140; 2000 141; 1000 142; 1700 143; 1500 144; 1500 144; 1500 145; 1450 146; 869 147; 1500 148; 390 149; 990 150; 990 151; 990 152; 990 153; 990 154; 990 155; 990 156; 990 157;

[5] `http://www.coin-or.org/`

990 158; 990 6; 990 159; 1090 160; 1090 160; 990 161; 990 162; 990 28; 990 163; 990 164; 990 165; 990 166; 990 10; 990 167; 990 168; 990 169; 1190 170; 1190 171; 1190 170; 1190 172; 1490 173; 1490 174; 290 175; 284 176; 990 177; 187 178; 1190 179; 187 178; 990 180; 819 181; 560 182; 796 183; 994 184; 994 184; 994 185; 894 186; 496 187; 994 188; 990 189; 990 164; 990 165; 690 190; 990 177; 990 191; 990 192; 990 193; 990 194; 990 195; 990 196; 890 197; 890 198; 890 199; 890 200; 890 201; 990 202; 341 203; 471 204; 463 205; 740 206; 480 207; 990 208; 560 182; 386 209; 580 210; 490 211; 994 212; 994 213; 1195 214; 894 215; 776 216; 557 217; 994 218; 994 184; 994 184; 994 185; 994 185; 994 219; 894 220; 994 221; 994 188; 1500 222; 1650 223; 1000 224; 1650 223; 1500 222; 1500 225; 1000 226; 1000 227; 1500 228; 1000 229; 1270 230; 600 231; 1200 232; 1200 232; 1200 233; 1200 233; 1200 234; 1200 234; 1200 234; 1390 235; 600 233; 600 234; 1200 232; 1000 236; 700 237; 600 233; 1200 232; 1000 238; 1500 239; 1500 240; 1500 240; 1000 241; 1100 242; 1000 243; 1000 244; 1000 245; 1000 246; 1000 247; 1270 248; 1390 249; 600 250; 1100 251; 1050 252; 1050 253; 1050 254; 1390 255; 205 256; 1250 257; 1200 258; 600 259; 994 260; 994 261; 696 262; 497 263; 497 264; 497 265; 497 266; 596 267; 190 268; 994 269; 497 270; 497 271; 994 272; 994 273; 497 274; 497 275; 994 276; 497 277; 994 278; 500 279; 650 280; 640 281; 1500 282; 1500 283; 1500 282; 1500 284; 1500 285; 1500 286; 1500 287; 1300 288; 1000 289; 1000 289; 1300 290; 1500 291; 1500 292; 1000 293; 1500 294; 1500 295; 497 296; 497 297; 497 298; 497 299; 1000 300; 497 301; 497 302; 497 303; 500 304; 1000 305; 700 306; 1470 307; 500 308; 1500 309; 1500 309; 1220 310; 1000 311; 1410 312; 700 313; 600 314; 1000 315; 1000 315; 1000 316; 600 317; 1000 318; 1000 319; 1100 320; 1320 321; 1140 322; 990 323; 1480 324; 1440 325; 990 326; 994 327; 994 328; 497 329; 994 330; 994 330; 994 331; 994 332; 496 333; 994 334; 700 335; 600 336; 600 337; 700 335; 800 338; 800 338; 800 338; 700 339; 700 340; 700 340; 990 341; 890 342; 890 343; 500 344; 1800 345; 1800 345; 1800 345; 1000 346; 1000 346;

A.2. **Instance `mkc7`.** The instance `mkc7` can be collected from the Coin-OR project. It contains w.r.t. the steel mill slab design problem 70 different slab capacities and 9484 orders, These orders are spread out over 642 color classes. Below we list the capacities and order tuples which give the size and the color. These tuples are listed in the form

$$s_1\ c_1; s_2\ c_2; \ldots; s_n\ c_n;$$

List of capacities.
1707; 1695; 1622; 1978; 2054; 1782; 1736; 1832; 1605; 1904; 1395; 1668; 1717; 998; 2230; 2277; 2145; 928; 2241; 1970; 1763; 1630; 1222; 1634; 1995; 1085; 1972; 2045; 1554; 1523; 1456; 1989; 1988; 1682; 1657; 1641; 1003; 4155; 1764; 1747; 2311; 3481; 2451; 3008; 1186; 1163; 1060; 1587; 2763; 831; 814; 827; 817; 809; 811; 2360; 1042; 1046; 1011; 743; 737; 746; 740; 833; 2710; 2662; 2689; 2910; 2892; 4391;

List of order tuples.
103 0; 111 0; 268 0; 116 0; 234 0; 117 0; 210 0; 113 0; 273 0; 112 0; 115 0; 117 0; 116 0; 104 0; 100 0; 108 0; 255 0; 205 0; 107 0; 114 0; 116 0; 116 0; 274 0; 291 0; 269 0; 258 0; 117 0; 101 0; 243 0; 218 0; 114 0; 106 0; 281 0; 114 0; 109 0; 277 0; 105 0; 283 0; 235 0; 110 0; 112 0; 252 0; 113 0; 298 0; 261 0; 201 0; 289 0; 115 0; 221 0; 209 0; 115 0; 104 0; 107 0; 299 0; 219 0; 267 0; 117 0; 116 0; 297 0; 265 0; 214 0; 103 0; 275 0; 223 0; 110 0; 215 0; 102 0; 290 0; 106 0; 109 0; 225 0; 115 0; 101 0; 116 0; 246 0; 251 0; 222 0; 112 0; 285 0; 282 0; 104 0; 114 0; 272 0; 242 0; 296 0; 232 0; 111 0; 266 0; 242 1; 292 1; 256 1; 100 1; 239 1; 115 1; 117 1; 264 1; 115 1; 244 1; 255 1; 117 1; 114 1; 279 1; 106 1; 268 1; 272 1; 117 1; 232 1; 103 1; 229 1; 116 1; 105 1; 254 1; 106 1; 284 1; 288 1; 274 1; 101 1; 104 1; 114 1; 269 1; 103 1; 221 1; 226 1; 250 1; 252 1; 215 1; 110 1; 104 1; 243 1; 273 1; 267 1; 282 1; 107 1; 258 1; 112 1; 293 1; 230 1; 241 1; 238 1; 112 1; 114 1; 113 1; 285 1; 299 1; 116 1; 225 1; 116 1; 289 1; 116 1; 217 1; 108 1; 111 1; 112 1; 115 1; 223 1; 110 1; 116 1; 102 1; 113 1; 104 1; 219 1; 296 1; 224 1; 211 1; 107 1; 109 1; 208 1; 286 1; 117 1; 111 1; 115 1; 259 1; 109 1; 116 1; 114 1; 101 1; 112 2; 258 2; 209 2; 117 2; 244 2; 103 2; 214 2; 113 2; 110 2; 294 2; 100 2; 116 2; 112 2; 114 2; 291 2; 106 2; 114 2; 114 2; 211 2; 267 2; 215 2; 116 2; 235 2; 111 2; 101 2; 117 2; 281 2; 282 2; 287 2; 104 2; 259 2; 102 2; 288 2; 225 2; 116 2; 109 2; 227 2; 243 2; 205 2; 265 2; 299 2; 115 2; 206 2; 111 2; 116 2; 116 2; 101 2; 218 2; 249 2; 261 2; 272 2; 107 2; 223 2; 115 2; 116 2; 275 2; 285 2; 238 2; 109 2; 256 2; 107 2; 234 2; 113 2; 106 2; 105 2; 232 2; 668 3; 544 3; 641 3; 562 3; 568 4; 600 4; 698 4; 329 5; 279 5; 343 5; 289 5; 311 6; 343 6; 279 6; 329 6; 220 7; 233 7; 275 7; 270 7; 240 7; 352 8; 465 8; 379 8; 699 9; 554 9; 552 10; 564 10; 654 10; 629 10; 591 10; 701 10; 684 10; 575 10; 1000 11; 947 11; 1163 11; 699 12; 554 12; 686 13; 659 13; 578 13; 558 13; 698 14; 568 14; 600 14; 554 15; 587 15; 639 15; 568 15; 666 15; 699 15; 558 16; 686 16; 578 16; 659 16; 465 17; 379 17; 400 17; 699 18; 554 18; 699 19; 554 19; 443 20; 559 20; 663 21; 700 21; 814 21; 218 22; 200 22; 189 22; 814 21; 700 21; 663 21; 915 23; 770 23; 879 23; 745 23; 400 24; 379 24; 465 24; 769 25; 800 25; 674 25; 652 25; 700 26; 643 26; 681 26; 803 26; 788 26; 663 23; 746 23; 778 23; 685 23; 646 23; 816 23; 554 27; 639 27; 699 27; 568 27; 587 27; 666 27; 279 28; 227 28; 240 28; 379 22; 400 22; 465 22; 457 29; 388 29; 426 29; 439 29; 372 29; 468 29; 412 29; 385 29; 460 29; 367 29; 397 29; 373 29; 400 21; 465 21; 379 21; 457 30; 385 30; 372 30; 439 30; 656 31; 600 31; 629 31; 597 31; 586 31; 680 31; 697 31; 693 31; 553 31; 560 31; 573 31; 552 31; 702 31; 669 31; 560 31; 576 31; 627 31; 414 32; 442 32; 387 32; 392 32; 466 32; 428 32; 411 32; 464 32; 374 32; 370 32; 404 32; 461 32; 383 32; 395 32; 399 32; 368 32; 434 32; 368 32; 452 32; 444 32; 378 32; 374 32; 468 32; 396 32; 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