Scheduling in a Floor Warehouse Environment
(Prof. J. Ota)

In a floor warehouse, there is a constraint to put only one kind of product in a location so that required products will be transported quickly (Fig.1). Three kind of transportation is used on a floor warehouse. They are referred to as picking which involves the transportation of products for shipment, replenishment, and arrangement in which stored products are arranged to secure free space. Because of such a transportation work is performed every day for several hours and sometimes it needs overtime work, establishment of the efficient scheduling method to shorten a makespan (the time to handle all transportation) is desired. In this study, we propose a scheduling method that can handle three kinds of transportation while considering the overall efficiency and mixed-load transportation which consolidate the transportation of different products or different destinations.

It is impossible that this problem demands the close most suitable solution in real time, and desired calculating fast in about several minutes. We solve this problem using simulated annealing which perform either operation of the following (1) or (2) and repeat the improvement of the schedule (Fig.2). (1) Changing the processing order of transportation task as shown figure 3(1). (2) Changing the agent of transportation and the processing order as shown figure 3(2). The simulation results indicate the effectiveness of the proposed method (Fig.4).

Keywords: warehouse, mixed load, scheduling, simulated annealing

References

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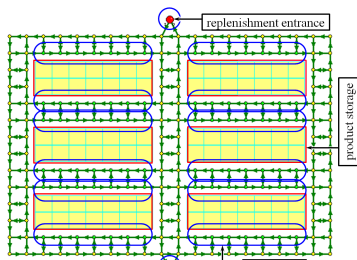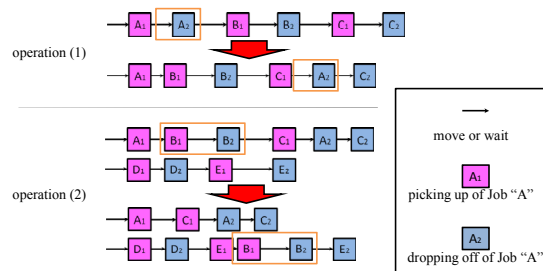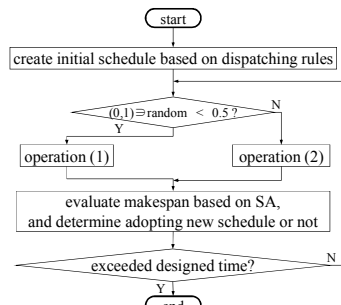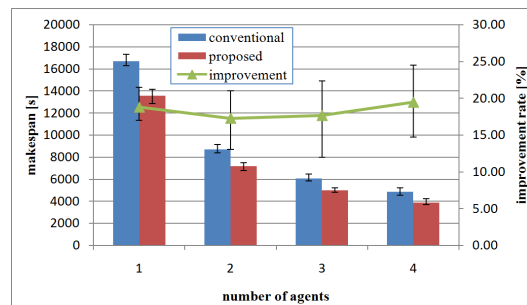
Fig. 1 layout of warehouse

Fig. 3 Ooperation

Fig. 2 Flowchart

Fig. 4 Simulation result