Omjai Chalard 2009: Genetic Algorithm Based Decision Support System for Two Dimensional Cutting Stock Problem Using Guillotine Cutting Machine. Master of Engineering (Industrial Engineering), Major Field: Industrial Engineering, Department of Industrial Engineering. Thesis Advisor: Associate Professor Anan Mungwattana, 142 pages.

This research project is to develop a decision support system for two-dimensional cutting problem using Guillotine cutting machines. The objective of the system is to minimize the loss from inefficient cutting patterns. Due to the complexity of the problem, finding optimal solutions is unlikely for large problems within an acceptable amount of time. Therefore, a genetic algorithm is embedded into the system to obtain efficient cutting patterns within the limited amount of time. The system consists of three main components, which are a database system, an algorithm and a user interface. Data regarding type, thickness and size of raw material sheet is maintained in the database. The user interface communicates with decision makers by allow them to input orders from customer in terms of type, size and quantity needed. The function of the algorithm is to design patterns from the guillotine cutting processes in order to minimize looses. The algorithm includes two steps for designing the patterns. First, an initial solution is obtained by using bottom-left algorithm. Then, the initial solution is improved by genetic algorithm. The developed system has been compared with steelGA program by Mann-Whitney test. The experimental results show that the developed system can provide good cutting patterns when compared with results from steelGA program. In addition, the computational times are also acceptable.

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