Two-dimensional flat glass cutting stock problem with multiple stock size and the rotation of items

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We propose a heuristic algorithm for two-dimensional flat glass cutting stock problem with multiple stock sizes and the rotation of items by 90°. Flat glass production in real plants produces small pieces (items) such as windows and mirrors from large glasses (stocks or bins). They are cut by cutting machines according to cutting patterns which are cutting order generated by a certain procedure. There are several specific features as follows: 1) Glass must be cut by cutting machine from one side edge to another side edge (guillotine cut). 2) There are different types of large glasses (multiple stock sizes). 3) The rotation of items is possible. Because of complexity of features, it requires many computational efforts to solve glass cutting stock the problem by using mathematical method. To reduce computational efforts, we propose a heuristic algorithm based on level packing methods. The algorithm consists of two stages. In the first stage, levels are generated by packing each type of items as the first item in the level. In the second stage, levels generated for each type of items are packed in each type of bins. By applying this proposed algorithm, we efficiently solve this problem including above features.