

Praveena In-Yim 2006: Jobs and Workforce Scheduling for Flow Shops. A Case Study in the Metal Cans Manufacture. Master of Engineering (Industrial Engineering), Major Field: Industrial Engineering, Department of Industrial Engineering. Thesis Advisor: Associate Professor Rachavarn Kanjanapanyakom, M.Eng 164 pages. ISBN 974-16-2805-6

The purpose of this thesis is to investigate the effect of skill differentiation on the assignment of flow shop scheduling in a two-stage parallel machine shop. The case study is a can manufacturing company with simple machines for pre-assembly line. There are 6 classes of products constitutes to 27 different types of part. Each part has a different processing time and each is allocated to a particular machine and one worker to each machine. There are high number of orders and presumably there are not enough number of machines to fulfill the orders. The objective is to minimize the maximum completion time of all the tasks and to improve effectiveness of production planning and reduced missing deliveries.

A simple heuristic approach is used by taking into consideration a two-step approach. The first step is assigning jobs to machines using 4 different dispatching rules, FIFO, EDD, SPT and LPT. The second step is to assign workers to different tasks by assuming that there is a differentiation in the work force. A variation from 0 to 80% in the ratio of multiple skill workers in the group is used to test the effects of skill differentiation. There are three heuristics of assigning skill workers to tasks, single skill first, multiple skill first and randomly assigned. The effect of learning curve is also taken into consideration by applying various degrees of penalty rates to the unmatched workers.

The results show that differentiation in the skill level of work group will take effects on the total completion time as soon as the ratio of multiple skill workers is less than 80%. The effect is higher when not assigning the single skill workers first. The effect remains even in the low penalty rate of 25%. The results from the new heuristic is reduce the number of carry over jobs by 96.66% and able to achieve 98.85% of delivery due dates. Therefore, it is important that workers in the production line be trained even in simple tasks and assigned right skill to the right task.

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